

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

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2025/05/30, v2.14

Abstract

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

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1 Introduction

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

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

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

2.1 Installation

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

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

¹<http://www.acm.org/>

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

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

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

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

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

- *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>,
- *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>,
- *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}
```

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

```
\documentclass[acmtog, review=false]{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, CIE, CSUR, FAC, GAMES, JACM, JATS, JDIQ, JDS, JEA, JERIC, JETC, JRC, PACMCGIT, PACMHCI, PACMMOD, PACMNET, PACMPL, PACMSE, POMACS, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TDS, TEAC, TECS, TELO, THRI, TIIS, TIOT, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPML, TOPS, TORS TOS, TOSEM, TOSN, TQC, TRETTS, 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.

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.

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

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

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

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

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

The default for the option `screen` depends on the publication. At present it is `false` for all publications *but* PACM, since PACM is now electronic-only. Thus PACM titles (see

Table 5) set this option to true. In the future this option may involve additional features suitable for on-screen versions of articles.

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

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

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

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

The option `balance` determines whether the last page in the two column mode has balanced columns. By default it is true; however, it may lead to problems for some documents. 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`.

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:

Table 2: Boolean options

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

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

name: the name of the conference.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

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

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

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

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

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

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

```
\editor{Jennifer B. Sartor}
\editor{Theo D'Hondt}
\editor{Wolfgang De Meuter}
```

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

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

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

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

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

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

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

```

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

```

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

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

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

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

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

```

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

```

Similarly you can repeat the `\email` command.

You may have several authors with the same affiliation, different affiliations, or overlapping affiliations (author A_1 is affiliated with institutions I_1 and I_2 , while author A_2 is affiliated with I_2 only, author A_3 is affiliated with I_1 and I_3 , etc.). The recommended solution is to put the `\affiliation` commands after each author, possibly repeating them:

```

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

```

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

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

However, this format is not generally recommended.

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

```
\author{G. Tobin}
\author{Ben Trovato}
\additionalaffiliation{%
  \institution{The Th{\o}rv{\a}ld Group}
  \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 Thørvöld Group.

`\position` The `\affiliation` and `\additionalaffiliation` commands are further structured to interact with the metadata extraction tools. Inside these commands you should use `\institution` the `\position`, `\institution`, `\department`, `\city`, `\state`, and `\country` macros to `\department` indicate the corresponding parts of the affiliation. Note that in some cases (for example, `\city` journals) these parts are not printed in the resulting copy, but they *are* necessary since `\state` they are used by the XML metadata extraction programs. Do *not* put commas or `\country` 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 warning.

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}}

```

`\thanks` Like `amsart` (and unlike standard \TeX), we allow `\thanks` only *outside* of the commands `\title` and `\author`. This command is obsolete and should *not* be used in most cases. Do not list your acknowledgments or grant sponsors here. Put this information in the `acks` environment (see Section 2.13).

`\authorsaddresses` In some formats, addresses are printed as a footnote on the first page. By default \TeX typesets them itself using the information you give it. However, you can override its choice using the 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 While the command \thanks generates a note without a footnote mark, sometimes
\subtitlenote the authors might need notes more tightly connected to the title, subtitle or author. The
\authornote commands \titlenote, \subtitlenote and \authornote that follow the correspond-
ing commands (\title, \subtitle and \author) generate such notes. For example,

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

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

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

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

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

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

```
\acmVolume{9}
\acmNumber{4}
\acmArticle{39}
\acmYear{2010}
\acmMonth{3}
```

Note that \acmArticle is used not only for journals but also for some conference pro-
ceedings.

\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.

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

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

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

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

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

```
\begin{CCSXML}
```

```

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

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

```

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

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

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

`\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 `cciicons.zip` with these icons. Just unzip it in the same directory where your document is.

Table 3: Parameters for the `\setcopyright` command

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

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 permission blocks for the printed version and authors' version, the page breaks might be different between them.

`abstract (env.)` The environment `abstract` must *precede* the `\maketitle` command. Again, this is different from the standard \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
<code>printccs</code>	true/false	Whether to print CCS categories
<code>printacmref</code>	true/false	Whether to print the ACM bibliographic entry
<code>printfolios</code>	true/false	Whether to print page numbers (folios)
<code>authorsperrow</code>	numeric	Number of authors per row for the title page in conference proceedings formats

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

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

You may repeat these commands if you have several repositories.

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

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

ACM cover page should have the following obligatory sections:

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

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

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

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

2.6 Internationalization

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

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

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

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

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

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

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

`\translatedtitle` The commands `\translatedtitle{<language>}title`, `\translatedsubtitle{<language>}subtitle`
`\translatedsubtitle` and `\translatedkeywordlanguagekeywords` are used to set title, subtitle and key-
`\translatedkeywords` words 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{translatedabstract}{english}
  This is the English version of the abstract
\end{translatedabstract}
```

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

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

2.7 Algorithms

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

2.8 Figures and tables

The new ACM styles use the standard \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`.

2.9 Descriptions of images

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

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

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

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

2.10 Theorems

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

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

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

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

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

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

2.11 Online-only and offline-only material

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

```
\section{Supplementary materials}

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

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

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

2.12 Note about anonymous mode

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

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

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

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

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

2.13 Acknowledgments

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

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

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

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

`\grantsponsor` 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}
```

2.14 Bibliography

The ACM lets you use either `BibTeX` or `BibLaTeX` to process your references: they require slightly different setup of your `TeX` file, as detailed in the following subsections.

2.14.1 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.

There are several customized \LaTeX 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>.

2.14.2 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 is not zero, URL is printed even if DOI is present.

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 of 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",
```

2.14.3 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 bibliography corresponding to two different possibilities. For standalone sources available online, you can use an `online` entry and set its `howpublished` field. For example,

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

For sources available as 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}
}

```

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

2.14.5 Processing using Bib_{La}T_EX

You will find in this package two sets of style files for Bib_{La}T_EX, `acmnumeric` and `acmauthoryear`, that mimic the behavior of the `ACM-Reference-Format.bst` Bib_T_EX style. They provide you access to all the power of Bib_{La}T_EX 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.

There are a few key differences in how the \LaTeX sources are set up when using Bib_{La}T_EX instead of Bib_T_EX, that we summarize briefly here (please refer to the official Bib_{La}T_EX 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 Bib_{La}T_EX package and select the appropriate bibliography style, as follows

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

Also in the preamble, you need to declare the bibliography sources files using the `\addbibresource` 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 Bib_{La}T_EX styles.

2.15 Colors

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

The ACM provides the following recommendation on color use.

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

1. The most common type of inherited Color Vision Deficiency (CVD) is red-green (in which similar-brightness colors that differ only in their amounts of red or green are often confused), and it affects up to 8% of males and 0.5% of females of Northern European descent.

2. The most common type of acquired Color Vision Deficiency (CVD) is blue-yellow (including mild cases for many older adults).
3. Most printing is in black and white.
4. Situational impairments (e.g., bright sunlight shining on a mobile screen) tend to reduce the entire color gamut, reducing color discriminability.

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

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

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

2.15.1 Manual bibliography

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

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

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

2.16 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

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

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

```
\widowpenalty=10000
```

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

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

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

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

2.17 Counting words

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

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

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

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

2.18 Disabled or forbidden commands

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

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

You cannot change `\baselinestretch` in your document: this produces an error.

You should not abuse the command `\vspace`: this command may disturb the type-setting of ACM papers.

You should not load `amssymb` package since the package `acmart` defines the corresponding symbols itself.

2.19 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`.

2.20 Currently supported publications

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

Abbreviation	Publication
ACMJCSS	ACM Journal on Computing and Sustainable Societies
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DLT	Distributed Ledger Technologies: Research and Practice
DGOV	Digital Government: Research and Practice
DTRAP	Digital Threats: Research and Practice
FAC	Formal Aspects of Computing
GAMES	ACM Games: Research and Practice
HEALTH	ACM Transactions on Computing for Healthcare
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
JATS	ACM Journal on Autonomous Transportation Systems
JDIQ	ACM Journal of Data and Information Quality
JDS	ACM/IMS Journal of Data Science
JEA	ACM Journal of Experimental Algorithmics
JERIC	ACM Journal of Educational Resources in Computing

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

Abbreviation	Publication
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCCH	ACM Journal on Computing and Cultural Heritage
JRC	ACM Journal on Responsible Computing
PACMCGIT	Proceedings of the ACM on Computer Graphics and Interactive Techniques
PACMHCI	PACM on Human-Computer Interaction
PACMOD	PACM on Management of Data
PACMNET	PACM on Networking
PACMPL	PACM on Programming Languages
PACMSE	PACM on Software Engineering
POMACS	PACM on Measurement and Analysis of Computing Systems
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
TALG	ACM Transactions on Algorithms
TALLIP	ACM Transactions on Asian and Low-Resource Language Information Processing
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TDS	ACM/IMS Transactions on Data Science
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
TELO	ACM Transactions on Evolutionary Learning 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
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

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

Abbreviation	Publication
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.

2.21 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:

sample-manuscript: A proceedings paper in the manuscript format.

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

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

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

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

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

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

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

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

sample-sigconf-xelatex: A proceedings paper in the `sigconf` format, Xe_{La}TeX version.

sample-sigconf-lualatex: A proceedings paper in the sigconf format, Lua \TeX version.

sample-sigplan: A proceedings paper in the sigplan format.

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

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

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

sample-acmengage: A sample of ACM Engage publication.

2.22 A note about sigchi-a format

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

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

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

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

sidebar: textual information in the margin,

marginfigure: a figure in the margin,

marginfigure: 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`.

2.23 Experiments with tagging

ACM is firmly committed to produce fully tagged PDFs compliant with the accessibility standards. We use the developmental version of tagging code by \TeX 3 team, see the details at <https://www.latex-project.org/publications/indexbytopic/pdf/> and <https://tug.org/twg/accessibility/overview.html>.

At present this work is highly experimental. You may try the experiments by (1) using the class `acmart-tagged` in the document class line, and (2) adding the command `\DocumentMetadata[options]` in the preamble, see the file `sample-acmsmall-tagged.tex`. If you do this, please *do not ask ACM for support*. On the other hand, bug reports at <https://github.com/borisveytsman/acmart/issues> will be appreciated.

3 Implementation

3.1 Identification

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

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class&!tagged>\ProvidesClass{acmart}
6 <tagged>\ProvidesClass{acmart-tagged}
7 [2025/05/30 v2.14 Typesetting articles for the Association for Computing Machinery]
```

And the driver code:

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

3.2 Preload hook

We preload acmart-preload-hook:

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

3.3 Options

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

```
31 \RequirePackage{xkeyval}
32
33   We use xstring to check whether user input is valid
34 \RequirePackage{xstring}
35
36   We need iftex to check the engine
37 \RequirePackage{iftex}
```

format The possible formats

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

\if@ACM@screen Whether we use screen mode

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

\if@ACM@urlbreakonhyphens

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

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

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

\if@ACM@review Whether we use review mode

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

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

```

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

```

```

120     false}}
121 \ExecuteOptionsX{natbib=true}

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

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

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

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

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

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

```

3.4 Setting switches

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

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

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

```
165 \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.

```
166 \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

```
167 \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.

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

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

```
169 \newif\if@ACM@engage
```

```
170 \@ACM@engagefalse
```

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

```
171 \newif\if@ACM@acmcp
```

```
172 \@ACM@acmcpfalse
```

Setting up switches

```
173 \ifnum\ACM@format@nr=5\relax % siggraph
```

```
174 \ClassWarning{\@classname}{%
```

```
175   The format siggraph is now obsolete.\MessageBreak
```

```
176   I am switching to sigconf.}
```

```
177   \setkeys{\@classname.cls}{format=sigconf}
```

```
178 \fi
```

```
179 \ifnum\ACM@format@nr=7\relax % sigchi
```

```
180 \ClassWarning{\@classname}{%
```

```
181   The format sigchi is now obsolete.\MessageBreak
```

```
182   I am switching to sigconf.}
```

```
183   \setkeys{\@classname.cls}{format=sigconf}
```

```
184 \fi
```

```
185 \ifnum\ACM@format@nr=8\relax % sigchi
```

```
186 \ClassWarning{\@classname}{%
```

```
187   ACM SIGCHI has retired the SIGCHI-A template\MessageBreak
```

```
188   effective immediately. ACM is keeping this template\MessageBreak
```

```
189   option available to authors who are working on legacy\MessageBreak
```

```
190   documents only. ACM will not, under any circumstances,\MessageBreak
```

```
191   accept documents in this format for publication and\MessageBreak
```

```
192   will not offer technical support to the authors who use\MessageBreak
```

```
193   this template.\MessageBreak
```

```
194   ACM SIGCHI is directing Conference leaders and\MessageBreak
```

```
195   authors to publish their articles using the SIGCONF\MessageBreak
```

```
196   template call.}
```



```

197 \fi
198 \ifnum\ACM@format@nr=0\relax
199   \@ACM@manuscripttrue
200 \else
201   \@ACM@manuscriptfalse
202 \fi
203 \@ACM@sigchiamodef=false
204 \ifcase\ACM@format@nr
205 \relax % manuscript
206   \@ACM@journaltrue
207 \or % acmsmall
208   \@ACM@journaltrue
209 \or % acmlarge
210   \@ACM@journaltrue
211 \or % acmtog
212   \@ACM@journaltrue
213   \@ACM@journal@bibstrip@or@togtrue
214 \or % sigconf
215   \@ACM@journalfalse
216 \or % siggraph
217   \@ACM@journalfalse
218 \or % sigplan
219   \@ACM@journalfalse
220 \or % sigchi
221   \@ACM@journalfalse
222 \or % sigchi-a
223   \@ACM@journalfalse
224   \@ACM@sigchiamode=true
225 \or % acmengage
226   \@ACM@journalfalse
227   \@ACM@engage=true
228 \or % acmcp
229   \@ACM@journaltrue
230   \@ACM@acmcp=true
231   \AtBeginDocument{\@ACM@printacmreffalse}%
232 \fi
233 \if@ACM@journal
234   \@ACM@journal@bibstrip=true
235   \@ACM@journal@bibstrip@or@togtrue
236 \else
237   \@ACM@journal@bibstrip=false
238 \fi

```

3.5 Loading the base class and package

**tagged* 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
239 \let\@startsection@kernel\@startsection

\@xsect@kernel
240 \let\@xsect@kernel\@xsect

```

```

\@sect@kernel
241 \let\@sect@kernel\@sect

\@essect@kernel
242 \let\@essect@kernel\@essect

;tagged;
At this point we either have \ACM@fontsize or use defaults
243 \ifx\ACM@fontsize\@empty
244 \ifcase\ACM@format@nr
245 \relax % manuscript
246 \def\ACM@fontsize{9pt}%
247 \or % acmsmall
248 \def\ACM@fontsize{10pt}%
249 \or % acmlarge
250 \def\ACM@fontsize{10pt}%
251 \or % acmtog
252 \def\ACM@fontsize{9pt}%
253 \or % sigconf
254 \def\ACM@fontsize{9pt}%
255 \or % siggraph
256 \def\ACM@fontsize{9pt}%
257 \or % sigplan
258 \def\ACM@fontsize{10pt}%
259 \or % sigchi
260 \def\ACM@fontsize{9pt}%
261 \or % sigchi-a
262 \def\ACM@fontsize{10pt}%
263 \or % acmengage
264 \def\ACM@fontsize{10pt}%
265 \or % acmcp
266 \def\ACM@fontsize{9pt}%
267 \fi
268 \fi
269 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
270 \LoadClass[\ACM@fontsize, reqno]{amsart}
271 \RequirePackage{microtype}

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

Booktabs is now the default
273 \RequirePackage{booktabs}

We need totpages to calculate the number of pages and refcount to use that number
274 \RequirePackage{refcount}
275 \RequirePackage{totpages}

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

We use setspace for double spacing
277 \if@ACM@manuscript

```

```

278 \RequirePackage{setspace}
279 \onehalfspacing
280 \fi

    We no longer need textcase for better upcasing.
281 % \RequirePackage{textcase}

282 \if@ACM@acmcp
283 \RequirePackage{framed}
284 \RequirePackage{zref-savepos, zref-user}
285 \fi

```

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

```

286 \newdimen\@ACM@acmcp@delta
287 \@ACM@acmcp@delta=0pt\relax

```

3.6 Citations

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

```

288 \if@ACM@natbib
289 \RequirePackage{natbib}
290 \renewcommand{\bibsection}{%
291 \section*{\refname}%
292 \phantomsection\addcontentsline{toc}{section}{\refname}%
293 }
294 \renewcommand{\bibfont}{\bibliofont}
295 \renewcommand\setcitestyle[1]{
296 \@for\@tempa:=#1\do
297 {\def\@tempb{round}\ifx\@tempa\@tempb
298 \renewcommand\NAT@open{()}\renewcommand\NAT@close{)}\fi
299 \def\@tempb{square}\ifx\@tempa\@tempb
300 \renewcommand\NAT@open{[]}\renewcommand\NAT@close{[]}\fi
301 \def\@tempb{angle}\ifx\@tempa\@tempb
302 \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
303 \def\@tempb{curly}\ifx\@tempa\@tempb
304 \renewcommand\NAT@open{\{}\renewcommand\NAT@close{\}}\fi
305 \def\@tempb{semicolon}\ifx\@tempa\@tempb
306 \renewcommand\NAT@sep{;}\fi
307 \def\@tempb{colon}\ifx\@tempa\@tempb
308 \renewcommand\NAT@sep{;}\fi
309 \def\@tempb{comma}\ifx\@tempa\@tempb
310 \renewcommand\NAT@sep{,}\fi
311 \def\@tempb{authoryear}\ifx\@tempa\@tempb
312 \NAT@numbersfalse\fi
313 \def\@tempb{numbers}\ifx\@tempa\@tempb
314 \NAT@numberstrue\NAT@superfalse\fi
315 \def\@tempb{super}\ifx\@tempa\@tempb
316 \NAT@numberstrue\NAT@supertrue\fi
317 \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
318 \let\bibstyle=\@gobble\fi
319 \def\@tempb{bibstyle}\ifx\@tempa\@tempb
320 \let\bibstyle=\@citestyle\fi
321 \def\@tempb{sort}\ifx\@tempa\@tempb

