

L^AT_EX Class for the *Association for Computing Machinery**

Boris Veytsman[†]

2023/11/05, v2.00

Abstract

This package provides a class for typesetting publications of the Association for Computing Machinery.

Contents

1	Introduction	3
2	User's guide	3
2.1	Installation	3
2.2	Invocation and options	6
2.3	Top matter	7
2.4	Top matter of ACM Engage materials	19
2.5	ACM cover page	20
2.6	Internationalization	21
2.7	Algorithms	22
2.8	Figures and tables	22
2.9	Descriptions of images	23
2.10	Theorems	23
2.11	Online-only and offline-only material	24
2.12	Note about anonymous mode	24
2.13	Acknowledgments	25
2.14	Bibliography	25
2.14.1	Processing using BibT _E X	25
2.14.2	Processing using BibL ^A T _E X	29
2.15	Colors	29
2.15.1	Manual bibliography	30
2.16	Other notable packages and typographic remarks	30
2.17	Counting words	31
2.18	Creative Commons licenses for ACM publications	31
2.19	Disabled or forbidden commands	31
2.20	Notes for wizards	32
2.21	Currently supported publications	32
2.22	A note about sigchi-a format	34

*©2016–2023, Association for Computing Machinery

[†]borisv@lk.net, boris@varphi.com

3	Implementation	36
3.1	Identification	36
3.2	Preload hook	36
3.3	Options	36
3.4	Setting switches	40
3.5	Loading the base class and package	41
3.6	Citations	42
3.7	Internationalization	44
3.8	Sectioning	46
3.9	Hyperxmp and hyperref	49
3.10	Other packages	51
3.11	Paper size and paragraphing	51
3.12	Fonts	55
3.13	Image descriptions	56
3.14	Floats	57
3.15	Lists	59
3.16	Top-matter data	60
3.17	Concepts system	77
3.18	Copyright system	78
3.19	Maketitle hook	84
3.20	ACM Engage top matter	84
3.21	Typesetting top matter	84
3.22	Headers and Footers	100
3.23	Sectioning	106
3.24	TOC lists	109
3.25	Theorems	109
3.26	Balancing columns	112
3.27	Acknowledgments	113
3.28	Conditional typesetting	113
3.29	Additional bibliography commands	114
3.30	Index	114
3.31	End of Class	114

1 Introduction

The Association for Computing Machinery¹ is the world’s largest educational and scientific computing society, which delivers resources that advance computing as a science and a profession. It was one of the early adopters of \TeX for its typesetting.

It provided several different classes for a number of journals and conference proceedings. Unfortunately during the years since these classes were written, the code was patched many times, and supporting different versions of the classes became difficult.

This package provides the uniform interface for all ACM publications. It is intended to replace all the different classes and packages and provide an up-to-date \LaTeX package.

This package uses only free \TeX packages and fonts included in \TeX Live, Mik \TeX and other popular \TeX distributions. It is intended to be published in these distributions itself, which minimizes users’ efforts in the installation and support of this package.

I am grateful to Michael D. Adams, Leif Andersen, Lawrence Christopher Angrave, Dirk Beyer, Andrew Black, Joachim Breitner, Yegor Bugayenko, Benjamin Byholm, John Collins, Roberto Di Cosmo, Nils Anders Danielsson, Michael Ekstrand, Matthew Fluet, Paolo G. Giarrusso, Ben Greenman, Enrico Gregorio, Jamie Davis, Ulrike Fischer, Jason Hemann, Peter Kemp, Luis Leiva, Ben Liblit, Rholais Lii, LianTze Lim, Kuldeep S. Meel, Kai Mindermann, Frank Mittelbach, Serguei Mokhov, Ross Moore, John Owens, Joel Nider, Scott Pakin, Tobias Pape, Henning Pohl, Philip Quinn, Mathias Rav, Andreas Reichinger, Matteo Riondato, Craig Rodkin, Bernard Rous, Feras Saad, Kerry A. Seitz, Jr., David Shamma, Gabriel Scherer, Kartik Singhal, Christoph Sommer, Stephen Spencer, Shin Hwei Tan, Daniel Thomas, Shari Trewin, Zack Weinberg, John Wickerson and many others for their invaluable help.

The development version of the package is available at <https://github.com/borisveytsman/acmart>.

2 User’s guide

This class uses many commands and customizatón options, so it might appear intimidating for a casual user. Do not panic! Many of these commands and options can be safely left with their default values or the values recommended by your conference or journal editors. If you have problems or questions, do not hesitate to ask me directly or the community at <https://github.com/borisveytsman/acmart>, <https://tex.stackexchange.com> or the closest \TeX Users Group. The world-wide \TeX Users Group is at <https://tug.org/>; please consider joining us if you use \TeX regularly.

2.1 Installation

Most probably, you already have this package installed in your favorite \TeX distribution; if not, you may want to upgrade. You may need to upgrade it anyway since this package uses a number of relatively recent packages, especially the ones related to fonts.

The latest released version of this package can be found on CTAN: <https://www.ctan.org/pkg/acmart>. The development version can be found on GitHub: <https://github.com/borisveytsman/acmart>. At this address you can file a bug report—or even contribute your own enhancement by making a pull request.

¹<http://www.acm.org/>

Please note that the version on Github is a development (or experimental) version: please download it for testing new features. The production version is the one on CTAN and ACM sites.

Most users should not attempt to install this package themselves but should rather rely on their \TeX distributions to provide it. If you decide to install the package yourself, follow the standard rules:

1. Run `latex acmart.ins`. This will produce the file `acmart.cls`
2. Put the files `acmart.cls`, `acm-jdslogo.png`, and `ACM-Reference-Format.bst` in places where \TeX can find them (see [1] or the documentation for your \TeX system).
3. Update the database of file names. Again, see [1] or the documentation for your \TeX system for the system-specific details.
4. The file `acmart.pdf` provides the documentation for the package. (This is probably the file you are reading now.)

As an alternative to items 2 and 3 you can just put the files in the working directory where your `.tex` file is.

This class uses a number of other packages. They are included in all major \TeX distributions (\TeX Live, Mac \TeX , Mik \TeX) of 2015 and later, so you probably have them installed. Just in case here is the list of these packages:

- *amscs*, <http://www.ctan.org/pkg/amscs>
- *amsfonts*, <http://www.ctan.org/pkg/amsfonts>
- *amsmath*, <http://www.ctan.org/pkg/amsmath>
- *binhex*, <http://www.ctan.org/pkg/binhex>
- *balance*, <http://www.ctan.org/pkg/balance>
- *booktabs*, <http://www.ctan.org/pkg/booktabs>
- *caption*, <http://www.ctan.org/pkg/caption>
- *comment*, <http://www.ctan.org/pkg/comment>
- *cm-super*, <http://www.ctan.org/pkg/cm-super>
- *cmap*, <http://www.ctan.org/pkg/cmap>
- *doclicense*, <http://www.ctan.org/pkg/doclicense>
- *draftwatermark*, <http://www.ctan.org/pkg/draftwatermark>
- *environ*, <http://www.ctan.org/pkg/environ>
- *etoolbox*, <http://www.ctan.org/pkg/etoolbox>
- *fancyhdr*, <http://www.ctan.org/pkg/fancyhdr>
- *float*, <http://www.ctan.org/pkg/float>
- *fontaxes*, <http://www.ctan.org/pkg/fontaxes>

- *geometry*, <http://www.ctan.org/pkg/geometry>
- *graphics*, <http://www.ctan.org/pkg/graphics>
- *hyperref*, <http://www.ctan.org/pkg/hyperref>
- *hyperxmp*, <http://www.ctan.org/pkg/hyperxmp>
- *iftex*, <http://www.ctan.org/pkg/iftex>
- *inconsolata*, <http://www.ctan.org/pkg/inconsolata>
- *libertine*, <http://www.ctan.org/pkg/libertine>
- *manyfoot*, <http://www.ctan.org/pkg/manyfoot>
- *microtype*, <http://www.ctan.org/pkg/microtype>
- *mmap*, <http://www.ctan.org/pkg/mmap>
- *ms*, <http://www.ctan.org/pkg/ms>
- *mweights*, <http://www.ctan.org/pkg/mweights>
- *natbib*, <http://www.ctan.org/pkg/natbib>
- *nccfoots*, <http://www.ctan.org/pkg/nccfoots>
- *newtx*, <http://www.ctan.org/pkg/newtx>
- *oberdiek*, <http://www.ctan.org/pkg/oberdiek>
- *pdftex-def*, <http://www.ctan.org/pkg/pdftex-def>
- *refcount*, <http://www.ctan.org/pkg/refcount>
- *setspace*, <http://www.ctan.org/pkg/setspace>
- *textcase*, <http://www.ctan.org/pkg/textcase>
- *totpages*, <http://www.ctan.org/pkg/totpages>
- *trimspaces*, <http://www.ctan.org/pkg/trimspaces>
- *upquote*, <http://www.ctan.org/pkg/upquote>
- *url*, <http://www.ctan.org/pkg/url>
- *xcolor*, <http://www.ctan.org/pkg/xcolor>
- *xkeyval*, <http://www.ctan.org/pkg/xkeyval>
- *xstring*, <http://www.ctan.org/pkg/xstring>

2.2 Invocation and options

To use this class, put in the preamble of your document

```
\documentclass[<options>]{acmart}
```

There are several options corresponding to the type of the document and its general appearance. They are described below. Generally speaking, the options have key=value forms, for example,

```
\documentclass[format=acmsmall, screen=true, review=false]{acmart}
```

The option `format` describes the format of the output. There are several possible values for this option, for example,

```
\documentclass[format=acmtog]{acmart}
```

Actually the words `format=` can be omitted, e.g.,

```
\documentclass[acmtog, review=false]{acmart}
```

The possible formats are listed in Table 1. Note that formats starting with `acm` are intended for journals, transactions, and course materials, while formats starting with `sig` are intended for proceedings published as books.

Note that sometimes conference proceedings are published as a special issue (or issues) of an ACM journal. In this case, you should use the journal format for a conference paper. Please contact your conference committee if in doubt.

Starting in 2020, ACM retired formats `sigchi` and `sigchi-a`. SIGCHI conferences now use `sigconf` format for their publications. If a file uses `sigchi` format, a warning is issued, and the format is automatically switched to `sigconf`. Format `sigchi-a` can be used for non-ACM documents only (see Section 2.22). The format `acmcp` is used for ACM cover pages discussed in Section 2.5.

There are several Boolean options that can take `true` or `false` values. They are listed in Table 2. The words `=true` can be omitted when setting a Boolean option, so instead of `screen=true` one can write just `screen`, for example,

```
\documentclass[acmsmall, screen, review]{acmart}
```

The option `review` is useful when combined with the `manuscript` format option. It provides a version suitable for reviewers and copy editors.

Two samples in the `samples` directory, `manuscript` and `acmsmall-submission`, show manuscripts formatted for submission to ACM.

The default for the option `screen` depends on the publication. At present it is `false` for all publications *but* PACM, since PACM is now electronic-only. Thus PACM titles (see Table 5) set this option to `true`. In the future this option may involve additional features suitable for on-screen versions of articles.

The option `natbib` is used when the corresponding BibTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.14.

The option `anonymous` is used for anonymous review processes and causes all author information to be obscured.

Table 1: The possible values for the format option

Value	Meaning
manuscript	A manuscript. This is the default.
acmsmall	Small single-column format. Used for ACMJCSS, CIE, CSUR, DLT, FAC, GAMES, JACM, JATS, JDIQ, JDS, JEA, JERIC, JETC, JRC, PACM-CGIT, PACMHCI, PACMMOD, PACMNET, PACMPL, PACMSE, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TDS, TEAC, TECS, TELO, THRI, TIIS, TIOT, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPML, TOPS, TORS TOS, TOSEM, TOSN, TQC, TRETs, TSAS, TSC, TSLP and TWEB, including special issues.
acmlarge	Large single-column format. Used for DTRAP, HEALTH, IMWUT, JOCCH, POMACS and TAP, including special issues.
acmtog	Large double-column format. Used for TOG, including annual conference Technical Papers.
sigconf	Proceedings format for most ACM conferences (with the exception of SIGPLAN) and all ICPS volumes.
sigplan	Proceedings format for SIGPLAN conferences.
acmengage	ACM EngageCSEdu Course materials.
acmcp	ACM cover page.

The option `timestamp` is used to include a time stamp in the footer of each page. When preparing a document, this can help avoid confusing different revisions. The footer also includes the page range of the document. This helps detect missing pages in hard copies.

The option `authordraft` is intended for author’s drafts that are not intended for distribution. It typesets a copyright block to give the author an idea of its size and the overall size of the paper but overprints it with the phrase “Unpublished working draft. Not for distribution.”, which is also used as a watermark. This option sets `timestamp` and `review` to true, but these can be overridden by setting these options to false *after* setting `authordraft` to true.

The option `balance` determines whether the last page in the two column mode has balanced columns. By default it is true; however, it may lead to problems for some documents. Set it to false if you encounter compilation errors. Note that for one page documents `\balance` command might cause problems. An alternative is the (experimental) option `pbalance`, which uses the new package `pbalance` for this end.

The option `urlbreakonhyphens` determines whether URLs can be split between lines after hyphens. By default it is true. Set it to false to disallow these breaks.

The option `language` is used to define the languages for the multi-language papers. It is discussed in Section 2.6.

2.3 Top matter

A number of commands set up *top matter* or (in computer science jargon) *metadata* for an article. They establish the publication name, article title, authors, DOI and other data. Some of these commands, like `\title` and `\author`, should be put by the authors.

Table 2: Boolean options

Option	Default	Meaning
review	false	A review version: lines are numbered and hyperlinks are colored
screen	see text	A screen version: hyperlinks are colored
natbib	true	Whether to use the natbib package (see Section 2.14)
anonymous	false	Whether to make author(s) anonymous
authorversion	false	Whether to generate a special version for the authors' personal use or posting (see Section 2.3)
nonacm	false	Use the class typesetting options for a non-ACM document, which will not include the conference/journal header and footers. Currently such documents allow only a Creative Commons license.
timestamp	false	Whether to put a time stamp in the footer of each page
authordraft	false	Whether author's-draft mode is enabled
acmthm	true	Whether to define theorem-like environments, see Section 2.10
balance	true	Whether to balance the last page in two column mode
pbalance	false	Whether to balance the last page in two column mode using pbalance package
urlbreakonhyphens	true	Whether to break urls on hyphens

Others, like `\acmVolume` and `\acmDOI`—by the editors. Below we describe these commands and mention who should issue them. These macros should be used *before* the `\maketitle` command. Note that in previous versions of ACM classes some of these commands should be used before `\maketitle`, and some after it. Now they all must be used before `\maketitle`.

This class internally loads the `amsart` class, so many top-matter commands are inherited from `amsart` [2].

`\acmJournal` The macro `\acmJournal{<shortName>}` sets the name of the journal or transaction for journals and transactions. The argument is the short name of the publication *in uppercase*, for example,

```
\acmJournal{TOMS}
```

The currently recognized journals are listed in Table 5. Note that conference proceedings published in *book* form do not set this macro.

`\acmConference` The macro `\acmConference[<short name>]{<name>}{<date>}{<venue>}` is used for conference proceedings published in the book form. The arguments are the following:

short name: the abbreviated name of the conference (optional).

name: the name of the conference.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

```
\acmConference[TD'15]{Technical Data Conference}{November
12--16}{Dallas, TX, USA}
\acmConference[SA'15 Art Papers]{November 02--06, 2015}{Kobe, Japan}
```

`\acmBooktitle` By default we assume that conference proceedings are published in the book named *Proceedings of CONFERENCE*, where *CONFERENCE* is the name of the conference inferred from the command `\acmConference` above. However, sometimes the book title is different. The command `\acmBooktitle` can be used to set this title, for example,

```
\acmBooktitle{Companion to the first International Conference on the
Art, Science and Engineering of Programming (Programming '17)}
```

An ACM paper should have either `\acmJournal` or `\acmConference` command. If it has both (or more) commands, the last one takes precedence. Note that if you have the command `\acmConference` in a journal format like `acmsmall`, the class will use conference format for bibstrip and reference citation formatting. In the samples directory there is a file `sample-acmsmall-conf.tex` with the example of this usage.

An ACM Engage material should *not* use `\acmJournal` or `\acmConference` command. It may use `\acmBooktitle` to override the default *ACM EngageCSEdu*. It should use `\acmYear` to set the date of the material.

`\editor` In most cases, conference proceedings are edited. You can use the command `\editor{<editor>}` to set the editor of the volume. This command can be repeated, for example,

```
\editor{Jennifer B. Sartor}
```

```
\editor{Theo D'Hondt}
\editor{Wolfgang De Meuter}
```

`\title` The command `\title`, as in the `amsart` class, has two arguments: one optional, and one mandatory:

```
\title[<ShortTitle>]{<FullTitle>}
```

The mandatory argument is the full title of the article. The optional argument, if present, defines the shorter version of the title for running heads. If the optional argument is absent, the full title is used instead.

It is expected that this command is inserted by the author of the manuscript.

`\subtitle` Besides title, ACM classes allow a subtitle, set with the `\subtitle{<subtitle>}` macro.

The commands for specifying authors are highly structured. The reason is they serve double duty: the authors' information is typeset in the manuscript *and* is used by the metadata extraction tools for indexing and cataloguing. Therefore it is very important to follow the guidelines exactly.

`\author` The basic commands are `\author`, `\orcid` (for the researchers registered with OR-

`\orcid` CID, <http://www.orcid.org/>), `\affiliation` and `\email`. In the simplest case, you

`\affiliation` enter them in this order:

```
\email
\author{...}
\orcid{...}
\affiliation{...}
\email{...}
```

Do *not* use the \LaTeX `\and` macro or commas, or `\\` between the authors! Each author deserves his or her own `\author` command. An attempt to list several authors or their e-mails in one command leads to a warning or an error. This is not a bug, but the expected behavior.

Note that some formats do not typeset e-mails or ORCID identifiers. Do not worry: the metadata tools will get them.

ACM strongly encourages that you include ORCIDs for all authors before compiling or submitting for review and/or production processing.

If you do not have an ORCID, you may get one for free by registering at <http://www.orcid.org/>.

Sometimes an author has several affiliations. In this case, the `\affiliation` command should be repeated:

```
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
```

Similarly you can repeat the `\email` command.

You may have several authors with the same affiliation, different affiliations, or overlapping affiliations (author A_1 is affiliated with institutions I_1 and I_2 , while author A_2 is affiliated with I_2 only, author A_3 is affiliated with I_1 and I_3 , etc.). The recommended

solution is to put the `\affiliation` commands after each author, possibly repeating them:

```
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
\author{...}
\orcid{...}
\affiliation{...}
\email{...}
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
```

In some cases, when several authors share the same affiliation, you can try to save space using the format

```
\author{...}
\email{...}
\author{...}
\email{...}
\affiliation{...}
```

However, this format is not generally recommended.

`\additionalaffiliation` In some cases, too many affiliations can take too much space. The command `\additionalaffiliation{<affiliation>}` creates a footnote after an author’s name with the words “Also with {<affiliation>}”. You should use this command only as a last resort. An example of usage is:

```
\author{G. Tobin}
\author{Ben Trovato}
\additionalaffiliation{%
  \institution{The Th{\o}rv{\a}ld Group}
  \streetaddress{1 Th{\o}rv{\a}ld Circle}
  \city{Hekla}
  \country{Iceland}}
\affiliation{%
  \institution{Institute for Clarity in Documentation}
  \streetaddress{P.O. Box 1212}
  \city{Dublin}
  \state{Ohio}
  \postcode{43017-6221}}
```

Here Trovato and Tobin share their affiliation with the Institute for Clarity in Documentation, but only Ben Trovato is affiliated with The Thørvæld Group.

The `\affiliation` and `\additionalaffiliation` commands are further structured to interact with the metadata extraction tools. Inside these commands you should use the `\position`, `\institution`, `\department`, `\city`, `\streetaddress`, `\state`, `\postcode`, `\country`

and `\country` macros to indicate the corresponding parts of the affiliation. Note that in some cases (for example, journals) these parts are not printed in the resulting copy, but they *are* necessary since they are used by the XML metadata extraction programs. Do *not* put commas or `\\` between the elements of `\affiliation`. They will be provided automatically.

The fields `\institution`, `\city` and `\country` are mandatory. If they are not provided, an error or a warning is issued. Currently the absence of `\country` produces an error; ACM may change this in the future.

An example of the author block:

```
\author{A. U. Thor}
\orcid{1234-4564-1234-4565}
\affiliation{%
  \institution{University of New South Wales}
  \department{School of Biomedical Engineering}
  \streetaddress{Samuels Building (F25), Kensington Campus}
  \city{Sidney}
  \state{NSW}
  \postcode{2052}
  \country{Australia}}
\email{author@nsw.au.edu}
\author{A. N. Other}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}
\author{C. O. Respondent}
\orcid{1234-4565-4564-1234}
\affiliation{%
  \institution{University of Pennsylvania}
  \city{Philadelphia}
  \state{PA}
  \country{USA}}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}
```

Note that the old ACM conference formats did not allow more than six authors and required some effort from authors to achieve alignment. The new format is much better in this.

Sometimes an author works in several departments within the same insitution. There could be two situations: the departments are independent, or one department is within another. In the first case, just repeat the command `\department` several times. To handle the second case the command has an optional numerical parameter. The departments with higher numbers are higher in the organizational chart. Compare

```
\affiliation{%
  \department[0]{Department of Lunar Studies} % 0 is the default
  \department[1]{John Doe Institute} % higher than 0
  \institution{University of San Serriffe}}
```

```
\country{San Serriffe}}
```

and

```
\affiliation{%  
  \department{Department of Lunar Studies} % Not in the John Doe Institute!  
  \department{John Doe Institute}  
  \institution{University of San Serriffe}  
  \country{San Serriffe}}
```

The command `\affiliation` formats its output according to American conventions. This might be wrong for some cases. Consider, for example, a German address. In Germany, the postcode is put before the city and is not separated by a comma. We can handle this order using

```
\affiliation{%  
  \institution{Fluginstitut}  
  \streetaddress{Sonnenallee 17}  
  \postcode{123456}  
  \city{Helm}  
  \country{Germany}}
```

However, the comma after the postcode is unfortunate: the address will be typeset (in some formats) as

```
Fluginstitut  
Sonnenallee 17  
123456, Helm, Germany
```

To overcome this problem, the command `\affiliation` has an optional parameter `obeypunctuation`, which can be `false` (the default) or `true`. If this parameter is `true`, `\affiliation` obeys the author's command. Thus

```
\affiliation[obeypunctuation=true]{%  
  \institution{Fluginstitut}\\  
  \streetaddress{Sonnenallee 17}\\  
  \postcode{123456}  
  \city{Helm},  
  \country{Germany}}
```

will be typeset as

```
Fluginstitut  
Sonnenallee 17  
123456 Helm, Germany
```

Note that you should *not* use this option for journals.

It is expected that these commands are inserted by the author of the manuscript.

`\thanks` Like `amsart` (and unlike standard \LaTeX), we allow `\thanks` only *outside* of the commands `\title` and `\author`. This command is obsolete and should *not* be used in most

cases. Do not list your acknowledgments or grant sponsors here. Put this information in the acks environment (see Section 2.13).

`\authorsaddresses` In some formats, addresses are printed as a footnote on the first page. By default \TeX typesets them itself using the information you give it. However, you can override its choice using the command `\authorsaddresses{<contact addresses>}`, for example,

```
\authorsaddresses{%
  Authors' addresses: G.~Zhou, Computer Science Department, College of
  William and Mary, 104 Jameson Rd, Williamsburg, PA 23185, US;
  V.~B'eranger, Inria Paris-Rocquencourt, Rocquencourt, France;
  A.~Patel, Rajiv Gandhi University, Rono-Hills, Doimukh, Arunachal
  Pradesh, India; H.~Chan, Tsinghua University, 30 Shuangqing Rd,
  Haidian Qu, Beijing Shi, China; T.~Yan, Eaton Innovation Center,
  Prague, Czech Republic; T.~He, C.~Huang, J.~A.~Stankovic University
  of Virginia, School of Engineering Charlottesville, VA 22903, USA;
  T. F. Abdelzaher, (Current address) NASA Ames Research Center,
  Moffett Field, California 94035.}
```

You can *suppress* printing authors' addresses by setting them to an empty string: `\authorsaddresses{}`. Please note that authors' addresses are mandatory for journal articles.

`\titlenote` While the command `\thanks` generates a note without a footnote mark, sometimes
`\subtitlenote` the authors might need notes more tightly connected to the title, subtitle or author. The
`\authornote` commands `\titlenote`, `\subtitlenote` and `\authornote` that follow the correspond-
ing commands (`\title`, `\subtitle` and `\author`) generate such notes. For example,

```
\title{This is a title}
\titlenote{This is a titlenote}
\author{A. U. Thor}
\authornote{This is an authornote}
```

Please never use a `\footnote` inside an `\author` or `\title` command since this confuses the metadata extraction software. (Actually these commands now produce errors.)

`\authornotemark` Sometimes one may need to have the same footnote connected to several authors. The command `\authornotemark[<number>]` adds just the footnote mark, for example,

```
\author{A. U. Thor}
\authornote{Both authors contributed equally to the paper}
...
\author{A. N. Other}
\authornotemark[1]
```

The correct numbering of these marks is the responsibility of the user.

`\acmVolume` The macros `\acmVolume`, `\acmNumber`, `\acmArticle`, `\acmYear` and `\acmMonth` are
`\acmNumber` inserted by the editor and set the journal volume, issue, article number, year and month
`\acmArticle` correspondingly. The arguments of all these commands, including `\acmMonth`, is numer-
`\acmYear` ical. For example,

```
\acmMonth
\acmVolume{9}
\acmNumber{4}
\acmArticle{39}
\acmYear{2010}
```

`\acmMonth{3}`

Note that `\acmArticle` is used not only for journals but also for some conference proceedings.

`\acmArticleSeq` The articles in the same issue of a journal have a *sequence number*. By default it is the same as the article number, but the command `\acmArticleSeq{<n>}` can be used to change it:

```
\acmArticle{39} % The sequence number will be 39 by default
\acmArticleSeq{5} % We redefine it to 5
```

`\acmSubmissionID` If your paper got a Submission ID from the Conference Management System, put it here:

```
\acmSubmissionID{123-A56-BU3}
```

`\acmISBN` Book-like volumes have ISBN numbers attached to them. The macro `\acmISBN{<ISBN>}` sets it. Normally it is set by the typesetter, for example,

```
\acmISBN{978-1-4503-3916-2}
```

Setting it to the empty string, as `\acmISBN{}`, suppresses printing the ISBN.

`\acmDOI` The macro `\acmDOI{<DOI>}` sets the DOI of the article, for example,

```
\acmDOI{10.1145/9999997.9999999}
```

It is normally set by the typesetter. Setting it to the empty string, as `\acmDOI{}`, suppresses the DOI.

`\acmBadge` Some conference articles get special distinctions, for example, the artifact evaluation for PPOPP 2016 (see <http://ctuning.org/ae/ppopp2016.html>). These articles display special badges supplied by the conference organizers. This class provides command to add these badges: `\acmBadge[<url>]{<graphics>}`. The arguments have the following meaning: [`<url>`], if provided, sets the link to the badge authority in the screen version, while `{<graphics>}` sets the graphics file with the badge image. The file must be a cropped square, which is scaled to a standard size in the output. For example, if the badge image is `ae-logo.pdf`, the command is

```
\acmBadgeR[http://ctuning.org/ae/ppopp2016.html]{ae-logo}
```

The command can be repeated, if a paper has several badges.

`\startPage` The macro `\startPage{<page>}` sets the first page of the article in a journal or book. It is used by the typesetter.

`\terms` The command `\keywords{<keyword, keyword,...>}` sets keywords for the article.

`\keywords` They must be separated by commas, for example,

```
\keywords{wireless sensor networks, media access control,
multi-channel, radio interference, time synchronization}
```

CCSXML (*env.*) ACM publications are classified according to the ACM Computing Classification Scheme (CCS). CCS codes are used both in the typeset version of the publications *and* in the metadata in various databases. Therefore you need to provide both \TeX commands and XML metadata with the paper.

The tool at <http://dl.acm.org/ccs.cfm> can be used to generate CCS codes. After you select the topics, click on “Generate CCS codes” to get results like the following:

```
\begin{CCSXML}
<ccs2012>
  <concept>
    <concept_id>10010520.10010553.10010562</concept_id>
    <concept_desc>Computer systems organization~Embedded systems</concept_desc>
    <concept_significance>500</concept_significance>
  </concept>
  <concept>
    <concept_id>10010520.10010575.10010755</concept_id>
    <concept_desc>Computer systems organization~Redundancy</concept_desc>
    <concept_significance>300</concept_significance>
  </concept>
  <concept>
    <concept_id>10010520.10010553.10010554</concept_id>
    <concept_desc>Computer systems organization~Robotics</concept_desc>
    <concept_significance>100</concept_significance>
  </concept>
  <concept>
    <concept_id>10003033.10003083.10003095</concept_id>
    <concept_desc>Networks~Network reliability</concept_desc>
    <concept_significance>100</concept_significance>
  </concept>
</ccs2012>
\end{CCSXML}

\ccsdesc[500]{Computer systems organization~Embedded systems}
\ccsdesc[300]{Computer systems organization~Redundancy}
\ccsdesc{Computer systems organization~Robotics}
\ccsdesc[100]{Networks~Network reliability}
```

You just need to copy this code and paste it in your paper anywhere before `\maketitle`.

CCS Concepts and user-defined keywords are required for all articles over two pages in length, and are optional for one- and two-page articles (or abstracts).

`\setcopyright` There are several possibilities for the copyright of the papers published by the ACM: the authors may license the paper to the ACM, some or all authors might be employees of the US or Canadian governments, etc. Accordingly the command `\setcopyright{...}` is introduced. Its argument is the copyright status of the paper, for example, `\setcopyright{acmcopyright}`. The possible values for this command are listed in Table 3. This command must be placed in the preamble, before `\begin{document}`. Additional information about ACM copyright rules is discussed in Section 2.18.

`\setcctype` If Creative Commons license is used, the package by default chooses CC-BY 4.0 Attribution 4.0 International license. You can override this choice by the command `\setcctype[<version>]{<type>}`, where [*<version>*] can be either 3.0 or 4.0 (4.0 by de-

Table 3: Parameters for the `\setcopyright` command

Parameter	Meaning
<code>none</code>	The copyright and permission information is not typeset. (This is the option for some ACM conferences.)
<code>acmlicensed</code>	The authors retain the copyright but license the publication rights to ACM.
<code>rightsretained</code>	The authors retain the copyright and publication rights to themselves or somebody else.
<code>usgov</code>	All the authors are employees of the US government.
<code>usgovmixed</code>	Some authors are employees of the US government.
<code>cagov</code>	All the authors are employees of the Canadian government.
<code>cagovmixed</code>	Some authors are employees of the Canadian government.
<code>licensedusgovmixed</code>	Some authors are employees of the US government, and the publication rights are licensed to ACM.
<code>licensedcagov</code>	All the authors are employees of the Canadian government, and the publication rights are licensed to ACM.
<code>licensedcagovmixed</code>	Some authors are employees of the Canadian government, and the publication rights are licensed to ACM.
<code>othergov</code>	Authors are employees of a government other than the US or Canada.
<code>licensedothergov</code>	Authors are employees of a government other than the US or Canada, and the publication rights are licensed to ACM.
<code>iw3c2w3</code>	Special statement for conferences organized by IW3C2.
<code>iw3c2w3g</code>	Special statement for conferences organized by IW3C2, when some authors are approved Google employees.
<code>cc</code>	Creative Commons license. If this key is set, <i>doclicense</i> images are used to typeset the license. See also <code>\setcctype</code> command. Note that at present this license can be used only either for <code>acmengage</code> format, or for <code>nonacm</code> publications, or for the authors that meet any of the following requirements: (a) part of the ACM Open Program; (b) publishing in a Gold Open Access publication; (c) paying the Open Access APC; (d) part of the Google publishing agreement.
<code>acmcopyright</code>	The authors transfer the copyright to the ACM. This choice is no longer available for the non-commissioned authors and will trigger a warning.

fault), and `{\type}` can be one of zero, by, by-sa, by-nd, by-nc, by-nc-sa, by-nc-nd (see <https://creativecommons.org/licenses/> for the explanation). This command should be used in the preamble only.

Material published under Creative Commons license should include the corresponding icon. A modern T_EX distribution includes these icons in the package *doclicense*. In case your distribution does not have them, ACM provides a file `ccicons.zip` with these icons. Just unzip it in the same directory where your document is.

The ACM submission software should generate the right command for you to paste into your file.

`\copyrightyear` Each copyright statement must have the year of copyright. By default it is the same as `\acmYear`, but you can override this using the macro `\copyrightyear`, e.g.,

```
\acmYear{2016}
\copyrightyear{2015}
```

There is a special case for a personal copy that the authors may be allowed to generate for their use or a posting on a personal site (check the instructions for the specific journal or conference for the details). The document option `authorversion=true` produces a special form of the copyright statement for this case. Note that you still need the `\setcopyright` command and (optionally) `\copyrightyear` command to tell T_EX about the copyright owner and year. Also, you should be aware that due to the different sizes of the permission blocks for the printed version and authors' version, the page breaks might be different between them.

`abstract (env)` The environment `abstract` must *precede* the `\maketitle` command. Again, this is different from the standard L^AT_EX. Putting `abstract` after `\maketitle` will trigger an error.

`teaserfigure (env)` A special kind of figure is used for many two-column conference proceedings. This figure is placed just after the authors but before the main text. The environment `teaserfigure` is used for these figures. This environment must be used *before* `\maketitle`, for example,

```
\begin{teaserfigure}
\includegraphics[width=\textwidth]{sampleteaser}
\caption{This is a teaser}
\label{fig:teaser}
\end{teaserfigure}
```

`\settopmatter` Some information in the top matter is printed for certain journals or proceedings and suppressed for others. You can override these defaults using the command `\settopmatter{<settings>}`. The settings and their meanings are listed in Table 4. For example,

```
\settopmatter{printacmref=false, printccs=true, printfolios=true}
```

The parameter `authorsperrow` requires some explanation. In conference proceedings authors' information is typeset in boxes, several boxes per row (see `sample-sigconf.pdf`, `sample-sigplan.pdf`, etc.). The number of boxes per row is determined automatically. If you want to override this, you can do it using this parameter, for example,

```
\settopmatter{authorsperrow=4}
```

Table 4: Settings for the `\settopmatter` command

Parameter	Values	Meaning
<code>printccs</code>	true/false	Whether to print CCS categories
<code>printacmref</code>	true/false	Whether to print the ACM bibliographic entry
<code>printfolios</code>	true/false	Whether to print page numbers (folios)
<code>authorsperrow</code>	numeric	Number of authors per row for the title page in conference proceedings formats

However, in most cases you should *not* do this and should use the default settings. Setting `authorsperrow` to 0 will revert it to the default settings.

The parameter `printacmref` specifies whether to print the ACM bibliographic entry (default), or not. Note that this entry is required for all articles over one page in length, and is optional for one-page articles (abstracts).

`\received` The command `\received[<stage>]{<date>}` sets the history of the publication. The [*<stage>*] argument is optional; the default is Received for the first date and revised for the subsequent ones. For example,

```
\received{20 February 2007}
\received[revised]{12 March 2009}
\received[accepted]{5 June 2009}
```

`\maketitle` The macro `\maketitle` must be the last command in the top-matter group. That is it must follow the commands defined in this section.

`\shortauthors` After the command `\maketitle`, the macro `\shortauthors` stores the names of the authors for the running head. You can redefine it if the list of author's name is too long, e.g.,

```
\maketitle
\renewcommand{\shortauthors}{Zhou et al.}
```

2.4 Top matter of ACM Engage materials

ACM Engage materials resemble conference proceedings, but have some special features. First, as a rule, they are released under a Creative Commons license. By default CC-BY is used. However, if you want to use another variant of CC license, use `\setccctype` command, for example, `\setccctype{by-nc}`. Second, abstract is called *synopsis*. Third, there are special top matter items used for the materials, such as *Course*, *Resource Type*, *Programming Language*, *CS Topics*.

`\setengagemetadata` These items are set with the command `\setengagemetadata{<name>}{<value>}`, for example,

```
\setengagemetadata{Course}{CS1}
\setengagemetadata{Programming Language}{Python}
\setengagemetadata{Knowledge Unit}{Programming Concepts}
\setengagemetadata{CS Topics}{Functions, Data Types, Expressions,
Mathematical Reasoning}
```

Note that the type of Creative Commons license, if such license is used, is automatically added to the metadata.

2.5 ACM cover page

ACM cover pages are forms of extended abstracts that are added to journals at the late stage. Authors prepare them as separate .tex files using acmcp format. At present only JDS uses them, but in the future this may change.

There are several top matter commands specific for this format.

`\acmArticleType` There are five article types accepted by JDS: *Research* (the default), *Review*, *Discussion*, *Invited*, and *Position*. The command `\acmArticleType{<type>}` sets the article type, for example

```
\acmArticleType{Review}
```

`\acmCodeLink` The commands `\acmCodeDataLink{<link>}` and `\acmDataLink{<link>}` set the links
`\acmDataLink` to the data and code accompanying the paper, for example,

```
\acmCodeLink{https://github.com/repository/code}  
\acmDataLink{https://datadryad.org/stash/dataset/doi:DOI}
```

You may repeat these commands if you have several repositories.

`\acmContributions` The command `\acmContributions{<contributions>}` sets the contributions of the authors, for example,

```
\acmContributions{AW designed the study, CD performed it, all  
authors contributed to the writing.}
```

ACM cover page should have the following obligatory sections:

- Problem statement,
- Methods,
- Results,
- Significance.

Sometimes the addresses extracted from the authors' data are too long to fit on the page. In this case the command `\authorsaddresses` can be use to override them, for example,

```
\authorsaddresses{Corresponding author: Ben Trovato,  
\href{mailto:trovato@corporation.com}{trovato@corporation.com};  
Institute for Clarity in Documentation, P.O. Box 1212, Dublin,  
Ohio, USA, 43017-6221}
```

The design of the cover page may require additional runs of latex to make the elements of the page align.

2.6 Internationalization

ACM accepts publications in languages other than English, as well as papers in English with translations of titles, subtitles, keywords and abstracts into other languages. Papers in languages other than English usually have titles, subtitles (if applicable), keywords and abstracts in English. Note that CCS concepts are always typeset in English.

To submit these papers you need to set the option `language` in the `\documentclass` command. This option can be repeated, for example,

```
\documentclass[sigconf, language=french, language=english]{acmart}
```

The last language in the list is the main language of the paper, i.e. the one for the main title, abstract, body, etc. The other languages are *secondary*, and used for translated titles, keywords, abstracts. Thus the paper above is written in English, and has a secondary abstract and a secondary title in French. On the other hand, a paper in French with secondary titles and abstracts in English and German should use, for example

```
\documentclass[sigconf,
               language=german,
               language=english,
               language=french]{acmart}
```

This key can use any language defined in *babel* package [3] (currently the package is tested with English, French, German and Spanish languages; other languages may require a translation of `\keywordsname` macro). Actually *acmart* loads *babel* internally, so you can use the facilities provided by this package.

If this key is set, you have access to several additional top matter commands.

<code>\translatedtitle</code> <code>\translatedsubtitle</code> <code>\translatedkeywords</code>	The commands <code>\translatedtitle{<language>}</code> title, <code>\translatedsubtitle{<language>}</code> subtitle and <code>\translatedkeywordslanguagekeywords</code> are used to set title, subtitle and keywords in the secondary language. For example, a paper in English with French title and abstract may set
---	---

```
\title{A note on computational complexity}
\translatedtitle{french}{Remarque sur la complexit\'e de calcul}
```

while a paper in French should set

```
\title{Remarque sur la complexit\'e de calcul}
\translatedtitle{english}{A note on computational complexity}
```

<code>translatedabstract (env)</code>	Similarly, <code>translatedabstract</code> environment has a mandatory <code>language</code> argument, for example,
---------------------------------------	---

```
\begin{translatedabstract}{english}
  This is the English version of the abstract
\end{translatedabstract}
```

You can repeat these commands if a paper has more than one secondary language.

Use the standard commands (`\title`, `\subtitle`, `\keywords`, `abstract`) for the main language of the paper.

2.7 Algorithms

There are now several good packages for typesetting algorithms [4, 5, 6], and the authors are free to choose their favorite one.

2.8 Figures and tables

The new ACM styles use the standard L^AT_EX interface for figures and tables. There are some important items to be aware of, however.

1. The captions for figures must be entered *after* the figure bodies and for tables *before* the table bodies.
2. The ACM uses the standard types for figures and tables and adds several new ones. In total there are the following types:
figure, table: a standard figure or table taking a full text width in one-column formats and one column width in two-column formats.
figure*, table* in two-column formats, a special figure or table taking a full text width.
teaserfigure: a special figure before \maketitle.
3. Accordingly, when scaling images, one should use the following sizes:
 - (a) For teaserfigure, figure in one-column mode or figure* in two-column mode, use \textwidth. In one-column mode, you can also use \columnwidth, which coincides with \textwidth in this case.
 - (b) For figure in two-column mode, use \columnwidth.

It is strongly recommended to use the package booktabs [7] and follow its main principles of typography with respect to tables:

1. Never, ever use vertical rules.
2. Never use double rules.

It is also a good idea not to overuse horizontal rules.

