LaTeX Class for the *Association for Computing Machinery*[*]

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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 . . . 5
2.3 Top matter . . . 7
2.4 Top matter of ACM Engage materials . . . 18
2.5 ACM cover page . . . 18
2.6 Internationalization . . . 19
2.7 Tagging . . . 20
2.8 Algorithms . . . 21
2.9 Figures and tables . . . 21
2.10 Descriptions of images . . . 22
2.11 Theorems . . . 23
2.12 Online-only and offline-only material . . . 24
2.13 Note about anonymous mode . . . 24
2.14 Acknowledgments . . . 24
2.15 Bibliography . . . 25
2.15.1 Processing using BibTeX . . . 25
2.15.2 URL, DOI, eprint . . . 26
2.15.3 Special entry types . . . 27
2.15.4 Dates and sorting . . . 29
2.15.5 Processing using BibLaTeX . . . 30
2.15.6 Manual bibliography . . . 31
2.16 Colors . . . 31
2.17 Other notable packages and typographic remarks . . . 32

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2.18 Counting words . . . 32
2.19 Disabled or forbidden commands . . . 32
2.20 Notes for wizards . . . 33
2.21 Currently supported publications . . . 33
2.22 Samples . . . 35
2.23 A note about `sigchi-a` format . . . 36

3 Implementation **38**
3.1 Identification . . . 38
3.2 Preload hook . . . 38
3.3 Tagging and old kernels . . . 38
3.4 Options . . . 39
3.5 Setting switches . . . 42
3.6 Loading the base class and package . . . 44
3.7 Citations . . . 45
3.8 Internationalization . . . 47
3.9 Sectioning . . . 49
3.10 Hyperxmp and hyperref . . . 50
3.11 Other packages . . . 52
3.12 Paper size and paragraphing . . . 52
3.13 Fonts . . . 56
3.14 Image descriptions . . . 57
3.15 Floats . . . 58
3.16 Lists . . . 61
3.17 Top-matter data . . . 62
3.18 Concepts system . . . 81
3.19 Copyright system . . . 82
3.20 Maketitle hook . . . 87
3.21 ACM Engage top matter . . . 88
3.22 Typesetting top matter . . . 88
3.23 Headers and Footers . . . 104
3.24 Sectioning . . . 110
3.25 TOC lists . . . 113
3.26 Theorems . . . 113
3.27 Balancing columns . . . 116
3.28 Acknowledgments . . . 117
3.29 Conditional typesetting . . . 118
3.30 Additional bibliography commands . . . 118
3.31 Index . . . 119
3.32 End of Class . . . 119

1 Introduction

The Association for Computing Machinery[1] 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 new consolidated template package replaces all previous independent class files and packages and provides a single up-to-date LaTeX package with optional calls. The package uses only free TEX packages and fonts included in TEXLive, MikTEX and other popular TEX distributions. The new ACM templates use a new font set (libertine) which will need to be installed on your machine before using the templates. Please download and install the libertine font set before writing your paper. Fonts used in the template cannot be substituted; margin adjustments are not allowed.

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, David F. Kotz, 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., M Senthilkumar, 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 customizaton 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 LATEX 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 (TEXLive, MacTEX, MikTEX) of 2015 and later, so you probably have them installed. Just in case here is the list of these packages:

- *amsart*, https://ctan.org/pkg/amsart,
- *babel*, https://ctan.org/pkg/babel,
- *balance*, https://ctan.org/pkg/balance,
- *booktabs*, https://ctan.org/pkg/booktabs,
- *caption*, https://ctan.org/pkg/caption,
- *cmap*, https://ctan.org/pkg/cmap,
- *comment*, https://ctan.org/pkg/comment,
- *doclicense*, https://ctan.org/pkg/doclicense,
- *draftwatermark*, https://ctan.org/pkg/draftwatermark,
- *environ*, https://ctan.org/pkg/environ,
- *etoolbox*, https://ctan.org/pkg/etoolbox,
- *fancyhdr*, https://ctan.org/pkg/fancyhdr,
- *float*, https://ctan.org/pkg/float,
- *fontenc*, https://ctan.org/pkg/fontenc,
- *framed*, https://ctan.org/pkg/framed,
- *geometry*, https://ctan.org/pkg/geometry,
- *graphicx*, https://ctan.org/pkg/graphicx,

- *hyperref*, https://ctan.org/pkg/hyperref,
- *hyperxmp*, https://ctan.org/pkg/hyperxmp,
- *iftex*, https://ctan.org/pkg/iftex,
- *libertine*, https://ctan.org/pkg/libertine,
- *manyfoot*, https://ctan.org/pkg/manyfoot,
- *microtype*, https://ctan.org/pkg/microtype,
- *natbib*, https://ctan.org/pkg/natbib,
- *newtxmath*, https://ctan.org/pkg/newtxmath,
- *pbalance*, https://ctan.org/pkg/pbalance,
- *pifont*, https://ctan.org/pkg/pifont,
- *refcount*, https://ctan.org/pkg/refcount,
- *setspace*, https://ctan.org/pkg/setspace,
- *totpages*, https://ctan.org/pkg/totpages,
- *unicode-math*, https://ctan.org/pkg/unicode-math,
- *xcolor*, https://ctan.org/pkg/xcolor,
- *xkeyval*, https://ctan.org/pkg/xkeyval,
- *xstring*, https://ctan.org/pkg/xstring,
- *zi4*, https://ctan.org/pkg/zi4,
- *zref-savepos*, https://ctan.org/pkg/zref-savepos,
- *zref-user*, https://ctan.org/pkg/zref-user.

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}
```

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, ACMJDS, AILET, CIE, CSUR, FAC, GAMES, JACM, JATS, JDIQ, JDS, JEA, JERIC, JETC, JRC, PACMCGIT, PACMHCI, PACMMOD, PACMNET, PACMPL, PACMSE, POMACS, TAAS, TACCESS, TACO, TAIS, TAISAP, 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 DLT, DTRAP, HEALTH, IMWUT, JOCCH, 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.

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.

Sometimes conference proceedings are published as a special issue (or issues) of an ACM journal. In this case, you should use the journal format. The templates `sample-acmsmall-conf.tex` and `sample-acmtog-conf.tex` show how to enter conference information. Note that you need to comment out `\acmJournal{...}` line for such papers to get the conference information in the footers and headers. The `acmtog` format then puts the conference name, date and venue into the footers instead of the journal name, volume, issue and article number. The `acmsmall` format uses the headers and footers of the proceedings formats: the conference name, date and venue in the headers, and no folios, since the page numbers of such a paper are assigned by the proceedings rather than by the article. If you do want the folios, say `\settopmatter{printfolios=true}` after `\acmConference`.

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 2.23). 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 2.15.

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

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 authors' 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 overriden 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. When there are many figures near the end of the document, the attempts to balance columns may lead to the loss of the figures. Set this option to false if you encounter problems. An alternative is the (experimental) option pbalance, which uses the new package pbalance. You may want to try pbalance=true to see if you get better results.

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. 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.

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 2.15)
`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. Currenly 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 2.11
`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

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` `\orcid` `\affiliation` `\email` The basic commands are `\author`, `\orcid` (for the researchers registered with ORCID, http://www.orcid.org/), `\affiliation` and `\email`. In the simplest case, you enter them in this order:

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

Do *not* use the LaTeX `\and` macro or commas, or `\\` between the authors! Each author deserves their 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}
  \city{Hekla}
  \country{Iceland}}
\affiliation{%
  \institution{Institute for Clarity in Documentation}
  \city{Dublin}
  \state{Ohio}}
```

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

`\position` `\institution` `\department` `\city` `\state` `\country` 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`, `\state`, 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.

Starting 2024, ACM no longer collects or print postal addresses of the authors. Thus the commands `\streetaddress` and `\postcode`, present in the previous versions of the class, now produce a warining.

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}
  \city{Sidney}
  \state{NSW}
  \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}}
```

\correspondingauthor The command \correspondingauthor after an author's name marks the corresponding author. Note that there could be more than one corresponding author. Make sure that you have the email of the author entered.

\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 2.14).

\authorsaddresses In some formats, addresses are printed as a footnote on the first page. By default LaTeX typesets them itself using the information you give it. However, you can override its choice using the commmand \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 \subtitlenote \authornote While the command \thanks generates a note without a footnote mark, sometimes the authors might need notes more tightly connected to the title, subtitle or author. The commands \titlenote, \subtitlenote and \authornote that follow the corresponding 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
\acmNumber
\acmArticle
\acmYear
\acmMonth

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

```
\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

```
\acmBadge[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.

\keywords The command \keywords{⟨*keyword, keyword,...*⟩} sets keywords for the publication. If present, keywords must be separated by commas, for example,

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

CCSXML (*env.*) \ccsdesc 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

Table 3: Parameters for the \setcopyright command

Parameter	Meaning
none	The copyright and permission information is not typeset. (This is the option for some ACM conferences.)
acmlicensed	The authors retain the copyright but license the publication rights to ACM.
rightsretained	The authors retain the copyright and publication rights to themselves or somebody else.
usgov	All the authors are employees of the US government.
usgovmixed	Some authors are employees of the US government.
cagov	All the authors are employees of the Canadian government.
cagovmixed	Some authors are employees of the Canadian government.
licensedusgovmixed	Some authors are employees of the US government, and the publication rights are licensed to ACM.
licensedcagov	All the authors are employees of the Canadian government, and the publication rights are licensed to ACM.
licensedcagovmixed	Some authors are employees of the Canadian government, and the publication rights are licensed to ACM.
othergov	Authors are employees of a government other than the US or Canada.
licensedothergov	Authors are employees of a government other than the US or Canada, and the publication rights are licensed to ACM.
iw3c2w3	Special statement for conferences organized by IW3C2.
iw3c2w3g	Special statement for conferences organized by IW3C2, when some authors are approved Google employees.
cc	Creative Commons license. If this key is set, *doclicense* images are used to typeset the license. See also \setcctype command.
acmcopyright	The authors transfer the copyright to the ACM. This choice is no longer available for the non-commissioned authors and will trigger a warning.

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}.

\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 default), 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 TEX 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 TEX about the copyright owner and year. Also, you should be aware that due to the different sizes of the permssion 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 LATEX. 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}
```

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.

Table 4: Settings for the `\settopmatter` command

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

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 `\setcctype` command, for example, `\setcctype{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
\acmDataLink The commands \acmCodeDataLink{⟨*link*⟩} and \acmDataLink{⟨*link*⟩} set the links 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. If `\keywords` are used, then 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.

`\translatedtitle` `\translatedsubtitle` `\translatedkeywords`

The commands `\translatedtitle`, `\translatedsubtitle`, and (if keywords are used) `\translatedkeywords` have two mandatory arguments each: {⟨*language*⟩} and {⟨*keywords*⟩}. They 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}
```

`translatedabstract` (*env.*)

Similarly, `translatedabstract` environment has a mandatory language argument, for example,

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

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 Tagging

ACM is firmly committed to produce fully tagged PDFs compliant with the accessibility standards.

The LaTeX tagging project, https://latex3.github.io/tagging-project/ is aimed to create accessible and standards compliant PDFs. To create a tagged PDF, start your document with the `\DocumentMetadata` command, for example,

```
\DocumentMetadata{
 lang        = en,
 pdfstandard = ua-2,
```

```
  pdfstandard = a-4f,
  tagging=on,
  tagging-setup={math/setup=mathml-SE}
 }
```

You must use `lualatex` to make the document fully tagged. For some features you may need `lualatex-dev`.

At present this code is still experimental. If you use it, please *do not ask ACM for support.* On the other hand, bug reports at https://github.com/borisveytsman/acmart/issues will be appreciated.

2.8 Algorithms

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

2.9 Figures and tables

ACM styles use the standard LaTeX 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\\
  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`.

If tagging is enabled (see Section 2.7), it assumes that the first row of table contains headers. To change this assumption, use tagpdfsetup, for example, if you have two rows of headers,

```
\tagpdfsetup{table/header-rows={1,2}}
```

2.10 Descriptions of images

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.

There are two ways to include descriptions in the figures.

`\Description` The old way, that predates LaTeX tagging project is based on the `\Description` command. 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 $0.5$~V with most
  measurements between $0.2$~V and $0.8$~V}
  \caption{Histogram of the measurements of voltage}
  \label{fig:voltage}
\end{figure}
```

The new way, which is switched on by the `\DocumentMetada` command is based on the `alt` keyword for the `\includegraphics` command, for example,

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

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

2.11 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}}
```

If you use *cleveref* and share counters between the theorem-like constructs, you need to explicitly tell *cleveref* the kind of the construct you use, for example,

```
\newtheorem{theorem}{Theorem}[section]
\newtheorem{lemma}[theorem]{Lemma}
 % Theorems and lemmas share counters
...
\begin{theorem}\label{thm:test} % This is a theorem
  ...
\begin{lemma}\label[lemma]{test-lemma} % This is a lemma
```

2.12 Online-only and offline-only material

printonly (*env.*)
screenonly (*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.

2.13 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}.
```

2.14 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 or comments.

`\grantsponsor` `\grantnum`

All financial support *must* be listed using the commands `\grantsponsor` and `\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{my-grant-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}
```

2.15 Bibliography

The ACM lets you use either BibTEX or BibLATEX to process your references: they require slightly different setup of your LATEX file, as detailed in the following subsections.

2.15.1 Processing using BibTEX

This uses the `natbib` package for formatting references and the BibTEX style file `ACM-Reference-Format.bst` for BibTEX 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 BibTEX 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. You can use these commands to produce in-text citations, for example,

```
So we see that \citeauthor{Burano2026}
proved this conjecture in \citeyear{Burano2026}~\cite{Burano2026}.
```

There are several customized BibTeX entry types and fields in the ACM style file ACM-Reference-Format.bst that you may want to be aware of. You can find many examples on the Web page https://www.acm.org/publications/authors/bibtex-formatting.

2.15.2 URL, DOI, eprint

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 has any value, URL is printed even if DOI is present, for example,

```
distinctURL = 'true',
```

The dynamic nature of Internet makes URLs not permanent: sometimes they disappear or change. The problem of "stale links" exists from the early days of WWW. That is why ACM prefers DOIs to URLs: unlike the latter, the former are supposed to work forever. However, if you really need to use URLs, there are two facilities that help to mitigate some problems with the URLs. The field lastaccessed gives the date when the given URL was visited and had the information you saw. Presumably, some service like Internet Wayback Machine (https://web.archive.org/) allows the reader to retrieve this link at the given date. Moreover, sometimes a page is explicitly archived by this or other service. In this case the field archived will give the reference ot the archival version. Examples:

```
lastaccessed = {March 2, 2005},
archived = {https://web.archive.org/web/20240505055615}
```

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

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

2.15.3 Special entry types

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 and `archived` field to add the archival link.

There are two ways to enter video or audio sources in the bibliograpy corresponding to two different possibilies. 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 supplemental material attached 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",
}
```

Sometimes a work is presented at meeting, but is not (yet) published in the proceedings. The entry type `presentation` is used for this purpose. The field `venue` is used for the place of the meeting:

```
@Presentation{Reiser2014,
  author = {Brian J. Reiser},
  year = 2014,
  title = {Designing coherent storylines aligned with NGSS for the
           K-12 classroom},
  venue = {National Science Education Leadership Association
        Meeting, Boston, MA, USA},
  url = {https://www.academia.edu/6884962/}
 }
```

The URL, if present, may be accompanied by `lastaccessed` and `archived` links.

A preprint can be cited using the entry `preprint`, for example,

```
@preprint{AnzarootPBM14,
  author    = {Sam Anzaroot and
               Alexandre Passos and
               David Belanger and
               Andrew McCallum},
  title     = {Learning Soft Linear Constraints with Application to
                  Citation Field Extraction},
  year      = {2014},
  archivePrefix = {arXiv},
  eprint    = {1403.1349},
  doi =    {10.48550/arXiv.1403.1349}
}
```

Sometimes you need to cite an article under review. ACM prefers the authors to use preprints for this purpose, but sometimes it is not feasible. In this case you can use the entry `underreview`, for example,

```
@underreview{Baggett2025,
  author = {R. Baggett and M. Simecek and C. Chambellan
            and K. Tsui and M. Fraune},
  year = 2025,
  title = {Fluidity in the Phased Framework of Technology
           Acceptance: Case Study to Gain a Holistic Understanding
           of (Older Adult) Participant Advancement Through
           Acceptance Phases with  Mobile Telepresence Robots},
  journal = {Robotics Aut. Systems}
}
```

2.15.4 Dates and sorting

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 includes, so you can use strings like `journal = taccess` for *ACM Transactions on Accessible Computing*.

2.15.5 Processing using BibLaTeX

You will find in this package two sets of style files for BibLaTeX, `acmnumeric` and `acmauthoryear`, that mimic the behavior of the ACM-Reference-Format.bst BibTeX style. They provide you access to all the power of BibLaTeX and already include support for advanced citation of software artifacts from the `biblatex-software` package, also separately available on CTAN. Look at the `biblatex-software` documentation to learn more about what it offers. This support is highly experimental and currently is *not* supported by TAPS!

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

First of all, you need to pass the `natbib=false` option to the document class, and remove the `\citestyle{acmauthoryear}` command from the sources (if present).

Then, in the preamble of your document you need to load the BibLaTeX package and select the approriate 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` command (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 BibLaTeX styles.

2.15.6 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 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.

2.17 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 `nomencl` [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.

2.18 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 faciliate 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.

2.19 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 typesetting 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.

\AtBeginMaketitle

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
ACMJDS	ACM Journal of Data Science
AILET	ACM AI Letters

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

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DLT	Distributed Ledger Technologies: Research and Practice
DGOV	Digital Government: Research and Practice
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 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
TAIS	ACM Transactions on AI for Science
TAISAP	ACM Transactions on AI Security and Privacy
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 Transactions on Data Science
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
TELO	ACM Transactions on Evolutionary Learning and Optimization
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

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

Abbreviation	Publication
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
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 Samples

There are several samples of acmart documents, that can serve as templates for the authors. Among them `sample-sig...` are templates for conference papers, while `sample-acm...` are templates for journal articles and special materials.

Here is the list of the samples:

acmmanuscript: A proceedings paper in the manuscript format.

acmsmall: A journal paper in the `acmsmall` format.

acmsmall-biblatex: A journal paper using experimental *biblatex* bibliography processing.

acmlarge: A journal paper in the `acmlarge` format.

acmtog: A journal paper in the `acmtog` format.

sigconf: A proceedings paper in the standard `sigconf` format.

sigconf-biblatex: A proceedings paper in the `sigconf` format using experimental *biblatex* bibliography processing.

sigconf-authordraft: A proceedings paper in the `sigconf` format with the `authordraft` option selected.

sigconf-i13n: A proceedings paper in the `sigconf` format with multilanguage titles and abstract.

sigconf-lualatex: A proceedings paper in the `sigconf` format, LuaLaTeX version.

sigplan: A proceedings paper in the `sigplan` format.

acmsmall-conf: A proceedings paper in the `acmsmall` format for the publication in a journal using this option.

acmtog-conf: A proceedings paper in the `acmtog` format for the publication in a journal using this option.

acmcp: A sample of ACM Cover Page used by JDS.

acmengage: A sample of ACM Engage publication.

acmsmall-tagged: A journal paper in the `acmsmall` format with the tagging code, see Section 2.7.

sigconf-tagged: A proceedings paper in the standard `sigconf` format with the tagging code, see Section 2.7.

2.23 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.*)
`marginfigure` (*env.*)
`margintable` (*env.*)

This format has large margin uses for special figures and tables. This package provides three environments for this with optional captions:

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.

```
⟨class⟩\NeedsTeXFormat{LaTeX2e}
⟨*gobble⟩
\ProvidesFile{acmart.dtx}
⟨/gobble⟩
⟨class&!tagged⟩\ProvidesClass{acmart}
⟨tagged⟩\ProvidesClass{acmart-tagged}
[2026/08/16 v2.20 Typesetting articles for the Association for Computing Machinery]
```

And the driver code:

```
⟨*gobble⟩
\documentclass{ltxdoc}
\usepackage{array,booktabs,amsmath,graphicx,fancyvrb,tabularx, longtable}
\usepackage[tt=false, type1=true]{libertine}
\usepackage[varqu]{zi4}
\usepackage[libertine]{newtxmath}
\usepackage[tableposition=top]{caption}
\usepackage{hypdoc}
\PageIndex
\CodelineIndex
\RecordChanges
\EnableCrossrefs
\begin{document}
  \DocInput{acmart.dtx}
\end{document}
⟨/gobble⟩
⟨*class⟩
\def\@classname{acmart}
```

3.2 Preload hook

We preload `acmart-preload-hook`:

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

3.3 Tagging and old kernels

We want to use `\DocumentMetadata` command, but what with the old kernels which some authors might use? Here we just switch off the tagging code if this is not defined

`\IfDocumentMetadata`

```
\providecommand{\IfDocumentMetadataTF}{\@secondoftwo}
\providecommand{\IfDocumentMetadataT}{\@gobble}
\providecommand{\IfDocumentMetadataF}{\@firstofone}
```

3.4 Options

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

```
\RequirePackage{xkeyval}
```

We use xstring to check whether user input is valid

```
\RequirePackage{xstring}
```

We need iftex to check the engine

```
\RequirePackage{iftex}
```

format The possible formats

```
\define@choicekey*+{\@classname.cls}{format}[\ACM@format\ACM@format@nr]{%
  manuscript, acmsmall, acmlarge, acmtog, sigconf, siggraph,
  sigplan, sigchi, sigchi-a, acmengage, acmcp}[manuscript]{}{%
  \ClassError{\@classname}{The option format must be manuscript,
    acmsmall, acmlarge, acmtog, sigconf, siggraph,
    sigplan, sigchi or sigchi-a}}
\def\@DeclareACMFormat#1{\DeclareOptionX{#1}{\setkeys{\@classname.cls}{format=#1}}}
\@DeclareACMFormat{manuscript}
\@DeclareACMFormat{acmsmall}
\@DeclareACMFormat{acmlarge}
\@DeclareACMFormat{acmtog}
\@DeclareACMFormat{sigconf}
\@DeclareACMFormat{siggraph}
\@DeclareACMFormat{sigplan}
\@DeclareACMFormat{sigchi}
\@DeclareACMFormat{sigchi-a}
\@DeclareACMFormat{acmengage}
\@DeclareACMFormat{acmcp}
\ExecuteOptionsX{format}
```

\if@ACM@screen Whether we use screen mode

```
\define@boolkey+{\@classname.cls}[@ACM@]{screen}[true]{%
  \if@ACM@screen
    \PackageInfo{\@classname}{Using screen mode}%
  \else
    \PackageInfo{\@classname}{Not using screen mode}%
  \fi}{\PackageError{\@classname}{The option screen can be either true or
    false}}
\ExecuteOptionsX{screen=false}
```

\if@ACM@urlbreakonhyphens

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

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

```
\define@boolkey+{\@classname.cls}[@ACM@]{acmthm}[true]{%
```

```
  \if@ACM@acmthm
    \PackageInfo{\@classname}{Requiring acmthm}%
  \else
    \PackageInfo{\@classname}{Suppressing acmthm}%
  \fi}{\PackageError{\@classname}{The option acmthm can be either true or
    false}}
\ExecuteOptionsX{acmthm=true}
```

`\if@ACM@review` Whether we use review mode

```
\define@boolkey+{\@classname.cls}[@ACM@]{review}[true]{%
  \if@ACM@review
    \PackageInfo{\@classname}{Using review mode}%
    \AtBeginDocument{\@ACM@printfoliostrue}%
  \else
    \PackageInfo{\@classname}{Not using review mode}%
  \fi}{\PackageError{\@classname}{The option review can be either true or
    false}}
\ExecuteOptionsX{review=false}
```

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

```
\define@boolkey+{\@classname.cls}[@ACM@]{authorversion}[true]{%
  \if@ACM@authorversion
    \PackageInfo{\@classname}{Using authorversion mode}%
  \else
    \PackageInfo{\@classname}{Not using authorversion mode}%
 \fi}{\PackageError{\@classname}{The option authorversion can be either true or
    false}}
\ExecuteOptionsX{authorversion=false}
```

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

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

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

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

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

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

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

`\if@ACM@natbib` Whether we use natbib mode

```
\define@boolkey+{\@classname.cls}[@ACM@]{natbib}[true]{%
  \if@ACM@natbib
    \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
  \else
    \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
  \fi}{\PackageError{\@classname}{The option natbib can be either true or
    false}}
\ExecuteOptionsX{natbib=true}
```

`\if@ACM@anonymous` Whether we use anonymous mode

```
\define@boolkey+{\@classname.cls}[@ACM@]{anonymous}[true]{%
  \if@ACM@anonymous
    \PackageInfo{\@classname}{Using anonymous mode}%
  \else
    \PackageInfo{\@classname}{Not using anonymous mode}%
  \fi}{\PackageError{\@classname}{The option anonymous can be either true or
    false}}
\ExecuteOptionsX{anonymous=false}
```

`\if@ACM@timestamp` Whether we use timestamp mode

```
\define@boolkey+{\@classname.cls}[@ACM@]{timestamp}[true]{%
  \if@ACM@timestamp
    \PackageInfo{\@classname}{Using timestamp mode}%
  \else
    \PackageInfo{\@classname}{Not using timestamp mode}%
  \fi}{\PackageError{\@classname}{The option timestamp can be either true or
    false}}
\ExecuteOptionsX{timestamp=false}
```

`\if@ACM@authordraft` Whether we use author-draft mode

```
\define@boolkey+{\@classname.cls}[@ACM@]{authordraft}[true]{%
  \if@ACM@authordraft
    \PackageInfo{\@classname}{Using authordraft mode}%
    \@ACM@timestamptrue
    \@ACM@reviewtrue
  \else
    \PackageInfo{\@classname}{Not using authordraft mode}%
 \fi}{\PackageError{\@classname}{The option authordraft can be either true or
    false}}
\ExecuteOptionsX{authordraft=false}
```

`\ACM@fontsize` The font size to pass to the base class

```
% \changes{v1.87}{2022/08/27}{Added fontsize 8pt}
\def\ACM@fontsize{}
\DeclareOptionX{8pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}
```

`\ACM@languages` The languages of the document

```
\def\ACM@languages{}
\DeclareOptionX{language}{%
  \ifx\ACM@languages\@empty
  \gdef\ACM@languages{english}\fi
  \g@addto@macro\ACM@languages{, #1}}

\DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
\DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
\ProcessOptionsX
\ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}
```

3.5 Setting switches

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

```
\newif\if@ACM@manuscript
```

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

```
\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.

```
\newif\if@ACM@journal@bibstrip
```

`\if@ACM@journal@bibstrip@or@tog` ACM TOG sometimes uses journal-like bibstrip even for conference proceedings, so we need to set it separately

```
\newif\if@ACM@journal@bibstrip@or@tog
```

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

```
\newif\if@ACM@sigchiamode
```

`\if@ACM@engage` ACM Engage course materials have special formatting

```
\newif\if@ACM@engage
\@ACM@engagefalse
```

`\if@ACM@acmcp` ACM cover page formatting

```
\newif\if@ACM@acmcp
\@ACM@acmcpfalse
```

Setting up switches

```
\ifnum\ACM@format@nr=5\relax % siggraph
\ClassWarning{\@classname}{%
  The format siggraph is now obsolete.\MessageBreak
  I am switching to sigconf.}
  \setkeys{\@classname.cls}{format=sigconf}
\fi
\ifnum\ACM@format@nr=7\relax % sigchi
\ClassWarning{\@classname}{%
  The format sigchi is now obsolete.\MessageBreak
  I am switching to sigconf.}
  \setkeys{\@classname.cls}{format=sigconf}
```

```
\fi
\ifnum\ACM@format@nr=8\relax % sigchi
\ClassWarning{\@classname}{%
  ACM SIGCHI has retired the SIGCHI-A template\MessageBreak
  effective immediately. ACM is keeping this template\MessageBreak
  option available to authors who are working on legacy\MessageBreak
  documents only. ACM will not, under any circumstances,\MessageBreak
  accept documents in this format for publication and\MessageBreak
  will not offer technical support to the authors who use\MessageBreak
  this template.\MessageBreak
  ACM SIGCHI is directing Conference leaders and\MessageBreak
  authors to publish their articles using the SIGCONF\MessageBreak
  template call.}
\fi
\ifnum\ACM@format@nr=0\relax
  \@ACM@manuscripttrue
\else
  \@ACM@manuscriptfalse
\fi
\@ACM@sigchiamodefalse
\ifcase\ACM@format@nr
\relax % manuscript
  \@ACM@journaltrue
\or % acmsmall
  \@ACM@journaltrue
\or % acmlarge
  \@ACM@journaltrue
\or % acmtog
  \@ACM@journaltrue
  \@ACM@journal@bibstrip@or@togtrue
\or % sigconf
  \@ACM@journalfalse
\or % siggraph
  \@ACM@journalfalse
 \or % sigplan
  \@ACM@journalfalse
 \or % sigchi
  \@ACM@journalfalse
\or % sigchi-a
  \@ACM@journalfalse
  \@ACM@sigchiamodetrue
\or % acmengage
  \@ACM@journalfalse
  \@ACM@engagetrue
\or % acmcp
  \@ACM@journaltrue
  \@ACM@acmcptrue
  \AtBeginDocument{\@ACM@printacmreffalse}%
\fi
\if@ACM@journal
  \@ACM@journal@bibstriptrue
  \@ACM@journal@bibstrip@or@togtrue
\else
 \@ACM@journal@bibstripfalse
```

```
\fi
```

3.6 Loading the base class and package

Before we load the base class we want to save the original definitions of sectioning commands since acmart redefines them, and we need the vanilla versions.

\@startsection@kernel

```
\let\@startsection@kernel\@startsection
```

\@xsect@kernel

```
\let\@xsect@kernel\@xsect
```

\@sect@kernel

```
\let\@sect@kernel\@sect
```

\@ssect@kernel

```
\let\@ssect@kernel\@ssect
```

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

```
\ifx\ACM@fontsize\@empty
  \ifcase\ACM@format@nr
  \relax % manuscript
    \def\ACM@fontsize{9pt}%
  \or % acmsmall
    \def\ACM@fontsize{10pt}%
  \or % acmlarge
    \def\ACM@fontsize{10pt}%
  \or % acmtog
    \def\ACM@fontsize{9pt}%
  \or % sigconf
    \def\ACM@fontsize{9pt}%
  \or % siggraph
    \def\ACM@fontsize{9pt}%
   \or % sigplan
    \def\ACM@fontsize{10pt}%
   \or % sigchi
    \def\ACM@fontsize{9pt}%
  \or % sigchi-a
    \def\ACM@fontsize{10pt}%
  \or % acmengage
    \def\ACM@fontsize{10pt}%
  \or % acmcp
    \def\ACM@fontsize{9pt}%
  \fi
\fi
\ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
\LoadClass[\ACM@fontsize, reqno]{amsart}
\RequirePackage{microtype}
```

We need etoolbox for delayed code

```
\RequirePackage{etoolbox}
```

Booktabs is now the default

```
\RequirePackage{booktabs}
```

We need totpages to calculate the number of pages and refcount to use that number

```
\RequirePackage{refcount}
\RequirePackage{totpages}
```

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

```
\RequirePackage{environ}
```

We use setspace for double spacing

```
\if@ACM@manuscript
\RequirePackage{setspace}
\onehalfspacing
\fi
```

We no longer need textcase for better upcasing.