```

```

322 \def\NAT@sort{\@ne}\fi
323 \def\@tempb{nosort}\ifx\@tempa\@tempb
324 \def\NAT@sort{\z@}\fi
325 \def\@tempb{compress}\ifx\@tempa\@tempb
326 \def\NAT@cmprs{\@ne}\fi
327 \def\@tempb{nocompress}\ifx\@tempa\@tempb
328 \def\NAT@cmprs{\z@}\fi
329 \def\@tempb{sort&compress}\ifx\@tempa\@tempb
330 \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
331 \def\@tempb{mcite}\ifx\@tempa\@tempb
332 \let\NAT@merge\@ne\fi
333 \def\@tempb{merge}\ifx\@tempa\@tempb
334 \ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}\fi
335 \def\@tempb{elide}\ifx\@tempa\@tempb
336 \ifnum{\NAT@merge<\thr@}{\let\NAT@merge\thr@}\fi
337 \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
338 \NAT@longnamestrue\fi
339 \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
340 \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
341 \expandafter\NAT@find@eq\@tempa=\relax\@nil
342 \if\@tempc\relax\else
343 \expandafter\NAT@rem@eq\@tempc
344 \def\@tempb{open}\ifx\@tempa\@tempb
345 \xdef\NAT@open{\@tempc}\fi
346 \def\@tempb{close}\ifx\@tempa\@tempb
347 \xdef\NAT@close{\@tempc}\fi
348 \def\@tempb{aysep}\ifx\@tempa\@tempb
349 \xdef\NAT@aysep{\@tempc}\fi
350 \def\@tempb{yysep}\ifx\@tempa\@tempb
351 \xdef\NAT@yrsep{\@tempc}\fi
352 \def\@tempb{notesep}\ifx\@tempa\@tempb
353 \xdef\NAT@cmt{\@tempc}\fi
354 \def\@tempb{citesep}\ifx\@tempa\@tempb
355 \xdef\NAT@sep{\@tempc}\fi
356 \fi
357 }%
358 \NAT@setcites
359 }
360 \renewcommand\citestyle[1]{%
361 \ifcsname bibstyle@#1\endcsname%
362 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
363 \else%
364 \@latex@error{Undefined `#1' citestyle}%
365 \fi
366 }%
367 \fi

```

\bibstyle@acmauthoryear The default author-year format:

```

368 \newcommand{\bibstyle@acmauthoryear}{%
369 \setcitestyle{%
370 authoryear,%
371 open={[]},close={[]},citesep={;},%
372 aysep={},yysep={},%
373 notesep={, }}

```

`\bibstyle@acmnumeric` The default numeric format:

```
374 \newcommand{\bibstyle@acmnumeric}{%
375   \setcitestyle{%
376     numbers,sort&compress,%
377     open={},close={}},citesep={,},%
378     notesep={, }}
```

The default is numeric:

```
379 \if@ACM@natbib
380 \citestyle{acmnumeric}
381 \fi
```

3.7 Internationalization

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

```

422     \renewcommand\keywordsname{Palabras y Frases Claves Adicionales}%
423     \else
424         \renewcommand\keywordsname{Palabras claves}%
425     \fi
426     \renewcommand\acksname{Expresiones de gratitud}%
427 }%
428 \fi

\ACM@lang@check Some commands should not be used if the document is monlingual
429 \newcommand\ACM@lang@check[1]{%
430     \ifx\ACM@languages\@empty\relax
431     \ClassError{\@classname}{%
432         Command \string#1 \MessageBreak is used in monlingual document}{%
433         You used a command (\string#1) \MessageBreak
434         that does not have a meaning \MessageBreak
435         unless are languages are defined. \MessageBreak
436         Please choose the languages in \string\documentclass
437         \MessageBreak
438         (e.g. \string\documentclass[languages={french, english}]{acmart}),
439         \MessageBreak
440         or delete the command.}%
441     \fi}

\@translatedtitle
442 \def\@translatedtitle{}

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

\@translatedsubtitle
445 \def\@translatedsubtitle{}

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

\@translatedkeywords
448 \def\@translatedkeywords{}

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

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

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

```

\@savetranslatedabstract And saving the abstract

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

3.8 Sectioning

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

```
459 </class>
460 <*tagged>
461 \let\@startsection\@startsection@kernel
462 \let\@sect\@sect@kernel
463 \let\@ssect\@ssect@kernel
464 \let\@xsect\@xsect@kernel
465 </tagged>
466 <*class&!tagged>
467 \def\@startsection#1#2#3#4#5#6{%
468 \ifnoskipsec \leavevmode \fi
469 \par
470 \@tempskipa #4\relax
471 \@afterindenttrue
472 \ifdim \@tempskipa <\z@
473 \@tempskipa -\@tempskipa \@afterindentfalse
474 \fi
475 \if@nobreak
476 \everypar{}%
477 \else
478 \addpenalty\@secpenalty\addvspace\@tempskipa
479 \fi
480 \@ifstar
481 {\@ssect{#3}{#4}{#5}{#6}}%
482 {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}
483 \def\@sect#1#2#3#4#5#6[#7]#8{%
484 \edef\@toclevel{\ifnum#2=\@m 0\else\number#2\fi}%
485 \ifnum #2>\c@secnumdepth
486 \let\@svsec\@empty
487 \else
488 \refstepcounter{#1}%
489 \protected@edef\@svsec{\@secntformat{#1}\relax}%
490 \fi
491 \@tempskipa #5\relax
492 \ifdim \@tempskipa>\z@
493 \begingroup
494 #6{%
495 \@hangfrom{\hskip #3\relax\@svsec}%
496 \interlinepenalty \@M #8\@par}%
497 \endgroup
498 \csname #1mark\endcsname{#7}%
499 \ifnum #2>\c@secnumdepth \else
```

```

500     \@tochangmeasure{\csname the#1\endcsname}%
501   \fi
502   \addcontentsline{toc}{#1}{%
503     \ifnum #2>\c@secnumdepth \else
504       \protect\numberline{\csname the#1\endcsname}%
505     \fi
506     #7}%
507   \else
508     \def\@svsechd{%
509       #6{\hskip #3\relax
510         \@svsec #8}%
511       \csname #1mark\endcsname{#7}%
512       \ifnum #2>\c@secnumdepth \else
513         \@tochangmeasure{\csname the#1\endcsname\space}%
514       \fi
515       \addcontentsline{toc}{#1}{%
516         \ifnum #2>\c@secnumdepth \else
517           \protect\numberline{\csname the#1\endcsname}%
518         \fi
519         #7}}%
520   \fi
521   \@xsect{#5}}
522 \def\@xsect#1{%
523   \@tempskipa #1\relax
524   \ifdim \@tempskipa>\z@
525     \par \nobreak
526     \vskip \@tempskipa
527     \@afterheading
528   \else
529     \@nobreakfalse
530     \global\@noskipsectrue
531     \everypar{%
532       \if@noskipsec
533         \global\@noskipsecfalse
534         {\setbox\z@\lastbox}%
535         \clubpenalty\@M
536         \begingroup \@svsechd \endgroup
537         \unskip
538         \@tempskipa #1\relax
539         \hskip -\@tempskipa
540       \else
541         \clubpenalty \@clubpenalty
542         \everypar{}%
543       \fi}%
544   \fi
545   \ignorespaces}
546 \def\@essect#1#2#3#4#5{%
547   \@tempskipa #3\relax
548   \ifdim \@tempskipa>\z@
549     \begingroup
550       #4{%
551         \@hangfrom{\hskip #1}%
552         \interlinepenalty \@M #5\@par}%
553   \endgroup

```



```

554 \else
555 \def\@svsechd{#4{\hskip #1\relax #5}}%
556 \fi
557 \@xsect{#3}}
558 \
```

[illegible]

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

577 \def\l@section{\@tocline{2}{0pt}{1pc}{3pc}{}}

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

\@makefn_{text} We do not use indentation for footnotes

```

580 \if@ACM@sigchiamode
581 \long\def\@footnotetext#1{\marginpar{%
582   \reset@font\small
583   \interlinepenalty\interfootnotelinepenalty
584   \protected@edef\@currentlabel{%
585     \csname p@footnote\endcsname\@thefnmark
586   }%
587   \color@begingroup
588     \makefntext{%
589       \rule{z\@footnotesep\ignorespaces#1\@finalstrut\strutbox}%
590     \color@endgroup}}}%
591 \fi

```

\@mpfootnotetext We want the footnotes in minipages centered:

```

592 \long\def\@mpfootnotetext#1{%
593   \global\setbox\@mpfootins\vbox{%
594     \unvbox\@mpfootins
595     \reset@font\footnotesize
596     \hsize\columnwidth
597     \@parboxrestore
598     \protected@edef\@currentlabel
599       {\csname p@mpfootnote\endcsname\@thefnmark}%
600     \color@begingroup\centering
601       \@makefnmark{
602         \rule{\z@}{\footnotesep}\ignorespaces#1\@finalstrut\strutbox}%
603     \color@endgroup}}

```

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

```

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

```

3.9 Hyperxmp and hyperref

Adding hyperref

```

605 \let\@footnotemark@nolink\@footnotemark
606 \let\@footnotetext@nolink\@footnotetext
607 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
608 \RequirePackage{hyperxmp}
609 \pdfstringdefDisableCommands{%
610   \def\addtocounter#1#2{%
611     \def\unskip{%
612       \def\textbullet{- }%
613       \def\textrightarrow{-> }%
614       \def\footnotemark{%
615 }
616 \urlstyle{rm}
617 \ifcase\ACM@format@nr
618 \relax % manuscript
619 \or % acsmall
620 \or % acmlarge
621 \or % acmtog
622 \or % sigconf
623 \or % siggraph
624 \or % sigplan
625 \urlstyle{sf}
626 \or % sigchi
627 \or % sigchi-a
628 \urlstyle{sf}
629 \or % acmengage
630 \or % acmcp
631 \fi
632 \AtEndPreamble{%
633   \if@ACM@urlbreakonhyphens
634     \def\do@url@hyp{\do\~}%
635   \fi
636   \if@ACM@screen
637     \hypersetup{colorlinks,

```

```

638     linkcolor=ACMPurple,
639     citecolor=ACMPurple,
640     urlcolor=ACMDarkBlue,
641     filecolor=ACMDarkBlue}
642 \else
643 \hypersetup{hidelinks}
644 \fi
645 \hypersetup{pdflang={en},
646 pdfdisplaydoctitle}}
    Bibliography mangling.
647 \if@ACM@natbib
648 \let\citeN\cite
649 \let\cite\citep
650 \let\citeANP\citeauthor
651 \let\citeNN\citeyearpar
652 \let\citeyearNP\citeyear
653 \let\citeNP\citealt
654 \DeclareRobustCommand\citeA
655     {\begingroup\NAT@swafalse
656      \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
657 \providecommand\newblock{}%
658 \else
659 \AtBeginDocument{%
660 \let\shortcite\cite%
661 \providecommand\citename[1]{#1}}
662 \fi
663 \newcommand\shortcite[2][]{%
664 \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:

```

665 \def\bibliographystyle#1{%
666 \ifx\@begindocumenthook\@undefined\else
667 \expandafter\AtBeginDocument
668 \fi
669 {\if@filesw
670 \immediate\write\@auxout{\string\bibstyle{#1}}%
671 \fi}}

```

3.10 Other packages

Graphics and color.

```

672 \RequirePackage{graphicx}
673 \RequirePackage[prologue]{xcolor}

```

We define ACM colors according to [8]:

```

674 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
675 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
676 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
677 \definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
678 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
679 \definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
680 \definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
681 \definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}

```

Author-draft mode or sigchi-a mode

```
682 \if@ACM@authordraft
683   \RequirePackage{draftwatermark}
684   \SetWatermarkFontSize{0.5in}
685   \SetWatermarkColor[gray]{.9}
686   \SetWatermarkText{\parbox{12em}{\centering
687     Unpublished working draft.\}
688     Not for distribution.}}
689 \else
690   \if@ACM@sigchiamode
691     \if@ACM@nonacm\else
692       \RequirePackage{draftwatermark}
693       \SetWatermarkFontSize{0.5in}
694       \SetWatermarkColor[gray]{.9}
695       \SetWatermarkText{\parbox{12em}{\centering
696         Legacy document. \}
697         Not for publication in an ACM venue}}
698     \fi
699   \fi
700 \fi
```

3.11 Paper size and paragraphing

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

```
701 \RequirePackage{geometry}
702 \ifcase\ACM@format@nr
703 \relax % manuscript
704   \geometry{letterpaper,head=13pt,
705     marginparwidth=6pc,heightrounded}%
706 \or % acmsmall
707   \geometry{twoside=true,
708     includeheadfoot, head=13pt, foot=2pc,
709     paperwidth=6.75in, paperheight=10in,
710     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
711     marginparwidth=2pc,heightrounded
712   }%
713 \or % acmlarge
714   \geometry{twoside=true, head=13pt, foot=2pc,
715     paperwidth=8.5in, paperheight=11in,
716     includeheadfoot,
717     top=78pt, bottom=114pt, inner=81pt, outer=81pt,
718     marginparwidth=4pc,heightrounded
719   }%
720 \or % acmtog
721   \geometry{twoside=true, head=13pt, foot=2pc,
722     paperwidth=8.5in, paperheight=11in,
723     includeheadfoot, columnsep=24pt,
724     top=52pt, bottom=75pt, inner=52pt, outer=52pt,
725     marginparwidth=2pc,heightrounded
726   }%
727 \or % sigconf
```

```

728 \geometry{twoside=true, head=13pt,
729   paperwidth=8.5in, paperheight=11in,
730   includeheadfoot, columnsep=2pc,
731   top=57pt, bottom=73pt, inner=54pt, outer=54pt,
732   marginparwidth=2pc,heightrounded
733   }%
734 \or % siggraph
735 \geometry{twoside=true, head=13pt,
736   paperwidth=8.5in, paperheight=11in,
737   includeheadfoot, columnsep=2pc,
738   top=57pt, bottom=73pt, inner=54pt, outer=54pt,
739   marginparwidth=2pc,heightrounded
740   }%
741 \or % sigplan
742 \geometry{twoside=true, head=13pt,
743   paperwidth=8.5in, paperheight=11in,
744   includeheadfoot=false, columnsep=2pc,
745   top=1in, bottom=1in, inner=0.75in, outer=0.75in,
746   marginparwidth=2pc,heightrounded
747   }%
748 \or % sigchi
749 \geometry{twoside=true, head=13pt,
750   paperwidth=8.5in, paperheight=11in,
751   includeheadfoot, columnsep=2pc,
752   top=66pt, bottom=73pt, inner=54pt, outer=54pt,
753   marginparwidth=2pc,heightrounded
754   }%
755 \or % sigchi-a
756 \geometry{twoside=false, head=13pt,
757   paperwidth=11in, paperheight=8.5in,
758   includeheadfoot, marginparsep=72pt,
759   marginparwidth=170pt, columnsep=20pt,
760   top=72pt, bottom=72pt, left=314pt, right=72pt
761   }%
762 \@mparswitchfalse
763 \reversemarginpar
764 \or % acmengage
765 \geometry{twoside=true, head=13pt,
766   paperwidth=8.5in, paperheight=11in,
767   includeheadfoot, columnsep=2pc,
768   top=57pt, bottom=73pt, inner=54pt, outer=54pt,
769   marginparwidth=2pc,heightrounded
770   }%
771 \or % acmcp
772 \geometry{twoside=true,
773   includeheadfoot, head=13pt, foot=2pc,
774   paperwidth=6.75in, paperheight=10in,
775   top=58pt, bottom=44pt, inner=46pt, outer=46pt,
776   marginparwidth=2pc,heightrounded
777   }%
778 \fi

```

\parindent Paragraphing

\parskip 779 \setlength\parindent{10\p@}

```

780 \setlength\parskip{\z@}
781 \ifcase\ACM@format@nr
782 \relax % manuscript
783 \or % acmsmall
784 \or % acmlarge
785 \or % acmtog
786 \setlength\parindent{9\p@}%
787 \or % sigconf
788 \or % siggraph
789 \or % sigplan
790 \or % sigchi
791 \or % sigchi-a
792 \or % acmengage
793 \or % acmcp
794 \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.

```

795 \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.