For table *footnotes* you have several options described in the TeX FAQ [1]. The simplest one is to use a \minipage environment:

```
\begin{table}
\caption{Simulation Configuration}
\label{tab:conf}
\begin{minipage}{\columnwidth}
\begin{center}
\begin{tabular}{ll}
\toprule
TERRAIN\footnote{This is a table footnote. This is a
table footnote. This is a table footnote.} &
(200\,m$\times$200\,m) Square\\
Node Number & 289\\
Node Placement & Uniform\\
Application & Many-to-Many/Gossip CBR Streams\\
Payload Size & 32 bytes\end{tabular}
\end{center}
\end{minipage}
\end{table}
```

```

Routing Layer & GF\\
MAC Layer & CSMA/MMSN\\
Radio Layer & RADIO-ACCNOISE\\
Radio Bandwidth & 250Kbps\\
Radio Range & 20m--45m\\
\bottomrule
\end{tabular}
\end{center}
\bigskip
\footnotesize\emph{Source:} This is a table
sourcenote. This is a table sourcenote. This is a table
sourcenote.

\emph{Note:} This is a table footnote.
\end{minipage}
\end{table}

```

Tables and figures are by default centered. However, in some cases (for example, when you use several subimages per figure) you may need to override this. A good way to do so is to put the contents into a `\minipage` of the width `\columnwidth`.

2.9 Descriptions of images

`\Description` Some readers of ACM publications might be visually challenged. These readers might use a voice-over software to read aloud the papers. It is important to provide them a description of each image used in the paper.

The command `\Description[<short description>]{<long description>}` should be placed inside every figure, `teaserfigure` or `marginfigure` environment to provide a description of the image(s) used in the figure. Unlike `\caption`, which is used alongside the image, `\Description` is intended to be used instead of the image, for example,

```

\begin{figure}
\centering
\includegraphics{voltage}
\Description{A bell-like histogram centered at $0.5\sim V$ with most
measurements between $0.2\sim V$ and $0.8\sim V$}
\caption{Histogram of the measurements of voltage}
\label{fig:voltage}
\end{figure}

```

At present the lack of descriptions generates a warning at compilation.

2.10 Theorems

The ACM classes define two theorem styles and several pre-defined theorem environments:

acmplain: this is the style used for theorem, conjecture, proposition, lemma and corollary, and

acmdefinition: this is the style used for example and definition.

These environments are defined by default. In the unusual circumstance that a user does not wish to have these environments defined, the option `acmthm=false` in the preamble will suppress them.

Sometimes authors want to define new theorem-like constructs that use theorem counters. These constructs must be defined either after `\begin{document}`, or delayed using `\AtEndPreamble` macro, for example,

```
\AtEndPreamble{%
  \theoremstyle{acmdefinition}
  \newtheorem{remark}[theorem]{Remark}}
```

2.11 Online-only and offline-only material

`printonly` (*env.*) Some supplementary material in ACM publications is put online but not in the printed version. The text inside the environment `screenonly` will be typeset only when the option `screen` (see Section 2.2) is set to true. Conversely, the text inside the environment `printonly` is typeset only when this option is set to false. For example,

```
\section{Supplementary materials}

\begin{printonly}
  Supplementary materials are available in the online version of this paper.
\end{printonly}

\begin{screenonly}
  (The actual supplementary materials.)
\end{screenonly}
```

We use the `comment` package for typesetting this code, so `\begin` and `\end` should start on a line of their own with no leading or trailing spaces.

2.12 Note about anonymous mode

`anonsuppress` (*env.*) When the option `anonymous` is selected, TeX suppresses author information (including the number of authors) for an anonymous review. However, sometimes the information identifying the authors may be present in the body of the paper. For example,

```
\begin{anonsuppress}
  This is the continuation of the previous work by the author
  \cite{prev1, prev2}.
\end{anonsuppress}
```

As for the `printonly` and `screenonly` environments, `\begin{anonsuppress}` and `\end{anonsuppress}` should start on a line of their own with no leading or trailing spaces.

`\anon` To suppress short snippets of information, use the command `\anon[<substitute>]{<suppressed-text>}`. By default [*<substitute>*] is the word ANONYMOUS. Examples:

```
This work was performed at \anon{NSA}.
This work was performed at \anon[No Such Agency]{NSA}.
```

2.13 Acknowledgments

The traditional “Acknowledgments” section is conventionally used to thank persons and granting agencies for their help and support. However, there are several important considerations about this section.

First, in anonymous mode this section must be omitted: it gives too much information to reviewers. Second, data about grants is extracted and stored separately by the postprocessing software. ACM classes provide facilities for both these tasks.

`acks (env)` The environment `acks` starts an unnumbered section “Acknowledgments” unless the anonymous mode is chosen. Put all thanks inside this environment.

As for the `printonly` and `screenonly` environments, `\begin{acks}` and `\end{acks}` should start on a line of their own with no leading or trailing spaces.

`\grantsponsor` All financial support *must* be listed using the commands `\grantsponsor` and
`\grantnum` `\grantnum`. These commands tell the postprocessing software about the granting organization and grant. The format of these commands is the following:

```
\grantsponsor{\<sponsorID>}{\<name>}{\<url>}
\grantnum[\<url>]{\<sponsorID>}{\<number>}.
```

Here `{\<sponsorID>}` is the unique ID used to match grants to sponsors, `{\<name>}` is the name of the sponsor, `{\<url>}` is its URL, and `{\<number>}` is the grant number. The `{\<sponsorID>}` of the `\grantnum` command must correspond to the `{\<sponsorID>}` of a `\grantsponsor` command. Some awards have their own web pages, which you can include using the optional argument of the `\grantnum` command.

At present `{\<sponsorID>}` is chosen by the authors and can be an arbitrary key in the same way the label of a `\cite` is arbitrarily chosen. There might be a change to this policy if the ACM decides to create a global database of sponsoring organizations.

Example:

```
\begin{acks}
The authors would like to thank Dr. Yuhua Li for providing the
matlab code of the \textit{BEPS} method.

The authors would also like to thank the anonymous referees for
their valuable comments and helpful suggestions. This work is
supported by the \grantsponsor{GS501100001809}{National Natural
Science Foundation of
China}{\https://doi.org/10.13039/501100001809} under Grant
No.: ~\grantnum{GS501100001809}{61273304}
and ~\grantnum[\http://www.nnsf.cn/youngscientists]{GS501100001809}{Young
Scientists' Support Program}.
\end{acks}
```

2.14 Bibliography

The ACM lets you use either Bib_{TeX} or Bib_{LaTeX} to process your references: they require slightly different setup of your _{LaTeX} file, as detailed in the following subsections.

2.14.1 Processing using Bib_{TeX}

This uses the `natbib` package for formatting references and the Bib_{TeX} style file `ACM-Reference-Format.bst` for Bib_{TeX} processing. You can disable loading of `natbib`

using the option `natbib=false` in `\documentclass`. However, it is not recommended, as well as the use of Bib \TeX styles other than `ACM-Reference-Format.bst`, and may delay the processing of the manuscript.

`\citestyle` If you use `natbib`, you can select one of two predefined citation styles using the command `\citestyle`: the author-year format `acmauthoryear` or the numeric format `acmnumeric`. For example,

```
\citestyle{acmauthoryear}
```

Note that numeric citations are the default mode for most formats.

`\setcitestyle` You can further customize `natbib` using the `\setcitestyle` command, for example,

```
\setcitestyle{numbers,sort&compress}
```

One of the more common versions is

```
\setcitestyle{nosort}
```

It is useful if you do not like the way `natbib` sorts citation lists.

If you use `natbib`, then commands like `\citep` and `\citeauthor` are automatically supported. The command `\shortcite` is the same as `\cite` in numerical mode and cites the year in author-date mode.

Note that before version 1.48 the command `\citeyear` put the year in parentheses. In version 1.48 and later it produces just the year; the command `\citeyearpar` can be used to emulate its old behavior.

There are several customized Bib \TeX entry types and fields in the ACM style file `ACM-Reference-Format.bst` that you may want to be aware of.

The style supports the fields `doi` and `url`, for example,

```
doi = "10.1145/1188913.1188915",
url = "http://ccrma.stanford.edu/~jos/bayes/bayes.pdf",
```

Normally the printing of URL is suppressed if DOI is present. However, there is a special field `distinctURL`. If it is present and is not zero, URL is printed even if DOI is present.

The style supports the arXiv-recommended fields `eprint` and (optionally) `primaryclass`, for example,

```
eprint = "960935712",
primaryclass = "cs",
```

See the examples at <https://arxiv.org/help/hypertex/bibstyles>.

There are several special entry types. Types `online` and `game` are used for Web pages and games, for example,

```
@online{Thornburg01,
  author = "Harry Thornburg",
  year = "2001",
  title = "Introduction to Bayesian Statistics",
  url = "http://ccrma.stanford.edu/~jos/bayes/bayes.html",
  month = mar,
  lastaccessed = "March 2, 2005",
}
```

Entry types `artifactsoftware`, `artifactdataset` (with synonyms `software` and `dataset`) can be used to cite software artifacts and datasets, for example,

```
@ArtifactSoftware{R,
  title = {R: A Language and Environment for Statistical Computing},
  author = {{R Core Team}},
  organization = {R Foundation for Statistical Computing},
  address = {Vienna, Austria},
  year = {2019},
  url = {https://www.R-project.org/},
}
@ArtifactDataset{UMassCitations,
  author = {Sam Anzaroot and Andrew McCallum},
  title = {{UMass} Citation Field Extraction Dataset},
  year = 2013,
  url =
    {http://www.iesl.cs.umass.edu/data/data-umasscitationfield},
  lastaccessed = {May 27, 2019}
}
```

For these entry types you can use the `lastaccessed` field to add the access date for the URL.

There are two ways to enter video or audio sources in the bibliography corresponding to two different possibilities. For standalone sources available online, you can use an online entry and set its `howpublished` field. For example,

```
@online{Obama08,
  author = "Barack Obama",
  year = "2008",
  title = "A more perfect union",
  howpublished = "Video",
  day = "5",
  url = "http://video.google.com/videoplay?docid=6528042696351994555",
  month = mar,
  lastaccessed = "March 21, 2008",
}
```

For sources available as attachments to conference proceedings and similar documents, you can use the usual `inproceedings` entry type and set its `howpublished` field:

```
@Inproceedings{Novak03,
  author = "Dave Novak",
  title = "Solder man",
  booktitle = "ACM SIGGRAPH 2003 Video Review on Animation theater Program",
  year = "2003",
  publisher = "ACM Press",
  address = "New York, NY",
  pages = "4",
  month = "March 21, 2008",
  doi = "10.9999/woot07-S422",
  howpublished = "Video",
}
```

Sometimes you need to cite a complete issue of a journal. The periodical entry type is intended for this:

```
@periodical{JCohen96,
  key =      "Cohen",
  editor =   "Jacques Cohen",
  title =    "Special issue: Digital Libraries",
  journal =  "Communications of the {ACM}",
  volume =   "39",
  number =   "11",
  month =    nov,
  year =     "1996",
}
```

If you do not know the year of publication, the style will add “[n. d.]” (for “no date”) to the entry.

If you do not know the author (this is often the case for online entries), use the key field to add a key for sorting and citations, for example,

```
@online{TUGInstmem,
  key =      {TUG},
  year =     2017,
  title =    "Institutional members of the {\TeX} Users Group",
  url =      "http://wwtug.org/instmem.html",
  lastaccessed = "May 27, 2017",
}
```

A note about sorting. The current ACM bibliography styles always sort the entries according to authors names and publication year. There is a controversy about sorting names with “von” or “van” part: should Ludwig van Beethoven be sorted under “V” or under “B”? The American practice is to use “van” in sorting, i.e. to file van Beethoven under “V”. However, some authorities recommend to sort Dutch persons according to their last names (see e.g. https://www.ifla.org/files/assets/cataloguing/pubs/names-of-persons_1996.pdf). While I do not want to take a part in this dispute, I would like to point to the old “noopsort” trick by Oren Patashnik. Add to the .bib file the line

```
@PREAMBLE{"\providecommand{\noopsort}[1]{}"}
```

and then encode the author as

```
author = {Ludwig {\noopsort{Beethoven}}van Beethoven},
```

This will make the author to be sorted as “Beethoven” rather than “van Beethoven”.

The current bst style defines a number of macros for common journal names. In particular, all journals listed in Table 5 are included, so you can use strings like `journal = taccess` for *ACM Transactions on Accessible Computing*.

2.14.2 Processing using Bib \LaTeX

You will find in this package two sets of style files for Bib \LaTeX , `acmnumeric` and `acmauthoryear`, that mimic the behaviour of the `ACM-Reference-Format.bst` Bib \TeX style. They provide you access to all the power of Bib \LaTeX and already include support for advanced citation of software artefact from the `biblatex-software` package, also separately available on CTAN. Look at the `biblatex-software` documentation to learn more about what it offers.

There are a few key differences in how the \LaTeX sources are set up when using Bib \LaTeX instead of Bib \TeX , that we summarize briefly here (please refer to the official Bib \LaTeX documentation for more details).

In the preamble of your document you need to load the Bib \LaTeX package and select the appropriate bibliography style, as follows

```
\RequirePackage[
  datamodel=acmdatamodel,
  style=acmnumeric, % use style=acmauthoryear for publications that require it
]{biblatex}
```

Also in the preamble, you need to declare the bibliography sources files using the `\addbibresource` directive (one `\addbibresource` command per source file), e.g.:

```
\addbibresource{software.bib}
\addbibresource{sample-base.bib}
```

At the end of the document, where you want the bibliography to appear, you need to place the command `\printbibliography`.

Look at the `sample-*-biblatex.tex` files that can be found in the `samples` directory after running `make` for templates showcasing these Bib \LaTeX styles.

2.15 Colors

While printed ACM publications are usually black and white, screen mode allows the use of colors. The ACM classes pre-define several colors according to [8]: `ACMBlue`, `ACMYellow`, `ACMOrange`, `ACMRed`, `ACMLightBlue`, `ACMGreen`, `ACMPurple` and `ACMDarkBlue`. You can use them in color assignments.

The ACM provides the following recommendation on color use.

The most accessible approach would be to ensure that your article is still readable when printed in greyscale. The most notable reasons for this are:

1. The most common type of inherited Color Vision Deficiency (CVD) is red-green (in which similar-brightness colors that differ only in their amounts of red or green are often confused), and it affects up to 8% of males and 0.5% of females of Northern European descent.
2. The most common type of acquired Color Vision Deficiency (CVD) is blue-yellow (including mild cases for many older adults).
3. Most printing is in black and white.
4. Situational impairments (e.g., bright sunlight shining on a mobile screen) tend to reduce the entire color gamut, reducing color discriminability.

Note: It is *not* safe to encode information using only variations in color (i.e., only differences in hue and/or saturation) as there is bound to be someone affected!

To ensure that you are using the most accessible colors, the ACM recommends that you choose sets of colors to help ensure suitable variations in when printed in greyscale by using either of the following tools:

1. ColourBrewer: <http://colorbrewer2.org/>
2. ACE: The Accessible Colour Evaluator: <http://daprlab.com/ace/> for designing WCAG 2.0 compliant palettes.

2.15.1 Manual bibliography

Some people create bibliographies manually, writing down `\bibitem` commands explicitly. This approach is *not* recommended for ACM styles. The reason is, ACM submissions, besides being typeset, are also processed by special programs that extract metadata and references. Bibliographies created automatically with ACM styles contain customized macros for these programs, for example,

```
\bibitem[Ablamowicz and Fauser(2007)]%
  {Ablamowicz07}
\bibfield{author}{\bibinfo{person}{Rafal Ablamowicz} {and}
  \bibinfo{person}{Bertfried Fauser}.} \bibinfo{year}{2007}\natexlab{}.
\newblock \bibinfo{booktitle}{\emph{CLIFFORD: a Maple 11 Package for Clifford
  Algebra Computations, version 11}}.
\newblock
\urldef\tempurl%
\url{http://math.tntech.edu/rafal/cliff11/index.html}
\showURL{%
Retrieved February 28, 2008 from \tempurl}
```

Manual bibliographies without these macros may slow down the publication process, and thus are not recommended for ACM submissions.

2.16 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

The package `subcaption` [9] is recommended for complex figures with several subplots or subfigures that require separate subcaptioning. The packages `nomenc1` [10] and `glossaries` [11] can be used for the automatic creation of the lists of symbols and concepts used.

By default `acmart` prevents all widows and orphans (i.e., lonely lines at the beginning or end of the page) and hyphenation at the end of the page. This is done by the rather strict settings

```
\widowpenalty=10000
\clubpenalty=10000
\brokenpenalty=10000
```

However, this may lead to frustrating results when the authors must obey a page limit. Setting these penalties to smaller values may help if you absolutely need to.

Another problem might be the too strict line breaking rules. Again, a strategically placed `\sloppy` command or putting the problematic paragraph inside `sloppypar` environment might help—but beware, the results might be, well, sloppy.

Note that the uppercasing in section titles is done using the `textcase` package [12], so the command `\NoCaseChange` inside the title may help to prevent extraneous uppercasing.

2.17 Counting words

Some ACM conferences use word count limits for papers. The calculation of word number for a paper with math, tables and figures is not a trivial task. Currently the authoritative word count is done by translating the PDF to text and using `wc -w` on the output. Authors can use the package `texcount` (used by Overleaf) to get an estimate of the word count. To facilitate this one adds to the beginning of the package metacomments

```
%TC:macro \cite [option:text,text]
%TC:macro \citep [option:text,text]
%TC:macro \citet [option:text,text]
%TC:envir table 0 1
%TC:envir table* 0 1
%TC:envir tabular [ignore] word
%TC:envir displaymath 0 word
%TC:envir math 0 word
%TC:envir comment 0 0
```

and uses `\begin{math}...\end{math}` instead of dollar signs for math. Note that the count is in any case approximate, and the final decision of editors is based on PDF count.

The script `texcount` provides a report of word count in the document.

2.18 Creative Commons licenses for ACM publications

At present ACM does not allow the authors to typeset Creative Commons license for most ACM publications. These licenses can be used under an agreement with the ACM publishing office. In this case they are inserted by ACM itself.

The exceptions are ACM Engage format, which allows Creative Commons license, and conferences organized and copyrighted by IW3C2. In these cases the authors should use correspondingly `\setcopyright{cc}`, `\setcopyright{iw3c2w3}`, or `\setcopyright{iw3c2w3g}` (the latter should be used by Google employees).

Yet another case is the typesetting of non-ACM materials, when the option `nonacm` is used. This case is somewhat opposite, because for this case *only* Creative Common licenses are supported.

The command `\setcopyright{cc}` produces an error unless the format is `acmengage` or `nonacm` option is selected. On the other hand, if the option `nonacm` is selected, any argument of `\setcopyright` other than `cc` is treated as `none`.

2.19 Disabled or forbidden commands

The goal of `acmart` package is to provide a uniform look and feel for ACM publications. Accordingly, a number of commands is forbidden or disabled in `acmart`.

You may *not* put several authors or several e-mails into a `\author` or `\email` command. This may lead to errors or warning.

You cannot change `\baselinestretch` in your document: this produces an error.
 You should not abuse the command `\vspace`: this command may disturb the type-setting of ACM papers.
 You should not load `amssymb` package since the package `acmart` defines the corresponding symbols itself.

2.20 Notes for wizards

Sometimes you need to change the behavior of `acmart`. The usual way to do this is to redefine commands in the preamble. However, these definitions are executed *after* `acmart` is loaded and certain decisions are made. This presents a number of problems.

For example, one may want to use the `titletoc` package with `acmart`. This package should be loaded before `hyperref`. However, since `acmart` loads `hyperref` itself, the line `\usepackage{titletoc}` in the preamble will lead to grief (see <http://tex.stackexchange.com/questions/357265/using-titletoc-with-acm-acmart-style>).

Another example is passing options to a package. Suppose you want to use the `dvipsnames` option of the `xcolor` package. Normally you cannot do this because `acmart` loads this package itself without options.

The file `acmart-preload-hook.tex` can be used to solve these problems. If this file exists, it will be processed before any other package. You can use this file to load packages or pass options to them. For example, if you put in this file

```
\let\LoadClassOrig\LoadClass
\renewcommand\LoadClass[2][\LoadClassOrig[#1]{#2}%
\usepackage{titletoc}
```

then `titletoc` will be loaded before `hyperref`. If you put in this file

```
\PassOptionsToPackage{dvipsnames}{xcolor}
```

you will pass `dvipsnames` to `xcolor`.

Important note. This hook makes it too easy to create a manuscript that is not acceptable by the ACM. It is even easier to create a file that cannot be compiled. So please do not use it *unless you know what you are doing*. And if you use it, *do not ask for support*. If you decide to use this hook, you are on your own.

Another hook is `\AtBeginMaketitle`. The commands in this hook are executed before `\maketitle`.

2.21 Currently supported publications

Table 5: ACM publications and arguments of the `\acmJournal` command

Abbreviation	Publication
ACMJCSS	ACM Journal on Computing and Sustainable Societies
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DLT	Distributed Ledger Technologies: Research and Practice
DGOV	Digital Government: Research and Practice

Table 5: ACM publications and arguments of the \acmJournal command (continued)

Abbreviation	Publication
DTRAP	Digital Threats: Research and Practice
FAC	Formal Aspects of Computing
GAMES	ACM Games: Research and Practice
HEALTH	ACM Transactions on Computing for Healthcare
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
JATS	ACM Journal on Autonomous Transportation Systems
JDIQ	ACM Journal of Data and Information Quality
JDS	ACM/IMS Journal of Data Science
JEA	ACM Journal of Experimental Algorithmics
JERIC	ACM Journal of Educational Resources in Computing
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCCH	ACM Journal on Computing and Cultural Heritage
JRC	ACM Journal on Responsible Computing
PACMCGIT	Proceedings of the ACM on Computer Graphics and Interactive Techniques
PACMHCI	PACM on Human-Computer Interaction
PACMOD	PACM on Management of Data
PACMNET	PACM on Networking
PACMPL	PACM on Programming Languages
PACMSE	PACM on Software Engineering
POMACS	PACM on Measurement and Analysis of Computing Systems
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
TALG	ACM Transactions on Algorithms
TALLIP	ACM Transactions on Asian and Low-Resource Language Information Processing
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TDS	ACM/IMS Transactions on Data Science
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
TELO	ACM Transactions on Evolutionary Learning
THRI	ACM Transactions on Human-Robot Interaction
TIIS	ACM Transactions on Interactive Intelligent Systems
TIOT	ACM Transactions on Internet of Things
TISSEC	ACM Transactions on Information and System Security
TIST	ACM Transactions on Intelligent Systems and Technology
TKDD	ACM Transactions on Knowledge Discovery from Data
TMIS	ACM Transactions on Management Information Systems
TOCE	ACM Transactions on Computing Education
TOCHI	ACM Transactions on Computer-Human Interaction
TOCL	ACM Transactions on Computational Logic
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory

Table 5: ACM publications and arguments of the `\acmJournal` command (continued)

Abbreviation	Publication
TODAES	ACM Transactions on Design Automation of Electronic Systems
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPML	ACM Transactions on Probabilistic Machine Learning
TOPS	ACM Transactions on Privacy and Security
TORS	ACM Transactions on Recommender Systems
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TQC	ACM Transactions on Quantum Computing
TRETS	ACM Transactions on Reconfigurable Technology and Systems
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

Besides the publications listed in Table 5, there is a special “publication” type FACMP, a forthcoming ACM publication, reserved for new journals which are not assigned an ISSN yet.

2.22 A note about sigchi-a format

Starting in Spring 2020 ACM retired SIGCHI Extended Abstract format (`sigchi-a`). ACM will not, under any circumstances, accept documents in this format for publication and will not offer technical support to the authors who use this template.

You may use this format in the `nonacm` mode only, as in

```
\documentclass[sigchi-a, nonacm]{acmart}
```

`sidebar (env.)` This format has large margin uses for special figures and tables. This package provides three environments for this with optional captions:
`marginfigure (env.)`
`margintable (env.)`

sidebar: textual information in the margin,

marginfigure: a figure in the margin,

margintable: a table in the margin.

The environments `figure` and `table` produce figures and tables with the width of the text column. The environments `figure*` and `table*` produce “wide” figures and tables, which take a large part of the margin.

The horizontal sizes of figures are:

1. `figure: \columnwidth`,
2. `marginfigure: \marginparwidth`,
3. `figure*: \fulltextwidth`.

3 Implementation

3.1 Identification

We start with a declaration of who we are. Most .dtx files put driver code in a separate .drv driver file. We roll this code into the main file and use the pseudo-guard <gobble> for it.

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class>\ProvidesClass{acmart}
6 [2023/11/05 v2.00 Typesetting articles for the Association for Computing Machinery]
```

And the driver code:

```
7 <*gobble>
8 \documentclass{ltxdoc}
9 \usepackage{array,booktabs,amsmath,graphicx,fancyvrb,tabularx, longtable}
10 \usepackage[tt=false, type1=true]{libertine}
11 \usepackage[varqu]{zi4}
12 \usepackage[libertine]{newtxmath}
13 \usepackage[tableposition=top]{caption}
14 \usepackage{hypdoc}
15 \PageIndex
16 \CodelineIndex
17 \RecordChanges
18 \EnableCrossrefs
19 \begin{document}
20   \DocInput{acmart.dtx}
21 \end{document}
22 </gobble>
23 <*class>
24 \def\@classname{acmart}
```

3.2 Preload hook

We preload acmart-preload-hook:

```
25 \InputIfFileExists{acmart-preload-hook.tex}{%
26   \ClassWarning{\@classname}{%
27     I am loading acmart-preload-hook.tex. You are fully responsible
28     for any problems from now on.}}{}
```

3.3 Options

We need xkeyval since some of our options may have values:

```
29 \RequirePackage{xkeyval}
   We use xstring to check whether user input is valid
30 \RequirePackage{xstring}
   We need iftex to check the engine
31 \RequirePackage{iftex}
```

format The possible formats

```
32 \define@choicekey*+{acmart.cls}{format}[\ACM@format\ACM@format@nr]{%
33 manuscript, acmsmall, acmlarge, acmtog, sigconf, siggraph,
34 sigplan, sigchi, sigchi-a, acmengage, acmcp}[manuscript]{}{%
35 \ClassError{\@classname}{The option format must be manuscript,
36 acmsmall, acmlarge, acmtog, sigconf, siggraph,
37 sigplan, sigchi or sigchi-a}}
38 \def\@DeclareACMFormat#1{\DeclareOptionX{#1}{\setkeys{acmart.cls}{format=#1}}}
39 \@DeclareACMFormat{manuscript}
40 \@DeclareACMFormat{acmsmall}
41 \@DeclareACMFormat{acmlarge}
42 \@DeclareACMFormat{acmtog}
43 \@DeclareACMFormat{sigconf}
44 \@DeclareACMFormat{siggraph}
45 \@DeclareACMFormat{sigplan}
46 \@DeclareACMFormat{sigchi}
47 \@DeclareACMFormat{sigchi-a}
48 \@DeclareACMFormat{acmengage}
49 \@DeclareACMFormat{acmcp}
50 \ExecuteOptionsX{format}
```

\if@ACM@screen Whether we use screen mode

```
51 \define@boolkey+{acmart.cls}[@ACM@]{screen}[true]{%
52 \if@ACM@screen
53 \PackageInfo{\@classname}{Using screen mode}%
54 \else
55 \PackageInfo{\@classname}{Not using screen mode}%
56 \fi}{\PackageError{\@classname}{The option screen can be either true or
57 false}}
58 \ExecuteOptionsX{screen=false}
```

\if@ACM@urlbreakonhyphens

```
59 \define@boolkey+{acmart.cls}[@ACM@]{urlbreakonhyphens}[true]{%
60 \if@ACM@urlbreakonhyphens
61 \PackageInfo{\@classname}{Using breaking urls on hyphens}%
62 \else
63 \PackageInfo{\@classname}{Not breaking urls on hyphens}%
64 \fi}{\PackageError{\@classname}{The option urlbreakonhyphens can be either true or
65 false}}
66 \ExecuteOptionsX{urlbreakonhyphens=true}
```

\if@ACM@acmthm Whether we define theorem-like environments.

```
67 \define@boolkey+{acmart.cls}[@ACM@]{acmthm}[true]{%
68 \if@ACM@acmthm
69 \PackageInfo{\@classname}{Requiring acmthm}%
70 \else
71 \PackageInfo{\@classname}{Suppressing acmthm}%
72 \fi}{\PackageError{\@classname}{The option acmthm can be either true or
73 false}}
74 \ExecuteOptionsX{acmthm=true}
```

\if@ACM@review Whether we use review mode

```
75 \define@boolkey+{acmart.cls}[@ACM@]{review}[true]{%
```

```

76 \if@ACM@review
77   \PackageInfo{\@classname}{Using review mode}%
78   \AtBeginDocument{\@ACM@printfoliostrue}%
79 \else
80   \PackageInfo{\@classname}{Not using review mode}%
81 \fi}{\PackageError{\@classname}{The option review can be either true or
82   false}}
83 \ExecuteOptionsX{review=false}

```

\if@ACM@authorversion Whether we use author's-version mode

```

84 \define@boolkey+{acmart.cls}[@ACM@]{authorversion}[true]{%
85   \if@ACM@authorversion
86     \PackageInfo{\@classname}{Using authorversion mode}%
87   \else
88     \PackageInfo{\@classname}{Not using authorversion mode}%
89   \fi}{\PackageError{\@classname}{The option authorversion can be either true or
90     false}}
91 \ExecuteOptionsX{authorversion=false}

```

\if@ACM@nonacm Special option for non-ACM publications using the ACM typesetting options.

```

92 \define@boolkey+{acmart.cls}[@ACM@]{nonacm}[true]{%
93   \if@ACM@nonacm
94     \PackageInfo{\@classname}{Using nonacm mode}%
95     \AtBeginDocument{\@ACM@printacmreffalse}%
96     % in 'nonacm' mode we disable the "ACM Reference Format"
97     % printing by default, but this can be re-enabled by the
98     % user using \settopmatter{printacmref=true}
99   \else
100     \PackageInfo{\@classname}{Not using nonacm mode}%
101   \fi}{\PackageError{\@classname}{The option nonacm can be either true or
102     false}}
103 \ExecuteOptionsX{nonacm=false}

```

\if@ACM@balance Whether to balance the last page

```

104 \define@boolkey+{acmart.cls}[@ACM@]{balance}[true]{%}{%
105   \PackageError{\@classname}{The option balance can be either true or
106     false}}
107 \ExecuteOptionsX{balance}

```

\if@ACM@pbalance Whether to balance the last page

```

108 \define@boolkey+{acmart.cls}[@ACM@]{pbalance}[true]{%}{%
109   \PackageError{\@classname}{The option pbalance can be either true or
110     false}}
111 \ExecuteOptionsX{pbalance=false}

```

\if@ACM@natbib@override This macro is no longer used.

\if@ACM@natbib Whether we use natbib mode

```

112 \define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
113   \if@ACM@natbib
114     \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
115   \else
116     \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
117   \fi}{\PackageError{\@classname}{The option natbib can be either true or

```

```

118     false}}
119 \ExecuteOptionsX{natbib=true}

\if@ACM@anonymous Whether we use anonymous mode
120 \define@boolkey+{acmart.cls}[@ACM@]{anonymous}[true]{%
121   \if@ACM@anonymous
122     \PackageInfo{\@classname}{Using anonymous mode}%
123   \else
124     \PackageInfo{\@classname}{Not using anonymous mode}%
125   \fi}{\PackageError{\@classname}{The option anonymous can be either true or
126     false}}
127 \ExecuteOptionsX{anonymous=false}

\if@ACM@timestamp Whether we use timestamp mode
128 \define@boolkey+{acmart.cls}[@ACM@]{timestamp}[true]{%
129   \if@ACM@timestamp
130     \PackageInfo{\@classname}{Using timestamp mode}%
131   \else
132     \PackageInfo{\@classname}{Not using timestamp mode}%
133   \fi}{\PackageError{\@classname}{The option timestamp can be either true or
134     false}}
135 \ExecuteOptionsX{timestamp=false}

\if@ACM@authordraft Whether we use author-draft mode
136 \define@boolkey+{acmart.cls}[@ACM@]{authordraft}[true]{%
137   \if@ACM@authordraft
138     \PackageInfo{\@classname}{Using authordraft mode}%
139     \@ACM@timestamptrue
140     \@ACM@reviewtrue
141   \else
142     \PackageInfo{\@classname}{Not using authordraft mode}%
143   \fi}{\PackageError{\@classname}{The option authordraft can be either true or
144     false}}
145 \ExecuteOptionsX{authordraft=false}

\ACM@fontsize The font size to pass to the base class
146 % \changes{v1.87}{2022/08/27}{Added fontsize 8pt}
147 \def\ACM@fontsize{}
148 \DeclareOptionX{8pt}{\edef\ACM@fontsize{\CurrentOption}}
149 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
150 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
151 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
152 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

\ACM@languages The languages of the document
153 \def\ACM@languages{}
154 \DeclareOptionX{language}{%
155   \ifx\ACM@languages\@empty
156     \gdef\ACM@languages{english}\fi
157   \g@addto@macro\ACM@languages{, #1}}

158 \DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
159 \DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
160 \ProcessOptionsX
161 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}

```

3.4 Setting switches

`\if@ACM@manuscript` Whether we use manuscript mode
162 `\newif\if@ACM@manuscript`

`\if@ACM@journal` There are two kinds of publications: journals and books
163 `\newif\if@ACM@journal`

`\if@ACM@journal@bibstrip` Sometimes ACM wants a journal-like publication to have conference information in the bibstrip and vice versa, so we have an additional switch.
164 `\newif\if@ACM@journal@bibstrip`

`\if@ACM@sigchiamode` The formatting of SIGCHI extended abstracts is quite unusual. We have a special switch for them.
165 `\newif\if@ACM@sigchiamode`

`\if@ACM@engage` ACM Engage course materials have special formatting
166 `\newif\if@ACM@engage`
167 `\@ACM@engagefalse`

`\if@ACM@acmcp` ACM cover page formatting
168 `\newif\if@ACM@acmcp`
169 `\@ACM@acmcpfalse`

Setting up switches

```
170 \ifnum\ACM@format@nr=5\relax % siggraph
171 \ClassWarning{\@classname}{%
172   The format siggraph is now obsolete.\MessageBreak
173   I am switching to sigconf.}
174 \setkeys{acmart.cls}{format=sigconf}
175 \fi
176 \ifnum\ACM@format@nr=7\relax % sigchi
177 \ClassWarning{\@classname}{%
178   The format sigchi is now obsolete.\MessageBreak
179   I am switching to sigconf.}
180 \setkeys{acmart.cls}{format=sigconf}
181 \fi
182 \ifnum\ACM@format@nr=8\relax % sigchi
183 \ClassWarning{\@classname}{%
184   ACM SIGCHI has retired the SIGCHI-A template\MessageBreak
185   effective immediately. ACM is keeping this template\MessageBreak
186   option available to authors who are working on legacy\MessageBreak
187   documents only. ACM will not, under any circumstances,\MessageBreak
188   accept documents in this format for publication and\MessageBreak
189   will not offer technical support to the authors who use\MessageBreak
190   this template.\MessageBreak
191   ACM SIGCHI is directing Conference leaders and\MessageBreak
192   authors to publish their articles using the SIGCONF\MessageBreak
193   template call.}
194 \fi
195 \ifnum\ACM@format@nr=0\relax
196   \@ACM@manuscripttrue
197 \else
```

```

198 \ACM@manuscriptfalse
199 \fi
200 \ACM@sigchiamodefalse
201 \ifcase\ACM@format@nr
202 \relax % manuscript
203 \ACM@journaltrue
204 \or % acmsmall
205 \ACM@journaltrue
206 \or % acmlarge
207 \ACM@journaltrue
208 \or % acmtog
209 \ACM@journaltrue
210 \or % sigconf
211 \ACM@journalfalse
212 \or % siggraph
213 \ACM@journalfalse
214 \or % sigplan
215 \ACM@journalfalse
216 \or % sigchi
217 \ACM@journalfalse
218 \or % sigchi-a
219 \ACM@journalfalse
220 \ACM@sigchiamodetrue
221 \or % acmengage
222 \ACM@journalfalse
223 \ACM@engagetrue
224 \or % acmcp
225 \ACM@journaltrue
226 \ACM@acmcptrue
227 \AtBeginDocument{\ACM@printacmreffalse}%
228 \fi
229 \if\ACM@journal
230 \ACM@journal@bibstriptrue
231 \else
232 \ACM@journal@bibstripfalse
233 \fi

```

3.5 Loading the base class and package

At this point we either have \ACM@fontsize or use defaults

```

234 \ifx\ACM@fontsize\@empty
235 \ifcase\ACM@format@nr
236 \relax % manuscript
237 \def\ACM@fontsize{9pt}%
238 \or % acmsmall
239 \def\ACM@fontsize{10pt}%
240 \or % acmlarge
241 \def\ACM@fontsize{10pt}%
242 \or % acmtog
243 \def\ACM@fontsize{9pt}%
244 \or % sigconf
245 \def\ACM@fontsize{9pt}%
246 \or % siggraph
247 \def\ACM@fontsize{9pt}%

```

```

248 \or % sigplan
249 \def\ACM@fontsize{10pt}%
250 \or % sigchi
251 \def\ACM@fontsize{9pt}%
252 \or % sigchi-a
253 \def\ACM@fontsize{10pt}%
254 \or % acmengage
255 \def\ACM@fontsize{10pt}%
256 \or % acmcp
257 \def\ACM@fontsize{9pt}%
258 \fi
259 \fi
260 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
261 \LoadClass[\ACM@fontsize, reqno]{amsart}
262 \RequirePackage{microtype}

    We need etoolbox for delayed code
263 \RequirePackage{etoolbox}

    Booktabs is now the default
264 \RequirePackage{booktabs}

    We need totpages to calculate the number of pages and refcount to use that num-
ber
265 \RequirePackage{refcount}
266 \RequirePackage{totpages}

    The \collect@body macro in amsmath is defined using \def. We load environ to
access the \long version of this command
267 \RequirePackage{environ}

    We use setspace for double spacing
268 \if@ACM@manuscript
269 \RequirePackage{setspace}
270 \onehalfspacing
271 \fi

    We need textcase for better upcasing
272 \RequirePackage{textcase}

273 \if@ACM@acmcp
274 \RequirePackage{framed}
275 \RequirePackage{zref-savepos, zref-user}
276 \fi

```

\@ACM@acmcp@delta We need to store the dimen to store the insert length of amcp box

```

277 \newdimen\@ACM@acmcp@delta
278 \@ACM@acmcp@delta=0pt\relax

```

3.6 Citations

We patch \setcitestyle to allow, for example, \setcitestyle{sort} and \setcitestyle{nosort}. We patch \citestyle to warn about undefined citation styles.