```
% \RequirePackage{textcase}
```

```
\if@ACM@acmcp
\RequirePackage{framed}
\RequirePackage{zref-savepos, zref-user}
\fi
```

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

```
\newdimen\@ACM@acmcp@delta
\@ACM@acmcp@delta=0pt\relax
```

3.7 Citations

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

```
\if@ACM@natbib
  \RequirePackage{natbib}
  \renewcommand{\bibsection}{%
     \section*{\refname}%
     \phantomsection\addcontentsline{toc}{section}{\refname}%
  }
  \renewcommand{\bibfont}{\bibliofont}
  \renewcommand\setcitestyle[1]{
  \@for\@tempa:=#1\do
  {\def\@tempb{round}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{(}\renewcommand\NAT@close{)}\fi
   \def\@tempb{square}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{[}\renewcommand\NAT@close{]}\fi
   \def\@tempb{angle}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
   \def\@tempb{curly}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{\{}\renewcommand\NAT@close{\}}\fi
   \def\@tempb{semicolon}\ifx\@tempa\@tempb
     \renewcommand\NAT@sep{;}\fi
   \def\@tempb{colon}\ifx\@tempa\@tempb
     \renewcommand\NAT@sep{;}\fi
   \def\@tempb{comma}\ifx\@tempa\@tempb
     \renewcommand\NAT@sep{,}\fi
```

```
  \def\@tempb{authoryear}\ifx\@tempa\@tempb
    \NAT@numbersfalse\fi
  \def\@tempb{numbers}\ifx\@tempa\@tempb
    \NAT@numberstrue\NAT@superfalse\fi
  \def\@tempb{super}\ifx\@tempa\@tempb
    \NAT@numberstrue\NAT@supertrue\fi
  \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
    \let\bibstyle=\@gobble\fi
  \def\@tempb{bibstyle}\ifx\@tempa\@tempb
    \let\bibstyle=\@citestyle\fi
  \def\@tempb{sort}\ifx\@tempa\@tempb
    \def\NAT@sort{\@ne}\fi
  \def\@tempb{nosort}\ifx\@tempa\@tempb
    \def\NAT@sort{\z@}\fi
  \def\@tempb{compress}\ifx\@tempa\@tempb
    \def\NAT@cmprs{\@ne}\fi
  \def\@tempb{nocompress}\ifx\@tempa\@tempb
    \def\NAT@cmprs{\z@}\fi
  \def\@tempb{sort&compress}\ifx\@tempa\@tempb
    \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
  \def\@tempb{mcite}\ifx\@tempa\@tempb
    \let\NAT@merge\@ne\fi
  \def\@tempb{merge}\ifx\@tempa\@tempb
    \@ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}{}\fi
  \def\@tempb{elide}\ifx\@tempa\@tempb
    \@ifnum{\NAT@merge<\thr@@}{\let\NAT@merge\thr@@}{}\fi
  \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
    \NAT@longnamestrue\fi
  \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
    \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
  \expandafter\NAT@find@eq\@tempa=\relax\@nil
  \if\@tempc\relax\else
    \expandafter\NAT@rem@eq\@tempc
    \def\@tempb{open}\ifx\@tempa\@tempb
     \xdef\NAT@open{\@tempc}\fi
    \def\@tempb{close}\ifx\@tempa\@tempb
     \xdef\NAT@close{\@tempc}\fi
    \def\@tempb{aysep}\ifx\@tempa\@tempb
     \xdef\NAT@aysep{\@tempc}\fi
    \def\@tempb{yysep}\ifx\@tempa\@tempb
     \xdef\NAT@yrsep{\@tempc}\fi
    \def\@tempb{notesep}\ifx\@tempa\@tempb
     \xdef\NAT@cmt{\@tempc}\fi
    \def\@tempb{citesep}\ifx\@tempa\@tempb
     \xdef\NAT@sep{\@tempc}\fi
  \fi
 }%
 \NAT@@setcites
 }
 \renewcommand\citestyle[1]{%
   \ifcsname bibstyle@#1\endcsname%
   \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
   \else%
   \@latex@error{Undefined `#1' citestyle}%
```

```
    \fi
  }%
\fi
```

\bibstyle@acmauthoryear The default author-year format:

```
\newcommand{\bibstyle@acmauthoryear}{%
  \setcitestyle{%
    authoryear,%
    open={[},close={]},citesep={;},%
    aysep={},yysep={,},%
    notesep={, }}}
```

\bibstyle@acmnumeric The default numeric format:

```
\newcommand{\bibstyle@acmnumeric}{%
  \setcitestyle{%
    numbers,sort&compress,%
    open={[},close={]},citesep={,},%
    notesep={, }}}
```

The default is numeric:

```
\if@ACM@natbib
\citestyle{acmnumeric}
\fi
```

3.8 Internationalization

```
\if@ACM@journal
  \renewcommand\keywordsname{Additional Key Words and Phrases}%
\else
  \renewcommand\keywordsname{Keywords}%
\fi
\if@ACM@engage
   \renewcommand\abstractname{Synopsis}%
\fi
\ifx\ACM@languages\@empty
\else
  \RequirePackage[\ACM@languages]{babel}%
  \addto\captionsenglish{%
      \if@ACM@journal
        \renewcommand\keywordsname{Additional Key Words and Phrases}%
      \else
        \renewcommand\keywordsname{Keywords}%
      \fi
      \renewcommand\acksname{Acknowledgements}%
      \if@ACM@engage
         \renewcommand\abstractname{Synopsis}%
      \fi
  }%
  \addto\captionsfrench{%
      \if@ACM@journal
        \renewcommand\keywordsname{Mots Clés et Phrases Supplémentaires}%
      \else
        \renewcommand\keywordsname{Mots clés}%
      \fi
```

```
    \renewcommand\acksname{Remerciements}%
  }%
  \addto\captionsgerman{%
    \if@ACM@journal
      \renewcommand\keywordsname{Zusätzliche Schlagwörter und Phrasen}%
    \else
      \renewcommand\keywordsname{Schlagwörter}%
    \fi
    \renewcommand\acksname{Danksagungen}%
  }%
  \addto\captionsspanish{%
    \if@ACM@journal
      \renewcommand\keywordsname{Palabras y Frases Claves Adicionales}%
    \else
      \renewcommand\keywordsname{Palabras claves}%
    \fi
    \renewcommand\acksname{Expresiones de gratitud}%
  }%
\fi
```

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

```
\newcommand\ACM@lang@check[1]{%
  \ifx\ACM@languages\@empty\relax
  \ClassError{\@classname}{%
    Command \string#1 \MessageBreak is used in monlingual document}{%
    You used a command (\string#1) \MessageBreak
    that does not have a meaning \MessageBreak
    unless are languages are defined. \MessageBreak
    Please choose the languages in \string\documentclass
    \MessageBreak
    (e.g. \string\documentclass[languages={french, english}]{acmart}),
    \MessageBreak
    or delete the command.}%
  \fi}
```

`\@translatedtitle`

```
\def\@translatedtitle{}
```

`\translatedtitle` The title of the paper in a different language

```
\newcommand\translatedtitle[2]{\ACM@lang@check{\translatedtitle}%
\g@addto@macro\@translatedtitle{\par\foreignlanguage{#1}{#2}}}
```

`\@translatedsubtitle`

```
\def\@translatedsubtitle{}
```

`\translatedsubtitle` The subtitle of the paper in a different language

```
\newcommand\translatedsubtitle[2]{\ACM@lang@check{\translatedsubtitle}%
\g@addto@macro\@translatedsubtitle{\par\foreignlanguage{#1}{#2}}}
```

`\@translatedkeywords`

```
\def\@translatedkeywords{}
```

`\translatedkeywords` Add keywords to the paper in the language specified

```
\newcommand\translatedkeywords[2]{\ACM@lang@check{\translatedkeywords}%
\g@addto@macro\@translatedkeywords{\@mktranslatedkeywords{#1}{#2}}}
```

\@translatedabstracts The container for translated abstracts.

```
\def\@translatedabstracts{}
```

translatedabstract We save translated abstracts into \@translatedabstracts

```
\newenvironment{translatedabstract}[1]{\Collect@Body
  \@savetranslatedabstract\@mktranslatedabstract{#1}}{}
```

\@savetranslatedabstract And saving the abstract

```
\long\def\@savetranslatedabstract#1{\if@ACM@maketitle@typeset
  \ClassError{\@classname}{Abstract must be defined before maketitle
    command. Please move it!}\fi
  \ACM@lang@check{translatedabstract}%
  \g@addto@macro\@translatedabstracts{\bgroup#1\egroup}}
```

3.9 Sectioning

\@startsection Before we call hyperref, we redefine \startsection commands to their LaTeX 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:

```
\let\@startsection\@startsection@kernel
\def\@sect#1#2#3#4#5#6[#7]#8{%
  \ifnum #2>\c@secnumdepth \else
    \@tochangmeasure{\csname the#1\endcsname}\fi
  \@sect@kernel{#1}{#2}{#3}{#4}{#5}{#6}[#7]{#8}}
\let\@ssect\@ssect@kernel
\let\@xsect\@xsect@kernel
\def\@seccntformat#1{\csname the#1\endcsname\quad}
```

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

```
\def\@starttoc#1#2{\begingroup\makeatletter
  \setTrue{#1}%
  \par\removelastskip\vskip\z@skip
  \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
    {.5\linespacing}{\centering\contentsnamefont}{#2}%
  \@input{\jobname.#1}%
  \if@filesw
    \@xp\newwrite\csname tf@#1\endcsname
    \immediate\@xp\openout\csname tf@#1\endcsname \jobname.#1\relax
  \fi
  \global\@nobreakfalse \endgroup
  \addvspace{32\p@\@plus14\p@}%
}
```

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

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

\l@subsection The spacing in amsart is too large

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

\l@subsubsection The spacing in amsart is too large

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

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

`\@makefntext` We do not use indentation for footnotes

```
\def\@makefntext{\noindent\@makefnmark}
```

`\@footnotetext` In `sigchi-a` mode our footnotes are in the margin!

```
\if@ACM@sigchiamode
\long\def\@footnotetext#1{\marginpar{%
    \reset@font\small
    \interlinepenalty\interfootnotelinepenalty
    \protected@edef\@currentlabel{%
       \csname p@footnote\endcsname\@thefnmark
    }%
    \color@begingroup
      \@makefntext{%
        \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
    \color@endgroup}}%
\fi
```

`\@mpfootnotetext` We want the footnotes in minipages centered:

```
\long\def\@mpfootnotetext#1{%
  \global\setbox\@mpfootins\vbox{%
    \unvbox\@mpfootins
    \reset@font\footnotesize
    \hsize\columnwidth
    \@parboxrestore
    \protected@edef\@currentlabel
         {\csname p@mpfootnote\endcsname\@thefnmark}%
    \color@begingroup\centering
      \@makefntext{%
        \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
    \color@endgroup}}
```

`\@makefnmark` AMS classes use a buggy definition of `\makefnmark`. We revert to the standard one.

```
\def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}
```

3.10 Hyperxmp and hyperref

Adding `hyperref`

```
\let\@footnotemark@nolink\@footnotemark
\let\@footnotetext@nolink\@footnotetext
\RequirePackage[bookmarksnumbered,unicode]{hyperref}
\RequirePackage{hyperxmp}
\pdfstringdefDisableCommands{%
  \def\addtocounter#1#2{}%
  \def\unskip{}%
  \def\textbullet{- }%
  \def\textrightarrow{ -> }%
  \def\footnotemark{}%
}
\urlstyle{rm}
\ifcase\ACM@format@nr
\relax % manuscript
```

```
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \urlstyle{sf}
\or % sigchi
\or % sigchi-a
  \urlstyle{sf}
\or % acmengage
\or % acmcp
\fi
\AtEndPreamble{%
  \if@ACM@urlbreakonhyphens
    \def\do@url@hyp{\do\-}%
  \fi
  \if@ACM@screen
    \hypersetup{colorlinks,
      linkcolor=ACMPurple,
      citecolor=ACMPurple,
      urlcolor=ACMDarkBlue,
      filecolor=ACMDarkBlue}
    \else
    \hypersetup{hidelinks}
  \fi
  \hypersetup{pdflang={en},
    pdfdisplaydoctitle}}
```

Bibliography mangling.

```
\if@ACM@natbib
  \let\citeN\cite
  \let\cite\citep
  \let\citeANP\citeauthor
  \let\citeNN\citeyearpar
  \let\citeyearNP\citeyear
  \let\citeNP\citealt
  \DeclareRobustCommand\citeA
     {\begingroup\NAT@swafalse
       \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
  \providecommand\newblock{}%
\else
  \AtBeginDocument{%
    \let\shortcite\cite%
    \providecommand\citename[1]{#1}}
\fi
\newcommand\shortcite[2][]{%
  \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:

```
\def\bibliographystyle#1{%
  \ifx\@begindocumenthook\@undefined\else
    \expandafter\AtBeginDocument
```

```
  \fi
    {\if@filesw
       \immediate\write\@auxout{\string\bibstyle{#1}}%
     \fi}}
```

3.11 Other packages

Graphics and color.

```
\RequirePackage{graphicx}
\RequirePackage[prologue]{xcolor}
```

We define ACM colors according to [8]:

```
\definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
\definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
\definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
\definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
\definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
\definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
\definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
\definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}
```

Author-draft mode or sigchi-a mode

```
\if@ACM@authordraft
  \RequirePackage{draftwatermark}
  \SetWatermarkFontSize{0.5in}
  \SetWatermarkColor[gray]{.9}
  \SetWatermarkText{\parbox{12em}{\centering
      Unpublished working draft.\\
      Not for distribution.}}
\else
  \if@ACM@sigchiamode
    \if@ACM@nonacm\else
      \RequirePackage{draftwatermark}
      \SetWatermarkFontSize{0.5in}
      \SetWatermarkColor[gray]{.9}
      \SetWatermarkText{\parbox{12em}{\centering
          Legacy document. \\
          Not for publication in an ACM venue}}
    \fi
  \fi
\fi
```

3.12 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.

```
\RequirePackage{geometry}
\ifcase\ACM@format@nr
\relax % manuscript
   \geometry{letterpaper,head=13pt,
   marginparwidth=6pc,heightrounded}%
\or % acmsmall
   \geometry{twoside=true,
```

```
    includeheadfoot, head=13pt, foot=2pc,
    paperwidth=6.75in, paperheight=10in,
    top=58pt, bottom=44pt, inner=46pt, outer=46pt,
    marginparwidth=2pc,heightrounded
  }%
\or % acmlarge
  \geometry{twoside=true, head=13pt, foot=2pc,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot,
    top=78pt, bottom=114pt, inner=81pt, outer=81pt,
    marginparwidth=4pc,heightrounded
    }%
\or % acmtog
  \geometry{twoside=true, head=13pt, foot=2pc,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=24pt,
    top=52pt, bottom=75pt, inner=52pt, outer=52pt,
    marginparwidth=2pc,heightrounded
    }%
\or % sigconf
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=2pc,
    top=57pt, bottom=73pt, inner=54pt, outer=54pt,
    marginparwidth=2pc,heightrounded
    }%
\or % siggraph
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=2pc,
    top=57pt, bottom=73pt, inner=54pt, outer=54pt,
    marginparwidth=2pc,heightrounded
    }%
\or % sigplan
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot=false, columnsep=2pc,
    top=1in, bottom=1in, inner=0.75in, outer=0.75in,
    marginparwidth=2pc,heightrounded
    }%
\or % sigchi
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=2pc,
    top=66pt, bottom=73pt, inner=54pt, outer=54pt,
    marginparwidth=2pc,heightrounded
    }%
\or % sigchi-a
  \geometry{twoside=false, head=13pt,
    paperwidth=11in, paperheight=8.5in,
    includeheadfoot, marginparsep=72pt,
    marginparwidth=170pt, columnsep=20pt,
    top=72pt, bottom=72pt, left=314pt, right=72pt
    }%
```

```
    \@mparswitchfalse
    \reversemarginpar
\or % acmengage
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=2pc,
    top=57pt, bottom=73pt, inner=54pt, outer=54pt,
    marginparwidth=2pc,heightrounded
    }%
\or % acmcp
  \geometry{twoside=true,
    includeheadfoot, head=13pt, foot=2pc,
    paperwidth=6.75in, paperheight=10in,
    top=58pt, bottom=44pt, inner=46pt, outer=46pt,
    marginparwidth=2pc,heightrounded
  }%
\fi
```

`\parindent` `\parskip` Paragraphing

```
\setlength\parindent{10\p@}
\setlength\parskip{\z@}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
  \setlength\parindent{9\p@}%
\or % sigconf
\or % siggraph
\or % sigplan
\or % sigchi
\or % sigchi-a
\or % acmengage
\or % acmcp
\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.

```
\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.

```
\def\copyrightpermissionfootnoterule{\kern-3\p@
  \hrule \@width \columnwidth \kern 2.6\p@}
```

```
\RequirePackage{manyfoot}
\SelectFootnoteRule[2]{copyrightpermission}
\DeclareNewFootnote{authorsaddresses}
\SelectFootnoteRule[2]{copyrightpermission}
\DeclareNewFootnote{copyrightpermission}
```

`\footnoterule` Tschichold's rules:

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

`\endminipage` We do not use footnote rules in minipages

```
\def\endminipage{%
    \par
    \unskip
    \ifvoid\@mpfootins\else
      \vskip\skip\@mpfootins
      \normalcolor
      \unvbox\@mpfootins
    \fi
    \@minipagefalse
  \color@endgroup
  \egroup
  \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}
```

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

```
\def\@textbottom{\vskip \z@ \@plus 1pt}
\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.

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
  \flushbottom
\or % sigconf
  \flushbottom
\or % siggraph
  \flushbottom
\or % sigplan
  \flushbottom
\or % sigchi
  \flushbottom
\or % sigchi-a
\or % acmengage
  \flushbottom
\or % acmcp
  \flushbottom
\fi
```

3.13 Fonts

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

The code below is by Ross Moore.

```
\ifPDFTeX
\input{glyphtounicode}
\pdfglyphtounicode{f_f}{FB00}
\pdfglyphtounicode{f_f_i}{FB03}
\pdfglyphtounicode{f_f_l}{FB04}
\pdfglyphtounicode{f_i}{FB01}
\pdfglyphtounicode{t_t}{0074 0074}
\pdfglyphtounicode{f_t}{0066 0074}
\pdfglyphtounicode{T_h}{0054 0068}
\pdfgentounicode=1
\RequirePackage{cmap}
\fi
```

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

```
\newif\if@ACM@newfonts
\@ACM@newfontstrue
\IfFileExists{libertine.sty}{}{\ClassWarning{\@classname}{You do not
    have the libertine package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
\IfFileExists{zi4.sty}{}{\ClassWarning{\@classname}{You do not
    have the inconsolata (zi4.sty) package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
\IfFileExists{newtxmath.sty}{}{\ClassWarning{\@classname}{You do not
    have the newtxmath package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
```

We use Libertine throughout. We use Libertine throughout.

```
\if@ACM@newfonts
  \ifxetex
    \RequirePackage{amssymb}
    \RequirePackage{unicode-math}
    \setmathfont[Scale=MatchUppercase]{LibertinusMath-Regular.otf}
    \setmathfont{latinmodern-math.otf}[range={cal}]
    \RequirePackage[tt=false]{libertine}
    \setmonofont[StylisticSet=3]{inconsolata}
  \else
    \ifluatex
      \RequirePackage{amssymb}
      \RequirePackage{unicode-math}
      \setmathfont[Scale=MatchUppercase]{LibertinusMath-Regular.otf}
      \setmathfont{latinmodern-math.otf}[range={cal}]
      \RequirePackage[tt=false]{libertine}
      \setmonofont[StylisticSet=3]{inconsolata}
    \else
       \RequirePackage[T1]{fontenc}
       \RequirePackage[tt=false, type1=true]{libertine}
       \RequirePackage[varqu]{zi4}
       \RequirePackage[libertine]{newtxmath}
    \fi
```

```
  \fi
\fi
```

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

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

The SIGCHI extended abstracts are sans serif:

```
\if@ACM@sigchiamode
  \renewcommand{\familydefault}{\sfdefault}
\fi
```

```
\RequirePackage{pifont}
```

3.14 Image descriptions

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

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

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

```
\newif\if@undescribed@images
\@undescribed@imagesfalse
```

\Description The Description macro right now just sets switches

```
\newcommand\Description[2][]{\global\@Description@presenttrue\ignorespaces}
```

The global warning

```
\IfDocumentMetadataF{%
\AtEndDocument{\if@undescribed@images
  \ClassWarningNoLine{\@classname}{Some images may lack
    descriptions.\MessageBreak
  ACM is committed to complying with the upcoming US ADA
  https://accessiblyapp.com/accessibility-compliance/ada/ and European
  Accessibility Act
  (EAA) https://accessiblyapp.com/accessibility-compliance/eaa/
  regulations by actively working to ensure our publications and
  application services are accessible to individuals with
  disabilities, adhering to the WCAG guidelines to provide a seamless
  experience for all users, and regularly reviewing our accessibility
  practices to maintain compliance with evolving standards. \MessageBreak
  To this end, we strongly encourage our authors to provide
  alternative text and captions for images and multimedia content. It
  is also important to optimize color contrast for the visually
  impaired. Taking these important steps when creating your papers
  will ensure that the widest possible audience can ingest your
  work.}\fi}
}
```

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

```
\AtBeginEnvironment{figure}{\@Description@presentfalse
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{figure*}{\@Description@presentfalse
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtEndEnvironment{figure}{\if@Description@present\else
  \global\@undescribed@imagestrue
  \ClassWarning{\@classname}{A possible image without description}\fi}
\AtEndEnvironment{figure*}{\if@Description@present\else
  \global\@undescribed@imagestrue
  \ClassWarning{\@classname}{A possible image without description}\fi}
\AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{table*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{lstinputlisting}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{lstinputlisting*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}

```

3.15 Floats

We use `caption` package

```
\RequirePackage{caption, float}
\captionsetup[table]{position=top}
\if@ACM@journal
  \captionsetup{labelfont={sf, small},
    textfont={sf, small}, margin=\z@}
  \captionsetup[figure]{name={Fig.}}
\else
  \captionsetup{labelfont={bf},
    textfont={bf}, labelsep=colon, margin=\z@}
  \ifcase\ACM@format@nr
```

```
  \relax % manuscript
  \or % acmsmall
  \or % acmlarge
  \or % acmtog
  \or % sigconf
  \or % siggraph
    \captionsetup{textfont={it}}
  \or % sigplan
    \captionsetup{labelfont={bf},
      textfont={normalfont}, labelsep=period, margin=\z@}
  \or % sigchi
    \captionsetup[figure]{labelfont={bf, small},
      textfont={bf, small}}
    \captionsetup[table]{labelfont={bf, small},
      textfont={bf, small}}
  \or % sigchi-a
    \captionsetup[figure]{labelfont={bf, small},
      textfont={bf, small}}
    \captionsetup[table]{labelfont={bf, small},
      textfont={bf, small}}
  \or % acmengage
  \or % acmcp
  \fi
\fi
```

Unfortinately caption package so far is not tagging compatible. So we need to recreate it if tagging is enabled. This is from https://github.com/latex3/tagging-project/issues/720

```
\ExplSyntaxOn
\IfDocumentMetadataT{%
  \RemoveFromHook{begindocument}[latex-lab-testphase-float]
  \socket_new_plug:nnn{tagsupport/parbox/before}{caption}
  {
    \tagpdfparaOn %restart para tagging
    \tl_if_empty:NTF\@current@float@struct
    {
      \tag_struct_begin:n{tag=Caption,firstkid}
    }
    {
     \tag_struct_begin:n{tag=Caption,parent=\@current@float@struct,firstkid}
    }
  }
  \socket_new_plug:nnn{tagsupport/parbox/after}{caption}
  {
    \tag_struct_end:
  }
  \l@addto@macro\caption@beginex@hook{%
    \tagpdfparaOff %leavevmode in parbox should not start paragraph structure
    \AssignSocketPlug{tagsupport/parbox/before}{caption}
    \AssignSocketPlug{tagsupport/parbox/after}{caption}}
}
\ExplSyntaxOff
```

By default the first row of a table contains headers

```
\IfDocumentMetadataT{%
```

```
  \tagpdfsetup{table/header-rows={1}}
}
```

sidebar The sidebar environment:

```
\newfloat{sidebar}{}{sbar}
\floatname{sidebar}{Sidebar}
\renewenvironment{sidebar}{\Collect@Body\@sidebar}{}
```

\@sidebar The processing of the saved text

```
\long\def\@sidebar#1{\bgroup\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig\captionsetup{type=sidebar}%
  \marginpar{\small#1}\egroup}
```

marginfigure The marginfigure environment:

```
\newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}
```

\@marginfigure The processing of the saved text

```
\long\def\@marginfigure#1{\bgroup
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig
  \captionsetup{type=figure}%
  \marginpar{\@Description@presentfalse\centering
    \small#1\if@Description@present\else
      \global\@undescribed@imagestrue
      \ClassWarning{\@classname}{A possible image without description}
      \fi}%
  \egroup}
```

margintable The margintable environment:

```
\newenvironment{margintable}{\Collect@Body\@margintable}{}
```

\@margintable The processing of the saved text

```
\long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
  \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

```
\newdimen\fulltextwidth
\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)

```
\if@ACM@sigchiamode
\def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
  \let\@endfloatbox\@endwidefloatbox
  \def\@fpsadddefault{\def\@fps{tp}}%
  \@float}
\fi
```

`\end@dblfloat` And the end. Just adding a `\bgroup`.

```
\if@ACM@sigchiamode
\def\end@dblfloat{%
    \end@float\egroup}
\fi
```

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

```
\def\@endwidefloatbox{%
  \par\vskip\z@skip
  \@minipagefalse
  \outer@nobreak
  \egroup
  \color@endbox
  \global\setbox\@currbox=\vbox{\moveleft
    \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
  \wd\@currbox=\textwidth
}
```

3.16 Lists

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
\def\labelenumi{\theenumi.}
\def\labelenumii{\theenumii.}
\def\labelenumiii{\theenumiii.}
\def\labelenumiv{\theenumiv.}
\or % sigchi
\or % sigchi-a
\or % acmengage
\or % acmcp
\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`.

```
\newdimen\@ACM@labelwidth
\AtBeginDocument{%
  \setlength\labelsep{4pt}
  \setlength{\@ACM@labelwidth}{6.5pt}

  %% First-level list: when beginning after the first line of an
  %% indented paragraph or ending before an indented paragraph, labels
  %% should not hang to the left of the preceding/following text.
  \setlength\leftmargini{\z@}
  \addtolength\leftmargini{\parindent}
```

```
  \addtolength\leftmargini{2\labelsep}
  \addtolength\leftmargini{\@ACM@labelwidth}

  %% Second-level and higher lists.
  \setlength\leftmarginii{\z@}
  \addtolength\leftmarginii{0.5\labelsep}
  \addtolength\leftmarginii{\@ACM@labelwidth}
  \setlength\leftmarginiii{\leftmarginii}
  \setlength\leftmarginiv{\leftmarginiii}
  \setlength\leftmarginv{\leftmarginiv}
  \setlength\leftmarginvi{\leftmarginv}
  \@listi}
\newskip\listisep
\listisep\smallskipamount
\def\@listI{\leftmargin\leftmargini
  \labelwidth\leftmargini \advance\labelwidth-\labelsep
  \listparindent\z@
  \topsep\listisep}
\let\@listi\@listI
\def\@listii{\leftmargin\leftmarginii
  \labelwidth\leftmarginii \advance\labelwidth-\labelsep
  \topsep\z@skip}
\def\@listiii{\leftmargin\leftmarginiii
  \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
\def\@listiv{\leftmargin\leftmarginiv
  \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
\def\@listv{\leftmargin\leftmarginv
  \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
\def\@listvi{\leftmargin\leftmarginvi
  \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
```

`\descriptionlabel` We do not use a colon by default like `amsart` does:

```
\renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}
```

`\description` Make the `description` environment indentation consistent with that of the `itemize` and `enumerate` environments.

```
\renewenvironment{description}{\list{}{%
    \labelwidth\@ACM@labelwidth
    \let\makelabel\descriptionlabel}%
}{
  \endlist
}
\let\enddescription=\endlist % for efficiency
```

3.17 Top-matter data

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

```
\newif\if@ACM@maketitle@typeset
\@ACM@maketitle@typesetfalse
```