```

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

798 \RequirePackage{manyfoot}
799 \SelectFootnoteRule[2]{copyrightpermission}
800 \DeclareNewFootnote{authorsaddresses}
801 \SelectFootnoteRule[2]{copyrightpermission}
802 \DeclareNewFootnote{copyrightpermission}

```

`\footnoterule` Tschichold’s rules:

```

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

```

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

```

805 \def\endminipage{%
806 \par
807 \unskip
808 \ifvoid\@mpfootins\else
809 \vskip\skip\@mpfootins
810 \normalcolor
811 \unvbox\@mpfootins
812 \fi

```

```

813 \minipagefalse
814 \color@endgroup
815 \egroup
816 \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}

```

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

```

817 \def\@textbottom{\vskip \z@ \@plus 1pt}
818 \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.

```

819 \ifcase\ACM@format@nr
820 \relax % manuscript
821 \or % acmsmall
822 \or % acmlarge
823 \or % acmtog
824 \flushbottom
825 \or % sigconf
826 \flushbottom
827 \or % siggraph
828 \flushbottom
829 \or % sigplan
830 \flushbottom
831 \or % sigchi
832 \flushbottom
833 \or % sigchi-a
834 \or % acmengage
835 \flushbottom
836 \or % acmcp
837 \flushbottom
838 \fi

```

3.12 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.

```

839 \ifPDFTeX
840 \input{glyphtounicode}
841 \pdfglyphtounicode{f_f}{FB00}
842 \pdfglyphtounicode{f_f_i}{FB03}
843 \pdfglyphtounicode{f_f_l}{FB04}
844 \pdfglyphtounicode{f_i}{FB01}
845 \pdfglyphtounicode{t_t}{0074 0074}
846 \pdfglyphtounicode{f_t}{0066 0074}
847 \pdfglyphtounicode{T_h}{0054 0068}
848 \pdfgentounicode=1
849 \RequirePackage{cmap}
850 \fi

```

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

```

851 \newif\if@ACM@newfonts

```

```

852 \@ACM@newfontstrue
853 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
854   have the libertine package installed. Please upgrade your
855   TeX}\@ACM@newfontsfalse}
856 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
857   have the inconsolata (zi4.sty) package installed. Please upgrade your
858   TeX}\@ACM@newfontsfalse}
859 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
860   have the newtxmath package installed. Please upgrade your
861   TeX}\@ACM@newfontsfalse}

```

We use Libertine throughout. We use Libertine throughout.

```

862 \if@ACM@newfonts
863 % Note that the order in which packages are loaded matters,
864 % and the correct order depends on the LaTeX engine used.
865 % See https://github.com/borisveytsman/acmart/issues/402
866 % and https://github.com/borisveytsman/acmart/issues/410
867 \ifxetex
868   \RequirePackage{unicode-math}
869   \setmathfont[Scale=MatchUppercase]{LibertinusMath-Regular.otf}
870   \setmathfont{latinmodern-math.otf}[range={cal}]
871   \RequirePackage[tt=false]{libertine}
872   \setmonofont[StylisticSet=3]{inconsolata}
873 \else
874   \ifluatex
875     \RequirePackage{unicode-math}
876     \setmathfont[Scale=MatchUppercase]{LibertinusMath-Regular.otf}
877     \setmathfont{latinmodern-math.otf}[range={cal}]
878     \RequirePackage[tt=false]{libertine}
879     \setmonofont[StylisticSet=3]{inconsolata}
880   \else
881     \RequirePackage[T1]{fontenc}
882     \RequirePackage[tt=false, type1=true]{libertine}
883     \RequirePackage[varqu]{zi4}
884     \RequirePackage[libertine]{newtxmath}
885   \fi
886 \fi
887 \fi

```

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

```

888 \let\liningnums\@undefined
889 \AtEndPreamble{%
890   \DeclareTextFontCommand{\liningnums}{\libertineLF}}

```

The SIGCHI extended abstracts are sans serif:

```

891 \if@ACM@sigchiamode
892   \renewcommand{\familydefault}{\sfdefault}
893 \fi

```

3.13 Image descriptions

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


```

894 \newif\if@Description@present
895 \@Description@presenttrue

\if@undescribed@images A global switch whether some images were not described
896 \newif\if@undescribed@images
897 \@undescribed@imagesfalse

\Description The Description macro right now just sets switches
898 \newcommand\Description[2][\global\@Description@presenttrue\ignorespaces]

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

    Hooks for figures and tables. We also patch algorithm and algorithm* in case
    somebody uses them.
917 \AtBeginEnvironment{figure}{\@Description@presentfalse
918   \let\@vspace\@vspace@orig
919   \let\@vspacer\@vspacer@orig}
920 \AtBeginEnvironment{figure*}{\@Description@presentfalse
921   \let\@vspace\@vspace@orig
922   \let\@vspacer\@vspacer@orig}
923 \AtEndEnvironment{figure}{\if@Description@present\else
924   \global\@undescribed@imagestrue
925   \ClassWarning{\@classname}{A possible image without description}\fi}
926 \AtEndEnvironment{figure*}{\if@Description@present\else
927   \global\@undescribed@imagestrue
928   \ClassWarning{\@classname}{A possible image without description}\fi}
929 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
930   \let\@vspacer\@vspacer@orig}
931 \AtBeginEnvironment{table*}{\let\@vspace\@vspace@orig
932   \let\@vspacer\@vspacer@orig}
933 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
934   \let\@vspacer\@vspacer@orig}
935 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
936   \let\@vspacer\@vspacer@orig}
937 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
938   \let\@vspacer\@vspacer@orig}

```

```

939 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
940 \let\@vspacer\@vspacer@orig}
941 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
942 \let\@vspacer\@vspacer@orig}
943 \AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig
944 \let\@vspacer\@vspacer@orig}
945 \AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig
946 \let\@vspacer\@vspacer@orig}
947 \AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig
948 \let\@vspacer\@vspacer@orig}
949 \AtBeginEnvironment{lstinputlisting}{\let\@vspace\@vspace@orig
950 \let\@vspacer\@vspacer@orig}
951 \AtBeginEnvironment{lstinputlisting*}{\let\@vspace\@vspace@orig
952 \let\@vspacer\@vspacer@orig}
953

```

3.14 Floats

We use the caption package

```

954 \RequirePackage{caption, float}
955 \captionsetup[table]{position=top}
956 \if@ACM@journal
957 \captionsetup{labelfont={sf, small},
958 textfont={sf, small}, margin=\z@}
959 \captionsetup[figure]{name={Fig.}}
960 \else
961 \captionsetup{labelfont={bf},
962 textfont={bf}, labelsep=colon, margin=\z@}
963 \ifcase\ACM@format@nr
964 \relax % manuscript
965 \or % acmsmall
966 \or % acmlarge
967 \or % acmtog
968 \or % sigconf
969 \or % siggraph
970 \captionsetup{textfont={it}}
971 \or % sigplan
972 \captionsetup{labelfont={bf},
973 textfont={normalfont}, labelsep=period, margin=\z@}
974 \or % sigchi
975 \captionsetup[figure]{labelfont={bf, small},
976 textfont={bf, small}}
977 \captionsetup[table]{labelfont={bf, small},
978 textfont={bf, small}}
979 \or % sigchi-a
980 \captionsetup[figure]{labelfont={bf, small},
981 textfont={bf, small}}
982 \captionsetup[table]{labelfont={bf, small},
983 textfont={bf, small}}
984 \or % acmengage
985 \or % acmcp
986 \fi
987 \fi

```

```

sidebar The sidebar environment:
988 \newfloat{sidebar}{}{sbar}
989 \floatname{sidebar}{Sidebar}
990 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}

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

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

\@marginfigure The processing of the saved text
995 \long\def\@marginfigure#1{\bgroup
996 \let\@vspace\@vspace@orig
997 \let\@vspacer\@vspacer@orig
998 \captionsetup{type=figure}%
999 \marginpar{\@Description@presentfalse\centering
1000 \small#1\if@Description@present\else
1001 \global\@undescrbed@imagestrue
1002 \ClassWarning{\@classname}{A possible image without description}
1003 \fi}%
1004 \egroup}

margintable The margintable environment:
1005 \newenvironment{margintable}{\Collect@Body\@margintable}{}

\@margintable The processing of the saved text
1006 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
1007 \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
1008 \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
1009 \newdimen\fulltextwidth
1010 \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)
1011 \if@ACM@sigchiamode
1012 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
1013 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
1014 \let\@endfloatbox\@endwidefloatbox
1015 \def\@fpsadddefault{\def\@fps{tp}}%
1016 \@float}
1017 \fi

\end@dblfloat And the end. Just adding a \bgroup.
1018 \if@ACM@sigchiamode
1019 \def\end@dblfloat{%
1020 \end@float\egroup}
1021 \fi

```

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

```

1022 \def\@endwidefloatbox{%
1023   \par\vskip\z@skip
1024   \@minipagefalse
1025   \outer@nobreak
1026   \egroup
1027   \color@endbox
1028   \global\setbox\@currbox=\vbox{\moveleft
1029     \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
1030   \wd\@currbox=\textwidth
1031 }
```

3.15 Lists

```

1032 \ifcase\ACM@format@nr
1033 \relax % manuscript
1034 \or % acmsmall
1035 \or % acmlarge
1036 \or % acmtog
1037 \or % sigconf
1038 \or % siggraph
1039 \or % sigplan
1040 \def\labelenumi{\theenumi.}
1041 \def\labelenumii{\theenumii.}
1042 \def\labelenumiii{\theenumiii.}
1043 \def\labelenumiv{\theenumiv.}
1044 \or % sigchi
1045 \or % sigchi-a
1046 \or % acmengage
1047 \or % acmcp
1048 \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`.

```

1049 \newdimen\@ACM@labelwidth
1050 \AtBeginDocument{%
1051   \setlength\labelsep{4pt}
1052   \setlength{\@ACM@labelwidth}{6.5pt}
1053
1054   %% First-level list: when beginning after the first line of an
1055   %% indented paragraph or ending before an indented paragraph, labels
1056   %% should not hang to the left of the preceding/following text.
1057   \setlength\leftmargini{\z@}
1058   \addtolength\leftmargini{\parindent}
1059   \addtolength\leftmargini{2\labelsep}
1060   \addtolength\leftmargini{\@ACM@labelwidth}
1061
1062   %% Second-level and higher lists.
1063   \setlength\leftmarginii{\z@}
1064   \addtolength\leftmarginii{0.5\labelsep}
```

```

1065 \addtolength\leftmarginii{\@ACM@labelwidth}
1066 \setlength\leftmarginiii{\leftmarginii}
1067 \setlength\leftmarginiv{\leftmarginiii}
1068 \setlength\leftmarginv{\leftmarginiv}
1069 \setlength\leftmarginvi{\leftmarginv}
1070 \@listi}
1071 \newskip\listisep
1072 \listisep\smallskipamount
1073 \def\@listI{\leftmargin\leftmargini
1074 \labelwidth\leftmargini \advance\labelwidth-\labelsep
1075 \listparindent\z@
1076 \topsep\listisep}
1077 \let\@listi\@listI
1078 \def\@listii{\leftmargin\leftmarginii
1079 \labelwidth\leftmarginii \advance\labelwidth-\labelsep
1080 \topsep\z@skip}
1081 \def\@listiii{\leftmargin\leftmarginiii
1082 \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
1083 \def\@listiv{\leftmargin\leftmarginiv
1084 \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
1085 \def\@listv{\leftmargin\leftmarginv
1086 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
1087 \def\@listvi{\leftmargin\leftmarginvi
1088 \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
\descriptionlabel We do not use a colon by default like amsart does:
1089 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}

\description Make the description environment indentation consistent with that of the itemize
and enumerate environments.
1090 \renewenvironment{description}{\list{}{%
1091 \labelwidth\@ACM@labelwidth
1092 \let\makelabel\descriptionlabel}%
1093 }{
1094 \endlist
1095 }
1096 \let\enddescription=\endlist % for efficiency

```

3.16 Top-matter data

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

```

1097 \newif\if@ACM@maketitle@typeset
1098 \@ACM@maketitle@typesetfalse

```

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

```

1099 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
1100 ACMJCSS,%
1101 CIE,%
1102 CSUR,%
1103 DGOV,%
1104 DLT,%
1105 DTRAP,%
1106 FAC,%

```

1107 GAMES,%
1108 HEALTH,%
1109 IMWUT,%
1110 JACM,%
1111 JATS,%
1112 JDIQ,%
1113 JDS,%
1114 JEA,%
1115 JERIC,%
1116 JETC,%
1117 JOCCH,%
1118 JRC,%
1119 PACMCGIT,%
1120 PACMHCI,%
1121 PACMMOD,%
1122 PACMNET,%
1123 PACMPL,%
1124 PACMSE,%
1125 POMACS,%
1126 TAAS,%
1127 TACCESS,%
1128 TACO,%
1129 TALG,%
1130 TALLIP,%
1131 TAP,%
1132 TCPS,%
1133 TDS,%
1134 TEAC,%
1135 TECS,%
1136 TELO,%
1137 THRI,%
1138 TIIS,%
1139 TIOT,%
1140 TISSEC,%
1141 TIST,%
1142 TKDD,%
1143 TMIS,%
1144 TOCE,%
1145 TOCHI,%
1146 TOCL,%
1147 TOCS,%
1148 TOCT,%
1149 TODAES,%
1150 TODS,%
1151 TOG,%
1152 TOIS,%
1153 TOIT,%
1154 TOMACS,%
1155 TOMM,%
1156 TOMPECS,%
1157 TOMS,%
1158 TOPC,%
1159 TOPLAS,%
1160 TOPML,%

```

1161 TOPS,%
1162 TORS,%
1163 TOS,%
1164 TOSEM,%
1165 TOSN,%
1166 TQC,%
1167 TRETs,%
1168 TSAS,%
1169 TSC,%
1170 TSLP,%
1171 TWEB,%
1172 FACMP%
1173 }{%
1174 \ifcase\@journalCode@nr
1175 \relax % ACMJCSS
1176 \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
1177 \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%
1178 \def\@permissionCodeOne{2834-5533}%
1179 \def\@permissionCodeTwo{2834-5533}%
1180 \or % CIE
1181 \def\@journalName{ACM Computers in Entertainment}%
1182 \def\@journalNameShort{ACM Comput. Entertain.}%
1183 \def\@permissionCodeOne{1544-3574}%
1184 \or % CSUR
1185 \def\@journalName{ACM Computing Surveys}%
1186 \def\@journalNameShort{ACM Comput. Surv.}%
1187 \def\@permissionCodeOne{0360-0300}%
1188 \def\@permissionCodeTwo{1557-7341}%
1189 \or % DGOV
1190 \def\@journalName{Digital Government: Research and Practice}%
1191 \def\@journalNameShort{Digit. Gov. Res. Pract.}%
1192 \def\@permissionCodeOne{2639-0175}%
1193 \def\@permissionCodeTwo{2639-0175}%
1194 \or % DLT
1195 \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
1196 \def\@journalNameShort{Distrib. Ledger Technol.}%
1197 \def\@permissionCodeOne{2769-6472}%
1198 \def\@permissionCodeTwo{2769-6480}%
1199 \or % DTRAP
1200 \def\@journalName{Digital Threats: Research and Practice}%
1201 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1202 \def\@permissionCodeOne{2576-5337}%
1203 \def\@permissionCodeTwo{2576-5337}%
1204 \or % FAC
1205 \def\@journalName{Formal Aspects of Computing}%
1206 \def\@journalNameShort{Form. Asp. Comput.}%
1207 \def\@permissionCodeOne{0934-5043}%
1208 \def\@permissionCodeTwo{1433-299X}%
1209 \or % GAMES
1210 \def\@journalName{ACM Games: Research and Practice}%
1211 \def\@journalNameShort{ACM Games}%
1212 \def\@permissionCodeOne{2832-5516}%
1213 \def\@permissionCodeTwo{2832-5516}%
1214 \or % HEALTH

```

```

1215 \def\@journalName{ACM Transactions on Computing for Healthcare}%
1216 \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1217 \def\@permissionCodeOne{2637-8051}%
1218 \def\@permissionCodeTwo{2637-8051}%
1219 \or % IMWUT
1220 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1221   Wearable and Ubiquitous Technologies}%
1222 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
1223 \def\@permissionCodeOne{2474-9567}%
1224 \def\@permissionCodeTwo{2474-9567}%
1225 \@ACM@screentru
1226 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1227 \or % JACM
1228 \def\@journalName{Journal of the ACM}%
1229 \def\@journalNameShort{J. ACM}%
1230 \def\@permissionCodeOne{0004-5411}%
1231 \def\@permissionCodeTwo{1557-735X}%
1232 \or % JATS
1233 \def\@journalName{Journal on Autonomous Transportation Systems}%
1234 \def\@journalNameShort{ACM J. Auton. Transport. Syst.}%
1235 \def\@permissionCodeOne{2833-0528}%
1236 \def\@permissionCodeTwo{2833-0528}%
1237 \or % JDIQ
1238 \def\@journalName{ACM Journal of Data and Information Quality}%
1239 \def\@journalNameShort{ACM J. Data Inform. Quality}%
1240 \def\@permissionCodeOne{1936-1955}%
1241 \def\@permissionCodeTwo{1936-1963}%
1242 \or % JDS
1243 \def\@journalName{ACM/IMS Journal of Data Science}%
1244 \def\@journalNameShort{ACM/IMS J. Data Sci.}%
1245 \def\@permissionCodeOne{2831-3194}%
1246 \def\@permissionCodeTwo{2831-3194}%
1247 \or % JEA
1248 \def\@journalName{ACM Journal of Experimental Algorithmics}%
1249 \def\@journalNameShort{ACM J. Exp. Algor.}%
1250 \def\@permissionCodeOne{1084-6654}%
1251 \def\@permissionCodeTwo{1084-6654}%
1252 \or % JERIC
1253 \def\@journalName{ACM Journal of Educational Resources in Computing}%
1254 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
1255 \def\@permissionCodeOne{1073-0516}%
1256 \or % JETC
1257 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
1258 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1259 \def\@permissionCodeOne{1550-4832}%
1260 \def\@permissionCodeTwo{1550-4840}%
1261 \or % JOCCH
1262 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1263 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1264 \def\@permissionCodeOne{1556-4673}%
1265 \def\@permissionCodeTwo{1556-4711}%
1266 \or % JRC
1267 \def\@journalName{ACM Journal on Responsible Computing}%
1268 \def\@journalNameShort{ACM J. Responsib. Comput.}%

```



```

1269 \def\@permissionCodeOne{2832-0565}%
1270 \def\@permissionCodeTwo{2832-0565}%
1271 \or % PACMCGIT
1272 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1273 \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1274 \def\@permissionCodeOne{2577-6193}%
1275 \def\@permissionCodeTwo{2577-6193}%
1276 \@ACM@screentruer
1277 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1278 \or % PACMHCI
1279 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
1280 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
1281 \def\@permissionCodeOne{2573-0142}%
1282 \def\@permissionCodeTwo{2573-0142}%
1283 \@ACM@screentruer
1284 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1285 \or % PACMMOD
1286 \def\@journalName{Proceedings of the ACM on Management of Data}%
1287 \def\@journalNameShort{Proc. ACM Manag. Data}%
1288 \def\@permissionCodeOne{2836-6573}%
1289 \def\@permissionCodeTwo{2836-6573}%
1290 \or % PACMNET
1291 \def\@journalName{Proceedings of the ACM on Networkng}%
1292 \def\@journalNameShort{Proc. ACM Netw.}%
1293 \def\@permissionCodeOne{2834-5509}%
1294 \def\@permissionCodeTwo{2834-5509}%
1295 \or % PACMPL
1296 \def\@journalName{Proceedings of the ACM on Programming Languages}%
1297 \def\@journalNameShort{Proc. ACM Program. Lang.}%
1298 \def\@permissionCodeOne{2475-1421}%
1299 \def\@permissionCodeTwo{2475-1421}%
1300 \@ACM@screentruer
1301 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1302 \or % PACMSE
1303 \def\@journalName{Proceedings of the ACM on Software Engineering}%
1304 \def\@journalNameShort{Proc. ACM Softw. Eng.}%
1305 \def\@permissionCodeOne{2994-970X}%
1306 \def\@permissionCodeTwo{2994-970X}%
1307 \@ACM@screentruer
1308 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1309 \or % POMACS
1310 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1311 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1312 \def\@permissionCodeOne{2476-1249}%
1313 \def\@permissionCodeTwo{2476-1249}%
1314 \@ACM@screentruer
1315 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1316 \or % TAAS
1317 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
1318 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
1319 \def\@permissionCodeOne{1556-4665}%
1320 \def\@permissionCodeTwo{1556-4703}%
1321 \or % TACCESS
1322 \def\@journalName{ACM Transactions on Accessible Computing}%

```