```

279 \if@ACM@natbib
280 \RequirePackage{natbib}
281 \renewcommand{\bibsection}{%

```

```

282 \section*{\refname}%
283 \phantomsection\addcontentsline{toc}{section}{\refname}%
284 }
285 \renewcommand{\bibfont}{\bibliofont}
286 \renewcommand\setcitestyle[1]{
287 \@for\@tempa:=#1\do
288 {\def\@tempb{round}\ifx\@tempa\@tempb
289 \renewcommand\NAT@open{(\}\renewcommand\NAT@close{)}\fi
290 \def\@tempb{square}\ifx\@tempa\@tempb
291 \renewcommand\NAT@open{[\}\renewcommand\NAT@close{]}\fi
292 \def\@tempb{angle}\ifx\@tempa\@tempb
293 \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
294 \def\@tempb{curly}\ifx\@tempa\@tempb
295 \renewcommand\NAT@open{\{\}\renewcommand\NAT@close{\}}\fi
296 \def\@tempb{semicolon}\ifx\@tempa\@tempb
297 \renewcommand\NAT@sep{;}\fi
298 \def\@tempb{colon}\ifx\@tempa\@tempb
299 \renewcommand\NAT@sep{:}\fi
300 \def\@tempb{comma}\ifx\@tempa\@tempb
301 \renewcommand\NAT@sep{,}\fi
302 \def\@tempb{authoryear}\ifx\@tempa\@tempb
303 \NAT@numbersfalse\fi
304 \def\@tempb{numbers}\ifx\@tempa\@tempb
305 \NAT@numberstrue\NAT@superfalse\fi
306 \def\@tempb{super}\ifx\@tempa\@tempb
307 \NAT@numberstrue\NAT@supertrue\fi
308 \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
309 \let\bibstyle=\@gobble\fi
310 \def\@tempb{bibstyle}\ifx\@tempa\@tempb
311 \let\bibstyle=\@citestyle\fi
312 \def\@tempb{sort}\ifx\@tempa\@tempb
313 \def\NAT@sort{\@ne}\fi
314 \def\@tempb{nosort}\ifx\@tempa\@tempb
315 \def\NAT@sort{\z@}\fi
316 \def\@tempb{compress}\ifx\@tempa\@tempb
317 \def\NAT@cmprs{\@ne}\fi
318 \def\@tempb{nocompress}\ifx\@tempa\@tempb
319 \def\NAT@cmprs{\z@}\fi
320 \def\@tempb{sort&compress}\ifx\@tempa\@tempb
321 \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
322 \def\@tempb{mcite}\ifx\@tempa\@tempb
323 \let\NAT@merge\@ne\fi
324 \def\@tempb{merge}\ifx\@tempa\@tempb
325 \@ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}{\fi
326 \def\@tempb{elide}\ifx\@tempa\@tempb
327 \@ifnum{\NAT@merge<\thr@}{\let\NAT@merge\thr@}{\fi
328 \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
329 \NAT@longnamestrue\fi
330 \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
331 \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
332 \expandafter\NAT@find@eq\@tempa=\relax\@nil
333 \if\@tempc\relax\else
334 \expandafter\NAT@rem@eq\@tempc
335 \def\@tempb{open}\ifx\@tempa\@tempb

```

```

336 \xdef\NAT@open{\@tempc}\fi
337 \def\@tempb{close}\ifx\@tempa\@tempb
338 \xdef\NAT@close{\@tempc}\fi
339 \def\@tempb{aysep}\ifx\@tempa\@tempb
340 \xdef\NAT@aysep{\@tempc}\fi
341 \def\@tempb{yysep}\ifx\@tempa\@tempb
342 \xdef\NAT@yrsep{\@tempc}\fi
343 \def\@tempb{notesep}\ifx\@tempa\@tempb
344 \xdef\NAT@cmt{\@tempc}\fi
345 \def\@tempb{citesep}\ifx\@tempa\@tempb
346 \xdef\NAT@sep{\@tempc}\fi
347 \fi
348 }%
349 \NAT@setcites
350 }
351 \renewcommand\citestyle[1]{%
352 \ifcsname bibstyle@#1\endcsname%
353 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
354 \else%
355 \@latex@error{Undefined ‘#1’ citestyle}%
356 \fi
357 }%
358 \fi

```

`\bibstyle@acmauthoryear` The default author-year format:

```

359 \newcommand{\bibstyle@acmauthoryear}{%
360 \setcitestyle{%
361 authoryear,%
362 open={},close={},citesep={;},%
363 aysep={},yysep={},,%
364 notesep={, }}%

```

`\bibstyle@acmnumeric` The default numeric format:

```

365 \newcommand{\bibstyle@acmnumeric}{%
366 \setcitestyle{%
367 numbers,sort&compress,%
368 open={},close={},citesep={,},%
369 notesep={, }}%

```

The default is numeric:

```

370 \if@ACM@natbib
371 \citestyle{acmnumeric}
372 \fi

```

3.7 Internationalization

```

373 \if@ACM@journal
374 \renewcommand\keywordsname{Additional Key Words and Phrases}%
375 \else
376 \renewcommand\keywordsname{Keywords}%
377 \fi
378 \if@ACM@engage
379 \renewcommand\abstractname{Synopsis}%
380 \fi

```

```

381 \ifx\ACM@languages\empty
382 \else
383   \RequirePackage[\ACM@languages]{babel}%
384   \addto\captionsenglish{%
385     \if@ACM@journal
386       \renewcommand\keywordsname{Additional Key Words and Phrases}%
387     \else
388       \renewcommand\keywordsname{Keywords}%
389     \fi
390     \renewcommand\acksname{Acknowledgements}%
391     \if@ACM@engage
392       \renewcommand\abstractname{Synopsis}%
393     \fi
394   }%
395   \addto\captionsfrench{%
396     \if@ACM@journal
397       \renewcommand\keywordsname{Mots Clés et Phrases Supplémentaires}%
398     \else
399       \renewcommand\keywordsname{Mots clés}%
400     \fi
401     \renewcommand\acksname{Remerciements}%
402   }%
403   \addto\captionsgerman{%
404     \if@ACM@journal
405       \renewcommand\keywordsname{Zusätzliche Schlagwörter und Phrasen}%
406     \else
407       \renewcommand\keywordsname{Schlagwörter}%
408     \fi
409     \renewcommand\acksname{Danksagungen}%
410   }%
411   \addto\captionsspanish{%
412     \if@ACM@journal
413       \renewcommand\keywordsname{Palabras y Frases Claves Adicionales}%
414     \else
415       \renewcommand\keywordsname{Palabras claves}%
416     \fi
417     \renewcommand\acksname{Expresiones de gratitud}%
418   }%
419 \fi

```

\ACM@lang@check Some commands should not be used if the document is monlingual

```

420 \newcommand\ACM@lang@check[1]{%
421   \ifx\ACM@languages\empty\relax
422   \ClassError{\@classname}{%
423     Command \string#1 \MessageBreak is used in monlingual document}{%
424     You used a command (\string#1) \MessageBreak
425     that does not have a meaning \MessageBreak
426     unless are languages are defined. \MessageBreak
427     Please choose the languages in \string\documentclass
428     \MessageBreak
429     (e.g. \string\documentclass[languages={french, english}]{acmart}),
430     \MessageBreak
431     or delete the command.}%
432   \fi}

```

```

\@translatedtitle
433 \def\@translatedtitle{}

\translatedtitle The title of the paper in a different language
434 \newcommand\translatedtitle[2]{\ACM@lang@check{\translatedtitle}%
435 \g@addto@macro\@translatedtitle{\par\foreignlanguage{#1}{#2}}}

\@translatedsubtitle
436 \def\@translatedsubtitle{}

\translatedsubtitle The subtitle of the paper in a different language
437 \newcommand\translatedsubtitle[2]{\ACM@lang@check{\translatedsubtitle}%
438 \g@addto@macro\@translatedsubtitle{\par\foreignlanguage{#1}{#2}}}

\@translatedkeywords
439 \def\@translatedkeywords{}

\translatedkeywords Add keywords to the paper in the language specified
440 \newcommand\translatedkeywords[2]{\ACM@lang@check{\translatedkeywords}%
441 \g@addto@macro\@translatedkeywords{\mktranslatedkeywords{#1}{#2}}}

\@translatedabstracts The container for translated abstracts.
442 \def\@translatedabstracts{}

translatedabstract We save translated abstracts into \@translatedabstracts
443 \newenvironment{translatedabstract}[1]{\Collect@Body
444 \@savetranslatedabstract\@mktranslatedabstract{#1}}{}

\@savetranslatedabstract And saving the abstract
445 \long\def\@savetranslatedabstract#1{\if@ACM@maketitle@typeset
446 \ClassError{\@classname}{Abstract must be defined before maketitle
447 command. Please move it!}\fi
448 \ACM@lang@check{translatedabstract}%
449 \g@addto@macro\@translatedabstracts{\bgroup#1\egroup}}

```

3.8 Sectioning

\@startsection Before we call hyperref, we redefine \@startsection commands to their L^AT_EX defaults since the amsart ones are too AMS-specific. We need to do this early since we want hyperref to have a chance to redefine them again:

```

450 \def\@startsection#1#2#3#4#5#6{%
451 \if@noskipsec \leavevmode \fi
452 \par
453 \@tempskipa #4\relax
454 \@afterindenttrue
455 \ifdim \@tempskipa <\z@
456 \@tempskipa -\@tempskipa \@afterindentfalse
457 \fi
458 \if@nobreak
459 \everypar{}%
460 \else
461 \addpenalty\@secpenalty\addvspace\@tempskipa

```

```

462 \fi
463 \@ifstar
464   {\@ssect{#3}{#4}{#5}{#6}}%
465   {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}%
466 \def\@sect#1#2#3#4#5#6[#7]#8{%
467   \edef\@toclevel{\ifnum#2=\@m 0\else\number#2\fi}%
468   \ifnum #2>\c@secnumdepth
469     \let\@svsec\empty
470   \else
471     \refstepcounter{#1}%
472     \protected@edef\@svsec{\@secntformat{#1}\relax}%
473   \fi
474   \@tempskipa #5\relax
475   \ifdim \@tempskipa>\z@
476     \begingroup
477       #6{%
478         \@hangfrom{\hskip #3\relax\@svsec}%
479         \interlinepenalty \@M #8\@par}%
480     \endgroup
481     \csname #1mark\endcsname{#7}%
482     \ifnum #2>\c@secnumdepth \else
483       \@tochangmeasure{\csname the#1\endcsname}%
484     \fi
485     \addcontentsline{toc}{#1}{%
486       \ifnum #2>\c@secnumdepth \else
487         \protect\numberline{\csname the#1\endcsname}%
488       \fi
489       #7}%
490   \else
491     \def\@svsechd{%
492       #6{\hskip #3\relax
493         \@svsec #8}%
494       \csname #1mark\endcsname{#7}%
495       \ifnum #2>\c@secnumdepth \else
496         \@tochangmeasure{\csname the#1\endcsname\space}%
497       \fi
498       \addcontentsline{toc}{#1}{%
499         \ifnum #2>\c@secnumdepth \else
500           \protect\numberline{\csname the#1\endcsname}%
501         \fi
502         #7}}%
503   \fi
504   \@xsect{#5}}
505 \def\@xsect#1{%
506   \@tempskipa #1\relax
507   \ifdim \@tempskipa>\z@
508     \par \nobreak
509     \vskip \@tempskipa
510     \@afterheading
511   \else
512     \@nobreakfalse
513     \global\@noskipsecttrue
514     \everypar{%
515       \if@noskipsec

```

```

516     \global\@noskipsecfalse
517     {\setbox\z@\lastbox}%
518     \clubpenalty\@M
519     \begingroup \@svsechd \endgroup
520     \unskip
521     \@tempskipa #1\relax
522     \hskip -\@tempskipa
523     \else
524     \clubpenalty \clubpenalty
525     \everypar{}%
526     \fi}%
527 \fi
528 \ignorespaces}
529 \def\@seccntformat#1{\csname the#1\endcsname\quad}
530 \def\@ssect#1#2#3#4#5{%
531   \@tempskipa #3\relax
532   \ifdim \@tempskipa>\z@
533     \begingroup
534     #4{%
535       \@hangfrom{\hspace #1}%
536       \interlinepenalty \@M #5\@par}%
537     \endgroup
538   \else
539     \def\@svsechd{#4{\hspace #1\relax #5}}%
540   \fi
541   \@xsect{#3}}

```

\@startsection The amsart package redefines \@startsection. Here we redefine it again to make the table of contents work.

```

542 \def\@starttoc#1#2{\begingroup\makeatletter
543   \setTrue{#1}%
544   \par\removelastskip\vskip\z@skip
545   \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
546   {.5\linespacing}{\centering\contentsnamefont}{#2}%
547   \@input{\jobname.#1}%
548   \if@filesw
549     \xp\newwrite\csname tf@#1\endcsname
550     \immediate\xp\openout\csname tf@#1\endcsname \jobname.#1\relax
551   \fi
552   \global\@nobreakfalse \endgroup
553   \addvspace{32\p@\@plus14\p@}%
554 }

```

\l@section Section spacing is more generous than for amsart

```
555 \def\l@section{\@tocline{1}{0pt}{1pc}{2pc}{}}
```

\l@subsection The spacing in amsart is too large

```
556 \def\l@subsection{\@tocline{2}{0pt}{1pc}{3pc}{}}
```

\l@subsubsection The spacing in amsart is too large

```
557 \def\l@subsubsection{\@tocline{3}{0pt}{1pc}{5pc}{}}
```

We need to define footnote-related stuff before the call to hyperref (Ross Moore)

```
\@makefnmark We do not use indentation for footnotes
558 \def\@makefnmark{\noindent\@makefnmark}
```

```
\@footnotetext In sigchi-a mode our footnotes are in the margin!
559 \if@ACM@sigchiamode
560 \long\def\@footnotetext#1{\marginpar{%
561   \reset@font\small
562   \interlinepenalty\interfootnotelinepenalty
563   \protected@edef\@currentlabel{%
564     \csname p@footnote\endcsname\@thefnmark
565   }%
566   \color@begingroup
567   \@makefnmark{%
568     \rule{z@footnotesep}{\ignorespaces#1\@finalstrut\strutbox}%
569   \color@endgroup}}%
570 \fi
```

```
\@mpfootnotetext We want the footnotes in minipages centered:
571 \long\def\@mpfootnotetext#1{%
572   \global\setbox\@mpfootins\vbox{%
573     \unvbox\@mpfootins
574     \reset@font\footnotesize
575     \hsize\columnwidth
576     \parboxrestore
577     \protected@edef\@currentlabel
578       {\csname p@mpfootnote\endcsname\@thefnmark}%
579     \color@begingroup\centering
580     \@makefnmark{%
581       \rule{z@footnotesep}{\ignorespaces#1\@finalstrut\strutbox}%
582     \color@endgroup}}%
```

```
\@makefnmark AMS classes use a buggy definition of \@makefnmark. We revert to the standard one.
583 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}
```

3.9 Hyperxmp and hyperref

Adding hyperref

```
584 \let\@footnotemark@nolink\@footnotemark
585 \let\@footnotetext@nolink\@footnotetext
586 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
587 \RequirePackage{hyperxmp}
588 \pdfstringdefDisableCommands{%
589   \def\addtocounter#1#2{%
590     \def\unskip{%
591       \def\textbullet{- }%
592       \def\textrightarrow{-> }%
593       \def\footnotemark{%
594       }
595       \urlstyle{rm}
596       \ifcase\ACM@format@nr
597       \relax % manuscript
598       \or % acmsmall
599       \or % acmlarge
```

```

600 \or % acmtog
601 \or % sigconf
602 \or % siggraph
603 \or % sigplan
604 \urlstyle{sf}
605 \or % sigchi
606 \or % sigchi-a
607 \urlstyle{sf}
608 \or % acmengage
609 \or % acmcp
610 \fi
611 \AtEndPreamble{%
612   \if@ACM@urlbreakonhyphens
613     \def\do@url@hyp{\do-}%
614   \fi
615   \if@ACM@screen
616     \hypersetup{colorlinks,
617       linkcolor=ACMPurple,
618       citecolor=ACMPurple,
619       urlcolor=ACMDarkBlue,
620       filecolor=ACMDarkBlue}
621   \else
622     \hypersetup{hidelinks}
623   \fi
624   \hypersetup{pdflang={en},
625     pdfdisplaydoctitle}}

```

Bibliography mangling.

```

626 \if@ACM@natbib
627   \let\citeN\cite
628   \let\cite\citep
629   \let\citeANP\citeauthor
630   \let\citeNN\citeyearpar
631   \let\citeyearNP\citeyear
632   \let\citeNP\citealt
633   \DeclareRobustCommand\citeA
634     {\begingroup\NAT@swafalse
635       \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
636   \providecommand\newblock{}%
637 \else
638   \AtBeginDocument{%
639     \let\shortcite\cite%
640     \providecommand\citename[1]{#1}}
641 \fi
642 \newcommand\shortcite[2][]{%
643   \ifNAT@numbers\cite[#1]{#2}\else\citeyearpar[#1]{#2}\fi}

```

`\bibliographystyle` The `amsart` package redefines `\bibliographystyle` since it prefers the AMS bibliography style. We turn it back to the \LaTeX definition:

```

644 \def\bibliographystyle#1{%
645   \ifx\@begindocumenthook\@undefined\else
646     \expandafter\AtBeginDocument
647   \fi
648   {\if@filesw

```

```

649 \immediate\write\@auxout{\string\bibstyle{#1}}%
650 \fi}}

```

3.10 Other packages

Graphics and color.

```

651 \RequirePackage{graphicx}
652 \RequirePackage[prologue]{xcolor}

```

We define ACM colors according to [8]:

```

653 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
654 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
655 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
656 \definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
657 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
658 \definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
659 \definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
660 \definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}

```

Author-draft mode or sigchi-a mode

```

661 \if@ACM@authordraft
662 \RequirePackage{draftwatermark}
663 \SetWatermarkFontSize{0.5in}
664 \SetWatermarkColor[gray]{.9}
665 \SetWatermarkText{\parbox{12em}{\centering
666     Unpublished working draft.\
667     Not for distribution.}}
668 \else
669 \if@ACM@sigchiamode
670 \if@ACM@nonacm\else
671 \RequirePackage{draftwatermark}
672 \SetWatermarkFontSize{0.5in}
673 \SetWatermarkColor[gray]{.9}
674 \SetWatermarkText{\parbox{12em}{\centering
675     Legacy document.\
676     Not for publication in an ACM venue}}
677 \fi
678 \fi
679 \fi

```

3.11 Paper size and paragraphing

We use geometry for dimensions. Note that the present margins do not depend on the font size option—we might need to change this. See <https://github.com/borisveytsman/acmart/issues/5#issuecomment-272881329>.

```

680 \RequirePackage{geometry}
681 \ifcase\ACM@format@nr
682 \relax % manuscript
683 \geometry{letterpaper,head=13pt,
684     marginparwidth=6pc,heightrounded}%
685 \or % acmsmall
686 \geometry{twoside=true,
687     includeheadfoot, head=13pt, foot=2pc,
688     paperwidth=6.75in, paperheight=10in,

```

```

689     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
690     marginparwidth=2pc,heightrounded
691 }%
692 \or % acmlarge
693 \geometry{twoside=true, head=13pt, foot=2pc,
694     paperwidth=8.5in, paperheight=11in,
695     includeheadfoot,
696     top=78pt, bottom=114pt, inner=81pt, outer=81pt,
697     marginparwidth=4pc,heightrounded
698 }%
699 \or % acmtog
700 \geometry{twoside=true, head=13pt, foot=2pc,
701     paperwidth=8.5in, paperheight=11in,
702     includeheadfoot, columnsep=24pt,
703     top=52pt, bottom=75pt, inner=52pt, outer=52pt,
704     marginparwidth=2pc,heightrounded
705 }%
706 \or % sigconf
707 \geometry{twoside=true, head=13pt,
708     paperwidth=8.5in, paperheight=11in,
709     includeheadfoot, columnsep=2pc,
710     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
711     marginparwidth=2pc,heightrounded
712 }%
713 \or % siggraph
714 \geometry{twoside=true, head=13pt,
715     paperwidth=8.5in, paperheight=11in,
716     includeheadfoot, columnsep=2pc,
717     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
718     marginparwidth=2pc,heightrounded
719 }%
720 \or % sigplan
721 \geometry{twoside=true, head=13pt,
722     paperwidth=8.5in, paperheight=11in,
723     includeheadfoot=false, columnsep=2pc,
724     top=1in, bottom=1in, inner=0.75in, outer=0.75in,
725     marginparwidth=2pc,heightrounded
726 }%
727 \or % sigchi
728 \geometry{twoside=true, head=13pt,
729     paperwidth=8.5in, paperheight=11in,
730     includeheadfoot, columnsep=2pc,
731     top=66pt, bottom=73pt, inner=54pt, outer=54pt,
732     marginparwidth=2pc,heightrounded
733 }%
734 \or % sigchi-a
735 \geometry{twoside=false, head=13pt,
736     paperwidth=11in, paperheight=8.5in,
737     includeheadfoot, marginparsep=72pt,
738     marginparwidth=170pt, columnsep=20pt,
739     top=72pt, bottom=72pt, left=314pt, right=72pt
740 }%
741 \@mparswitchfalse
742 \reversemarginpar

```

```

743 \or % acmengage
744 \geometry{twoside=true, head=13pt,
745   paperwidth=8.5in, paperheight=11in,
746   includeheadfoot, columnsep=2pc,
747   top=57pt, bottom=73pt, inner=54pt, outer=54pt,
748   marginparwidth=2pc,heightrounded
749   }%
750 \or % acmcp
751 \geometry{twoside=true,
752   includeheadfoot, head=13pt, foot=2pc,
753   paperwidth=6.75in, paperheight=10in,
754   top=58pt, bottom=44pt, inner=46pt, outer=46pt,
755   marginparwidth=2pc,heightrounded
756   }%
757 \fi

```

\parindent Paragraphing

```

\parskip 758 \setlength\parindent{10\p@}
759 \setlength\parskip{\z@}
760 \ifcase\ACM@format@nr
761 \relax % manuscript
762 \or % acmsmall
763 \or % acmlarge
764 \or % acmtog
765 \setlength\parindent{9\p@}%
766 \or % sigconf
767 \or % siggraph
768 \or % sigplan
769 \or % sigchi
770 \or % sigchi-a
771 \or % acmengage
772 \or % acmcp
773 \fi

```

\normalparindent The amsart package defines the \normalparindent length and initializes it to 12pt (the value of \parindent in amsart). It is later used to set the \listparindent length in the quotation environment and the \parindent length in the \@footnotetext command. We set \normalparindent to the value of \parindent as selected by acmart for consistent paragraph indents.

```
774 \setlength\normalparindent{\parindent}
```

Footnotes require some consideration. We have several layers of footnotes: front-matter footnotes, “regular” footnotes and the special insert for the bibstrip. In the old ACM classes, the bibstrip was a \@float. The problem with floats is that they tend to, well, float—and we want the guarantee they stay.

We use manyfoot for layered footnotes instead.

copyrightpermissionfootnoterule This is the footnote rule that separates the bibstrip from the rest of the paper. It is a full width rule.

```

775 \def\copyrightpermissionfootnoterule{\kern-3\p@
776   \hrule \@width \columnwidth \kern 2.6\p@}
777 \RequirePackage{manyfoot}

```

```

778 \SelectFootnoteRule[2]{copyrightpermission}
779 \DeclareNewFootnote{authorsaddresses}
780 \SelectFootnoteRule[2]{copyrightpermission}
781 \DeclareNewFootnote{copyrightpermission}

```

\footnoterule Tschichold's rules:

```

782 \def\footnoterule{\kern-3\p@
783   \hrule \@width 4pc \kern 2.6\p@}

```

\endminipage We do not use footnote rules in minipages

```

784 \def\endminipage{%
785   \par
786   \unskip
787   \ifvoid\@mpfootins\else
788     \vskip\skip\@mpfootins
789     \normalcolor
790     \unvbox\@mpfootins
791   \fi
792   \@minipagefalse
793   \color@endgroup
794   \egroup
795   \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}

```

\@textbottom Add some stretch according to David Carlisle's advice at <http://tex.stackexchange.com/a/62318/5522>

```

796 \def\@textbottom{\vskip \z@ \@plus 1pt}
797 \let\@texttop\relax

```

In two-column layouts, force both columns to be the same height by inserting extra internal vertical space to fill out the page.

```

798 \ifcase\ACM@format@nr
799 \relax % manuscript
800 \or % acmsmall
801 \or % acmlarge
802 \or % acmtog
803   \flushbottom
804 \or % sigconf
805   \flushbottom
806 \or % siggraph
807   \flushbottom
808 \or % sigplan
809   \flushbottom
810 \or % sigchi
811   \flushbottom
812 \or % sigchi-a
813 \or % acmengage
814   \flushbottom
815 \or % acmcp
816   \flushbottom
817 \fi

```

3.12 Fonts

Somehow PDF \TeX and Xe \TeX require different incantations to make a PDF compliant with the current Acrobat bugs. Xpdf is much better.

The code below is by Ross Moore.

```
818 \ifPDF $\TeX$ 
819 \input{glyptounicode}
820 \pdfglyptounicode{f_f}{FB00}
821 \pdfglyptounicode{f_f_i}{FB03}
822 \pdfglyptounicode{f_f_l}{FB04}
823 \pdfglyptounicode{f_i}{FB01}
824 \pdfglyptounicode{t_t}{0074 0074}
825 \pdfglyptounicode{f_t}{0066 0074}
826 \pdfglyptounicode{T_h}{0054 0068}
827 \pdfgentounicode=1
828 \RequirePackage{cmap}
829 \fi
```

`\if@ACM@newfonts` Whether we load the new fonts

```
830 \newif\if@ACM@newfonts
831 \@ACM@newfontstrue
832 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
833   have the libertine package installed. Please upgrade your
834   TeX}\@ACM@newfontsfalse}
835 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
836   have the inconsolata (zi4.sty) package installed. Please upgrade your
837   TeX}\@ACM@newfontsfalse}
838 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
839   have the newtxmath package installed. Please upgrade your
840   TeX}\@ACM@newfontsfalse}
```

We use Libertine throughout.

```
841 \if@ACM@newfonts
842   \RequirePackage[T1]{fontenc}
843   % Note that the order in which packages are loaded matters,
844   % and the correct order depends on the LaTeX engine used.
845   % See https://github.com/borisveytsman/acmart/issues/402
846   % and https://github.com/borisveytsman/acmart/issues/410
847   \ifxetex
848     \RequirePackage[libertine]{newtxmath}
849     \RequirePackage[tt=false]{libertine}
850     \setmonofont[StylisticSet=3]{inconsolata}
851   \else
852     \ifluatex
853       \RequirePackage[libertine]{newtxmath}
854       \RequirePackage[tt=false]{libertine}
855       \setmonofont[StylisticSet=3]{inconsolata}
856     \else
857       \RequirePackage[tt=false, type1=true]{libertine}
858       \RequirePackage[varqu]{zi4}
859       \RequirePackage[libertine]{newtxmath}
860     \fi
861   \fi
862 \fi
```

`\liningnums` Libertine defines `\liningnums`, which makes `fontspec` unhappy. While we do not use `fontspec`, some users do.

```
863 \let\liningnums\@undefined
864 \AtEndPreamble{%
865   \DeclareTextFontCommand{\liningnums}{\libertineLF}}
```

The SIGCHI extended abstracts are sans serif:

```
866 \ifACM@sigchiamode
867   \renewcommand{\familydefault}{\sfdefault}
868 \fi
```

3.13 Image descriptions

`\if@Description@present` A local switch: whether there is a description in the given figure

```
869 \newif\if@Description@present
870 \@Description@presenttrue
```

`\if@undescrbed@images` A global switch whether some images were *not* described

```
871 \newif\if@undescrbed@images
872 \@undescrbed@imagesfalse
```

`\Description` The `Description` macro right now just sets switches

```
873 \newcommand\Description[2][\global\@Description@presenttrue\ignorespaces]
```

The global warning

```
874 \AtEndDocument{\if@undescrbed@images
875   \ClassWarningNoLine{\@classname}{Some images may lack descriptions}\fi}
```

Hooks for figures and tables. We also patch `algorithm` and `algorithm*` in case somebody uses them.

```
876 \AtBeginEnvironment{figure}{\@Description@presentfalse
877   \let\@vspace\@vspace@orig
878   \let\@vspacer\@vspacer@orig}
879 \AtBeginEnvironment{figure*}{\@Description@presentfalse
880   \let\@vspace\@vspace@orig
881   \let\@vspacer\@vspacer@orig}
882 \AtEndEnvironment{figure}{\if@Description@present\else
883   \global\@undescrbed@imagestrue
884   \ClassWarning{\@classname}{A possible image without description}\fi}
885 \AtEndEnvironment{figure*}{\if@Description@present\else
886   \global\@undescrbed@imagestrue
887   \ClassWarning{\@classname}{A possible image without description}\fi}
888 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
889   \let\@vspacer\@vspacer@orig}
890 \AtBeginEnvironment{table*}{\let\@vspace\@vspace@orig
891   \let\@vspacer\@vspacer@orig}
892 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
893   \let\@vspacer\@vspacer@orig}
894 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
895   \let\@vspacer\@vspacer@orig}
896 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
897   \let\@vspacer\@vspacer@orig}
898 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
```

```

899 \let\@vspacer\@vspacer@orig}
900 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
901 \let\@vspacer\@vspacer@orig}
902 \AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig
903 \let\@vspacer\@vspacer@orig}
904 \AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig
905 \let\@vspacer\@vspacer@orig}
906 \AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig
907 \let\@vspacer\@vspacer@orig}
908

```

3.14 Floats

We use the caption package

```

909 \RequirePackage{caption, float}
910 \captionsetup[table]{position=top}
911 \if@ACM@journal
912 \captionsetup{labelfont={sf, small},
913 textfont={sf, small}, margin=\z@}
914 \captionsetup[figure]{name={Fig.}}
915 \else
916 \captionsetup{labelfont={bf},
917 textfont={bf}, labelsep=colon, margin=\z@}
918 \ifcase\ACM@format@nr
919 \relax % manuscript
920 \or % acmsmall
921 \or % acmlarge
922 \or % acmtog
923 \or % sigconf
924 \or % siggraph
925 \captionsetup{textfont={it}}
926 \or % sigplan
927 \captionsetup{labelfont={bf},
928 textfont={normalfont}, labelsep=period, margin=\z@}
929 \or % sigchi
930 \captionsetup[figure]{labelfont={bf, small},
931 textfont={bf, small}}
932 \captionsetup[table]{labelfont={bf, small},
933 textfont={bf, small}}
934 \or % sigchi-a
935 \captionsetup[figure]{labelfont={bf, small},
936 textfont={bf, small}}
937 \captionsetup[table]{labelfont={bf, small},
938 textfont={bf, small}}
939 \or % acmengage
940 \or % acmcp
941 \fi
942 \fi

```

sidebar The sidebar environment:

```

943 \newfloat{sidebar}{}{sbar}
944 \floatname{sidebar}{Sidebar}
945 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}

```

```

\@sidebar The processing of the saved text
946 \long\def\@sidebar#1{\bgroup\let\@vspace\@vspace@orig
947 \let\@vspacer\@vspacer@orig\captionsetup{type=sidebar}%
948 \marginpar{\small#1}\egroup}

marginfigure The marginfigure environment:
949 \newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}

\@marginfigure The processing of the saved text
950 \long\def\@marginfigure#1{\bgroup
951 \let\@vspace\@vspace@orig
952 \let\@vspacer\@vspacer@orig
953 \captionsetup{type=figure}%
954 \marginpar{\@Description@presentfalse\centering
955 \small#1\if@Description@present\else
956 \global\@undescribed@imagestrue
957 \ClassWarning{\@classname}{A possible image without description}
958 \fi}%
959 \egroup}

marginfigure The marginfigure environment:
960 \newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}

\@marginfigure The processing of the saved text
961 \long\def\@marginfigure#1{\bgroup\let\@vspace\@vspace@orig
962 \let\@vspacer\@vspacer@orig\captionsetup{type=figure}%
963 \marginpar{\centering\small#1}\egroup}

SIGCHI extended abstracts provide an interesting possibility to push into the margin.
Here we use figure* and table* for this.

\fulltextwidth We define the width of the boxes as
964 \newdimen\fulltextwidth
965 \fulltextwidth=\dimexpr(\textwidth+\marginparwidth+\marginparsep)

\@dblfloat We redefine the double-float command. First, we make the size bigger. Second, our
default position is going to be tp (to give marginalia a chance)
966 \if@ACM@sigchiamode
967 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
968 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
969 \let\@endfloatbox\@endwidefloatbox
970 \def\@fpsadddefault{\def\@fps{tp}}%
971 \@float}
972 \fi

\end@dblfloat And the end. Just adding a \bgroup.
973 \if@ACM@sigchiamode
974 \def\end@dblfloat{%
975 \end@float\egroup}
976 \fi

```

`\@endwidefloatbox` This is the end of a wide box—we basically move everything to the left

```

977 \def\@endwidefloatbox{%
978   \par\vskip\z@skip
979   \@minipagefalse
980   \outer@nobreak
981   \egroup
982   \color@endbox
983   \global\setbox\@currbox=\vbox{\moveleft
984     \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
985   \wd\@currbox=\textwidth
986 }

```

3.15 Lists

```

987 \ifcase\ACM@format@nr
988 \relax % manuscript
989 \or % acmsmall
990 \or % acmlarge
991 \or % acmtog
992 \or % sigconf
993 \or % siggraph
994 \or % sigplan
995 \def\labelenumi{\theenumi.}
996 \def\labelenumii{\theenumii.}
997 \def\labelenumiii{\theenumiii.}
998 \def\labelenumiv{\theenumiv.}
999 \or % sigchi
1000 \or % sigchi-a
1001 \or % acmengage
1002 \or % acmcp
1003 \fi

```

The AMS uses generous margins for lists. Note that `amsart` defines `\leftmargin` values for list levels at the beginning of the document, so we must redefine them in the same manner. Also, note that `amsart` redefines the `enumerate` and `itemize` environments with a `\makelabel` command that uses `\llap`, so the `\labelwidth` value is (effectively) irrelevant; nonetheless, we follow `amsart` and set `\labelwidth` to `\leftmargin` minus `\labelsep`.

```

1004 \newdimen\@ACM@labelwidth
1005 \AtBeginDocument{%
1006   \setlength\labelsep{4pt}
1007   \setlength{\@ACM@labelwidth}{6.5pt}
1008
1009   %% First-level list: when beginning after the first line of an
1010   %% indented paragraph or ending before an indented paragraph, labels
1011   %% should not hang to the left of the preceding/following text.
1012   \setlength\leftmargini{\z@}
1013   \addtolength\leftmargini{\parindent}
1014   \addtolength\leftmargini{2\labelsep}
1015   \addtolength\leftmargini{\@ACM@labelwidth}
1016
1017   %% Second-level and higher lists.
1018   \setlength\leftmarginii{\z@}
1019   \addtolength\leftmarginii{0.5\labelsep}

```

```

1020 \addtolength\leftmarginii{\@ACM@labelwidth}
1021 \setlength\leftmarginiii{\leftmarginii}
1022 \setlength\leftmarginiv{\leftmarginiii}
1023 \setlength\leftmarginv{\leftmarginiv}
1024 \setlength\leftmarginvi{\leftmarginv}
1025 \@listi}
1026 \newskip\listisep
1027 \listisep\smallskipamount
1028 \def\@listI{\leftmargin\leftmargini
1029 \labelwidth\leftmargini \advance\labelwidth-\labelsep
1030 \listparindent\z@
1031 \topsep\listisep}
1032 \let\@listi\@listI
1033 \def\@listii{\leftmargin\leftmarginii
1034 \labelwidth\leftmarginii \advance\labelwidth-\labelsep
1035 \topsep\z@skip}
1036 \def\@listiii{\leftmargin\leftmarginiii
1037 \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
1038 \def\@listiv{\leftmargin\leftmarginiv
1039 \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
1040 \def\@listv{\leftmargin\leftmarginv
1041 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
1042 \def\@listvi{\leftmargin\leftmarginvi
1043 \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
\descriptionlabel We do not use a colon by default like amsart does:
1044 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}

\description Make the description environment indentation consistent with that of the itemize
and enumerate environments.
1045 \renewenvironment{description}{\list{}}{%
1046 \labelwidth\@ACM@labelwidth
1047 \let\makelabel\descriptionlabel}%
1048 }{
1049 \endlist
1050 }
1051 \let\enddescription=\endlist % for efficiency

```

3.16 Top-matter data

`\if@ACM@maketitle@typeset` The switch to check whether `\maketitle` is already typeset. It is initially false, and setting top matter when it is true is wrong.

```

1052 \newif\if@ACM@maketitle@typeset
1053 \@ACM@maketitle@typesetfalse

```

We use the `xkeyval` interface to define journal titles and the relevant information

```

1054 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
1055 ACMJCSS,%
1056 CIE,%
1057 CSUR,%
1058 DGOV,%
1059 DLT,%
1060 DTRAP,%
1061 FAC,%

```

1062	GAMES,%
1063	HEALTH,%
1064	IMWUT,%
1065	JACM,%
1066	JATS,%
1067	JDIQ,%
1068	JDS,%
1069	JEA,%
1070	JERIC,%
1071	JETC,%
1072	JOCCH,%
1073	JRC,%
1074	PACMCGIT,%
1075	PACMHCI,%
1076	PACMMOD,%
1077	PACMNET,%
1078	PACMPL,%
1079	PACMSE,%
1080	POMACS,%
1081	TAAS,%
1082	TACCESS,%
1083	TACO,%
1084	TALG,%
1085	TALLIP,%
1086	TAP,%
1087	TCPS,%
1088	TDS,%
1089	TEAC,%
1090	TECS,%
1091	TELO,%
1092	THRI,%
1093	TIIS,%
1094	TIOT,%
1095	TISSEC,%
1096	TIST,%
1097	TKDD,%
1098	TMIS,%
1099	TOCE,%
1100	TOCHI,%
1101	TOCL,%
1102	TOCS,%
1103	TOCT,%
1104	TODAES,%
1105	TODS,%
1106	TOG,%
1107	TOIS,%
1108	TOIT,%
1109	TOMACS,%
1110	TOMM,%
1111	TOMPECS,%
1112	TOMS,%
1113	TOPC,%
1114	TOPS,%
1115	TOPLAS,%

```

1116 TOPML,%
1117 TORS,%
1118 TOS,%
1119 TOSEM,%
1120 TOSN,%
1121 TQC,%
1122 TRETs,%
1123 TSAS,%
1124 TSC,%
1125 TSLP,%
1126 TWEB,%
1127 FACMP%
1128 }{%
1129 \ifcase\@journalCode@nr
1130 \relax % ACMJCSS
1131 \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
1132 \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%
1133 \def\@permissionCodeOne{2834-5533}%
1134 \or % CIE
1135 \def\@journalName{ACM Computers in Entertainment}%
1136 \def\@journalNameShort{ACM Comput. Entertain.}%
1137 \def\@permissionCodeOne{1544-3574}%
1138 \or % CSUR
1139 \def\@journalName{ACM Computing Surveys}%
1140 \def\@journalNameShort{ACM Comput. Surv.}%
1141 \def\@permissionCodeOne{0360-0300}%
1142 \or % DGOV
1143 \def\@journalName{Digital Government: Research and Practice}%
1144 \def\@journalNameShort{Digit. Gov. Res. Pract.}%
1145 \def\@permissionCodeOne{2639-0175}%
1146 \or % DLT
1147 \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
1148 \def\@journalNameShort{Distrib. Ledger Technol.}%
1149 \def\@permissionCodeOne{2769-6472}%
1150 \or % DTRAP
1151 \def\@journalName{Digital Threats: Research and Practice}%
1152 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1153 \def\@permissionCodeOne{2576-5337}%
1154 \or % FAC
1155 \def\@journalName{Formal Aspects of Computing}%
1156 \def\@journalNameShort{Form. Asp. Comput.}%
1157 \def\@permissionCodeOne{0934-5043}%
1158 \def\@permissionCodeTwo{1433-299X}%
1159 \or % GAMES
1160 \def\@journalName{ACM Games: Research and Practice}%
1161 \def\@journalNameShort{ACM Games}%
1162 \def\@permissionCodeOne{2832-5516}%
1163 \or % HEALTH
1164 \def\@journalName{ACM Transactions on Computing for Healthcare}%
1165 \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1166 \def\@permissionCodeOne{2637-8051}%
1167 \or % IMWUT
1168 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1169 Wearable and Ubiquitous Technologies}%

```

```

1170 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
1171 \def\@permissionCodeOne{2474-9567}%
1172 \@ACM@screentruer
1173 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1174 \or % JACM
1175 \def\@journalName{Journal of the ACM}%
1176 \def\@journalNameShort{J. ACM}%
1177 \def\@permissionCodeOne{0004-5411}%
1178 \or % JATS
1179 \def\@journalName{Journal on Autonomous Transportation Systems}%
1180 \def\@journalNameShort{ACM J. Auton. Transport. Syst.}%
1181 \def\@permissionCodeOne{2833-0528}%
1182 \or % JDIQ
1183 \def\@journalName{ACM Journal of Data and Information Quality}%
1184 \def\@journalNameShort{ACM J. Data Inform. Quality}%
1185 \def\@permissionCodeOne{1936-1955}%
1186 \or % JDS
1187 \def\@journalName{ACM/JMS Journal of Data Science}%
1188 \def\@journalNameShort{ACM/IMS J. Data Sci.}%
1189 \def\@permissionCodeOne{2831-3194}%
1190 \def\@permissionCodeTwo{2831-3194}%
1191 \or % JEA
1192 \def\@journalName{ACM Journal of Experimental Algorithmics}%
1193 \def\@journalNameShort{ACM J. Exp. Algor.}%
1194 \def\@permissionCodeOne{1084-6654}%
1195 \or % JERIC
1196 \def\@journalName{ACM Journal of Educational Resources in Computing}%
1197 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
1198 \def\@permissionCodeOne{1073-0516}%
1199 \or % JETC
1200 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
1201 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1202 \def\@permissionCodeOne{1550-4832}%
1203 \or % JOCCH
1204 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1205 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1206 \def\@permissionCodeOne{1556-4673}%
1207 \def\@permissionCodeTwo{1556-4711}%
1208 \or % JRC
1209 \def\@journalName{ACM Journal on Responsible Computing}%
1210 \def\@journalNameShort{ACM J. Responsib. Comput.}%
1211 \def\@permissionCodeOne{2832-0565}%
1212 \or % PACMCGIT
1213 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1214 \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1215 \def\@permissionCodeOne{2577-6193}%
1216 \@ACM@screentruer
1217 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1218 \or % PACMHCI
1219 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
1220 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
1221 \def\@permissionCodeOne{2573-0142}%
1222 \@ACM@screentruer
1223 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%

```

```

1224 \or % PACMMOD
1225 \def\@journalName{Proceedings of the ACM on Management of Data}%
1226 \def\@journalNameShort{Proc. ACM Manag. Data}%
1227 \def\@permissionCodeOne{2836-6573}%
1228 \or % PACMNET
1229 \def\@journalName{Proceedings of the ACM on Networkng}%
1230 \def\@journalNameShort{Proc. ACM Netw.}%
1231 \def\@permissionCodeOne{2834-5509}%
1232 \or % PACMPL
1233 \def\@journalName{Proceedings of the ACM on Programming Languages}%
1234 \def\@journalNameShort{Proc. ACM Program. Lang.}%
1235 \def\@permissionCodeOne{2475-1421}%
1236 \@ACM@screentruue
1237 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1238 \or % PACMSE
1239 \def\@journalName{Proceedings of the ACM on Software Engineering}%
1240 \def\@journalNameShort{Proc. ACM Softw. Eng.}%
1241 \def\@permissionCodeOne{2994-970X}%
1242 \@ACM@screentruue
1243 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1244 \or % POMACS
1245 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1246 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1247 \def\@permissionCodeOne{2476-1249}%
1248 \@ACM@screentruue
1249 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1250 \or % TAAS
1251 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
1252 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
1253 \def\@permissionCodeOne{1556-4665}%
1254 \or % TACCESS
1255 \def\@journalName{ACM Transactions on Accessible Computing}%
1256 \def\@journalNameShort{ACM Trans. Access. Comput.}%
1257 \def\@permissionCodeOne{1936-7228}%
1258 \or % TACO
1259 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1260 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1261 \def\@permissionCodeOne{1544-3566}%
1262 \def\@permissionCodeTwo{1544-3973}%
1263 \or % TALG
1264 \def\@journalName{ACM Transactions on Algorithms}%
1265 \def\@journalNameShort{ACM Trans. Algor.}%
1266 \def\@permissionCodeOne{1549-6325}%
1267 \or % TALLIP
1268 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1269 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1270 \def\@permissionCodeOne{2375-4699}%
1271 \or % TAP
1272 \def\@journalName{ACM Transactions on Applied Perception}%
1273 \def\@journalNameShort{ACM Trans. Appl. Percept.}%
1274 \def\@permissionCodeOne{1544-3558}%
1275 \or % TCPS
1276 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1277 \def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%

```