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

```
\define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
  ACMJCSS,%
```

```
ACMJDS,%
AILET,%
CIE,%
CSUR,%
DGOV,%
DLT,%
DTRAP,%
FAC,%
GAMES,%
HEALTH,%
IMWUT,%
JACM,%
JATS,%
JDIQ,%
JDS,%
JEA,%
JERIC,%
JETC,%
JOCCH,%
JRC,%
PACMCGIT,%
PACMHCI,%
PACMMOD,%
PACMNET,%
PACMPL,%
PACMSE,%
POMACS,%
TAAS,%
TACCESS,%
TACO,%
TAIS,%
TAISAP,%
TALG,%
TALLIP,%
TAP,%
TCPS,%
TDS,%
TEAC,%
TECS,%
TELO,%
THRI,%
TIIS,%
TIOT,%
TISSEC,%
TIST,%
TKDD,%
TMIS,%
TOCE,%
TOCHI,%
TOCL,%
TOCS,%
TOCT,%
TODAES,%
TODS,%
```

```
  TOG,%
  TOIS,%
  TOIT,%
  TOMACS,%
  TOMM,%
  TOMPECS,%
  TOMS,%
  TOPC,%
  TOPLAS,%
  TOPML,%
  TOPS,%
  TORS,%
  TOS,%
  TOSEM,%
  TOSN,%
  TQC,%
  TRETS,%
  TSAS,%
  TSC,%
  TSLP,%
  TWEB,%
  FACMP%
}{%
\ifcase\@journalCode@nr
\relax % ACMJCSS
  \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
  \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%
  \def\@permissionCodeOne{2834-5533}%
  \def\@permissionCodeTwo{2834-5533}%
\or % ACMJDS
  \def\@journalName{ACM Journal of Data Science}%
  \def\@journalNameShort{ACM J. Data Sci.}%
  \def\@permissionCodeOne{3069-3497}%
  \def\@permissionCodeTwo{3069-3497}%
\or % AILET
  \def\@journalName{ACM AI Letters}%
  \def\@journalNameShort{ACM AI Lett.}%
  \def\@permissionCodeOne{3068-8590}%
  \def\@permissionCodeTwo{3068-8590}%
\or % CIE
  \def\@journalName{ACM Computers in Entertainment}%
  \def\@journalNameShort{ACM Comput. Entertain.}%
  \def\@permissionCodeOne{1544-3574}%
\or % CSUR
  \def\@journalName{ACM Computing Surveys}%
  \def\@journalNameShort{ACM Comput. Surv.}%
  \def\@permissionCodeOne{0360-0300}%
  \def\@permissionCodeTwo{1557-7341}%
\or % DGOV
  \def\@journalName{Digital Government: Research and Practice}%
  \def\@journalNameShort{Digit. Gov. Res. Pract.}%
  \def\@permissionCodeOne{2639-0175}%
  \def\@permissionCodeTwo{2639-0175}%
\or % DLT
```

```
  \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
  \def\@journalNameShort{Distrib. Ledger Technol.}%
  \def\@permissionCodeOne{2769-6472}%
  \def\@permissionCodeTwo{2769-6480}%
\or % DTRAP
  \def\@journalName{Digital Threats: Research and Practice}%
  \def\@journalNameShort{Digit. Threat. Res. Pract.}%
  \def\@permissionCodeOne{2576-5337}%
  \def\@permissionCodeTwo{2576-5337}%
\or % FAC
  \def\@journalName{Formal Aspects of Computing}%
  \def\@journalNameShort{Form. Asp. Comput.}%
  \def\@permissionCodeOne{0934-5043}%
  \def\@permissionCodeTwo{1433-299X}%
\or % GAMES
  \def\@journalName{ACM Games: Research and Practice}%
  \def\@journalNameShort{ACM Games}%
  \def\@permissionCodeOne{2832-5516}%
  \def\@permissionCodeTwo{2832-5516}%
\or % HEALTH
  \def\@journalName{ACM Transactions on Computing for Healthcare}%
  \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
  \def\@permissionCodeOne{2637-8051}%
  \def\@permissionCodeTwo{2637-8051}%
\or % IMWUT
  \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
    Wearable and Ubiquitous Technologies}%
 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
  \def\@permissionCodeOne{2474-9567}%
  \def\@permissionCodeTwo{2474-9567}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % JACM
  \def\@journalName{Journal of the ACM}%
  \def\@journalNameShort{J. ACM}%
  \def\@permissionCodeOne{0004-5411}%
  \def\@permissionCodeTwo{1557-735X}%
\or % JATS
  \def\@journalName{Journal on Autonomous Transportation Systems}%
  \def\@journalNameShort{ACM J. Auton. Transport. Syst.}%
  \def\@permissionCodeOne{2833-0528}%
  \def\@permissionCodeTwo{2833-0528}%
\or % JDIQ
  \def\@journalName{ACM Journal of Data and Information Quality}%
  \def\@journalNameShort{ACM J. Data Inform. Quality}%
  \def\@permissionCodeOne{1936-1955}%
  \def\@permissionCodeTwo{1936-1963}%
\or % JDS
  \def\@journalName{ACM Journal of Data Science}%
  \def\@journalNameShort{ACM J. Data Sci.}%
  \def\@permissionCodeOne{2831-3194}%
  \def\@permissionCodeTwo{2831-3194}%
\or % JEA
  \def\@journalName{ACM Journal of Experimental Algorithmics}%
```

```
  \def\@journalNameShort{ACM J. Exp. Algor.}%
  \def\@permissionCodeOne{1084-6654}%
  \def\@permissionCodeTwo{1084-6654}%
\or % JERIC
  \def\@journalName{ACM Journal of Educational Resources in Computing}%
  \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
  \def\@permissionCodeOne{1073-0516}%
\or % JETC
 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
  \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
  \def\@permissionCodeOne{1550-4832}%
  \def\@permissionCodeTwo{1550-4840}%
\or % JOCCH
  \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
  \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
  \def\@permissionCodeOne{1556-4673}%
  \def\@permissionCodeTwo{1556-4711}%
\or % JRC
  \def\@journalName{ACM Journal on Responsible Computing}%
  \def\@journalNameShort{ACM J. Responsib. Comput.}%
  \def\@permissionCodeOne{2832-0565}%
  \def\@permissionCodeTwo{2832-0565}%
\or % PACMCGIT
 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
  \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
  \def\@permissionCodeOne{2577-6193}%
  \def\@permissionCodeTwo{2577-6193}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % PACMHCI
  \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
  \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
  \def\@permissionCodeOne{2573-0142}%
  \def\@permissionCodeTwo{2573-0142}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % PACMMOD
  \def\@journalName{Proceedings of the ACM on Management of Data}%
  \def\@journalNameShort{Proc. ACM Manag. Data}%
  \def\@permissionCodeOne{2836-6573}%
  \def\@permissionCodeTwo{2836-6573}%
\or % PACMNET
  \def\@journalName{Proceedings of the ACM on Networkng}%
  \def\@journalNameShort{Proc. ACM Netw.}%
  \def\@permissionCodeOne{2834-5509}%
  \def\@permissionCodeTwo{2834-5509}%
\or % PACMPL
  \def\@journalName{Proceedings of the ACM on Programming Languages}%
  \def\@journalNameShort{Proc. ACM Program. Lang.}%
  \def\@permissionCodeOne{2475-1421}%
  \def\@permissionCodeTwo{2475-1421}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % PACMSE
```

```
  \def\@journalName{Proceedings of the ACM on Software Engineering}%
  \def\@journalNameShort{Proc. ACM Softw. Eng.}%
  \def\@permissionCodeOne{2994-970X}%
  \def\@permissionCodeTwo{2994-970X}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % POMACS
 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
  \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
  \def\@permissionCodeOne{2476-1249}%
  \def\@permissionCodeTwo{2476-1249}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % TAAS
  \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
  \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
  \def\@permissionCodeOne{1556-4665}%
  \def\@permissionCodeTwo{1556-4703}%
\or % TACCESS
  \def\@journalName{ACM Transactions on Accessible Computing}%
  \def\@journalNameShort{ACM Trans. Access. Comput.}%
  \def\@permissionCodeOne{1936-7228}%
  \def\@permissionCodeTwo{1936-7236}%
\or % TACO
  \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
  \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
  \def\@permissionCodeOne{1544-3566}%
  \def\@permissionCodeTwo{1544-3973}%
\or % TAIS
  \def\@journalName{ACM Transactions on AI for Science}%
  \def\@journalNameShort{ACM Trans. AI Sci.}%
  \def\@permissionCodeOne{3066-4438}%
  \def\@permissionCodeTwo{3066-4438}%
\or % TAISAP
  \def\@journalName{ACM Transactions on AI Security and Privacy}%
  \def\@journalNameShort{ACM Trans. AI Secur. Priv.}%
  \def\@permissionCodeOne{3068-3564}%
  \def\@permissionCodeTwo{3068-3564}%
\or % TALG
  \def\@journalName{ACM Transactions on Algorithms}%
  \def\@journalNameShort{ACM Trans. Algor.}%
  \def\@permissionCodeOne{1549-6325}%
  \def\@permissionCodeTwo{1549-6333}%
\or % TALLIP
 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
  \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
  \def\@permissionCodeOne{2375-4699}%
  \def\@permissionCodeTwo{2375-4702}%
\or % TAP
  \def\@journalName{ACM Transactions on Applied Perception}%
  \def\@journalNameShort{ACM Trans. Appl. Percept.}%
  \def\@permissionCodeOne{1544-3558}%
  \def\@permissionCodeTwo{1544-3965}%
\or % TCPS
```

```
  \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
  \def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%
  \def\@permissionCodeOne{2378-962X}%
  \def\@permissionCodeTwo{2378-9638}%
\or % TDS
  \def\@journalName{ACM Transactions on Data Science}%
  \def\@journalNameShort{ACM Trans. Data Sci.}%
  \def\@permissionCodeOne{2577-3224}%
\or % TEAC
  \def\@journalName{ACM Transactions on Economics and Computation}%
  \def\@journalNameShort{ACM Trans. Econ. Comput.}%
  \def\@permissionCodeOne{2167-8375}%
  \def\@permissionCodeTwo{2167-8383}%
\or % TECS
  \def\@journalName{ACM Transactions on Embedded Computing Systems}%
  \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
  \def\@permissionCodeOne{1539-9087}%
  \def\@permissionCodeTwo{1558-3465}%
\or % TELO
 \def\@journalName{ACM Transactions on Evolutionary Learning and Optimization}%
  \def\@journalNameShort{ACM Trans. Evol. Learn. Optim.}%
  \def\@permissionCodeOne{2688-299X}%
  \def\@permissionCodeTwo{2688-3007}%
\or % THRI
  \def\@journalName{ACM Transactions on Human-Robot Interaction}%
  \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
  \def\@permissionCodeOne{2573-9522}%
  \def\@permissionCodeTwo{2573-9522}%
\or % TIIS
  \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
  \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
  \def\@permissionCodeOne{2160-6455}%
  \def\@permissionCodeTwo{2160-6463}%
\or % TIOT
  \def\@journalName{ACM Transactions on Internet of Things}%
  \def\@journalNameShort{ACM Trans. Internet Things}%
  \def\@permissionCodeOne{2577-6207}%
  \def\@permissionCodeTwo{2577-6207}%
\or % TISSEC
  \def\@journalName{ACM Transactions on Information and System Security}%
  \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
  \def\@permissionCodeOne{1094-9224}%
\or % TIST
  \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
  \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
  \def\@permissionCodeOne{2157-6904}%
  \def\@permissionCodeTwo{2157-6912}%
\or % TKDD
  \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
  \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
  \def\@permissionCodeOne{1556-4681}%
  \def\@permissionCodeTwo{1556-472X}%
\or % TMIS
  \def\@journalName{ACM Transactions on Management Information Systems}%
```

```
  \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
  \def\@permissionCodeOne{2158-656X}%
  \def\@permissionCodeTwo{2158-6578}%
\or % TOCE
  \def\@journalName{ACM Transactions on Computing Education}%
  \def\@journalNameShort{ACM Trans. Comput. Educ.}%
  \def\@permissionCodeOne{1946-6226}%
  \def\@permissionCodeTwo{1946-6226}%
\or % TOCHI
  \def\@journalName{ACM Transactions on Computer-Human Interaction}%
  \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
  \def\@permissionCodeOne{1073-0516}%
  \def\@permissionCodeTwo{1557-7325}%
\or % TOCL
  \def\@journalName{ACM Transactions on Computational Logic}%
  \def\@journalNameShort{ACM Trans. Comput. Logic}%
  \def\@permissionCodeOne{1529-3785}%
  \def\@permissionCodeTwo{1557-945X}%
\or % TOCS
  \def\@journalName{ACM Transactions on Computer Systems}%
  \def\@journalNameShort{ACM Trans. Comput. Syst.}%
  \def\@permissionCodeOne{0734-2071}%
  \def\@permissionCodeTwo{1557-7333}%
\or % TOCT
  \def\@journalName{ACM Transactions on Computation Theory}%
  \def\@journalNameShort{ACM Trans. Comput. Theory}%
  \def\@permissionCodeOne{1942-3454}%
  \def\@permissionCodeTwo{1942-3462}%
\or % TODAES
 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
  \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
  \def\@permissionCodeOne{1084-4309}%
  \def\@permissionCodeTwo{1557-7309}%
\or % TODS
  \def\@journalName{ACM Transactions on Database Systems}%
  \def\@journalNameShort{ACM Trans. Datab. Syst.}%
  \def\@permissionCodeOne{0362-5915}%
  \def\@permissionCodeTwo{1557-4644}%
\or % TOG
  \def\@journalName{ACM Transactions on Graphics}%
  \def\@journalNameShort{ACM Trans. Graph.}%
  \def\@permissionCodeOne{0730-0301}%
  \def\@permissionCodeTwo{1557-7368}%
\or % TOIS
  \def\@journalName{ACM Transactions on Information Systems}%
  \def\@journalNameShort{ACM Trans. Inf. Syst.}%
  \def\@permissionCodeOne{1046-8188}%
  \def\@permissionCodeTwo{1558-2868}%
\or % TOIT
  \def\@journalName{ACM Transactions on Internet Technology}%
  \def\@journalNameShort{ACM Trans. Internet Technol.}%
  \def\@permissionCodeOne{1533-5399}%
  \def\@permissionCodeTwo{1557-6051}%
\or % TOMACS
```

```
  \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
  \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
  \def\@permissionCodeOne{1049-3301}%
  \def\@permissionCodeTwo{1558-1195}%
\or % TOMM
 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
  \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
  \def\@permissionCodeOne{1551-6857}%
  \def\@permissionCodeTwo{1551-6865}%
\or % TOMPECS
 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
  \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
  \def\@permissionCodeOne{2376-3639}%
  \def\@permissionCodeTwo{2376-3647}%
\or % TOMS
  \def\@journalName{ACM Transactions on Mathematical Software}%
  \def\@journalNameShort{ACM Trans. Math. Softw.}%
  \def\@permissionCodeOne{0098-3500}%
  \def\@permissionCodeTwo{1557-7295}%
\or % TOPC
  \def\@journalName{ACM Transactions on Parallel Computing}%
  \def\@journalNameShort{ACM Trans. Parallel Comput.}%
  \def\@permissionCodeOne{2329-4949}%
  \def\@permissionCodeTwo{2329-4957}%
\or % TOPLAS
  \def\@journalName{ACM Transactions on Programming Languages and Systems}%
  \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
  \def\@permissionCodeOne{0164-0925}%
  \def\@permissionCodeTwo{1558-4593}%
\or % TOPML
  \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
  \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
  \def\@permissionCodeOne{2836-8924}%
  \def\@permissionCodeTwo{2836-8924}%
\or % TOPS
  \def\@journalName{ACM Transactions on Privacy and Security}%
  \def\@journalNameShort{ACM Trans. Priv. Sec.}%
  \def\@permissionCodeOne{2471-2566}%
  \def\@permissionCodeTwo{2471-2574}%
\or % TORS
  \def\@journalName{ACM Transactions on Recommender Systems}%
  \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
  \def\@permissionCodeOne{2770-6699}%
  \def\@permissionCodeTwo{2770-6699}%
\or % TOS
  \def\@journalName{ACM Transactions on Storage}%
  \def\@journalNameShort{ACM Trans. Storage}%
  \def\@permissionCodeOne{1553-3077}%
  \def\@permissionCodeTwo{1553-3093}%
\or % TOSEM
 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
  \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
  \def\@permissionCodeOne{1049-331X}%
  \def\@permissionCodeTwo{1557-7392}%
```

```
\or % TOSN
  \def\@journalName{ACM Transactions on Sensor Networks}%
  \def\@journalNameShort{ACM Trans. Sensor Netw.}%
  \def\@permissionCodeOne{1550-4859}%
  \def\@permissionCodeTwo{1550-4867}%
\or % TQC
  \def\@journalName{ACM Transactions on Quantum Computing}%
  \def\@journalNameShort{ACM Trans. Quantum Comput.}%
  \def\@permissionCodeOne{2643-6817}%
  \def\@permissionCodeTwo{2643-6817}%
\or % TRETS
 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
  \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
  \def\@permissionCodeOne{1936-7406}%
  \def\@permissionCodeTwo{1936-7414}%
\or % TSAS
  \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
  \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
  \def\@permissionCodeOne{2374-0353}%
  \def\@permissionCodeTwo{2374-0361}%
\or % TSC
  \def\@journalName{ACM Transactions on Social Computing}%
  \def\@journalNameShort{ACM Trans. Soc. Comput.}%
  \def\@permissionCodeOne{2469-7818}%
  \def\@permissionCodeTwo{2469-7826}%
\or % TSLP
  \def\@journalName{ACM Transactions on Speech and Language Processing}%
  \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
  \def\@permissionCodeOne{1550-4875}%
  \def\@permissionCodeTwo{2329-9304}%
\or % TWEB
  \def\@journalName{ACM Transactions on the Web}%
  \def\@journalNameShort{ACM Trans. Web}%
  \def\@permissionCodeOne{1559-1131}%
  \def\@permissionCodeTwo{1559-114X}%
\else % FACMP, a dummy journal
  \def\@journalName{ACM Just Accepted}%
  \def\@journalNameShort{ACM Accepted}%
  \def\@permissionCodeOne{XXXX-XXXX}%
\fi
\ClassInfo{\@classname}{Using journal code \@journalCode}%
}{%
  \ClassError{\@classname}{Incorrect journal #1}%
}%
```

`\acmJournal` And the syntactic sugar around it

```
\def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
  \global\@ACM@journal@bibstriptrue
  \global\@ACM@journal@bibstrip@or@togtrue}
```

The defaults:

```
\def\@journalCode@nr{0}
\def\@journalName{}%
\def\@journalNameShort{\@journalName}%
```

```
\def\@permissionCodeOne{XXXX-XXXX}%
\def\@permissionCodeTwo{\@permissionCodeOne}%
```

\acmConference This is the conference command. The acmsmall format is used both for journals and for conference proceedings published as books. In the latter case the paper has no journal name, volume, issue or article number, so we switch it to the headers and footers of the proceedings formats, and suppress the folios like these formats do: the page numbers of such a paper are assigned by the proceedings rather than by the article. An author who wants the folios can say \settopmatter{printfolios=true} after \acmConference. The acmtog format keeps its own conference headers and footers: there a conference paper is published as a journal issue and does have an article number.

```
\newcommand\acmConference[4][]{%
  \gdef\acmConference@shortname{#1}%
  \gdef\acmConference@name{#2}%
  \gdef\acmConference@date{#3}%
  \gdef\acmConference@venue{#4}%
  \ifx\acmConference@shortname\@empty
    \gdef\acmConference@shortname{#2}%
  \fi
  \global\@ACM@journal@bibstripfalse
  \ifnum\ACM@format@nr=1\relax % acmsmall
    \global\@ACM@journal@bibstrip@or@togfalse
    \settopmatter{printfolios=false}%
  \fi
  \ifx\@acmBooktitle\@empty\relax
    \acmBooktitle{Proceedings of \acmConference@name
      \ifx\acmConference@name\acmConference@shortname\else
      \ (\acmConference@shortname)\fi}%
  \fi
}
\if@ACM@journal\else
\acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
  DC, USA}%
\fi
```

\acmBooktitle The book title of the conference:

\@acmBooktitle

```
\def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
\acmBooktitle{}
```

\@editorsAbbrev How to abbreviate editors

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

\@acmEditors The list of editors

```
\def\@acmEditors{}
```

\editor Add a new editor to the list

```
\def\editor#1{\ifx\@acmEditors\@empty
    \gdef\@acmEditors{#1}%
  \else
    \gdef\@editorsAbbrev{(Eds.)}%
    \g@addto@macro\@acmEditors{\and#1}%
\fi}
```

`\subtitle` The subtitle macro

```
\def\subtitle#1{\def\@subtitle{#1}}
\subtitle{}
```

`\num@authorgroups` The total number of "groups". Each group is several authors with the same affiliations(s)

```
\newcount\num@authorgroups
\num@authorgroups=0\relax
```

`\num@authors` The total number of authors

```
\newcount\num@authors
\num@authors=0\relax
```

`\if@insideauthorgroup` Whether we are continuing an author group

```
\newif\if@insideauthorgroup
\@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.

```
\renewcommand\author[2][]{%
 \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\@classname}{Do not put several
     authors in the same \string\author\space macro!}}{}%
  \global\advance\num@authors by 1\relax
  \if@insideauthorgroup\else
    \global\advance\num@authorgroups by 1\relax
    \global\@insideauthorgrouptrue
  \fi
  \ifx\addresses\@empty
    \if@ACM@anonymous
      \gdef\addresses{\@author{Anonymous Author(s)%
        \ifx\@acmSubmissionID\@empty\else\\Submission Id:
          \@acmSubmissionID\fi}}%
      \gdef\authors{Anonymous Author(s)}%
    \else
      \expandafter\gdef\expandafter\addresses\expandafter{%
        \expandafter\@author\expandafter{%
          \csname typeset@author\the\num@authors\endcsname{#2}}}%
      \gdef\authors{#2}%
    \fi
  \else
    \if@ACM@anonymous\else
    \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
      \expandafter\and\expandafter\@author\expandafter{%
        \csname typeset@author\the\num@authors\endcsname{#2}}}%
      \g@addto@macro\authors{\and#2}%
    \fi
  \fi
  \if@ACM@anonymous
    \ifx\shortauthors\@empty
      \gdef\shortauthors{Anon.
```

```
        \ifx\@acmSubmissionID\@empty\else Submission Id:
        \@acmSubmissionID\fi}%
    \fi
  \else
    \def\@tempa{#1}%
    \ifx\@tempa\@empty
      \ifx\shortauthors\@empty
        \gdef\shortauthors{#2}%
      \else
        \g@addto@macro\shortauthors{\and#2}%
      \fi
    \else
      \ifx\shortauthors\@empty
        \gdef\shortauthors{#1}%
      \else
        \g@addto@macro\shortauthors{\and#1}%
      \fi
    \fi
  \fi}
```

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

```
\newcommand{\affiliation}[2][]{%
  \global\@insideauthorgroupfalse
  \if@ACM@anonymous\else
    \g@addto@macro\addresses{\affiliation{#1}{#2}}%
  \fi}
```

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

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

`\additionalaffiliation` Additional affiliations go to footnotes

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

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

```
\def\@additionalaffiliation#1{\bgroup
  \def\position##1{\ignorespaces}%
  \def\institution##1{##1\ignorespaces}%
  \def\department{\@ifnextchar[{\@department}{\@department[]}}%
  \def\@department[##1]##2{, ##2 \ignorespaces}%
  \let\city\position
  \let\state\position
  \let\country\position
  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.

```
\renewcommand{\email}[2][]{%
  \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
      addresses in the same \string\email\space macro!}}{}%
  \if@ACM@anonymous\else
```

```
    \g@addto@macro\addresses{\email{#1}{#2}}%
  \fi}
```

\orcid We redefine the command to typeset the current author

```
\def\orcid#1{\unskip\ignorespaces%
  \protected\def\orcidsite{https://orcid.org/}%
  \IfBeginWith{#1}{http}{%
    \expandafter\gdef\csname
        typeset@author\the\num@authors\endcsname##1{%
          \href{#1}{##1}}}{%
    \expandafter\gdef\csname
        typeset@author\the\num@authors\endcsname##1{%
          \href{\orcidsite#1}{##1}}}}
```

\authorsaddresses Setting up authors' addresses

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

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

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

\@titlenotes The title notes

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

\titlenote Adding a note to the title

```
\def\titlenote#1{%
  \g@addto@macro\@title{\footnotemark}%
  \if@ACM@anonymous
    \g@addto@macro\@titlenotes{%
      \stepcounter{footnote}\footnotetext{Title note}}%
  \else
    \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

\@subtitlenotes The subtitle notes

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

\subtitlenote Adding a note to the subtitle

```
\def\subtitlenote#1{%
  \g@addto@macro\@subtitle{\footnotemark}%
  \if@ACM@anonymous
    \g@addto@macro\@subtitlenotes{%
      \stepcounter{footnote}\footnotetext{Subtitle note}}%
  \else
    \g@addto@macro\@subtitlenotes{%
      \stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

\@authornotes The author notes

```
\def\@authornotes{}
```

\authornote Adding a note to the author

```
\def\authornote#1{%
  \if@ACM@anonymous\else
    \g@addto@macro\addresses{\@authornotemark}%
    \g@addto@macro\@authornotes{%
      \stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

\correspondingauthor Mark the author as corresponding author

```
\newcommand\correspondingauthor{%
  \if@ACM@anonymous\else
  \g@addto@macro\addresses{\@correspondingauthormark}%
  \fi}
```

\@correspondingauthormark Print the envelope

```
\def\@correspondingauthormark{\g@addto@macro\@currentauthors{%
    \advance\hfuzz by 5pt\relax\textsuperscript{\ding{41}}\relax}}
```

\authornotemark Adding a footnote mark to the authors

```
\newcommand\authornotemark[1][\relax]{%
  \if@ACM@anonymous\else
    \ifx#1\relax\relax\relax
      \g@addto@macro\addresses{\@authornotemark}%
    \else
      \g@addto@macro\addresses{\@@authornotemark{#1}}%
    \fi
  \fi}
```

\acmVolume The current volume

```
\def\acmVolume#1{\def\@acmVolume{#1}}
\acmVolume{1}
```

\acmNumber The current number

```
\def\acmNumber#1{\def\@acmNumber{#1}}
\acmNumber{1}
```

\acmArticle The current article

```
\def\acmArticle#1{\def\@acmArticle{#1}}
\acmArticle{}
```

\acmArticleSeq The sequence number

```
\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
\acmArticleSeq{\@acmArticle}
```

\acmYear The current year

```
\def\acmYear#1{\def\@acmYear{#1}}
\acmYear{\the\year}
```

\acmMonth The current month

```
\def\acmMonth#1{\def\@acmMonth{#1}}
\acmMonth{\the\month}
```

\@acmPubDate The publication date

```
\def\@acmPubDate{\ifcase\@acmMonth\or
  January\or February\or March\or April\or May\or June\or
  July\or August\or September\or October\or November\or
  December\fi~\@acmYear}
```

\acmPrice The price—obsolete

```
\def\acmPrice#1{\ClassWarning{\@classname}{The macro \string\acmPrice
    is obsolete.  ACM no longer prints the price in bibstrip.}}
```

\acmSubmissionID The submission ID

```
\def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
\acmSubmissionID{}
```

\acmISBN The book ISBN

```
\def\acmISBN#1{\def\@acmISBN{#1}}
\acmISBN{978-x-xxxx-xxxx-x/YYYY/MM}
```

\acmDOI The paper DOI

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

\if@ACM@badge

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

```
\newlength\@ACM@badge@width
\setlength\@ACM@badge@width{3pc}
```

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

```
\newlength\@ACM@title@width
```

\@ACM@badge@skip The spacing between badges

```
\newlength\@ACM@badge@skip
\setlength\@ACM@badge@skip{1pt}
```

\@acmBadgeR

```
\def\@acmBadgeR{}
```

\@acmBadgeL

```
\def\@acmBadgeL{}
```

\acmBadgeR Setting the right badge

```
\newcommand\acmBadgeR[2][]{%
  \ifx\@acmBadgeR\@empty
    \gdef\@acmBadgeR{%
      \smash{%
        \raisebox{0.5\height}{%
          \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
  \else
    \g@addto@macro{\@acmBadgeR}{%
      \hspace{\@ACM@badge@skip}%
      \smash{%
        \raisebox{0.5\height}{%
          \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
  \fi}
```

\acmBadgeL Setting the left badge

```
\newcommand\acmBadgeL[2][]{%
  \ifx\@acmBadgeL\@empty
    \gdef\@acmBadgeL{%
      \smash{%
        \raisebox{0.5\height}{%
          \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
  \else
    \g@addto@macro{\@acmBadgeL}{%
      \hspace{\@ACM@badge@skip}%
      \smash{%
        \raisebox{0.5\height}{%
          \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
  \fi}
```

\acmBadge Just a syntax sugar for \acmBadgeR

```
\let\acmBadge=\acmBadgeR
```

\startPage The start page of the paper

```
\def\startPage#1{\def\@startPage{#1}}
\startPage{}
```

\terms Terms are obsolete. We use CCS now.

```
\def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
    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.

```
\def\keywords#1{\def\@keywords{#1}}
\let\@keywords\@empty
```

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

```
\renewenvironment{abstract}{\Collect@Body\@saveabstract}{}
```

\@saveabstract And saving the abstract

```
\long\def\@saveabstract#1{\if@ACM@maketitle@typeset
  \ClassError{\@classname}{Abstract must be defined before maketitle
    command. Please move it!}\fi
  \long\gdef\@abstract{#1}}
\@saveabstract{}
```

\@lempty The long version of \@empty (to compare with \@abstract)

```
\long\def\@lempty{}
```

\if@ACM@printccs Whether to print CCS

```
\define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
  \if@ACM@printccs
    \ClassInfo{\@classname}{Printing CCS}%
  \else
    \ClassInfo{\@classname}{Suppressing CCS}%
 \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}
```

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

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

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

\if@ACM@printfolios Whether to print folios

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

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

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

\settopmatter The usual syntactic sugar

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

Now the settings

```
\settopmatter{printccs=true, printacmref=true}
\if@ACM@manuscript
  \settopmatter{printfolios=true}
\else
  \if@ACM@journal
    \settopmatter{printfolios=true}
  \else
    \settopmatter{printfolios=false}
  \fi
\fi
\settopmatter{authorsperrow=0}
```

\@received The container for the paper history

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

\received The \received command

```
\newcommand\received[2][]{\def\@tempa{#1}%
  \ifx\@tempa\@empty
    \ifx\@received\@empty
      \gdef\@received{Received #2}%
    \else
      \g@addto@macro{\@received}{; revised #2}%
    \fi
  \else
    \ifx\@received\@empty
      \gdef\@received{#1 #2}%
    \else
      \g@addto@macro{\@received}{; #1 #2}%
    \fi
  \fi}
\AtEndDocument{%
  \ifx\@received\@empty\else
    \par\bigskip\noindent{\small\normalfont\@received\par}%
  \fi}
```

\acmArticleType Article type. We set up the color.

```
\define@choicekey+{ACM}{articletype}[\ACM@ArticleType\ACM@ArticleType@nr]{%
  Research,Review,Discussion,Invited,Position}[Review]{%
  \ifcase\ACM@ArticleType@nr
  \relax % Research
     \colorlet{@ACM@Article@color}{ACMBlue}%
  \or % Review
     \colorlet{@ACM@Article@color}{ACMOrange}%
  \or % Discussion
     \colorlet{@ACM@Article@color}{ACMGreen}%
  \or % Invited
     \colorlet{@ACM@Article@color}{ACMPurple}%
  \or % Position
     \colorlet{@ACM@Article@color}{ACMRed}%
  \fi
}{%
 \ClassError{\@classname}{Article Type must be Research, Review,\MessageBreak
   Discussion, Invited, or Position}}
\def\acmArticleType#1{\setkeys{ACM}{articletype=#1}}
\if@ACM@acmcp
\acmArticleType{Research}%
\fi
```

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

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

\acmCodeDataLink The code link

```
\def\acmCodeLink#1{%
  \ifx\@acmCodeDataLink\@empty
     \gdef\@acmCodeDataLink{\url{#1}}%
  \else
     \g@addto@macro{\@acmCodeDataLink}{\\ \url{#1}}%
  \fi}
\def\@acmCodeDataLink{}
```

\acmContributions The authors' contrubution statement

```
\def\acmContributions#1{\gdef\@acmContributions{#1}}
\acmContributions{}
```

\acmDataLink The code link

```
\let\acmDataLink\acmCodeLink
```

3.18 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```
\RequirePackage{comment}
\excludecomment{CCSXML}
```

\@concepts This is the storage macro and counter for concepts

```
\let\@concepts\@empty
\newcounter{@concepts}
```

\ccsdesc The first argument is the significance, the second is the concept(s)

```
\newcommand\ccsdesc[2][100]{%
  \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!

```
\def\textrightarrow{$\rightarrow$}
\def\ccsdesc@parse#1~#2~#3~{%
  \stepcounter{@concepts}%
  \expandafter\ifx\csname CCS@General@#2\endcsname\relax
    \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
      \textbf{#2}}%
    \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
    \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
  \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
    \csname CCS@Punctuation@#2\endcsname
    \csname CCS@Specific@#2\endcsname}%
  \fi
  \ifx#3\relax\relax\else
    \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
      \textrightarrow\ }%
   \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
     \addtocounter{@concepts}{-1}%
     \ifnum#1>499\textbf{#3}\else
     \ifnum#1>299\textit{#3}\else
     #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
  \fi
\ccsdesc@parse@finish}
```

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

`\ccdesc@parse@finish` Gobble everything to `\ccsdesc@parse@end`

```
\def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}
```

3.19 Copyright system

This is from `acmcopyright.sty`

`\if@printcopyright` Whether to print a copyright symbol

```
\newif\if@printcopyright
\@printcopyrighttrue
```

`\if@printpermission` Whether to print the permission block

```
\newif\if@printpermission
\@printpermissiontrue
```

`\if@acmowned` Whether the ACM owns the rights to the paper

```
\newif\if@acmowned
\@acmownedtrue
```

Keys:

```
\define@choicekey*{ACM@}{acmcopyrightmode}[%
  \acm@copyrightinput\acm@copyrightmode]{none,%
    acmcopyright,acmlicensed,rightsretained,%
    usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
    licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
    iw3c2w3,iw3c2w3g,cc}{%
  \@printpermissiontrue
  \@printcopyrighttrue
  \@acmownedtrue
  \ifnum\acm@copyrightmode=0\relax % none
   \@printpermissionfalse
   \@printcopyrightfalse
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=2\relax % acmlicensed
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=3\relax % rightsretained
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=4\relax % usgov
   \@printpermissiontrue
   \@printcopyrightfalse
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=6\relax % cagov
   \@acmownedfalse
```

```
\fi
\ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=9\relax % licensedcagov
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=11\relax % othergov
 \@acmownedtrue
\fi
\ifnum\acm@copyrightmode=12\relax % licensedothergov
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=13\relax % iw3c2w3
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=14\relax % iw3c2w3g
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=15\relax % cc
 \@acmownedfalse
\fi}
```

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

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

`\setcctype` The type of Creative Commons license used

```
\newcommand\setcctype[2][4.0]{%
 \def\ACM@cc@version{#1}%
 \def\ACM@cc@type{#2}}
\setcctype{by}
```

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

```
\def\@copyrightowner{%
 \ifcase\acm@copyrightmode\relax % none
 \or % acmcopyright
 ACM\@.
 \or % acmlicensed
 Copyright held by the owner/author(s). Publication rights licensed to
 ACM\@.
 \or % rightsretained
 Copyright held by the owner/author(s).
 \or % usgov
 \or % usgovmixed
 Copyright held by the owner/author(s).
 \or % cagov
 Copyright Crown in Right of Canada.
 \or %cagovmixed
 Copyright held by the owner/author(s).
 \or %licensedusgovmixed
```

```
Copyright held by the owner/author(s). Publication rights licensed to
ACM\@.
\or % licensedcagov
Copyright held by the owner/author(s).
\or %licensedcagovmixed
Copyright held by the owner/author(s). Publication rights licensed to
ACM\@.
\or % othergov
Copyright held by the owner/author(s).
\or % licensedothergov
Copyright held by the owner/author(s). Publication rights licensed to
ACM\@.
\or % ic2w3www
IW3C2 (International World Wide Web Conference Committee), published
under Creative Commons CC-BY~4.0 License.
\or % ic2w3wwwgoogle
IW3C2 (International World Wide Web Conference Committee), published
under Creative Commons CC-BY-NC-ND~4.0 License.
\or % cc
Copyright held by the owner/author(s).
\fi}
```

`\@formatdoi` Print a clickable DOI

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

`\@ACM@copyright@check@cc` This macro is no longer needed due to the change in ACM policy.