```

1323 \def\@journalNameShort{ACM Trans. Access. Comput.}%
1324 \def\@permissionCodeOne{1936-7228}%
1325 \def\@permissionCodeTwo{1936-7236}%
1326 \or % TACO
1327 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1328 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1329 \def\@permissionCodeOne{1544-3566}%
1330 \def\@permissionCodeTwo{1544-3973}%
1331 \or % TALG
1332 \def\@journalName{ACM Transactions on Algorithms}%
1333 \def\@journalNameShort{ACM Trans. Algor.}%
1334 \def\@permissionCodeOne{1549-6325}%
1335 \def\@permissionCodeTwo{1549-6333}%
1336 \or % TALLIP
1337 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1338 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1339 \def\@permissionCodeOne{2375-4699}%
1340 \def\@permissionCodeTwo{2375-4702}%
1341 \or % TAP
1342 \def\@journalName{ACM Transactions on Applied Perception}%
1343 \def\@journalNameShort{ACM Trans. Appl. Percept.}%
1344 \def\@permissionCodeOne{1544-3558}%
1345 \def\@permissionCodeTwo{1544-3965}%
1346 \or % TCPS
1347 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1348 \def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%
1349 \def\@permissionCodeOne{2378-962X}%
1350 \def\@permissionCodeTwo{2378-9638}%
1351 \or % TDS
1352 \def\@journalName{ACM/IMS Transactions on Data Science}%
1353 \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
1354 \def\@permissionCodeOne{2577-3224}%
1355 \or % TEAC
1356 \def\@journalName{ACM Transactions on Economics and Computation}%
1357 \def\@journalNameShort{ACM Trans. Econ. Comput.}%
1358 \def\@permissionCodeOne{2167-8375}%
1359 \def\@permissionCodeTwo{2167-8383}%
1360 \or % TECS
1361 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
1362 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1363 \def\@permissionCodeOne{1539-9087}%
1364 \def\@permissionCodeTwo{1558-3465}%
1365 \or % TELO
1366 \def\@journalName{ACM Transactions on Evolutionary Learning and Optimization}%
1367 \def\@journalNameShort{ACM Trans. Evol. Learn. Optim.}%
1368 \def\@permissionCodeOne{2688-299X}%
1369 \def\@permissionCodeTwo{2688-3007}%
1370 \or % THRI
1371 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
1372 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1373 \def\@permissionCodeOne{2573-9522}%
1374 \def\@permissionCodeTwo{2573-9522}%
1375 \or % TIIS
1376 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%

```

```

1377 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1378 \def\@permissionCodeOne{2160-6455}%
1379 \def\@permissionCodeTwo{2160-6463}%
1380 \or % TIOT
1381 \def\@journalName{ACM Transactions on Internet of Things}%
1382 \def\@journalNameShort{ACM Trans. Internet Things}%
1383 \def\@permissionCodeOne{2577-6207}%
1384 \def\@permissionCodeTwo{2577-6207}%
1385 \or % TISSEC
1386 \def\@journalName{ACM Transactions on Information and System Security}%
1387 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1388 \def\@permissionCodeOne{1094-9224}%
1389 \or % TIST
1390 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1391 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1392 \def\@permissionCodeOne{2157-6904}%
1393 \def\@permissionCodeTwo{2157-6912}%
1394 \or % TKDD
1395 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
1396 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1397 \def\@permissionCodeOne{1556-4681}%
1398 \def\@permissionCodeTwo{1556-472X}%
1399 \or % TMIS
1400 \def\@journalName{ACM Transactions on Management Information Systems}%
1401 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1402 \def\@permissionCodeOne{2158-656X}%
1403 \def\@permissionCodeTwo{2158-6578}%
1404 \or % TOCE
1405 \def\@journalName{ACM Transactions on Computing Education}%
1406 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
1407 \def\@permissionCodeOne{1946-6226}%
1408 \def\@permissionCodeTwo{1946-6226}%
1409 \or % TOCHI
1410 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1411 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1412 \def\@permissionCodeOne{1073-0516}%
1413 \def\@permissionCodeTwo{1557-7325}%
1414 \or % TOCL
1415 \def\@journalName{ACM Transactions on Computational Logic}%
1416 \def\@journalNameShort{ACM Trans. Comput. Logic}%
1417 \def\@permissionCodeOne{1529-3785}%
1418 \def\@permissionCodeTwo{1557-945X}%
1419 \or % TOCS
1420 \def\@journalName{ACM Transactions on Computer Systems}%
1421 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1422 \def\@permissionCodeOne{0734-2071}%
1423 \def\@permissionCodeTwo{1557-7333}%
1424 \or % TOCT
1425 \def\@journalName{ACM Transactions on Computation Theory}%
1426 \def\@journalNameShort{ACM Trans. Comput. Theory}%
1427 \def\@permissionCodeOne{1942-3454}%
1428 \def\@permissionCodeTwo{1942-3462}%
1429 \or % TODAES
1430 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%

```

```

1431 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1432 \def\@permissionCodeOne{1084-4309}%
1433 \def\@permissionCodeTwo{1557-7309}%
1434 \or % TODS
1435 \def\@journalName{ACM Transactions on Database Systems}%
1436 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
1437 \def\@permissionCodeOne{0362-5915}%
1438 \def\@permissionCodeTwo{1557-4644}%
1439 \or % TOG
1440 \def\@journalName{ACM Transactions on Graphics}%
1441 \def\@journalNameShort{ACM Trans. Graph.}%
1442 \def\@permissionCodeOne{0730-0301}%
1443 \def\@permissionCodeTwo{1557-7368}%
1444 \or % TOIS
1445 \def\@journalName{ACM Transactions on Information Systems}%
1446 \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1447 \def\@permissionCodeOne{1046-8188}%
1448 \def\@permissionCodeTwo{1558-2868}%
1449 \or % TOIT
1450 \def\@journalName{ACM Transactions on Internet Technology}%
1451 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1452 \def\@permissionCodeOne{1533-5399}%
1453 \def\@permissionCodeTwo{1557-6051}%
1454 \or % TOMACS
1455 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1456 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1457 \def\@permissionCodeOne{1049-3301}%
1458 \def\@permissionCodeTwo{1558-1195}%
1459 \or % TOMM
1460 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
1461 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1462 \def\@permissionCodeOne{1551-6857}%
1463 \def\@permissionCodeTwo{1551-6865}%
1464 \or % TOMPECS
1465 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1466 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1467 \def\@permissionCodeOne{2376-3639}%
1468 \def\@permissionCodeTwo{2376-3647}%
1469 \or % TOMS
1470 \def\@journalName{ACM Transactions on Mathematical Software}%
1471 \def\@journalNameShort{ACM Trans. Math. Softw.}%
1472 \def\@permissionCodeOne{0098-3500}%
1473 \def\@permissionCodeTwo{1557-7295}%
1474 \or % TOPC
1475 \def\@journalName{ACM Transactions on Parallel Computing}%
1476 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1477 \def\@permissionCodeOne{2329-4949}%
1478 \def\@permissionCodeTwo{2329-4957}%
1479 \or % TOPLAS
1480 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1481 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1482 \def\@permissionCodeOne{0164-0925}%
1483 \def\@permissionCodeTwo{1558-4593}%
1484 \or % TOPML

```

```

1485 \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
1486 \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
1487 \def\@permissionCodeOne{2836-8924}%
1488 \def\@permissionCodeTwo{2836-8924}%
1489 \or % TOPS
1490 \def\@journalName{ACM Transactions on Privacy and Security}%
1491 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1492 \def\@permissionCodeOne{2471-2566}%
1493 \def\@permissionCodeTwo{2471-2574}%
1494 \or % TORS
1495 \def\@journalName{ACM Transactions on Recommender Systems}%
1496 \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
1497 \def\@permissionCodeOne{2770-6699}%
1498 \def\@permissionCodeTwo{2770-6699}%
1499 \or % TOS
1500 \def\@journalName{ACM Transactions on Storage}%
1501 \def\@journalNameShort{ACM Trans. Storage}%
1502 \def\@permissionCodeOne{1553-3077}%
1503 \def\@permissionCodeTwo{1553-3093}%
1504 \or % TOSEM
1505 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1506 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1507 \def\@permissionCodeOne{1049-331X}%
1508 \def\@permissionCodeTwo{1557-7392}%
1509 \or % TOSN
1510 \def\@journalName{ACM Transactions on Sensor Networks}%
1511 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1512 \def\@permissionCodeOne{1550-4859}%
1513 \def\@permissionCodeTwo{1550-4867}%
1514 \or % TQC
1515 \def\@journalName{ACM Transactions on Quantum Computing}%
1516 \def\@journalNameShort{ACM Trans. Quantum Comput.}%
1517 \def\@permissionCodeOne{2643-6817}%
1518 \def\@permissionCodeTwo{2643-6817}%
1519 \or % TRET
1520 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1521 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1522 \def\@permissionCodeOne{1936-7406}%
1523 \def\@permissionCodeTwo{1936-7414}%
1524 \or % TSAS
1525 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1526 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1527 \def\@permissionCodeOne{2374-0353}%
1528 \def\@permissionCodeTwo{2374-0361}%
1529 \or % TSC
1530 \def\@journalName{ACM Transactions on Social Computing}%
1531 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1532 \def\@permissionCodeOne{2469-7818}%
1533 \def\@permissionCodeTwo{2469-7826}%
1534 \or % TSLP
1535 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1536 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1537 \def\@permissionCodeOne{1550-4875}%
1538 \def\@permissionCodeTwo{2329-9304}%

```

```

1539 \or % TWEB
1540 \def\@journalName{ACM Transactions on the Web}%
1541 \def\@journalNameShort{ACM Trans. Web}%
1542 \def\@permissionCodeOne{1559-1131}%
1543 \def\@permissionCodeTwo{1559-114X}%
1544 \else % FACMP, a dummy journal
1545 \def\@journalName{ACM Just Accepted}%
1546 \def\@journalNameShort{ACM Accepted}%
1547 \def\@permissionCodeOne{XXXX-XXXX}%
1548 \fi
1549 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1550 }{%
1551 \ClassError{\@classname}{Incorrect journal #1}%
1552 }%

```

`\acmJournal` And the syntactic sugar around it

```

1553 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
1554 \global\@ACM@journal@bibstriptrue
1555 \global\@ACM@journal@bibstrip@or@togtrue}

```

The defaults:

```

1556 \def\@journalCode@nr{0}
1557 \def\@journalName{}%
1558 \def\@journalNameShort{\@journalName}%
1559 \def\@permissionCodeOne{XXXX-XXXX}%
1560 \def\@permissionCodeTwo{\@permissionCodeOne}%

```

`\acmConference` This is the conference command

```

1561 \newcommand\acmConference[4][{}%
1562 \gdef\acmConference@shortname{#1}%
1563 \gdef\acmConference@name{#2}%
1564 \gdef\acmConference@date{#3}%
1565 \gdef\acmConference@venue{#4}%
1566 \ifx\acmConference@shortname\@empty
1567 \gdef\acmConference@shortname{#2}%
1568 \fi
1569 \global\@ACM@journal@bibstripfalse
1570 \ifx\@acmBooktitle\@empty\relax
1571 \acmBooktitle{Proceedings of \acmConference@name
1572 \ifx\acmConference@name\acmConference@shortname\else
1573 \ (\acmConference@shortname)\fi}%
1574 \fi
1575 }
1576 \if@ACM@journal\else
1577 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1578 DC, USA}%
1579 \fi

```

`\acmBooktitle` The book title of the conference:

```

\@acmBooktitle 1580 \def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
1581 \acmBooktitle{}

```

`\@editorsAbbrev` How to abbreviate editors

```

1582 \def\@editorsAbbrev{(Ed.)}

```

`\@acmEditors` The list of editors

```
1583 \def\@acmEditors{}
```

`\editor` Add a new editor to the list

```
1584 \def\editor#1{\ifx\@acmEditors\@empty
1585   \gdef\@acmEditors{#1}%
1586   \else
1587     \gdef\@editorsAbbrev{(Eds.)}%
1588     \g@addto@macro\@acmEditors{\and#1}%
1589 \fi}
```

`\subtitle` The subtitle macro

```
1590 \def\subtitle#1{\def\@subtitle{#1}}
1591 \subtitle{}
```

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

```
1592 \newcount\num@authorgroups
1593 \num@authorgroups=0\relax
```

`\num@authors` The total number of authors

```
1594 \newcount\num@authors
1595 \num@authors=0\relax
```

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

```
1596 \newif\if@insideauthorgroup
1597 \@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.

```
1598 \renewcommand\author[2][{}%
1599   \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\@classname}{Do not put several
1600     authors in the same \string\author\space macro!}}{}%
1601   \global\advance\num@authors by 1\relax
1602   \if@insideauthorgroup\else
1603     \global\advance\num@authorgroups by 1\relax
1604     \global\@insideauthorgrouptrue
1605   \fi
1606   \ifx\addresses\@empty
1607     \if@ACM@anonymous
1608       \gdef\addresses{\@author{Anonymous Author(s)}%
1609         \ifx\@acmSubmissionID\@empty\else\Submission Id:
1610           \@acmSubmissionID\fi}}%
1611       \gdef\authors{Anonymous Author(s)}%
1612     \else
1613       \expandafter\gdef\expandafter\addresses\expandafter{%
1614         \expandafter\@author\expandafter{%
1615           \csname typeset@author\the\num@authors\endcsname{#2}}}%
1616       \gdef\authors{#2}%
1617   \fi
```

```

1618 \else
1619   \if@ACM@anonymous\else
1620     \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
1621       \expandafter\and\expandafter\@author\expandafter{%
1622         \csname typeset@author\the\num@authors\endcsname{#2}}}%
1623     \g@addto@macro\authors{\and#2}%
1624   \fi
1625 \fi
1626 \if@ACM@anonymous
1627   \ifx\shortauthors\@empty
1628     \gdef\shortauthors{Anon.
1629       \ifx\@acmSubmissionID\@empty\else Submission Id:
1630         \@acmSubmissionID\fi}%
1631   \fi
1632 \else
1633   \def\@tempa{#1}%
1634   \ifx\@tempa\@empty
1635     \ifx\shortauthors\@empty
1636       \gdef\shortauthors{#2}%
1637     \else
1638       \g@addto@macro\shortauthors{\and#2}%
1639     \fi
1640   \else
1641     \ifx\shortauthors\@empty
1642       \gdef\shortauthors{#1}%
1643     \else
1644       \g@addto@macro\shortauthors{\and#1}%
1645     \fi
1646   \fi
1647 \fi}

```

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

```

1648 \newcommand{\affiliation}[2][{}]{%
1649   \global\@insideauthorgroupfalse
1650   \if@ACM@anonymous\else
1651     \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1652   \fi}

```

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

```

1653 \define@boolkey+{@ACM@affiliation@}[@ACM@affiliation@]{obeypunctuation}%
1654 [true]{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

```

`\additionalaffiliation` Additional affiliations go to footnotes

```

1655 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

```

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

```

1656 \def\@additionalaffiliation#1{\bgroup
1657   \def\position##1{\ignorespaces}%
1658   \def\institution##1{##1\ignorespaces}%
1659   \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1660   \def\@department[##1]##2{##2, \ignorespaces}%

```



```

1661 \let\city\position
1662 \let\state\position
1663 \let\country\position
1664 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.

```

1665 \renewcommand{\email}[2][{}]{%
1666   \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1667     addresses in the same \string\email\space macro!}}{}%
1668   \if@ACM@anonymous\else
1669     \g@addto@macro\addresses{\email{#1}{#2}}%
1670   \fi}

```

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

```

1671 \def\orcid#1{\unskip\ignorespaces%
1672   \protected\def\orcidsite{https://orcid.org/}%
1673   \IfBeginWith{#1}{http}{%
1674     \expandafter\gdef\csname
1675       typeset@author\the\num@authors\endcsname##1{%
1676       \href{#1}{##1}}}%
1677   \expandafter\gdef\csname
1678     typeset@author\the\num@authors\endcsname##1{%
1679     \href{\orcidsite#1}{##1}}}}

```

`\authorsaddresses` Setting up authors' addresses

```

1680 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1681 \authorsaddresses{\@mkauthorsaddresses}

```

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

```

1682 \newcommand\@mktranslatedkeywords[2]{\bgroup
1683   \selectlanguage{#1}%
1684   {\@specialsection{keywordsname}%
1685     \noindent#2\par}\egroup}

```

`\@titlenotes` The title notes

```

1686 \def\@titlenotes{}

```

`\titlenote` Adding a note to the title

```

1687 \def\titlenote#1{%
1688   \g@addto@macro\@title{\footnotemark}%
1689   \if@ACM@anonymous
1690     \g@addto@macro\@titlenotes{%
1691       \stepcounter{footnote}\footnotetext{Title note}}%
1692   \else
1693     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1694   \fi}

```

`\@subtitlenotes` The subtitle notes

```

1695 \def\@subtitlenotes{}

```

`\subtitlenote` Adding a note to the subtitle

```
1696 \def\subtitlenote#1{%
1697   \g@addto@macro\@subtitle{\footnotemark}%
1698   \if@ACM@anonymous
1699     \g@addto@macro\@subtitlenotes{%
1700       \stepcounter{footnote}\footnotetext{Subtitle note}}%
1701   \else
1702     \g@addto@macro\@subtitlenotes{%
1703       \stepcounter{footnote}\footnotetext{#1}}%
1704   \fi}
```

`\@authornotes` The author notes

```
1705 \def\@authornotes{}
```

`\authornote` Adding a note to the author

```
1706 \def\authornote#1{%
1707   \if@ACM@anonymous\else
1708     \g@addto@macro\addresses{\@authornotemark}%
1709     \g@addto@macro\@authornotes{%
1710       \stepcounter{footnote}\footnotetext{#1}}%
1711   \fi}
```

`\authornotemark` Adding a footnote mark to the authors

```
1712 \newcommand\authornotemark[1][\relax]{%
1713   \if@ACM@anonymous\else
1714     \ifx#1\relax\relax\relax
1715       \g@addto@macro\addresses{\@authornotemark}%
1716     \else
1717       \g@addto@macro\addresses{\@authornotemark{#1}}%
1718     \fi
1719   \fi}
```

`\acmVolume` The current volume

```
1720 \def\acmVolume#1{\def\@acmVolume{#1}}
1721 \acmVolume{1}
```

`\acmNumber` The current number

```
1722 \def\acmNumber#1{\def\@acmNumber{#1}}
1723 \acmNumber{1}
```

`\acmArticle` The current article

```
1724 \def\acmArticle#1{\def\@acmArticle{#1}}
1725 \acmArticle{}
```

`\acmArticleSeq` The sequence number

```
1726 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
1727 \acmArticleSeq{\@acmArticle}
```

`\acmYear` The current year

```
1728 \def\acmYear#1{\def\@acmYear{#1}}
1729 \acmYear{\the\year}
```

`\acmMonth` The current month