```

1278 \def\@permissionCodeOne{2378-962X}%
1279 \or % TDS
1280 \def\@journalName{ACM/IMS Transactions on Data Science}%
1281 \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
1282 \def\@permissionCodeOne{2577-3224}%
1283 \or % TEAC
1284 \def\@journalName{ACM Transactions on Economics and Computation}%
1285 \def\@journalNameShort{ACM Trans. Econ. Comput.}%
1286 \def\@permissionCodeOne{2167-8375}%
1287 \or % TECS
1288 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
1289 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1290 \def\@permissionCodeOne{1539-9087}%
1291 \or % TELO
1292 \def\@journalName{ACM Transactions on Evolutionary Learning}%
1293 \def\@journalNameShort{ACM Trans. Evol. Learn.}%
1294 \def\@permissionCodeOne{2688-3007}%
1295 \or % THRI
1296 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
1297 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1298 \def\@permissionCodeOne{2573-9522}%
1299 \or % TIIS
1300 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
1301 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1302 \def\@permissionCodeOne{2160-6455}%
1303 \or % TIOT
1304 \def\@journalName{ACM Transactions on Internet of Things}%
1305 \def\@journalNameShort{ACM Trans. Internet Things}%
1306 \def\@permissionCodeOne{2577-6207}%
1307 \or % TISSEC
1308 \def\@journalName{ACM Transactions on Information and System Security}%
1309 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1310 \def\@permissionCodeOne{1094-9224}%
1311 \or % TIIST
1312 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1313 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1314 \def\@permissionCodeOne{2157-6904}%
1315 \or % TKDD
1316 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
1317 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1318 \def\@permissionCodeOne{1556-4681}%
1319 \or % TMIS
1320 \def\@journalName{ACM Transactions on Management Information Systems}%
1321 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1322 \def\@permissionCodeOne{2158-656X}%
1323 \or % TOCE
1324 \def\@journalName{ACM Transactions on Computing Education}%
1325 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
1326 \def\@permissionCodeOne{1946-6226}%
1327 \or % TOCHI
1328 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1329 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1330 \def\@permissionCodeOne{1073-0516}%
1331 \or % TOCL

```

```

1332 \def\@journalName{ACM Transactions on Computational Logic}%
1333 \def\@journalNameShort{ACM Trans. Comput. Logic}%
1334 \def\@permissionCodeOne{1529-3785}%
1335 \or % TOCS
1336 \def\@journalName{ACM Transactions on Computer Systems}%
1337 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1338 \def\@permissionCodeOne{0734-2071}%
1339 \or % TOCT
1340 \def\@journalName{ACM Transactions on Computation Theory}%
1341 \def\@journalNameShort{ACM Trans. Comput. Theory}%
1342 \def\@permissionCodeOne{1942-3454}%
1343 \or % TODAES
1344 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1345 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1346 \def\@permissionCodeOne{1084-4309}%
1347 \or % TODS
1348 \def\@journalName{ACM Transactions on Database Systems}%
1349 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
1350 \def\@permissionCodeOne{0362-5915}%
1351 \or % TOG
1352 \def\@journalName{ACM Transactions on Graphics}%
1353 \def\@journalNameShort{ACM Trans. Graph.}%
1354 \def\@permissionCodeOne{0730-0301}%
1355 \or % TOIS
1356 \def\@journalName{ACM Transactions on Information Systems}%
1357 \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1358 \def\@permissionCodeOne{1046-8188}%
1359 \or % TOIT
1360 \def\@journalName{ACM Transactions on Internet Technology}%
1361 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1362 \def\@permissionCodeOne{1533-5399}%
1363 \or % TOMACS
1364 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1365 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1366 \def\@permissionCodeOne{1049-3301}%
1367 \def\@permissionCodeTwo{1558-1195}%
1368 \or % TOMM
1369 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
1370 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1371 \def\@permissionCodeOne{1551-6857}%
1372 \def\@permissionCodeTwo{1551-6865}%
1373 \or % TOMPECS
1374 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1375 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1376 \def\@permissionCodeOne{2376-3639}%
1377 \or % TOMS
1378 \def\@journalName{ACM Transactions on Mathematical Software}%
1379 \def\@journalNameShort{ACM Trans. Math. Softw.}%
1380 \def\@permissionCodeOne{0098-3500}%
1381 \or % TOPC
1382 \def\@journalName{ACM Transactions on Parallel Computing}%
1383 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1384 \def\@permissionCodeOne{2329-4949}%
1385 \def\@permissionCodeTwo{2329-4957}%

```

```

1386 \or % TOPS
1387 \def\@journalName{ACM Transactions on Privacy and Security}%
1388 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1389 \def\@permissionCodeOne{2471-2566}%
1390 \or % TOPLAS
1391 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1392 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1393 \def\@permissionCodeOne{0164-0925}%
1394 \or % TOPML
1395 \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
1396 \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
1397 \def\@permissionCodeOne{2836-8924}%
1398 \or % TORS
1399 \def\@journalName{ACM Transactions on Recommender Systems}%
1400 \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
1401 \def\@permissionCodeOne{2770-6699}%
1402 \or % TOS
1403 \def\@journalName{ACM Transactions on Storage}%
1404 \def\@journalNameShort{ACM Trans. Storage}%
1405 \def\@permissionCodeOne{1553-3077}%
1406 \or % TOSEM
1407 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1408 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1409 \def\@permissionCodeOne{1049-331X}%
1410 \or % TOSN
1411 \def\@journalName{ACM Transactions on Sensor Networks}%
1412 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1413 \def\@permissionCodeOne{1550-4859}%
1414 \or % TQC
1415 \def\@journalName{ACM Transactions on Quantum Computing}%
1416 \def\@journalNameShort{ACM Trans. Quantum Comput.}%
1417 \def\@permissionCodeOne{2643-6817}%
1418 \or % TRETS
1419 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1420 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1421 \def\@permissionCodeOne{1936-7406}%
1422 \or % TSAS
1423 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1424 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1425 \def\@permissionCodeOne{2374-0353}%
1426 \or % TSC
1427 \def\@journalName{ACM Transactions on Social Computing}%
1428 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1429 \def\@permissionCodeOne{2469-7818}%
1430 \or % TSLP
1431 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1432 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1433 \def\@permissionCodeOne{1550-4875}%
1434 \or % TWEB
1435 \def\@journalName{ACM Transactions on the Web}%
1436 \def\@journalNameShort{ACM Trans. Web}%
1437 \def\@permissionCodeOne{1559-1131}%
1438 \else % FACMP, a dummy journal
1439 \def\@journalName{ACM Just Accepted}%

```

```

1440 \def\@journalNameShort{ACM Accepted}%
1441 \def\@permissionCodeOne{XXXX-XXXX}%
1442 \fi
1443 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1444 }{%
1445 \ClassError{\@classname}{Incorrect journal #1}%
1446 }%

```

`\acmJournal` And the syntactic sugar around it

```

1447 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
1448 \global\@ACM@journal@bibstriptrue}

```

The defaults:

```

1449 \def\@journalCode@nr{0}
1450 \def\@journalName{}%
1451 \def\@journalNameShort{\@journalName}%
1452 \def\@permissionCodeOne{XXXX-XXXX}%
1453 \def\@permissionCodeTwo{}%

```

`\acmConference` This is the conference command

```

1454 \newcommand\acmConference[4][{}]{%
1455 \gdef\acmConference@shortname{#1}%
1456 \gdef\acmConference@name{#2}%
1457 \gdef\acmConference@date{#3}%
1458 \gdef\acmConference@venue{#4}%
1459 \ifx\acmConference@shortname\@empty
1460 \gdef\acmConference@shortname{#2}%
1461 \fi
1462 \global\@ACM@journal@bibstripfalse
1463 }
1464 \if@ACM@journal\else
1465 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1466 DC, USA}%
1467 \fi

```

`\acmBooktitle` The book title of the conference:

```

\@acmBooktitle 1468 \def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
1469 \acmBooktitle{}
1470 \ifx\acmConference@name\@undefined\else
1471 \acmBooktitle{Proceedings of \acmConference@name
1472 \ifx\acmConference@name\acmConference@shortname\else
1473 \ (\acmConference@shortname)\fi}
1474 \fi

```

`\@editorsAbbrev` How to abbreviate editors

```

1475 \def\@editorsAbbrev{(Ed.)}

```

`\@acmEditors` The list of editors

```

1476 \def\@acmEditors{}

```

`\editor` Add a new editor to the list

```

1477 \def\editor#1{\ifx\@acmEditors\@empty
1478 \gdef\@acmEditors{#1}%

```

```

1479 \else
1480 \gdef\@editorsAbbrev{(Eds.)}%
1481 \g@addto@macro\@acmEditors{\and#1}%
1482 \fi}

\subtitle The subtitle macro
1483 \def\subtitle#1{\def\@subtitle{#1}}
1484 \subtitle{}

\num@authorgroups The total number of “groups”. Each group is several authors with the same affiliations(s)
1485 \newcount\num@authorgroups
1486 \num@authorgroups=0\relax

\num@authors The total number of authors
1487 \newcount\num@authors
1488 \num@authors=0\relax

\if@insideauthorgroup Whether we are continuing an author group
1489 \newif\if@insideauthorgroup
1490 \@insideauthorgroupfalse

\author Adding an author to the list of authors and addresses.
    Note that we want to typeset the link to the author’s orcid if known. The problem
    is, we know the orcid only after the author is entered. The trick is based on the idea
    that \csname...\endcsname is \relax unless defined. Therefore we typeset authors by
    the special macro \csname typeset@author\the\num@authors\endcsname, which is
    defined by \orcid command.
1491 \renewcommand\author[2][{}%
1492 \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\@classname}{Do not put several
1493     authors in the same \string\author\space macro!}}{}%
1494 \global\advance\num@authors by 1\relax
1495 \if@insideauthorgroup\else
1496 \global\advance\num@authorgroups by 1\relax
1497 \global\@insideauthorgrouptrue
1498 \fi
1499 \ifx\addresses\@empty
1500 \if@ACM@anonymous
1501 \gdef\addresses{\@author{Anonymous Author(s)}%
1502 \ifx\@acmSubmissionID\@empty\else\\Submission Id:
1503 \@acmSubmissionID\fi}}%
1504 \gdef\authors{Anonymous Author(s)}%
1505 \else
1506 \expandafter\gdef\expandafter\addresses\expandafter{%
1507 \expandafter\@author\expandafter{%
1508 \csname typeset@author\the\num@authors\endcsname{#2}}}%
1509 \gdef\authors{#2}%
1510 \fi
1511 \else
1512 \if@ACM@anonymous\else
1513 \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
1514 \expandafter\and\expandafter\@author\expandafter{%
1515 \csname typeset@author\the\num@authors\endcsname{#2}}}%
1516 \g@addto@macro\authors{\and#2}%

```

```

1517 \fi
1518 \fi
1519 \if@ACM@anonymous
1520 \ifx\shortauthors\@empty
1521 \gdef\shortauthors{Anon.
1522 \ifx\@acmSubmissionID\@empty\else Submission Id:
1523 \@acmSubmissionID\fi}%
1524 \fi
1525 \else
1526 \def\@tempa{#1}%
1527 \ifx\@tempa\@empty
1528 \ifx\shortauthors\@empty
1529 \gdef\shortauthors{#2}%
1530 \else
1531 \g@addto@macro\shortauthors{\and#2}%
1532 \fi
1533 \else
1534 \ifx\shortauthors\@empty
1535 \gdef\shortauthors{#1}%
1536 \else
1537 \g@addto@macro\shortauthors{\and#1}%
1538 \fi
1539 \fi
1540 \fi}

```

`\affiliation` The macro `\affiliation` mimics `\address` from `amsart`. Note that it has an optional argument, which we use differently from `amsart`.

```

1541 \newcommand{\affiliation}[2][{}]{%
1542 \global\@insideauthorgroupfalse
1543 \if@ACM@anonymous\else
1544 \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1545 \fi}

```

`\ACM@affiliation@obeypunctuation` Whether to use the author's punctuation (false by default, which adds American-style address punctuation)

```

1546 \define@boolkey+{@ACM@affiliation@}{@ACM@affiliation@}{obeypunctuation}%
1547 [true]{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

```

`\additionalaffiliation` Additional affiliations go to footnotes

```

1548 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

```

`\@additionalaffiliation` Process `\additionalaffiliation` inside `\authornote`

```

1549 \def\@additionalaffiliation#1{\bgroup
1550 \def\position##1{\ignorespaces}%
1551 \def\institution##1{##1\ignorespaces}%
1552 \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1553 \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
1554 \let\streetaddress\position
1555 \let\city\position
1556 \let\state\position
1557 \let\postcode\position
1558 \let\country\position
1559 Also with #1\unskip.\egroup}

```

`\email` The macro `\email` mimics `\email` from `amsart`. Again, it has an optional argument that we do not currently need but keep for possible future use.

```
1560 \renewcommand{\email}[2][{}]{%
1561   \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1562     addresses in the same \string\email\space macro!}}{}%
1563   \if@ACM@anonymous\else
1564     \g@addto@macro\addresses{\email{#1}{#2}}%
1565   \fi}
```

`\orcid` We redefine the command to typeset the current author

```
1566 \def\orcid#1{\unskip\ignorespaces%
1567   \IfBeginWith{#1}{http}{%
1568     \expandafter\gdef\csname
1569       typeset@author\the\num@authors\endcsname##1{%
1570       \href{#1}{##1}}}%
1571   \expandafter\gdef\csname
1572     typeset@author\the\num@authors\endcsname##1{%
1573     \href{https://orcid.org/#1}{##1}}}
```

`\authorsaddresses` Setting up authors' addresses

```
1574 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1575 \authorsaddresses{\@mkauthorsaddresses}
```

`\@mktranslatedkeywords` We have two argument: the language to typeset keywords and the keywords.

```
1576 \newcommand\@mktranslatedkeywords[2]{\bgroup
1577   \selectlanguage{#1}%
1578   {\@specialsection{\keywordsname}%
1579     \noindent#2\par}\egroup}
```

`\@titlenotes` The title notes

```
1580 \def\@titlenotes{}
```

`\titlenote` Adding a note to the title

```
1581 \def\titlenote#1{%
1582   \g@addto@macro\@title{\footnotemark}%
1583   \if@ACM@anonymous
1584     \g@addto@macro\@titlenotes{%
1585       \stepcounter{footnote}\footnotetext{Title note}}%
1586   \else
1587     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1588   \fi}
```

`\@subtitlenotes` The subtitle notes

```
1589 \def\@subtitlenotes{}
```

`\subtitlenote` Adding a note to the subtitle

```
1590 \def\subtitlenote#1{%
1591   \g@addto@macro\@subtitle{\footnotemark}%
1592   \if@ACM@anonymous
1593     \g@addto@macro\@subtitlenotes{%
1594       \stepcounter{footnote}\footnotetext{Subtitle note}}%
1595   \else
1596     \g@addto@macro\@subtitlenotes{%
```

```

1597         \stepcounter{footnote}\footnotetext{#1}}%
1598     \fi}

\@authornotes The author notes
1599 \def\@authornotes{}

\authornote Adding a note to the author
1600 \def\authornote#1{%
1601     \if@ACM@anonymous\else
1602         \g@addto@macro\addresses{\@authornotemark}%
1603         \g@addto@macro\@authornotes{%
1604             \stepcounter{footnote}\footnotetext{#1}}%
1605     \fi}

\authornotemark Adding a footnote mark to the authors
1606 \newcommand\authornotemark[1][\relax]{%
1607     \ifx#1\relax\relax\relax
1608     \g@addto@macro\addresses{\@authornotemark}%
1609     \else
1610     \g@addto@macro\addresses{\@authornotemark{#1}}%
1611     \fi}

\acmVolume The current volume
1612 \def\acmVolume#1{\def\@acmVolume{#1}}
1613 \acmVolume{1}

\acmNumber The current number
1614 \def\acmNumber#1{\def\@acmNumber{#1}}
1615 \acmNumber{1}

\acmArticle The current article
1616 \def\acmArticle#1{\def\@acmArticle{#1}}
1617 \acmArticle{}

\acmArticleSeq The sequence number
1618 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
1619 \acmArticleSeq{\@acmArticle}

\acmYear The current year
1620 \def\acmYear#1{\def\@acmYear{#1}}
1621 \acmYear{\the\year}

\acmMonth The current month
1622 \def\acmMonth#1{\def\@acmMonth{#1}}
1623 \acmMonth{\the\month}

\@acmPubDate The publication date
1624 \def\@acmPubDate{\ifcase\@acmMonth\or
1625     January\or February\or March\or April\or May\or June\or
1626     July\or August\or September\or October\or November\or
1627     December\fi~\@acmYear}

\acmPrice The price—obsolete

```

`\acmSubmissionID` The submission ID

```

1628 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
1629 \acmSubmissionID{}

```

`\acmISBN` The book ISBN

```

1630 \def\acmISBN#1{\def\@acmISBN{#1}}
1631 \acmISBN{978-x-xxxx-xxxx-x/YY/MM}

```

`\acmDOI` The paper DOI

```

1632 \def\acmDOI#1{\def\@acmDOI{#1}}
1633 \acmDOI{10.1145/nnnnnnn.nnnnnnn}

```

`\if@ACM@badge`

`\@ACM@badge@width` The width of the badge

```

1634 \newlength\@ACM@badge@width
1635 \setlength\@ACM@badge@width{3pc}

```

`\@ACM@title@width` The width of the title

```

1636 \newlength\@ACM@title@width

```

`\@ACM@badge@skip` The spacing between badges

```

1637 \newlength\@ACM@badge@skip
1638 \setlength\@ACM@badge@skip{1pt}

```

`\@acmBadgeR`

```

1639 \def\@acmBadgeR{}

```

`\@acmBadgeL`

```

1640 \def\@acmBadgeL{}

```

`\acmBadgeR` Setting the right badge

```

1641 \newcommand\acmBadgeR[2][\%
1642   \ifx\@acmBadgeR\empty
1643     \gdef\@acmBadgeR{\%
1644       \smash{\%
1645         \raisebox{0.5\height}{\%
1646           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1647   \else
1648     \g@addto@macro{\@acmBadgeR}{\%
1649       \hspace{\@ACM@badge@skip}%
1650       \smash{\%
1651         \raisebox{0.5\height}{\%
1652           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1653   \fi}

```

`\acmBadgeL` Setting the left badge

```

1654 \newcommand\acmBadgeL[2][\%
1655   \ifx\@acmBadgeL\empty
1656     \gdef\@acmBadgeL{\%
1657       \smash{\%
1658         \raisebox{0.5\height}{\%
1659           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%

```

```

1660 \else
1661   \g@addto@macro{\@acmBadgeL}{%
1662     \hspace{\@ACM@badge@skip}%
1663     \smash{%
1664       \raisebox{0.5\height}{%
1665         \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}%
1666     \fi}

\acmBadge Just a syntax sugar for \acmBadgeR
1667 \let\acmBadge=\acmBadgeR

\startPage The start page of the paper
1668 \def\startPage#1{\def\@startPage{#1}}
1669 \startPage{}

\terms Terms are obsolete. We use CCS now.
1670 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
1671   obsolete. I am going to ignore it}}

\keywords Keywords are mostly obsolete. We use CCS now. Still it makes sense to keep them for
compatibility.
1672 \def\keywords#1{\def\@keywords{#1}}
1673 \let\@keywords\@empty

1674 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty
1675   \ifnum\getrefnumber{TotPages}>2\relax
1676   \ClassWarningNoLine{\@classname}{ACM keywords are mandatory
1677     for papers over two pages}%
1678   \fi\fi\fi}

abstract The amsart package puts abstract in a box. Since we do not know whether we will
use two-column mode, we prefer to save the text
1679 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{\}

\@saveabstract And saving the abstract
1680 \long\def\@saveabstract#1{\if@ACM@maketitle@typeset
1681   \ClassError{\@classname}{Abstract must be defined before maketitle
1682     command. Please move it!}\fi
1683   \long\gdef\@abstract{#1}}
1684 \let\@saveabstract{}

\@empty The long version of \@empty (to compare with \@abstract)
1685 \long\def\@empty{}

\if@ACM@printccs Whether to print CCS
1686 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
1687   \if@ACM@printccs
1688     \ClassInfo{\@classname}{Printing CCS}%
1689   \else
1690     \ClassInfo{\@classname}{Suppressing CCS}%
1691   \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}

```

`\if@ACM@printacmref` Whether to print the ACM bibstrip

```
1692 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1693   \if@ACM@printacmref
1694     \ClassInfo{\@classname}{Printing bibformat}%
1695   \else
1696     \ClassInfo{\@classname}{Suppressing bibformat}%
1697   \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}

1698 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
1699   \ifnum\getrefnumber{TotPages}>1\relax
1700     \ClassWarningNoLine{\@classname}{%
1701       ACM reference format is mandatory \MessageBreak
1702       for papers over one page. \MessageBreak
1703       Please add printacmref=true to the \MessageBreak
1704       \string\settopmatter\space command.}%
1705   \fi\fi\fi}
```

`\if@ACM@printfolios` Whether to print folios

```
1706 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1707   \if@ACM@printfolios
1708     \ClassInfo{\@classname}{Printing folios}%
1709   \else
1710     \ClassInfo{\@classname}{Suppressing folios}%
1711   \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}
```

`\@ACM@authorssperrow` The number of authors per row. 0 means use the default algorithm.

```
1712 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorssperrow}[0]{%
1713   \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorssperrow to
1714     #1}}{\ClassWarning{\@classname}{The parameter authorssperrow must be
1715     numerical. Ignoring the input #1}}\gdef\@ACM@authorssperrow{0}}
```

`\settopmatter` The usual syntactic sugar

```
1716 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}
```

Now the settings

```
1717 \settopmatter{printccs=true, printacmref=true}
1718 \if@ACM@manuscript
1719   \settopmatter{printfolios=true}
1720 \else
1721   \if@ACM@journal
1722     \settopmatter{printfolios=true}
1723   \else
1724     \settopmatter{printfolios=false}
1725   \fi
1726 \fi
1727 \settopmatter{authorssperrow=0}
```

`\@received` The container for the paper history

```
1728 \def\@received{}
```

`\received` The `\received` command

```
1729 \newcommand\received[2][\def\@tempa{#1}%
1730   \ifx\@tempa\empty
```

```

1731 \ifx\@received\@empty
1732 \gdef\@received{Received #2}%
1733 \else
1734 \g@addto@macro{\@received}{; revised #2}%
1735 \fi
1736 \else
1737 \ifx\@received\@empty
1738 \gdef\@received{#1 #2}%
1739 \else
1740 \g@addto@macro{\@received}{; #1 #2}%
1741 \fi
1742 \fi}
1743 \AtEndDocument{%
1744 \ifx\@received\@empty\else
1745 \par\bigskip\noindent\small\normalfont\@received\par
1746 \fi}

```

\acmArticleType Article type. We set up the color.

```

1747 \define@choicekey+{ACM}{articletype}[\ACM@ArticleType\ACM@ArticleType@nr]{%
1748 Research,Review,Discussion,Invited,Position}[Review]{%
1749 \ifcase\ACM@ArticleType@nr
1750 \relax % Research
1751 \colorlet{@ACM@Article@color}{ACMBlue}%
1752 \or % Review
1753 \colorlet{@ACM@Article@color}{ACMOrange}%
1754 \or % Discussion
1755 \colorlet{@ACM@Article@color}{ACMGreen}%
1756 \or % Invited
1757 \colorlet{@ACM@Article@color}{ACMPurple}%
1758 \or % Position
1759 \colorlet{@ACM@Article@color}{ACMRed}%
1760 \fi
1761 }{%
1762 \ClassError{\@classname}{Article Type must be Research, Review,\MessageBreak
1763 Discussion, Invited, or Position}}
1764 \def\acmArticleType#1{\setkeys{ACM}{articletype=#1}}
1765 \if@ACM@acmcp
1766 \acmArticleType{Research}%
1767 \fi
1768

```

\@ACM@color@frame The colored frame for the acmcp

```

1769 \newenvironment{@ACM@color@frame}{%
1770 \def\FrameCommand{\hspace*{-6.5pc}}%
1771 \colorbox{@ACM@Article@color!10!white}}%
1772 \MakeFramed {\advance\hsize
1773 -6.5pc\relax\FrameRestore}}{\zsaveposy{@ACM@acmcpframe@y}}%
1774 \endMakeFramed}

```

\acmCodeDataLink The code link

```

1775 \def\acmCodeLink#1{%
1776 \ifx\@acmCodeDataLink\@empty
1777 \gdef\@acmCodeDataLink{\url{#1}}%
1778 \else

```

```

1779      \g@addto@macro{\@acmCodeDataLink}{\ \url{#1}}%
1780      \fi}
1781 \def\@acmCodeDataLink{}

\acmContributions The authors' contrubution statement
1782 \def\acmContributions#1{\gdef\@acmContributions{#1}}
1783 \acmContributions{}

\acmDataLink The code link
1784 \let\acmDataLink\acmCodeLink

3.17 Concepts system

We exclude CCSXML stuff generated by the ACM system:
1785 \RequirePackage{comment}
1786 \excludecomment{CCSXML}

\@concepts This is the storage macro and counter for concepts
1787 \let\@concepts\@empty
1788 \newcounter{@concepts}

\ccsdesc The first argument is the significance, the second is the concept(s)
1789 \newcommand\ccsdesc[2][100]{%
1790   \ccsdesc@parse#1~#2~~\ccsdesc@parse@end}

\ccsdesc@parse The parser of the expression Significance~General~Specific (we need textcomp for
\textrightarrow). Note that Specific can be empty!
1791 \def\textrightarrow{$\rightarrow$}
1792 \def\ccsdesc@parse#1~#2~#3~{%
1793   \stepcounter{@concepts}%
1794   \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1795     \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1796       \textbf{#2}}%
1797     \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{;}%
1798     \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1799     \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
1800       \csname CCS@Punctuation@#2\endcsname
1801       \csname CCS@Specific@#2\endcsname}%
1802   \fi
1803   \ifx#3\relax\relax\else
1804     \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
1805       \textrightarrow\ }%
1806     \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1807       \addtocounter{@concepts}{-1}%
1808       \ifnum#1>499\textbf{#3}\else
1809       \ifnum#1>299\textit{#3}\else
1810       #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
1811   \fi
1812 \ccsdesc@parse@finish}

1813 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\@empty\relax
1814   \ifnum\getrefnumber{TotPages}>2\relax
1815   \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
1816     for papers over two pages}%
1817   \fi\fi\fi}

```

```
\ccdesc@parse@finish Gobble everything to \ccsdesc@parse@end
1818 \def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}
```

3.18 Copyright system

This is from acmcopyright.sty

```
\if@printcopyright Whether to print a copyright symbol
1819 \newif\if@printcopyright
1820 \@printcopyrighttrue
```

```
\if@printpermission Whether to print the permission block
1821 \newif\if@printpermission
1822 \@printpermissiontrue
```

```
\if@acmowned Whether the ACM owns the rights to the paper
1823 \newif\if@acmowned
1824 \@acmownedtrue
```

Keys:

```
1825 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1826 \acm@copyrightinput\acm@copyrightmode]{none,%
1827 acmcopyright,acmlicensed,rightsretained,%
1828 usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1829 licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
1830 iw3c2w3,iw3c2w3g,cc}{%
1831 \@printpermissiontrue
1832 \@printcopyrighttrue
1833 \@acmownedtrue
1834 \ifnum\acm@copyrightmode=0\relax % none
1835 \@printpermissionfalse
1836 \@printcopyrightfalse
1837 \@acmownedfalse
1838 \fi
1839 \ifnum\acm@copyrightmode=2\relax % acmlicensed
1840 \@acmownedfalse
1841 \fi
1842 \ifnum\acm@copyrightmode=3\relax % rightsretained
1843 \@acmownedfalse
1844 \fi
1845 \ifnum\acm@copyrightmode=4\relax % usgov
1846 \@printpermissiontrue
1847 \@printcopyrightfalse
1848 \@acmownedfalse
1849 \fi
1850 \ifnum\acm@copyrightmode=6\relax % cagov
1851 \@acmownedfalse
1852 \fi
1853 \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1854 \@acmownedfalse
1855 \fi
1856 \ifnum\acm@copyrightmode=9\relax % licensedcagov
1857 \@acmownedfalse
```

```

1858 \fi
1859 \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1860 \@acmownedfalse
1861 \fi
1862 \ifnum\acm@copyrightmode=11\relax % othergov
1863 \@acmownedtrue
1864 \fi
1865 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1866 \@acmownedfalse
1867 \fi
1868 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1869 \@acmownedfalse
1870 \fi
1871 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1872 \@acmownedfalse
1873 \fi
1874 \ifnum\acm@copyrightmode=15\relax % cc
1875 \@acmownedfalse
1876 \fi}

```

`\setcopyright` This is the syntactic sugar around setting keys.

```

1877 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1878 \setcopyright{acmlicensed}

```

`\setcctype` The type of Creative Commons license used

```

1879 \newcommand\setcctype[2][4.0]{%
1880 \def\ACM@cc@version{#1}%
1881 \def\ACM@cc@type{#2}}
1882 \setcctype{by}

```

`\@copyrightowner` Here is the owner of the copyright

```

1883 \def\@copyrightowner{%
1884 \ifcase\acm@copyrightmode\relax % none
1885 \or % acmcopyright
1886 ACM\@.
1887 \or % acmlicensed
1888 Copyright held by the owner/author(s). Publication rights licensed to
1889 ACM\@.
1890 \or % rightsretained
1891 Copyright held by the owner/author(s).
1892 \or % usgov
1893 \or % usgovmixed
1894 Copyright held by the owner/author(s).
1895 \or % cagov
1896 Copyright Crown in Right of Canada.
1897 \or %cagovmixed
1898 Copyright held by the owner/author(s).
1899 \or %licensedusgovmixed
1900 Copyright held by the owner/author(s). Publication rights licensed to
1901 ACM\@.
1902 \or % licensedcagov
1903 Copyright held by the owner/author(s).
1904 \or %licensedcagovmixed
1905 Copyright held by the owner/author(s). Publication rights licensed to

```

```

1906 ACM\@.
1907 \or % othergov
1908 Copyright held by the owner/author(s).
1909 \or % licensedothergov
1910 Copyright held by the owner/author(s). Publication rights licensed to
1911 ACM\@.
1912 \or % ic2w3www
1913 IW3C2 (International World Wide Web Conference Committee), published
1914 under Creative Commons CC-BY~4.0 License.
1915 \or % ic2w3wwwgoogle
1916 IW3C2 (International World Wide Web Conference Committee), published
1917 under Creative Commons CC-BY-NC-ND~4.0 License.
1918 \or % cc
1919 Copyright held by the owner/author(s).
1920 \fi}

```

\@formatdoi Print a clickable DOI

```

1921 \def\@formatdoi#1{\url{https://doi.org/#1}}

```

\@ACM@copyright@check@cc At present cC licenses can be used only for acmengage format or for non-acm stuff. This macro checks whether the CC license is applicable and generates an error if not.

```

1922 \def\@ACM@copyright@check@cc{%
1923   \if@ACM@nonacm
1924     \ClassInfo{\@classname}{Using CC license with a non-acm
1925       material}%
1926   \else
1927     \if@ACM@engage
1928       \ClassInfo{\@classname}{Using CC license with ACM Engage
1929         material}%
1930     \else
1931       \ClassWarning{\@classname}{%
1932         Sorry, Creative Commons licenses are\MessageBreak
1933         currently not used with ACM publications\MessageBreak
1934         typeset by the authors}{Please use nonacm
1935         option or ACM Engage class to enable CC licenses}%
1936     \fi
1937   \fi}

```

\@copyrightpermission The canned permission block.

```

1938 \def\@copyrightpermission{%
1939   \ifcase\acm@copyrightmode\relax % none
1940   \or % acmcopyright
1941     Permission to make digital or hard copies of all or part of this
1942     work for personal or classroom use is granted without fee provided
1943     that copies are not made or distributed for profit or commercial
1944     advantage and that copies bear this notice and the full citation on
1945     the first page. Copyrights for components of this work owned by
1946     others than ACM must be honored. Abstracting with credit is
1947     permitted. To copy otherwise, or republish, to post on servers or
1948     to redistribute to lists, requires prior specific permission
1949     and\hspace*{.5pt}/or
1950     a fee. Request permissions from permissions@acm.org.
1951   \or % acmlicensed
1952     Permission to make digital or hard copies of all or part of this

```

1953 work for personal or classroom use is granted without fee provided
 1954 that copies are not made or distributed for profit or commercial
 1955 advantage and that copies bear this notice and the full citation on
 1956 the first page. Copyrights for components of this work owned by
 1957 others than the author(s) must be honored. Abstracting with credit
 1958 is permitted. To copy otherwise, or republish, to post on servers
 1959 or to redistribute to lists, requires prior specific permission
 1960 and\hspace*{.5pt}/or a fee. Request permissions from
 1961 permissions@acm.org.
 1962 \or % rightsretained
 1963 Permission to make digital or hard copies of part or all of this
 1964 work for personal or classroom use is granted without fee provided
 1965 that copies are not made or distributed for profit or commercial
 1966 advantage and that copies bear this notice and the full citation on
 1967 the first page. Copyrights for third-party components of this work
 1968 must be honored. For all other uses, contact the
 1969 owner\hspace*{.5pt}/author(s).
 1970 \or % usgov
 1971 This paper is authored by an employee(s) of the United States
 1972 Government and is in the public domain. Non-exclusive copying or
 1973 redistribution is allowed, provided that the article citation is
 1974 given and the authors and agency are clearly identified as its
 1975 source. All others Request permissions from
 1976 owner\hspace*{.5pt}/author(s).
 1977 \or % usgovmixed
 1978 ACM acknowledges that this contribution was authored or co-authored
 1979 by an employee, contractor, or affiliate of the United States
 1980 government. As such, the United States government retains a
 1981 nonexclusive, royalty-free right to publish or reproduce this
 1982 article, or to allow others to do so, for government purposes
 1983 only. Request permissions from owner\hspace*{.5pt}/author(s).
 1984 \or % cagov
 1985 This article was authored by employees of the Government of
 1986 Canada. As such, the Canadian government retains all interest in
 1987 the copyright to this work and grants to ACM a nonexclusive,
 1988 royalty-free right to publish or reproduce this article, or to
 1989 allow others to do so, provided that clear attribution is given
 1990 both to the authors and the Canadian government agency employing
 1991 them. Permission to make digital or hard copies for personal or
 1992 classroom use is granted. Copies must bear this notice and the full
 1993 citation on the first page. Copyrights for components of this work
 1994 owned by others than the Canadian Government must be honored. To
 1995 copy otherwise, distribute, republish, or post, requires prior
 1996 specific permission and/or a fee. Request permissions from
 1997 owner\hspace*{.5pt}/author(s).
 1998 \or % cagovmixed
 1999 ACM acknowledges that this contribution was co-authored by an
 2000 affiliate of the national government of Canada. As such, the Crown
 2001 in Right of Canada retains an equal interest in the
 2002 copyright. Reprints must include clear attribution to ACM and the
 2003 author's government agency affiliation. Permission to make digital
 2004 or hard copies for personal or classroom use is granted. Copies
 2005 must bear this notice and the full citation on the first
 2006 page. Copyrights for components of this work owned by others than

2007 ACM must be honored. To copy otherwise, distribute, republish, or
2008 post, requires prior specific permission and/or a fee. Request
2009 permissions from owner\hspace*{.5pt}/author(s).
2010 \or % licensedusgovmixed
2011 Publication rights licensed to ACM\@. ACM acknowledges that this
2012 contribution was authored or co-authored by an employee, contractor
2013 or affiliate of the United States government. As such, the
2014 Government retains a nonexclusive, royalty-free right to publish or
2015 reproduce this article, or to allow others to do so, for Government
2016 purposes only. Request permissions from
2017 owner\hspace*{.5pt}/author(s).
2018 \or % licensedcagov
2019 This article was authored by employees of the Government of
2020 Canada. As such, the Canadian government retains all interest in
2021 the copyright to this work and grants to ACM a nonexclusive,
2022 royalty-free right to publish or reproduce this article, or to
2023 allow others to do so, provided that clear attribution is given
2024 both to the authors and the Canadian government agency employing
2025 them. Permission to make digital or hard copies for personal or
2026 classroom use is granted. Copies must bear this notice and the full
2027 citation on the first page. Copyrights for components of this work
2028 owned by others than the Canadian Government must be honored. To
2029 copy otherwise, distribute, republish, or post, requires prior
2030 specific permission and/or a fee. Request permissions from
2031 owner\hspace*{.5pt}/author(s).
2032 \or % licensedcagovmixed
2033 Publication rights licensed to ACM. ACM acknowledges that this
2034 contribution was authored or co-authored by an employee, contractor
2035 or affiliate of the national government of Canada. As such, the
2036 Government retains a nonexclusive, royalty-free right to publish or
2037 reproduce this article, or to allow others to do so, for Government
2038 purposes only. Request permissions from
2039 owner\hspace*{.5pt}/author(s).
2040 \or % othergov
2041 ACM acknowledges that this contribution was authored or co-authored
2042 by an employee, contractor or affiliate of a national
2043 government. As such, the Government retains a nonexclusive,
2044 royalty-free right to publish or reproduce this article, or to
2045 allow others to do so, for Government purposes only. Request
2046 permissions from owner\hspace*{.5pt}/author(s).
2047 \or % licensedothergov
2048 Publication rights licensed to ACM\@. ACM acknowledges that this
2049 contribution was authored or co-authored by an employee, contractor
2050 or affiliate of a national government. As such, the Government
2051 retains a nonexclusive, royalty-free right to publish or reproduce
2052 this article, or to allow others to do so, for Government purposes
2053 only. Request permissions from owner\hspace*{.5pt}/author(s).
2054 \or % iw3c2w3
2055 This paper is published under the Creative Commons Attribution~4.0
2056 International (CC-BY~4.0) license. Authors reserve their rights to
2057 disseminate the work on their personal and corporate Web sites with
2058 the appropriate attribution.
2059 \or % iw3c2w3g
2060 This paper is published under the Creative Commons

```

2061 Attribution-NonCommercial-NoDerivs~4.0 International
2062 (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
2063 disseminate the work on their personal and corporate Web sites with
2064 the appropriate attribution.
2065 \or % CC
2066 \@ACM@copyright@check@cc
2067 \IfEq{\ACM@cc@type}{zero}{%
2068 \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0/legalcode}}{%
2069 \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version/legalcode}}%
2070 \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\
2071 \href{\ACM@CC@Url}{%
2072 This work is licensed under a Creative Commons
2073 \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}{%
2074 \IfEq{\ACM@cc@type}{by}{Attribution}{%
2075 \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}{%
2076 \IfEq{\ACM@cc@type}{by-nd}{Attribution-NoDerivatives}{%
2077 \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}{%
2078 \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{%
2079 \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{%
2080 ~\IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}%
2081 }
2082 License.}%
2083 \fi}

\copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
2084 \def\copyrightyear#1{\def\@copyrightyear{#1}}
2085 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container
2086 \def\@teaserfigures{}

teaserfigure The teaser figure
2087 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

\@saveteaser Saving the teaser
2088 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

\thanks We redefine amsart \thanks so the anonymous key works
2089 \renewcommand{\thanks}[1]{%
2090 \ifnotempty{#1}{%
2091 \if@ACM@anonymous
2092 \g@addto@macro\thankses{\thanks{A note}}%
2093 \else
2094 \g@addto@macro\thankses{\thanks{#1}}%
2095 \fi}}

\anon We provide \anon command, which obscures parts of the text if the package option
anonymous is set
2096 \newcommand{\anon}[2][ANONYMIZED]{%
2097 \if@ACM@anonymous%
2098 {\color{ACMOrange}#1}%
2099 \else%
2100 #2%
2101 \fi}

```

3.19 Maketitle hook

The current L^AT_EX provides a nice lthooks mechanism. However, since it is relatively new, we will use oldfashioned approach—at least for now.

`\@beginmaketitlehook` The hook

```
2102 \ifx\@beginmaketitlehook\@undefined
2103   \let\@beginmaketitlehook\empty
2104 \fi
```

`\AtBeginMaketitle` Adding to the hook

```
2105 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}
```

3.20 ACM Engage top matter

`\@acmengagemetadadata` The special metadata for ACM engage course materials

```
2106 \def\@acmengagemetadadata{}
```

`\setengagemetadadata` Adding topic to engage metadata

```
2107 \def\setengagemetadadata#1#2{%
2108   \g@addto@macro{\@acmengagemetadadata}{%
2109     \@setengagemetadadata{#1}{#2}}}
```

3.21 Typesetting top matter

`\mktitle@bx` Some of our formats use a two-column design. Some use a one-column design. In all cases we use a wide title. Thus we typeset the top matter in a special box to be used in the construction `\@twocolumn[⟨box⟩]`.