`\@copyrightpermission` The canned permission block.

```
\def\@copyrightpermission{%
 \ifcase\acm@copyrightmode\relax % none
 \or % acmcopyright
  Permission to make digital or hard copies of all or part of this
  work for personal or classroom use is granted without fee provided
  that copies are not made or distributed for profit or commercial
  advantage and that copies bear this notice and the full citation on
  the first page. Copyrights for components of this work owned by
  others than ACM must be honored. Abstracting with credit is
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```

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\or % cagovmixed
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  Attribution-NonCommercial-NoDerivs~4.0 International
  (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
  disseminate the work on their personal and corporate Web sites with
  the appropriate attribution.
\or % CC
  \IfEq{\ACM@cc@type}{zero}{%
    \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0}}{%
 \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version}}%
  \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\\
  \href{\ACM@CC@Url}{%
  This work is licensed under a Creative Commons
```

```
  \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}{%
    \IfEq{\ACM@cc@type}{by}{Attribution}{}%
    \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}{}%
    \IfEq{\ACM@cc@type}{by-nd}{Attribution-NoDerivatives}{}%
    \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}{}%
    \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{}%
   \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{}%
    ~\IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}%
  }
  License.}%
\fi}
```

`\copyrightyear` By default, the copyright year is the same as `\acmYear`, but one can override this:

```
\def\copyrightyear#1{\def\@copyrightyear{#1}}
\copyrightyear{\@acmYear}
```

`\@teaserfigures` The teaser figures container

```
\def\@teaserfigures{}
```

`teaserfigure` The teaser figure

```
\newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}
```

`\@saveteaser` Saving the teaser

```
\long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}
```

`\thanks` We redefine `amsart` `\thanks` so the `anonymous` key works

```
\renewcommand{\thanks}[1]{%
  \@ifnotempty{#1}{%
    \if@ACM@anonymous
      \g@addto@macro\thankses{\thanks{A note}}%
   \else
    \g@addto@macro\thankses{\thanks{#1}}%
   \fi}}
```

`\anon` We provide `\anon` command, which obscures parts of the text if the package option `anonymous` is set

```
\newcommand{\anon}[2][ANONYMIZED]{%
  \if@ACM@anonymous%
    {\color{ACMOrange}#1}%
  \else%
    #2%
  \fi}
```

3.20 Maketitle hook

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

`\@beginmaketitlehook` The hook

```
\ifx\@beginmaketitlehook\@undefined
  \let\@beginmaketitlehook\@empty
\fi
```

`\AtBeginMaketitle` Adding to the hook

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

3.21 ACM Engage top matter

\@acmengagemetadata The special metadata for ACM engage course materials

```
\def\@acmengagemetadata{}
```

\setengagemetadata Adding topic to engage metadata

```
\def\setengagemetadata#1#2{%
  \g@addto@macro{\@acmengagemetadata}{%
    \@setengagemetadata{#1}{#2}}}
```

3.22 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*⟩].

```
\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.

```
\def\maketitle{\@beginmaketitlehook
  \@ACM@maketitle@typesettrue
  \if@ACM@anonymous
    % Anonymize omission of \author-s
    \ifnum\num@authorgroups=0\author{}\fi
  \fi
  \begingroup
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig
  \let\@footnotemark\@footnotemark@nolink
  \let\@footnotetext\@footnotetext@nolink
  \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
  \hsize=\textwidth
  \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
  \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
  \@printtopmatter
  \if@ACM@sigchiamode\@mkauthors\fi
  \setcounter{footnote}{0}%
  \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
  \@titlenotes
  \@subtitlenotes
  \@authornotes
  \let\@makefnmark\relax
  \let\@thefnmark\relax
  \let\@makefntext\noindent
  \ifx\@empty\thankses\else
    \footnotetextauthorsaddresses{%
      \def\par{\let\par\@par}\parindent\z@\@setthanks}%
  \fi
  \if@ACM@acmcp\else
    \ifx\@empty\@authorsaddresses\else
```

```
      \if@ACM@anonymous\else
        \if@ACM@journal@bibstrip@or@tog
          \footnotetextauthorsaddresses{%
            \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
        \fi
      \fi
    \fi
  \fi
  \if@ACM@nonacm
    \ifnum\acm@copyrightmode=15\relax % cc
      \footnotetextcopyrightpermission{\@copyrightpermission}%
    \fi
  \else
    \if@ACM@acmcp\else
    \footnotetextcopyrightpermission{%
    \if@ACM@authordraft
        \raisebox{-2ex}[\z@][\z@]{\makebox[0pt][l]{\large\bfseries
            Unpublished working draft. Not for distribution.}}%
      \color[gray]{0.9}%
    \fi
    \parindent\z@\parskip0.1\baselineskip
    \if@ACM@authorversion\else
      \if@printpermission\@copyrightpermission\par\fi
    \fi
    \if@ACM@manuscript\else
      \if@ACM@journal@bibstrip\else % Print the conference information
        \if@ACM@engage
          {\itshape \@acmBooktitle, \@acmYear.}\par
        \else
        {\itshape \acmConference@shortname, \acmConference@venue}\par
        \fi
      \fi
    \fi
    \if@printcopyright
      \copyright\ \@copyrightyear\ \@copyrightowner\\
    \else
      \ifx\@copyrightyear\@empty\else
        \@copyrightyear.\
      \fi
    \fi
    \if@ACM@manuscript
      Manuscript submitted to ACM\\
    \else
      \if@ACM@authorversion
          This is the author's version of the work. It is posted here for
          your personal use. Not for redistribution. The definitive Version
          of Record was published in
          \if@ACM@journal@bibstrip
            \emph{\@journalName}%
          \else
            \emph{\@acmBooktitle}%
          \fi
          \ifx\@acmDOI\@empty
          .
```

```
          \else
            , \@formatdoi{\@acmDOI}.
          \fi\\
        \else
          \if@ACM@nonacm\else
            \if@ACM@journal@bibstrip
              ACM~\@permissionCodeTwo/\@acmYear/\@acmMonth-ART\@acmArticle\\
              \@formatdoi{\@acmDOI}%
            \else % Conference
              \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN\\\fi
              \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
            \fi
          \fi
        \fi
      \fi}%
    \fi
    \fi
  \endgroup
  \if@ACM@engage\@typesetengagemetadata\fi
  \setcounter{footnote}{0}%
  \@mkabstract
  \ifx\@translatedabstracts\@empty\else
  \@translatedabstracts\fi
  \if@ACM@printccs
  \ifx\@concepts\@empty\else\bgroup
      {\@specialsection{CCS Concepts}%
         \noindent\@concepts\par}\egroup
    \fi
   \fi
   \if@ACM@acmcp\else
     \ifx\@keywords\@empty\else\bgroup
        {\@specialsection{\keywordsname}%
           \noindent\@keywords\par}\egroup
     \fi
    \ifx\@translatedkeywords\@empty\else
       \@translatedkeywords
    \fi
  \fi
  \let\metadata@authors=\authors
  \nxandlist{, }{, }{, }\metadata@authors
  \def\@ACM@checkaffil{}%
  \hypersetup{%
    pdfauthor={\metadata@authors},
    pdftitle={\@title},
    pdfsubject={\@concepts},
    pdfkeywords={\@keywords},
    pdfcreator={LaTeX with acmart
      \csname ver@\@classname.cls\endcsname\space
      and hyperref
      \csname ver@hyperref.sty\endcsname}}%
  \andify\authors
  \andify\shortauthors
  \global\let\authors=\authors
  \global\let\shortauthors=\shortauthors
```

```
  \if@ACM@printacmref
     \@mkbibcitation
  \fi
  \global\@topnum\z@ % this prevents floats from falling
                     % at the top of page 1
  \global\@botnum\z@ % we do not want them to be on the bottom either
  \@printendtopmatter
  \@afterindentfalse
  \@afterheading
  \if@ACM@acmcp
    \set@ACM@acmcpbox
    \AtEndDocument{\end@ACM@color@frame}%
    \@ACM@color@frame
  \fi
}
```

\set@ACM@acmcpbox Setting infobox for acmcp

```
\newbox\@ACM@acmcpbox
\def\set@ACM@acmcpbox{%
  \bgroup
  \hsize=5pc
  \global\setbox\@ACM@acmcpbox=\vbox{%
    \setlength{\parindent}{\z@}%
    {\includegraphics[width=\hsize]{acm-jdslogo}\par}%
    \scriptsize
    \ifnum\getrefnumber{TotPages}>1\else
      \zrefused{@ACM@acmcpbox@y}%
      \zrefused{@ACM@acmcpframe@y}%
      \@tempdima=\dimexpr\zposy{@ACM@acmcpbox@y}sp -
      \zposy{@ACM@acmcpframe@y}sp+0.3\FrameSep+
      \@ACM@acmcp@delta\relax
      \ifdim\@tempdima>0pt\relax
         \vspace*{\@tempdima}%
         \protected@write\@auxout{}%
         {\string\global\@ACM@acmcp@delta=\the\@tempdima\relax}%
      \fi
    \fi
    \ifx\@acmCodeDataLink\@empty\else\bigskip
    Code and data links:\\ \@acmCodeDataLink\par\bigskip
    \fi
    \ifx\@keywords\@empty\else\bigskip
      Keywords: \@keywords\par
    \fi
    \ifx\@acmContributions\@empty\else\bigskip
      \@acmContributions\par
    \fi
    \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
    \zsaveposy{@ACM@acmcpbox@y}%
    \par
  }
\egroup}
```

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

```
\def\@specialsection#1{%
```

```
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig
  \ifcase\ACM@format@nr
  \relax % manuscript
    \par\medskip\small\noindent#1: %
  \or % acmsmall
    \par\medskip\small\noindent#1: %
  \or % acmlarge
    \par\medskip\small\noindent#1: %
  \or % acmtog
    \par\medskip\small\noindent#1: %
  \or % sigconf
    \section*{#1}%
  \or % siggraph
    \section*{#1}%
  \or % sigplan
     \noindentparagraph*{#1:~}%
  \or % sigchi
    \section*{#1}%
  \or % sigchi-a
    \section*{#1}%
  \or % acmengage
    \section*{#1}%
  \or % acmcp
    \section*{#1}%
    \fi
  \let\@vspace\@vspace@acm
  \let\@vspacer\@vspacer@acm
}
```

`\@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.

```
\def\@printtopmatter{%
  \ifx\@startPage\@empty
     \gdef\@startPage{1}%
  \else
     \setcounter{page}{\@startPage}%
  \fi
  \@tempdima=\ht\mktitle@bx
  \advance\@tempdima by \dp\mktitle@bx
  \ifdim\@tempdima>0.9\textheight
    \loop
      \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
      \thispagestyle{firstpagestyle}%
      \noindent\unvbox\@tempboxa
      \clearpage
      \@tempdima=\ht\mktitle@bx
      \advance\@tempdima by \dp\mktitle@bx
    \ifdim\@tempdima>0.9\textheight\repeat
  \fi
  \thispagestyle{firstpagestyle}%
  \noindent
```

```
  \ifcase\ACM@format@nr
  \relax % manuscript
    \box\mktitle@bx\par
  \or % acmsmall
    \box\mktitle@bx\par
  \or % acmlarge
    \box\mktitle@bx\par
  \or % acmtog
    \twocolumn[\box\mktitle@bx]%
  \or % sigconf
    \twocolumn[\box\mktitle@bx]%
  \or % siggraph
    \twocolumn[\box\mktitle@bx]%
  \or % sigplan
    \twocolumn[\box\mktitle@bx]%
  \or % sigchi
    \twocolumn[\box\mktitle@bx]%
  \or % sigchi-a
    \par\box\mktitle@bx\par\bigskip
  \or % acmengage
    \twocolumn[\box\mktitle@bx]%
  \or % acmcp
     \box\mktitle@bx\par
  \fi
}
```

`\@mktitle` The title of the article

```
\def\@mktitle{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \@mktitle@i
  \or % acmsmall
    \@mktitle@i
  \or % acmlarge
    \@mktitle@i
  \or % acmtog
    \@mktitle@i
  \or % sigconf
    \@mktitle@iii
  \or % siggraph
    \@mktitle@iii
  \or % sigplan
    \@mktitle@iii
  \or % sigchi
    \@mktitle@iii
  \or % sigchi-a
    \@mktitle@iv
  \or % acmengage
    \@mktitle@iii
  \or % acmcp
    \@mktitle@i
  \fi
}
```

`\@titlefont` The font to typeset the title

```
\def\@titlefont{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \LARGE\sffamily\bfseries
  \or % acmsmall
    \LARGE\sffamily\bfseries
  \or % acmlarge
    \LARGE\sffamily\bfseries
  \or % acmtog
    \Huge\sffamily
  \or % sigconf
    \Huge\sffamily\bfseries
  \or % siggraph
    \Huge\sffamily\bfseries
  \or % sigplan
    \Huge\bfseries
  \or % sigchi
    \Huge\sffamily\bfseries
  \or % sigchi-a
     \Huge\bfseries
  \or % acmengage
    \Huge\sffamily\bfseries
  \or % acmcp
    \LARGE\sffamily\bfseries
  \fi}
```

`\@subtitlefont` The font to typeset the subtitle

```
\def\@subtitlefont{\normalsize
  \ifcase\ACM@format@nr
  \relax % manuscript
    \mdseries
  \or % acmsmall
    \mdseries
  \or % acmlarge
    \mdseries
  \or % acmtog
     \LARGE
  \or % sigconf
     \LARGE\mdseries
  \or % siggraph
     \LARGE\mdseries
  \or % sigplan
     \LARGE\mdseries
  \or % sigchi
     \LARGE\mdseries
  \or % sigchi-a
     \mdseries
  \or % acmengage
     \LARGE\mdseries
  \or % acmcp
    \mdseries
  \fi}
```

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

```
\def\@mktitle@i{\hsize=\textwidth
  \if@ACM@acmcp
    \advance\hsize by -6pc%
  \fi
  \@ACM@title@width=\hsize
  \setbox\mktitle@bx=\vbox{\noindent\@titlefont
    \parbox[t]{\@ACM@title@width}{\raggedright
      \@titlefont\noindent
      \@title\@translatedtitle%
  \ifx\@subtitle\@empty\else
    \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
  \fi}%
  \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.

```
\def\@mktitle@iii{\hsize=\textwidth
    \setbox\mktitle@bx=\vbox{\@titlefont\centering
      \@ACM@title@width=\hsize
      \parbox[t]{\@ACM@title@width}{\centering\@titlefont
        \@title\@translatedtitle%
        \ifx\@subtitle\@empty\else
          \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
        \fi
      }%
      \par\bigskip}}%
```

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

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

\@ACM@addtoaddress

```
\newbox\@ACM@commabox
\def\@ACM@addtoaddress#1{%
  \ifvmode\else
    \if@ACM@affiliation@obeypunctuation\else
    \unskip,~%
  \fi\fi
  #1}
```

\institution
\position
\department
\streetaddress
\city
\state
\postcode
\country

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 \affiliation. Of course we can make them produce an error message, but…

```
\def\streetaddress#1{\ClassWarning{\@classname}{ACM no longer collects
```

```
  authors' postal addresses.  I am ignoring your street
  address}\unskip\ignorespaces}
\def\postcode#1{\ClassWarning{\@classname}{ACM no longer collects
  authors' postal addresses.  I am ignoring your postal
  code}\unskip\ignorespaces}
\if@ACM@journal
  \def\position#1{\unskip\ignorespaces}
  \def\institution#1{\global\@ACM@instpresenttrue
    \unskip~#1\ignorespaces}
  \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
  \def\state#1{\unskip\ignorespaces}
  \newcommand\department[2][0]{\unskip\ignorespaces}
  \def\country#1{\StrDel{#1}{ }[\@tempa]%
    \ifx\@tempa\@empty\else
    \global\@ACM@countrypresenttrue\fi
    \if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
\else
  \def\position#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
  \def\institution#1{\global\@ACM@instpresenttrue
    \if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
  \newcommand\department[2][0]{\if@ACM@affiliation@obeypunctuation
    #2\else#2\par\fi}%
  \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
  \let\state\@ACM@addtoaddress
  \def\country#1{\global\@ACM@countrypresenttrue\@ACM@addtoaddress{#1}}%
\fi
```

`\@mkauthors` Typesetting the authors

```
\def\@mkauthors{\begingroup
  \hsize=\textwidth
  \ifcase\ACM@format@nr
  \relax % manuscript
    \@mkauthors@i
  \or % acmsmall
    \@mkauthors@i
  \or % acmlarge
    \@mkauthors@i
  \or % acmtog
    \@mkauthors@i
  \or % sigconf
    \@mkauthors@iii
  \or % siggraph
    \@mkauthors@iii
  \or % sigplan
    \@mkauthors@iii
  \or % sigchi
    \@mkauthors@iii
  \or % sigchi-a
    \@mkauthors@iv
  \or % acmengage
    \@mkauthors@iii
  \or % acmcp
    \@mkauthors@i
  \fi
```

```
  \endgroup
}
```

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

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

\@affiliationfont Font for affiliations

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

Adjusting fonts for different formats

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
  \def\@authorfont{\large\sffamily}
  \def\@affiliationfont{\small\normalfont}
\or % acmlarge
\or % acmtog
  \def\@authorfont{\LARGE\sffamily}
  \def\@affiliationfont{\large}
\or % sigconf
  \def\@authorfont{\LARGE}
  \def\@affiliationfont{\large}
\or % siggraph
  \def\@authorfont{\normalsize\normalfont}
  \def\@affiliationfont{\normalsize\normalfont}
\or % sigplan
  \def\@authorfont{\Large\normalfont}
  \def\@affiliationfont{\normalsize\normalfont}
\or % sigchi
  \def\@authorfont{\bfseries}
  \def\@affiliationfont{\mdseries}
\or % sigchi-a
  \def\@authorfont{\bfseries}
  \def\@affiliationfont{\mdseries}
\or % acmengage
  \def\@authorfont{\LARGE}
  \def\@affiliationfont{\large}
\or % acmcp
  \def\@authorfont{\large\sffamily}
  \def\@affiliationfont{\small\normalfont}
\fi
```

\@typeset@author@line At this point we have \@currentauthors and \@currentaffiliations. We typeset them in the journal style

```
\def\@typeset@author@line{%
  \andify\@currentauthors\par\noindent
  \@currentauthors\def\@currentauthors{}%
  \ifx\@currentaffiliations\@empty\else
    \andify\@currentaffiliations
      \unskip, {\@currentaffiliations}\par
  \fi
  \def\@currentaffiliations{}}
```

`\if@ACM@instpresent` Whether the given affiliation has institution

```
\newif\if@ACM@instpresent
\@ACM@instpresenttrue
```

`\if@ACM@citypresent` Whether the given affiliation has city

```
\newif\if@ACM@citypresent
\@ACM@citypresenttrue
```

`\if@ACM@countrypresent` Whether the given affiliation has country

```
\newif\if@ACM@countrypresent
\@ACM@countrypresenttrue
```

`\@ACM@resetaffil` Reset affiliation flags

```
\def\@ACM@resetaffil{%
  \global\@ACM@instpresentfalse
  \global\@ACM@citypresentfalse
  \global\@ACM@countrypresentfalse
}
```

`\@ACM@checkaffil` Check affiliation flags

```
\def\@ACM@checkaffil{%
  \if@ACM@instpresent\else
 \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
  \fi
  \if@ACM@citypresent\else
  \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
  \fi
  \if@ACM@countrypresent\else
  \ClassError{\@classname}{No country present for an affiliation}{ACM
    requires each author to indicate their country using country macro.}%
  \fi
}
```

`\@mkauthors@i` This version is used in most journal formats. Note that `\and` between authors with the same affiliation becomes ␣and␣:

```
\def\@mkauthors@i{%
  \def\@currentauthors{}%
  \def\@currentaffiliations{}%
  \global\let\and\@typeset@author@line
  \def\@author##1{%
    \ifx\@currentauthors\@empty
      \gdef\@currentauthors{\@authorfont\MakeUppercase{##1}}%
    \else
       \g@addto@macro{\@currentauthors}{\and\MakeUppercase{##1}}%
    \fi
    \gdef\and{}}%
  \def\email##1##2{}%
  \def\affiliation##1##2{%
    \def\@tempa{##2}\ifx\@tempa\@empty\else
       \ifx\@currentaffiliations\@empty
          \gdef\@currentaffiliations{%
            \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
            \setkeys{@ACM@affiliation@}{##1}%
```

```
            \@ACM@resetaffil
            \@affiliationfont##2\@ACM@checkaffil}%
       \else
         \g@addto@macro{\@currentaffiliations}{\and
           \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
           \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
           ##2\@ACM@checkaffil}%
      \fi
    \fi
     \global\let\and\@typeset@author@line}%
  \if@ACM@acmcp
    \advance\hsize by -6pc%
  \fi
  \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
    \noindent\addresses\@typeset@author@line
   \par\medskip}%
}
```

`\@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

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

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

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

`\author@bx@sep` The separation between author boxes

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

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

```
\def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd
  \def\and{\par}\normalbaselines
  \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
    \@authorfont\@currentauthors\par\@affiliationfont
    \@currentaffiliation\par}\egroup
  \box\author@bx\hspace{\author@bx@sep}%
  \gdef\@currentauthors{}%
  \gdef\@currentaffiliation{}}
```

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

```
\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 (`\textwidth` − `\author@bx@sep`)/N − `\author@bx@sep`, where N is the number of boxes per row.

```
  \author@bx@wd=\textwidth\relax
  \advance\author@bx@wd by -\author@bx@sep\relax
  \ifnum\@ACM@authorsperrow>0\relax
    \divide\author@bx@wd by \@ACM@authorsperrow\relax
  \else
    \ifcase\num@authorgroups
```

```
    \relax % 0?
    \or  % 1=one author per row
    \or  % 2=two authors per row
       \divide\author@bx@wd by \num@authorgroups\relax
    \or  % 3=three authors per row
       \divide\author@bx@wd by \num@authorgroups\relax
    \or  % 4=two authors per row (!)
       \divide\author@bx@wd by 2\relax
    \else % three authors per row
       \divide\author@bx@wd by 3\relax
    \fi
  \fi
  \advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of `\addresses`:

```
  \gdef\@currentauthors{}%
  \gdef\@currentaffiliation{}%
  \def\@author##1{\ifx\@currentauthors\@empty
    \gdef\@currentauthors{\par##1}%
  \else
    \g@addto@macro\@currentauthors{\par##1}%
  \fi
  \gdef\and{}}%
  \def\email##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{\bgroup
      \mathchardef\UrlBreakPenalty=10000\href{mailto:##2}{##2}\egroup}%
  \else
    \g@addto@macro\@currentaffiliation{\par\bgroup
      \mathchardef\UrlBreakPenalty=10000\href{mailto:##2}{##2}\egroup}%
  \fi}%
  \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{%
      \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
      \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
      ##2\@ACM@checkaffil}%
  \else
    \g@addto@macro\@currentaffiliation{\par
      \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
      \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
      ##2\@ACM@checkaffil}%
  \fi
  \global\let\and\@typeset@author@bx
}%
```

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

```
  \hsize=\textwidth
  \global\setbox\mktitle@bx=\vbox{\noindent
    \unvbox\mktitle@bx\par\medskip\leavevmode
    \lineskip=1pc\relax\centering\hspace*{-1em}%
    \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 overriden.

```
\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 (\textwidth − \author@bx@sep)/N − \author@bx@sep, where N is the number of boxes per row.

```
\author@bx@wd=\columnwidth\relax
\advance\author@bx@wd by -\author@bx@sep\relax
\ifnum\@ACM@authorsperrow>0\relax
  \divide\author@bx@wd by \@ACM@authorsperrow\relax
\else
  \ifcase\num@authorgroups
  \relax % 0?
  \or  % 1=one author per row
  \else  % 2=two authors per row
     \divide\author@bx@wd by 2\relax
  \fi
\fi
\advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of \addresses:

```
\gdef\@currentauthors{}%
\gdef\@currentaffiliation{}%
\def\@author##1{\ifx\@currentauthors\@empty
  \gdef\@currentauthors{\par##1}%
\else
  \g@addto@macro\@currentauthors{\par##1}%
\fi
\gdef\and{}}%
\def\email##1##2{\ifx\@currentaffiliation\@empty
  \gdef\@currentaffiliation{\href{mailto:##2}{##2}}%
\else
  \g@addto@macro\@currentaffiliation{\par\href{mailto:##2}{##2}}%
\fi}%
\def\affiliation##1##2{\ifx\@currentaffiliation\@empty
  \gdef\@currentaffiliation{%
    \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
    \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
    ##2\@ACM@checkaffil}%
\else
  \g@addto@macro\@currentaffiliation{\par
    \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
    \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
    ##2\@ACM@checkaffil}%
\fi
\global\let\and\@typeset@author@bx}%
%
```

Actual typesetting is done by the \and macro

```
  \bgroup\hsize=\columnwidth
  \par\raggedright\leftskip=\z@
  \lineskip=1pc\noindent
  \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}
```

\@mkauthorsaddresses Typesetting authors' addresses in the footnote style

```
\def\@mkauthorsaddresses{%
```

```
  \ifnum\num@authors>1\relax
  Authors' \else Author's \fi
  Contact Information:
  \bgroup
  \def\streetaddress##1{\ClassWarning{\@classname}{ACM no longer collects
  authors' postal addresses.  I am ignoring your street
  address}\unskip\ignorespaces}%
  \def\postcode##1{\ClassWarning{\@classname}{ACM no longer collects
  authors' postal addresses.  I am ignoring your postal
  code}\unskip\ignorespaces}%
  \def\position##1{\unskip\ignorespaces}%
  \gdef\@ACM@institution@separator{, }%
 \def\institution##1{\unskip\@ACM@institution@separator ##1\gdef\@ACM@institution@separator{ and }
  \def\city##1{\unskip, ##1}%
  \def\state##1{\unskip, ##1}%
  \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
  \def\country##1{\unskip, ##1}%
  \def\and{\unskip; \gdef\@ACM@institution@separator{, }}%
  \def\@author##1{##1}%
  \def\email##1##2{\unskip, \href{mailto:##2}{##2}}%
  \addresses
  \egroup}
```

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

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

```
\def\@setaddresses{}
```

`\@authornotemark` Adding a footnote mark to authors. This version adds a “normal” footnote mark. Note that since we typeset the author in a box, we get superflous box overfull; to protect against it we increase `\hfuzz`

```
\def\@authornotemark{\g@addto@macro\@currentauthors{%
    \advance\hfuzz by 5pt\relax\footnotemark\relax}}
```

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

```
\def\@@authornotemark#1{\g@addto@macro\@currentauthors{%
    \advance\hfuzz by 5pt\relax\footnotemark[#1]}}
```

`\@mkteasers` Typesetting the teasers

```
\def\@mkteasers{%
  \ifx\@teaserfigures\@empty\else
    \def\@teaser##1{\par\bigskip\bgroup
      \captionsetup{type=figure}##1\egroup\par}
    \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
      \noindent\@Description@presentfalse
      \@teaserfigures\par\if@Description@present\else
         \global\@undescribed@imagestrue
         \ClassWarning{\@classname}{A possible image without
           description}\fi
    \medskip}%
  \fi}
```

`\@mkabstract` Typesetting the abstract

```
\def\@mkabstract{\bgroup
  \ifx\@abstract\@lempty\else
  {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
    \if@ACM@journal
       \everypar{\setbox\z@\lastbox\everypar{}}\small
    \else
      \section*{\abstractname}%
    \fi
   \ignorespaces\@abstract\par}%
  \fi\egroup}
```

`\@mktranslatedabstract` Typesetting a translated abstract

```
\def\@mktranslatedabstract#1{\selectlanguage{#1}%
    \if@ACM@journal
       \everypar{\setbox\z@\lastbox\everypar{}}\small
    \else
       \section*{\abstractname}%
    \fi
   \ignorespaces}
```

`\@mkbibcitation` Print the `bibcitation` format

```
\def\@mkbibcitation{\bgroup
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig
 \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
  \def\footnotemark{}%
  \def\\{\unskip{} \ignorespaces}%
  \def\footnote{\ClassError{\@classname}{Please do not use footnotes
      inside a \string\title{} or \string\author{} command! Use
      \string\titlenote{} or \string\authornote{} instead!}}%
  \def\@article@string{\ifx\@acmArticle\@empty{\ }\else,
    Article~\@acmArticle\ \fi}%
  \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
  \noindent\bgroup
    \def\\{\unskip{}, \ignorespaces}\authors\egroup. \@acmYear. \@title
  \ifx\@subtitle\@empty. \else: \@subtitle. \fi
  \if@ACM@nonacm\else
    % The 'nonacm' option disables 'printacmref' by default,
    % and the present \@mkbibcitation definition is never used
    % in this case. The conditional remains useful if the user
    % explicitly sets \settopmatter{printacmref=true}.
    \if@ACM@journal@bibstrip
       \textit{\@journalNameShort}
       \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
       \ref{TotPages}~\@pages@word.
    \else
       In \textit{\@acmBooktitle}%
       \ifx\@acmEditors\@empty\textit{.}\else
         \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
       \fi\
       ACM, New York, NY, USA%
         \@article@string\unskip, \ref{TotPages}~\@pages@word.
    \fi
```

```
  \fi
  \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
\par\egroup}
```

\@printendtopmatter End the top matter

```
\def\@printendtopmatter{%
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig
  \par\bigskip
  \let\@vspace\@vspace@acm
  \let\@vspacer\@vspacer@acm
  }
```

\@setthanks We redefine \setthanks using \long

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

\@setauthorsaddresses

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

\@typesetengagemetadata Typesetting special metadata for ACM Engage

```
\def\@typesetengagemetadata{%
  \def\@setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
  \@acmengagemetadata}
```

3.23 Headers and Footers

We use fancyhdr for our headers and footers:

```
\RequirePackage{fancyhdr}
```

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

```
\let\ACM@ps@plain\ps@plain
\let\ACM@ps@myheadings\ps@myheadings
\let\ACM@ps@headings\ps@headings
\def\ACM@restore@pagestyle{%
  \let\ps@plain\ACM@ps@plain
  \let\ps@myheadings\ACM@ps@myheadings
  \let\ps@headings\ACM@ps@headings}
\AtBeginDocument{\ACM@restore@pagestyle}
```

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

```
\if@ACM@review
  \newsavebox{\ACM@linecount@bx}
  \newlength\ACM@linecount@bxht
  \newcount\ACM@linecount
  \ACM@linecount\@ne\relax
  \def\ACM@mk@linecount{%
    \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
        \normalsize
        \setlength{\ACM@linecount@bxht}{0pt}%
        \loop{\color{red}\scriptsize\the\ACM@linecount}\\
        \global\advance\ACM@linecount by \@ne
        \addtolength{\ACM@linecount@bxht}{\baselineskip}%
        \ifdim\ACM@linecount@bxht<\textheight\repeat
```

```
        {\color{red}\scriptsize\the\ACM@linecount}\hfill
        \global\advance\ACM@linecount by \@ne}}}
\fi
```