```

1730 \def\acmMonth#1{\def\@acmMonth{#1}}
1731 \acmMonth{\the\month}

```

`\@acmPubDate` The publication date

```

1732 \def\@acmPubDate{\ifcase\@acmMonth\or
1733   January\or February\or March\or April\or May\or June\or
1734   July\or August\or September\or October\or November\or
1735   December\fi~\@acmYear}

```

`\acmPrice` The price—obsolete

```

1736 \def\acmPrice#1{\ClassWarning{\@classname}{The macro \string\acmPrice
1737   is obsolete. ACM no longer prints the price in bibstrip.}}

```

`\acmSubmissionID` The submission ID

```

1738 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
1739 \acmSubmissionID{}

```

`\acmISBN` The book ISBN

```

1740 \def\acmISBN#1{\def\@acmISBN{#1}}
1741 \acmISBN{978-x-xxxx-xxxx-x/YYYY/MM}

```

`\acmDOI` The paper DOI

```

1742 \def\acmDOI#1{\def\@acmDOI{#1}}
1743 \acmDOI{10.1145/nnnnnnnn.nnnnnnn}

```

`\if@ACM@badge`

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

```

1744 \newlength\@ACM@badge@width
1745 \setlength\@ACM@badge@width{3pc}

```

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

```

1746 \newlength\@ACM@title@width

```

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

```

1747 \newlength\@ACM@badge@skip
1748 \setlength\@ACM@badge@skip{1pt}

```

`\@acmBadgeR`

```

1749 \def\@acmBadgeR{}

```

`\@acmBadgeL`

```

1750 \def\@acmBadgeL{}

```

`\acmBadgeR` Setting the right badge

```

1751 \newcommand\acmBadgeR[2][\%
1752   \ifx\@acmBadgeR\@empty
1753     \gdef\@acmBadgeR{%
1754       \smash{%
1755         \raisebox{0.5\height}{%
1756           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1757   \else

```

```

1758 \g@addto@macro{\@acmBadgeR}{%
1759 \hspace{\@ACM@badge@skip}%
1760 \smash{%
1761 \raisebox{0.5\height}{%
1762 \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1763 \fi}

\acmBadgeL Setting the left badge
1764 \newcommand\acmBadgeL[2][{}]{%
1765 \ifx\@acmBadgeL\@empty
1766 \gdef\@acmBadgeL{%
1767 \smash{%
1768 \raisebox{0.5\height}{%
1769 \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1770 \else
1771 \g@addto@macro{\@acmBadgeL}{%
1772 \hspace{\@ACM@badge@skip}%
1773 \smash{%
1774 \raisebox{0.5\height}{%
1775 \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1776 \fi}

\acmBadge Just a syntax sugar for \acmBadgeR
1777 \let\acmBadge=\acmBadgeR

\startPage The start page of the paper
1778 \def\startPage#1{\def\@startPage{#1}}
1779 \startPage{}

\terms Terms are obsolete. We use CCS now.
1780 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
1781 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.
1782 \def\keywords#1{\def\@keywords{#1}}
1783 \let\@keywords\@empty

1784 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty
1785 \ifnum\getrefnumber{TotPages}>2\relax
1786 \ClassWarningNoLine{\@classname}{ACM keywords are mandatory
1787 for papers over two pages}%
1788 \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
1789 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{\fi}

\@saveabstract And saving the abstract
1790 \long\def\@saveabstract#1{\if@ACM@maketitle@typeset
1791 \ClassError{\@classname}{Abstract must be defined before maketitle
1792 command. Please move it!}\fi
1793 \long\gdef\@abstract{#1}}
1794 \@saveabstract{}

```

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

```
1795 \long\def\@empty{}
```

\if@ACM@printccs Whether to print CCS

```
1796 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
1797   \if@ACM@printccs
1798     \ClassInfo{\@classname}{Printing CCS}%
1799   \else
1800     \ClassInfo{\@classname}{Suppressing CCS}%
1801   \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}
```

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

```
1802 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1803   \if@ACM@printacmref
1804     \ClassInfo{\@classname}{Printing bibformat}%
1805   \else
1806     \ClassInfo{\@classname}{Suppressing bibformat}%
1807   \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}

1808 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
1809   \ifnum\getrefnumber{TotPages}>1\relax
1810   \ClassWarningNoLine{\@classname}{%
1811     ACM reference format is mandatory \MessageBreak
1812     for papers over one page. \MessageBreak
1813     Please add printacmref=true to the \MessageBreak
1814     \string\settopmatter\space command.}%
1815   \fi\fi\fi}
```

\if@ACM@printfolios Whether to print folios

```
1816 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1817   \if@ACM@printfolios
1818     \ClassInfo{\@classname}{Printing folios}%
1819   \else
1820     \ClassInfo{\@classname}{Suppressing folios}%
1821   \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}
```

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

```
1822 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsprow}[0]{%
1823   \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsprow to
1824     #1}}{\ClassWarning{\@classname}{The parameter authorsprow must be
1825     numerical. Ignoring the input #1}}\gdef\@ACM@authorsprow{0}}
```

\settopmatter The usual syntactic sugar

```
1826 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}
```

Now the settings

```
1827 \settopmatter{printccs=true, printacmref=true}
1828 \if@ACM@manuscript
1829   \settopmatter{printfolios=true}
1830 \else
1831   \if@ACM@journal
1832     \settopmatter{printfolios=true}
1833   \else
```

```

1834 \settopmatter{printfolios=false}
1835 \fi
1836 \fi
1837 \settopmatter{authorsperrow=0}

\@received The container for the paper history
1838 \def\@received{}

\received The \received command
1839 \newcommand\received[2][\def\@tempa{#1}%
1840 \ifx\@tempa\@empty
1841 \ifx\@received\@empty
1842 \gdef\@received{Received #2}%
1843 \else
1844 \g@addto@macro{\@received}{; revised #2}%
1845 \fi
1846 \else
1847 \ifx\@received\@empty
1848 \gdef\@received{#1 #2}%
1849 \else
1850 \g@addto@macro{\@received}{; #1 #2}%
1851 \fi
1852 \fi}
1853 \AtEndDocument{%
1854 \ifx\@received\@empty\else
1855 \par\bigskip\noindent{\small\normalfont\@received\par}%
1856 \fi}

\acmArticleType Article type. We set up the color.
1857 \define@choicekey+{ACM}{articletype}[\ACM@ArticleType\ACM@ArticleType@nr]{%
1858 Research,Review,Discussion,Invited,Position}[Review]{%
1859 \ifcase\ACM@ArticleType@nr
1860 \relax % Research
1861 \colorlet{\ACM@Article@color}{ACMBlue}%
1862 \or % Review
1863 \colorlet{\ACM@Article@color}{ACMOrange}%
1864 \or % Discussion
1865 \colorlet{\ACM@Article@color}{ACMGreen}%
1866 \or % Invited
1867 \colorlet{\ACM@Article@color}{ACMPurple}%
1868 \or % Position
1869 \colorlet{\ACM@Article@color}{ACMRed}%
1870 \fi
1871 }{%
1872 \ClassError{\@classname}{Article Type must be Research, Review,\MessageBreak
1873 Discussion, Invited, or Position}}
1874 \def\acmArticleType#1{\setkeys{ACM}{articletype=#1}}
1875 \if@ACM@acmcp
1876 \acmArticleType{Research}%
1877 \fi
1878

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

```

```

1879 \newenvironment{@ACM@color@frame}{%
1880   \def\FrameCommand{\hspace*{-6.5pc}%
1881     \colorbox{@ACM@Article@color!10!white}}%
1882   \MakeFramed {\advance\hsize
1883     -6.5pc\relax\FrameRestore}}{\zsaveposy{@ACM@acmcpframe@y}%
1884   \endMakeFramed}

```

\acmCodeDataLink The code link

```

1885 \def\acmCodeLink#1{%
1886   \ifx\@acmCodeDataLink\@empty
1887     \gdef\@acmCodeDataLink{\url{#1}}%
1888   \else
1889     \g@addto@macro{\@acmCodeDataLink}{\ \url{#1}}%
1890   \fi}
1891 \def\@acmCodeDataLink{}

```

\acmContributions The authors' contrubution statement

```

1892 \def\acmContributions#1{\gdef\@acmContributions{#1}}
1893 \acmContributions{}

```

\acmDataLink The code link

```

1894 \let\acmDataLink\acmCodeLink

```

3.17 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```

1895 \RequirePackage{comment}
1896 \excludecomment{CCSXML}

```

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

```

1897 \let\@concepts\@empty
1898 \newcounter{@concepts}

```

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

```

1899 \newcommand\ccsdesc[2][100]{%
1900   \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!

```

1901 \def\textrightarrow{\rightarrow}
1902 \def\ccsdesc@parse#1~#2~#3~{%
1903   \stepcounter{@concepts}%
1904   \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1905     \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1906       \textbf{#2}}%
1907   \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{;}%
1908   \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1909   \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
1910     \csname CCS@Punctuation@#2\endcsname
1911     \csname CCS@Specific@#2\endcsname}%
1912   \fi
1913   \ifx#3\relax\relax\else
1914     \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{

```

```

1915 \textrightarrow\ }%
1916 \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1917 \addtocounter{@concepts}{-1}%
1918 \ifnum#1>499\textbf{#3}\else
1919 \ifnum#1>299\textit{#3}\else
1920 #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
1921 \fi
1922 \ccsdesc@parse@finish}

1923 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\@empty\relax
1924 \ifnum\getrefnumber{TotPages}>2\relax
1925 \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
1926 for papers over two pages}%
1927 \fi\fi\fi}

```

```

\ccdesc@parse@finish Gobble everything to \ccsdesc@parse@end
1928 \def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}

```

3.18 Copyright system

This is from acmcopyright.sty

```

\if@printcopyright Whether to print a copyright symbol
1929 \newif\if@printcopyright
1930 \@printcopyrighttrue

```

```

\if@printpermission Whether to print the permission block
1931 \newif\if@printpermission
1932 \@printpermissiontrue

```

```

\if@acmowned Whether the ACM owns the rights to the paper
1933 \newif\if@acmowned
1934 \@acmownedtrue

```

Keys:

```

1935 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1936 \acm@copyrightinput\acm@copyrightmode]{none,%
1937 acmcopyright,acmlicensed,rightsretained,%
1938 usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1939 licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
1940 iw3c2w3,iw3c2w3g,cc}{%
1941 \@printpermissiontrue
1942 \@printcopyrighttrue
1943 \@acmownedtrue
1944 \ifnum\acm@copyrightmode=0\relax % none
1945 \@printpermissionfalse
1946 \@printcopyrightfalse
1947 \@acmownedfalse
1948 \fi
1949 \ifnum\acm@copyrightmode=2\relax % acmlicensed
1950 \@acmownedfalse
1951 \fi
1952 \ifnum\acm@copyrightmode=3\relax % rightsretained

```



```

1953 \@acmownedfalse
1954 \fi
1955 \ifnum\acm@copyrightmode=4\relax % usgov
1956 \@printpermissiontrue
1957 \@printcopyrightfalse
1958 \@acmownedfalse
1959 \fi
1960 \ifnum\acm@copyrightmode=6\relax % cagov
1961 \@acmownedfalse
1962 \fi
1963 \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1964 \@acmownedfalse
1965 \fi
1966 \ifnum\acm@copyrightmode=9\relax % licensedcagov
1967 \@acmownedfalse
1968 \fi
1969 \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1970 \@acmownedfalse
1971 \fi
1972 \ifnum\acm@copyrightmode=11\relax % othergov
1973 \@acmownedtrue
1974 \fi
1975 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1976 \@acmownedfalse
1977 \fi
1978 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1979 \@acmownedfalse
1980 \fi
1981 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1982 \@acmownedfalse
1983 \fi
1984 \ifnum\acm@copyrightmode=15\relax % cc
1985 \@acmownedfalse
1986 \fi}

```

\setcopyright This is the syntactic sugar around setting keys.

```

1987 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1988 \setcopyright{acmlicensed}

```

\setcctype The type of Creative Commons license used

```

1989 \newcommand\setcctype[2][4.0]{%
1990 \def\ACM@cc@version{#1}%
1991 \def\ACM@cc@type{#2}}
1992 \setcctype{by}

```

\@copyrightowner Here is the owner of the copyright

```

1993 \def\@copyrightowner{%
1994 \ifcase\acm@copyrightmode\relax % none
1995 \or % acmcopyright
1996 ACM\@.
1997 \or % acmlicensed
1998 Copyright held by the owner/author(s). Publication rights licensed to
1999 ACM\@.
2000 \or % rightsretained

```

```

2001 Copyright held by the owner/author(s).
2002 \or % usgov
2003 \or % usgovmixed
2004 Copyright held by the owner/author(s).
2005 \or % cagov
2006 Copyright Crown in Right of Canada.
2007 \or %cagovmixed
2008 Copyright held by the owner/author(s).
2009 \or %licensedusgovmixed
2010 Copyright held by the owner/author(s). Publication rights licensed to
2011 ACM\@.
2012 \or % licensedcagov
2013 Copyright held by the owner/author(s).
2014 \or %licensedcagovmixed
2015 Copyright held by the owner/author(s). Publication rights licensed to
2016 ACM\@.
2017 \or % othergov
2018 Copyright held by the owner/author(s).
2019 \or % licensedothergov
2020 Copyright held by the owner/author(s). Publication rights licensed to
2021 ACM\@.
2022 \or % ic2w3www
2023 IW3C2 (International World Wide Web Conference Committee), published
2024 under Creative Commons CC-BY~4.0 License.
2025 \or % ic2w3wwwgoogle
2026 IW3C2 (International World Wide Web Conference Committee), published
2027 under Creative Commons CC-BY-NC-ND~4.0 License.
2028 \or % cc
2029 Copyright held by the owner/author(s).
2030 \fi}

```

\@formatdoi Print a clickable DOI

```

2031 \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.

```

2032 \def\@copyrightpermission{%
2033 \ifcase\acm@copyrightmode\relax % none
2034 \or % acmcopyright
2035 Permission to make digital or hard copies of all or part of this
2036 work for personal or classroom use is granted without fee provided
2037 that copies are not made or distributed for profit or commercial
2038 advantage and that copies bear this notice and the full citation on
2039 the first page. Copyrights for components of this work owned by
2040 others than ACM must be honored. Abstracting with credit is
2041 permitted. To copy otherwise, or republish, to post on servers or
2042 to redistribute to lists, requires prior specific permission
2043 and\hspace*{.5pt}/or
2044 a fee. Request permissions from permissions@acm.org.
2045 \or % acmlicensed
2046 Permission to make digital or hard copies of all or part of this
2047 work for personal or classroom use is granted without fee provided
2048 that copies are not made or distributed for profit or commercial

```

2049 advantage and that copies bear this notice and the full citation on
 2050 the first page. Copyrights for components of this work owned by
 2051 others than the author(s) must be honored. Abstracting with credit
 2052 is permitted. To copy otherwise, or republish, to post on servers
 2053 or to redistribute to lists, requires prior specific permission
 2054 and\hspace*{.5pt}/or a fee. Request permissions from
 2055 permissions@acm.org.
 2056 \or % rightsretained
 2057 Permission to make digital or hard copies of all or part of this
 2058 work for personal or classroom use is granted without fee provided
 2059 that copies are not made or distributed for profit or commercial
 2060 advantage and that copies bear this notice and the full citation on
 2061 the first page. Copyrights for third-party components of this work
 2062 must be honored. For all other uses, contact the
 2063 owner\hspace*{.5pt}/author(s).
 2064 \or % usgov
 2065 This paper is authored by an employee(s) of the United States
 2066 Government and is in the public domain. Non-exclusive copying or
 2067 redistribution is allowed, provided that the article citation is
 2068 given and the authors and agency are clearly identified as its
 2069 source. Request permissions from
 2070 owner\hspace*{.5pt}/author(s).
 2071 \or % usgovmixed
 2072 ACM acknowledges that this contribution was authored or co-authored
 2073 by an employee, contractor, or affiliate of the United States
 2074 government. As such, the United States government retains a
 2075 nonexclusive, royalty-free right to publish or reproduce this
 2076 article, or to allow others to do so, for government purposes
 2077 only. Request permissions from owner\hspace*{.5pt}/author(s).
 2078 \or % cagov
 2079 This article was authored by employees of the Government of
 2080 Canada. As such, the Canadian government retains all interest in
 2081 the copyright to this work and grants to ACM a nonexclusive,
 2082 royalty-free right to publish or reproduce this article, or to
 2083 allow others to do so, provided that clear attribution is given
 2084 both to the authors and the Canadian government agency employing
 2085 them. Permission to make digital or hard copies for personal or
 2086 classroom use is granted. Copies must bear this notice and the full
 2087 citation on the first page. Copyrights for components of this work
 2088 owned by others than the Canadian Government must be honored. To
 2089 copy otherwise, distribute, republish, or post, requires prior
 2090 specific permission and/or a fee. Request permissions from
 2091 owner\hspace*{.5pt}/author(s).
 2092 \or % cagovmixed
 2093 ACM acknowledges that this contribution was co-authored by an
 2094 affiliate of the national government of Canada. As such, the Crown
 2095 in Right of Canada retains an equal interest in the
 2096 copyright. Reprints must include clear attribution to ACM and the
 2097 author's government agency affiliation. Permission to make digital
 2098 or hard copies for personal or classroom use is granted. Copies
 2099 must bear this notice and the full citation on the first
 2100 page. Copyrights for components of this work owned by others than
 2101 ACM must be honored. To copy otherwise, distribute, republish, or
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 2151 disseminate the work on their personal and corporate Web sites with
 2152 the appropriate attribution.
 2153 \or % iw3c2w3g
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```

2157   disseminate the work on their personal and corporate Web sites with
2158   the appropriate attribution.
2159 \or % CC
2160   \IfEq{\ACM@cc@type}{zero}{%
2161     \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0}}{%
2162   \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version}}%
2163   \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\
2164   \href{\ACM@CC@Url}{%
2165     This work is licensed under a Creative Commons
2166     \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}{%
2167       \IfEq{\ACM@cc@type}{by}{Attribution}{%
2168         \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}{%
2169           \IfEq{\ACM@cc@type}{by-nd}{Attribution-NoDerivatives}{%
2170             \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}{%
2171               \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{%
2172                 \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{%
2173                   ~\IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}%
2174                 }
2175               License.}%
2176             \fi}

```

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

```

2177 \def\copyrightyear#1{\def\@copyrightyear{#1}}
2178 \copyrightyear{\@acmYear}

```

`\@teaserfigures` The teaser figures container