```
2110 \newbox\mktitle@bx
```

`\maketitle` The (in)famous `\maketitle`. Note that in sigchi-a mode, authors are *not* in the title box.

Another note: there is a subtle difference between author notes, title notes and thanks. The latter two refer to the paper itself and therefore belong to the copyright/permission block. By the way, this was the default behavior of the old ACM classes.

```
2111 \def\maketitle{\@beginmaketitlehook
2112   \@ACM@maketitle@typesettrue
2113   \if@ACM@anonymous
2114     % Anonymize omission of \author-s
2115     \ifnum\num@authorgroups=0\author{}\fi
2116   \fi
2117   \begingroup
2118   \let\@vspace\@vspace@orig
2119   \let\@vspacer\@vspacer@orig
2120   \let\@footnotemark\@footnotemark@nolink
2121   \let\@footnotetext\@footnotetext@nolink
2122   \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
2123   \hsize=\textwidth
2124   \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
2125   \mktitle\if@ACM@sigchiamode\else\mkauthors\fi\mkteasers
2126   \@printtopmatter
2127   \if@ACM@sigchiamode\mkauthors\fi
```

```

2128 \setcounter{footnote}{0}%
2129 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
2130 \@titlenotes
2131 \@subtitlenotes
2132 \@authornotes
2133 \let\@makefnmark\relax
2134 \let\@thefnmark\relax
2135 \let\@makefntext\noindent
2136 \ifx\@empty\thankses\else
2137   \footnotetextauthorsaddresses{%
2138     \def\par{\let\par\@par}\parindent\z@\@setthanks}%
2139   \fi
2140 \if@ACM@acmcp\else
2141   \ifx\@empty\@authorsaddresses\else
2142     \if@ACM@anonymous\else
2143       \if@ACM@journal@bibstrip
2144         \footnotetextauthorsaddresses{%
2145           \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2146         \fi
2147       \fi
2148     \fi
2149   \fi
2150 \if@ACM@nonacm
2151   \ifnum\acm@copyrightmode=15\relax % cc
2152     \footnotetextcopyrightpermission{\@copyrightpermission}%
2153   \fi
2154 \else
2155   \if@ACM@acmcp\else
2156     \footnotetextcopyrightpermission{%
2157       \if@ACM@authordraft
2158         \raisebox{-2ex}{\z@\z@{\makebox[0pt][l]{\large\bfseries
2159           Unpublished working draft. Not for distribution.}}}%
2160       \color[gray]{0.9}%
2161     \fi
2162     \parindent\z@\parskip0.1\baselineskip
2163     \if@ACM@authorversion\else
2164       \if@printpermission\@copyrightpermission\par\fi
2165     \fi
2166     \if@ACM@manuscript\else
2167       \if@ACM@journal@bibstrip\else % Print the conference information
2168         \if@ACM@engage
2169           {\itshape \@acmBooktitle, \@acmYear.}\par
2170         \else
2171           {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
2172         \fi
2173       \fi
2174     \fi
2175     \if@printcopyright
2176       \copyright\ \@copyrightyear\ \@copyrightowner\
2177     \else
2178       \@copyrightyear.\
2179     \fi
2180     \if@ACM@manuscript
2181       Manuscript submitted to ACM\

```

```

2182 \else
2183 \if@ACM@authorversion
2184 This is the author's version of the work. It is posted here for
2185 your personal use. Not for redistribution. The definitive Version
2186 of Record was published in
2187 \if@ACM@journal@bibstrip
2188 \emph{\@journalName}%
2189 \else
2190 \emph{\@acmBooktitle}%
2191 \fi
2192 \ifx\@acmDOI\@empty
2193 .
2194 \else
2195 , \@formatdoi{\@acmDOI}.
2196 \fi\
2197 \else
2198 \if@ACM@nonacm\else
2199 \if@ACM@journal@bibstrip
2200 ACM~\@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle\
2201 \@formatdoi{\@acmDOI}%
2202 \else % Conference
2203 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN\\\fi
2204 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
2205 \fi
2206 \fi
2207 \fi
2208 \fi}%
2209 \fi
2210 \fi
2211 \endgroup
2212 \if@ACM@engage\@typesetengagemetadata\fi
2213 \setcounter{footnote}{0}%
2214 \@mkabstract
2215 \ifx\@translatedabstracts\@empty\else
2216 \@translatedabstracts\fi
2217 \if@ACM@printccs
2218 \ifx\@concepts\@empty\else\bgroup
2219 {\@specialsection{CCS Concepts}%
2220 \noindent\@concepts\par}\egroup
2221 \fi
2222 \fi
2223 \if@ACM@acmcp\else
2224 \ifx\@keywords\@empty\else\bgroup
2225 {\@specialsection{\keywordsname}%
2226 \noindent\@keywords\par}\egroup
2227 \fi
2228 \ifx\@translatedkeywords\@empty\else
2229 \@translatedkeywords
2230 \fi
2231 \fi
2232 \let\metadata@authors=\authors
2233 \nxandlist{, }, {, }, \metadata@authors
2234 \def\@ACM@checkaffil{}%
2235 \hypersetup{%

```

```

2236 pdfauthor={\metadata@authors},
2237 pdftitle={\@title},
2238 pdfsubject={\@concepts},
2239 pdfkeywords={\@keywords},
2240 pdfcreator={LaTeX with acmart
2241 \csname ver@acmart.cls\endcsname\space
2242 and hyperref
2243 \csname ver@hyperref.sty\endcsname}}%
2244 \andify\authors
2245 \andify\shortauthors
2246 \global\let\authors=\authors
2247 \global\let\shortauthors=\shortauthors
2248 \if@ACM@printacmref
2249 \mkbibcitation
2250 \fi
2251 \global\@topnum\z@ % this prevents floats from falling
2252 % at the top of page 1
2253 \global\@botnum\z@ % we do not want them to be on the bottom either
2254 \@printendtopmatter
2255 \@afterindentfalse
2256 \@afterheading
2257 \if@ACM@acmcp
2258 \set@ACM@acmcpbox
2259 \AtEndDocument{\end@ACM@color@frame}%
2260 \@ACM@color@frame
2261 \fi
2262 }

```

\set@ACM@acmcpbox Setting infobox for acmcp

```

2263 \newbox\@ACM@acmcpbox
2264 \def\set@ACM@acmcpbox{%
2265 \bgroup
2266 \hsize=5pc
2267 \global\setbox\@ACM@acmcpbox=\vbox{%
2268 \setlength{\parindent}{\z@}%
2269 {\includegraphics[width=\hsize]{acm-jdslogo}\par}%
2270 \scriptsize
2271 \ifnum\getrefnumber{TotPages}>1\else
2272 \zrefused{\@ACM@acmcpbox@y}%
2273 \zrefused{\@ACM@acmcpframe@y}%
2274 \@tempdima=\dimexpr\zposy{\@ACM@acmcpbox@y}sp -
2275 \zposy{\@ACM@acmcpframe@y}sp+0.3\FrameSep+
2276 \@ACM@acmcp@delta\relax
2277 \ifdim\@tempdima>0pt\relax
2278 \vspace*{\@tempdima}%
2279 \protected@write\@auxout{%
2280 {\string\global\@ACM@acmcp@delta=\the\@tempdima\relax}%
2281 \fi
2282 \fi
2283 \ifx\@acmCodeDataLink\@empty\else\bigskip
2284 Code and data links:\\ \@acmCodeDataLink\par\bigskip
2285 \fi
2286 \ifx\@keywords\@empty\else\bigskip
2287 Keywords: \@keywords\par

```

```

2288 \fi
2289 \ifx\@acmContributions\@empty\else\bigskip
2290 \@acmContributions\par
2291 \fi
2292 \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
2293 \zsaveposy{\@ACM@acmcpbox@y}%
2294 }
2295 \egroup}

```

`\@specialsection` This macro starts sections for proceedings and uses `\small` for journals

```

2296 \def\@specialsection#1{%
2297 \let\@vspace\@vspace@orig
2298 \let\@vspacer\@vspacer@orig
2299 \ifcase\ACM@format@nr
2300 \relax % manuscript
2301 \par\medskip\small\noindent#1: %
2302 \or % acmsmall
2303 \par\medskip\small\noindent#1: %
2304 \or % acmlarge
2305 \par\medskip\small\noindent#1: %
2306 \or % acmtog
2307 \par\medskip\small\noindent#1: %
2308 \or % sigconf
2309 \section*{#1}%
2310 \or % siggraph
2311 \section*{#1}%
2312 \or % sigplan
2313 \noindentparagraph*{#1:~}%
2314 \or % sigchi
2315 \section*{#1}%
2316 \or % sigchi-a
2317 \section*{#1}%
2318 \or % acmengage
2319 \section*{#1}%
2320 \or % acmcp
2321 \section*{#1}%
2322 \fi
2323 \let\@vspace\@vspace@acm
2324 \let\@vspacer\@vspacer@acm
2325 }

```

`\@printtopmatter` The printing of top matter starts a new page and uses the given title box.

Note that if there are too many authors, `\mktitle@bx` might overflow the page. Therefore we start with checking this and if this happens, we split the box and print it page by page.

```

2326 \def\@printtopmatter{%
2327 \ifx\@startPage\@empty
2328 \gdef\@startPage{1}%
2329 \else
2330 \setcounter{page}{\@startPage}%
2331 \fi
2332 \@tempdima=\ht\mktitle@bx
2333 \advance\@tempdima by \dp\mktitle@bx
2334 \ifdim\@tempdima>0.9\textheight

```

```

2335 \loop
2336 \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
2337 \thispagestyle{firstpagestyle}%
2338 \noindent\unvbox\@tempboxa
2339 \clearpage
2340 \@tempdima=\ht\mktitle@bx
2341 \advance\@tempdima by \dp\mktitle@bx
2342 \ifdim\@tempdima>0.9\textheight\repeat
2343 \fi
2344 \thispagestyle{firstpagestyle}%
2345 \noindent
2346 \ifcase\ACM@format@nr
2347 \relax % manuscript
2348 \box\mktitle@bx\par
2349 \or % acmsmall
2350 \box\mktitle@bx\par
2351 \or % acmlarge
2352 \box\mktitle@bx\par
2353 \or % acmtog
2354 \twocolumn[\box\mktitle@bx]%
2355 \or % sigconf
2356 \twocolumn[\box\mktitle@bx]%
2357 \or % siggraph
2358 \twocolumn[\box\mktitle@bx]%
2359 \or % sigplan
2360 \twocolumn[\box\mktitle@bx]%
2361 \or % sigchi
2362 \twocolumn[\box\mktitle@bx]%
2363 \or % sigchi-a
2364 \par\box\mktitle@bx\par\bigskip
2365 \or % acmengage
2366 \twocolumn[\box\mktitle@bx]%
2367 \or % acmcp
2368 \box\mktitle@bx\par
2369 \fi
2370 }

```

\@mktitle The title of the article

```

2371 \def\@mktitle{%
2372 \ifcase\ACM@format@nr
2373 \relax % manuscript
2374 \@mktitle@i
2375 \or % acmsmall
2376 \@mktitle@i
2377 \or % acmlarge
2378 \@mktitle@i
2379 \or % acmtog
2380 \@mktitle@i
2381 \or % sigconf
2382 \@mktitle@iii
2383 \or % siggraph
2384 \@mktitle@iii
2385 \or % sigplan
2386 \@mktitle@iii

```

```

2387 \or % sigchi
2388 \mktitle@iii
2389 \or % sigchi-a
2390 \mktitle@iv
2391 \or % acmengage
2392 \mktitle@iii
2393 \or % acmcp
2394 \mktitle@i
2395 \fi
2396 }

```

`\@titlefont` The font to typeset the title

```

2397 \def\@titlefont{%
2398 \ifcase\ACM@format@nr
2399 \relax % manuscript
2400 \LARGE\sffamily\bfseries
2401 \or % acmsmall
2402 \LARGE\sffamily\bfseries
2403 \or % acmlarge
2404 \LARGE\sffamily\bfseries
2405 \or % acmtog
2406 \Huge\sffamily
2407 \or % sigconf
2408 \Huge\sffamily\bfseries
2409 \or % siggraph
2410 \Huge\sffamily\bfseries
2411 \or % sigplan
2412 \Huge\bfseries
2413 \or % sigchi
2414 \Huge\sffamily\bfseries
2415 \or % sigchi-a
2416 \Huge\bfseries
2417 \or % acmengage
2418 \Huge\sffamily\bfseries
2419 \or % acmcp
2420 \LARGE\sffamily\bfseries
2421 \fi}

```

`\@subtitlefont` The font to typeset the subtitle

```

2422 \def\@subtitlefont{\normalsize
2423 \ifcase\ACM@format@nr
2424 \relax % manuscript
2425 \mdseries
2426 \or % acmsmall
2427 \mdseries
2428 \or % acmlarge
2429 \mdseries
2430 \or % acmtog
2431 \LARGE
2432 \or % sigconf
2433 \LARGE\mdseries
2434 \or % siggraph
2435 \LARGE\mdseries
2436 \or % sigplan

```

```

2437     \LARGE\mdseries
2438 \or % sigchi
2439     \LARGE\mdseries
2440 \or % sigchi-a
2441     \mdseries
2442 \or % acmengage
2443     \LARGE\mdseries
2444 \or % acmcp
2445     \mdseries
2446 \fi}

```

\mktitle@i The version of \mktitle for most journals

```

2447 \def\mktitle@i{\hsize=\textwidth
2448 \if@ACM@acmcp
2449     \advance\hsize by -6pc%
2450 \fi
2451 \@ACM@title@width=\hsize
2452 \setbox\mktitle@bx=\vbox{\noindent\@titlefont
2453     \parbox[t]{\@ACM@title@width}{\raggedright
2454         \@titlefont\noindent
2455         \@title\@translatedtitle%
2456 \ifx\@subtitle\@empty\else
2457     \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
2458 \fi}%
2459 \par\bigskip}}%

```

\mktitle@ii The version of \mktitle for TOG. Since v1.06, this is subsumed by the \mktitle@i macro

\mktitle@iii The version of \mktitle for SIG proceedings.

```

2460 \def\mktitle@iii{\hsize=\textwidth
2461     \setbox\mktitle@bx=\vbox{\@titlefont\centering
2462         \@ACM@title@width=\hsize
2463         \parbox[t]{\@ACM@title@width}{\centering\@titlefont
2464             \@title\@translatedtitle%
2465             \ifx\@subtitle\@empty\else
2466                 \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
2467             \fi
2468         }}%
2469 \par\bigskip}}%

```

\mktitle@iv The version of \mktitle for sigchi-a

```

2470 \def\mktitle@iv{\hsize=\textwidth
2471     \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
2472         \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
2473         \noindent\@title\@translatedtitle%
2474         \ifx\@subtitle\@empty\else
2475             \par\noindent\@subtitlefont\@subtitle\@translatedsubtitle%
2476         \fi
2477     \par\bigskip}}%

```

\ACM@addtoaddress This macro adds an item to the address using the following rules:

1. If we start a paragraph, add the item

2. Otherwise, add a comma and the item
3. However, the comma is deleted if it is at the end of a line. We use the magic `\cleaders` trick for this.

```

2478 \newbox\@ACM@commabox
2479 \def\@ACM@addtoaddress#1{%
2480   \ifvmode\else
2481     \if@ACM@affiliation@obexpunctuation\else
2482       \setbox\@ACM@commabox=\hbox{, }%
2483       \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
2484     \fi\fi
2485   #1}

```

`\institution` Theoretically we can define the macros for `\affiliation` inside the `\mkauthors`-style commands. However, this would lead to a strange error if an author uses them outside `\department` `\affiliation`. Of course we can make them produce an error message, but...

```

\streetaddress 2486 \def\streetaddress#1{\unskip\ignorespaces}
\city           2487 \def\postcode#1{\unskip\ignorespaces}
\state          2488 \if@ACM@journal
\postcode       2489 \def\position#1{\unskip\ignorespaces}
\country        2490 \def\institution#1{\global\@ACM@instpresenttrue
2491   \unskip~#1\ignorespaces}
2492 \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
2493 \def\state#1{\unskip\ignorespaces}
2494 \newcommand\department[2][0]{\unskip\ignorespaces}
2495 \def\country#1{\StrDel{#1}{ }[\@tempa]%
2496   \ifx\@tempa\@empty\else
2497     \global\@ACM@countrypresenttrue\fi
2498     \if@ACM@affiliation@obexpunctuation\else, \fi#1\ignorespaces}
2499 \else
2500   \def\position#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2501   \def\institution#1{\global\@ACM@instpresenttrue
2502     \if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2503   \newcommand\department[2][0]{\if@ACM@affiliation@obexpunctuation
2504     #2\else#2\par\fi}%
2505 % \def\streetaddress#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2506 \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
2507 \let\state\@ACM@addtoaddress
2508 % \def\postcode#1{\if@ACM@affiliation@obexpunctuation#1\else\unskip\space#1\fi}%
2509 \def\country#1{\global\@ACM@countrypresenttrue\@ACM@addtoaddress{#1}}%
2510 \fi

```

`\mkauthors` Typesetting the authors

```

2511 \def\mkauthors{\begingroup
2512   \hsize=\textwidth
2513   \ifcase\ACM@format@nr
2514     \relax % manuscript
2515     \mkauthors@i
2516   \or % acmsmall
2517     \mkauthors@i
2518   \or % acmlarge
2519     \mkauthors@i
2520   \or % acmtog

```

```

2521 \mkauthors@i
2522 \or % sigconf
2523 \mkauthors@iii
2524 \or % siggraph
2525 \mkauthors@iii
2526 \or % sigplan
2527 \mkauthors@iii
2528 \or % sigchi
2529 \mkauthors@iii
2530 \or % sigchi-a
2531 \mkauthors@iv
2532 \or % acmengage
2533 \mkauthors@iii
2534 \or % acmcp
2535 \mkauthors@i
2536 \fi
2537 \endgroup
2538 }

```

\@authorfont Somehow different conferences use different fonts for author names. Why?

```

2539 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```

2540 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

2541 \ifcase\ACM@format@nr
2542 \relax % manuscript
2543 \or % acmsmall
2544 \def\@authorfont{\large\sffamily}
2545 \def\@affiliationfont{\small\normalfont}
2546 \or % acmlarge
2547 \or % acmtog
2548 \def\@authorfont{\LARGE\sffamily}
2549 \def\@affiliationfont{\large}
2550 \or % sigconf
2551 \def\@authorfont{\LARGE}
2552 \def\@affiliationfont{\large}
2553 \or % siggraph
2554 \def\@authorfont{\normalsize\normalfont}
2555 \def\@affiliationfont{\normalsize\normalfont}
2556 \or % sigplan
2557 \def\@authorfont{\Large\normalfont}
2558 \def\@affiliationfont{\normalsize\normalfont}
2559 \or % sigchi
2560 \def\@authorfont{\bfseries}
2561 \def\@affiliationfont{\mdseries}
2562 \or % sigchi-a
2563 \def\@authorfont{\bfseries}
2564 \def\@affiliationfont{\mdseries}
2565 \or % acmengage
2566 \def\@authorfont{\LARGE}
2567 \def\@affiliationfont{\large}
2568 \or % acmcp

```

```

2569 \def\@authorfont{\large\sffamily}
2570 \def\@affiliationfont{\small\normalfont}
2571 \fi

\@typeset@author@line At this point we have \@currentauthors and \@currentaffiliations. We typeset
                        them in the journal style
2572 \def\@typeset@author@line{%
2573   \andify\@currentauthors\par\noindent
2574   \@currentauthors\def\@currentauthors{}%
2575   \ifx\@currentaffiliations\@empty\else
2576     \andify\@currentaffiliations
2577     \unskip, {\@currentaffiliations}\par
2578   \fi
2579   \def\@currentaffiliations{}}

\if@ACM@instpresent Whether the given affiliation has institution
2580 \newif\if@ACM@instpresent
2581 \@ACM@instpresenttrue

\if@ACM@citypresent Whether the given affiliation has city
2582 \newif\if@ACM@citypresent
2583 \@ACM@citypresenttrue

\if@ACM@countrypresent Whether the given affiliation has country
2584 \newif\if@ACM@countrypresent
2585 \@ACM@countrypresenttrue

\@ACM@resetaffil Reset affiliation flags
2586 \def\@ACM@resetaffil{%
2587   \global\@ACM@instpresentfalse
2588   \global\@ACM@citypresentfalse
2589   \global\@ACM@countrypresentfalse
2590 }

\@ACM@checkaffil Check affiliation flags
2591 \def\@ACM@checkaffil{%
2592   \if@ACM@instpresent\else
2593     \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
2594     \fi
2595   \if@ACM@citypresent\else
2596     \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
2597     \fi
2598   \if@ACM@countrypresent\else
2599     \ClassError{\@classname}{No country present for an affiliation}{ACM
2600       requires each author to indicate their country using country macro.}%
2601     \fi
2602 }

\@mkauthors@i This version is used in most journal formats. Note that \and between authors with the
                same affiliation becomes _and_:
2603 \def\@mkauthors@i{%
2604   \def\@currentauthors{}%
2605   \def\@currentaffiliations{}%

```

```

2606 \global\let\and\@typeset@author@line
2607 \def\@author##1{%
2608   \ifx\@currentauthors\@empty
2609     \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
2610   \else
2611     \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
2612   \fi
2613   \gdef\and{}}%
2614 \def\email##1##2{%
2615 \def\affiliation##1##2{%
2616   \def\@tempa{##2}\ifx\@tempa\@empty\else
2617     \ifx\@currentaffiliations\@empty
2618       \gdef\@currentaffiliations{%
2619         \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2620         \setkeys{@ACM@affiliation@}{##1}%
2621         \@ACM@resetaffil
2622         \@affiliationfont##2\@ACM@checkaffil}%
2623       \else
2624         \g@addto@macro{\@currentaffiliations}{\and
2625           \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2626           \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2627           ##2\@ACM@checkaffil}%
2628       \fi
2629     \fi
2630     \global\let\and\@typeset@author@line}%
2631 \if@ACM@acmcp
2632   \advance\hsize by -6pc%
2633 \fi
2634 \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
2635   \noindent\addresses\@typeset@author@line
2636   \par\medskip}%
2637 }

```

\@mkauthors@ii The \@mkauthors@ii command was the version used in acmtog. It is no longer necessary.

\author@bx The box to put an individual author in

```
2638 \newbox\author@bx
```

\author@bx@wd The width of the author box

```
2639 \newdimen\author@bx@wd
```

\author@bx@sep The separation between author boxes

```
2640 \newskip\author@bx@sep
```

```
2641 \author@bx@sep=1pc\relax
```

\@typeset@author@bx Typesetting the box with authors. Note that in sigchi-a the box is not centered.

```

2642 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd
2643   \def\and{\par}\normalbaselines
2644   \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2645     \@authorfont\@currentauthors\par\@affiliationfont
2646     \@currentaffiliation}\egroup
2647   \box\author@bx\hspace{\author@bx@sep}%
2648   \gdef\@currentauthors{}}%
2649   \gdef\@currentaffiliation{}}

```

\mkauthors@iii The sigconf version. Here we use a centered design with each author in a separate box.

```
2650 \def\mkauthors@iii{%
```

First, we need to determine the design of the author strip. The boxes are separated by \author@bx@sep plus two \author@bx@sep margins. This means that each box must be of width $(\text{textwidth} - \text{author@bx@sep})/N - \text{author@bx@sep}$, where N is the number of boxes per row.

```
2651 \author@bx@wd=\textwidth\relax
2652 \advance\author@bx@wd by -\author@bx@sep\relax
2653 \ifnum\@ACM@authorsperrow>0\relax
2654   \divide\author@bx@wd by \@ACM@authorsperrow\relax
2655 \else
2656   \ifcase\num@authorgroups
2657     \relax % 0?
2658   \or % 1=one author per row
2659     \or % 2=two authors per row
2660       \divide\author@bx@wd by \num@authorgroups\relax
2661     \or % 3=three authors per row
2662       \divide\author@bx@wd by \num@authorgroups\relax
2663     \or % 4=two authors per row (!)
2664       \divide\author@bx@wd by 2\relax
2665     \else % three authors per row
2666       \divide\author@bx@wd by 3\relax
2667   \fi
2668 \fi
2669 \advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of \addresses:

```
2670 \gdef\@currentauthors{}%
2671 \gdef\@currentaffiliation{}%
2672 \def\@author##1{\ifx\@currentauthors\@empty
2673   \gdef\@currentauthors{\par##1}%
2674 \else
2675   \g@addto@macro\@currentauthors{\par##1}%
2676 \fi
2677 \gdef\and{}}%
2678 \def\email##1##2{\ifx\@currentaffiliation\@empty
2679   \gdef\@currentaffiliation{\bgroup
2680     \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2681 \else
2682   \g@addto@macro\@currentaffiliation{\par\bgroup
2683     \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2684 \fi}%
2685 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2686   \gdef\@currentaffiliation{%
2687     \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2688     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2689     ##2\@ACM@checkaffil}%
2690 \else
2691   \g@addto@macro\@currentaffiliation{\par
2692     \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2693     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2694     ##2\@ACM@checkaffil}%
2695 \fi
```

```

2696 \global\let\and\@typeset@author@bx
2697 }%

```

Actual typesetting is done by the `\and` macro:

```

2698 \hsize=\textwidth
2699 \global\setbox\mktitle@bx=\vbox{\noindent
2700   \unvbox\mktitle@bx\par\medskip\leavevmode
2701   \lineskip=1pc\relax\centering\hspace*{-1em}%
2702   \addresses\let\and\@typeset@author@bx\and\par\bigskip}}

```

`\@mkauthors@iv` The `sigchi-a` version. We put authors in the main text with no more than 2 authors per line, unless overridden.

```

2703 \def\@mkauthors@iv{%

```

First, we need to determine the design of the author strip. The boxes are separated by `\author@bx@sep` plus two `\author@bx@sep` margins. This means that each box must be of width $(\text{textwidth} - \text{author@bx@sep})/N - \text{author@bx@sep}$, where N is the number of boxes per row.

```

2704 \author@bx@wd=\columnwidth\relax
2705 \advance\author@bx@wd by -\author@bx@sep\relax
2706 \ifnum\@ACM@authorsperrow>0\relax
2707   \divide\author@bx@wd by \@ACM@authorsperrow\relax
2708 \else
2709   \ifcase\@num@authorgroups
2710     \relax % 0?
2711     \or % 1=one author per row
2712     \else % 2=two authors per row
2713       \divide\author@bx@wd by 2\relax
2714   \fi
2715 \fi
2716 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of `\addresses`:

```

2717 \gdef\@currentauthors{%
2718 \gdef\@currentaffiliation{%
2719 \def\@author##1{\ifx\@currentauthors\@empty
2720   \gdef\@currentauthors{\par##1}%
2721 \else
2722   \g@addto@macro\@currentauthors{\par##1}%
2723 \fi
2724 \gdef\and{}}%
2725 \def\email##1##2{\ifx\@currentaffiliation\@empty
2726   \gdef\@currentaffiliation{\nolinkurl{##2}}%
2727 \else
2728   \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2729 \fi}%
2730 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2731   \gdef\@currentaffiliation{%
2732     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2733     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2734     ##2\@ACM@checkaffil}%
2735 \else
2736   \g@addto@macro\@currentaffiliation{\par
2737     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2738     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil

```

```

2739      ##2\@ACM@checkaffil}%
2740 \fi
2741 \global\let\and\@typeset@author@bx}%
2742 %

Actual typesetting is done by the \and macro
2743 \bgroup\hsize=\columnwidth
2744 \par\raggedright\leftskip=\z@
2745 \lineskip=1pc\noindent
2746 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

\mkauthorsaddresses Typesetting authors' addresses in the footnote style

```

2747 \def\mkauthorsaddresses{%
2748 \ifnum\num@authors>1\relax
2749 Authors' \else Author's \fi
2750 \ifnum\num@authorgroups>1\relax
2751 addresses: \else address: \fi
2752 \bgroup
2753 \def\streetaddress##1{\unskip, ##1}%
2754 \def\postcode##1{\unskip, ##1}%
2755 \def\position##1{\unskip\ignorespaces}%
2756 \gdef\@ACM@institution@separator{,}%
2757 \def\institution##1{\unskip\@ACM@institution@separator ##1\gdef\@ACM@institution@separator{ and }}
2758 \def\city##1{\unskip, ##1}%
2759 \def\state##1{\unskip, ##1}%
2760 \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2761 \def\country##1{\unskip, ##1}%
2762 \def\and{\unskip; \gdef\@ACM@institution@separator{,}}%
2763 \def\@author##1{##1}%
2764 \def\email##1##2{\unskip, \nolinkurl{##2}}%
2765 \addresses
2766 \egroup}

2767 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
2768 \ifx\@authorsaddresses\empty
2769 \ClassWarningNoLine{\@classname}{Authors'
2770 addresses are mandatory for ACM journals}%
2771 \fi\fi\fi}

```

\@setaddresses This is an amsart macro that we do not need.

```

2772 \def\@setaddresses{}

```

\@authornotemark Adding a footnote mark to authors. This version adds a “normal” footnote mark.

```

2773 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}

```

\@@authornotemark Adding a footnote mark to authors with a given number

```

2774 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}

```

\mkteasers Typesetting the teasers

```

2775 \def\mkteasers{%
2776 \ifx\@teaserfigures\empty\else
2777 \def\@teaser##1{\par\bigskip\bgroup
2778 \captionsetup{type=figure}##1\egroup\par}
2779 \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par}

```

```

2780 \noindent\@Description@presentfalse
2781 \@teaserfigures\par\if@Description@present\else
2782 \global\@undescribed@imagestrue
2783 \ClassWarning{\@classname}{A possible image without
2784 description}\fi
2785 \medskip}%
2786 \fi}

```

\@mkabstract Typesetting the abstract

```

2787 \def\@mkabstract{\bgroup
2788 \ifx\@abstract\@empty\else
2789 {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
2790 \if@ACM@journal
2791 \everypar{\setbox\z@\lastbox\everypar{}}\small
2792 \else
2793 \section*{\abstractname}%
2794 \fi
2795 \ignorespaces\@abstract\par}%
2796 \fi\egroup}

```

\@mktranslatedabstract Typesetting a translated abstract

```

2797 \def\@mktranslatedabstract#1{\selectlanguage{#1}%
2798 \if@ACM@journal
2799 \everypar{\setbox\z@\lastbox\everypar{}}\small
2800 \else
2801 \section*{\abstractname}%
2802 \fi
2803 \ignorespaces}

```

\@mkbibcitation Print the bibcitation format

```

2804 \def\@mkbibcitation{\bgroup
2805 \let\@vspace\@vspace@orig
2806 \let\@vspacer\@vspacer@orig
2807 \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2808 \def\footnotemark{}%
2809 \def\@unskip{\ignorespaces}%
2810 \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2811 inside a \string\title{} or \string\author{} command! Use
2812 \string\titlenote{} or \string\authornote{} instead!}}%
2813 \def\@article@string{\ifx\@acmArticle\@empty{\ } \else,
2814 Article~\@acmArticle\ } \fi}%
2815 \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2816 \noindent\bgroup
2817 \def\@unskip{\ignorespaces}\authors\egroup. \@acmYear. \@title
2818 \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2819 \if@ACM@nonacm\else
2820 % The 'nonacm' option disables 'printacmref' by default,
2821 % and the present \@mkbibcitation definition is never used
2822 % in this case. The conditional remains useful if the user
2823 % explicitly sets \settopmatter{printacmref=true}.
2824 \if@ACM@journal@bibstrip
2825 \textit{\@journalNameShort}
2826 \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2827 \ref{TotPages}~\@pages@word.

```

```

2828 \else
2829   In \textit{\@acmBooktitle}%
2830   \ifx\@acmEditors\empty\textit{.}\else
2831     \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
2832   \fi\
2833   ACM, New York, NY, USA%
2834   \@article@string\unskip, \ref{TotPages}~\@pages@word.
2835 \fi
2836 \fi
2837 \ifx\@acmDOI\empty\else\@formatdoi{\@acmDOI}\fi
2838 \par\egroup}

```

\@printendtopmatter End the top matter

```

2839 \def\@printendtopmatter{%
2840   \let\@vspace\@vspace@orig
2841   \let\@vspacer\@vspacer@orig
2842   \par\bigskip
2843   \let\@vspace\@vspace@acm
2844   \let\@vspacer\@vspacer@acm
2845 }

```

\@setthanks We redefine \@setthanks using \long

```

2846 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}

```

\@setauthorsaddresses

```

2847 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}

```

\@typesetengagemetadata Typesetting special metadata for ACM Engage

```

2848 \def\@typesetengagemetadata{%
2849   \def\@setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
2850   \@acmengagemetadata}

```

3.22 Headers and Footers

We use fancyhdr for our headers and footers:

```

2851 \RequirePackage{fancyhdr}

```

\ACM@restore@pagestyle The following code by Ross Moore protects against changes by the totpages package:

```

2852 \let\ACM@ps@plain\ps@plain
2853 \let\ACM@ps@myheadings\ps@myheadings
2854 \let\ACM@ps@headings\ps@headings
2855 \def\ACM@restore@pagestyle{%
2856   \let\ps@plain\ACM@ps@plain
2857   \let\ps@myheadings\ACM@ps@myheadings
2858   \let\ps@headings\ACM@ps@headings}
2859 \AtBeginDocument{\ACM@restore@pagestyle}

```

\ACM@linecount@bx This is the box displayed in review mode

```

2860 \if@ACM@review
2861   \newsavebox{\ACM@linecount@bx}
2862   \newlength\ACM@linecount@bxht
2863   \newcount\ACM@linecount
2864   \ACM@linecount\@ne\relax

```

```

2865 \def\ACM@mk@linecount{%
2866   \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
2867     \normalsize
2868     \setlength{\ACM@linecount@bxht}{0pt}%
2869     \loop{\color{red}\scriptsize\the\ACM@linecount}\
2870     \global\advance\ACM@linecount by \@ne
2871     \addtolength{\ACM@linecount@bxht}{\baselineskip}%
2872     \ifdim\ACM@linecount@bxht<\textheight\repeat
2873     {\color{red}\scriptsize\the\ACM@linecount}\hfill
2874     \global\advance\ACM@linecount by \@ne}}
2875 \fi

```

\ACM@linecountL How to display the box on the left

```

2876 \def\ACM@linecountL{%
2877   \if@ACM@review
2878     \ACM@mk@linecount
2879     \begin{picture}(0,0)%
2880       \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2881     \end{picture}%
2882   \fi}

```

\ACM@linecountR How to display the box on the right. In one column formats we do not step the numbers.

```

2883 \def\ACM@linecountR{%
2884   \if@ACM@review
2885     \ifcase\ACM@format@nr
2886       \relax % manuscript
2887       \relax
2888       \or % acmsmall
2889       \relax
2890       \or % acmlarge
2891       \relax
2892       \or % acmtog
2893       \ACM@mk@linecount
2894       \or % sigconf
2895       \ACM@mk@linecount
2896       \or % siggraph
2897       \ACM@mk@linecount
2898       \or % sigplan
2899       \ACM@mk@linecount
2900       \or % sigchi
2901       \ACM@mk@linecount
2902       \or % sigchi-a
2903       \ACM@mk@linecount
2904       \or % acmengage
2905       \ACM@mk@linecount
2906       \or % acmcp
2907       \relax
2908     \fi
2909     \begin{picture}(0,0)%
2910       \put(20,-22){\usebox{\ACM@linecount@bx}}%
2911     \end{picture}%
2912   \fi}

```

\ACM@timestamp The timestamp system

```

2913 \if@ACM@timestamp
2914 % Subtracting 30 from \time gives us the effect of rounding down despite
2915 % \numexpr rounding to nearest
2916 \newcounter{ACM@time@hours}
2917 \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
2918 \newcounter{ACM@time@minutes}
2919 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
2920 \newcommand\ACM@timestamp{%
2921   \footnotesize%
2922   \ifx\@acmSubmissionID\empty\relax\else
2923     Submission ID: \@acmSubmissionID.{ }%
2924   \fi
2925   \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
2926   \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
2927   Page \thepage\ of \@startPage--\pageref*{TotPages}.%
2928 }
2929 \fi

```

\@shortauthors Even if the author redefined \@shortauthors, we do not print it in the headers when in anonymous mode:

```

2930 \def\@shortauthors{%
2931   \if@ACM@anonymous
2932     Anon.
2933     \ifx\@acmSubmissionID\empty\else Submission Id: \@acmSubmissionID\fi
2934   \else\@shortauthors\fi}

```

\@headfootfont The font to typeset header and footer text.

```

2935 \def\@headfootfont{\sffamily\footnotesize}

```

standardpagestyle The page style for all pages but the first one The page style for all pages but the first one

```

2936 \AtBeginDocument{%
2937 \fancypagestyle{standardpagestyle}{%
2938   \fancyhf{}%
2939   \renewcommand{\headrulewidth}{\z@}%
2940   \renewcommand{\footrulewidth}{\z@}%
2941   \def\@acmArticlePage{%
2942     \ifx\@acmArticle\empty%
2943       \if@ACM@printfolios\thepage\fi%
2944     \else%
2945       \@acmArticle\if@ACM@printfolios:\thepage\fi%
2946     \fi%
2947   }%
2948   \if@ACM@journal@bibstrip
2949     \ifcase\ACM@format@nr
2950       \relax % manuscript
2951       \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
2952       \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
2953       \fancyhead[RE]{\@shortauthors}%
2954       \fancyhead[LO]{\ACM@linecountL\shorttitle}%
2955       \if@ACM@nonacm\else%
2956         \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
2957       \fi%
2958     \or % acmsmall

```

```

2959 \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
2960 \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
2961 \fancyhead[RE]{\@headfootfont\@shortauthors}%
2962 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2963 \if@ACM@nonacm\else%
2964 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2965 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2966 \fi
2967 \or % acmlarge
2968 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2969 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2970 \fancyhead[LO]{\ACM@linecountL}%
2971 \fancyhead[RO]{\@headfootfont
2972 \shorttitle\quad\textbullet\quad\@acmArticlePage}%
2973 \if@ACM@nonacm\else%
2974 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2975 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2976 \fi
2977 \or % acmtog
2978 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2979 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2980 \fancyhead[LO]{\ACM@linecountL}%
2981 \fancyhead[RE]{\ACM@linecountR}%
2982 \fancyhead[RO]{\@headfootfont
2983 \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
2984 \if@ACM@nonacm\else%
2985 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2986 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2987 \fi
2988 \else % Proceedings
2989 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2990 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2991 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
2992 \if@ACM@nonacm
2993 \fancyhead[LE]{\ACM@linecountL}%
2994 \fancyhead[RO]{\ACM@linecountR}%
2995 \else%
2996 \if@ACM@engage
2997 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
2998 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
2999 \fancyhead[RO]{\@headfootfont
3000 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3001 \ACM@linecountR}%
3002 \else
3003 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3004 \acmConference@shortname,
3005 \acmConference@date, \acmConference@venue}%
3006 \fancyhead[RO]{\@headfootfont
3007 \acmConference@shortname,
3008 \acmConference@date, \acmConference@venue\ACM@linecountR}%
3009 \fi
3010 \fi
3011 \fi
3012 \else % Proceedings

```

```

3013 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3014 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3015 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3016 \if@ACM@nonacm
3017 \fancyhead[LE]{\ACM@linecountL}%
3018 \fancyhead[RO]{\ACM@linecountR}%
3019 \else%
3020 \if@ACM@engage
3021 \fancyhead[LE]{\ACM@linecountL\@headfootfont
3022 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3023 \fancyhead[RO]{\@headfootfont
3024 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3025 \ACM@linecountR}%
3026 \else
3027 \fancyhead[LE]{\ACM@linecountL\@headfootfont
3028 \acmConference@shortname,
3029 \acmConference@date, \acmConference@venue}%
3030 \fancyhead[RO]{\@headfootfont
3031 \acmConference@shortname,
3032 \acmConference@date, \acmConference@venue\ACM@linecountR}%
3033 \fi
3034 \fi
3035 \fi
3036 \if@ACM@sigchiamode
3037 \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
3038 \fi
3039 \if@ACM@timestamp
3040 \fancyfoot[LO,RE]{\ACM@timestamp}
3041 \fi
3042 \if@ACM@acmcp
3043 \renewcommand{\footrulewidth}{0.1\p@}%
3044 \fancyheadoffset[L]{46pt}%
3045 \fancyhead[L]{\makebox[\z@][l]{%
3046 \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3047 \rotatebox{90}{\colorbox{\ACM@Article@color}{\color{white}%
3048 \strut\ACM@ArticleType~Article}}}%
3049 \ACM@linecountL}%
3050 \fancyhead[R]{\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3051 \fancyfoot[L,C]{}%
3052 \fancyfoot[R]{\footnotesize
3053 \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3054 \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3055 (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3056 \fi
3057 }%
3058 \pagestyle{standardpagestyle}
3059 }

```

\@folio@wd Folio blob width, height, offsets and max number

\@folio@ht

\@folio@blob The macro to typeset the folio blob.

\@folio@max

firstpagestyle The page style for the first page only.