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

```
\def\ACM@linecountL{%
  \if@ACM@review
  \ACM@mk@linecount
  \begin{picture}(0,0)%
    \put(-26,-22){\usebox{\ACM@linecount@bx}}%
  \end{picture}%
  \fi}
```

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

```
\def\ACM@linecountR{%
  \if@ACM@review
    \ifcase\ACM@format@nr
    \relax % manuscript
         \relax
       \or % acmsmall
         \relax
       \or % acmlarge
         \relax
       \or % acmtog
          \ACM@mk@linecount
       \or % sigconf
          \ACM@mk@linecount
       \or % siggraph
          \ACM@mk@linecount
       \or % sigplan
          \ACM@mk@linecount
       \or % sigchi
          \ACM@mk@linecount
       \or % sigchi-a
          \ACM@mk@linecount
       \or % acmengage
          \ACM@mk@linecount
       \or % acmcp
         \relax
    \fi
    \begin{picture}(0,0)%
      \put(20,-22){\usebox{\ACM@linecount@bx}}%
     \end{picture}%
  \fi}
```

\ACM@timestamp The timestamp system

```
\if@ACM@timestamp
  % Subtracting 30 from \time gives us the effect of rounding down despite
  % \numexpr rounding to nearest
  \newcounter{ACM@time@hours}
  \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
  \newcounter{ACM@time@minutes}
 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
  \newcommand\ACM@timestamp{%
```

```
    \footnotesize%
    \ifx\@acmSubmissionID\@empty\relax\else
    Submission ID: \@acmSubmissionID.{ }%
    \fi
    \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
    \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
    Page \thepage\ of \@startPage--\pageref*{TotPages}.%
  }
\fi
```

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

```
\def\@shortauthors{%
  \if@ACM@anonymous
    Anon.
    \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
  \else\shortauthors\fi}
```

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

```
\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

```
\AtBeginDocument{%
\fancypagestyle{standardpagestyle}{%
  \fancyhf{}%
  \renewcommand{\headrulewidth}{\z@}%
  \renewcommand{\footrulewidth}{\z@}%
  \def\@acmArticlePage{%
    \ifx\@acmArticle\empty%
      \if@ACM@printfolios\thepage\fi%
    \else%
      \@acmArticle\if@ACM@printfolios:\thepage\fi%
    \fi%
  }%
  \if@ACM@journal@bibstrip@or@tog
    \ifcase\ACM@format@nr
    \relax % manuscript
      \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
      \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
      \fancyhead[RE]{\@shortauthors}%
      \fancyhead[LO]{\ACM@linecountL\shorttitle}%
      \if@ACM@nonacm\else%
        \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
      \fi%
    \or % acmsmall
      \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
      \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
      \fancyhead[RE]{\@headfootfont\@shortauthors}%
      \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
      \if@ACM@nonacm\else%
     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
       \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
      \fi
    \or % acmlarge
```

```
    \fancyhead[LE]{\ACM@linecountL\@headfootfont
    \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL}%
    \fancyhead[RO]{\@headfootfont
      \shorttitle\quad\textbullet\quad\@acmArticlePage}%
    \if@ACM@nonacm\else%
   \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
     \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
    \fi
  \or % acmtog
    \fancyhead[LE]{\ACM@linecountL\@headfootfont
      \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL}%
    \fancyhead[RE]{\ACM@linecountR}%
    \fancyhead[RO]{\@headfootfont
      \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
    \if@ACM@nonacm\else
      \if@ACM@journal@bibstrip
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
          Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
          Publication date: \@acmPubDate.}%
      \else
        \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
          \acmConference@date, \acmConference@venue.}%
       \fi
    \fi
  \else % Proceedings
    \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
    \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
    \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
    \if@ACM@nonacm
      \fancyhead[LE]{\ACM@linecountL}%
      \fancyhead[RO]{\ACM@linecountR}%
    \else%
      \if@ACM@engage
        \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
          EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
        \fancyhead[RO]{\@headfootfont
          EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
          \ACM@linecountR}%
      \else
        \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
          \acmConference@shortname,
          \acmConference@date, \acmConference@venue}%
        \fancyhead[RO]{\@headfootfont
          \acmConference@shortname,
          \acmConference@date, \acmConference@venue\ACM@linecountR}%
       \fi
    \fi
  \fi
\else % Proceedings
  \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
  \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
  \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
```

```
    \if@ACM@nonacm
      \fancyhead[LE]{\ACM@linecountL}%
      \fancyhead[RO]{\ACM@linecountR}%
    \else%
      \if@ACM@engage
        \fancyhead[LE]{\ACM@linecountL\@headfootfont
          EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
        \fancyhead[RO]{\@headfootfont
          EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
          \ACM@linecountR}%
      \else
        \fancyhead[LE]{\ACM@linecountL\@headfootfont
          \acmConference@shortname,
          \acmConference@date, \acmConference@venue}%
        \fancyhead[RO]{\@headfootfont
          \acmConference@shortname,
          \acmConference@date, \acmConference@venue\ACM@linecountR}%
       \fi
    \fi
  \fi
  \if@ACM@sigchiamode
     \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
  \fi
  \if@ACM@timestamp
     \fancyfoot[LO,RE]{\ACM@timestamp}
  \fi
  \if@ACM@acmcp
  \renewcommand{\footrulewidth}{0.1\p@}%
  \fancyheadoffset[L]{46pt}%
  \fancyhead[L]{\makebox[\z@][l]{%
      \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
      \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
          \strut\ACM@ArticleType~Article}}}}%
    \ACM@linecountL}%
  \fancyhead[R]{\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
  \fancyfoot[L,C]{}%
  \fancyfoot[R]{\footnotesize
    \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
    \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
    (\@acmPubDate)\ifx\@acmDOI\@empty\else\\\@formatdoi{\@acmDOI}\fi}
  \fi
}%
\pagestyle{standardpagestyle}
}
```

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

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

`firstpagestyle` The page style for the first page only.

```
\AtBeginDocument{%
\fancypagestyle{firstpagestyle}{%
  \fancyhf{}%
  \renewcommand{\headrulewidth}{\z@}%
```

```
\renewcommand{\footrulewidth}{\z@}%
\if@ACM@journal@bibstrip@or@tog
  \ifcase\ACM@format@nr
  \relax % manuscript
    \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
    \fancyhead[R]{\@acmBadgeR}%
    \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
    \if@ACM@nonacm\else%
      \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
    \fi%
  \or % acmsmall
    \if@ACM@nonacm\else%
   \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
      \@acmNumber, Article \@acmArticle.  Publication date:
      \@acmPubDate.}%
    \fi%
    \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
    \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
    \fancyhead[RO]{\@acmBadgeR}%
    \fancyhead[RE]{\@acmBadgeR}%
  \or % acmlarge
    \if@ACM@nonacm\else%
   \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
      \@acmNumber, Article \@acmArticle.  Publication date:
      \@acmPubDate.}%
    \fi%
    \fancyhead[RO]{\@acmBadgeR}%
    \fancyhead[RE]{\@acmBadgeR}%
    \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
    \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
  \or % acmtog
    \if@ACM@nonacm\else%
      \if@ACM@journal@bibstrip
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
          Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
          Publication date: \@acmPubDate.}%
      \else
        \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
          \acmConference@date, \acmConference@venue.}%
       \fi
    \fi%
    \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
    \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
  \else % Conference proceedings
    \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
    \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
    \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
  \fi
\else
  \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
  \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
  \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
\fi
\if@ACM@timestamp
```

```
    \ifnum\ACM@format@nr=0\relax % Manuscript
    \fancyfoot[LO,RE]{\ACM@timestamp\quad
      \if@ACM@nonacm\else
        \footnotesize Manuscript submitted to ACM
      \fi}
    \else
    \fancyfoot[LO,RE]{\ACM@timestamp}
    \fi
  \fi
  \if@ACM@acmcp
  \renewcommand{\footrulewidth}{0.1\p@}%
  \fancyheadoffset[L]{46pt}%
  \fancyhead[L]{\makebox[\z@][l]{%
      \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
      \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
          \strut\ACM@ArticleType~Article}}}}%
    \ACM@linecountL\@acmBadgeL}%
  \fancyhead[R]{\@acmBadgeR\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
  \fancyfoot[L,C]{}%
  \fancyfoot[R]{\footnotesize
    \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
    \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
    (\@acmPubDate)\ifx\@acmDOI\@empty\else\\\@formatdoi{\@acmDOI}\fi}
  \fi
}}
```

3.24 Sections

`\ACM@NRadjust` 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@NRadjust` 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@NRadjust`. 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`.

```
\def\ACM@NRadjust#1{%
 \begingroup
  \expandafter\ifx\csname Sectionformat\endcsname\relax
  % do nothing when  \Sectionformat  is unknown
```

```
    \def\next{\endgroup #1}%
  \else
   \def\next{\endgroup
    \let\realSectionformat\Sectionformat
    \def\ACM@sect@format@{#1}%
    \let\Sectionformat\ACM@NR@adjustedSectionformat
  %%  next lines added 2018-06-17 to ensure section number is styled
    \let\real@adddotafter\@adddotafter
    \let\@adddotafter\ACM@adddotafter
    #1{}% imposes the styles, but nullifies  \MakeUppercase
    \let\@adddotafter\real@adddotafter
   }%
  \fi \next
}
```

\ACM@NR@adjustedSectionformat

```
\def\ACM@NR@adjustedSectionformat#1#2{%
 \realSectionformat{\ACM@sect@format{#1}}{#2}%
 \let\Sectionformat\realSectionformat}
\DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
\def\ACM@sect@format@null#1{#1}
\let\ACM@sect@format@\ACM@sect@format@null
\AtBeginDocument{%
 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
  \let\LTX@adddotafter\@adddotafter
 \fi
}
```

\ACM@adddotafter

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

Sectioning is different for different levels

```
\renewcommand\section{\def\@toclevel{1}%
  \@startsection{section}{1}{\z@}%
  {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {.25\baselineskip}%
  {\ACM@NRadjust\@secfont}}
\renewcommand\subsection{\def\@toclevel{2}%
  \@startsection{subsection}{2}{\z@}%
  {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {.25\baselineskip}%
  {\ACM@NRadjust\@subsecfont}}
\renewcommand\subsubsection{\def\@toclevel{3}%
  \@startsection{subsubsection}{3}{\z@}%
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}
\renewcommand\paragraph{\def\@toclevel{4}%
  \@startsection{paragraph}{4}{\parindent}%
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\ACM@NRadjust{\@parfont\@adddotafter}}}
\newcommand\noindentparagraph{\def\@toclevel{4}%
  \@startsection{paragraph}{4}{\z@}%
```

```
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\ACM@NRadjust{\@parfont}}}
\renewcommand\part{\def\@toclevel{9}%
  \@startsection{part}{9}{\z@}%
  {-10\p@ \@plus -4\p@ \@minus -2\p@}%
  {4\p@}%
  {\ACM@NRadjust\@parfont}}
```

\section@raggedright Special version of \raggedright compatible with \MakeUppercase

```
\def\section@raggedright{\@rightskip\@flushglue
  \rightskip\@rightskip
  \leftskip\z@skip
  \parindent\z@}
```

\@secfont Fonts for sections etc. are different for different formats.

\@subsecfont

\@subsubsecfont

\@parfont

```
\def\@secfont{\sffamily\bfseries\section@raggedright}
\def\@subsecfont{\sffamily\bfseries\section@raggedright}
\def\@subsubsecfont{\sffamily\itshape}
\def\@parfont{\itshape}
\setcounter{secnumdepth}{3}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
 \def\@secfont{\sffamily\large\section@raggedright}
 \def\@subsecfont{\sffamily\large\section@raggedright}
\or % acmtog
 \def\@secfont{\sffamily\large\section@raggedright}
 \def\@subsecfont{\sffamily\large\section@raggedright}
\or % sigconf
 \def\@secfont{\bfseries\Large\section@raggedright}
 \def\@subsecfont{\bfseries\Large\section@raggedright}
\or % siggraph
 \def\@secfont{\sffamily\bfseries\Large\section@raggedright}
 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
\or % sigplan
 \def\@secfont{\bfseries\Large\section@raggedright}
 \def\@subsecfont{\bfseries\section@raggedright}
 \def\@subsubsecfont{\bfseries\section@raggedright}
 \def\@parfont{\bfseries\itshape}
 \def\@subparfont{\itshape}
\or % sigchi
 \setcounter{secnumdepth}{1}
 \def\@secfont{\sffamily\bfseries\section@raggedright}
 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\or % sigchi-a
 \setcounter{secnumdepth}{0}
 \def\@secfont{\sffamily\bfseries\section@raggedright}
 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\or % acmengage
 \def\@secfont{\bfseries\Large\section@raggedright}
 \def\@subsecfont{\bfseries\Large\section@raggedright}
\or %acmcp
```

```
\fi
```

Amasat does not define tocindents for paragraphs and subparagraphs. Here we add them

```
\AtBeginDocument{%
  \@for\@tempa:=-1,0,1,2,3,4,5\do{%
    \@ifundefined{r@tocindent\@tempa}{%
      \@xp\gdef\csname r@tocindent\@tempa\endcsname{0pt}}{}%
  }%
}
\def\@writetocindents{%
  \begingroup
  \@for\@tempa:=-1,0,1,2,3,4,5\do{%
    \immediate\write\@auxout{%
      \string\newlabel{tocindent\@tempa}{%
        \csname r@tocindent\@tempa\endcsname}}%
  }%
  \endgroup}
```

`\@adddotafter` Add punctuation after a sectioning command

```
\def\@adddotafter#1{#1\@addpunct{.}}
```

`\@addspaceafter` Add space after a sectioning command

```
\def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

```
\if@ACM@acmcp
   \setcounter{secnumdepth}{-1}%
\fi
```

3.25 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.

```
\providecommand*\@dotsep{4.5}
```

3.26 Theorems

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

```
\def\@acmplainbodyfont{\itshape}
```

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

```
\def\@acmplainindent{\parindent}
```

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

```
\def\@acmplainheadfont{\scshape}
```

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

```
\def\@acmplainnotefont{\@empty}
```

Customization of the acmplain theorem style:

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@acmplainbodyfont{\itshape}
  \def\@acmplainindent{\z@}
  \def\@acmplainheadfont{\bfseries}
  \def\@acmplainnotefont{\normalfont}
\or % sigchi
\or % sigchi-a
\or % acmengage
\or % acmcp
\fi
```

acmplain The acmplain theorem style

```
\newtheoremstyle{acmplain}%
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space above
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space below
  {\@acmplainbodyfont}% body font
  {\@acmplainindent}% indent amount
  {\@acmplainheadfont}% head font
  {.}% punctuation after head
  {.5em}% spacing after head
  {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec
```

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

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

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

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

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

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

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

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

Customization of the acmdefinition theorem style:

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
```

```
  \def\@acmdefinitionbodyfont{\normalfont}
  \def\@acmdefinitionindent{\z@}
  \def\@acmdefinitionheadfont{\bfseries}
  \def\@acmdefinitionnotefont{\normalfont}
\or % sigchi
\or % sigchi-a
\or % acmengage
\or % acmcp
\fi
```

acmdefinition The acmdefinition theorem style

```
\newtheoremstyle{acmdefinition}%
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space above
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space below
  {\@acmdefinitionbodyfont}% body font
  {\@acmdefinitionindent}% indent amount
  {\@acmdefinitionheadfont}% head font
  {.}% punctuation after head
  {.5em}% spacing after head
 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec
```

Make acmplain the default theorem style.

```
\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.

```
\AtEndPreamble{%
  \if@ACM@acmthm
  \theoremstyle{acmplain}
  \@ifundefined{theorem}{%
  \newtheorem{theorem}{Theorem}[section]
  }{}
  \@ifundefined{conjecture}{%
  \newtheorem{conjecture}[theorem]{Conjecture}
  }{}
  \@ifundefined{proposition}{%
  \newtheorem{proposition}[theorem]{Proposition}
  }{}
  \@ifundefined{lemma}{%
  \newtheorem{lemma}[theorem]{Lemma}
  }{}
  \@ifundefined{corollary}{%
  \newtheorem{corollary}[theorem]{Corollary}
  }{}
  \theoremstyle{acmdefinition}
  \@ifundefined{example}{%
```

```
  \newtheorem{example}[theorem]{Example}
  }{}
  \@ifundefined{definition}{%
  \newtheorem{definition}[theorem]{Definition}
  }{}
  \fi
  \theoremstyle{acmplain}
}
```

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

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

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

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

Customization of the proof environment.

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@proofnamefont{\itshape}
  \def\@proofindent{\noindent}
\or % sigchi
\or % sigchi-a
\or % acmengage
\or % acmcp
\fi
```

`proof` We want some customization of the proof environment.

```
\renewenvironment{proof}[1][\proofname]{\par
  \pushQED{\qed}%
  \normalfont \topsep6\p@\@plus6\p@\relax
  \trivlist
  \item[\@proofindent\hskip\labelsep
        {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
}{%
  \popQED\endtrivlist\@endpefalse
}
```

3.27 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.

```
\AtEndPreamble{%
  \if@ACM@pbalance
    \global\@ACM@balancefalse
    \ifcase\ACM@format@nr
    \relax % manuscript
       \or % acmsmall
```

```
      \or % acmlarge
      \or % acmtog
         \RequirePackage{pbalance}%
      \or % sigconf
         \RequirePackage{pbalance}%
      \or % siggraph
         \RequirePackage{pbalance}%
      \or % sigplan
         \RequirePackage{pbalance}%
      \or % sigchi
         \RequirePackage{pbalance}%
      \or % sigchi-a
      \or % acmengage
         \RequirePackage{pbalance}%
      \or % acmcp
    \fi
  \fi
  \if@ACM@balance
    \ifcase\ACM@format@nr
    \relax % manuscript
         \global\@ACM@balancefalse
      \or % acmsmall
         \global\@ACM@balancefalse
      \or % acmlarge
         \global\@ACM@balancefalse
      \or % acmtog
         \RequirePackage{balance}%
      \or % sigconf
         \RequirePackage{balance}%
      \or % siggraph
         \RequirePackage{balance}%
      \or % sigplan
         \RequirePackage{balance}%
      \or % sigchi
         \RequirePackage{balance}%
      \or % sigchi-a
         \global\@ACM@balancefalse
      \or % acmengage
         \RequirePackage{balance}%
      \or % acmcp
         \global\@ACM@balancefalse
    \fi
  \fi
}
\AtEndDocument{%
  \if@ACM@balance
  \if@twocolumn
  \balance
  \fi\fi}
```

3.28 Acknowledgments

\acksname

```
\newcommand\acksname{Acknowledgments}
```

\acks This is a comment-like structure

```
\specialcomment{acks}{%
  \begingroup
  \section*{\acksname}
  \phantomsection\addcontentsline{toc}{section}{\acksname}
}{%
  \endgroup
}
```

\grantsponsor We just typeset the name of the sponsor

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

\grantnum

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

3.29 Conditional typesetting

We use the comment package for conditional typesetting:

```
\AtEndPreamble{%
\if@ACM@screen
  \includecomment{screenonly}
  \excludecomment{printonly}
\else
  \excludecomment{screenonly}
  \includecomment{printonly}
\fi
\if@ACM@anonymous
  \excludecomment{anonsuppress}
  \excludecomment{acks}
\else
  \includecomment{anonsuppress}
\fi}
```

3.30 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'.

```
\newcommand\showeprint[2][arxiv]{%
  \def\@tempa{#1}%
  \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
  \def\@tempb{arxiv}%
  \ifx\@tempa\@tempb\relax
     arXiv:\href{https://arxiv.org/abs/#2}{#2}%
  \else
     \def\@tempb{arXiv}%
     \ifx\@tempa\@tempb\relax
       arXiv:\href{https://arxiv.org/abs/#2}{#2}%
     \else
       #1:#2%
    \fi
  \fi}
```

3.31 Index

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

```
\def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
  \columnseprule\z@ \columnsep 35\p@
  \@indextitlestyle
  \let\item\@idxitem
  \parindent\z@  \parskip\z@\@plus.3\p@\relax
  \raggedright
  \hyphenpenalty\@M
  \footnotesize}
```

3.32 End of Class

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

```
\let\@vspace@orig=\@vspace
\let\@vspacer@orig=\@vspacer
\apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
    only be used to provide space above/below surrounding
    objects}}{}{}
\apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
    only be used to provide space above/below surrounding
    objects}}{}{}
\let\@vspace@acm=\@vspace
\let\@vspacer@acm=\@vspacer
```

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

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

\ACM@origsection We produce an error if the user tries to change \section

```
\let\ACM@origsection\section
\AtEndDocument{\ifx\section\ACM@origsection\else
  \ClassError{\@classname}{An attempt to redefine
    \string\section\space detected.  Please do not do this for
    ACM submissions!}\fi}
```

\ACM@origsubsection We produce an error if the user tries to change \subsection

```
\let\ACM@origsubsection\subsection
\AtEndDocument{\ifx\subsection\ACM@origsubsection\else
  \ClassError{\@classname}{An attempt to redefine
    \string\subsection\space detected.  Please do not do this for
    ACM submissions!}\fi}
```

\ACM@origsubsubsection We produce an error if the user tries to change \subsubsection

```
\let\ACM@origsubsubsection\subsubsection
\AtEndDocument{\ifx\subsubsection\ACM@origsubsubsection\else
  \ClassError{\@classname}{An attempt to redefine
    \string\subsubsection\space detected.  Please do not do this for
    ACM submissions!}\fi}
```

\ACM@origparagraph We produce an error if the user tries to change \paragraph

```
\let\ACM@origparagraph\paragraph
\AtEndDocument{\ifx\paragraph\ACM@origparagraph\else
  \ClassError{\@classname}{An attempt to redefine
    \string\paragraph\space detected.  Please do not do this for
    ACM submissions!}\fi}

\normalsize\normalfont\frenchspacing
```

⟨/class⟩

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Change History

1.48
General: Added prologue option to xcolor 52
Bib code cleanup (Zack Weinberg) 38
Documentation update (siggraph) . 38
1.49
General: New journal: DTRAP 38
1.53
General: New journals: PACMCGIT, TIOT, TDSCI 38
Rearranged docs 38
1.54
General: Moved footnote stuff before hyperref call (Ross Moore) 38
1.56
General: Documented `\Description` 38
1.57
General: Booktabs package is now the default 38
1.58
General: Changes in samples (Enrico Gregorio) 38
New journal: HEALTH. TDS is renamed to TDSCI 38
1.60
General: New option: urlbreakonhyphens 38
`\if@ACM@urlbreakonhyphens`: introduced macro 39
1.62
General: New journal: TELO 38
1.63
General: New journal: FACMP 38
New journal: TQUANT 38
1.63a
General: Move: TQUANT to TQC . . 38
1.64
General: Putting abstract after `\maketitle` now causes an error . 38
1.65
General: New journal: DGOV 38
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 38
Authors' addresses are mandatory for journal articles 38
`\@mkauthorsaddresses`: Added warning for missing addresses . 102
`\ccsdesc@parse`: Added warning for missing concepts 82
`\if@ACM@printacmref`: Added warning for longer papers 79
`\keywords`: Added warning for missing keywords 78
1.69
`\vspace`: Added the changed command to avoid grouping . . . 119
1.70
General: Name change for TDS 62
1.71
General: Bibliography change: volume for @inproceedings is now in brackets together with series . . . 38
LuaTeX now uses the OTF versions of fonts 38
Retired sigchi and sigchi-a 38
1.75
General: Documentation update . . . 38
1.78
General: Documentation update: Word count 38
1.79
General: Updated indormation for TAP, TCPS, TEAC 62
1.80
General: Added DLT and FAC 62
1.82
General: Updated abbreviations and codes for several journals 62
1.84
General: New journals: JDS, GAMES 38, 62
1.85
General: Added CC licenses 38
Added: acmengage 50
New journal: JRC 62
`\@mkauthors`: Added: acmengage . . 96
`\@mktitle`: Added: acmengage 93
`\@printtopmatter`: Added: acmengage 92
`\@specialsection`: Added: acmengage 91
`\@subtitlefont`: Added: acmengage 94
`\@titlefont`: Added: acmengage . . 93
`\ACM@linecountR`: Added: acmengage 105
`format`: New format: acmengage . . . 39
`\parskip`: Added: acmengage 54

1.87
General: New journals: ACMJCSS, JATS, TORS 62
format: New format: acmcp 39
1.88
General: Added ISSN for ACMJCSS . 62
Added ISSN for GAMES 62
Added PACMNET 62
1.89
General: Added PACMMOD 62
Added TOPML 62
\@printtopmatter: Moved badges to top header 92
1.90
General: Added TOPML eISSN 62
1.90a
General: Changes in the sample keywords and concepts 38
1.92
General: Documentation update: use of 'anonymous' throughout 38
Moved hyperxmp again due to kernel update 50
2.04
General: Deleted loading ifdraft due to the new release of hyperxmp . . . 50
Explicitly load ifdraft since hyperxmp tries to load it inside a group 50
2.05
General: New data for TELO 62
2.06
General: Added eISSN for a number of journals 62
2.07
General: Another change for TELO . 62
2.13
\orcid: Protected orchidcite against uppercasing 75
2.15
General: Added AILET, TAIS, TAISAP, ACMJDS 62
2.16
General: Corrected handling of journals in the options 62
2.17
General: Fixed bug with ACMJDS . . 62

v1.00
General: First released version 38
v1.01
General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/acmart/issues/1) 38
Defined ACM colors 38
Explicitly put draft option (closes https://github.com/borisveytsman/acmart/issues/4) 42
Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/acmart/issues/5) 38
v1.02
General: Added TOPS and TSC (closes https://github.com/borisveytsman/acmart/issues/12) 38
Documentation changes (closes https://github.com/borisveytsman/acmart/issues/13) 38
v1.03
General: Added anonsuppress environment 38
Added authorversion option (closes https://github.com/borisveytsman/acmart/issues/9) 38
\@formatdoi: Added macro 84
\if@ACM@authorversion: Added macro 40
\maketitle: Added special case of authorversion 88
v1.04
General: Updated bibliography for siggraph 38
\acmArticleSeq: Name change by Matthew Fluet 76
\acmDOI: Name change by Matthew Fluet 77
\acmISBN: Name change by Matthew Fluet 77
v1.05
General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib 38
Patched \setcitestyle command; closes https://github.com/borisveytsman/acmart/issues/19 38
v1.06
\@ACM@badge@skip: Added macro . . 77
\@ACM@badge@width: Added macro . 77
\@ACM@title@width: Added macro . 77

\@mktitle@i: Added processing badges 94
Made generic 94
\@mktitle@ii: Now this macro is obsolete 95
\@mktitle@iii: Added processing badges 95
Made more generic 95
\@mktitle@iv: Made more generic . 95
\@printtopmatter: Added processing badges 92
\@subtitlefont: Added macro 94
\@titlefont: Added macro 93
\acmBadgeL: Added macro 78
\acmBadgeR: Added macro 77
\if@ACM@badge: Added macro 77

v1.07
\maketitle: Corrected a bug with abstract footnotes 88
Corrected a bug with permssion and footnotes order 88

v1.08
General: SIGPLAN reformatting by Matthew Fluet 38
Typos corrected (Tobias Pape) . . . 38

v1.09
General: Revert SIGPLAN caption rules 38

v1.10
General: Changes of 'licensedothergov' wording 82
\maketitle: Corrected a bug with doi in manuscript and author vertsion, https://github.com/borisveytsman/acmart/issues/36 88
standardpagestyle: Reversed folios location 106

v1.11
General: Customization of ACM theorem styles and proof environment by Matthew Fluet . . 38

v1.12
General: Added graceful behavior when libertine fonts are absent . . 56
Documentation updates 38
\@marginfigure: Now centering by default 60
\@margintable: Now centering by default 60
\@mkauthors@i: Removed MakeTextUppercase due to a bug with new kernel 98
\@parfont: Moved to \section@raggedright 112
\copyrightpermissionfootnoterule: Added macro 54
\descriptionlabel: Redefined 62
\footnoterule: Made shorter 55
\if@ACM@natbib@override: Added macro 41
\if@ACM@newfonts: Added macro . . 56
\maketitle: Moved thankses to copyrightpermission box 88
\section@raggedright: Introduced macro 112

v1.13
General: Font adjustments for acmsmall 97
Increased font size for ACM Large 44
Print bibliographic information by default for the proceedings 79
\@mpfootnotetext: Made minipage footnotes centered 50
\bibliographystyle: Redefined macro 51
\bibstyle@acmauthoryear: Added macro 47
\bibstyle@acmnumeric: Added macro 47
\if@ACM@printfolios: Added macro 79
standardpagestyle: Added headers for sigs 106
Expanded headers for sigchi-a . . . 106
Suppressed folios if sig 106

v1.14
General: \citestyle updates (Matthew Fluet) 38
Patched \citestyle 45
\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use 47
\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use . . 47

v1.15
\@ACM@addtoaddress: Added macro 95
\@mkauthors@iii: New authors system 99
\@shortauthors: Introduced macro . 106
\@typeset@author@bx: Moved to separate macro 99
\acks: Added macro 118
\affiliation: Added code for author groups 74
\author: Added code for author groups 73
\city: Added macro 95

\country: Added macro 95
\department: Added macro 95
\grantnum: Added macro 118
\grantsponsor: Added macro 118
\if@insideauthorgroup: Introduced macro 73
\institution: Added macro 95
\num@authorgroups: Renamed 73
\orcid: Introduced macro 75
\position: Added macro 95
\postcode: Added macro 95
\state: Added macro 95
\streetaddress: Added macro 95
standardpagestyle: Better handling of anonymous mode 106
v1.16
General: Formatting header/footer (Matthew Fluet) 38
\@headfootfont: Added macro 106
standardpagestyle: Customize header/footer text font 106
v1.17
General: Slightly decreased margins for sigs 52
\@makefnmark: Redefined 50
\@mkauthors: TOG now uses the same authors block as other journals . . 96
\@mkauthors@ii: Deleted 99
\@mkbibcitation: Added \nobreak 103
Changed format for sigs 103
\acmArticle: The default is now numerical 76
\acmMonth: The default must be numerical. Closes #50. 76
\acmNumber: The default is now numerical 76
\acmVolume: The default is now numerical 76
\acmYear: The default is now numerical 76
\description: Decreased indent . . . 62
\grantnum: Added url 118
\grantsponsor: Renamed 118
\if@ACM@printacmref: Renamed from \if@ACM@printbib 79
standardpagestyle: Added paper title to sigs 106
v1.18
General: Natbib is now the default for all formats 38
\@mkauthors@i: Now we andify affiliations 98
\@typeset@author@line: Added macro 97
v1.19
General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet) 38
Include 'References' in PDF bookmarks (Matthew Fluet) 45
Tagging code for tables 59
\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet) 103
\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet) 118
v1.20
General: Bug fixes for bst 38
\@mkabstract: Deleted spurious space 103
v1.21
\showeprint: Added macro 118
v1.22
General: More bibliography changes for Aptara 38
v1.23
General: Add PACMPL journal option 38
v1.24
General: Add IMWUT journal option 62
v1.25
General: Updated PACMPL 62
v1.26
General: Corrected \shortcite bug . 38
Documentation typos fixed (thanks to Stephen Spencer) 38
v1.27
\if@ACM@printccs: Typo corrected . 79
v1.28
General: Corrected option natbib behavior 47
Got rid of warnings in pdf keywords 50
\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato) 81
v1.29
General: Increased head to 13pt 52
\@mkabstract: Removed spurious indentation (John Wickerson) . . 103
\ccsdesc@parse: Add spacing after bullet and around rightarrow; semicolon separators no longer in bold/italic (John Wickerson) 81
standardpagestyle: Corrected printfolios (Matthew Fluet) 106
v1.30
General: Added \frenchspacing . . . 120
Bibtex style now recognizes https://in doi 38