```

2179 \def\@teaserfigures{}

```

`teaserfigure` The teaser figure

```

2180 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

```

`\@saveteaser` Saving the teaser

```

2181 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

```

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

```

2182 \renewcommand{\thanks}[1]{%
2183   \@ifnotempty{#1}{%
2184     \if@ACM@anonymous
2185       \g@addto@macro\thankses{\thanks{A note}}%
2186     \else
2187       \g@addto@macro\thankses{\thanks{#1}}%
2188     \fi}}

```

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

```

2189 \newcommand{\anon}[2][ANONYMIZED]{%
2190   \if@ACM@anonymous%
2191     {\color{ACMOrange}#1}%
2192   \else%
2193     #2%
2194   \fi}

```

3.19 Maketitle hook

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

`\@beginmaketitlehook` The hook

```
2195 \ifx\@beginmaketitlehook\@undefined
2196   \let\@beginmaketitlehook\@empty
2197 \fi
```

`\AtBeginMaketitle` Adding to the hook

```
2198 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}
```

3.20 ACM Engage top matter

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

```
2199 \def\@acmengagemetadadata{}
```

`\setengagemetadadata` Adding topic to engage metadata

```
2200 \def\setengagemetadadata#1#2{%
2201   \g@addto@macro{\@acmengagemetadadata}{%
2202     \setengagemetadadata{#1}{#2}}}
```

3.21 Typesetting top matter

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

```
2203 \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.

```
2204 \def\maketitle{\@beginmaketitlehook
2205   \@ACM@maketitle@typesettrue
2206   \if@ACM@anonymous
2207     % Anonymize omission of \author-s
2208     \ifnum\num@authorgroups=0\author{}\fi
2209   \fi
2210   \begingroup
2211   \let\@vspace\@vspace@orig
2212   \let\@vspacer\@vspacer@orig
2213   \let\@footnotemark\@footnotemark@nolink
2214   \let\@footnotetext\@footnotetext@nolink
2215   \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
2216   \hsize=\textwidth
2217   \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
2218   \mktitle\if@ACM@sigchiamode\else\mkauthors\fi\mkteasers
2219   \@printtopmatter
2220   \if@ACM@sigchiamode\mkauthors\fi
```

```

2221 \setcounter{footnote}{0}%
2222 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
2223 \@titlenotes
2224 \@subtitlenotes
2225 \@authornotes
2226 \let\@makefnmark\relax
2227 \let\@thefnmark\relax
2228 \let\@makefntext\noindent
2229 \ifx\@empty\thankses\else
2230   \footnotetextauthorsaddresses{%
2231     \def\par{\let\par\@par}\parindent\z@\@setthanks}%
2232   \fi
2233   \if@ACM@acmcp\else
2234     \ifx\@empty\@authorsaddresses\else
2235       \if@ACM@anonymous\else
2236         \if@ACM@journal@bibstrip@or@tog
2237           \footnotetextauthorsaddresses{%
2238             \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2239         \fi
2240       \fi
2241     \fi
2242   \fi
2243   \if@ACM@nonacm
2244     \ifnum\acm@copyrightmode=15\relax % cc
2245       \footnotetextcopyrightpermission{\@copyrightpermission}%
2246     \fi
2247   \else
2248     \if@ACM@acmcp\else
2249       \footnotetextcopyrightpermission{%
2250         \if@ACM@authordraft
2251           \raisebox{-2ex}{\z@\z@{\makebox[0pt][l]{\large\bfseries
2252             Unpublished working draft. Not for distribution.}}}%
2253         \color[gray]{0.9}%
2254       \fi
2255       \parindent\z@\parskip0.1\baselineskip
2256       \if@ACM@authorversion\else
2257         \if@printpermission\@copyrightpermission\par\fi
2258       \fi
2259       \if@ACM@manuscript\else
2260         \if@ACM@journal@bibstrip\else % Print the conference information
2261           \if@ACM@engage
2262             {\itshape \@acmBooktitle, \@acmYear.}\par
2263           \else
2264             {\itshape \acmConference@shortname, \acmConference@venue}\par
2265           \fi
2266         \fi
2267       \fi
2268       \if@printcopyright
2269         \copyright\ \@copyrightyear\ \@copyrightowner\
2270       \else
2271         \ifx\@copyrightyear\@empty\else
2272           \@copyrightyear.\
2273         \fi
2274       \fi

```

```

2275 \if@ACM@manuscript
2276 Manuscript submitted to ACM\
2277 \else
2278 \if@ACM@authorversion
2279 This is the author's version of the work. It is posted here for
2280 your personal use. Not for redistribution. The definitive Version
2281 of Record was published in
2282 \if@ACM@journal@bibstrip
2283 \emph{\@journalName}%
2284 \else
2285 \emph{\@acmBooktitle}%
2286 \fi
2287 \ifx\@acmDOI\@empty
2288 .
2289 \else
2290 , \@formatdoi{\@acmDOI}.
2291 \fi\
2292 \else
2293 \if@ACM@nonacm\else
2294 \if@ACM@journal@bibstrip
2295 ACM~\@permissionCodeTwo/\@acmYear/\@acmMonth-ART\@acmArticle\
2296 \@formatdoi{\@acmDOI}%
2297 \else % Conference
2298 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN\\fi
2299 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
2300 \fi
2301 \fi
2302 \fi
2303 \fi}%
2304 \fi
2305 \fi
2306 \endgroup
2307 \if@ACM@engage\@typesetengagemetadata\fi
2308 \setcounter{footnote}{0}%
2309 \@mkabstract
2310 \ifx\@translatedabstracts\@empty\else
2311 \@translatedabstracts\fi
2312 \if@ACM@printccs
2313 \ifx\@concepts\@empty\else\bgroup
2314 {\@specialsection{CCS Concepts}%
2315 \noindent\@concepts\par}\egroup
2316 \fi
2317 \fi
2318 \if@ACM@acmcp\else
2319 \ifx\@keywords\@empty\else\bgroup
2320 {\@specialsection{\@keywordsname}%
2321 \noindent\@keywords\par}\egroup
2322 \fi
2323 \ifx\@translatedkeywords\@empty\else
2324 \@translatedkeywords
2325 \fi
2326 \fi
2327 \let\metadata@authors=\authors
2328 \xandlist{, }, }, }\metadata@authors

```



```

2329 \def\@ACM@checkaffil{%
2330 \hypersetup{%
2331   pdfauthor={\metadata@authors},
2332   pdftitle={\@title},
2333   pdfsubject={\@concepts},
2334   pdfkeywords={\@keywords},
2335   pdfcreator={LaTeX with acmart
2336     \csname ver@\@classname.cls\endcsname\space
2337     and hyperref
2338     \csname ver@hyperref.sty\endcsname}}}%
2339 \andify\authors
2340 \andify\shortauthors
2341 \global\let\authors=\authors
2342 \global\let\shortauthors=\shortauthors
2343 \if@ACM@printacmref
2344   \mkbibcitation
2345 \fi
2346 \global\@topnum\z@ % this prevents floats from falling
2347                   % at the top of page 1
2348 \global\@botnum\z@ % we do not want them to be on the bottom either
2349 \@printendtopmatter
2350 \@afterindentfalse
2351 \@afterheading
2352 \if@ACM@acmcp
2353   \set@ACM@acmcpbox
2354   \AtEndDocument{\end@ACM@color@frame}%
2355   \@ACM@color@frame
2356 \fi
2357 }

```

\set@ACM@acmcpbox Setting infobox for acmcp

```

2358 \newbox\@ACM@acmcpbox
2359 \def\set@ACM@acmcpbox{%
2360   \bgroup
2361   \hsize=5pc
2362   \global\setbox\@ACM@acmcpbox=\vbox{%
2363     \setlength{\parindent}{\z@}%
2364     {\includegraphics[width=\hsize]{acm-jdslogo}\par}%
2365     \scriptsize
2366     \ifnum\getrefnumber{TotPages}>1\else
2367       \zrefused{\@ACM@acmcpbox@y}%
2368       \zrefused{\@ACM@acmcpframe@y}%
2369       \@tempdima=\dimexpr\zposy{\@ACM@acmcpbox@y}sp -
2370       \zposy{\@ACM@acmcpframe@y}sp+0.3\FrameSep+
2371       \@ACM@acmcp@delta\relax
2372       \ifdim\@tempdima>0pt\relax
2373         \vspace*{\@tempdima}%
2374         \protected@write\@auxout{%
2375           {\string\global\@ACM@acmcp@delta=\the\@tempdima\relax}%
2376         \fi
2377       \fi
2378       \ifx\@acmCodeDataLink\@empty\else\bigskip
2379       Code and data links:\\ \@acmCodeDataLink\par\bigskip
2380       \fi

```

```

2381 \ifx\@keywords\@empty\else\bigskip
2382 Keywords: \@keywords\par
2383 \fi
2384 \ifx\@acmContributions\@empty\else\bigskip
2385 \@acmContributions\par
2386 \fi
2387 \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
2388 \zsaveposy{\@ACM@acmcpbox@y}%
2389 \par
2390 }
2391 \egroup}

```

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

```

2392 \def\@specialsection#1{%
2393 \let\@vspace\@vspace@orig
2394 \let\@vspacer\@vspacer@orig
2395 \ifcase\ACM@format@nr
2396 \relax % manuscript
2397 \par\medskip\small\noindent#1: %
2398 \or % acmsmall
2399 \par\medskip\small\noindent#1: %
2400 \or % acmlarge
2401 \par\medskip\small\noindent#1: %
2402 \or % acmtog
2403 \par\medskip\small\noindent#1: %
2404 \or % sigconf
2405 \section*{#1}%
2406 \or % siggraph
2407 \section*{#1}%
2408 \or % sigplan
2409 \noindentparagraph*{#1:~}%
2410 \or % sigchi
2411 \section*{#1}%
2412 \or % sigchi-a
2413 \section*{#1}%
2414 \or % acmengage
2415 \section*{#1}%
2416 \or % acmcp
2417 \section*{#1}%
2418 \fi
2419 \let\@vspace\@vspace@acm
2420 \let\@vspacer\@vspacer@acm
2421 }

```

\@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.

```

2422 \def\@printtopmatter{%
2423 \ifx\@startPage\@empty
2424 \gdef\@startPage{1}%
2425 \else
2426 \setcounter{page}{\@startPage}%
2427 \fi

```

```

2428 \@tempdima=\ht\mktitle@bx
2429 \advance\@tempdima by \dp\mktitle@bx
2430 \ifdim\@tempdima>0.9\textheight
2431   \loop
2432     \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
2433     \thispagestyle{firstpagestyle}%
2434     \noindent\unvbox\@tempboxa
2435     \clearpage
2436     \@tempdima=\ht\mktitle@bx
2437     \advance\@tempdima by \dp\mktitle@bx
2438     \ifdim\@tempdima>0.9\textheight\repeat
2439   \fi
2440 \thispagestyle{firstpagestyle}%
2441 \noindent
2442 \ifcase\ACM@format@nr
2443 \relax % manuscript
2444   \box\mktitle@bx\par
2445 \or % acmsmall
2446   \box\mktitle@bx\par
2447 \or % acmlarge
2448   \box\mktitle@bx\par
2449 \or % acmtog
2450   \twocolumn[\box\mktitle@bx]%
2451 \or % sigconf
2452   \twocolumn[\box\mktitle@bx]%
2453 \or % siggraph
2454   \twocolumn[\box\mktitle@bx]%
2455 \or % sigplan
2456   \twocolumn[\box\mktitle@bx]%
2457 \or % sigchi
2458   \twocolumn[\box\mktitle@bx]%
2459 \or % sigchi-a
2460   \par\box\mktitle@bx\par\bigskip
2461 \or % acmengage
2462   \twocolumn[\box\mktitle@bx]%
2463 \or % acmcp
2464   \box\mktitle@bx\par
2465 \fi
2466 }

```

\@mktitle The title of the article

```

2467 \def\@mktitle{%
2468   \ifcase\ACM@format@nr
2469   \relax % manuscript
2470     \@mktitle@i
2471   \or % acmsmall
2472     \@mktitle@i
2473   \or % acmlarge
2474     \@mktitle@i
2475   \or % acmtog
2476     \@mktitle@i
2477   \or % sigconf
2478     \@mktitle@iii
2479   \or % siggraph

```

```

2480 \mktitle@iii
2481 \or % sigplan
2482 \mktitle@iii
2483 \or % sigchi
2484 \mktitle@iii
2485 \or % sigchi-a
2486 \mktitle@iv
2487 \or % acmengage
2488 \mktitle@iii
2489 \or % acmcp
2490 \mktitle@i
2491 \fi
2492 }

```

\@titlefont The font to typeset the title

```

2493 \def\@titlefont{%
2494 \ifcase\ACM@format@nr
2495 \relax % manuscript
2496 \LARGE\sffamily\bfseries
2497 \or % acmsmall
2498 \LARGE\sffamily\bfseries
2499 \or % acmlarge
2500 \LARGE\sffamily\bfseries
2501 \or % acmtog
2502 \Huge\sffamily
2503 \or % sigconf
2504 \Huge\sffamily\bfseries
2505 \or % siggraph
2506 \Huge\sffamily\bfseries
2507 \or % sigplan
2508 \Huge\bfseries
2509 \or % sigchi
2510 \Huge\sffamily\bfseries
2511 \or % sigchi-a
2512 \Huge\bfseries
2513 \or % acmengage
2514 \Huge\sffamily\bfseries
2515 \or % acmcp
2516 \LARGE\sffamily\bfseries
2517 \fi}

```

\@subtitlefont The font to typeset the subtitle

```

2518 \def\@subtitlefont{\normalsize
2519 \ifcase\ACM@format@nr
2520 \relax % manuscript
2521 \mdseries
2522 \or % acmsmall
2523 \mdseries
2524 \or % acmlarge
2525 \mdseries
2526 \or % acmtog
2527 \LARGE
2528 \or % sigconf
2529 \LARGE\mdseries

```

```

2530 \or % siggraph
2531     \LARGE\mdseries
2532 \or % sigplan
2533     \LARGE\mdseries
2534 \or % sigchi
2535     \LARGE\mdseries
2536 \or % sigchi-a
2537     \mdseries
2538 \or % acmengage
2539     \LARGE\mdseries
2540 \or % acmcp
2541     \mdseries
2542 \fi}

```

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

```

2543 \def\mktitle@i{\hsize=\textwidth
2544   \if@ACM@acmcp
2545     \advance\hsize by -6pc%
2546   \fi
2547   \@ACM@title@width=\hsize
2548   \setbox\mktitle@bx=\vbox{\noindent\@titlefont
2549     \parbox[t]{\@ACM@title@width}{\raggedright
2550       \@titlefont\noindent
2551       \@title\@translatedtitle%
2552   \ifx\@subtitle\@empty\else
2553     \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
2554   \fi}%
2555   \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.

```

2556 \def\mktitle@iii{\hsize=\textwidth
2557   \setbox\mktitle@bx=\vbox{\@titlefont\centering
2558     \@ACM@title@width=\hsize
2559     \parbox[t]{\@ACM@title@width}{\centering\@titlefont
2560       \@title\@translatedtitle%
2561     \ifx\@subtitle\@empty\else
2562       \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
2563     \fi
2564   }%
2565   \par\bigskip}}%

```

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

```

2566 \def\mktitle@iv{\hsize=\textwidth
2567   \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
2568     \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
2569     \noindent\@title\@translatedtitle%
2570   \ifx\@subtitle\@empty\else
2571     \par\noindent\@subtitlefont\@subtitle\@translatedsubtitle%
2572   \fi
2573   \par\bigskip}}%

```

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

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

```

2574 \newbox\@ACM@commabox
2575 \def\@ACM@addtoaddress#1{%
2576   \ifvmode\else
2577     \if@ACM@affiliation@obexpunctuation\else
2578       \setbox\@ACM@commabox=\hbox{, }%
2579       \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
2580     \fi\fi
2581   #1}

```

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

```

\streetaddress 2582 \def\streetaddress#1{\ClassWarning{\@classname}{ACM no longer collects
\city 2583 authors' postal addresses. I am ignoring your street
\state 2584 address}\unskip\ignorespaces}
\postcode 2585 \def\postcode#1{\ClassWarning{\@classname}{ACM no longer collects
\country 2586 authors' postal addresses. I am ignoring your postal
2587 code}\unskip\ignorespaces}
2588 \if@ACM@journal
2589   \def\position#1{\unskip\ignorespaces}
2590   \def\institution#1{\global\@ACM@instpresenttrue
2591     \unskip~#1\ignorespaces}
2592   \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
2593   \def\state#1{\unskip\ignorespaces}
2594   \newcommand\department[2][0]{\unskip\ignorespaces}
2595   \def\country#1{\StrDel{#1}{ }[\@tempa]%
2596     \ifx\@tempa\empty\else
2597       \global\@ACM@countrypresenttrue\fi
2598     \if@ACM@affiliation@obexpunctuation\else, \fi#1\ignorespaces}
2599 \else
2600   \def\position#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2601   \def\institution#1{\global\@ACM@instpresenttrue
2602     \if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2603   \newcommand\department[2][0]{\if@ACM@affiliation@obexpunctuation
2604     #2\else#2\par\fi}%
2605   \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
2606   \let\state\@ACM@addtoaddress
2607   \def\country#1{\global\@ACM@countrypresenttrue\@ACM@addtoaddress{#1}}%
2608 \fi

```

`\mkauthors` Typesetting the authors

```

2609 \def\mkauthors{\begingroup
2610   \hsize=\textwidth
2611   \ifcase\ACM@format@nr
2612     \relax % manuscript
2613     \@mkauthors@i

```

```

2614 \or % acmsmall
2615 \mkauthors@i
2616 \or % acmlarge
2617 \mkauthors@i
2618 \or % acmtog
2619 \mkauthors@i
2620 \or % sigconf
2621 \mkauthors@iii
2622 \or % siggraph
2623 \mkauthors@iii
2624 \or % sigplan
2625 \mkauthors@iii
2626 \or % sigchi
2627 \mkauthors@iii
2628 \or % sigchi-a
2629 \mkauthors@iv
2630 \or % acmengage
2631 \mkauthors@iii
2632 \or % acmcp
2633 \mkauthors@i
2634 \fi
2635 \endgroup
2636 }

```

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