3060 \AtBeginDocument{%

```

3061 \fancypagestyle{firstpagestyle}{%
3062   \fancyhf{}%
3063   \renewcommand{\headrulewidth}{\z@}%
3064   \renewcommand{\footrulewidth}{\z@}%
3065   \if@ACM@journal@bibstrip
3066     \ifcase\ACM@format@nr
3067       \relax % manuscript
3068       \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3069       \fancyhead[R]{\@acmBadgeR}%
3070       \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
3071       \if@ACM@nonacm\else%
3072         \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
3073       \fi%
3074     \or % acmsmall
3075       \if@ACM@nonacm\else%
3076         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3077           \@acmNumber, Article \@acmArticle. Publication date:
3078             \@acmPubDate.}%
3079         \fi%
3080         \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3081         \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3082         \fancyhead[RO]{\@acmBadgeR}%
3083         \fancyhead[RE]{\@acmBadgeR}%
3084     \or % acmlarge
3085       \if@ACM@nonacm\else%
3086         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3087           \@acmNumber, Article \@acmArticle. Publication date:
3088             \@acmPubDate.}%
3089         \fi%
3090         \fancyhead[RO]{\@acmBadgeR}%
3091         \fancyhead[RE]{\@acmBadgeR}%
3092         \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3093         \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3094     \or % acmtog
3095       \if@ACM@nonacm\else%
3096         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3097           \@acmNumber, Article \@acmArticle. Publication date:
3098             \@acmPubDate.}%
3099         \fi%
3100         \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3101         \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3102     \else % Conference proceedings
3103       \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3104       \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3105       \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3106     \fi
3107   \else
3108     \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3109     \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3110     \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3111   \fi
3112   \if@ACM@timestamp
3113     \ifnum\ACM@format@nr=0\relax % Manuscript
3114     \fancyfoot[LO,RE]{\ACM@timestamp\quad

```

```

3115     \if@ACM@nonacm\else
3116         \footnotesize Manuscript submitted to ACM
3117     \fi}
3118 \else
3119     \fancyfoot[LO,RE]{\ACM@timestamp}
3120 \fi
3121 \fi
3122 \if@ACM@acmcp
3123 \renewcommand{\footrulewidth}{0.1\p@}%
3124 \fancyheadoffset[L]{46pt}%
3125 \fancyhead[L]{\makebox[\z@][l]{%
3126     \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3127     \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3128         \strut\ACM@ArticleType~Article}}}%
3129     \ACM@linecountL\@acmBadgeL}%
3130 \fancyhead[R]{\@acmBadgeR\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3131 \fancyfoot[L,C]{}%
3132 \fancyfoot[R]{\footnotesize
3133     \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3134     \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3135     (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3136 \fi
3137 }}

```

3.23 Sectioning

\ACM@Nadjust Ross Moore's macro.

Initially \ACM@sect@format@ just passes through its #1 argument unchanged. When a sectioning macro such as \section occurs, the \ACM@Nadjust redefines \ACM@sect@format@ to expand into the styling commands; e.g., \@secfont. Then \Sectionformat is temporarily redefined to produce \realSectionformat{\ACM@sect@format{#1}}{#2}, which ultimately becomes \Sectionformat{\@secfont{#1}}{#2}. This is done to allow \Sectionformat to be variable, as may be needed in particular circumstances. Its current expansion is saved as \realSectionformat which is used with the modified 1st argument, then \Sectionformat is reverted to its former expansion.

To style the section-number, the line #1{} is used at the end of \ACM@Nadjust. This imposes style-changing commands for fonts and sizes, but any \MakeUppercase acts on just the {}. It's a bit hacky, by essentially assuming that only numbers occur here, not letters to be case-changed. (This should be acceptable in a class-file, as it ought to be possible to change the case elsewhere, if that was ever desired.) Also, it can result in \@adddotafter being called too soon, so a slight adjustment is made, via \ACM@adddotafter, which now tests whether its argument is empty. But the coding has to allow for other packages to have also patched \@adddotafter.

```

3138 \def\ACM@Nadjust#1{%
3139     \begingroup
3140     \expandafter\ifx\csname Sectionformat\endcsname\relax
3141     % do nothing when \Sectionformat is unknown
3142     \def\next{\endgroup #1}%
3143 \else

```

```

3144 \def\next{\endgroup
3145 \let\realSectionformat\Sectionformat
3146 \def\ACM@sect@format@{#1}%
3147 \let\Sectionformat\ACM@NR@adjustedSectionformat
3148 %% next lines added 2018-06-17 to ensure section number is styled
3149 \let\real@adddotafter\@adddotafter
3150 \let\@adddotafter\ACM@adddotafter
3151 #1}% imposes the styles, but nullifies \MakeUppercase
3152 \let\@adddotafter\real@adddotafter
3153 }%
3154 \fi \next
3155 }

```

\ACM@NR@adjustedSectionformat

```

3156 \def\ACM@NR@adjustedSectionformat#1#2{%
3157 \realSectionformat{\ACM@sect@format@{#1}}{#2}%
3158 \let\Sectionformat\realSectionformat}
3159 \DeclareRobustCommand{\ACM@sect@format@}{\ACM@sect@format@}
3160 \def\ACM@sect@format@null#1{#1}
3161 \let\ACM@sect@format@\ACM@sect@format@null
3162 \AtBeginDocument{%
3163 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
3164 \let\LTX@adddotafter\@adddotafter
3165 \fi
3166 }

```

\ACM@adddotafter

```

3167 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}

```

Sectioning is different for different levels

```

3168 \renewcommand\section{\@startsection{section}{1}{\z@}%
3169 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3170 {.25\baselineskip}%
3171 {\ACM@NRadjust\@secfont}}
3172 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
3173 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3174 {.25\baselineskip}%
3175 {\ACM@NRadjust\@subsecfont}}
3176 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
3177 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3178 {-3.5\p@}%
3179 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}}
3180 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
3181 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3182 {-3.5\p@}%
3183 {\ACM@NRadjust{\@parfont\@adddotafter}}}}
3184 \newcommand\noindentparagraph{\@startsection{paragraph}{4}{\z@}%
3185 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3186 {-3.5\p@}%
3187 {\ACM@NRadjust{\@parfont}}}}
3188
3189 \renewcommand\part{\@startsection{part}{9}{\z@}%
3190 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
3191 {4\p@}%

```

```

3192 {\ACM@NAdjust\@parfont}}

\section@raggedright Special version of \raggedright compatible with \MakeUppercase
3193 \def\section@raggedright{\@rightskip\@flushglue
3194 \rightskip\@rightskip
3195 \leftskip\z@skip
3196 \parindent\z@}

\@secfont Fonts for sections etc. are different for different formats.
\@subsecfont 3197 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
\@subsubsecfont 3198 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 3199 \def\@subsubsecfont{\sffamily\itshape}
3200 \def\@parfont{\itshape}
3201 \setcounter{secnumdepth}{3}
3202 \ifcase\ACM@format@nr
3203 \relax % manuscript
3204 \or % acmsmall
3205 \or % acmlarge
3206 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
3207 \def\@subsecfont{\sffamily\large\section@raggedright}
3208 \or % acmtog
3209 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
3210 \def\@subsecfont{\sffamily\large\section@raggedright}
3211 \or % sigconf
3212 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
3213 \def\@subsecfont{\bfseries\Large\section@raggedright}
3214 \or % siggraph
3215 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
3216 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
3217 \or % sigplan
3218 \def\@secfont{\bfseries\Large\section@raggedright}
3219 \def\@subsecfont{\bfseries\section@raggedright}
3220 \def\@subsubsecfont{\bfseries\section@raggedright}
3221 \def\@parfont{\bfseries\itshape}
3222 \def\@subparfont{\itshape}
3223 \or % sigchi
3224 \setcounter{secnumdepth}{1}
3225 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
3226 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3227 \or % sigchi-a
3228 \setcounter{secnumdepth}{0}
3229 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
3230 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3231 \or % acmengage
3232 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
3233 \def\@subsecfont{\bfseries\Large\section@raggedright}
3234 \or %acmcp
3235 \fi

\@adddotafter Add punctuation after a sectioning command
3236 \def\@adddotafter#1{#1\@addpunct{.}}

\@addspaceafter Add space after a sectioning command
3237 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

```

3238 \if@ACM@acmcp
3239   \setcounter{secnumdepth}{-1}%
3240 \fi

```

3.24 TOC lists

`\@dotsep` Related to the `\tableofcontents` are all the horizontal fillers. Base \LaTeX defines `\@dottedtocline`, which we should not disable. Yet, this command expects `\@dotsep` to be defined but leaves this to the class implementation. Since `amsart` does not provide this, we copy the standard variant from `article` here.

```

3241 \providecommand*\@dotsep{4.5}

```

3.25 Theorems

`\acmplainbodyfont` The font to typeset the body of the `acmplain` theorem style.

```

3242 \def\acmplainbodyfont{\itshape}

```

`\acmplainindent` The amount to indent the `acmplain` theorem style.

```

3243 \def\acmplainindent{\parindent}

```

`\acmplainheadfont` The font to typeset the head of the `acmplain` theorem style.

```

3244 \def\acmplainheadfont{\scshape}

```

`\acmplainnotefont` The font to typeset the note of the `acmplain` theorem style.

```

3245 \def\acmplainnotefont{\@empty}

```

Customization of the `acmplain` theorem style:

```

3246 \ifcase\ACM@format@nr
3247 \relax % manuscript
3248 \or % acmsmall
3249 \or % acmlarge
3250 \or % acmtog
3251 \or % sigconf
3252 \or % siggraph
3253 \or % sigplan
3254   \def\acmplainbodyfont{\itshape}
3255   \def\acmplainindent{\z@}
3256   \def\acmplainheadfont{\bfseries}
3257   \def\acmplainnotefont{\normalfont}
3258 \or % sigchi
3259 \or % sigchi-a
3260 \or % acmengage
3261 \or % acmcp
3262 \fi

```

`acmplain` The `acmplain` theorem style

```

3263 \newtheoremstyle{acmplain}%
3264   {.5\baselineskip\@plus.2\baselineskip
3265     \@minus.2\baselineskip}% space above
3266   {.5\baselineskip\@plus.2\baselineskip
3267     \@minus.2\baselineskip}% space below
3268   {\acmplainbodyfont}% body font

```

```

3269 {\@acmplainindent}% indent amount
3270 {\@acmplainheadfont}% head font
3271 {.}% punctuation after head
3272 {.5em}% spacing after head
3273 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont{#3}}}}% head spec

```

`\@acmdefinitionbodyfont` The font to typeset the body of the acmdefinition theorem style.

```
3274 \def\@acmdefinitionbodyfont{\normalfont}
```

`\@acmdefinitionindent` The amount to indent the acmdefinition theorem style.

```
3275 \def\@acmdefinitionindent{\parindent}
```

`\@acmdefinitionheadfont` The font to typeset the head of the acmdefinition theorem style.

```
3276 \def\@acmdefinitionheadfont{\itshape}
```

`\@acmdefinitionnotefont` The font to typeset the note of the acmdefinition theorem style.

```
3277 \def\@acmdefinitionnotefont{\@empty}
```

Customization of the acmdefinition theorem style:

```

3278 \ifcase\ACM@format@nr
3279 \relax % manuscript
3280 \or % acmsmall
3281 \or % acmlarge
3282 \or % acmtog
3283 \or % sigconf
3284 \or % siggraph
3285 \or % sigplan
3286 \def\@acmdefinitionbodyfont{\normalfont}
3287 \def\@acmdefinitionindent{\z@}
3288 \def\@acmdefinitionheadfont{\bfseries}
3289 \def\@acmdefinitionnotefont{\normalfont}
3290 \or % sigchi
3291 \or % sigchi-a
3292 \or % acmengage
3293 \or % acmcp
3294 \fi

```

`acmdefinition` The acmdefinition theorem style

```

3295 \newtheoremstyle{acmdefinition}%
3296 {.5\baselineskip\@plus.2\baselineskip
3297 \@minus.2\baselineskip}% space above
3298 {.5\baselineskip\@plus.2\baselineskip
3299 \@minus.2\baselineskip}% space below
3300 {\@acmdefinitionbodyfont}% body font
3301 {\@acmdefinitionindent}% indent amount
3302 {\@acmdefinitionheadfont}% head font
3303 {.}% punctuation after head
3304 {.5em}% spacing after head
3305 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont{#3}}}}% head spec

```

Make acmplain the default theorem style.

```
3306 \theoremstyle{acmplain}
```

Delay defining the theorem environments until after other packages have been loaded. In particular, the `cleveref` package must be loaded before the theorem environments are defined in order to show the correct environment name (see <https://github.com/borisveytsman/acmart/issues/138>). The `acmthm` option is used to suppress the definition of any theorem environments. Also, to avoid obscure errors arising from these environment definitions conflicting with environments defined by the user or by user-loaded packages, we only define environments that have not yet been defined.

```

3307 \AtEndPreamble{%
3308   \if@ACM@acmthm
3309     \theoremstyle{acmplain}
3310     \@ifundefined{theorem}{%
3311       \newtheorem{theorem}{Theorem}[section]
3312     }{}
3313     \@ifundefined{conjecture}{%
3314       \newtheorem{conjecture}[theorem]{Conjecture}
3315     }{}
3316     \@ifundefined{proposition}{%
3317       \newtheorem{proposition}[theorem]{Proposition}
3318     }{}
3319     \@ifundefined{lemma}{%
3320       \newtheorem{lemma}[theorem]{Lemma}
3321     }{}
3322     \@ifundefined{corollary}{%
3323       \newtheorem{corollary}[theorem]{Corollary}
3324     }{}
3325     \theoremstyle{acmdefinition}
3326     \@ifundefined{example}{%
3327       \newtheorem{example}[theorem]{Example}
3328     }{}
3329     \@ifundefined{definition}{%
3330       \newtheorem{definition}[theorem]{Definition}
3331     }{}
3332   \fi
3333   \theoremstyle{acmplain}
3334 }
```

`\@proofnamefont` The font to typeset the proof name.

```
3335 \def\@proofnamefont{\scshape}
```

`\@proofindent` Whether or not to indent proofs.

```
3336 \def\@proofindent{\indent}
```

Customization of the proof environment.

```

3337 \ifcase\ACM@format@nr
3338 \relax % manuscript
3339 \or % acmsmall
3340 \or % acmlarge
3341 \or % acmtog
3342 \or % sigconf
3343 \or % siggraph
3344 \or % sigplan
3345 \def\@proofnamefont{\itshape}
```

```

3346 \def\@proofindent{\noindent}
3347 \or % sigchi
3348 \or % sigchi-a
3349 \or % acmengage
3350 \or % acmcp
3351 \fi

```

proof We want some customization of the proof environment.

```

3352 \renewenvironment{proof}[1][\proofname]{\par
3353 \pushQED{\qed}%
3354 \normalfont \topsep6\p@\@plus6\p@\relax
3355 \trivlist
3356 \item[\@proofindent\hskip\labelsep
3357 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
3358 }{%
3359 \popQED\endtrivlist\endpfalse
3360 }

```

3.26 Balancing columns

We need balancing only if the user did not disable it, and we use a two column format. Note that pbalance uses a different mechanism.

```

3361 \AtEndPreamble{%
3362 \if@ACM@pbalance
3363 \global\@ACM@balancefalse
3364 \ifcase\ACM@format@nr
3365 \relax % manuscript
3366 \or % acmsmall
3367 \or % acmlarge
3368 \or % acmtog
3369 \RequirePackage{pbalance}%
3370 \or % sigconf
3371 \RequirePackage{pbalance}%
3372 \or % siggraph
3373 \RequirePackage{pbalance}%
3374 \or % sigplan
3375 \RequirePackage{pbalance}%
3376 \or % sigchi
3377 \RequirePackage{pbalance}%
3378 \or % sigchi-a
3379 \or % acmengage
3380 \RequirePackage{pbalance}%
3381 \or % acmcp
3382 \fi
3383 \fi
3384 \if@ACM@balance
3385 \ifcase\ACM@format@nr
3386 \relax % manuscript
3387 \global\@ACM@balancefalse
3388 \or % acmsmall
3389 \global\@ACM@balancefalse
3390 \or % acmlarge
3391 \global\@ACM@balancefalse

```

```

3392      \or % acmtog
3393      \RequirePackage{balance}%
3394      \or % sigconf
3395      \RequirePackage{balance}%
3396      \or % siggraph
3397      \RequirePackage{balance}%
3398      \or % sigplan
3399      \RequirePackage{balance}%
3400      \or % sigchi
3401      \RequirePackage{balance}%
3402      \or % sigchi-a
3403      \global\@ACM@balancefalse
3404      \or % acmengage
3405      \RequirePackage{balance}%
3406      \or % acmcp
3407      \global\@ACM@balancefalse
3408      \fi
3409      \fi
3410 }
3411 \AtEndDocument{%
3412   \if@ACM@balance
3413     \if@twocolumn
3414       \balance
3415     \fi\fi}

```

3.27 Acknowledgments

`\acksname`

```

3416 \newcommand\acksname{Acknowledgments}

```

`\acks` This is a comment-like structure

```

3417 \specialcomment{acks}{%
3418   \begin{group}
3419     \section*{\acksname}
3420     \phantomsection\addcontentsline{toc}{section}{\acksname}
3421   }{%
3422     \end{group}
3423 }

```

`\grantsponsor` We just typeset the name of the sponsor

```

3424 \def\grantsponsor#1#2#3{#2}

```

`\grantnum`

```

3425 \newcommand\grantnum[3][{}]{#3%
3426   \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}

```

3.28 Conditional typesetting

We use the comment package for conditional typesetting:

```

3427 \AtEndPreamble{%
3428   \if@ACM@screen
3429     \includecomment{screenonly}
3430     \excludecomment{printonly}

```

```

3431 \else
3432   \excludecomment{screenonly}
3433   \includecomment{printonly}
3434 \fi
3435 \if@ACM@anonymous
3436   \excludecomment{anonsuppress}
3437   \excludecomment{acks}
3438 \else
3439   \includecomment{anonsuppress}
3440 \fi}

```

3.29 Additional bibliography commands

`\showeprint` The command `\showeprint` has two arguments: the (optional) prefix and the eprint number. Right now the only prefix we understand is the (lowercase) word ‘arxiv’.

```

3441 \newcommand\showeprint[2][arxiv]{%
3442   \def\@tempa{#1}%
3443   \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
3444   \def\@tempb{arxiv}%
3445   \ifx\@tempa\@tempb\relax
3446     arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3447   \else
3448     \def\@tempb{arXiv}%
3449     \ifx\@tempa\@tempb\relax
3450       arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3451     \else
3452       #1:#2%
3453     \fi
3454   \fi}

```

3.30 Index

`\theindex` Standard `amsart` uses plain page style in index pages. This clashes with line numbering for review option, so we redefine it.

```

3455 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
3456   \columnseprule\z@ \columnsep 35\p@
3457   \@indextitlestyle
3458   \let\item\@idxitem
3459   \parindent\z@ \parskip\z@\@plus.3\p@\relax
3460   \raggedright
3461   \hyphenpenalty\@M
3462   \footnotesize}

```

3.31 End of Class

`\vspace` We do not disable `\vspace`, but add warning to it

```

3463 \let\@vspace@orig=\@vspace
3464 \let\@vspacer@orig=\@vspacer
3465 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
3466   only be used to provide space above/below surrounding
3467   objects}}{}{}
3468 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should

```

```

3469     only be used to provide space above/below surrounding
3470     objects}}{}}{}
3471 \let\@vspace@acm=\@vspace
3472 \let\@vspacer@acm=\@vspacer

```

\ACM@origbaselinestretch We produce an error if the user tries to change \baselinestretch

```

3473 \let\ACM@origbaselinestretch\baselinestretch
3474 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
3475   \ClassError{\@classname}{An attempt to redefine
3476     \string\baselinestretch\space detected. Please do not do this for
3477     ACM submissions!}\fi}