Switched to T1: looks like libertine has problems with \l in OT1 . . . 56
Updated IMWUT and PACMPL . . 62
\department: Added optional parameter 95
v1.31
General: Documentation changes . . . 38
\@additionalaffiliation: Added macro 74
\@mkbibcitation: Disabled linebreak 103
\@startsection: Added \tochangmeasure 49
\@starttoc: Redefined macro 49
\@textbottom: Redefined 55
\acmMonth: The default now is the current month (Matteo Riondato) 76
\acmYear: The default now is the current year (Matteo Riondato) . . 76
\additionalaffiliation: Added macro 74
\l@subsection: Redefined macro . . 49
\l@subsubsection: Redefined macro 49
v1.32
General: Added POMACS journal option 38
Format siggraph is now obsolete . 38
\@formatdoi: New doi format 84
v1.33
General: Added acmart-preload-hook 38
Added cmap and glyphtounicode . 56
BibTeX comma before articleno bug corrected 38
BibTeX crossref bug corrected . . . 38
BibTeX numpages bug corrected . 38
Documentation updates 38
Moved \citename definition for non-natbib bibliography, so a package may redefine it 51
Switched to Type 1 fonts for libertine even if OTF-capable engine is used (Kai Mindermann) . 56
\@ACM@addtoaddress: Added obeypunctuation code 95
\@mkauthors@i: Added obeypunctuation code 98
\@mkauthors@iii: Added obeypunctuation code 99
\@mkauthors@iv: Added obeypunctuation code 100
\@subtitlefont: Added \normalsize 94
\ACM@linecountL: Renamed macro . 105
\ACM@linecountR: Added macro . . . 105
\ACM@timestamp: Added current page number 105
Added macro (Michael D. Adams) . 105
Added submission id 105
\acmSubmissionID: Added macro . . 77
\city: Added obeypunctuation code 95
\country: Added obeypunctuation code 95
\department: Added obeypunctuation code 95
\if@ACM@affiliation@obeypunctuation: Added macro 74
\if@ACM@authordraft: Added macro 41
\if@ACM@natbib@override: Deleted macro 41
\if@ACM@timestamp: Added macro (Michael D. Adams) 41
\institution: Added obeypunctuation code 95
firstpagestyle: Added right linecount for two-column formats 108
Added timestamp (Michael D. Adams) 108
\maketitle: Fixed the bug with figures on top and bottom of the title page, thanks to David Epstein 88
\position: Added obeypunctuation code 95
\postcode: Added obeypunctuation code 95
\state: Added obeypunctuation code 95
\streetaddress: Added obeypunctuation code 95
standardpagestyle: Added right linecount for two-column formats 106
Added timestamp (Michael D. Adams) 106
v1.34
\@mkbibcitation: Deleted DOI from doi numbers 103
\ACM@linecount@bx: Rulers now are continuous 104
\ACM@linecountL: Rulers now are continuous 105
\ACM@linecountR: Rulers now are continuous 105
\maketitle: Added date to the bibstrip in conf proceedings 88
Deleted 'DOI' from doi numbers . 88
Rearranged bibstrip 88
The \terms command is now obsolete 88
\terms: The \terms command now just produces a warning 78

v1.35
General: BibTeX bug fixed: et al. . . . 38
If the copyright is set to usgov or rigtsretained, the price is suppressed 82
\bibstyle@acmauthoryear: Square brackets for author-year style . . . 47
v1.36
General: Added PACMHCI journal options 62
Added the possibility to adjust number of author boxes per row in conference formats 38
\@ACM@authorsperrow: Added macro 79
\@mkauthors@iii: Added authorsperrow overrride 99
\@mkauthors@iv: Added authorsperrow overrride 100
\if@ACM@authordraft: Corrected typo, thanks to bargteil 41
v1.37
General: Reduce list indentation (Matthew Fluet) 61
Set \normalparindent; Reduce list indentation (Matthew Fluet) 38
\description: Reduce list indentation (Matthew Fluet) 62
\descriptionlabel: Reduce list indentation (Matthew Fluet) 62
\normalparindent: Set \normalparindent (Matthew Fluet) 54
v1.38
General: Increase default font size for SIGPLAN 38, 44
v1.39
\@@authornotemark: Added macro . 102
\authornotemark: Added macro . . . 76
v1.40
General: Added 'textcase' package . . 45
Added heightrounded to geometry 52
Added new copyright version: licensedcagov 38
Added package cleveref 38
Added Ross Moore code for glyphtounicode 56
Bibliography changes 38
\@copyrightowner: Added new copyright version: licensedcagov . 83
\@copyrightpermission: Added new copyright version: licensedcagov . 84
\@mkauthors@i: Switched to MakeTextUppercase 98
\@parfont: Switched to MakeTextUppercase 112
\ACM@linecount@bx: Work around a bug in xcolor: looks like cmyk colors in boxes do not work . . . 104
\ccdesc@parse@finish: Added macro 82
\city: We now do not print this even in SIG 95
\country: Fixed bugs with extra spaces 95
\l@subsection: Redefined macro . . 49
\postcode: We now do not print this even in SIG 95
\state: We now do not print this even in SIG 95
\streetaddress: We now do not print this even in SIG 95
v1.41
General: Added new badges 38
v1.42
General: Deleted ACM badges 38
v1.43
\@starttoc: Added \makeatletter 49
\country: Added comma before country for journals 95
v1.44
General: Added package refcount . . . 38
Deleted package cleveref 38
Put theorem defs in a separate style 38
\@acmBooktitle: Added macro 72
\@acmEditors: Added macro 72
\@editorsAbbrev: Added macro . . . 72
\@folioblob: Suppress the blob if acmArticleSeq is empty 108
\@mkbibcitation: If the paper has just one page, use 'page' instead of 'pages' 103
\ACM@restore@pagestyle: Added macro 104
\acmArticle: The default is now empty 76
\acmArticleSeq: Now acmArticle might be empty 76
\acmBooktitle: Added macro 72
\editor: Added macro 72
\if@ACM@acmthm: Added macro 39
\maketitle: Empty DOI or ISBN are not printed (by Michael Ekstrand) 88
v1.45
\@folioblob: Switched \bfeseries\sffamily to \sffamily\bfseries 108

\@parfont: Switched \bfeseries\sffamily to \sffamily\bfseries 112
\@titlefont: Switched \bfeseries\sffamily to \sffamily\bfseries 93
v1.46
General: Added etoolbox 38
Bst file bug fixes: label width is calculated correctly 38
Delayed hypersetup since journal options may change screen mode 50
PACM now set screen to true 62
Restore theorem defs to class file . 38
\@mkauthorsaddresses: Introduced macro 101
\@mkbibcitation: Added subtitle . . 103
\@printendtopmatter: Made it \par\bigskip uniformly 104
\@printtopmatter: Deleted rule . . . 92
\@setauthorsaddresses: Introduced macro 104
\ACM@linecount@bx: Rearranged the code to get rid of spurious underfull messages (Benjamin Byholm) 104
\author: Started counting authors . . 73
\authorsaddresses: Introduced macro 75
\country: Corrected spacing for institution 95
\if@ACM@acmthm: Modified description 39
\liningnums: Workaround for compatibility with fontspec 57
\maketitle: Added authors' addresses 88
Thankses go before authors' addresses 88
\num@authors: Introduced macro . . 73
v1.47
General: New journal: THRI 38
v1.48
General: \citeyear no longer behaves like \citeyearpar 51
Code prettying (Michael D. Adams) 38
Initial support for Biblatex (Daniel Thomas) 38
Misc entries in the bibliography no longer produce a separate date . . 38
Typos fixed (Jamie Davis) 38
\@headfootfont: Deleted unnecessary switch (Michael D. Adams) 106
\@mkabstract: Removed spurious indentation if abstract is followed by an empty line 103
\ACM@timestamp: Fromatting change (Michael D. Adams) 105
\if@ACM@review: Review mode now switches on folios 40
\maketitle: Added acmart and version info to pdfcreator tag . . . 88
Added language and doctitle attributes to PDF (Andreas Reichinger) 88
Suppressed empty DOI (Serguei Mokhov) 88
v1.50
\@copyrightpermission: New copyright statements for iw3c2w3[g] 84
v1.51
General: Corrected the bug with price suppression 82
Suppress price if the copyright is set to iw3c2w3 or iw3c2w3g 82
XeTeX now uses OTF fonts (Joachim Breitner) 56
firstpagestyle: We now use journal abbreviation for footers 108
standardpagestyle: We now use journal abbreviation for footers . 106
v1.52
\@copyrightowner: Rewording of licenses 83
\@copyrightpermission: Another rewording of copyright statements for iw3c2w3[g] 84
v1.53
General: Added PACMCGIT, TIOT, TDSCI 62
v1.54
General: Added Ross's patch for sectioning 111
Deleted indent for subsubsection . 111
XeTeX now uses T1 encoding . . . 56
\@mkbibcitation: Bug corrected (Ross Moore) 103
\@shortauthors: Added submission id in anonymous mode 106
\ACM@adddotafter: Added macro . . 111
\ACM@NR@adjustedSectionformat: Added macro 111
\ACM@NRadjust: Added macro 110
\author: Added submission id in anonymous mode 73
\if@ACM@nonacm: Added macro 40

v1.55
General: Now we use purple color for links 50
Table captions for SIGCHI now use the same font size as figure captions (Luis Leiva) 58
Typo corrected (Zack Weinberg) . 45
\@mkbibcitation: Bug corrected . . . 103
\maketitle: Fixes topnum 88
v1.56
General: Looks like XeTeX requires explicit monotype font declaration 56
Make two-column layouts flush (Philip Quinn) 52
\@marginfigure: Added checking for description 60
\@mkteasers: Added check for description 102
\acksname: Added macro (Philip Quinn) 117
\ccsdesc@parse: End the concepts list with a period (Philip Quinn) . 81
\Description: Added macro 57
\if@Description@present: Added macro 57
\if@undescribed@images: Added macro 57
v1.57
\ACM@origbaselinestretch: Added check whether the user changed \baselinestretch 119
\author: Added warning if \author has comma 73
\email: Added warning if \author has comma 74
\if@ACM@balance: Added macro . . . 40
\vspace: Added warning 119
v1.58
General: Added HEALTH. TDSCI is renamed to TDS 62
Suppressed \addtocounter in pdf subject 50
\@dblfloat: Deleted spurious \vspace warning 60
\@marginfigure: Deleted spurious \vspace warning 60
\@margintable: Deleted spurious \vspace warning 60
\@mkbibcitation: Deleted spurious \vspace warning 103
\@printendtopmatter: Deleted spurious \vspace warning 104
\@sidebar: Deleted spurious \vspace warning 60
\maketitle: Original \vspace inside \maketitle 88
\vspace: Preserved old versions as \@vspace@orig and \@vspace@orig 119
v1.59
\acmConference: Setting \@ACM@journal@bibstrip 72
\acmJournal: Setting \@ACM@journal@bibstrip 71
\if@ACM@journal@bibstrip: Introduced macro 42
firstpagestyle: Added logic for conference papers using journal format 108
Moved page styles to \AtBeginDocument 108
standardpagestyle: Added logic for conference papers using journal format 106
Moved page styles to \AtBeginDocument 106
v1.60
\@headfootfont: Moved to footnotesize 106
v1.61
\@typeset@author@bx: Added \normalbaselines 99
v1.64
\ACM@linecount@bx: Bug fix: made the spacing on the left and the right size equal 104
\if@ACM@maketitle@typeset: Introduced macro 62
\maketitle: Added a switch setting to show that \maketitle is typeset . 88
v1.65
\@mkauthorsaddresses: Deleted cs@addpunct 101
v1.66
General: Patching algorithm and algorithm* to prevent spurious space warnings 58
\@specialsection: Suppress warnings about \vspace 91
v1.67
General: Patching lstlisting and lstlisting* to prevent spurious space warnings 58
\@parfont: Deleted redefinitions of sections 112
\@specialsection: Paragraph inside group does not print its argument. Added a bugfix 91

v1.68
General: New command for unindent paras 111
\@specialsection: Deleted grouping altogether 91
v1.69
General: No dots for unindented paragraphs 111
\@printendtopmatter: Deleted grouping 104
\@specialsection: Changed dot to colon for sigplan 91
\ACM@linecountR: Do not increase numbers in one column format . 105
\ccsdesc@parse: Use math right arrow in text 81
v1.71
\l@subsubsection: Bug fixed (thanks to Andrew Black) 49
v1.72
\author: Added \detokenize (Kuldeep S. Meel) 73
\maketitle: Do not andify authors for pdf metadata (Scott Pakin) . . . 88
v1.73
General: Patching minted and minted* to prevent spurious space warnings 58
\@ACM@checkaffil: Added macro . . 98
\@ACM@resetaffil: Added macro . . 98
\@mkauthors@i: Check the presence of required elements for affiliations 98
\@mkauthors@iii: Check the presence of required elements for affiliations 99
\@mkauthors@iv: Check the presence of required elements for affiliations 100
\city: Check the presence in affil . . 95
\country: Check the presence in affil 95
\if@ACM@citypresent: Added macro 98
\if@ACM@countrypresent: Added macro 98
\if@ACM@instpresent: Added macro 98
\institution: Check the presence in affil 95
\maketitle: Do not check again the presense of address fields 88
v1.74
General: Changed the order of font loading 56
v1.75
\@ACM@checkaffil: Changed warning to error for country 98
\@beginmaketitlehook: Introduced macro 87
\AtBeginMaketitle: Introduced macro 87
\maketitle: Added \@beginmaketitlehook 88
v1.76
General: Moved hyperxmp before hyperref, see https://github.com/borisveytsman/acmart/issues/425 50
\author: Added code for orcid links . 73
\if@ACM@pbalance: Added macro . . 40
\maketitle: Put \par inside group for keywords 88
\orcid: Added code for orcid links . . 75
standardpagestyle: Fixed bug with no line numbers for nonacm . . . 106
v1.77
\@mkauthorsaddresses: New separator of institutions 101
v1.78
\@mkauthors@i: Unboxing \mktitle@bx 98
\@mkauthors@iii: Unboxing \mktitle@bx 99
\@mkteasers: Unboxing \mktitle@bx 102
\@printtopmatter: Added processing the overflowing title box 92
\@specialsection: Again suppressed \vspace warning 91
v1.82
\anon: Introduced macro 87
v1.83
General: Use babel for multilanguage papers 47
\@mkabstract: I13n 103
\@mktitle@i: Added \translatedtitle and \translatedsubtitle 94
\@mktitle@iii: Added \translatedtitle and \translatedsubtitle 95
\@mktitle@iv: Added \translatedtitle and \translatedsubtitle 95
\@mktranslatedabstract: Added macro 103
\@mktranslatedkeywords: Added macro 75

\@translatedabstracts: Added macro 49
\@translatedkeywords: Added macro 48
\@translatedsubtitle: Added macro 48
\@translatedtitle: Added macro . 48
\ACM@lang@check: Added macro . . . 48
\ACM@languages: Introduced macro . 42
\maketitle: I13n 88
translatedabstract: Added macro 49
\translatedkeywords: Added macro 48
\translatedsubtitle: Added macro 48
\translatedtitle: Added macro . . 48
v1.85
General: Added CC licenses 82
\@acmengagemetadata: Introduced macro 88
\@copyrightowner: Added CC licenses 83
\@copyrightpermission: Added CC licenses 84
\@parfont: Added: acmengage 112
\@typesetengagemetadata: Introduced macro 104
\if@ACM@engage: Introduced macro . 42
\maketitle: acmengage 88
\setcctype: Added macro 83
\setengagemetadata: Introduced macro 88
v1.86
\country: Error if country is empty . 95
standardpagestyle: Special treatment of ACM Engage materials 106
v1.87
General: Added 'framed' package for acmcp 45
No numbering sections for ACMCP 113
\@ACM@color@frame: Introduced macro 80
\@ACM@copyright@check@cc: Added macro 84
\@copyrightpermission: CC licenses now are allowed only for non-acm or ACM engage publications 84
\@mkauthors@i: Special treatment for acmcp 98
\@mktitle@i: Special treatment for acmcp 94
\acmArticleType: Introduced macro 80
\acmCodeDataLink: Added possibility to have several links 81
Introduced macro 81
\acmDataLink: Introduced macro . . 81
Now this is the same as the code link 81
\if@ACM@acmcp: Introduced macro . . 42
firstpagestyle: Special treatment for acmcp 108
\maketitle: CC license are allowed for non-acm publications 88
\set@ACM@acmcpbox: Added macro . 91
standardpagestyle: Special treatment of ACMCP 106
v1.88
\@mktitle@i: Moved down title for acmcp 94
v1.89
General: Added 'zref-savepos' package for acmcp 45
\@ACM@acmcp@delta: Added dimen . 45
\@ACM@badge@skip: Redefined macro 77
\@ACM@color@frame: Added saving the position of the bottom 80
\@acmBadgeL: Introduced macro . . . 77
\@acmBadgeR: Introduced macro . . . 77
\@mktitle@i: Moved badges to top header 94
Moved up acmcp title 94
\@mktitle@iii: Moved badges to top header 95
\acmBadge: Added macro 78
\acmBadgeL: Redefined macro 78
\acmBadgeR: Redefined macro 77
\if@ACM@badge: Deleted macro 77
firstpagestyle: Moved badges here 108
\set@ACM@acmcpbox: Added logo . . . 91
Added zref position of the bottom 91
v1.91
\acmContributions: Restored the macro 81
standardpagestyle: Redesigned ACMP labels 106
v1.93
General: Added PACMSE journal option 38
v2.00
General: Deleted acmPrice 82
\@ACM@copyright@check@cc: Moved to warning 84
\@copyrightowner: Changed wording 83
\@folio@ht: Obsoleted macro 108
\@folio@max: Obsoleted macro 108
\@folio@voffset: Obsoleted macro . 108
\@folio@wd: Obsoleted macro 108
\@folioblob: Obsoleted macro 108
\@sect@kernel: Added macro 44
\@ssect@kernel: Added macro 44

\@startsection@kernel: Added macro 44
\@xsect@kernel: Added macro 44
\acmPrice: Deleted macro 77
firstpagestyle: Deleted blobs 108
\maketitle: Added "ACM" for papers 88
Deleted acmPrice 88
v2.01
General: Documentation update: POMACS uses acmsmall 38
\acmBooktitle: Moved default conference title to conference setting 72
\acmPrice: Now the macro produces a warning 77
v2.02
\acmConference: Moved here setting the conference title for bibstrip . . 72
v2.03
General: Added documentation about samples 38
\acmConference: Made setting bibstrip overriding journal 72
\if@ACM@journal@bibstrip@or@tog: Introduced macro 42
firstpagestyle: Special treatment of tog 108
\maketitle: Special processing for conferences in TOG 88
standardpagestyle: Special treatment of ACM TOG 106
v2.04
General: eISSN is printed, rather than pSSN 71
\@copyrightowner: Changed wording 83
v2.06
\@mkauthorsaddresses: \streetaddress and \postcode now produce warnings 101
\postcode: We now do not collect postal information anymore 95
\streetaddress: We now do not collect postal information anymore 95
v2.08
\@parfont: Deleted uppercasing . . . 112
v2.09
General: Saved the old definitions (Ulrike's code 44
\@ACM@copyright@check@cc: Deleted macro 84
\@copyrightpermission: Deleted checking whether CC licenses are allowed 84
v2.10
General: Added tocindent for paragraphs and subparagraphs . 113
v2.11
\@copyrightpermission: Changed URL for CC licenses 84
\maketitle: Deleted conference date from bibstrip 88
v2.12
General: Removed 'textcase' package 45
Use unicode-math and libertinus for Unicode engines 56
v2.13
General: Added mathcal in unicode mode 56
New warnings about lack of descriptions 57
v2.14
\ACM@origparagraph: Added check whether the user changed \paragraph 120
\ACM@origsection: Added check whether the user changed \section 119
\ACM@origsubsection: Added check whether the user changed \subsection 119
\ACM@origsubsubsection: Added check whether the user changed \subsubsection 119
v2.15
General: Added symbols in unicode mode 56
\@@authornotemark: Suppressed spurious overfull warning 102
\@authornotemark: Suppressed spurious overfull warning 102
v2.16
\IfDocumentMetadata: Provided stubs for old kernels 38
v2.17
General: Added tagging documentation 38
Moved tagged code to the main class 44
Rearranged documentation 38
\@startsection: Moved tagging code to the main class 49
v2.18
General: Added pifont 57
Deleted IMS designation 38
Keywords are now deprecated. Deleted them from the samples . . 38
Merged tagged branch 38

Moved note before url (suggested by David F. Kotz) 38
New code for captions 59
Revised documentation 38
Rewrote caption code for tagging . 58
Switched off warning in tagged mode 57
`\@ACM@addtoaddress`: Deleted the cleaders code 95
`\@correspondingauthormark`: Added macro 76
`\@mkauthors@iii`: Email is now clickable 99
`\@mkauthors@iv`: Email is now clickable 100
`\@mkauthorsaddresses`: Email is now clickable 101
`\correspondingauthor`: Added macro 76
v2.19
General: ACM cleared their position about keywords. Re-added them . 38
v2.20
`\acmConference`: Proceedings headers, footers and folios for acmsmall used for conference proceedings 72

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

\- 540
\@ . . . 1964, 1967, 1979, 1984, 1989, 2073, 2110
\@@authornotemark 1685, 2843
\@ACM@acmcp@delta 288, 2339, 2343
\@ACM@acmcpbox 2326, 2330, 2326, 3211
\@ACM@acmcpfalse . . . 174
\@ACM@acmcptrue 232
\@ACM@addtoaddress . 2542, 2572, 2573, 2574
\@ACM@authorsperrow 1790, 2718, 2719, 2771, 2772
\@ACM@badge@skip 1715, 1727, 1740
\@ACM@badge@width 1712, 1724, 1730, 1737, 1743
\@ACM@balancefalse 3463, 3487, 3489, 3491, 3503, 3507
\@ACM@checkaffil 2297, 2656, 2687, 2692, 2754, 2759, 2799, 2804
\@ACM@citypresentfalse 2653
\@ACM@citypresenttrue . . . 2559, 2572, 2648
\@ACM@color@frame 1847, 2323
\@ACM@commabox 2542
\@ACM@copyright@check@cc 2000
\@ACM@countrypresentfalse 2654
\@ACM@countrypresenttrue . . . 2564, 2574, 2650
\@ACM@engagefalse . . 172
\@ACM@engagetrue . . . 229
\@ACM@institution@separator . . . 2824, 2825, 2830
\@ACM@instpresentfalse 2652
\@ACM@instpresenttrue . . . 2557, 2568, 2646
\@ACM@journal@bibstrip@or@tog@false 1529
\@ACM@journal@bibstrip@or@tog@true 215, 237, 1513
\@ACM@journal@bibstripfalse 239, 1527
\@ACM@journal@bibstriptrue 236, 1512
\@ACM@journalfalse 217, 219, 221, 223, 225, 228
\@ACM@journaltrue . . 208, 210, 212, 214, 231
\@ACM@labelwidth 983, 986, 994, 999, 1025
\@ACM@maketitle@typesetfalse 1032
\@ACM@maketitle@typesettrue 2173
\@ACM@manuscriptfalse 203
\@ACM@manuscripttrue 201
\@ACM@newfontsfalse 761, 764, 767
\@ACM@newfontstrue . 758
\@ACM@printacmreffalse 99, 233
\@ACM@printfoliostrue 82
\@ACM@resetaffil . . . 2651, 2686, 2691, 2753, 2758, 2798, 2803
\@ACM@reviewtrue . . . 144
\@ACM@screentrue 1173, 1224, 1231, 1248, 1255, 1262
\@ACM@sigchiamodefalse 205
\@ACM@sigchiamodetrue 226
\@ACM@timestamptrue 143
\@ACM@title@width 1714, 2515, 2517, 2526, 2527
\@DeclareACMFormat 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53
\@Description@presentfalse . . 824, 827, 933, 2850
\@Description@presenttrue 800, 803
\@M 472, 3561
\@abstract 1761, 2858, 2865
\@acmArticle 1692, 1695, 2263, 2883, 2884, 3012, 3015, 3035, 3045, 3057, 3130, 3153, 3163, 3174, 3215
\@acmArticlePage . . . 3011, 3029, 3030, 3039, 3042, 3049, 3053
\@acmArticleSeq 1694
\@acmBadgeL 1718, 1733, 1734, 1739, 3144, 3156, 3157, 3168, 3169, 3181, 3184, 3189, 3210
\@acmBadgeR 1717, 1720, 1721, 1726, 3145, 3158, 3159, 3166, 3167, 3182, 3185, 3190, 3211
\@acmBooktitle . 1532, 1542, 2230, 2253, 2899
\@acmCodeDataLink 1854, 1855, 1857, 1859, 2346, 2347
\@acmContributions 1860, 2352, 2353
\@acmDOI . . 1710, 2255, 2258, 2264, 2267, 2907, 3074, 3076, 3098, 3100, 3131, 3216
\@acmEditors 1545, 1546, 1547, 1550, 2900, 2901
\@acmISBN 1708, 2266
\@acmMonth 1698, 1700, 2263
\@acmNumber 1690, 2896, 3035, 3045, 3057, 3129, 3153, 3163, 3174, 3214
\@acmPubDate 1700, 2896, 3035, 3045, 3058, 3131, 3154, 3164, 3175, 3216
\@acmSubmissionID 1571,

1572, 1591, 1592, 1706, 2992, 2993, 3003
\@acmVolume 1688, 2896, 3034, 3044, 3057, 3129, 3152, 3162, 3174, 3214
\@acmYear . . 1696, 1703, 2146, 2230, 2263, 2887
\@acmdefinitionbodyfont . . . 3374, 3386, 3400
\@acmdefinitionheadfont . . . 3376, 3388, 3402
\@acmdefinitionindent . . . 3375, 3387, 3401
\@acmdefinitionnotefont . . . 3377, 3389, 3405
\@acmengagemetadata . . . 2167, 2169, 2920
\@acmownedfalse 1915, 1918, 1921, 1926, 1929, 1932, 1935, 1938, 1944, 1947, 1950, 1953
\@acmownedtrue 1902, 1911, 1941
\@acmplainbodyfont 3342, 3354, 3368
\@acmplainheadfont 3344, 3356, 3370
\@acmplainindent 3343, 3355, 3369
\@acmplainnotefont 3345, 3357, 3373
\@adddotafter 3230, 3231, 3233, 3245, 3263, 3268, 3336
\@additionalaffiliation 1617, 1618
\@addpunct . 2828, 2916, 2917, 3336, 3337, 3457
\@addspaceafter 3337
\@affiliationfont 2605, 2610, 2614, 2617, 2620, 2623, 2626, 2629, 2632, 2635, 2687, 2710
\@afterheading 2319
\@afterindentfalse . 2318
\@article@string 2883, 2896, 2904
\@author 1570, 1576, 1583, 2672, 2737, 2784, 2831
\@authorfont 2604, 2609, 2613, 2616, 2619, 2622, 2625, 2628, 2631, 2634, 2674, 2710
\@authornotemark 1670, 1683, 2841
\@authornotes 1667, 1671, 2193
\@authorsaddresses 1642, 2202, 2355, 2836, 2917
\@auxout . . 576, 2342, 3331
\@begindocumenthook 572
\@beginmaketitlehook . . . 2163, 2166, 2172
\@botnum 2316
\@citestyle 322
\@classname . . . 25, 27, 36, 39, 42, 55, 57, 59, 60, 63, 65, 67, 68, 71, 73, 75, 76, 79, 81, 84, 85, 88, 90, 92, 93, 96, 98, 104, 105, 108, 109, 112, 113, 116, 118, 120, 121, 124, 126, 128, 129, 132, 134, 136, 137, 140, 142, 146, 147, 165, 176, 179, 182, 185, 188, 271, 433, 457, 759, 762, 765, 806, 832, 835, 936, 1174, 1225, 1232, 1249, 1256, 1263, 1507, 1509, 1561, 1616, 1628, 1704, 1748, 1754, 1759, 1766, 1768, 1769, 1772, 1774, 1775, 1778, 1786, 1788, 1789, 1791, 1792, 1840, 1893, 2304, 2549, 2552, 2658, 2661, 2664, 2817, 2820, 2837, 2853, 2880, 3565, 3568, 3575, 3580, 3585, 3590, 3595
\@concepts . 1865, 1877, 1891, 2281, 2283, 2301
\@copyrightowner 1961, 2237
\@copyrightpermission . . . 2000, 2213, 2225
\@copyrightyear 2145, 2237, 2239, 2240
\@correspondingauthormark 1676, 1678
\@currbox . . . 962, 963, 964
\@current@float@struct 901, 906
\@currentaffiliation 2711, 2714, 2736, 2743, 2744, 2747, 2750, 2751, 2756, 2783, 2790, 2791, 2793, 2795, 2796, 2801
\@currentaffiliations 2640, 2641, 2642, 2644, 2670, 2682, 2683, 2689
\@currentauthors . . . 1678, 2638, 2639, 2669, 2673, 2674, 2676, 2710, 2713, 2735, 2737, 2738, 2740, 2782, 2784, 2785, 2787, 2841, 2843
\@currentlabel . 490, 504
\@dblfloat 945
\@department . . 1621, 1622
\@dotsep 3341
\@editorsAbbrev 1544, 1549, 2901
\@empty 159, 245, 392, 432, 1524, 1532, 1546, 1568, 1571, 1589, 1591, 1596, 1597, 1603, 1720, 1733, 1751, 1752, 1808, 1809, 1815, 1822, 1854, 1865, 1891, 2164, 2197, 2202, 2239, 2255, 2266, 2267, 2278, 2281, 2287, 2291, 2346, 2349, 2352, 2355, 2391, 2520, 2529, 2538, 2563, 2640, 2673, 2681, 2682, 2737, 2743, 2750, 2784, 2790, 2795, 2836, 2846, 2883, 2888, 2900, 2907, 2992, 3003, 3074, 3076, 3098, 3100, 3130, 3131, 3215, 3216,