```

2637 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```

2638 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

2639 \ifcase\ACM@format@nr
2640 \relax % manuscript
2641 \or % acmsmall
2642 \def\@authorfont{\large\sffamily}
2643 \def\@affiliationfont{\small\normalfont}
2644 \or % acmlarge
2645 \or % acmtog
2646 \def\@authorfont{\LARGE\sffamily}
2647 \def\@affiliationfont{\large}
2648 \or % sigconf
2649 \def\@authorfont{\LARGE}
2650 \def\@affiliationfont{\large}
2651 \or % siggraph
2652 \def\@authorfont{\normalsize\normalfont}
2653 \def\@affiliationfont{\normalsize\normalfont}
2654 \or % sigplan
2655 \def\@authorfont{\Large\normalfont}
2656 \def\@affiliationfont{\normalsize\normalfont}
2657 \or % sigchi
2658 \def\@authorfont{\bfseries}
2659 \def\@affiliationfont{\mdseries}
2660 \or % sigchi-a
2661 \def\@authorfont{\bfseries}

```

```

2662 \def\@affiliationfont{\mdseries}
2663 \or % acmengage
2664 \def\@authorfont{\LARGE}
2665 \def\@affiliationfont{\large}
2666 \or % acmcp
2667 \def\@authorfont{\large\sffamily}
2668 \def\@affiliationfont{\small\normalfont}
2669 \fi

\@typeset@author@line At this point we have \@currentauthors and \@currentaffiliations. We typeset
them in the journal style
2670 \def\@typeset@author@line{%
2671 \andify\@currentauthors\par\noindent
2672 \@currentauthors\def\@currentauthors{}%
2673 \ifx\@currentaffiliations\empty\else
2674 \andify\@currentaffiliations
2675 \unskip, {\@currentaffiliations}\par
2676 \fi
2677 \def\@currentaffiliations{}}

\if@ACM@instpresent Whether the given affiliation has institution
2678 \newif\if@ACM@instpresent
2679 \@ACM@instpresenttrue

\if@ACM@citypresent Whether the given affiliation has city
2680 \newif\if@ACM@citypresent
2681 \@ACM@citypresenttrue

\if@ACM@countrypresent Whether the given affiliation has country
2682 \newif\if@ACM@countrypresent
2683 \@ACM@countrypresenttrue

\@ACM@resetaffil Reset affiliation flags
2684 \def\@ACM@resetaffil{%
2685 \global\@ACM@instpresentfalse
2686 \global\@ACM@citypresentfalse
2687 \global\@ACM@countrypresentfalse
2688 }

\@ACM@checkaffil Check affiliation flags
2689 \def\@ACM@checkaffil{%
2690 \if@ACM@instpresent\else
2691 \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
2692 \fi
2693 \if@ACM@citypresent\else
2694 \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
2695 \fi
2696 \if@ACM@countrypresent\else
2697 \ClassError{\@classname}{No country present for an affiliation}{ACM
2698 requires each author to indicate their country using country macro.}%
2699 \fi
2700 }

```


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

```

2701 \def\mkauthors@i{%
2702   \def\@currentauthors{%
2703     \def\@currentaffiliations{%
2704       \global\let\and\@typeset@author@line
2705     \def\@author##1{%
2706       \ifx\@currentauthors\@empty
2707         \gdef\@currentauthors{\@authorfont\MakeUppercase{##1}}%
2708       \else
2709         \g@addto@macro{\@currentauthors}{\and\MakeUppercase{##1}}%
2710       \fi
2711       \gdef\and{}}%
2712     \def\email##1##2{%
2713     \def\affiliation##1##2{%
2714       \def\@tempa{##2}\ifx\@tempa\@empty\else
2715         \ifx\@currentaffiliations\@empty
2716           \gdef\@currentaffiliations{%
2717             \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2718             \setkeys{@ACM@affiliation@}{##1}%
2719             \@ACM@resetaffil
2720             \@affiliationfont##2\@ACM@checkaffil}%
2721           \else
2722             \g@addto@macro{\@currentaffiliations}{\and
2723               \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2724               \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2725               ##2\@ACM@checkaffil}%
2726           \fi
2727         \fi
2728         \global\let\and\@typeset@author@line}%
2729     \if@ACM@acmcp
2730       \advance\hsize by -6pc%
2731     \fi
2732     \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
2733       \noindent\addresses\@typeset@author@line
2734       \par\medskip}%
2735   }

```

`\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

```

2736 \newbox\author@bx

```

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

```

2737 \newdimen\author@bx@wd

```

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

```

2738 \newskip\author@bx@sep
2739 \author@bx@sep=1pc\relax

```

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

```

2740 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd

```

```

2741 \def\and{\par}\normalbaselines
2742 \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2743   \@authorfont\@currentauthors\par\@affiliationfont
2744   \@currentaffiliation}\egroup
2745 \box\author@bx\hspace{\author@bx@sep}%
2746 \gdef\@currentauthors{}%
2747 \gdef\@currentaffiliation{}}

```

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

```

2748 \def\@mkauthors@iii{%

```

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

```

2749 \author@bx@wd=\textwidth\relax
2750 \advance\author@bx@wd by -\author@bx@sep\relax
2751 \ifnum\@ACM@authorsperrow>0\relax
2752   \divide\author@bx@wd by \@ACM@authorsperrow\relax
2753 \else
2754   \ifcase\@num@authorgroups
2755     \relax % 0?
2756   \or % 1=one author per row
2757   \or % 2=two authors per row
2758     \divide\author@bx@wd by \@num@authorgroups\relax
2759   \or % 3=three authors per row
2760     \divide\author@bx@wd by \@num@authorgroups\relax
2761   \or % 4=two authors per row (!)
2762     \divide\author@bx@wd by 2\relax
2763   \else % three authors per row
2764     \divide\author@bx@wd by 3\relax
2765   \fi
2766 \fi
2767 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2768 \gdef\@currentauthors{}%
2769 \gdef\@currentaffiliation{}%
2770 \def\@author##1{\ifx\@currentauthors\@empty
2771   \gdef\@currentauthors{\par##1}%
2772 \else
2773   \g@addto@macro\@currentauthors{\par##1}%
2774 \fi
2775 \gdef\and{}}%
2776 \def\email##1##2{\ifx\@currentaffiliation\@empty
2777   \gdef\@currentaffiliation{\bgroup
2778     \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2779 \else
2780   \g@addto@macro\@currentaffiliation{\par\bgroup
2781     \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2782 \fi}%
2783 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2784   \gdef\@currentaffiliation{%
2785     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2786     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil

```

```

2787     ##2\@ACM@checkaffil}%
2788 \else
2789     \g@addto@macro\@currentaffiliation{\par
2790         \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2791         \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2792         ##2\@ACM@checkaffil}%
2793 \fi
2794 \global\let\and\@typeset@author@bx
2795 }%

Actual typesetting is done by the \and macro:

2796 \hsize=\textwidth
2797 \global\setbox\mktitle@bx=\vbox{\noindent
2798     \unvbox\mktitle@bx\par\medskip\leavevmode
2799     \lineskip=1pc\relax\centering\hspace*{-1em}%
2800     \addresses\let\and\@typeset@author@bx\and\par\bigskip}}

```

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

```

2801 \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.

2802 \author@bx@wd=\columnwidth\relax
2803 \advance\author@bx@wd by -\author@bx@sep\relax
2804 \ifnum\@ACM@authorsprow>0\relax
2805     \divide\author@bx@wd by \@ACM@authorsprow\relax
2806 \else
2807     \ifcase\@num@authorgroups
2808     \relax % 0?
2809     \or % 1=one author per row
2810     \else % 2=two authors per row
2811         \divide\author@bx@wd by 2\relax
2812     \fi
2813 \fi
2814 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2815 \gdef\@currentauthors{}%
2816 \gdef\@currentaffiliation{}%
2817 \def\author##1{\ifx\@currentauthors\@empty
2818     \gdef\@currentauthors{\par##1}%
2819 \else
2820     \g@addto@macro\@currentauthors{\par##1}%
2821 \fi
2822 \gdef\and{}}%
2823 \def\email##1##2{\ifx\@currentaffiliation\@empty
2824     \gdef\@currentaffiliation{\nolinkurl{##2}}%
2825 \else
2826     \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2827 \fi}%
2828 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2829     \gdef\@currentaffiliation{}%

```

```

2830 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2831 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2832 ##2\@ACM@checkaffil}%
2833 \else
2834 \g@addto@macro\@currentaffiliation{\par
2835 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2836 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2837 ##2\@ACM@checkaffil}%
2838 \fi
2839 \global\let\and\@typeset@author@bx}%
2840 %
Actual typesetting is done by the \and macro
2841 \bgroup\hsize=\columnwidth
2842 \par\raggedright\leftskip=\z@
2843 \lineskip=1pc\noindent
2844 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

`\@mkauthorsaddresses` Typesetting authors' addresses in the footnote style

```

2845 \def\@mkauthorsaddresses{%
2846 \ifnum\num@authors>1\relax
2847 Authors' \else Author's \fi
2848 Contact Information:
2849 \bgroup
2850 \def\streetaddress##1{\ClassWarning{\@classname}{ACM no longer collects
2851 authors' postal addresses. I am ignoring your street
2852 address}\unskip\ignorespaces}%
2853 \def\postcode##1{\ClassWarning{\@classname}{ACM no longer collects
2854 authors' postal addresses. I am ignoring your postal
2855 code}\unskip\ignorespaces}%
2856 \def\position##1{\unskip\ignorespaces}%
2857 \gdef\@ACM@institution@separator{,}%
2858 \def\institution##1{\unskip\@ACM@institution@separator##1\gdef\@ACM@institution@separator{ and }}
2859 \def\city##1{\unskip, ##1}%
2860 \def\state##1{\unskip, ##1}%
2861 \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2862 \def\country##1{\unskip, ##1}%
2863 \def\and{\unskip; \gdef\@ACM@institution@separator{,}}%
2864 \def\@author##1{##1}%
2865 \def\email##1##2{\unskip, \nolinkurl{##2}}%
2866 \addresses
2867 \egroup}

2868 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
2869 \ifx\@authorsaddresses\@empty
2870 \ClassWarningNoLine{\@classname}{Authors'
2871 addresses are mandatory for ACM journals}%
2872 \fi\fi\fi}

```

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

```

2873 \def\@setaddresses{}

```

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

```

2874 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}

```

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

```
2875 \def\@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}
```

\@mkteasers Typesetting the teasers

```
2876 \def\@mkteasers{%
2877   \ifx\@teaserfigures\empty\else
2878     \def\@teaser##1{\par\bigskip\bgroup
2879       \captionsetup{type=figure}##1\egroup\par}
2880   \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
2881     \noindent\@Description@presentfalse
2882     \@teaserfigures\par\if@Description@present\else
2883       \global\@undescribed@imagestrue
2884       \ClassWarning{\@classname}{A possible image without
2885         description}\fi
2886     \medskip}%
2887   \fi}
```

\@mkabstract Typesetting the abstract

```
2888 \def\@mkabstract{\bgroup
2889   \ifx\@abstract\empty\else
2890     {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
2891     \if@ACM@journal
2892       \everypar{\setbox\z@\lastbox\everypar{}}\small
2893     \else
2894       \section*{\abstractname}%
2895     \fi
2896     \ignorespaces\@abstract\par}%
2897   \fi\egroup}
```

\@mktranslatedabstract Typesetting a translated abstract

```
2898 \def\@mktranslatedabstract#1{\selectlanguage{#1}%
2899   \if@ACM@journal
2900     \everypar{\setbox\z@\lastbox\everypar{}}\small
2901   \else
2902     \section*{\abstractname}%
2903   \fi
2904   \ignorespaces}
```

\@mkbibcitation Print the bibcitation format

```
2905 \def\@mkbibcitation{\bgroup
2906   \let\@vspace\@vspace@orig
2907   \let\@vspacer\@vspacer@orig
2908   \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2909   \def\footnotemark{}%
2910   \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2911     inside a \string\title{} or \string\author{} command! Use
2912     \string\titlenote{} or \string\authornote{} instead!}}%
2913   \def\@article@string{\ifx\@acmArticle\empty{\ } \else,
2914     Article~\@acmArticle\ } \fi}%
2915   \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2916   \noindent\bgroup
2917     \def\footnote{\footnote}, \ignorespaces\authors\egroup. \@acmYear. \@title
2918   \endgroup}
```

```

2919 \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2920 \if@ACM@nonacm\else
2921   % The 'nonacm' option disables 'printacmref' by default,
2922   % and the present \mkbibcitation definition is never used
2923   % in this case. The conditional remains useful if the user
2924   % explicitly sets \settopmatter{printacmref=true}.
2925   \if@ACM@journal@bibstrip
2926     \textit{\@journalNameShort}
2927     \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2928     \ref{TotPages}~\@pages@word.
2929   \else
2930     In \textit{\@acmBooktitle}%
2931     \ifx\@acmEditors\@empty\textit{.}\else
2932       \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
2933     \fi\
2934     ACM, New York, NY, USA%
2935     \@article@string\unskip, \ref{TotPages}~\@pages@word.
2936   \fi
2937 \fi
2938 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2939 \par\egroup}

```

\@printendtopmatter End the top matter

```

2940 \def\@printendtopmatter{%
2941   \let\@vspace\@vspace@orig
2942   \let\@vspacer\@vspacer@orig
2943   \par\bigskip
2944   \let\@vspace\@vspace@acm
2945   \let\@vspacer\@vspacer@acm
2946 }

```

\@setthanks We redefine \setthanks using \long

```

2947 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}

```

\@setauthorsaddresses

```

2948 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}

```

\@typesetengagemetadata Typesetting special metadata for ACM Engage

```

2949 \def\@typesetengagemetadata{%
2950   \def\@setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
2951   \@acmengagemetadata}

```

;*tagged; We stop tagging inside maketitle for now. Ulrike's code again.

```

2952 \ExplSyntaxOn
2953 \AddToHook{cmd/maketitle/before}
2954 {\tagstructbegin{tag=Title}\tagmcbegin{} \tag_stop:}
2955 \AddToHook{cmd/maketitle/after}
2956 {\tag_start:\tagmcbend\tagstructend }
2957 \ExplSyntaxOff
;*tagged;

```

3.22 Headers and Footers

We use fancyhdr for our headers and footers:

```
2958 \RequirePackage{fancyhdr}
```

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

```
2959 \let\ACM@ps@plain\ps@plain
2960 \let\ACM@ps@myheadings\ps@myheadings
2961 \let\ACM@ps@headings\ps@headings
2962 \def\ACM@restore@pagestyle{%
2963   \let\ps@plain\ACM@ps@plain
2964   \let\ps@myheadings\ACM@ps@myheadings
2965   \let\ps@headings\ACM@ps@headings}
2966 \AtBeginDocument{\ACM@restore@pagestyle}
```

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

```
2967 \if@ACM@review
2968   \newsavebox{\ACM@linecount@bx}
2969   \newlength\ACM@linecount@bxht
2970   \newcount\ACM@linecount
2971   \ACM@linecount\@ne\relax
2972   \def\ACM@mk@linecount{%
2973     \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
2974       \normalsize
2975       \setlength{\ACM@linecount@bxht}{0pt}%
2976       \loop{\color{red}\scriptsize\the\ACM@linecount}\
2977         \global\advance\ACM@linecount by \@ne
2978         \addtolength{\ACM@linecount@bxht}{\baselineskip}%
2979         \ifdim\ACM@linecount@bxht<\textheight\repeat
2980         {\color{red}\scriptsize\the\ACM@linecount}\hfill
2981         \global\advance\ACM@linecount by \@ne}}
2982   \fi
```

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

```
2983 \def\ACM@linecountL{%
2984   \if@ACM@review
2985     \ACM@mk@linecount
2986     \begin{picture}(0,0)%
2987       \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2988     \end{picture}%
2989   \fi}
```

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

```
2990 \def\ACM@linecountR{%
2991   \if@ACM@review
2992     \ifcase\ACM@format@nr
2993       \relax % manuscript
2994       \relax
2995       \or % acmsmall
2996       \relax
2997       \or % acmlarge
2998       \relax
2999       \or % acmtog
3000       \ACM@mk@linecount
```

```

3001      \or % sigconf
3002      \ACM@mk@linecount
3003      \or % siggraph
3004      \ACM@mk@linecount
3005      \or % sigplan
3006      \ACM@mk@linecount
3007      \or % sigchi
3008      \ACM@mk@linecount
3009      \or % sigchi-a
3010      \ACM@mk@linecount
3011      \or % acmengage
3012      \ACM@mk@linecount
3013      \or % acmcp
3014      \relax
3015  \fi
3016  \begin{picture}(0,0)%
3017    \put(20,-22){\usebox{\ACM@linecount@bx}}%
3018  \end{picture}%
3019  \fi}

```

\ACM@timestamp The timestamp system

```

3020 \if@ACM@timestamp
3021 % Subtracting 30 from \time gives us the effect of rounding down despite
3022 % \numexpr rounding to nearest
3023 \newcounter{ACM@time@hours}
3024 \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
3025 \newcounter{ACM@time@minutes}
3026 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
3027 \newcommand\ACM@timestamp{%
3028   \footnotesize%
3029   \ifx\@acmSubmissionID\@empty\relax\else
3030     Submission ID: \@acmSubmissionID.{ }%
3031   \fi
3032   \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
3033   \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
3034   Page \thepage of \@startPage--\pageref*{TotPages}.%
3035 }
3036 \fi

```

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

```

3037 \def\@shortauthors{%
3038   \if@ACM@anonymous
3039     Anon.
3040     \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
3041   \else\shortauthors\fi}

```

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

```

3042 \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

```

3043 \AtBeginDocument{%

```



```

3044 \fancypagestyle{standardpagestyle}{%
3045   \fancyhf{}%
3046   \renewcommand{\headrulewidth}{\z@}%
3047   \renewcommand{\footrulewidth}{\z@}%
3048   \def\@acmArticlePage{%
3049     \ifx\@acmArticle\empty%
3050       \if@ACM@printfolios\thepage\fi%
3051     \else%
3052       \@acmArticle\if@ACM@printfolios:\thepage\fi%
3053     \fi%
3054   }%
3055   \if@ACM@journal@bibstrip@or@tog
3056     \ifcase\ACM@format@nr
3057     \relax % manuscript
3058       \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
3059       \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
3060       \fancyhead[RE]{\@shortauthors}%
3061       \fancyhead[LO]{\ACM@linecountL\shorttitle}%
3062       \if@ACM@nonacm\else%
3063         \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
3064       \fi%
3065     \or % acmsmall
3066       \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
3067       \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
3068       \fancyhead[RE]{\@headfootfont\@shortauthors}%
3069       \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3070       \if@ACM@nonacm\else%
3071         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3072           \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
3073       \fi
3074     \or % acmlarge
3075       \fancyhead[LE]{\ACM@linecountL\@headfootfont
3076         \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
3077       \fancyhead[LO]{\ACM@linecountL}%
3078       \fancyhead[RO]{\@headfootfont
3079         \shorttitle\quad\textbullet\quad\@acmArticlePage}%
3080       \if@ACM@nonacm\else%
3081         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3082           \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
3083       \fi
3084     \or % acmtog
3085       \fancyhead[LE]{\ACM@linecountL\@headfootfont
3086         \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
3087       \fancyhead[LO]{\ACM@linecountL}%
3088       \fancyhead[RE]{\ACM@linecountR}%
3089       \fancyhead[RO]{\@headfootfont
3090         \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
3091       \if@ACM@nonacm\else
3092         \if@ACM@journal@bibstrip
3093           \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
3094             Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
3095             Publication date: \@acmPubDate.}%
3096         \else
3097           \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,

```