3478 \normalsize\normalfont\frenchspacing
3479 </class>

```

References

- [1] UK TeX Users Group. UK list of TeX frequently asked questions. <https://texfaq.org>, 2019.
- [2] Michael Downes and Barbara Beeton. *The amsart, amsproc, and amsbook document classes*. American Mathematical Society, August 2004. <http://www.ctan.org/pkg/amslatex>.
- [3] Johannes L. Braams and Javier Bezos. *Babel*, 2022. <http://www.ctan.org/pkg/babel>.
- [4] Cristophe Fiorio. *algorithm2e.sty—package for algorithms*, October 2015. <http://www.ctan.org/pkg/algorithm2e>.
- [5] Rogério Brito. *The algorithms bundle*, August 2009. <http://www.ctan.org/pkg/algorithms>.
- [6] Carsten Heinz, Brooks Moses, and Jobst Hoffmann. *The Listings Package*, June 2015. <http://www.ctan.org/pkg/listings>.
- [7] Simon Fear. *Publication quality tables in L^AT_EX*, April 2005. <http://www.ctan.org/pkg/booktabs>.
- [8] Association for Computing Machinery. *ACM Visual Identity Standards*, 2007. <http://identitystandards.acm.org>.
- [9] Axel Sommerfeldt. *The subcaption package*, April 2013. <http://www.ctan.org/pkg/subcaption>.
- [10] Boris Veytsman, Bern Schandl, Lee Netherton, and C. V. Radhakrishnan. *A package to create a nomenclature*, September 2005. <http://www.ctan.org/pkg/nomencl>.
- [11] Nicola L. C. Talbot. *User Manual for glossaries.sty v4.44*, December 2019. <http://www.ctan.org/pkg/glossaries>.
- [12] David Carlisle. *The textcase package*, October 2004. <http://www.ctan.org/pkg/textcase>.

Change History

1.48	General: Added prologue option to xcolor	51	\ccsdesc@parse: Added warning for missing concepts	77
	Bib code cleanup (Zack Weinberg)	36	\if@ACM@printacmref: Added warning for longer papers	75
	Documentation update (siggraph) .	36	\keywords: Added warning for missing keywords	74
1.49	General: New journal: DTRAP	36	1.69	\vspace: Added the changed command to avoid grouping
1.53	General: New journals: PACMCGIT, TIOT, TDSCI	36	1.70	General: Name change for TDS
	Rearranged docs	36	1.71	General: Bibliography change: volume for @inproceedings is now in brackets together with series
1.54	General: Moved footnote stuff before hyperref call (Ross Moore)	36		LuaTeX now uses the OTF versions of fonts
1.56	General: Documented \Description	36		Retired sigchi and sigchi-a
1.57	General: Booktabs package is now the default	36	1.75	General: Documentation update
1.58	General: Changes in samples (Enrico Gregorio)	36	1.78	General: Documentation update: Word count
	New journal: HEALTH. TDS is renamed to TDSCI	36	1.79	General: Updated indormation for TAP, TCPS, TEAC
1.60	General: New option: urlbreakonhyphens	36	1.80	General: Added DLT and FAC
	\if@ACM@urlbreakonhyphens: introduced macro	37	1.82	General: Updated abbreviations and codes for several journals
1.62	General: New journal: TELO	36	1.84	General: New journals: JDS, GAMES
1.63	General: New journal: FACMP	36	1.85	General: Added CC licenses
	New journal: TQUANT	36		Added: acmengage
1.63a	General: Move: TQUANT to TQC	36		New journal: JRC
1.64	General: Putting abstract after \maketitle now causes an error	36		\@mkauthors: Added: acmengage
1.65	General: New journal: DGOV	36		\@mktitle: Added: acmengage
1.66	General: ACM reference format is now mandatory for papers over one page; CCS concepts and keywords are now mandatory for papers over two pages	36		\@parfont: Added: acmengage
	Authors' addresses are mandatory for journal articles	36		\@printtopmatter: Added: acmengage
	\@mkauthorsaddresses: Added warning for missing addresses	98		\@specialsection: Added: acmengage
				\@subtitlefont: Added: acmengage
				\@titlefont: Added: acmengage
				\ACM@linecountR: Added: acmengage
				format: New format: acmengage
				\parskip: Added: acmengage

1.87	General: New journals: ACMJCSS, JATS, TORS	60	//github.com/borisveytsman/ acmart/issues/9)	36
	format: New format: acmcp	37	\@formatdoi: Added macro	80
1.88	General: Added ISSN for ACMJCSS	60	\ifACM@authorversion: Added macro	38
	Added ISSN for GAMES	60	\maketitle: Added special case of authorversion	84
	Added PACMNET	60	v1.04	
1.89	General: Added PACMMOD	60	General: Updated bibliography for siggraph	36
	Added TOPML	60	\acmArticleSeq: Name change by Matthew Fluet	72
	\@printtopmatter: Moved badges to top header	88	\acmDOI: Name change by Matthew Fluet	73
1.90	General: Added TOPML eISSN	60	\acmISBN: Name change by Matthew Fluet	73
1.90a	General: Changes in the sample keywords and concepts	36	v1.05	
1.92	General: Documentation update: use of ‘anonymous’ throughout	36	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	36
	Moved hyperxmp again due to kernel update	49	Patched \setcitestyle command; closes https: //github.com/borisveytsman/ acmart/issues/19	36
v1.00	General: First released version	36	v1.06	
v1.01	General: Changed hyperref colors in screen mode (closes https: //github.com/borisveytsman/ acmart/issues/1)	36	\@ACM@badge@skip: Added macro	73
	Defined ACM colors	36	\@ACM@badge@width: Added macro	73
	Explicitly put draft option (closes https: //github.com/borisveytsman/ acmart/issues/4)	39	\@ACM@title@width: Added macro	73
	Set headheight to 1pc for all formats (closes https: //github.com/borisveytsman/ acmart/issues/5)	36	\@mktitle@i: Added processing badges	91
v1.02	General: Added TOPS and TSC (closes https: //github.com/borisveytsman/ acmart/issues/12)	36	Made generic	91
	Documentation changes (closes https: //github.com/borisveytsman/ acmart/issues/13)	36	\@mktitle@ii: Now this macro is obsolete	91
v1.03	General: Added anonsuppress environment	36	\@mktitle@iii: Added processing badges	91
	Added authorversion option (closes https: //github.com/borisveytsman/ acmart/issues/13)	36	Made more generic	91
			\@mktitle@iv: Made more generic	91
			\@printtopmatter: Added processing badges	88
			\@subtitlefont: Added macro	90
			\@titlefont: Added macro	90
			\acmBadgeL: Added macro	73
			\acmBadgeR: Added macro	73
			\ifACM@badge: Added macro	73
			v1.07	
			\maketitle: Corrected a bug with abstract footnotes	84
			Corrected a bug with permission and footnotes order	84
			v1.08	
			General: SIGPLAN reformatting by Matthew Fluet	36
			Typos corrected (Tobias Pape)	36

v1.09	General: Revert SIGPLAN caption rules	36	standardpagestyle: Added headers for sigs	102
v1.10	General: Changes of 'licensedothergov' wording	78	Expanded headers for sigchi-a . . .	102
	\maketitle: Corrected a bug with doi in manuscript and author version, https://github.com/borisveytsman/acmart/issues/36	84	Suppressed folios if sig	102
	standardpagestyle: Reversed folios location	102		
v1.11	General: Customization of ACM theorem styles and proof environment by Matthew Fluet . .	36		
v1.12	General: Added graceful behavior when libertine fonts are absent . .	55		
	Documentation updates	36		
	\@marginfigure: Now centering by default	58		
	\@marginable: Now centering by default	58		
	\@parfont: Moved to \section@raggedright	108		
	\copyrightpermissionfootnoterule: Added macro	53		
	\descriptionlabel: Redefined	60		
	\footnoterule: Made shorter	54		
	\if@ACM@natbib@override: Added macro	38		
	\if@ACM@newfonts: Added macro . .	55		
	\maketitle: Moved thankses to copyrightpermission box	84		
	\section@raggedright: Introduced macro	108		
v1.13	General: Font adjustments for acmsmall	93		
	Increased font size for ACM Large . .	41		
	Print bibliographic information by default for the proceedings	75		
	\@mpfootnotetext: Made minipage footnotes centered	49		
	\bibliographystyle: Redefined macro	50		
	\bibstyle@acmauthoryear: Added macro	44		
	\bibstyle@acmnumeric: Added macro	44		
	\if@ACM@printfolios: Added macro .	75		
			v1.14	
			General: \citestyle updates (Matthew Fluet)	36
			Patched \citestyle	42
			\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use	44
			\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use . .	44
			v1.15	
			\@ACM@addtoaddress: Added macro .	91
			\@mkauthors@iii: New authors system	96
			\@shortauthors: Introduced macro .	102
			\@typeset@author@bx: Moved to separate macro	95
			\acks: Added macro	113
			\affiliation: Added code for author groups	70
			\author: Added code for author groups	69
			\city: Added macro	92
			\country: Added macro	92
			\department: Added macro	92
			\grantnum: Added macro	113
			\grantsponsor: Added macro	113
			\if@insideauthorgroup: Introduced macro	69
			\institution: Added macro	92
			\num@authorgroups: Renamed	69
			\orcid: Introduced macro	71
			\position: Added macro	92
			\postcode: Added macro	92
			\state: Added macro	92
			\streetaddress: Added macro	92
			standardpagestyle: Better handling of anonymous mode	102
			v1.16	
			General: Formatting header/footer (Matthew Fluet)	36
			\@headfootfont: Added macro	102
			standardpagestyle: Customize header/footer text font	102
			v1.17	
			General: Slightly decreased margins for sigs	51
			\@makefnmark: Redefined	49
			\@mkauthors: TOG now uses the same authors block as other journals . .	92
			\@mkauthors@ii: Deleted	95

\@mkbibcitation: Added \nobreak	99	Documentation typos fixed (thanks to Stephen Spencer)	36
Changed format for sigs	99		
\acmArticle: The default is now numerical	72	v1.27 \if@ACM@printccs: Typo corrected	74
\acmMonth: The default must be numerical. Closes #50.	72	v1.28 General: Corrected option natbib behavior	44
\acmNumber: The default is now numerical	72	Got rid of warnings in pdf keywords	49
\acmVolume: The default is now numerical	72	\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato)	77
\acmYear: The default is now numerical	72	v1.29 General: Increased head to 13pt	51
\description: Decreased indent	60	\@mkabstract: Removed spurious indentation (John Wickerson)	99
\grantnum: Added url	113	\ccsdesc@parse: Add spacing after bullet and around rightarrow; semicolon separators no longer in bold/italic (John Wickerson)	77
\grantsponsor: Renamed	113	standardpagestyle: Corrected printfolios (Matthew Fluet)	102
\if@ACM@printacmref: Renamed from \if@ACM@printbib	75	v1.30 General: Added \frenchspacing	115
standardpagestyle: Added paper title to sigs	102	Bibtex style now recognizes https:// in doi	36
v1.18 General: Natbib is now the default for all formats	36	Switched to T1: looks like libertine has problems with \l in OT1	55
\@mkauthors@i: Now we andify affiliations	94	Updated IMWUT and PACMPL	60
\@typeset@author@line: Added macro	94	\department: Added optional parameter	92
v1.19 General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	36	v1.31 General: Documentation changes	36
Include 'References' in PDF bookmarks (Matthew Fluet)	42	\@additionalaffiliation: Added macro	70
\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet)	99	\@mkbibcitation: Disabled linebreak	99
\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet)	113	\@startsection: Added \tochangmeasure	46
v1.20 General: Bug fixes for bst	36	Redefined macro	48
\@mkabstract: Deleted spurious space	99	\@textbottom: Redefined	54
v1.21 \showeprint: Added macro	114	\acmMonth: The default now is the current month (Matteo Riondato)	72
v1.22 General: More bibliography changes for Aptara	36	\acmYear: The default now is the current year (Matteo Riondato)	72
v1.23 General: Add PACMPL journal option	36	\additionalaffiliation: Added macro	70
v1.24 General: Add IMWUT journal option	60	\l@section: Redefined macro	48
v1.25 General: Updated PACMPL	60	\l@subsubsection: Redefined macro	48
v1.26 General: Corrected \shortcite bug	36	v1.32 General: Added POMACS journal option	36
		Format siggraph is now obsolete	36
		\@formatdoi: New doi format	80
		v1.33 General: Added acmart-preload-hook	36

Added cmap and glyptounicode	55	\state: Added obeypunctuation code	92
BibTeX comma before articleno bug corrected	36	\streetaddress: Added obeypunctuation code	92
BibTeX crossref bug corrected	36	standardpagestyle: Added right linecount for two-column formats	102
BibTeX numpages bug corrected	36	Added timestamp (Michael D. Adams)	102
Documentation updates	36		
Moved \citename definition for non-natbib bibliography, so a package may redefine it	50	v1.34	
Switched to Type 1 fonts for libertine even if OTF-capable engine is used (Kai Mindermann)	55	\@mkbibcitation: Deleted DOI from doi numbers	99
\@ACM@addtoaddress: Added obeypunctuation code	91	\ACM@linecount@bx: Rulers now are continuous	100
\@mkauthors@i: Added obeypunctuation code	94	\ACM@linecountL: Rulers now are continuous	101
\@mkauthors@iii: Added obeypunctuation code	96	\ACM@linecountR: Rulers now are continuous	101
\@mkauthors@iv: Added obeypunctuation code	97	\maketitle: Added date to the bibstrip in conf proceedings	84
\@subtitlefont: Added \normalsize	90	Deleted 'DOI' from doi numbers	84
\ACM@linecountL: Renamed macro	101	Rearranged bibstrip	84
\ACM@linecountR: Added macro	101	The \terms command is now obsolete	84
\ACM@timestamp: Added current page number	101	\terms: The \terms command now just produces a warning	74
Added macro (Michael D. Adams)	101		
Added submission id	101	v1.35	
\acmSubmissionID: Added macro	73	General: BibTeX bug fixed: et al.	36
\city: Added obeypunctuation code	92	If the copyright is set to usgov or rigtsretained, the price is suppressed	78
\country: Added obeypunctuation code	92	\bibstyle@acmauthoryear: Square brackets for author-year style	44
\department: Added obeypunctuation code	92		
\if@ACM@affiliation@obeypunctuation: Added macro	70	v1.36	
\if@ACM@authordraft: Added macro	39	General: Added PACMHCI journal options	60
\if@ACM@natbib@override: Deleted macro	38	Added the possibility to adjust number of author boxes per row in conference formats	36
\if@ACM@timestamp: Added macro (Michael D. Adams)	39	\@ACM@authorsperrow: Added macro	75
\institution: Added obeypunctuation code	92	\@mkauthors@iii: Added authorsperrow override	96
firstpagestyle: Added right linecount for two-column formats	104	\@mkauthors@iv: Added authorsperrow override	97
Added timestamp (Michael D. Adams)	104	\if@ACM@authordraft: Corrected typo, thanks to bargteil	39
\maketitle: Fixed the bug with figures on top and bottom of the title page, thanks to David Epstein	84		
\position: Added obeypunctuation code	92	v1.37	
\postcode: Added obeypunctuation code	92	General: Reduce list indentation (Matthew Fluet)	59
		Set \normalparindent; Reduce list indentation (Matthew Fluet)	36
		\description: Reduce list indentation (Matthew Fluet)	60
		\descriptionlabel: Reduce list indentation (Matthew Fluet)	60

\normalparindent: Set	Put theorem defs in a separate style	36
\normalparindent (Matthew Fluet)	\acmBooktitle: Added macro	68
v1.38	\acmEditors: Added macro	68
General: Increase default font size for SIGPLAN	\@editorsAbbrev: Added macro	68
v1.39	\@folioblob: Suppress the blob if acmArticleSeq is empty	104
\@@authornotemark: Added macro	\@mkbibcitation: If the paper has just one page, use 'page' instead of 'pages'	99
\authornotemark: Added macro	\ACM@restore@pagestyle: Added macro	100
v1.40	\acmArticle: The default is now empty	72
General: Added 'textcase' package	\acmArticleSeq: Now acmArticle might be empty	72
Added heightrounded to geometry	\acmBooktitle: Added macro	68
Added new copyright version: licensedcagov	\editor: Added macro	68
Added package cleveref	\if@ACM@acmthm: Added macro	37
Added Ross Moore code for glyptounicode	\maketitle: Empty DOI or ISBN are not printed (by Michael Ekstrand)	84
Bibliography changes	v1.45	
\@copyrightowner: Added new copyright version: licensedcagov	\@folioblob: Switched \bfseries\sffamily to \sffamily\bfseries	104
\@copyrightpermission: Added new copyright version: licensedcagov	\@parfont: Switched \bfseries\sffamily to \sffamily\bfseries	108
\@mkauthors@i: Switched to MakeTextUppercase	\@titlefont: Switched \bfseries\sffamily to \sffamily\bfseries	90
\@parfont: Switched to MakeTextUppercase	v1.46	
\ACM@linecount@bx: Work around a bug in xcolor: looks like cmyk colors in boxes do not work	General: Added etoolbox	36
\ccdesc@parse@finish: Added macro	Bst file bug fixes: label width is calculated correctly	36
\city: We now do not print this even in SIG	Delayed hypersetup since journal options may change screen mode	49
\country: Fixed bugs with extra spaces	PACM now set screen to true	60
\l@section: Redefined macro	Restore theorem defs to class file	36
\postcode: We now do not print this even in SIG	\@mkauthorsaddresses: Introduced macro	98
\state: We now do not print this even in SIG	\@mkbibcitation: Added subtitle	99
\streetaddress: We now do not print this even in SIG	\@printendtopmatter: Made it \par\bigskip uniformly	100
v1.41	\@printtopmatter: Deleted rule	88
General: Added new badges	\@setauthorsaddresses: Introduced macro	100
v1.42	\ACM@linecount@bx: Rearranged the code to get rid of spurious underfull messages (Benjamin Byholm)	100
General: Deleted ACM badges	\author: Started counting authors	69
v1.43	\authorsaddresses: Introduced macro	71
\@startsection: Added \makeatletter		
\country: Added comma before country for journals		
v1.44		
General: Added package refcount		
Deleted package cleveref		

\country: Corrected spacing for institution	92	v1.52	\@copyrightowner: Rewording of licenses	79
\if@ACM@acmthm: Modified description	37		\@copyrightpermission: Another rewording of copyright statements for iw3c2w3[g]	80
\liningnums: Workaround for compatibility with fontspec	56			
\maketitle: Added authors' addresses	84	v1.53	General: Added PACMCGIT, TIOT, TDSCI	60
Thankses go before authors' addresses	84			
\num@author: Introduced macro	69	v1.54	General: Added Ross's patch for sectioning	107
v1.47			Deleted indent for subsubsection	107
General: New journal: THRI	36		XeTeX now uses T1 encoding	55
v1.48			\@mkbibcitation: Bug corrected (Ross Moore)	99
General: \citeyear no longer behaves like \citeyearpar	50		\@shortauthors: Added submission id in anonymous mode	102
Code prettying (Michael D. Adams)	36		\ACM@adddotafter: Added macro	107
Initial support for Biblatex (Daniel Thomas)	36		\ACM@NR@adjustedSectionformat: Added macro	107
Misc entries in the bibliography no longer produce a separate date	36		\ACM@NRadjust: Added macro	106
Typos fixed (Jamie Davis)	36		\author: Added submission id in anonymous mode	69
\@headfootfont: Deleted unnecessary switch (Michael D. Adams)	102		\if@ACM@nonacm: Added macro	38
\@mkabstract: Removed spurious indentation if abstract is followed by an empty line	99	v1.55	General: Now we use purple color for links	49
\ACM@timestamp: Fromatting change (Michael D. Adams)	101		Table captions for SIGCHI now use the same font size as figure captions (Luis Leiva)	57
\if@ACM@review: Review mode now switches on folios	37		Typo corrected (Zack Weinberg)	42
\maketitle: Added acmart and version info to pdfcreator tag	84		\@mkbibcitation: Bug corrected	99
Added language and doctitle attributes to PDF (Andreas Reichinger)	84	v1.56	\maketitle: Fixes topnum	84
Suppressed empty DOI (Serguei Mokhov)	84			
v1.50			General: Looks like XeTeX requires explicit monotype font declaration	55
\@copyrightpermission: New copyright statements for iw3c2w3[g]	80		Make two-column layouts flush (Philip Quinn)	51
v1.51			\@marginfigure: Added checking for description	58
General: Corrected the bug with price suppression	78		\@mkteasers: Added check for description	98
Suppress price if the copyright is set to iw3c2w3 or iw3c2w3g	78		\acksname: Added macro (Philip Quinn)	113
XeTeX now uses OTF fonts (Joachim Breitner)	55		\ccsdesc@parse: End the concepts list with a period (Philip Quinn)	77
firstpagestyle: We now use journal abbreviation for footers	104		\Description: Added macro	56
standardpagestyle: We now use journal abbreviation for footers	102		\if@Description@present: Added macro	56
			\if@undescribed@images: Added macro	56

v1.57	\ACM@origbaselinestretch: Added check whether the user changed \baselinestretch 115	v1.61	\@typeset@author@bx: Added \normalbaselines 95
	\author: Added warning if \author has comma 69	v1.64	\ACM@linecount@bx: Bug fix: made the spacing on the left and the right size equal 100
	\email: Added warning if \author has comma 71	\if@ACM@maketitle@typeset:	Introduced macro 60
	\if@ACM@balance: Added macro . . . 38	\maketitle: Added a switch setting to show that \maketitle is typeset . 84	
	\vspace: Added warning 114		
v1.58	General: Added HEALTH. TDS CI is renamed to TDS 60	v1.65	\@mkauthorsaddresses: Deleted cs@addpunct 98
	Suppressed \addtocounter in pdf subject 49	v1.66	General: Patching algorithm and algorithm* to prevent spurious space warnings 56
	\@dblfloat: Deleted spurious \vspace warning 58	\@specialsection: Suppress warnings about \vspace 88	
	\@marginfigure: Deleted spurious \vspace warning 58		
	\@margintable: Deleted spurious \vspace warning 58	v1.67	General: Patching lstlisting and lstlisting* to prevent spurious space warnings 56
	\@mkbibcitation: Deleted spurious \vspace warning 99	\@parfont: Deleted redefinitions of sections 108	
	\@printendtopmatter: Deleted spurious \vspace warning 100	\@specialsection: Paragraph inside group does not print its argument. Added a bugfix 88	
	\@sidebar: Deleted spurious \vspace warning 58		
	\maketitle: Original \vspace inside \maketitle 84	v1.68	General: New command for unindent paras 107
	\vspace: Preserved old versions as \@vspace@orig and \@vspace@orig 114	\@specialsection: Deleted grouping altogether 88	
v1.59	\acmConference: Setting \@ACM@journal@bibstrip 68	v1.69	General: No dots for unindented paragraphs 107
	\acmJournal: Setting \@ACM@journal@bibstrip 68	\@printendtopmatter: Deleted grouping 100	
	\if@ACM@journal@bibstrip: Introduced macro 40	\@specialsection: Changed dot to colon for sigplan 88	
	firstpagestyle: Added logic for conference papers using journal format 104	\ACM@linecountR: Do not increase numbers in one column format . 101	
	Moved page styles to \AtBeginDocument 104	\ccsdesc@parse: Use math right arrow in text 77	
	standardpagestyle: Added logic for conference papers using journal format 102	v1.71	\l@subsubsection: Bug fixed (thanks to Andrew Black) 48
	Moved page styles to \AtBeginDocument 102	v1.72	\author: Added \detokenize (Kuldeep S. Meel) 69
v1.60	\@headfootfont: Moved to footnotesize 102	\maketitle: Do not andify authors for pdf metadata (Scott Pakin) . . 84	

v1.73	General: Patching minted and minted* to prevent spurious space warnings	56	v1.78	\mkauthors@i: Unboxing \mktitle@bx	94
	\@ACM@checkaffil: Added macro	94		\mkauthors@iii: Unboxing \mktitle@bx	96
	\@ACM@resetaffil: Added macro	94		\mkteasers: Unboxing \mktitle@bx	98
	\mkauthors@i: Check the presence of required elements for affiliations	94		\@printtopmatter: Added processing the overflowing title box	88
	\mkauthors@iii: Check the presence of required elements for affiliations	96		\@specialsection: Again suppressed \vspace warning	88
	\mkauthors@iv: Check the presence of required elements for affiliations	97	v1.82	\anon: Introduced macro	83
	\city: Check the presence in affil	92	v1.83	General: Use babel for multilanguage papers	44
	\country: Check the presence in affil	92		\mkabstract: I13n	99
	\if@ACM@citypresent: Added macro	94		\mktitle@i: Added \translatedtitle and \translatedsubtitle	91
	\if@ACM@countrypresent: Added macro	94		\mktitle@iii: Added \translatedtitle and \translatedsubtitle	91
	\if@ACM@instpresent: Added macro	94		\mktitle@iv: Added \translatedtitle and \translatedsubtitle	91
	\institution: Check the presence in affil	92		\mktranslatedabstract: Added macro	99
	\maketitle: Do not check again the presense of address fields	84		\mktranslatedkeywords: Added macro	71
v1.74	General: Changed the order of font loading	55		\@translatedabstracts: Added macro	46
v1.75	\@ACM@checkaffil: Changed warning to error for country	94		\@translatedkeywords: Added macro	46
	\@beginmaketitlehook: Introduced macro	84		\@translatedsubtitle: Added macro	46
	\AtBeginMaketitle: Introduced macro	84		\@translatedtitle: Added macro	45
	\maketitle: Added \@beginmaketitlehook	84		\ACM@lang@check: Added macro	45
v1.76	General: Moved hyperxmp before hyperref, see https://github.com/borisveytsman/ acmart/issues/425	49		\ACM@languages: Introduced macro	39
	\author: Added code for orcid links	69		\maketitle: I13n	84
	\if@ACM@pbalance: Added macro	38		translatedabstract: Added macro	46
	\maketitle: Put \par inside group for keywords	84		\translatedkeywords: Added macro	46
	\orcid: Added code for orcid links	71		\translatedsubtitle: Added macro	46
	standardpagestyle: Fixed bug with no line numbers for nonacm	102		\translatedtitle: Added macro	46
v1.77	\mkauthorsaddresses: New separator of institutions	98	v1.85	General: Added CC licenses	78
				\@acmengagemetadata: Introduced macro	84
				\@copyrightowner: Added CC licenses	79
				\@copyrightpermission: Added CC licenses	80
				\@typesetengagemetadata: Introduced macro	100
				\if@ACM@engage: Introduced macro	40

\maketitle: acmengage	84	\@ACM@acmcp@delta: Added dimen	42
\setcctype: Added macro	79	\@ACM@badge@skip: Redefined macro	73
\setengagemetadata: Introduced macro	84	\@ACM@color@frame: Added saving the position of the bottom	76
v1.86		\@acmBadgeL: Introduced macro	73
\country: Error if country is empty	92	\@acmBadgeR: Introduced macro	73
standardpagestyle: Special treatment of ACM Engage materials	102	\@mktitle@i: Moved badges to top header	91
v1.87		Moved up acmcp title	91
General: Added ‘framed’ package for acmcp	42	\@mktitle@iii: Moved badges to top header	91
No numbering sections for ACMCP	109	\acmBadge: Added macro	74
\@ACM@color@frame: Introduced macro	76	\acmBadgeL: Redefined macro	73
\@ACM@copyright@check@cc: Added macro	80	\acmBadgeR: Redefined macro	73
\@copyrightpermission: CC licenses now are allowed only for non-acm or ACM engage publications	80	\if@ACM@badge: Deleted macro	73
\@mkauthors@i: Special treatment for acmcp	94	firstpagestyle: Moved badges here	104
\@mktitle@i: Special treatment for acmcp	91	\set@ACM@acmcpbox: Added logo	87
\acmArticleType: Introduced macro	76	Added zref position of the bottom	87
\acmCodeDataLink: Added possibility to have several links	76	v1.91	
Introduced macro	76	\acmContributions: Restored the macro	77
\acmDataLink: Introduced macro	77	standardpagestyle: Redesigned ACMP labels	102
Now this is the same as the code link	77	v1.93	
\if@ACM@acmcp: Introduced macro	40	General: Added PACMSE journal option	36
firstpagestyle: Special treatment for acmcp	104	v2.00	
\maketitle: CC license are allowed for non-acm publications	84	General: Deleted acmPrice	78
\set@ACM@acmcpbox: Added macro	87	\@ACM@copyright@check@cc: Moved to warning	80
standardpagestyle: Special treatment of ACMCP	102	\@copyrightowner: Changed wording	79
v1.88		\@copyrightpermission: Rewrote wording	80
\@mktitle@i: Moved down title for acmcp	91	\@folio@ht: Obsoleted macro	104
v1.89		\@folio@max: Obsoleted macro	104
General: Added ‘zref-savepos’ package for acmcp	42	\@folio@voffset: Obsoleted macro	104
		\@folio@wd: Obsoleted macro	104
		\@folioblob: Obsoleted macro	104
		\acmPrice: Deleted macro	72
		firstpagestyle: Deleted blobs	104
		\maketitle: Added “ACM” for papers	84
		Deleted acmPrice	84

Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in *roman* refer to the code lines where the entry is used.

Symbols		
\- 613	\@ACM@instpresentfalse 2587	\@M . 479, 518, 536, 545, 3461
\@ ... 1886, 1889, 1901, 1906, 1911, 2011, 2048	\@ACM@instpresenttrue ... 2490, 2501, 2581	\@abstract 1683, 2788, 2795
\@authornotemark 1610, 2774	\@ACM@journal@bibstripfalse 232, 1462	\@acmArticle 1616, 1619, 2200, 2813, 2814, 2942, 2945, 2965, 2975, 2986, 3054, 3077, 3087, 3097, 3134
\@par 479, 536	\@ACM@journal@bibstriptrue 230, 1448	\@acmArticlePage ... 2941, 2959, 2960, 2969, 2972, 2979, 2983
\@ACM@acmcp@delta 277, 2276, 2280	\@ACM@journalfalse 211, 213, 215, 217, 219, 222	\@acmArticleSeq 1618
\@ACM@acmcpbox 2263, 2267, 3050, 3130	\@ACM@journaltrue .. 203, 205, 207, 209, 225	\@acmBadgeL 1640, 1655, 1656, 1661, 3068, 3080, 3081, 3092, 3093, 3100, 3103, 3108, 3129
\@ACM@acmcpfalse ... 169	\@ACM@labelwidth 1004, 1007, 1015, 1020, 1046	\@acmBadgeR 1639, 1642, 1643, 1648, 3069, 3082, 3083, 3090, 3091, 3101, 3104, 3109, 3130
\@ACM@acmcptrue 226	\@ACM@maketitle@typesetfalse 1053	\@acmBooktitle 1468, 2169, 2190, 2829
\@ACM@addtoaddress . 2478, 2506, 2507, 2509	\@ACM@maketitle@typesettrue 2112	\@acmCodeDataLink .. 1776, 1777, 1779, 1781, 2283, 2284
\@ACM@authorsperrrow 1712, 2653, 2654, 2706, 2707	\@ACM@manuscriptfalse 198	\@acmContributions . 1782, 2289, 2290
\@ACM@badge@skip ... 1637, 1649, 1662	\@ACM@manuscripttrue 196	\@acmDOI .. 1632, 2192, 2195, 2201, 2204, 2837, 2998, 3000, 3022, 3024, 3055, 3135
\@ACM@badge@width 1634, 1646, 1652, 1659, 1665	\@ACM@newfontsfalse 834, 837, 840	\@acmEditors 1476, 1477, 1478, 1481, 2830, 2831
\@ACM@balancefalse 3363, 3387, 3389, 3391, 3403, 3407	\@ACM@newfontstrue . 831	\@acmISBN 1630, 2203
\@ACM@checkaffil 2234, 2591, 2622, 2627, 2689, 2694, 2734, 2739	\@ACM@printacmreffalse 95, 227	\@acmMonth 1622, 1624, 2200
\@ACM@citypresentfalse 2588	\@ACM@printfoliostrue 78	\@acmNumber 1614, 2826, 2965, 2975, 2986, 3053, 3077, 3087, 3097, 3133
\@ACM@citypresenttrue ... 2492, 2506, 2583	\@ACM@resetaffil ... 2586, 2621, 2626, 2688, 2693, 2733, 2738	\@acmPubDate 1624, 2826, 2965, 2975, 2986, 3055, 3078, 3088, 3098, 3135
\@ACM@color@frame 1769, 2260	\@ACM@reviewtrue ... 140	\@acmSubmissionID .. 1502, 1503, 1522, 1523, 1628, 2922, 2923, 2933
\@ACM@commabox 2478, 2482, 2483	\@ACM@screenttrue ... 1172, 1216, 1222, 1236, 1242, 1248	
\@ACM@copyright@check@cc 1922, 2066	\@ACM@sigchiamodeffalse 200	
\@ACM@countrypresentfalse 2589	\@ACM@sigchiamodetrue 220	
\@ACM@countrypresenttrue ... 2497, 2509, 2585	\@ACM@timestamptrue 139	
\@ACM@engagefalse .. 167	\@ACM@title@width 1636, 2451, 2453, 2462, 2463	
\@ACM@engagetrue ... 223	\@DeclareACMFormat 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49	
\@ACM@institution@separator\@Description@presenttrue 2756, 2757, 2762	\@Description@presentfalse .. 876, 879, 954, 2780	
	\@Description@presenttrue 870, 873	

\@acmVolume	\@authorfont 2539, 2544,	2678, 2679, 2682,
1612, 2826, 2964,	2548, 2551, 2554,	2685, 2686, 2691,
2974, 2985, 3053,	2557, 2560, 2563,	2718, 2725, 2726,
3076, 3086, 3096, 3133	2566, 2569, 2609, 2645	2728, 2730, 2731, 2736
\@acmYear . . 1620, 1627,	\@authornotemark . . .	\@currentaffiliations
2085, 2169, 2200, 2817	. . . 1602, 1608, 2773	. . . . . 2575,
\@acmdefinitionbodyfont	\@authornotes	2576, 2577, 2579,
. . . 3274, 3286, 3300	. . . 1599, 1603, 2132	2605, 2617, 2618, 2624
\@acmdefinitionheadfont	\@authorsaddresses .	\@currentauthors . . .
. . . 3276, 3288, 3302	. . . . . 1574,	. . . . . 2573, 2574,
\@acmdefinitionindent	2141, 2292, 2768, 2847	2604, 2608, 2609,
. . . 3275, 3287, 3301	\@auxout 649, 2279	2611, 2645, 2648,
\@acmdefinitionnotefont	\@begindocumenthook 645	2670, 2672, 2673,
. . . 3277, 3289, 3305	\@beginmaketitlehook	2675, 2717, 2719,
\@acmengagemetadata	. . . 2102, 2105, 2111	2720, 2722, 2773, 2774
. . . 2106, 2108, 2850	\@botnum 2253	\@currentlabel . 563, 577
\@acmownedfalse	\@citestyle 311	\@dblalg 465
. . . . 1837, 1840,	\@classname . . . 24, 26,	\@dblfloat 966
1843, 1848, 1851,	35, 53, 55, 56, 61,	\@department . . 1552, 1553
1854, 1857, 1860,	63, 64, 69, 71, 72,	\@dotsep 3241
1866, 1869, 1872, 1875	77, 80, 81, 86, 88,	\@editorsAbbrev
\@acmownedtrue	89, 94, 100, 101,	. . . 1475, 1480, 2831
. . . 1824, 1833, 1863	105, 109, 114, 116,	\@empty
\@acmplainbodyfont .	117, 122, 124, 125,	155, 234, 381, 421,
. . . 3242, 3254, 3268	130, 132, 133, 138,	469, 1459, 1477,
\@acmplainheadfont .	142, 143, 161, 171,	1499, 1502, 1520,
. . . 3244, 3256, 3270	177, 183, 260, 422,	1522, 1527, 1528,
\@acmplainindent . . .	446, 832, 835, 838,	1534, 1642, 1655,
. . . 3243, 3255, 3269	875, 884, 887, 957,	1673, 1674, 1730,
\@acmplainnotefont .	1173, 1217, 1223,	1731, 1737, 1744,
. . . 3245, 3257, 3273	1237, 1243, 1249,	1776, 1787, 1813,
\@adddotafter	1443, 1445, 1492,	2103, 2136, 2141,
3149, 3150, 3152,	1547, 1561, 1670,	2192, 2203, 2204,
3164, 3179, 3183, 3236	1676, 1681, 1688,	2215, 2218, 2224,
\@additionalaffiliation	1690, 1691, 1694,	2228, 2283, 2286,
. 1548, 1549	1696, 1697, 1700,	2289, 2292, 2327,
\@addpunct . 2760, 2846,	1708, 1710, 1711,	2456, 2465, 2474,
2847, 3236, 3237, 3357	1713, 1714, 1762,	2496, 2575, 2608,
\@addspaceafter . . . 3237	1815, 1924, 1928,	2616, 2617, 2672,
\@affiliationfont . .	1931, 2593, 2596,	2678, 2685, 2719,
. . . . 2540, 2545,	2599, 2769, 2783,	2725, 2730, 2768,
2549, 2552, 2555,	2810, 3465, 3468, 3475	2776, 2813, 2818,
2558, 2561, 2564,	\@clubpenalty 524	2830, 2837, 2922,
2567, 2570, 2622, 2645	\@concepts . 1787, 1799,	2933, 2998, 3000,
\@afterheading . 510, 2256	1813, 2218, 2220, 2238	3022, 3024, 3054,
\@afterindentfalse .	\@copyrightowner . . .	3055, 3134, 3135,
. 456, 2255	. . . . . 1883, 2176	3245, 3277, 3426, 3443
\@afterindenttrue . . 454	\@copyrightpermission	\@endfloatbox 969
\@article@string . . .	. . . 1938, 2152, 2164	\@endpfalse 3359
. . . 2813, 2826, 2834	\@copyrightyear	\@endwdefloatbox 969, 977
\@author . . . . .	. . . 2084, 2176, 2178	\@finalstrut . . . 568, 581
1501, 1507, 1514,	\@currbox . . . 983, 984, 985	\@float 971
2607, 2672, 2719, 2763	\@currentaffiliation	\@flushglue 3193
	2646, 2649, 2671,	\@fnsymbol 2122

<code>\@folioeht</code>	3060	<code>1179, 1183, 1187,</code>	<code>\@empty</code>	1685, 2788
<code>\@folioemax</code>	3060	<code>1192, 1196, 1200,</code>	<code>\@listI</code>	1028, 1032
<code>\@folio@voffset</code>	3060	<code>1204, 1209, 1213,</code>	<code>\@listi</code>	1025, 1032
<code>\@folio@wd</code>	3060	<code>1219, 1225, 1229,</code>	<code>\@listii</code>	1033
<code>\@folioblob</code>	3060	<code>1233, 1239, 1245,</code>	<code>\@listiii</code>	1036
<code>\@footnotemark</code> .	584, 2120	<code>1251, 1255, 1259,</code>	<code>\@listiv</code>	1038
<code>\@footnotemark@nolink</code>		<code>1264, 1268, 1272,</code>	<code>\@listv</code>	1040
.	584, 2120	<code>1276, 1280, 1284,</code>	<code>\@listvi</code>	1042
<code>\@footnotetext</code>		<code>1288, 1292, 1296,</code>	<code>\@m</code>	467
.	559, 585, 2121	<code>1300, 1304, 1308,</code>	<code>\@makefnmark</code> . . .	558,
<code>\@footnotetext@nolink</code>		<code>1312, 1316, 1320,</code>	583, 2124, 2129, 2133	
.	585, 2121	<code>1324, 1328, 1332,</code>	<code>\@makefntext</code>	
<code>\@for</code>	287	<code>1336, 1340, 1344,</code>	. . .	558, 567, 580, 2135
<code>\@formatdoi</code>	1921,	<code>1348, 1352, 1356,</code>	<code>\@marginfigure</code> .	949, 950
2195, 2201, 2204,		<code>1360, 1364, 1369,</code>	<code>\@marginatable</code> . .	960, 961
2837, 2998, 3000,		<code>1374, 1378, 1382,</code>	<code>\@minipagefalse</code> .	792, 979
3022, 3024, 3055, 3135		<code>1387, 1391, 1395,</code>	<code>\@minus</code> 3169, 3173, 3177,	
<code>\@fps</code>	970	<code>1399, 1403, 1407,</code>	3181, 3185, 3190,	
<code>\@fpsadddefault</code>	970	<code>1411, 1415, 1419,</code>	3265, 3267, 3297, 3299	
<code>\@gobble</code>	309, 353	<code>1423, 1427, 1431,</code>	<code>\@mkabstract</code> . .	2214, 2787
<code>\@hangfrom</code>	478, 535	<code>1435, 1439, 1450,</code>	<code>\@mkauthors</code> 2125, 2127, 2511	
<code>\@headfootfont</code>		1451, 2188, 3053, 3133	<code>\@mkauthors@i</code>	
. . . .	2935, 2959,	<code>\@journalNameShort</code> .	. . . .	2515, 2517,
2960, 2961, 2962,		. . . .	2519, 2521, 2535, 2603	
2968, 2971, 2978,		1132, 1136,	<code>\@mkauthors@ii</code>	2638
2982, 2990, 2991,		1140, 1144, 1148,	<code>\@mkauthors@iii</code>	
2997, 2999, 3003,		1152, 1156, 1161,	. . . .	2523, 2525,
3006, 3014, 3015,		1165, 1170, 1176,	2527, 2529, 2533, 2650	
3021, 3023, 3027, 3030		1180, 1184, 1188,	<code>\@mkauthors@iv</code> 2531, 2703	
<code>\@idxitem</code>	3458	1193, 1197, 1201,	<code>\@mkauthorsaddresses</code>	
<code>\@ifnextchar</code>	1552	1205, 1210, 1214,	. . . . .	1575, 2747
<code>\@ifnotempty</code>	2090	1220, 1226, 1230,	<code>\@mkbibcitation</code> 2249, 2804	
<code>\@ifnum</code>	325, 327	1234, 1240, 1246,	<code>\@mkteasers</code> . . .	2125, 2775
<code>\@ifstar</code>	463	1252, 1256, 1260,	<code>\@mkttitle</code>	2125, 2371
<code>\@ifundefined</code>		1265, 1269, 1273,	<code>\@mkttitle@i</code> 2374, 2376,	
3310, 3313, 3316,		1277, 1281, 1285,	2378, 2380, 2394, 2447	
3319, 3322, 3326, 3329		1289, 1293, 1297,	<code>\@mkttitle@ii</code>	2460
<code>\@iiiparbox</code>	795	1301, 1305, 1309,	<code>\@mkttitle@iii</code>	
<code>\@indextitlestyle</code> . .	3457	1313, 1317, 1321,	. . . .	2382, 2384,
<code>\@input</code>	547	1325, 1329, 1333,	2386, 2388, 2392, 2460	
<code>\@insideauthorgroupfalse</code>		1337, 1341, 1345,	<code>\@mkttitle@iv</code> . .	2390, 2470
.	1490, 1542	1349, 1353, 1357,	<code>\@mktranslatedabstract</code>	
<code>\@insideauthorgrouprtrue</code>		1361, 1365, 1370,	. . . . .	444, 2797
.	1497	1375, 1379, 1383,	<code>\@mktranslatedkeywords</code>	
<code>\@journalCode</code> . .	1054,	1388, 1392, 1396,	. . . . .	441, 1576
1173, 1217, 1223,		1400, 1404, 1408,	<code>\@mpargs</code>	795
1237, 1243, 1249, 1443		1412, 1416, 1420,	<code>\@mparswitchfalse</code> . .	741
<code>\@journalCode@nr</code> . . .		1424, 1428, 1432,	<code>\@mpfootins</code>	
. . .	1054, 1129, 1449	1436, 1440, 1451,	. . . . .	572, 573, 787, 788, 790
<code>\@journalName</code>		2825, 2964, 2974,	<code>\@mpfootnotetext</code> . . .	571
. . . .	1131, 1135,	2985, 3076, 3086, 3096	<code>\@ne</code> .	313, 317, 321, 323,
1139, 1143, 1147,		<code>\@keywords</code>	635, 2864, 2870, 2874	
1151, 1155, 1160,		<code>\@nil</code>	332
1164, 1168, 1175,		1673, 1674, 2224,	<code>\@nobreakfalse</code> .	512, 552
		2226, 2239, 2286, 2287		
		<code>\@latex@error</code>		
		355		

\@noskipsecfalse ...	516	\@printtopmatter ...		\@tempa	287,
\@noskipsectrue	513	.....	2126, 2326		288, 290, 292, 294,
\@pages@word		\@proofindent			296, 298, 300, 302,
... ..	2807, 2827, 2834	... ..	3336, 3346, 3356		304, 306, 308, 310,
\@par	2138, 2145	\@proofnamefont			312, 314, 316, 318,
\@parboxrestore	576	... ..	3335, 3345, 3357		320, 322, 324, 326,
\@parfont		\@received .	1728, 1731,		328, 330, 332, 335,
3183, 3187, 3192, 3197		1732, 1734, 1737,			337, 339, 341, 343,
\@permissionCodeOne		1738, 1740, 1744, 1745			345, 1526, 1527,
....	1133, 1137,	\@restonecolfalse ..	3455		1729, 1730, 2495,
1141, 1145, 1149,		\@restonecoltrue ...	3455		2496, 2616, 3426,
1153, 1157, 1162,		\@rightskip ...	3193, 3194		3442, 3443, 3445, 3449
1166, 1171, 1177,		\@saveabstract	1679, 1680	\@tempb	
1181, 1185, 1189,		\@saveteaser ..	2087, 2088		288, 290, 292, 294,
1194, 1198, 1202,		\@savetranslatedabstract			296, 298, 300, 302,
1206, 1211, 1215,		.....	444, 445		304, 306, 308, 310,
1221, 1227, 1231,		\@secCNTformat .	472, 529		312, 314, 316, 318,
1235, 1241, 1247,		\@secfont	3171, 3197		320, 322, 324, 326,
1253, 1257, 1261,		\@secpenalty	461		328, 330, 335, 337,
1266, 1270, 1274,		\@sect	465, 466		339, 341, 343, 345,
1278, 1282, 1286,		\@setaddresses	2772		3444, 3445, 3448, 3449
1290, 1294, 1298,		\@setauthorsaddresses		\@tempboxa .	795, 2336, 2338
1302, 1306, 1310,		... ..	2145, 2292, 2847	\@tempc .	333, 334, 336,
1314, 1318, 1322,		\@setengagemetadata			338, 340, 342, 344, 346
1326, 1330, 1334,		.....	2109, 2849	\@tempdima	
1338, 1342, 1346,		\@setthanks ...	2138, 2846		2274, 2277, 2278,
1350, 1354, 1358,		\@shortauthors			2280, 2332, 2333,
1362, 1366, 1371,		2930, 2953, 2961,			2334, 2340, 2341, 2342
1376, 1380, 1384,		2969, 2979, 2991, 3015		\@tempskipa	
1389, 1393, 1397,		\@sidebar	945, 946		453, 455, 456, 461,
1401, 1405, 1409,		\@specialsection ...			474, 475, 506, 507,
1413, 1417, 1421,		1578, 2219, 2225, 2296			509, 521, 522, 531, 532