3345, 3377, 3526, 3543
\@endfloatbox 948
\@endpefalse 3459
\@endwidefloatbox 948, 956
\@finalstrut . . . 495, 508
\@firstofone 32
\@float 950
\@flushglue 3279
\@fnsymbol 2183
\@folio@ht 3136
\@folio@max 3136
\@folio@voffset 3136
\@folio@wd 3136
\@folioblob 3136
\@footnotemark . 511, 2181
\@footnotemark@nolink 511, 2181
\@footnotetext 486, 512, 2182
\@footnotetext@nolink 512, 2182
\@for 298, 3323, 3330
\@formatdoi 1999, 2258, 2264, 2267, 2907, 3074, 3076, 3098, 3100, 3131, 3216
\@fps 949
\@fpsadddefault 949
\@gobble 31, 320, 364
\@headfootfont 3005, 3029, 3030, 3031, 3032, 3038, 3041, 3048, 3052, 3066, 3067, 3073, 3075, 3079, 3082, 3090, 3091, 3097, 3099, 3103, 3106
\@idxitem 3558
\@ifnextchar 1621
\@ifnotempty 2151
\@ifnum 336, 338
\@ifundefined . . 3324, 3410, 3413, 3416, 3419, 3422, 3426, 3429
\@iiiparbox 722
\@indextitlestyle . . 3557
\@input 474
\@insideauthorgroupfalse 1559, 1611
\@insideauthorgrouptrue 1566
\@journalCode . . 1033, 1174, 1225, 1232, 1249, 1256, 1263, 1507
\@journalCode@nr 1033, 1112, 1514
\@journalName 1114, 1119, 1124, 1129, 1133, 1138, 1143, 1148, 1153, 1158, 1163, 1168, 1176, 1181, 1186, 1191, 1196, 1201, 1205, 1210, 1215, 1220, 1227, 1234, 1239, 1244, 1251, 1258, 1265, 1270, 1275, 1280, 1285, 1290, 1295, 1300, 1305, 1310, 1314, 1319, 1324, 1329, 1334, 1339, 1344, 1348, 1353, 1358, 1363, 1368, 1373, 1378, 1383, 1388, 1393, 1398, 1403, 1408, 1413, 1418, 1423, 1428, 1433, 1438, 1443, 1448, 1453, 1458, 1463, 1468, 1473, 1478, 1483, 1488, 1493, 1498, 1503, 1515, 1516, 2251, 3129, 3214
\@journalNameShort . 1115, 1120, 1125, 1130, 1134, 1139, 1144, 1149, 1154, 1159, 1164, 1170, 1177, 1182, 1187, 1192, 1197, 1202, 1206, 1211, 1216, 1221, 1228, 1235, 1240, 1245, 1252, 1259, 1266, 1271, 1276, 1281, 1286, 1291, 1296, 1301, 1306, 1311, 1315, 1320, 1325, 1330, 1335, 1340, 1345, 1349, 1354, 1359, 1364, 1369, 1374, 1379, 1384, 1389, 1394, 1399, 1404, 1409, 1414, 1419, 1424, 1429, 1434, 1439, 1444, 1449, 1454, 1459, 1464, 1469, 1474, 1479, 1484, 1489, 1494, 1499, 1504, 1516, 2895, 3034, 3044, 3056, 3152, 3162, 3173
\@keywords 1750, 1751, 1752, 2287, 2289, 2302, 2349, 2350
\@latex@error 366
\@lempty 1763, 2858
\@listI 1007, 1011
\@listi 1004, 1011
\@listii 1012
\@listiii 1015
\@listiv 1017
\@listv 1019
\@listvi 1021
\@makefnmark . . . 485, 510, 2185, 2190, 2194
\@makefntext 485, 494, 507, 2196
\@marginfigure . 928, 929
\@margintable . . 939, 940
\@minipagefalse . 719, 958
\@minus 3251, 3256, 3261, 3266, 3271, 3276, 3365, 3367, 3397, 3399
\@mkabstract . . 2277, 2857
\@mkauthors 2186, 2188, 2576
\@mkauthors@i 2580, 2582, 2584, 2586, 2600, 2668
\@mkauthors@ii 2703
\@mkauthors@iii 2588, 2590, 2592, 2594, 2598, 2715
\@mkauthors@iv 2596, 2768
\@mkauthorsaddresses 1643, 2812
\@mkbibcitation 2312, 2874
\@mkteasers . . . 2186, 2845
\@mktitle 2186, 2435
\@mktitle@i 2438, 2440, 2442, 2444, 2458, 2511
\@mktitle@ii 2524
\@mktitle@iii 2446, 2448, 2450, 2452, 2456, 2524
\@mktitle@iv . . 2454, 2534
\@mktranslatedabstract 455, 2867
\@mktranslatedkeywords 452, 1644
\@mpargs 722

\@mparswitchfalse .. 668
\@mpfootins 499, 500, 714, 715, 717
\@mpfootnotetext ... 498
\@ne . 324, 328, 332, 334, 562, 2934, 2940, 2944
\@nil 343
\@nobreakfalse 479
\@pages@word 2877, 2897, 2904
\@par 2199, 2206
\@parboxrestore 503
\@parfont 3268, 3273, 3278, 3283
\@permissionCodeOne 1116, 1121, 1126, 1131, 1135, 1140, 1145, 1150, 1155, 1160, 1165, 1171, 1178, 1183, 1188, 1193, 1198, 1203, 1207, 1212, 1217, 1222, 1229, 1236, 1241, 1246, 1253, 1260, 1267, 1272, 1277, 1282, 1287, 1292, 1297, 1302, 1307, 1312, 1316, 1321, 1326, 1331, 1336, 1341, 1346, 1350, 1355, 1360, 1365, 1370, 1375, 1380, 1385, 1390, 1395, 1400, 1405, 1410, 1415, 1420, 1425, 1430, 1435, 1440, 1445, 1450, 1455, 1460, 1465, 1470, 1475, 1480, 1485, 1490, 1495, 1500, 1505, 1517, 1518
\@permissionCodeTwo 1117, 1122, 1127, 1136, 1141, 1146, 1151, 1156, 1161, 1166, 1172, 1179, 1184, 1189, 1194, 1199, 1208, 1213, 1218, 1223, 1230, 1237, 1242, 1247, 1254, 1261, 1268, 1273, 1278, 1283, 1288, 1293, 1298, 1303, 1308, 1317, 1322, 1327, 1332, 1337, 1342, 1351, 1356, 1361, 1366, 1371, 1376, 1381, 1386, 1391, 1396, 1401, 1406, 1411, 1416, 1421, 1426, 1431, 1436, 1441, 1446, 1451, 1456, 1461, 1466, 1471, 1476, 1481, 1486, 1491, 1496, 1501, 1518, 2263
\@plus 472, 480, 723, 3251, 3256, 3261, 3266, 3271, 3276, 3364, 3366, 3396, 3398, 3454, 3559
\@printcopyrightfalse 1914, 1925
\@printcopyrighttrue 1898, 1910
\@printendtopmatter 2317, 2909
\@printpermissionfalse 1913
\@printpermissiontrue ... 1900, 1909, 1924
\@printtopmatter 2187, 2390
\@proofindent 3436, 3446, 3456
\@proofnamefont 3435, 3445, 3457
\@received . 1806, 1809, 1810, 1812, 1815, 1816, 1818, 1822, 1823
\@restonecolfalse .. 3555
\@restonecoltrue ... 3555
\@rightskip ... 3279, 3280
\@saveabstract 1757, 1758
\@saveteaser .. 2148, 2149
\@savetranslatedabstract 455, 456
\@seccntformat 468
\@secfont 3253, 3283
\@secondoftwo 30
\@sect 243, 462
\@sect@kernel .. 243, 465
\@setaddresses 2840
\@setauthorsaddresses ... 2206, 2355, 2917
\@setengagemetadata 2170, 2919
\@setthanks ... 2199, 2916
\@shortauthors 3000, 3023, 3031, 3039, 3049, 3067, 3091
\@sidebar 924, 925
\@specialsection ... 1646, 2282, 2288, 2360
\@ssect 244, 466
\@ssect@kernel . 244, 466
\@startPage 1746, 2391, 2392, 2394, 2997
\@startsection 241, 461, 472, 3250, 3255, 3260, 3265, 3270, 3275
\@startsection@kernel 241, 461
\@starttoc 469
\@subparfont 3308
\@subsecfont .. 3258, 3283
\@subsubsecfont 3263, 3283
\@subtitle . 1552, 1659, 2520, 2521, 2529, 2530, 2538, 2539, 2888
\@subtitlefont 2486, 2521, 2530, 2539
\@subtitlenotes 1657, 1661, 1664, 2192
\@teaser 2149, 2847
\@teaserfigures 2147, 2149, 2846, 2851
\@tempa 298, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 346, 348, 350, 352, 354, 356, 1595, 1596, 1807, 1808, 2562, 2563, 2681, 3323, 3324, 3325, 3330, 3332, 3333, 3526, 3542, 3543, 3545, 3549
\@tempb 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 346, 348, 350, 352, 354, 356, 3544, 3545, 3548, 3549

\@tempboxa . 722, 2400, 2402
\@tempc . 344, 345, 347, 349, 351, 353, 355, 357
\@tempdima 2337, 2340, 2341, 2343, 2396, 2397, 2398, 2404, 2405, 2406
\@textbottom 723
\@textsuperscript 510, 2185, 2190
\@texttop 724
\@thefnmark . 491, 505, 510, 2185, 2190, 2195
\@title . . . 1650, 2300, 2519, 2528, 2537, 2887
\@titlefont 2461, 2516, 2518, 2525, 2527, 2535
\@titlenotes 1648, 1652, 1655, 2191
\@tochangmeasure . . . 464
\@toclevel . 3249, 3254, 3259, 3264, 3269, 3274
\@tocline . . . 482, 483, 484
\@topnum 2314
\@translatedabstracts . 453, 460, 2278, 2279
\@translatedkeywords . 450, 452, 2291, 2292
\@translatedsubtitle 447, 449, 2521, 2530, 2539
\@translatedtitle 444, 446, 2519, 2528, 2537
\@typeset@author@bx 2707, 2761, 2767, 2806, 2811
\@typeset@author@line 2637, 2671, 2695, 2700
\@typesetengagemetadata 2275, 2918
\@undefined 572, 792, 2163
\@undescribed@imagesfalse 802
\@undescribed@imagestrue . . 831, 834, 935, 2852
\@vspace 825, 828, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 925, 930, 940, 946, 2179, 2361, 2387, 2875, 2910, 2913, 3563, 3565, 3571
\@vspace@acm 2387, 2913, 3571
\@vspace@orig . . 825, 828, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 925, 930, 940, 946, 2179, 2361, 2875, 2910, 3563
\@vspacer 826, 829, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 926, 931, 941, 947, 2180, 2362, 2388, 2876, 2911, 2914, 3564, 3568, 3572
\@vspacer@acm 2388, 2914, 3572
\@vspacer@orig . 826, 829, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 926, 931, 941, 947, 2180, 2362, 2876, 2911, 3564
\@width 703, 710
\@writetocindents . . 3328
\@xp 476, 477, 3325
\@xsect 242, 467
\@xsect@kernel . 242, 467
\\ 593, 602, 1571, 1857, 2131, 2237, 2244, 2259, 2263, 2266, 2347, 2879, 2887, 2939, 3131, 3216
\{ 306
\} 306
\␣ 1535, 1873, 1883, 2237, 2240, 2883, 2884, 2902, 2997

A

\abstract 1757
abstract (env.) *17*
\abstractname . . 390, 403, 2859, 2863, 2871
\acks 3517
acks (env.) *24*
\acksname 401, 412, 420, 428, 3516, 3519, 3520
\ACM@adddotafter 3231, 3248
\ACM@ArticleType 1825, 3124, 3209
\ACM@ArticleType@nr 1825, 1827, 3122, 3207
\ACM@cc@type . . . 1959, 2128, 2130, 2131, 2134, 2135, 2136, 2137, 2138, 2139, 2140
\ACM@CC@Url 2129, 2130, 2131, 2132
\ACM@cc@version 1958, 2130, 2141
\acm@copyrightinput 1904
\acm@copyrightmode 1904, 1912, 1917, 1920, 1923, 1928, 1931, 1934, 1937, 1940, 1943, 1946, 1949, 1952, 1962, 2001, 2212
\ACM@fontsize 150, 245, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 271, 272
\ACM@format 36, 165
\ACM@format@nr . . 36, 165, 175, 181, 187, 200, 206, 246, 523, 608, 687, 725, 870, 966, 1528, 2363, 2410, 2436, 2462, 2487, 2578, 2606, 2955, 3019, 3142, 3194, 3288, 3346, 3378, 3437, 3464, 3485
\ACM@lang@check 431, 445, 448, 451, 459
\ACM@languages 157, 392, 394, 432
\ACM@linecount 2933, 2934, 2939, 2940, 2943, 2944
\ACM@linecount@bx 2930, 2950, 2980
\ACM@linecount@bxht 2932, 2938, 2941, 2942
\ACM@linecountL 2946, 3021, 3024, 3029, 3032, 3038, 3040, 3048, 3050, 3066, 3069, 3073, 3079, 3090, 3093, 3097, 3103, 3125, 3144, 3156,

3157, 3168, 3169, 3181, 3184, 3189, 3210
\ACM@linecountR . 2953, 3051, 3053, 3067, 3070, 3077, 3084, 3091, 3094, 3101, 3108, 3182, 3185, 3190
\ACM@mk@linecount 2935, 2948, 2963, 2965, 2967, 2969, 2971, 2973, 2975
\ACM@NR@adjustedSectionformat 3228, 3237
\ACM@NRadjust 3219, 3253, 3258, 3263, 3268, 3273, 3278
\ACM@origbaselinestretch 3573
\ACM@origparagraph . 3593
\ACM@origsection . . . 3578
\ACM@origsubsection 3583
\ACM@origsubsubsection 3588
\ACM@ps@headings 2924, 2928
\ACM@ps@myheadings 2923, 2927
\ACM@ps@plain . 2922, 2926
\ACM@restore@pagestyle 2922
\ACM@sect@format 3238, 3240
\ACM@sect@format@ 3227, 3240, 3242
\ACM@sect@format@null 3241, 3242
\ACM@timestamp 2983, 3116, 3195, 3200
\acmArticle *14*, 1692
\acmArticleSeq . *14*, 1694
\acmArticleType . *19*, 1825
\acmBadge *14*, 1745
\acmBadgeL 1732
\acmBadgeR 1719, 1745
\acmBooktitle *9*, 1533, 1542
\acmCodeDataLink . . . 1853
\acmCodeLink *19*, 1853, 1862
\acmConference . . *9*, 1519
\acmConference@date 1522, 3061, 3081, 3084, 3105, 3108, 3178
\acmConference@name . . . 1521, 1533, 1534
\acmConference@shortname 1520, 1524, 1525, 1534, 1535, 2232, 3060, 3080, 3083, 3104, 3107, 3177
\acmConference@venue 1523, 2232, 3061, 3081, 3084, 3105, 3108, 3178
\acmContributions . . 1860
\acmDataLink . . . *19*, 1862
\acmdefinition 3395
\acmDOI *14*, 1710
\acmISBN *14*, 1708
\acmJournal *9*, 1511
\acmMonth *14*, 1698
\acmNumber *14*, 1690
\acmplain 3363
\acmPrice 1704
\acmSubmissionID *14*, 1706
\acmVolume *14*, 1688
\acmYear *14*, 1696
\addcontentsline 294, 2859, 3520
\additionalaffiliation *11*, 1617
\addresses 1568, 1570, 1575, 1582, 1613, 1631, 1670, 1676, 1683, 1685, 2700, 2767, 2811, 2833
\addto . . 395, 406, 414, 422
\addtocounter . . 516, 1885
\addtolength . . . 992, 993, 994, 998, 999, 2941
\addvspace 480
\advance 1008, 1013, 1016, 1018, 1020, 1022, 1563, 1565, 1679, 1850, 2397, 2405, 2513, 2697, 2717, 2734, 2770, 2781, 2842, 2844, 2940, 2944
\affiliation *10*, 1610, 2680, 2750, 2795
\and 1550, 1583, 1585, 1600, 1606, 2671, 2676, 2678, 2689, 2695, 2708, 2742, 2761, 2767, 2789, 2806, 2811, 2830
\andify 2307, 2308, 2638, 2641, 2901
\anon *24*, 2157
anonsuppress (env.) . . . *24*
\apptocmd 3565, 3568
\AssignSocketPlug 915, 916
\AtBeginDocument . 82, 99, 233, 565, 573, 984, 2929, 3006, 3136, 3243, 3322
\AtBeginEnvironment 824, 827, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858
\AtBeginMaketitle *33*, 2166
\AtEndDocument 805, 1752, 1776, 1821, 1891, 2322, 2835, 3511, 3574, 3579, 3584, 3589, 3594
\AtEndEnvironment 830, 833
\AtEndPreamble . 538, 793, 3407, 3461, 3527
\author *10*, 1560, 2175, 2176, 2881
\author@bx 2703, 2709, 2712
\author@bx@sep 2705, 2712, 2717, 2734, 2770, 2781
\author@bx@wd 2704, 2707, 2716, 2717, 2719, 2725, 2727, 2729, 2731, 2734, 2769, 2770, 2772, 2778, 2781
\authornote *13*, 1617, 1668, 2882
\authornotemark . *13*, 1680
\authors 1573, 1578, 1585, 2295, 2307, 2309, 2887
\authorsaddresses *13*, 1642

B

\balance 3514
\baselineskip . . 2223, 2941, 3251, 3252, 3256, 3257, 3261, 3266, 3271, 3364, 3365, 3366, 3367, 3396, 3397, 3398, 3399
\baselinestretch 3573, 3574, 3576
\begin 20, 2949, 2979

\begingroup 469, 561, 2178, 2576, 3220, 3329, 3518
\bfseries . . 1023, 2219, 2464, 2466, 2468, 2472, 2474, 2476, 2478, 2480, 2482, 2484, 2625, 2628, 2885, 3283, 3284, 3298, 3299, 3301, 3302, 3304, 3305, 3306, 3307, 3311, 3312, 3315, 3316, 3318, 3319, 3356, 3388
\bgroup . 460, 925, 929, 940, 946, 1618, 1644, 2281, 2287, 2328, 2707, 2744, 2747, 2808, 2816, 2847, 2857, 2874, 2886
\bibfont 296
\bibliofont 296
\bibliographystyle . 571
\bibsection 292
\bibstyle 320, 322, 364, 576
\bibstyle@acmauthoryear 370
\bibstyle@acmnumeric 376
\bigskip 1823, 2346, 2347, 2349, 2352, 2355, 2428, 2523, 2533, 2541, 2767, 2811, 2847, 2912
\box 963, 2412, 2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2712, 3126, 3211

C

\c@footnote 2183
\c@secnumdepth 463
\caption@beginex@hook 913
\captionsenglish . . . 395
\captionsetup . . 862, 864, 866, 868, 877, 879, 882, 884, 887, 889, 926, 932, 941, 2848
\captionsfrench 406
\captionsgerman 414
\captionsspanish . . . 422
\ccdesc@parse@finish 1896
\ccsdesc *15*, 1867
\ccsdesc@parse 1868, 1869
\ccsdesc@parse@end 1868, 1896
\ccsdesc@parse@finish 1890, 1896
CCSXML (env.) *15*
\centering . . 473, 506, 592, 601, 933, 942, 2525, 2527, 2709, 2766
\changes 150
\cite . . . 554, 555, 566, 570
\citeA 560
\citealt 559
\citeANP 556
\citeauthor 556
\citeN 554
\citename 567
\citeNN 557
\citeNP 559
\citep 555
\citestyle . . . *25*, 362, 382
\citeyear 558
\citeyearNP 558
\citeyearpar . . . 557, 570
\city . . *11*, 1623, 2549, 2826
\ClassError 39, 433, 457, 1509, 1616, 1759, 1769, 1775, 1789, 1840, 2664, 2880, 3575, 3580, 3585, 3590, 3595
\ClassInfo 165, 271, 1507, 1766, 1768, 1772, 1774, 1786, 1788, 1791
\ClassWarning . . . 27, 176, 182, 188, 759, 762, 765, 832, 835, 936, 1561, 1628, 1704, 1748, 1792, 2549, 2552, 2817, 2820, 2853, 3565, 3568
\ClassWarningNoLine . 806, 1754, 1778, 1893, 2658, 2661, 2837
\clearpage 2403
\CodelineIndex 17
\Collect@Body 454, 924, 928, 939, 1757, 2148
\color 2159, 2221, 2939, 2943, 3123, 3208
\color@begingroup 493, 506
\color@endbox 961
\color@endgroup 496, 509, 720
\colorbox . 1849, 3123, 3208
\colorlet 1829, 1831, 1833, 1835, 1837
\columnsep 3556
\columnseprule 3556
\columnwidth . . . 502, 703, 947, 2769, 2808
\contentsnamefont . . 473
\copyright 2237
\copyrightpermissionfootnoterule 702
\copyrightyear . *17*, 2145
\correspondingauthor *13*, 1674
\country *11*, 1625, 2549, 2829
\csname . 364, 464, 468, 476, 477, 491, 505, 1577, 1584, 1636, 1639, 1872, 1873, 1875, 1876, 1877, 1878, 1879, 1882, 1884, 2304, 2306, 3221, 3244, 3325, 3333
\CurrentOption 152, 153, 154, 155, 156, 162, 163

D

\day 2995
\DeclareNewFootnote 706, 708
\DeclareOptionX 42, 152, 153, 154, 155, 156, 158, 162, 163
\DeclareRobustCommand 560, 3240
\DeclareTextFontCommand 794
\def 25, 42, 151, 157, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 335, 337, 339, 341, 342, 346, 348, 350, 352, 354, 356, 444, 447, 450, 453, 456, 462, 468, 469, 482, 483, 484, 485, 487,

498, 510, 516, 517,
518, 519, 520, 540,
571, 702, 709, 711,
723, 925, 929, 940,
946, 949, 953, 956,
974, 975, 976, 977,
1007, 1012, 1015,
1017, 1019, 1021,
1114, 1115, 1116,
1117, 1119, 1120,
1121, 1122, 1124,
1125, 1126, 1127,
1129, 1130, 1131,
1133, 1134, 1135,
1136, 1138, 1139,
1140, 1141, 1143,
1144, 1145, 1146,
1148, 1149, 1150,
1151, 1153, 1154,
1155, 1156, 1158,
1159, 1160, 1161,
1163, 1164, 1165,
1166, 1168, 1170,
1171, 1172, 1176,
1177, 1178, 1179,
1181, 1182, 1183,
1184, 1186, 1187,
1188, 1189, 1191,
1192, 1193, 1194,
1196, 1197, 1198,
1199, 1201, 1202,
1203, 1205, 1206,
1207, 1208, 1210,
1211, 1212, 1213,
1215, 1216, 1217,
1218, 1220, 1221,
1222, 1223, 1227,
1228, 1229, 1230,
1234, 1235, 1236,
1237, 1239, 1240,
1241, 1242, 1244,
1245, 1246, 1247,
1251, 1252, 1253,
1254, 1258, 1259,
1260, 1261, 1265,
1266, 1267, 1268,
1270, 1271, 1272,
1273, 1275, 1276,
1277, 1278, 1280,
1281, 1282, 1283,
1285, 1286, 1287,
1288, 1290, 1291,
1292, 1293, 1295,
1296, 1297, 1298,
1300, 1301, 1302,
1303, 1305, 1306,
1307, 1308, 1310,
1311, 1312, 1314,
1315, 1316, 1317,
1319, 1320, 1321,
1322, 1324, 1325,
1326, 1327, 1329,
1330, 1331, 1332,
1334, 1335, 1336,
1337, 1339, 1340,
1341, 1342, 1344,
1345, 1346, 1348,
1349, 1350, 1351,
1353, 1354, 1355,
1356, 1358, 1359,
1360, 1361, 1363,
1364, 1365, 1366,
1368, 1369, 1370,
1371, 1373, 1374,
1375, 1376, 1378,
1379, 1380, 1381,
1383, 1384, 1385,
1386, 1388, 1389,
1390, 1391, 1393,
1394, 1395, 1396,
1398, 1399, 1400,
1401, 1403, 1404,
1405, 1406, 1408,
1409, 1410, 1411,
1413, 1414, 1415,
1416, 1418, 1419,
1420, 1421, 1423,
1424, 1425, 1426,
1428, 1429, 1430,
1431, 1433, 1434,
1435, 1436, 1438,
1439, 1440, 1441,
1443, 1444, 1445,
1446, 1448, 1449,
1450, 1451, 1453,
1454, 1455, 1456,
1458, 1459, 1460,
1461, 1463, 1464,
1465, 1466, 1468,
1469, 1470, 1471,
1473, 1474, 1475,
1476, 1478, 1479,
1480, 1481, 1483,
1484, 1485, 1486,
1488, 1489, 1490,
1491, 1493, 1494,
1495, 1496, 1498,
1499, 1500, 1501,
1503, 1504, 1505,
1511, 1514, 1515,
1516, 1517, 1518,
1542, 1544, 1545,
1546, 1552, 1595,
1617, 1618, 1619,
1620, 1621, 1622,
1633, 1634, 1642,
1648, 1649, 1657,
1658, 1667, 1668,
1678, 1688, 1690,
1692, 1694, 1696,
1698, 1700, 1704,
1706, 1708, 1710,
1717, 1718, 1746,
1748, 1750, 1758,
1763, 1794, 1806,
1807, 1842, 1848,
1853, 1859, 1860,
1869, 1870, 1896,
1955, 1958, 1959,
1961, 1999, 2000,
2129, 2145, 2147,
2149, 2166, 2167,
2168, 2172, 2185,
2190, 2199, 2206,
2297, 2327, 2360,
2390, 2435, 2461,
2486, 2511, 2524,
2534, 2543, 2549,
2552, 2556, 2557,
2559, 2560, 2562,
2567, 2568, 2572,
2574, 2576, 2604,
2605, 2609, 2610,
2613, 2614, 2616,
2617, 2619, 2620,
2622, 2623, 2625,
2626, 2628, 2629,
2631, 2632, 2634,
2635, 2637, 2639,
2644, 2651, 2656,
2668, 2669, 2670,
2672, 2679, 2680,
2681, 2707, 2708,
2715, 2737, 2743,
2750, 2768, 2784,
2790, 2795, 2812,
2817, 2820, 2823,
2825, 2826, 2827,
2829, 2830, 2831,
2832, 2840, 2841,
2843, 2845, 2847,
2857, 2867, 2874,

2877, 2878, 2879, 2880, 2883, 2887, 2909, 2916, 2917, 2918, 2919, 2925, 2935, 2946, 2953, 3000, 3005, 3011, 3219, 3223, 3225, 3227, 3237, 3241, 3248, 3249, 3254, 3259, 3264, 3269, 3274, 3279, 3283, 3284, 3285, 3286, 3292, 3293, 3295, 3296, 3298, 3299, 3301, 3302, 3304, 3305, 3306, 3307, 3308, 3311, 3312, 3315, 3316, 3318, 3319, 3328, 3336, 3337, 3342, 3343, 3344, 3345, 3354, 3355, 3356, 3357, 3374, 3375, 3376, 3377, 3386, 3387, 3388, 3389, 3435, 3436, 3445, 3446, 3524, 3526, 3542, 3543, 3544, 3548, 3555
\define@boolkey 55, 63, 71, 79, 88, 96, 108, 112, 116, 124, 132, 140, 1615, 1764, 1770, 1784
\define@choicekey . . . 36, 1033, 1825, 1903
\define@cmdkey 1790
\definecolor 580, 581, 582, 583, 584, 585, 586, 587
\department *11*, 1621, 2549, 2828
\Description *22*, 803
\description 1024
\descriptionlabel 1023, 1026
\detokenize 1561
\dimexpr . . . 944, 963, 2337, 3113, 3122, 3207
\ding 1679
\divide 2719, 2725, 2727, 2729, 2731, 2772, 2778
\do 298, 540, 3323, 3330
\do@url@hyp 540
\DocInput 21
\documentclass 9, 438, 440
\dp 2397, 2405

E

\edef 152, 153, 154, 155, 156, 2130
\editor *9*, 1546
\egroup 460, 721, 927, 938, 942, 954, 960, 1626, 1647, 2283, 2289, 2359, 2711, 2745, 2748, 2811, 2834, 2848, 2866, 2887, 2908
\else . 58, 66, 74, 83, 91, 103, 119, 127, 135, 145, 202, 238, 344, 365, 386, 393, 398, 409, 417, 425, 463, 548, 564, 570, 572, 595, 597, 714, 776, 784, 830, 833, 867, 934, 1502, 1534, 1538, 1548, 1564, 1571, 1574, 1580, 1581, 1591, 1594, 1599, 1602, 1605, 1612, 1630, 1654, 1663, 1669, 1675, 1681, 1684, 1725, 1738, 1752, 1767, 1773, 1776, 1787, 1798, 1801, 1811, 1814, 1817, 1822, 1856, 1881, 1886, 1887, 1888, 1891, 2154, 2160, 2186, 2197, 2201, 2202, 2203, 2215, 2216, 2224, 2227, 2228, 2231, 2238, 2239, 2245, 2252, 2257, 2260, 2261, 2265, 2266, 2267, 2278, 2281, 2286, 2287, 2291, 2334, 2346, 2349, 2352, 2355, 2393, 2520, 2529, 2538, 2544, 2545, 2563, 2565, 2566, 2567, 2569, 2571, 2640, 2657, 2660, 2663, 2675, 2681, 2688, 2709, 2720, 2730, 2739, 2746, 2755, 2773, 2777, 2786, 2792, 2800, 2814, 2835, 2846, 2851, 2858, 2862, 2870, 2877, 2883, 2888, 2889, 2898, 2900, 2907, 2992, 3003, 3004, 3014, 3025, 3033, 3043, 3054, 3059, 3064, 3071, 3074, 3076, 3078, 3088, 3095, 3098, 3100, 3102, 3130, 3131, 3147, 3151, 3161, 3171, 3176, 3183, 3188, 3196, 3199, 3215, 3216, 3224, 3248, 3526, 3531, 3538, 3547, 3551, 3574, 3579, 3584, 3589, 3594
\email *10*, 1627, 2679, 2743, 2790, 2832
\emph 2251, 2253
\empty 3012
\EnableCrossrefs 19
\end 22, 2951, 2981
\end@ACM@color@frame 2322
\end@dblfloat 952
\end@float 954
\endcsname 363, 364, 464, 468, 476, 477, 491, 505, 1577, 1584, 1637, 1640, 1872, 1873, 1875, 1876, 1877, 1878, 1879, 1882, 1884, 2304, 2306, 3221, 3244, 3325, 3333
\enddescription 1030
\endgroup 479, 2274, 2602, 3223, 3225, 3335, 3522
\endlist 1028, 1030
\endMakeFramed 1852
\endminipage 711
\endtrivlist 3459
\enspace 3337
environments:
abstract *17*
acks *24*
anonsuppress *24*
CCSXML *15*

marginfigure *36*
margintable *36*
printonly *24*
screenonly *24*
sidebar *36*
teaserfigure *17*
translatedabstract *20*
\everypar 2861, 2869
\excludecomment . 1864, 3530, 3532, 3536, 3537
\ExecuteOptionsX 54, 62, 70, 78, 87, 95, 107, 111, 115, 123, 131, 139, 149
\expandafter 343, 345, 573, 722, 1575, 1576, 1582, 1583, 1636, 1639, 1872, 1873, 1875, 1876, 1882, 1884, 3221, 3244
\ExplSyntaxOff 918
\ExplSyntaxOn 895

F

\familydefault 796
\fancyfoot 3026, 3034, 3044, 3056, 3060, 3065, 3089, 3116, 3127, 3128, 3146, 3148, 3152, 3162, 3173, 3177, 3186, 3191, 3195, 3200, 3212, 3213
\fancyhead . 3021, 3022, 3023, 3024, 3029, 3030, 3031, 3032, 3038, 3040, 3041, 3048, 3050, 3051, 3052, 3066, 3067, 3069, 3070, 3073, 3075, 3079, 3082, 3090, 3091, 3093, 3094, 3097, 3099, 3103, 3106, 3121, 3126, 3144, 3145, 3156, 3157, 3158, 3159, 3166, 3167, 3168, 3169, 3181, 3182, 3184, 3185, 3189, 3190, 3206, 3211
\fancyheadoffset 3113, 3120, 3205
\fancyhf 3008, 3138
\fancypagestyle 3007, 3137
\fi 60, 68, 76, 85, 93, 105, 121, 129, 137, 147, 160, 180, 186, 199, 204, 234, 240, 269, 270, 282, 287, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 347, 349, 351, 353, 355, 357, 358, 367, 369, 383, 388, 391, 400, 404, 411, 419, 427, 430, 443, 458, 464, 478, 497, 537, 541, 550, 568, 570, 574, 577, 604, 605, 606, 684, 700, 718, 744, 756, 789, 790, 791, 797, 822, 832, 835, 893, 894, 937, 951, 955, 982, 1506, 1526, 1531, 1535, 1536, 1541, 1551, 1567, 1572, 1579, 1586, 1587, 1592, 1593, 1601, 1607, 1608, 1609, 1614, 1632, 1656, 1666, 1673, 1677, 1686, 1687, 1703, 1731, 1744, 1756, 1760, 1769, 1775, 1783, 1789, 1803, 1804, 1813, 1819, 1820, 1824, 1838, 1845, 1858, 1880, 1888, 1889, 1895, 1916, 1919, 1922, 1927, 1930, 1933, 1936, 1939, 1942, 1945, 1948, 1951, 1954, 1998, 2144, 2156, 2162, 2165, 2176, 2177, 2186, 2188, 2200, 2207, 2208, 2209, 2210, 2214, 2222, 2225, 2226, 2233, 2234, 2235, 2241, 2242, 2254, 2259, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2275, 2279, 2284, 2285, 2290, 2293, 2294, 2313, 2324, 2344, 2345, 2348, 2351, 2354, 2355, 2386, 2395, 2407, 2433, 2459, 2485, 2510, 2514, 2522, 2531, 2540, 2547, 2564, 2565, 2567, 2569, 2571, 2575, 2601, 2636, 2643, 2659, 2662, 2666, 2677, 2693, 2694, 2698, 2709, 2732, 2733, 2741, 2749, 2760, 2779, 2780, 2788, 2794, 2805, 2814, 2839, 2854, 2856, 2864, 2866, 2872, 2877, 2884, 2888, 2902, 2905, 2906, 2907, 2945, 2952, 2978, 2982, 2994, 2999, 3003, 3004, 3013, 3015, 3016, 3021, 3022, 3027, 3036, 3046, 3062, 3063, 3065, 3074, 3076, 3085, 3086, 3087, 3089, 3098, 3100, 3109, 3110, 3111, 3114, 3117, 3130, 3131, 3132, 3146, 3149, 3155, 3165, 3179, 3180, 3186, 3187, 3191, 3192, 3198, 3201, 3202, 3215, 3216, 3217, 3235, 3246, 3248, 3321, 3340, 3362, 3394, 3432, 3451, 3482, 3483, 3508, 3509, 3515, 3526, 3534, 3540, 3543, 3553, 3554, 3555, 3577, 3582, 3587, 3592, 3597
\firstpagestyle 3136
\floatname 923
\flushbottom 730, 732, 734, 736, 738, 741, 743