1425, 1429, 1433,		\@sssect	464, 530	\@textbottom	796
1437, 1441, 1452, 2200		\@startPage	1668,	\@textsuperscript ..	
\@permissionCodeTwo		2327, 2328, 2330, 2927		....	583, 2124, 2129
.....	1158,	\@startsection .	450,	\@texttop	797
1190, 1207, 1262,		542, 3168, 3172,		\@thefnmark .	564, 578,
1367, 1372, 1385, 1453		3176, 3180, 3184, 3189			583, 2124, 2129, 2134
\@plus	545, 553,	\@starttoc	542	\@title ...	1582, 2237,
796, 3169, 3173,		\@subparfont	3222		2455, 2464, 2473, 2817
3177, 3181, 3185,		\@subsecfont ..	3175, 3197	\@titlefont	2397, 2452,
3190, 3264, 3266,		\@subsubsecfont	3179, 3197		2454, 2461, 2463, 2471
3296, 3298, 3354, 3459		\@subtitle .	1483, 1591,	\@titlenotes	
\@printcopyrightfalse		2456, 2457, 2465,			1580, 1584, 1587, 2130
.....	1836, 1847	2466, 2474, 2475, 2818		\@tochangmeasure	483, 496
\@printcopyrighttrue		\@subtitlefont		\@toclevel	467
.....	1820, 1832	2422, 2457, 2466, 2475		\@tocline ...	555, 556, 557
\@printendtopmatter		\@subtitlenotes		\@topnum	2251
.....	2254, 2839	1589, 1593, 1596, 2131		\@translatedabstracts	
\@printpermissionfalse		\@svsec .	469, 472, 478, 493		442, 449, 2215, 2216
.....	1835	\@svsechd ...	491, 519, 539	\@translatedkeywords	
\@printpermissiontrue		\@teaser	2088, 2777		439, 441, 2228, 2229
... ..	1822, 1831, 1846	\@teaserfigures		\@translatedsubtitle	
		2086, 2088, 2776, 2781		.....	436,

438, 2457, 2466, 2475	2203, 2284, 2809,	\ACM@lang@check
\@translatedtitle 433,	2817, 2869, 3055, 3135	420, 434, 437, 440, 448
435, 2455, 2464, 2473	\{ 295	\ACM@languages
\@typeset@author@bx	\} 295	. . . 153, 381, 383, 421
. 2642,	_ 1473, 1795,	\ACM@linecount
2696, 2702, 2741, 2746	1805, 2176, 2178,	. . . . 2863, 2864,
\@typeset@author@line	2813, 2814, 2832, 2927	2869, 2870, 2873, 2874
2572, 2606, 2630, 2635		\ACM@linecount@bx . .
\@typesetengagemetadata	A	. . . 2860, 2880, 2910
. 2212, 2848	\abstract 1679	\ACM@linecount@bxht
\@undefined	abstract (env.) 18	2862, 2868, 2871, 2872
. 645, 863, 1470, 2102	\abstractname . . 379,	\ACM@linecountL
\@undescribed@imagesfalse	392, 2789, 2793, 2801	. . . . 2876, 2951,
. 872	\acks 3417	2954, 2959, 2962,
\@undescribed@imagetrue	acks (env.) 25	2968, 2970, 2978,
. . 883, 886, 956, 2782	\ackssname 390, 401, 409,	2980, 2990, 2993,
\@vspace 877, 880, 888,	417, 3416, 3419, 3420	2997, 3003, 3014,
890, 892, 894, 896,	\ACM@adddotafter . . .	3017, 3021, 3027,
898, 900, 902, 904,	. . . . . 3150, 3167	3049, 3068, 3080,
906, 946, 951, 961,	\ACM@ArticleType . . .	3081, 3092, 3093,
967, 2118, 2297,	. . . 1747, 3048, 3128	3100, 3103, 3108, 3129
2323, 2805, 2840,	\ACM@ArticleType@nr	\ACM@linecountR . 2883,
2843, 3463, 3465, 3471	1747, 1749, 3046, 3126	2981, 2983, 2991,
\@vspace@acm	\ACM@cc@type . . . 1881,	2994, 3001, 3008,
. . . 2323, 2843, 3471	2067, 2069, 2070,	3015, 3018, 3025,
\@vspace@orig 877, 880,	2073, 2074, 2075,	3032, 3101, 3104, 3109
888, 890, 892, 894,	2076, 2077, 2078, 2079	\ACM@mk@linecount . .
896, 898, 900, 902,	\ACM@CC@Ur1 . . . . .	. . . . 2865, 2878,
904, 906, 946, 951,	2068, 2069, 2070, 2071	2893, 2895, 2897,
961, 967, 2118,	\ACM@cc@version	2899, 2901, 2903, 2905
2297, 2805, 2840, 3463	. . . 1880, 2069, 2080	\ACM@NR@adjustedSectionformat
\@vspacer 878, 881, 889,	\acm@copyrightinput 1826	. . . . . 3147, 3156
891, 893, 895, 897,	\acm@copyrightmode .	\ACM@NRadjust
899, 901, 903, 905,	. . . . . 1826,	3138, 3171, 3175,
907, 947, 952, 962,	1834, 1839, 1842,	3179, 3183, 3187, 3192
968, 2119, 2298,	1845, 1850, 1853,	\ACM@origbaselinestretch
2324, 2806, 2841,	1856, 1859, 1862,	. . . . . 3473
2844, 3464, 3468, 3472	1865, 1868, 1871,	\ACM@ps@headings . . .
\@vspacer@acm	1874, 1884, 1939, 2151	. . . . . 2854, 2858
. . . 2324, 2844, 3472	\ACM@fontsize 146, 234,	\ACM@ps@myheadings .
\@vspacer@orig . 878,	237, 239, 241, 243,	. . . . . 2853, 2857
881, 889, 891, 893,	245, 247, 249, 251,	\ACM@ps@plain . 2852, 2856
895, 897, 899,	253, 255, 257, 260, 261	\ACM@restore@pagestyle
901, 903, 905,	\ACM@format 32, 161	. . . . . 2852
907, 947, 952,	\ACM@format@nr . . 32,	\ACM@sect@format . . .
962, 968, 2119,	161, 170, 176, 182,	. . . . . 3157, 3159
2298, 2806, 2841, 3464	195, 201, 235, 596,	\ACM@sect@format@ . .
\@width 776, 783	681, 760, 798,	. . . 3146, 3159, 3161
\@xp 549, 550	918, 987, 2299,	\ACM@sect@format@null
\@xsect 504, 505, 541	2346, 2372, 2398,	. . . . . 3160, 3161
\\ 666, 675, 1502,	2423, 2513, 2541,	\ACM@timestamp
1779, 2070, 2176,	2885, 2949, 3066,	2913, 3040, 3114, 3119
2181, 2196, 2200,	3113, 3202, 3246,	\acmArticle 14, 1616
	3278, 3337, 3364, 3385	\acmArticleSeq . 15, 1618

\acmArticleType .	20, 1747	2632, 2652, 2669,	\baselineskip . .	2162,
\acmBadge	15, 1667	2705, 2716, 2870, 2874		2871, 3169, 3170,
\acmBadgeL	1654	\affiliation	10,	3173, 3174, 3177,
\acmBadgeR	1641, 1667		1541, 2615, 2685, 2730	3181, 3185, 3264,
\acmBooktitle	9, 1468	\and	1481, 1514,	3265, 3266, 3267,
\acmCodeDataLink	1775		1516, 1531, 1537,	3296, 3297, 3298, 3299
\acmCodeLink	20, 1775, 1784		2606, 2611, 2613,	\baselinestretch
\acmConference	9, 1454		2624, 2630, 2643,	3473, 3474, 3476
\acmConference@date	1457, 2171,		2677, 2696, 2702,	\begin
	3005, 3008, 3029, 3032		2724, 2741, 2746, 2762	19, 2879, 2909
\acmConference@name	1456, 1470, 1471, 1472	\andify	2244,	\beginingroup
\acmConference@shortname	1455, 1459, 1460,		2245, 2573, 2576, 2831	476,
	1472, 1473, 2171,	\anon	24, 2096	519, 533, 542, 634,
	3004, 3007, 3028, 3031	anonsuppress (env.)	24	2117, 2511, 3139, 3418
\acmConference@venue	1458, 2171,	\apptocmd	3465, 3468	\bfseries
	3005, 3008, 3029, 3032	\AtBeginDocument		1044, 2158,
\acmContributions	1782		78, 95, 227,	2400, 2402, 2404,
\acmDataLink	20, 1784	\AtBeginEnvironment	638, 646, 1005,	2408, 2410, 2412,
\acmdefinition	3295		2859, 2936, 3060, 3162	2414, 2416, 2418,
\acmDOI	15, 1632		876, 879, 888,	2420, 2560, 2563,
\acmISBN	15, 1630		890, 892, 894, 896,	2815, 3197, 3198,
\acmJournal	9, 1447		898, 900, 902, 904, 906	3212, 3213, 3215,
\acmMonth	14, 1622	\AtBeginMaketitle	32, 2105	3216, 3218, 3219,
\acmNumber	14, 1614	\AtEndDocument		3220, 3221, 3225,
\acmplain	3263		874, 1674,	3226, 3229, 3230,
\acmPrice	1628		1698, 1743, 1813,	3232, 3233, 3256, 3288
\acmSubmissionID	15, 1628	\AtEndEnvironment	882, 885	\bgroup
\acmVolume	14, 1612	\AtEndPreamble	611,	449, 946, 950,
\acmYear	14, 1620		864, 3307, 3361, 3427	961, 967, 1549,
\addcontentsline	283,	\author	10,	1576, 2218, 2224,
	485, 498, 2789, 3420		1491, 2114, 2115, 2811	2265, 2642, 2679,
\additionalaffiliation	11, 1548	\author@bx	2638, 2644, 2647	2682, 2743, 2752,
		\author@bx@sep		2777, 2787, 2804, 2816
\addpenalty	461		2640, 2647,	\bibfont
\addresses			2652, 2669, 2705, 2716	285
	1499, 1501, 1506,	\author@bx@wd		\bibliofont
	1513, 1544, 1564,		2639, 2642,	285
	1602, 1608, 1610,		2651, 2652, 2654,	\bibliographystyle
	2635, 2702, 2746, 2765		2660, 2662, 2664,	644
\addto	384, 395, 403, 411		2666, 2669, 2704,	\bibsection
\addtocounter	589, 1807		2705, 2707, 2713, 2716	281
\addtolength	1013, 1014,	\authornote		\bibstyle
	1015, 1019, 1020, 2871		14, 1548, 1600, 2812	309, 311, 353, 649
\addvspace	461, 553	\authornotemark	14, 1606	\bibstyle@acmauthoryear
\advance		\authors		359
	1029, 1034, 1037,		1504, 1509, 1516,	\bibstyle@acmnumeric
	1039, 1041, 1043,		2232, 2244, 2246, 2817	365
	1494, 1496, 1772,	\authorsaddresses	14, 1574	\bigskip
	2333, 2341, 2449,			1745,
				2283, 2284, 2286,
				2289, 2292, 2364,
				2459, 2469, 2477,
				2702, 2746, 2777, 2842
				\box
				984, 2348,
				2350, 2352, 2354,
				2356, 2358, 2360,
				2362, 2364, 2366,
				2368, 2647, 3050, 3130
				C
				\c@footnote
				2122
				\c@secnumdepth
				468, 482, 486, 495, 499
				\captionseenglish
				384
				B
				\balance
				3414

<code>\captionsetup</code> .. 910, 912, 914, 916, 925, 927, 930, 932, 935, 937, 947, 953, 962, 2778	<code>\CodelineIndex</code> 16	312, 313, 314, 315,
<code>\captionsfrench</code> 395	<code>\Collect@Body</code> 443, 945, 949, 960, 1679, 2087	316, 317, 318, 319,
<code>\captionsgerman</code> 403	<code>\color</code> 2098, 2160, 2869, 2873, 3047, 3127	320, 321, 322, 324,
<code>\captionsspanish</code> ... 411	<code>\color@begingroup</code> 566, 579	326, 328, 330, 331,
<code>\ccdesc@parse@finish</code> <u>1818</u>	<code>\color@endbox</code> 982	335, 337, 339, 341,
<code>\ccsdesc</code> 16, <u>1789</u>	<code>\color@endgroup</code> 569, 582, 793	343, 345, 433, 436,
<code>\ccsdesc@parse</code> 1790, <u>1791</u>	<code>\colorbox</code> . 1771, 3047, 3127	439, 442, 445, 450,
<code>\ccsdesc@parse@end</code> 1790, 1818	<code>\colorlet</code> 1751, 1753, 1755, 1757, 1759	466, 491, 505, 529,
<code>\ccsdesc@parse@finish</code> 1812, 1818	<code>\columnsep</code> 3456	530, 539, 542, 555,
CCSXML (env.) 16	<code>\columnseprule</code> 3456	556, 557, 558, 560,
<code>\centering</code> .. 546, 579, 665, 674, 954, 963, 2461, 2463, 2644, 2701	<code>\columnwidth</code> ... 575, 776, 968, 2704, 2743	571, 583, 589, 590,
<code>\changes</code> 146	<code>\contentsnamefont</code> .. 546	591, 592, 593, 613,
<code>\cite</code> ... 627, 628, 639, 643	<code>\copy</code> 2483	644, 775, 782, 784,
<code>\citeA</code> 633	<code>\copyright</code> 2176	796, 946, 950, 961,
<code>\citealt</code> 632	<code>\copyrightpermissionfootnoterule</code> 775	967, 970, 974, 977,
<code>\citeANP</code> 629	<code>\copyrightyear</code> . 18, <u>2084</u>	995, 996, 997, 998,
<code>\citeauthor</code> 629	<code>\country</code> 11, 1558, <u>2486</u> , 2761	1028, 1033, 1036,
<code>\citeN</code> 627	<code>\csname</code> 353, 481, 483, 487, 494, 496,	1038, 1040, 1042,
<code>\citename</code> 640	500, 529, 549, 550,	1131, 1132, 1133,
<code>\citeNN</code> 630	564, 578, 1508,	1135, 1136, 1137,
<code>\citeNP</code> 632	1515, 1568, 1571,	1139, 1140, 1141,
<code>\citep</code> 628	1794, 1795, 1797,	1143, 1144, 1145,
<code>\citestyle</code> ... 26, 351, 371	1798, 1799, 1800,	1147, 1148, 1149,
<code>\citeyear</code> 631	1801, 1804, 1806,	1151, 1152, 1153,
<code>\citeyearNP</code> 631	2241, 2243, 3140, 3163	1155, 1156, 1157,
<code>\citeyearpar</code> ... 630, 643	<code>\CurrentOption</code> 148, 149,	1158, 1160, 1161,
<code>\city</code> .. 11, 1555, <u>2486</u> , 2758	150, 151, 152, 158, 159	1162, 1164, 1165,
<code>\ClassError</code> 35, 422, 446, 1445, 1547, 1681, 1691, 1697, 1711, 1762, 2599, 2810, 3475	D	1166, 1168, 1170,
<code>\ClassInfo</code> .. 161, 260, 1443, 1688, 1690, 1694, 1696, 1708, 1710, 1713, 1924, 1928	<code>\day</code> 2925	1171, 1175, 1176,
<code>\ClassWarning</code> ... 26, 171, 177, 183, 832, 835, 838, 884, 887, 957, 1492, 1561, 1670, 1714, 1931, 2783, 3465, 3468	<code>\DeclareNewFootnote</code> 779, 781	1177, 1179, 1180,
<code>\ClassWarningNoLine</code> .. 875, 1676, 1700, 1815, 2593, 2596, 2769	<code>\DeclareOptionX</code> 38, 148, 149, 150, 151, 152, 154, 158, 159	1181, 1183, 1184,
<code>\cleaders</code> 2483	<code>\DeclareRobustCommand</code> 633, 3159	1185, 1187, 1188,
<code>\clearpage</code> 2339	<code>\DeclareTextFontCommand</code> 865	1189, 1190, 1192,
<code>\clubpenalty</code> ... 518, 524	<code>\def</code> 24, 38, 147, 153, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310,	1193, 1194, 1196, 1197, 1198, 1200, 1201, 1202, 1204, 1205, 1206, 1207, 1209, 1210, 1211, 1213, 1214, 1215, 1219, 1220, 1221, 1225, 1226, 1227, 1229, 1230, 1231, 1233, 1234, 1235, 1239, 1240, 1241, 1245, 1246, 1247, 1251, 1252, 1253, 1255, 1256, 1257, 1259, 1260, 1261, 1262, 1264, 1265, 1266, 1268, 1269, 1270, 1272, 1273, 1274, 1276, 1277, 1278, 1280, 1281, 1282, 1284, 1285,

1286, 1288, 1289,	1728, 1729, 1764,	3232, 3233, 3236,
1290, 1292, 1293,	1770, 1775, 1781,	3237, 3242, 3243,
1294, 1296, 1297,	1782, 1791, 1792,	3244, 3245, 3254,
1298, 1300, 1301,	1818, 1877, 1880,	3255, 3256, 3257,
1302, 1304, 1305,	1881, 1883, 1921,	3274, 3275, 3276,
1306, 1308, 1309,	1922, 1938, 2068,	3277, 3286, 3287,
1310, 1312, 1313,	2084, 2086, 2088,	3288, 3289, 3335,
1314, 1316, 1317,	2105, 2106, 2107,	3336, 3345, 3346,
1318, 1320, 1321,	2111, 2124, 2129,	3424, 3426, 3442,
1322, 1324, 1325,	2138, 2145, 2234,	3443, 3444, 3448, 3455
1326, 1328, 1329,	2264, 2296, 2326,	\define@boolkey
1330, 1332, 1333,	2371, 2397, 2422,	. . . 51, 59, 67, 75,
1334, 1336, 1337,	2447, 2460, 2470,	84, 92, 104, 108,
1338, 1340, 1341,	2479, 2486, 2487,	112, 120, 128, 136,
1342, 1344, 1345,	2489, 2490, 2492,	1546, 1686, 1692, 1706
1346, 1348, 1349,	2493, 2495, 2500,	\define@choicekey . .
1350, 1352, 1353,	2501, 2505, 2506,	. 32, 1054, 1747, 1825
1354, 1356, 1357,	2508, 2509, 2511,	\define@cmdkey 1712
1358, 1360, 1361,	2539, 2540, 2544,	\definecolor
1362, 1364, 1365,	2545, 2548, 2549,	. . . 653, 654, 655,
1366, 1367, 1369,	2551, 2552, 2554,	656, 657, 658, 659, 660
1370, 1371, 1372,	2555, 2557, 2558,	\department
1374, 1375, 1376,	2560, 2561, 2563,	. 11, 1552, 2486, 2760
1378, 1379, 1380,	2564, 2566, 2567,	\Description 23, 873
1382, 1383, 1384,	2569, 2570, 2572,	\description 1045
1385, 1387, 1388,	2574, 2579, 2586,	\descriptionlabel . .
1389, 1391, 1392,	2591, 2603, 2604,	. . . . . 1044, 1047
1393, 1395, 1396,	2605, 2607, 2614,	\detokenize 1492
1397, 1399, 1400,	2615, 2616, 2642,	\dimexpr . . . 965, 984,
1401, 1403, 1404,	2643, 2650, 2672,	2274, 3037, 3046, 3126
1405, 1407, 1408,	2678, 2685, 2703,	\divide 2654, 2660, 2662,
1409, 1411, 1412,	2719, 2725, 2730,	2664, 2666, 2707, 2713
1413, 1415, 1416,	2747, 2753, 2754,	\do 287, 613
1417, 1419, 1420,	2755, 2757, 2758,	\do@url@hyp 613
1421, 1423, 1424,	2759, 2761, 2762,	\DocInput 20
1425, 1427, 1428,	2763, 2764, 2772,	\documentclass 8, 427, 429
1429, 1431, 1432,	2773, 2774, 2775,	\dp 2333, 2341
1433, 1435, 1436,	2777, 2787, 2797,	
1437, 1439, 1440,	2804, 2807, 2808,	
1441, 1447, 1449,	2809, 2810, 2813,	E
1450, 1451, 1452,	2817, 2839, 2846,	\edef 148, 149,
1453, 1468, 1475,	2847, 2848, 2849,	150, 151, 152, 467, 2069
1476, 1477, 1483,	2855, 2865, 2876,	\editor 9, 1477
1526, 1548, 1549,	2883, 2930, 2935,	\egroup 449,
1550, 1551, 1552,	2941, 3138, 3142,	794, 948, 959, 963,
1553, 1566, 1574,	3144, 3146, 3156,	975, 981, 1559,
1580, 1581, 1589,	3160, 3167, 3193,	1579, 2220, 2226,
1590, 1599, 1600,	3197, 3198, 3199,	2295, 2646, 2680,
1612, 1614, 1616,	3200, 3206, 3207,	2683, 2746, 2766,
1618, 1620, 1622,	3209, 3210, 3212,	2778, 2796, 2817, 2838
1624, 1628, 1630,	3213, 3215, 3216,	\else 54, 62,
1632, 1639, 1640,	3218, 3219, 3220,	70, 79, 87, 99, 115,
1668, 1670, 1672,	3221, 3222, 3225,	123, 131, 141, 197,
1680, 1685, 1716,	3226, 3229, 3230,	231, 333, 354, 375,
		382, 387, 398, 406,

414, 460, 467, 470,	3085, 3095, 3102,	\expandafter 332, 334,
482, 486, 490, 495,	3107, 3115, 3118,	646, 795, 1506,
499, 511, 523, 538,	3134, 3135, 3143,	1507, 1513, 1514,
621, 637, 643, 645,	3167, 3426, 3431,	1568, 1571, 1794,
668, 670, 787, 851,	3438, 3447, 3451, 3474	1795, 1797, 1798,
856, 882, 885, 915,	\email 10, 1560,	1804, 1806, 3140, 3163
955, 1438, 1464,	2614, 2678, 2725, 2764	
1470, 1472, 1479,	\emph 2188, 2190	F
1495, 1502, 1505,	\empty 2942	\familydefault 867
1511, 1512, 1522,	\EnableCrossrefs 18	\fancyfoot 2956,
1525, 1530, 1533,	\end 21, 2881, 2911	2964, 2974, 2985,
1536, 1543, 1563,	\end@ACM@color@frame 2259	2989, 3013, 3040,
1586, 1595, 1601,	\end@dblfloat 973	3051, 3052, 3070,
1609, 1647, 1660,	\end@float 975	3072, 3076, 3086,
1674, 1689, 1695,	\endcsname 352, 353, 481,	3096, 3105, 3110,
1698, 1709, 1720,	483, 487, 494, 496,	3114, 3119, 3131, 3132
1723, 1733, 1736,	500, 529, 549, 550,	\fancyhead . 2951, 2952,
1739, 1744, 1778,	564, 578, 1508,	2953, 2954, 2959,
1803, 1808, 1809,	1515, 1569, 1572,	2960, 2961, 2962,
1810, 1813, 1926,	1794, 1795, 1797,	2968, 2970, 2971,
1930, 2093, 2099,	1798, 1799, 1800,	2978, 2980, 2981,
2125, 2136, 2140,	1801, 1804, 1806,	2982, 2990, 2991,
2141, 2142, 2154,	2241, 2243, 3140, 3163	2993, 2994, 2997,
2155, 2163, 2166,	\enddescription 1051	2999, 3003, 3006,
2167, 2170, 2177,	\endgroup . . . 480, 519,	3014, 3015, 3017,
2182, 2189, 2194,	537, 552, 2211,	3018, 3021, 3023,
2197, 2198, 2202,	2537, 3142, 3144, 3422	3027, 3030, 3045,
2203, 2204, 2215,	\endlist 1049, 1051	3050, 3068, 3069,
2218, 2223, 2224,	\endMakeFramed 1774	3080, 3081, 3082,
2228, 2271, 2283,	\endminipage 784	3083, 3090, 3091,
2286, 2289, 2292,	\endtrivlist 3359	3092, 3093, 3100,
2329, 2456, 2465,	\enspace 3237	3101, 3103, 3104,
2474, 2480, 2481,	environments:	3108, 3109, 3125, 3130
2496, 2498, 2499,	abstract 18	\fancyheadoffset . . .
2500, 2502, 2504,	acks 25	. . . 3037, 3044, 3124
2505, 2508, 2575,	anonsuppress 24	\fancyhf 2938, 3062
2592, 2595, 2598,	CCSXML 16	\fancypagestyle 2937, 3061
2610, 2616, 2623,	marginfigure 34	\fi . . . 56, 64, 72, 81, 89,
2644, 2655, 2665,	marginable 34	101, 117, 125, 133,
2674, 2681, 2690,	printonly 24	143, 156, 175, 181,
2708, 2712, 2721,	screenonly 24	194, 199, 228, 233,
2727, 2735, 2749,	sidebar 34	258, 259, 271, 276,
2751, 2767, 2776,	teaserfigure 18	289, 291, 293, 295,
2781, 2788, 2792,	translatedabstract	297, 299, 301, 303,
2800, 2807, 2813,	. . . . . 21	305, 307, 309, 311,
2818, 2819, 2828,	\everypar 459,	313, 315, 317, 319,
2830, 2837, 2922,	514, 525, 2791, 2799	321, 323, 325, 327,
2933, 2934, 2944,	\excludcomment . 1786,	329, 331, 336, 338,
2955, 2963, 2973,	3430, 3432, 3436, 3437	340, 342, 344, 346,
2984, 2988, 2995,	\ExecuteOptionsX . . .	347, 356, 358, 372,
2998, 3000, 3002,	. . . 50, 58, 66, 74,	377, 380, 389, 393,
3012, 3019, 3022,	83, 91, 103, 107,	400, 408, 416, 419,
3024, 3026, 3054,	111, 119, 127, 135, 145	432, 447, 451, 457,
3055, 3071, 3075,		462, 467, 473, 484,

488, 497, 501, 503,	2628, 2629, 2633,	..... 2152, 2156
526, 527, 540, 551,	2644, 2667, 2668,	\footrulewidth
570, 610, 614, 623,	2676, 2684, 2695,	2940, 3043, 3064, 3123
641, 643, 647, 650,	2714, 2715, 2723,	\foreignlanguage 435, 438
677, 678, 679, 757,	2729, 2740, 2749,	\format 32
773, 791, 817, 829,	2751, 2771, 2784,	\FrameCommand 1770
860, 861, 862, 868,	2786, 2794, 2796,	\FrameRestore 1773
875, 884, 887, 941,	2802, 2807, 2814,	\FrameSep 2275
942, 958, 972, 976,	2818, 2832, 2835,	\frenchspacing 3478
1003, 1442, 1461,	2836, 2837, 2875,	\fulltextwidth
1467, 1473, 1474,	2882, 2908, 2912,	..... 964, 968, 984
1482, 1498, 1503,	2924, 2929, 2933,	
1510, 1517, 1518,	2934, 2943, 2945,	G
1523, 1524, 1532,	2946, 2951, 2952,	\g@addto@macro
1538, 1539, 1540,	2957, 2966, 2976,	157, 435, 438, 441,
1545, 1565, 1588,	2987, 2989, 2998,	449, 1481, 1513,
1598, 1605, 1611,	3000, 3009, 3010,	1516, 1531, 1537,
1627, 1653, 1666,	3011, 3013, 3022,	1544, 1564, 1582,
1678, 1682, 1691,	3024, 3033, 3034,	1584, 1587, 1591,
1697, 1705, 1711,	3035, 3038, 3041,	1593, 1596, 1602,
1725, 1726, 1735,	3054, 3055, 3056,	1603, 1608, 1610,
1741, 1742, 1746,	3070, 3073, 3079,	1648, 1661, 1734,
1760, 1767, 1780,	3089, 3099, 3105,	1740, 1779, 1799,
1802, 1810, 1811,	3106, 3110, 3111,	1806, 2088, 2092,
1817, 1838, 1841,	3117, 3120, 3121,	2094, 2105, 2108,
1844, 1849, 1852,	3134, 3135, 3136,	2611, 2624, 2675,
1855, 1858, 1861,	3154, 3165, 3167,	2682, 2691, 2722,
1864, 1867, 1870,	3235, 3240, 3262,	2728, 2736, 2773, 2774
1873, 1876, 1920,	3294, 3332, 3351,	
1936, 1937, 2083,	3382, 3383, 3408,	\gdef 156, 1455,
2095, 2101, 2104,	3409, 3415, 3426,	1456, 1457, 1458,
2115, 2116, 2125,	3434, 3440, 3443,	1460, 1468, 1478,
2127, 2139, 2146,	3453, 3454, 3455, 3477	1480, 1501, 1504,
2147, 2148, 2149,	\firstpagestyle 3060	1506, 1509, 1521,
2153, 2161, 2164,	\floatname 944	1529, 1535, 1568,
2165, 2172, 2173,	\flushbottom 803, 805,	1571, 1643, 1656,
2174, 2179, 2191,	807, 809, 811, 814, 816	1683, 1715, 1732,
2196, 2203, 2204,	\footnote 2810	1738, 1777, 1782,
2205, 2206, 2207,	\footnotemark 593, 1582,	1795, 1797, 1798,
2208, 2209, 2210,	1591, 2773, 2774, 2808	1804, 2328, 2609,
2212, 2216, 2221,	\footnoterule 782	2613, 2618, 2648,
2222, 2227, 2230,	\footnotesep ... 568, 581	2649, 2670, 2671,
2231, 2250, 2261,	\footnotesize 574, 2921,	2673, 2677, 2679,
2281, 2282, 2285,	2935, 2956, 2964,	2686, 2717, 2718,
2288, 2291, 2292,	2974, 2985, 2989,	2720, 2724, 2726,
2322, 2331, 2343,	2997, 3003, 3013,	2731, 2756, 2757, 2762
2369, 2395, 2421,	3052, 3072, 3076,	\geometry ... 683, 686,
2446, 2450, 2458,	3086, 3096, 3105,	693, 700, 707, 714,
2467, 2476, 2484,	3110, 3116, 3132, 3462	721, 728, 735, 744, 751
2497, 2498, 2500,	\footnotetext .. 1585,	\getrefnumber .. 1675,
2502, 2504, 2505,	1587, 1594, 1597, 1604	1699, 1814, 2271, 2807
2508, 2510, 2536,	\footnotetextauthorsaddresses	\global . 513, 516, 552,
2571, 2578, 2594,	..... 2137, 2144	572, 873, 883, 886,
2597, 2601, 2612,	\footnotetextcopyrightpermission	956, 983, 1448,
		1462, 1494, 1496,

1497, 1542, 2246, 2247, 2251, 2253, 2267, 2280, 2490, 2492, 2497, 2501, 2506, 2509, 2587, 2588, 2589, 2606, 2630, 2634, 2644, 2696, 2699, 2741, 2779, 2782, 2870, 2874, 3363, 3387, 3389, 3391, 3403, 3407	\grantnum 25, <u>3425</u> \grantsponsor . . 25, <u>3424</u>	\if@ACM@anonymous 120, 1500, 1512, 1519, 1543, 1563, 1583, 1592, 1601, 2091, 2097, 2113, 2142, 2931, 3435 \if@ACM@authordraft 136, 661, 2157 \if@ACM@authorversion 84, 2163, 2183 \if@ACM@badge 1634 \if@ACM@balance 104, 3384, 3412 \if@ACM@citypresent 2582, 2595 \if@ACM@countrypresent 2584, 2598 \if@ACM@engage . 166, 378, 391, 1927, 2168, 2212, 2996, 3020 \if@ACM@instpresent 2580, 2592 \if@ACM@journal 163, 229, 373, 385, 396, 404, 412, 911, 1464, 1721, 2488, 2767, 2790, 2798 \if@ACM@journal@bibstrip 164, 2143, 2167, 2187, 2199, 2824, 2948, 3065 \if@ACM@maketitle@typeset 445, <u>1052</u> , 1680 \if@ACM@manuscript 162, 268, 1718, 2166, 2180 \if@ACM@natbib 112, 279, 370, 626 \if@ACM@natbib@override 112 \if@ACM@newfonts 830, 841 \if@ACM@nonacm <u>92</u> , 670, 1674, 1698, 1813, 1923, 2150, 2198, 2767, 2819, 2955, 2963, 2973, 2984, 2992, 3016, 3071, 3075, 3085, 3095, 3115 \if@ACM@pbalance <u>108</u> , 3362 \if@ACM@printacmref 1692, 2248 \if@ACM@printccs 1686, 2217	\if@ACM@printfolios <u>1706</u> , 2943, 2945, 2951, 2952, 2989, 3013, 3070, 3105, 3110 \if@ACM@review 75, 2860, 2877, 2884 \if@ACM@screen <u>51</u> , 615, 3428 \if@ACM@sigchiamode 165, 559, 669, 866, 966, 973, 2125, 2127, 2644, 3036 \if@ACM@timestamp 128, 2913, 3039, 3112 \if@ACM@urlbreakonhyphens 59, 612 \if@acmowned <u>1823</u> \if@Description@present 869, 882, 885, 955, 2781 \if@filesw 548, 648 \if@insideauthorgroup 1489, 1495 \if@nobreak 458 \if@noskipsec . . 451, 515 \if@printcopyright 1819, 2175 \if@printpermission 1821, 2164 \if@twocolumn . 3413, 3455 \if@undescribed@images 871, 874 \IfBeginWith 1567 \ifcase 201, 235, 596, 681, 760, 798, 918, 987, 1129, 1624, 1749, 1884, 1939, 2299, 2346, 2372, 2398, 2423, 2513, 2541, 2656, 2709, 2885, 2949, 3066, 3202, 3246, 3278, 3337, 3364, 3385 \ifcsname 352 \ifdim 455, 475, 507, 532, 2277, 2334, 2342, 2872 \IfEq 2067, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080 \IfFileExists 832, 835, 838 \IfInteger 1713 \ifluatex 852 \ifNAT@numbers 643 \ifnum 170, 176, 182, 195, 467, 468,
H			
\hbox . 583, 2124, 2129, 2482 \headrulewidth 2939, 3063 \height 1645, 1651, 1658, 1664 \hfill 2472, 2873 \href . 1570, 1573, 1646, 1652, 1659, 1665, 2070, 2071, 3446, 3450 \hrule 776, 783, 2472 \hsize . 575, 1772, 2123, 2266, 2269, 2447, 2449, 2451, 2460, 2462, 2470, 2512, 2632, 2642, 2698, 2743 \hskip . . 478, 492, 522, 535, 539, 2483, 3356 \hspace 1649, 1662, 1770, 1949, 1960, 1969, 1976, 1983, 1997, 2009, 2017, 2031, 2039, 2046, 2053, 2647, 2701 \ht 2332, 2340 \Huge . 2406, 2408, 2410, 2412, 2414, 2416, 2418 \hypersetup 616, 622, 624, 2235 \hyphenpenalty 3461			
I			
\if 333 \if@ACM@acmcp <u>168</u> , 273, 1765, 2140, 2155, 2223, 2257, 2448, 2631, 3042, 3122, 3238 \if@ACM@acmthm . 67, 3308 \if@ACM@affiliation@obeypunct@ACM@ 1546, 2481, 2498, 2500, 2502, 2503, 2505, 2508			

482, 486, 495, 499,	2492, 2493, 2494,	\Large 2539, 2557,
1675, 1699, 1808,	2498, 2755, 2795,	3212, 3213, 3215,
1809, 1810, 1814,	2803, 2809, 2817, 3357	3216, 3218, 3232, 3233
1834, 1839, 1842,	\immediate 550, 649	\large 2158, 2544, 2549,
1845, 1850, 1853,	\includecomment	2552, 2567, 2569,
1856, 1859, 1862,	. . . 3429, 3433, 3439	3206, 3207, 3209, 3210
1865, 1868, 1871,	\includegraphics . . .	\lastbox . . 517, 2791, 2799
1874, 2115, 2151,	. . . . 1646, 1652,	\leaders 2472
2271, 2653, 2706,	1659, 1665, 2070, 2269	\leavevmode 451, 2472, 2700
2748, 2750, 2807, 3113	\indent 3336	\leftmargin 1028, 1033,
\ifPDFTeX 818	\input 819	1036, 1038, 1040, 1042
\IfSubStr 1492, 1561	\InputIfFileExists . . 25	\leftmargini 1012, 1013,
\ifvmode 2480	\institution	1014, 1015, 1028, 1029
\ifvoid 787	. . 11, 1551, 2486, 2757	\leftmarginii
\ifx . 155, 234, 288, 290,	\interfootnotelinepenalty	. . . . 1018, 1019,
292, 294, 296, 298,	. . . . . 562	1020, 1021, 1033, 1034
300, 302, 304, 306,	\interlinepenalty . .	\leftmarginiii
308, 310, 312, 314,	. . . . . 479, 536, 562	1021, 1022, 1036, 1037
316, 318, 320, 322,	\item 3356, 3458	\leftmarginiv
324, 326, 328, 330,	\itshape	1022, 1023, 1038, 1039
335, 337, 339, 341,	2169, 2171, 3199,	\leftmarginv
343, 345, 381, 421,	3200, 3221, 3222,	1023, 1024, 1040, 1041
645, 1459, 1470,	3242, 3254, 3276, 3345	\leftmarginvi
1472, 1477, 1499,		. . . 1024, 1042, 1043
1502, 1520, 1522,	J	\leftskip . 2471, 2744, 3195
1527, 1528, 1534,	\jobname 547, 550	\let 309, 311,
1607, 1642, 1655,		323, 325, 327, 353,
1674, 1730, 1731,	K	469, 584, 585, 627,
1737, 1744, 1776,	\kern 775, 776, 782, 783, 2472	628, 629, 630, 631,
1794, 1803, 1813,	\keywords 15, 1672	632, 635, 639, 797,
2102, 2136, 2141,	\keywordsname	863, 877, 878, 880,
2192, 2203, 2204,	374, 376, 386, 388,	881, 888, 889, 890,
2215, 2218, 2224,	397, 399, 405, 407,	891, 892, 893, 894,
2228, 2283, 2286,	413, 415, 1578, 2225	895, 896, 897, 898,
2289, 2292, 2327,		899, 900, 901, 902,
2456, 2465, 2474,	L	903, 904, 905, 906,
2496, 2575, 2608,	\l@section 555	907, 946, 947, 951,
2616, 2617, 2672,	\l@subsection . . 555, 556	952, 961, 962, 967,
2678, 2685, 2719,	\l@subsubsection . . . 557	968, 969, 1032,
2725, 2730, 2768,	\labelenumi 995	1047, 1051, 1554,
2776, 2788, 2813,	\labelenumii 996	1555, 1556, 1557,
2818, 2830, 2837,	\labelenumiii 997	1558, 1667, 1673,
2922, 2933, 2942,	\labelenumiv 998	1784, 1787, 2103,
2998, 3000, 3022,	\labelsep	2118, 2119, 2120,
3024, 3054, 3055,	1006, 1014, 1019,	2121, 2133, 2134,
3134, 3135, 3140,	1029, 1034, 1037,	2135, 2138, 2145,
3163, 3167, 3426,	1039, 1041, 1043, 3356	2232, 2246, 2247,
3443, 3445, 3449, 3474	\labelwidth	2297, 2298, 2323,
\ifxetex 847	1029, 1034, 1037,	2324, 2507, 2606,
\ignorespaces	1039, 1041, 1043, 1046	2630, 2696, 2702,
. . . 528, 568, 581,	\LARGE 2400, 2402, 2404,	2741, 2746, 2805,
873, 1550, 1551,	2420, 2431, 2433,	2806, 2840, 2841,
1553, 1566, 2486,	2435, 2437, 2439,	2843, 2844, 2852,
2487, 2489, 2491,	2443, 2548, 2551, 2566	2853, 2854, 2856,

<code>\num@authors</code>	1418, 1422, 1426,	3293, 3339, 3340,
1487, 1494, 1508,	1430, 1434, 1624,	3341, 3342, 3343,
1515, 1569, 1572, 2748	1625, 1626, 1752,	3344, 3347, 3348,
<code>\number</code> 467	1754, 1756, 1758,	3349, 3350, 3366,
<code>\numberline</code> 487, 500	1885, 1887, 1890,	3367, 3368, 3370,
<code>\numexpr</code> . 2915, 2917, 2919	1892, 1893, 1895,	3372, 3374, 3376,
<code>\nxandlist</code> 2233	1897, 1899, 1902,	3378, 3379, 3381,
	1904, 1907, 1909,	3388, 3390, 3392,
	1912, 1915, 1918,	3394, 3396, 3398,
	1940, 1951, 1962,	3400, 3402, 3404, 3406
O	1970, 1977, 1984,	<code>\orcid</code> 10, 1566
<code>\onehalfspacing</code> 270	1998, 2010, 2018,	<code>\outer@nobreak</code> 980
<code>\openout</code> 550	2032, 2040, 2047,	
<code>\or</code> 204,	2054, 2059, 2065,	P
206, 208, 210, 212,	2302, 2304, 2306,	<code>\pe</code> 553, 758,
214, 216, 218, 221,	2308, 2310, 2312,	765, 775, 776, 782,
224, 238, 240, 242,	2314, 2316, 2318,	783, 3043, 3123,
244, 246, 248, 250,	2320, 2349, 2351,	3169, 3173, 3177,
252, 254, 256, 598,	2353, 2355, 2357,	3178, 3181, 3182,
599, 600, 601, 602,	2359, 2361, 2363,	3185, 3186, 3190,
603, 605, 606, 608,	2365, 2367, 2375,	3191, 3354, 3456, 3459
609, 685, 692, 699,	2377, 2379, 2381,	<code>\PackageError</code> 56, 64, 72,
706, 713, 720, 727,	2383, 2385, 2387,	81, 89, 101, 105,
734, 743, 750, 762,	2389, 2391, 2393,	109, 117, 125, 133, 143
763, 764, 766, 767,	2401, 2403, 2405,	<code>\PackageInfo</code> 53,
768, 769, 770, 771,	2407, 2409, 2411,	55, 61, 63, 69, 71,
772, 800, 801, 802,	2413, 2415, 2417,	77, 80, 86, 88, 94,
804, 806, 808, 810,	2419, 2426, 2428,	100, 114, 116, 122,
812, 813, 815, 920,	2430, 2432, 2434,	124, 130, 132, 138,
921, 922, 923, 924,	2436, 2438, 2440,	142, 1173, 1217,
926, 929, 934, 939,	2442, 2444, 2516,	1223, 1237, 1243, 1249
940, 989, 990, 991,	2518, 2520, 2522,	<code>\PageIndex</code> 15
992, 993, 994, 999,	2524, 2526, 2528,	<code>\pageref</code> 2927
1000, 1001, 1002,	2530, 2532, 2534,	<code>\pagestyle</code> 3058
1134, 1138, 1142,	2543, 2546, 2547,	<code>\par</code> 435,
1146, 1150, 1154,	2550, 2553, 2556,	438, 452, 508, 544,
1159, 1163, 1167,	2559, 2562, 2565,	785, 978, 1579,
1174, 1178, 1182,	2568, 2658, 2659,	1745, 2138, 2145,
1186, 1191, 1195,	2661, 2663, 2711,	2164, 2169, 2171,
1199, 1203, 1208,	2888, 2890, 2892,	2220, 2226, 2269,
1212, 1218, 1224,	2894, 2896, 2898,	2284, 2287, 2290,
1228, 1232, 1238,	2900, 2902, 2904,	2301, 2303, 2305,
1244, 1250, 1254,	2906, 2958, 2967,	2307, 2348, 2350,
1258, 1263, 1267,	2977, 3074, 3084,	2352, 2364, 2368,
1271, 1275, 1279,	3094, 3204, 3205,	2457, 2459, 2466,
1283, 1287, 1291,	3208, 3211, 3214,	2469, 2472, 2475,
1295, 1299, 1303,	3217, 3223, 3227,	2477, 2500, 2502,
1307, 1311, 1315,	3231, 3234, 3248,	2504, 2505, 2573,
1319, 1323, 1327,	3249, 3250, 3251,	2577, 2634, 2636,
1331, 1335, 1339,	3252, 3253, 3258,	2643, 2645, 2673,
1343, 1347, 1351,	3259, 3260, 3261,	2675, 2682, 2691,
1355, 1359, 1363,	3280, 3281, 3282,	2700, 2702, 2720,
1368, 1373, 1377,	3283, 3284, 3285,	2722, 2728, 2736,
1381, 1386, 1390,	3290, 3291, 3292,	2744, 2746, 2777,
1394, 1398, 1402,		
1406, 1410, 1414,		

2778, 2779, 2781, 2795, 2815, 2838, 2842, 2846, 2849, 3352	\parabox 3180	\raisebox 1645, 1651, 1658, 1664, 2158, 3046, 3126	386, 388, 390, 392, 397, 399, 401, 405, 407, 409, 413, 415, 417, 867, 1044, 1491, 1560, 2089, 2122, 2760, 2939, 2940, 3043, 3063, 3064, 3123, 3168, 3172, 3176, 3180, 3189
674, 2453, 2463, 2866	\parbox 665, 674, 2453, 2463, 2866	\real@adddotafter 3149, 3152	\renewenvironment . . 945, 1045, 1679, 3352
\parindent . . 758, 774, 1013, 2138, 2145, 2162, 2268, 3180, 3196, 3243, 3275, 3459	\parindent . . 758, 774, 1013, 2138, 2145, 2162, 2268, 3180, 3196, 3243, 3275, 3459	\received 19, 1729	\repeat 2342, 2872
\parskip . . 758, 2162, 3459	\parskip . . 758, 2162, 3459	\RecordChanges 17	\RequirePackage . . 29, 30, 31, 262, 263, 264, 265, 266, 267, 269, 272, 274, 275, 280, 383, 586, 587, 651, 652, 662, 671, 680, 777, 828, 842, 848, 849, 853, 854, 857, 858, 859, 909, 1785, 2851, 3369, 3371, 3373, 3375, 3377, 3380, 3393, 3395, 3397, 3399, 3401, 3405
\part 3189	\part 3189	\ref 2827, 2834	\reset@font 561, 574
\PassOptionsToClass 158, 159	\PassOptionsToClass 158, 159	\refname 282, 283	\reversemarginpar . . 742
\pdfgentounicode . . 827	\pdfgentounicode . . 827	\refstepcounter 471	\rightarrow 1791
\pdfglyphtounicode 820, 821, 822, 823, 824, 825, 826	\pdfglyphtounicode 820, 821, 822, 823, 824, 825, 826	\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	\rule 568, 581
\pdfstringdefDisableCommands 588	\pdfstringdefDisableCommands 588	\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	\section 282, 2309, 2311, 2315, 2317, 2319, 2321, 2793, 2801, 3168, 3419
\phantomsection 283, 2789, 3420	\phantomsection 283, 2789, 3420	\ref 2827, 2834	\section@raggedright 3193, 3197, 3198, 3206, 3207, 3209, 3210, 3212, 3213, 3215, 3216, 3218, 3219, 3220, 3225, 3226, 3229, 3230, 3232, 3233
\popQED 3359	\popQED 3359	\refname 282, 283	\Sectionformat 3141, 3145, 3147, 3158
\position . . . 11, 1550, 1554, 1555, 1556, 1557, 1558, 2486, 2755	\position . . . 11, 1550, 1554, 1555, 1556, 1557, 1558, 2486, 2755	\refstepcounter 471	\SelectFootnoteRule 778, 780
\postcode 11, 1557, 2486, 2754	\postcode 11, 1557, 2486, 2754	\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	
prntonly (env.) 24	prntonly (env.) 24	\ref 2827, 2834	
\ProcessOptionsX . . . 160	\ProcessOptionsX . . . 160	\refname 282, 283	
\proof 3352	\proof 3352	\refstepcounter 471	
\proofname 3352	\proofname 3352	\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	
\protect 487, 500	\protect 487, 500	\ref 2827, 2834	
\protected@edef 472, 563, 577	\protected@edef 472, 563, 577	\refname 282, 283	
\protected@write . . . 2279	\protected@write . . . 2279	\refstepcounter 471	
\providecommand 636, 640, 3241	\providecommand 636, 640, 3241	\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	
\ProvidesClass 5	\ProvidesClass 5	\ref 2827, 2834	
\ProvidesFile 3	\ProvidesFile 3	\refname 282, 283	
\ps@headings . . 2854, 2858	\ps@headings . . 2854, 2858	\refstepcounter 471	
\ps@myheadings 2853, 2857	\ps@myheadings 2853, 2857	\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	
\ps@plain 2852, 2856	\ps@plain 2852, 2856	\ref 2827, 2834	
\pushQED 3353	\pushQED 3353	\refname 282, 283	
\put 2880, 2910	\put 2880, 2910	\refstepcounter 471	
Q		\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	
\qed 3353	\qed 3353	\ref 2827, 2834	
\quad 529, 2969, 2972, 2979, 2983, 3114	\quad 529, 2969, 2972, 2979, 2983, 3114	\refname 282, 283	
R		\refstepcounter 471	
\raggedright 2453, 2471, 2744, 3460	\raggedright 2453, 2471, 2744, 3460	\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	
		\ref 2827, 2834	
		\refname 282, 283	
		\refstepcounter 471	
		\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	
		\ref 2827, 2834	
		\refname 282, 283	
		\refstepcounter 471	
		\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	
		\ref 2827, 2834	
		\refname 282, 283	
		\refstepcounter 471	
		\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652, 2653, 2654, 2657, 2660, 2662, 2664, 2666, 2669, 2701, 2704, 2705, 2706, 2707, 2710, 2713, 2716, 2748, 2750, 2773, 2807, 2864, 2886, 2887, 2889, 2891, 2907, 2917, 2919, 2922, 2950, 3067, 3113, 3140, 3163, 3167, 3203, 3247, 3279, 3338, 3354, 3365, 3386, 3445, 3449, 3459	
		\ref 2827, 2834	
		\refname 282, 283	
		\refstepcounter 471	
		\relax . . 170, 176, 182, 195, 202, 236, 278, 332, 333, 421, 453, 472, 474, 478, 492, 506, 521, 531, 539, 550, 597, 682, 761, 797, 799, 919, 988, 1130, 1486, 1488, 1494, 1496, 1606, 1607, 1675, 1699, 1750, 1773, 1794, 1803, 1813, 1814, 1834, 1839, 1842, 1845, 1850, 1853, 1856, 1859, 1862, 1865, 1868, 1871, 1874, 1884, 1939, 2133, 2134, 2151, 2276, 2277, 2280, 2300, 2347, 2373, 2399, 2424, 2514, 2542, 2641, 2651, 2652,	

<code>\selectlanguage</code> 1577, 2797	<code>\shorttitle</code> 2954, 2962,	<code>\thanks</code> 13, 2089, 2846
<code>\set@ACM@acmcpbox</code> ..	2972, 2983, 2990, 3014	<code>\thankses</code>
..... 2258, 2263	<code>\showeprint</code> 3441	2092, 2094, 2136, 2846
<code>\setbox</code> 517, 572,	<code>\sidebar</code> 943	<code>\the</code> .. 1508, 1515, 1569,
983, 2267, 2336,	<code>sidebar (env.)</code> 34	1572, 1621, 1623,
2452, 2461, 2471,	<code>\skip</code> 788	2280, 2869, 2873, 2925
2482, 2634, 2644,	<code>\small</code> 561, 948,	<code>\theACM@time@hours</code> .
2699, 2779, 2791, 2799	955, 963, 1745,	..... 2919, 2926
<code>\setccctype</code> 16, 1879	2301, 2303, 2305,	<code>\theACM@time@minutes</code> 2926
<code>\setcitestyle</code>	2307, 2545, 2570,	<code>\theenumi</code> 995
... 26, 286, 360, 366	2791, 2799, 2815, 3070	<code>\theenumii</code> 996
<code>\setcopyright</code> .. 16, 1877	<code>\smallskipamount</code> ... 1027	<code>\theenumiii</code> 997
<code>\setcounter</code> 2128, 2213,	<code>\smash</code> 1644, 1650, 1657, 1663	<code>\theenumiv</code> 998
2330, 2917, 2919,	<code>\space</code> 496, 1493,	<code>\thefootnote</code> 2122
3201, 3224, 3228, 3239	1562, 1704, 2241,	<code>\theindex</code> 3455
<code>\setengagemetadate</code> .	2508, 3054, 3134,	<code>\theoremstyle</code>
..... 19, 2107	3426, 3465, 3468, 3476	3306, 3309, 3325, 3333
<code>\setkeys</code> . 38, 174, 180,	<code>\specialcomment</code> 3417	<code>\thepage</code>
1447, 1716, 1764,	<code>\standardpagestyle</code> . 2936	2927, 2943, 2945,
1877, 2619, 2620,	<code>\startPage</code> 15, 1668	2951, 2952, 2989,
2625, 2626, 2687,	<code>\state</code> . 11, 1556, 2486, 2759	3013, 3070, 3105, 3110
2688, 2692, 2693,	<code>\stepcounter</code> 1585, 1587,	<code>\thispagestyle</code> 2337, 2344
2732, 2733, 2737, 2738	1594, 1597, 1604, 1793	<code>\thmname</code> 3273, 3305
<code>\setlength</code> 758, 759, 765,	<code>\StrDel</code> 2495	<code>\thmnote</code> 3273, 3305
774, 1006, 1007,	<code>\streetaddress</code>	<code>\thmnumber</code> 3273, 3305
1012, 1018, 1021,	. 11, 1554, 2486, 2753	<code>\thr@@</code> 327
1022, 1023, 1024,	<code>\string</code> 423,	<code>\time</code> 2914, 2917, 2919
1635, 1638, 2268, 2868	424, 427, 429, 649,	<code>\title</code> 10, 2811
<code>\setmonofont</code> ... 850, 855	1493, 1562, 1670,	<code>\titlenote</code> .. 14, 1581, 2812
<code>\settopmatter</code>	1704, 2280, 2811,	<code>\topsep</code> .. 1031, 1035, 3354
... 18, 98, 1704,	2812, 3465, 3468, 3476	<code>\translatedabstract</code> 443
1716, 1717, 1719,	<code>\strut</code> 3048, 3128	<code>translatedabstract</code>
1722, 1724, 1727, 2823	<code>\strutbox</code> 568, 581	(env.) 21
<code>\setTrue</code> 543	<code>\subsection</code> 3172	<code>\translatedkeywords</code>
<code>\SetWatermarkColor</code> .	<code>\subsubsection</code> 3176	..... 21, 440
..... 664, 673	<code>\subtitle</code> 10, 1483	<code>\translatedsubtitle</code>
<code>\SetWatermarkFontSize</code>	<code>\subtitlenote</code> .. 14, 1590	..... 21, 437
..... 663, 672		<code>\translatedtitle</code> . 21, 434
<code>\SetWatermarkText</code> 665, 674	T	<code>\trivlist</code> 3355
<code>\sfdefault</code> 867	<code>\teaserfigure</code> 2087	<code>\tw@</code> 325
<code>\sffamily</code> .. 2400, 2402,	<code>teaserfigure (env.)</code> ... 18	<code>\two@digits</code> ... 2925, 2926
2404, 2406, 2408,	<code>\terms</code> 15, 1670	<code>\twocolumn</code> . 2354, 2356,
2410, 2414, 2418,	<code>\textbf</code> .. 1796, 1808, 2849	2358, 2360, 2362, 2366
2420, 2539, 2544,	<code>\textbullet</code> 591, 1795,	
2548, 2569, 2935,	2969, 2972, 2979, 2983	U
3197, 3198, 3199,	<code>\textheight</code> 2334, 2336,	<code>\unskip</code> 520, 590,
3206, 3207, 3209,	2342, 2872, 3046, 3126	786, 1553, 1559,
3210, 3215, 3216,	<code>\textit</code> 1809,	1566, 2483, 2486,
3225, 3226, 3229, 3230	2825, 2829, 2830, 2831	2487, 2489, 2491,
<code>\shortauthors</code> 19, 1520,	<code>\textrightarrow</code>	2492, 2493, 2494,
1521, 1528, 1529,	.... 592, 1791, 1805	2508, 2577, 2753,
1531, 1534, 1535,	<code>\textwidth</code> 965, 984, 985,	2754, 2755, 2757,
1537, 2245, 2247, 2934	2123, 2447, 2460,	2758, 2759, 2760,
<code>\shortcite</code> 639, 642	2470, 2512, 2651, 2698	

2761, 2762, 2764, 2809, 2817, 2834, 2847	\vskip 509, 544, 788, 796, 978	545, 568, 581, 759, 796, 913, 917, 928,
\unvbox . 573, 790, 795, 2338, 2634, 2700, 2779	\vspace 2278, 3463	1012, 1018, 1030, 2138, 2145, 2158,
\upshape 1044	\vsplit 2336	2162, 2251, 2253, 2268, 2744, 2791,
\url . 1777, 1779, 1921, 3426	\vtop 2644	2799, 2939, 2940, 3045, 3050, 3063,
\UrlBreakPenalty 2680, 2683	W	3064, 3125, 3130, 3168, 3172, 3176,
\urlstyle . . . 595, 604, 607	\wd 985, 2483	3184, 3189, 3196, 3255, 3287, 3456, 3459
\usebox 2880, 2910	\write 649	
\usepackage 9, 10, 11, 12, 13, 14	X	
	\xdef 336, 338, 340, 342, 344, 346	
V	Y	
\value 1810	\year 1621, 2925	\z@skip 544, 978, 1035, 3195
\vbox 572, 983, 2267, 2452, 2461, 2471, 2634, 2699, 2779	Z	\zposy 2274, 2275
	\z@ 315, 319, 455, 475, 507, 517, 532,	\zrefused 2272, 2273
		\zsaveposy 1773, 2293