\footnote 2880
\footnotemark 520, 1650, 1659, 2842, 2844, 2878
\footnoterule 709
\footnotesep . . . 495, 508
\footnotesize . . 501, 2991, 3005, 3026, 3034, 3044, 3056, 3060, 3065, 3073, 3079, 3089, 3128, 3148, 3152, 3162, 3173, 3177, 3186, 3191, 3197, 3213, 3562
\footnotetext . . 1653, 1655, 1662, 1665, 1672
\footnotetextauthorsaddresses 2198, 2205
\footnotetextcopyrightpermission 2213, 2217
\footrulewidth 3010, 3119, 3140, 3204
\foreignlanguage 446, 449
\format 36
\FrameCommand 1848
\FrameRestore 1851
\FrameSep 2338
\frenchspacing 3598
\fulltextwidth 943, 947, 963

G

\g@addto@macro . 161, 446, 449, 452, 460, 1550, 1582, 1585, 1600, 1606, 1613, 1631, 1650, 1652, 1655, 1659, 1661, 1664, 1670, 1671, 1676, 1678, 1683, 1685, 1726, 1739, 1812, 1818, 1857, 1877, 1884, 2149, 2153, 2155, 2166, 2169, 2676, 2689, 2740, 2747, 2756, 2787, 2793, 2801, 2841, 2843
\gdef . . 160, 1520, 1521, 1522, 1523, 1525, 1542, 1547, 1549, 1570, 1573, 1575, 1578, 1590, 1598, 1604, 1636, 1639, 1721, 1734, 1761, 1793, 1810, 1816, 1855, 1860, 1873, 1875, 1876, 1882, 2392, 2674, 2678, 2683, 2713, 2714, 2735, 2736, 2738, 2742, 2744, 2751, 2782, 2783, 2785, 2789, 2791, 2796, 2824, 2825, 2830, 3325
\geometry . . . 610, 613, 620, 627, 634, 641, 648, 655, 662, 671, 678
\getrefnumber . . 1753, 1777, 1892, 2334, 2877
\global . 479, 499, 803, 831, 834, 935, 962, 1512, 1513, 1527, 1529, 1563, 1565, 1566, 1611, 2309, 2310, 2314, 2316, 2330, 2343, 2557, 2559, 2564, 2568, 2572, 2574, 2652, 2653, 2654, 2671, 2695, 2699, 2709, 2761, 2764, 2806, 2849, 2852, 2940, 2944, 3463, 3487, 3489, 3491, 3503, 3507
\grantnum *25*, 3525
\grantsponsor . . *25*, 3524

H

\hbox 510, 2185, 2190
\headrulewidth 3009, 3139
\height 1723, 1729, 1736, 1742
\hfill 2536, 2943
\hfuzz . . . 1679, 2842, 2844
\href 1638, 1641, 1724, 1730, 1737, 1743, 2131, 2132, 2745, 2748, 2791, 2793, 2832, 3546, 3550
\hrule 703, 710, 2536
\hsize . 502, 1850, 2184, 2329, 2332, 2511, 2513, 2515, 2524, 2526, 2534, 2577, 2697, 2707, 2763, 2808
\hskip 3456
\hspace 1727, 1740, 1848, 2011, 2022, 2031, 2038, 2045, 2059, 2071, 2079, 2093, 2101, 2108, 2115, 2712, 2766
\ht 2396, 2404
\Huge . 2470, 2472, 2474, 2476, 2478, 2480, 2482
\hypersetup 543, 549, 551, 2298
\hyphenpenalty 3561

I

\if 344
\if@ACM@acmcp 173, 284, 1843, 2201, 2216, 2286, 2320, 2512, 2696, 3118, 3203, 3338
\if@ACM@acmthm . 71, 3408
\if@ACM@affiliation@obeypunctuation 1615, 2545, 2565, 2567, 2569, 2570
\if@ACM@anonymous 124, 1569, 1581, 1588, 1612, 1630, 1651, 1660, 1669, 1675, 1681, 2152, 2158, 2174, 2203, 3001, 3535
\if@ACM@authordraft 140, 588, 2218
\if@ACM@authorversion 88, 2224, 2246
\if@ACM@badge 1712
\if@ACM@balance 108, 3484, 3512
\if@ACM@citypresent 2647, 2660
\if@ACM@countrypresent 2649, 2663
\if@ACM@engage 171, 389, 402, 2229, 2275, 3072, 3096
\if@ACM@instpresent 2645, 2657
\if@ACM@journal 167, 235, 384, 396, 407, 415, 423, 863, 1538, 1799, 2555, 2835, 2860, 2868
\if@ACM@journal@bibstrip . 168, 2228, 2250, 2262, 2894, 3055, 3172
\if@ACM@journal@bibstrip@or@tog 169, 2204, 3018, 3141

\if@ACM@maketitle@typeset 456, 1031, 1758
\if@ACM@manuscript 166, 279, 1796, 2227, 2243
\if@ACM@natbib 116, 290, 381, 553
\if@ACM@natbib@override 116
\if@ACM@newfonts 757, 768
\if@ACM@nonacm .. 96, 597, 1752, 1776, 1891, 2211, 2261, 2835, 2889, 3025, 3033, 3043, 3054, 3068, 3092, 3147, 3151, 3161, 3171, 3196
\if@ACM@pbalance 112, 3462
\if@ACM@printacmref 1770, 2311
\if@ACM@printccs 1764, 2280
\if@ACM@printfolios 1784, 3013, 3015, 3021, 3022, 3065, 3089, 3146, 3186, 3191
\if@ACM@review 79, 2930, 2947, 2954
\if@ACM@screen 55, 542, 3528
\if@ACM@sigchiamode 170, 486, 596, 795, 945, 952, 2186, 2188, 2709, 3112
\if@ACM@timestamp .. 132, 2983, 3115, 3193
\if@ACM@urlbreakonhyphens 63, 539
\if@acmowned 1901
\if@Description@present 799, 830, 833, 934, 2851
\if@filesw 475, 575
\if@insideauthorgroup 1558, 1564
\if@printcopyright 1897, 2236
\if@printpermission 1899, 2225
\if@twocolumn . 3513, 3555
\if@undescribed@images 801, 805
\IfBeginWith 1635
\ifcase 206, 246, 523, 608, 687, 725, 870, 966, 1112, 1700, 1827, 1962, 2001, 2363, 2410, 2436, 2462, 2487, 2578, 2606, 2721, 2774, 2955, 3019, 3142, 3288, 3346, 3378, 3437, 3464, 3485
\ifcsname 363
\ifdim 2340, 2398, 2406, 2942
\IfDocumentMetadata . 30
\IfDocumentMetadataF 32, 804
\IfDocumentMetadataT 31, 896, 919
\IfDocumentMetadataTF 30
\IfEq 2128, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141
\IfFileExists 759, 762, 765
\IfInteger 1791
\ifluatex 777
\ifNAT@numbers 570
\ifnum 175, 181, 187, 200, 463, 1528, 1753, 1777, 1886, 1887, 1888, 1892, 1912, 1917, 1920, 1923, 1928, 1931, 1934, 1937, 1940, 1943, 1946, 1949, 1952, 2176, 2212, 2334, 2718, 2771, 2813, 2877, 3194
\ifPDFTeX 745
\IfSubStr 1561, 1628
\ifvmode 2544
\ifvoid 714
\ifx 159, 245, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 346, 348, 350, 352, 354, 356, 392, 432, 572, 1524, 1532, 1534, 1546, 1568, 1571, 1589, 1591, 1596, 1597, 1603, 1682, 1720, 1733, 1752, 1808, 1809, 1815, 1822, 1854, 1872, 1881, 1891, 2163, 2197, 2202, 2239, 2255, 2266, 2267, 2278, 2281, 2287, 2291, 2346, 2349, 2352, 2355, 2391, 2520, 2529, 2538, 2563, 2640, 2673, 2681, 2682, 2737, 2743, 2750, 2784, 2790, 2795, 2836, 2846, 2858, 2883, 2888, 2900, 2907, 2992, 3003, 3012, 3074, 3076, 3098, 3100, 3130, 3131, 3215, 3216, 3221, 3244, 3248, 3526, 3543, 3545, 3549, 3574, 3579, 3584, 3589, 3594
\ifxetex 769
\ignorespaces .. 495, 508, 803, 1619, 1620, 1622, 1633, 2551, 2554, 2556, 2558, 2559, 2560, 2561, 2565, 2819, 2822, 2823, 2865, 2873, 2879, 2887, 3457
\immediate . 477, 576, 3331
\includecomment 3529, 3533, 3539
\includegraphics 1724, 1730, 1737, 1743, 2131, 2332
\indent 3436
\input 746
\InputIfFileExists .. 26
\institution *11*, 1620, 2549, 2825
\interfootnotelinepenalty 489
\interlinepenalty .. 489
\item 3456, 3558
\itshape 2230, 2232, 2285, 3286, 3307, 3308, 3342, 3354, 3376, 3445

J

\jobname 474, 477

K

\kern 702, 703, 709, 710, 2536

\keywords 15, 1750
\keywordsname 385, 387, 397, 399, 408, 410, 416, 418, 424, 426, 1646, 2288

L

\l@addto@macro 913
\l@section 482
\l@subsection . . 482, 483
\l@subsubsection . . . 484
\labelenumi 974
\labelenumii 975
\labelenumiii 976
\labelenumiv 977
\labelsep 985, 993, 998, 1008, 1013, 1016, 1018, 1020, 1022, 3456
\labelwidth 1008, 1013, 1016, 1018, 1020, 1022, 1025
\LARGE 2464, 2466, 2468, 2484, 2495, 2497, 2499, 2501, 2503, 2507, 2613, 2616, 2631
\Large 2604, 2622, 3298, 3299, 3301, 3302, 3304, 3318, 3319
\large 2219, 2609, 2614, 2617, 2632, 2634, 3292, 3293, 3295, 3296
\lastbox 2861, 2869
\leaders 2536
\leavevmode . . . 2536, 2765
\leftmargin 1007, 1012, 1015, 1017, 1019, 1021
\leftmargini 991, 992, 993, 994, 1007, 1008
\leftmarginii 997, 998, 999, 1000, 1012, 1013
\leftmarginiii 1000, 1001, 1015, 1016
\leftmarginiv 1001, 1002, 1017, 1018
\leftmarginv 1002, 1003, 1019, 1020
\leftmarginvi 1003, 1021, 1022
\leftskip . 2535, 2809, 3281
\let 241, 242, 243, 244, 320, 322, 334, 336, 338, 364, 461, 466, 467, 511, 512, 554, 555, 556, 557, 558, 559, 562, 566, 724, 792, 825, 826, 828, 829, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 925, 926, 930, 931, 940, 941, 946, 947, 948, 1011, 1026, 1030, 1623, 1624, 1625, 1745, 1751, 1862, 1865, 2164, 2179, 2180, 2181, 2182, 2194, 2195, 2196, 2199, 2206, 2295, 2309, 2310, 2361, 2362, 2387, 2388, 2573, 2671, 2695, 2761, 2767, 2806, 2811, 2875, 2876, 2910, 2911, 2913, 2914, 2922, 2923, 2924, 2926, 2927, 2928, 3226, 3228, 3230, 3231, 3233, 3239, 3242, 3245, 3558, 3563, 3564, 3571, 3572, 3573, 3578, 3583, 3588, 3593
\libertineLF 794
\lineskip 2766, 2810
\linespacing . . . 472, 473
\liningnums 792
\list 1024
\listisep . 1005, 1006, 1010
\listparindent 1009
\LoadClass 272
\long 456, 487, 498, 925, 929, 940, 1758, 1761, 1763, 2149, 2916
\loop 2399, 2939
\LTX@adddotafter 3245, 3248

M

\makeatletter 469
\makebox 2219, 3121, 3126, 3206, 3211
\MakeFramed 1850
\makelabel 1026
\maketitle 18, 2172
\MakeUppercase 2674, 2676, 3232
\marginfigure 928
marginfigure (env.) . . . 36
\marginpar 487, 927, 933, 942
\marginparsep . . 944, 3113
\marginparwidth . 944, 3113
\margintable 939
margintable (env.) 36
\mathchardef . . 2745, 2748
\mbox 342
\mdseries . . 2489, 2491, 2493, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2626, 2629
\medskip . . 2365, 2367, 2369, 2371, 2699, 2701, 2765, 2855, 2885
\MessageBreak 177, 183, 189, 190, 191, 192, 193, 194, 195, 196, 197, 434, 435, 436, 437, 439, 441, 807, 816, 1779, 1780, 1781, 1840
\metadata@authors 2295, 2296, 2299
\mktitle@bx 2171, 2396, 2397, 2400, 2404, 2405, 2412, 2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2516, 2525, 2535, 2699, 2764, 2765, 2849
\month 1699, 2995
\moveleft 962

N

\NAT@@setcites 360
\NAT@aysep 351
\NAT@citetp 562
\NAT@close 300, 302, 304, 306, 349
\NAT@cmprs . . 328, 330, 332
\NAT@cmt 355
\NAT@ctype 562
\NAT@find@eq 343
\NAT@fullfalse 562
\NAT@longnamestrue . 340
\NAT@merge . . 334, 336, 338
\NAT@nmfmt 342
\NAT@numbersfalse . . 314
\NAT@numberstrue 316, 318

\NAT@open 300, 302, 304, 306, 347, 562
\NAT@partrue 562
\NAT@rem@eq 345
\NAT@sep 308, 310, 312, 357
\NAT@sort . . . 324, 326, 332
\NAT@superfalse 316
\NAT@supertrue 318
\NAT@swafalse 561
\NAT@up 342
\NAT@yrsep 353
\NeedsTeXFormat 1
\newblock 563
\newbox 2171, 2326, 2542, 2703
\newcommand 370, 376, 431, 445, 448, 451, 569, 803, 1519, 1610, 1644, 1674, 1680, 1719, 1732, 1807, 1867, 1957, 2157, 2561, 2570, 2990, 3269, 3516, 3525, 3541
\newcount . 1554, 1556, 2933
\newcounter 1866, 2986, 2988
\newdimen 288, 943, 983, 2704
\newenvironment . 454, 928, 939, 1847, 2148
\newfloat 922
\newif 166, 167, 168, 169, 170, 171, 173, 757, 799, 801, 1031, 1558, 1897, 1899, 1901, 2645, 2647, 2649
\newlabel 3332
\newlength 1712, 1714, 1715, 2932
\newsavebox 2931
\newskip 1005, 2705
\newtheorem 3411, 3414, 3417, 3420, 3423, 3427, 3430
\newtheoremstyle 3363, 3395
\newwrite 476
\next 3223, 3225, 3235
\nobreak 2885
\noindent . . 485, 1647, 1823, 2196, 2283, 2289, 2365, 2367, 2369, 2371, 2402, 2409, 2516, 2518, 2521, 2530, 2536, 2537, 2539, 2638, 2699, 2700, 2764, 2810, 2849, 2850, 2885, 2886, 2919, 3446
\noindentparagraph 2377, 3269
\normalbaselines . . . 2708
\normalcolor 716
\normalfont 510, 1823, 2190, 2605, 2610, 2619, 2620, 2622, 2623, 2635, 2936, 3357, 3374, 3386, 3389, 3454, 3598
\normalparindent . . . 701
\normalsize 2486, 2605, 2619, 2620, 2623, 2937, 3598
\num@authorgroups . . 1554, 1565, 2176, 2721, 2725, 2727, 2774
\num@authors 1556, 1563, 1577, 1584, 1637, 1640, 2813
\numexpr . 2985, 2987, 2989
\nxandlist 2296

O

\onehalfspacing 281
\openout 477
\or 209, 211, 213, 216, 218, 220, 222, 224, 227, 230, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 525, 526, 527, 528, 529, 530, 532, 533, 535, 536, 612, 619, 626, 633, 640, 647, 654, 661, 670, 677, 689, 690, 691, 693, 694, 695, 696, 697, 698, 699, 727, 728, 729, 731, 733, 735, 737, 739, 740, 742, 872, 873, 874, 875, 876, 878, 881, 886, 891, 892, 968, 969, 970, 971, 972, 973, 978, 979, 980, 981, 1118, 1123, 1128, 1132, 1137, 1142, 1147, 1152, 1157, 1162, 1167, 1175, 1180, 1185, 1190, 1195, 1200, 1204, 1209, 1214, 1219, 1226, 1233, 1238, 1243, 1250, 1257, 1264, 1269, 1274, 1279, 1284, 1289, 1294, 1299, 1304, 1309, 1313, 1318, 1323, 1328, 1333, 1338, 1343, 1347, 1352, 1357, 1362, 1367, 1372, 1377, 1382, 1387, 1392, 1397, 1402, 1407, 1412, 1417, 1422, 1427, 1432, 1437, 1442, 1447, 1452, 1457, 1462, 1467, 1472, 1477, 1482, 1487, 1492, 1497, 1700, 1701, 1702, 1830, 1832, 1834, 1836, 1963, 1965, 1968, 1970, 1971, 1973, 1975, 1977, 1980, 1982, 1985, 1987, 1990, 1993, 1996, 2002, 2013, 2024, 2032, 2039, 2046, 2060, 2072, 2080, 2094, 2102, 2109, 2116, 2121, 2127, 2366, 2368, 2370, 2372, 2374, 2376, 2378, 2380, 2382, 2384, 2413, 2415, 2417, 2419, 2421, 2423, 2425, 2427, 2429, 2431, 2439, 2441, 2443, 2445, 2447, 2449, 2451, 2453, 2455, 2457, 2465, 2467, 2469, 2471, 2473, 2475, 2477, 2479, 2481, 2483, 2490, 2492, 2494, 2496, 2498, 2500, 2502, 2504, 2506, 2508, 2581, 2583, 2585, 2587, 2589, 2591, 2593, 2595, 2597, 2599,

2608, 2611, 2612, 2615, 2618, 2621, 2624, 2627, 2630, 2633, 2723, 2724, 2726, 2728, 2776, 2958, 2960, 2962, 2964, 2966, 2968, 2970, 2972, 2974, 2976, 3028, 3037, 3047, 3150, 3160, 3170, 3290, 3291, 3294, 3297, 3300, 3303, 3309, 3313, 3317, 3320, 3348, 3349, 3350, 3351, 3352, 3353, 3358, 3359, 3360, 3361, 3380, 3381, 3382, 3383, 3384, 3385, 3390, 3391, 3392, 3393, 3439, 3440, 3441, 3442, 3443, 3444, 3447, 3448, 3449, 3450, 3466, 3467, 3468, 3470, 3472, 3474, 3476, 3478, 3479, 3481, 3488, 3490, 3492, 3494, 3496, 3498, 3500, 3502, 3504, 3506
\orcid *10*, 1633
\orcidsite 1634, 1641
\outer@nobreak 959

P

\p@ 480, 685, 692, 702, 703, 709, 710, 3119, 3204, 3251, 3256, 3261, 3262, 3266, 3267, 3271, 3272, 3276, 3277, 3454, 3556, 3559
\PackageError 60, 68, 76, 85, 93, 105, 109, 113, 121, 129, 137, 147
\PackageInfo 57, 59, 65, 67, 73, 75, 81, 84, 90, 92, 98, 104, 118, 120, 126, 128, 134, 136, 142, 146, 1174, 1225, 1232, 1249, 1256, 1263
\PageIndex 16
\pageref 2997
\pagestyle 3134
\par . 446, 449, 471, 712, 957, 1647, 1823, 2199, 2206, 2225, 2230, 2232, 2283, 2289, 2332, 2347, 2350, 2353, 2357, 2365, 2367, 2369, 2371, 2412, 2414, 2416, 2428, 2432, 2521, 2523, 2530, 2533, 2536, 2539, 2541, 2567, 2569, 2571, 2638, 2642, 2699, 2701, 2708, 2710, 2711, 2738, 2740, 2747, 2756, 2765, 2767, 2785, 2787, 2793, 2801, 2809, 2811, 2847, 2848, 2849, 2851, 2865, 2885, 2908, 2912, 2916, 2919, 3452
\paragraph 3264, 3593, 3594, 3596
\parbox 592, 601, 2517, 2527, 2936
\parindent . . 685, 701, 992, 2199, 2206, 2223, 2331, 3265, 3282, 3343, 3375, 3559
\parskip . . 685, 2223, 3559
\part 3274
\PassOptionsToClass 162, 163
\pdfgentounicode . . . 754
\pdfglyphtounicode 747, 748, 749, 750, 751, 752, 753
\pdfstringdefDisableCommands 515
\phantomsection 294, 2859, 3520
\popQED 3459
\position *11*, 1619, 1623, 1624, 1625, 2549, 2823
\postcode 2549, 2820
printonly (env.) *24*
\ProcessOptionsX . . . 164
\proof 3452
\proofname 3452
\protected 1634
\protected@edef . 490, 504
\protected@write . . . 2342
\providecommand . . 30, 31, 32, 563, 567, 3341
\ProvidesClass 5, 6
\ProvidesFile 3
\ps@headings . . 2924, 2928
\ps@myheadings 2923, 2927
\ps@plain 2922, 2926
\pushQED 3453
\put 2950, 2980

Q

\qed 3453
\quad 468, 3039, 3042, 3049, 3053, 3195

R

\raggedright 2517, 2535, 2809, 3560
\raisebox 1723, 1729, 1736, 1742, 2219, 3122, 3207
\real@adddotafter 3230, 3233
\realSectionformat 3226, 3238, 3239
\received *17*, 1807
\RecordChanges 18
\ref 2897, 2904
\refname 293, 294
\relax 175, 181, 187, 200, 207, 247, 289, 343, 344, 432, 477, 524, 609, 688, 724, 726, 871, 967, 1113, 1528, 1532, 1555, 1557, 1563, 1565, 1679, 1680, 1682, 1753, 1777, 1828, 1851, 1872, 1881, 1891, 1892, 1912, 1917, 1920, 1923, 1928, 1931, 1934, 1937, 1940, 1943, 1946, 1949, 1952, 1962, 2001, 2194, 2195, 2212, 2339, 2340, 2343, 2364, 2411, 2437, 2463, 2488, 2579, 2607, 2706, 2716, 2717, 2718, 2719, 2722, 2725, 2727, 2729, 2731, 2734, 2766, 2769, 2770,

2771, 2772, 2775, 2778, 2781, 2813, 2842, 2844, 2877, 2934, 2956, 2957, 2959, 2961, 2977, 2987, 2989, 2992, 3020, 3143, 3194, 3221, 3244, 3248, 3289, 3347, 3379, 3438, 3454, 3465, 3486, 3545, 3549, 3559
\RemoveFromHook 897
\removelastskip 471
\renewcommand 292, 296, 297, 300, 302, 304, 306, 308, 310, 312, 362, 385, 387, 390, 397, 399, 401, 403, 408, 410, 412, 416, 418, 420, 424, 426, 428, 796, 1023, 1560, 1627, 2150, 2183, 2828, 3009, 3010, 3119, 3139, 3140, 3204, 3249, 3254, 3259, 3264, 3274
\renewenvironment . . 924, 1024, 1757, 3452
\repeat 2406, 2942
\RequirePackage 33, 34, 35, 273, 274, 275, 276, 277, 278, 280, 283, 285, 286, 291, 394, 513, 514, 578, 579, 589, 598, 607, 704, 755, 770, 771, 774, 778, 779, 782, 785, 786, 787, 788, 798, 861, 1863, 2921, 3469, 3471, 3473, 3475, 3477, 3480, 3493, 3495, 3497, 3499, 3501, 3505
\reset@font 488, 501
\reversemarginpar . . 669
\rightarrow 1869
\rightskip 3280
\rotatebox 3123, 3208
\rule 495, 508

S

\savebox 2936
screenonly (env.) *24*
\scriptsize 2333, 2939, 2943
\scshape 3344, 3435
\section 293, 2373, 2375, 2379, 2381, 2383, 2385, 2863, 2871, 3249, 3519, 3578, 3579, 3581
\section@raggedright 3279, 3283, 3284, 3292, 3293, 3295, 3296, 3298, 3299, 3301, 3302, 3304, 3305, 3306, 3311, 3312, 3315, 3316, 3318, 3319
\Sectionformat 3222, 3226, 3228, 3239
\SelectFootnoteRule 705, 707
\selectlanguage 1645, 2867
\set@ACM@acmcpbox 2321, 2326
\setbox 499, 962, 2330, 2400, 2516, 2525, 2535, 2699, 2709, 2764, 2849, 2861, 2869
\setcctype *16*, 1957
\setcitestyle *26*, 297, 371, 377
\setcopyright . . *15*, 1955
\setcounter 2189, 2276, 2394, 2987, 2989, 3287, 3310, 3314, 3339
\setengagemetadata *18*, 2168
\setkeys . 42, 179, 185, 1511, 1794, 1842, 1955, 2684, 2685, 2690, 2691, 2752, 2753, 2757, 2758, 2797, 2798, 2802, 2803
\setlength . . 685, 686, 692, 701, 985, 986, 991, 997, 1000, 1001, 1002, 1003, 1713, 1716, 2331, 2938
\setmathfont 772, 773, 780, 781
\setmonofont . . . 775, 783
\settopmatter . . . *17*, 102, 1530, 1782, 1794, 1795, 1797, 1800, 1802, 1805, 2893
\setTrue 470
\SetWatermarkColor 591, 600
\SetWatermarkFontSize 590, 599
\SetWatermarkText 592, 601
\sfdefault 796
\sffamily . . 2464, 2466, 2468, 2470, 2472, 2474, 2478, 2482, 2484, 2604, 2609, 2613, 2634, 3005, 3283, 3284, 3285, 3292, 3293, 3295, 3296, 3301, 3302, 3311, 3312, 3315, 3316
\shortauthors *18*, 1589, 1590, 1597, 1598, 1600, 1603, 1604, 1606, 2308, 2310, 3004
\shortcite 566, 569
\shorttitle 3024, 3032, 3042, 3053, 3066, 3090
\showeprint 3541
\sidebar 922
sidebar (env.) *36*
\skip 715
\small 488, 927, 934, 942, 1823, 2365, 2367, 2369, 2371, 2610, 2635, 2861, 2869, 2885, 3146
\smallskipamount . . . 1006
\smash 1722, 1728, 1735, 1741
\socket 898, 909
\space 1562, 1629, 1782, 2304, 3130, 3215, 3526, 3565, 3568, 3576, 3581, 3586, 3591, 3596
\specialcomment 3517
\standardpagestyle . 3006
\startPage *15*, 1746
\state . *11*, 1624, 2549, 2827
\stepcounter 1653, 1655, 1662, 1665, 1672, 1871
\StrDel 2562
\streetaddress 2549, 2817
\string 434, 435, 438, 440, 576, 1562, 1629, 1704, 1748, 1782, 2343, 2881, 2882, 3332, 3565, 3568, 3576, 3581, 3586, 3591, 3596

\strut 3124, 3209
\strutbox 495, 508
\subsection 3254, 3583, 3584, 3586
\subsubsection 3259, 3588, 3589, 3591
\subtitle *10*, 1552
\subtitlenote . . *13*, 1658

T

\tag 903, 906, 911
\tagpdfparaOff 914
\tagpdfparaOn 900
\tagpdfsetup 920
\teaserfigure 2148
teaserfigure (env.) . . . *17*
\terms 1748
\textbf . . 1874, 1886, 2919
\textbullet 518, 1873, 3039, 3042, 3049, 3053
\textheight 2398, 2400, 2406, 2942, 3122, 3207
\textit 1887, 2895, 2899, 2900, 2901
\textrightarrow 519, 1869, 1883
\textsuperscript . . . 1679
\textwidth 944, 963, 964, 2184, 2511, 2524, 2534, 2577, 2716, 2763
\thanks *13*, 2150, 2916
\thankses 2153, 2155, 2197, 2916
\the . . 1577, 1584, 1637, 1640, 1697, 1699, 2343, 2939, 2943, 2995
\theACM@time@hours 2989, 2996
\theACM@time@minutes 2996
\theenumi 974
\theenumii 975
\theenumiii 976
\theenumiv 977
\thefootnote 2183
\theindex 3555
\theoremstyle 3406, 3409, 3425, 3433
\thepage 2997, 3013, 3015, 3021, 3022, 3065, 3089, 3146, 3186, 3191
\thispagestyle 2401, 2408
\thmname 3373, 3405
\thmnote 3373, 3405
\thmnumber 3373, 3405
\thr@@ 338
\time 2984, 2987, 2989
\title *10*, 2881
\titlenote . . *13*, 1649, 2882
\tl 901
\topsep . . 1010, 1014, 3454
\translatedabstract 454
translatedabstract (env.) *20*
\translatedkeywords *20*, 451
\translatedsubtitle *20*, 448
\translatedtitle . *20*, 445
\trivlist 3455
\tw@ 336
\two@digits . . . 2995, 2996
\twocolumn . 2418, 2420, 2422, 2424, 2426, 2430

U

\unskip 517, 713, 1626, 1633, 2546, 2551, 2554, 2556, 2558, 2559, 2560, 2561, 2642, 2819, 2822, 2823, 2825, 2826, 2827, 2828, 2829, 2830, 2832, 2879, 2887, 2904, 2917
\unvbox . 500, 717, 722, 2402, 2699, 2765, 2849
\upshape 1023
\url . 1855, 1857, 1999, 3526
\UrlBreakPenalty 2745, 2748
\urlstyle . . . 522, 531, 534
\usebox 2950, 2980
\usepackage 10, 11, 12, 13, 14, 15

V

\value 1888
\vbox 499, 962, 2330, 2516, 2525, 2535, 2699, 2764, 2849
\vskip . . 471, 715, 723, 957
\vspace 2341, 3563
\vsplit 2400
\vtop 2709

W

\wd 964
\write 576, 3331

X

\xdef 347, 349, 351, 353, 355, 357

Y

\year 1697, 2995

Z

\z@ 326, 330, 472, 495, 508, 686, 723, 865, 869, 880, 991, 997, 1009, 2199, 2206, 2219, 2223, 2314, 2316, 2331, 2809, 2861, 2869, 3009, 3010, 3121, 3126, 3139, 3140, 3206, 3211, 3250, 3255, 3260, 3270, 3275, 3282, 3355, 3387, 3556, 3559
\z@skip 471, 957, 1014, 3281
\zposy 2337, 2338
\zrefused 2335, 2336
\zsaveposy 1851, 2356