```

3098         \acmConference@date, \acmConference@venue.}%
3099     \fi
3100 \fi
3101 \else % Proceedings
3102     \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3103     \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3104     \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3105     \if@ACM@nonacm
3106         \fancyhead[LE]{\ACM@linecountL}%
3107         \fancyhead[RO]{\ACM@linecountR}%
3108     \else%
3109         \if@ACM@engage
3110             \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3111             EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3112             \fancyhead[RO]{\@headfootfont
3113             EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3114             \ACM@linecountR}%
3115         \else
3116             \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3117             \acmConference@shortname,
3118             \acmConference@date, \acmConference@venue}%
3119             \fancyhead[RO]{\@headfootfont
3120             \acmConference@shortname,
3121             \acmConference@date, \acmConference@venue\ACM@linecountR}%
3122         \fi
3123     \fi
3124 \fi
3125 \else % Proceedings
3126     \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3127     \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3128     \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3129     \if@ACM@nonacm
3130         \fancyhead[LE]{\ACM@linecountL}%
3131         \fancyhead[RO]{\ACM@linecountR}%
3132     \else%
3133         \if@ACM@engage
3134             \fancyhead[LE]{\ACM@linecountL\@headfootfont
3135             EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3136             \fancyhead[RO]{\@headfootfont
3137             EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3138             \ACM@linecountR}%
3139         \else
3140             \fancyhead[LE]{\ACM@linecountL\@headfootfont
3141             \acmConference@shortname,
3142             \acmConference@date, \acmConference@venue}%
3143             \fancyhead[RO]{\@headfootfont
3144             \acmConference@shortname,
3145             \acmConference@date, \acmConference@venue\ACM@linecountR}%
3146         \fi
3147     \fi
3148 \fi
3149 \if@ACM@sigchiamode
3150     \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
3151 \fi

```

```

3152 \if@ACM@timestamp
3153   \fancyfoot[LO,RE]{\ACM@timestamp}
3154 \fi
3155 \if@ACM@acmcp
3156 \renewcommand{\footrulewidth}{0.1\p@}%
3157 \fancyheadoffset[L]{46pt}%
3158 \fancyhead[L]{\makebox[\z@][l]{%
3159   \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3160     \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3161       \strut\ACM@ArticleType~Article}}}%
3162   \ACM@linecountL}%
3163 \fancyhead[R]{\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3164 \fancyfoot[L,C]{}%
3165 \fancyfoot[R]{\footnotesize
3166   \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3167   \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3168   (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3169 \fi
3170 }%
3171 \pagestyle{standardpagestyle}
3172 }

```

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

\@folio@ht

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

\@folio@voffset

\@folio@max

firstpagestyle The page style for the first page only.

```

3173 \AtBeginDocument{%
3174 \fancypagestyle{firstpagestyle}{%
3175   \fancyhf{}%
3176   \renewcommand{\headrulewidth}{\z@}%
3177   \renewcommand{\footrulewidth}{\z@}%
3178   \if@ACM@journal@bibstrip@or@tog
3179     \ifcase\ACM@format@nr
3180     \relax % manuscript
3181     \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3182     \fancyhead[R]{\@acmBadgeR}%
3183     \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
3184     \if@ACM@nonacm\else%
3185       \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
3186     \fi%
3187   \or % acsmall
3188     \if@ACM@nonacm\else%
3189     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3190       \@acmNumber, Article \@acmArticle. Publication date:
3191       \@acmPubDate.}%
3192     \fi%
3193     \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3194     \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3195     \fancyhead[RO]{\@acmBadgeR}%
3196     \fancyhead[RE]{\@acmBadgeR}%
3197   \or % acmlarge
3198     \if@ACM@nonacm\else%
3199     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.

```

```

3200         \@acmNumber, Article \@acmArticle. Publication date:
3201         \@acmPubDate.}%
3202     \fi%
3203     \fancyhead[RO]{\@acmBadgeR}%
3204     \fancyhead[RE]{\@acmBadgeR}%
3205     \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3206     \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3207     \or % acmtog
3208     \if@ACM@nonacm\else%
3209         \if@ACM@journal@bibstrip
3210             \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
3211             Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
3212             Publication date: \@acmPubDate.}%
3213         \else
3214             \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
3215             \acmConference@date, \acmConference@venue.}%
3216         \fi
3217     \fi%
3218     \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3219     \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3220     \else % Conference proceedings
3221         \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3222         \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3223         \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3224     \fi
3225 \else
3226     \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3227     \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3228     \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3229 \fi
3230 \if@ACM@timestamp
3231     \ifnum\ACM@format@nr=0\relax % Manuscript
3232     \fancyfoot[LO,RE]{\ACM@timestamp\quad
3233     \if@ACM@nonacm\else
3234         \footnotesize Manuscript submitted to ACM
3235     \fi}
3236 \else
3237     \fancyfoot[LO,RE]{\ACM@timestamp}
3238 \fi
3239 \fi
3240 \if@ACM@acmcp
3241 \renewcommand{\footrulewidth}{0.1\p@}%
3242 \fancyheadoffset[L]{46pt}%
3243 \fancyhead[L]{\makebox[\z@][l]{%
3244     \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3245     \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3246     \strut\ACM@ArticleType~Article}}}%
3247     \ACM@linecountL\@acmBadgeL}%
3248 \fancyhead[R]{\@acmBadgeR\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3249 \fancyfoot[L,C]{}%
3250 \fancyfoot[R]{\footnotesize
3251     \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3252     \ifx\@acmArticle\empty\else Article~\@acmArticle\fi\space
3253     (\@acmPubDate)\ifx\@acmDOI\empty\else\\@formatdoi{\@acmDOI}\fi}

```

```

3254 \fi
3255 }}

```

3.23 Sectioning

\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.

```

3256 \def\ACM@NRadjust#1{%
3257   \begingroup
3258   \expandafter\ifx\csname Sectionformat\endcsname\relax
3259   % do nothing when \Sectionformat is unknown
3260   \def\next{\endgroup #1}%
3261   \else
3262   \def\next{\endgroup
3263     \let\realSectionformat\Sectionformat
3264     \def\ACM@sect@format@{#1}%
3265     \let\Sectionformat\ACM@NR@adjustedSectionformat
3266     %% next lines added 2018-06-17 to ensure section number is styled
3267     \let\real@adddotafter\@adddotafter
3268     \let\@adddotafter\ACM@adddotafter
3269     #1{}% imposes the styles, but nullifies \MakeUppercase
3270     \let\@adddotafter\real@adddotafter
3271   }%
3272 \fi \next
3273 }

```

\ACM@NR@adjustedSectionformat

```

3274 \def\ACM@NR@adjustedSectionformat#1#2{%
3275   \realSectionformat{\ACM@sect@format{#1}}{#2}%
3276   \let\Sectionformat\realSectionformat}
3277 \DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
3278 \def\ACM@sect@format@null#1{#1}
3279 \let\ACM@sect@format@\ACM@sect@format@null
3280 \AtBeginDocument{%

```

```

3281 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
3282 \let\LTX@adddotafter\@adddotafter
3283 \fi
3284 }

```

\ACM@adddotafter

```

3285 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}

```

Sectioning is different for different levels

```

3286 \renewcommand\section{\def\@toclevel{1}%
3287 \@startsection{section}{1}{\z@}%
3288 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3289 {.25\baselineskip}%
3290 {\ACM@NRadjust\@secfont}}
3291 \renewcommand\subsection{\def\@toclevel{2}%
3292 \@startsection{subsection}{2}{\z@}%
3293 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3294 {.25\baselineskip}%
3295 {\ACM@NRadjust\@subsecfont}}
3296 \renewcommand\subsubsection{\def\@toclevel{3}%
3297 \@startsection{subsubsection}{3}{\z@}%
3298 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3299 {-3.5\p@}%
3300 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}
3301 \renewcommand\paragraph{\def\@toclevel{4}%
3302 \@startsection{paragraph}{4}{\parindent}%
3303 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3304 {-3.5\p@}%
3305 {\ACM@NRadjust{\@parfont\@adddotafter}}}
3306 \newcommand\noindentparagraph{\def\@toclevel{4}%
3307 \@startsection{paragraph}{4}{\z@}%
3308 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3309 {-3.5\p@}%
3310 {\ACM@NRadjust{\@parfont}}}
3311 \renewcommand\part{\def\@toclevel{9}%
3312 \@startsection{part}{9}{\z@}%
3313 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
3314 {4\p@}%
3315 {\ACM@NRadjust\@parfont}}

```

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

```

3316 \def\section@raggedright{\@rightskip\@flushglue
3317 \rightskip\@rightskip
3318 \leftskip\z@skip
3319 \parindent\z@}

```

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

```

\@subsecfont 3320 \def\@secfont{\sffamily\bfseries\section@raggedright}
\@subsubsecfont 3321 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 3322 \def\@subsubsecfont{\sffamily\itshape}
3323 \def\@parfont{\itshape}
3324 \setcounter{secnumdepth}{3}
3325 \ifcase\ACM@format@nr
3326 \relax % manuscript

```

```

3327 \or % acmsmall
3328 \or % acmlarge
3329 \def\@secfont{\sffamily\large\section@raggedright}
3330 \def\@subsecfont{\sffamily\large\section@raggedright}
3331 \or % acmtog
3332 \def\@secfont{\sffamily\large\section@raggedright}
3333 \def\@subsecfont{\sffamily\large\section@raggedright}
3334 \or % sigconf
3335 \def\@secfont{\bfseries\Large\section@raggedright}
3336 \def\@subsecfont{\bfseries\Large\section@raggedright}
3337 \or % siggraph
3338 \def\@secfont{\sffamily\bfseries\Large\section@raggedright}
3339 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
3340 \or % sigplan
3341 \def\@secfont{\bfseries\Large\section@raggedright}
3342 \def\@subsecfont{\bfseries\section@raggedright}
3343 \def\@subsubsecfont{\bfseries\section@raggedright}
3344 \def\@parfont{\bfseries\itshape}
3345 \def\@subparfont{\itshape}
3346 \or % sigchi
3347 \setcounter{secnumdepth}{1}
3348 \def\@secfont{\sffamily\bfseries\section@raggedright}
3349 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3350 \or % sigchi-a
3351 \setcounter{secnumdepth}{0}
3352 \def\@secfont{\sffamily\bfseries\section@raggedright}
3353 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3354 \or % acmengage
3355 \def\@secfont{\bfseries\Large\section@raggedright}
3356 \def\@subsecfont{\bfseries\Large\section@raggedright}
3357 \or %acmcp
3358 \fi

```

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

```

3359 \AtBeginDocument{%
3360   \@for\@tempa:=-1,0,1,2,3,4,5\do{%
3361     \ifundefined{r@tocindent\@tempa}{%
3362       \exp\gdef\csname r@tocindent\@tempa\endcsname{0pt}}{}}%
3363   }%
3364 }
3365 \def\@writetocindents{%
3366   \begingroup
3367   \@for\@tempa:=-1,0,1,2,3,4,5\do{%
3368     \immediate\write\@auxout{%
3369       \string\newlabel{tocindent\@tempa}{%
3370         \csname r@tocindent\@tempa\endcsname}}%
3371     }%
3372   \endgroup}

```

\@adddotafter Add punctuation after a sectioning command

```
3373 \def\@adddotafter#1{#1\@addpunct{.}}
```

\@addspaceafter Add space after a sectioning command

```
3374 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

```
3375 \if@ACM@acmcp
3376   \setcounter{secnumdepth}{-1}%
3377 \fi
```

3.24 TOC lists

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

```
3378 \providecommand*\@dotsep{4.5}
```

3.25 Theorems

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

```
3379 \def\@acmplainbodyfont{\itshape}
```

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

```
3380 \def\@acmplainindent{\parindent}
```

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

```
3381 \def\@acmplainheadfont{\scshape}
```

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

```
3382 \def\@acmplainnotefont{\@empty}
```

Customization of the acmplain theorem style:

```
3383 \ifcase\ACM@format@nr
3384 \relax % manuscript
3385 \or % acmsmall
3386 \or % acmlarge
3387 \or % acmtog
3388 \or % sigconf
3389 \or % siggraph
3390 \or % sigplan
3391   \def\@acmplainbodyfont{\itshape}
3392   \def\@acmplainindent{\z@}
3393   \def\@acmplainheadfont{\bfseries}
3394   \def\@acmplainnotefont{\normalfont}
3395 \or % sigchi
3396 \or % sigchi-a
3397 \or % acmengage
3398 \or % acmcp
3399 \fi
```

acmplain The acmplain theorem style

```
3400 \newtheoremstyle{acmplain}%
3401   {.5\baselineskip\@plus.2\baselineskip
3402     \@minus.2\baselineskip}% space above
3403   {.5\baselineskip\@plus.2\baselineskip
```



```

3404 \@minus.2\baselineskip}% space below
3405 {\@acmplainbodyfont}% body font
3406 {\@acmplainindent}% indent amount
3407 {\@acmplainheadfont}% head font
3408 {.}% punctuation after head
3409 {.5em}% spacing after head
3410 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec

\acmdefinitionbodyfont The font to typeset the body of the acmdefinition theorem style.
3411 \def\acmdefinitionbodyfont{\normalfont}

\acmdefinitionindent The amount to indent the acmdefinition theorem style.
3412 \def\acmdefinitionindent{\parindent}

\acmdefinitionheadfont The font to typeset the head of the acmdefinition theorem style.
3413 \def\acmdefinitionheadfont{\itshape}

\acmdefinitionnotefont The font to typeset the note of the acmdefinition theorem style.
3414 \def\acmdefinitionnotefont{\@empty}

Customization of the acmdefinition theorem style:
3415 \ifcase\ACM@format@nr
3416 \relax % manuscript
3417 \or % acmsmall
3418 \or % acmlarge
3419 \or % acmtog
3420 \or % sigconf
3421 \or % siggraph
3422 \or % sigplan
3423 \def\acmdefinitionbodyfont{\normalfont}
3424 \def\acmdefinitionindent{\z@}
3425 \def\acmdefinitionheadfont{\bfseries}
3426 \def\acmdefinitionnotefont{\normalfont}
3427 \or % sigchi
3428 \or % sigchi-a
3429 \or % acmengage
3430 \or % acmcp
3431 \fi

acmdefinition The acmdefinition theorem style
3432 \newtheoremstyle{acmdefinition}%
3433 {.5\baselineskip\@plus.2\baselineskip
3434 \@minus.2\baselineskip}% space above
3435 {.5\baselineskip\@plus.2\baselineskip
3436 \@minus.2\baselineskip}% space below
3437 {\acmdefinitionbodyfont}% body font
3438 {\acmdefinitionindent}% indent amount
3439 {\acmdefinitionheadfont}% head font
3440 {.}% punctuation after head
3441 {.5em}% spacing after head
3442 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\acmdefinitionnotefont(#3)}}}% head spec

Make acmplain the default theorem style.
3443 \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.

```

3444 \AtEndPreamble{%
3445   \if@ACM@acmthm
3446   \theoremstyle{acmplain}
3447   \@ifundefined{theorem}{%
3448     \newtheorem{theorem}{Theorem}[section]
3449   }{}
3450   \@ifundefined{conjecture}{%
3451     \newtheorem{conjecture}[theorem]{Conjecture}
3452   }{}
3453   \@ifundefined{proposition}{%
3454     \newtheorem{proposition}[theorem]{Proposition}
3455   }{}
3456   \@ifundefined{lemma}{%
3457     \newtheorem{lemma}[theorem]{Lemma}
3458   }{}
3459   \@ifundefined{corollary}{%
3460     \newtheorem{corollary}[theorem]{Corollary}
3461   }{}
3462   \theoremstyle{acmdefinition}
3463   \@ifundefined{example}{%
3464     \newtheorem{example}[theorem]{Example}
3465   }{}
3466   \@ifundefined{definition}{%
3467     \newtheorem{definition}[theorem]{Definition}
3468   }{}
3469   \fi
3470   \theoremstyle{acmplain}
3471 }
```

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

```

3472 \def\@proofnamefont{\scshape}
```

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

```

3473 \def\@proofindent{\indent}
```

Customization of the proof environment.

```

3474 \ifcase\ACM@format@nr
3475 \relax % manuscript
3476 \or % acmsmall
3477 \or % acmlarge
3478 \or % acmtog
3479 \or % sigconf
3480 \or % siggraph
3481 \or % sigplan
3482 \def\@proofnamefont{\itshape}
```

```

3483 \def\@proofindent{\noindent}
3484 \or % sigchi
3485 \or % sigchi-a
3486 \or % acmengage
3487 \or % acmcp
3488 \fi

```

proof We want some customization of the proof environment.

```

3489 \renewenvironment{proof}[1][\proofname]{\par
3490 \pushQED{\qed}%
3491 \normalfont \topsep6\p@\@plus6\p@\relax
3492 \trivlist
3493 \item[\@proofindent\hskip\labelsep
3494 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
3495 }{%
3496 \popQED\endtrivlist\endpfalse
3497 }

```

3.26 Balancing columns

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

```

3498 \AtEndPreamble{%
3499 \if@ACM@pbalance
3500 \global\@ACM@balancefalse
3501 \ifcase\ACM@format@nr
3502 \relax % manuscript
3503 \or % acsmall
3504 \or % acmlarge
3505 \or % acmtog
3506 \RequirePackage{pbalance}%
3507 \or % sigconf
3508 \RequirePackage{pbalance}%
3509 \or % siggraph
3510 \RequirePackage{pbalance}%
3511 \or % sigplan
3512 \RequirePackage{pbalance}%
3513 \or % sigchi
3514 \RequirePackage{pbalance}%
3515 \or % sigchi-a
3516 \or % acmengage
3517 \RequirePackage{pbalance}%
3518 \or % acmcp
3519 \fi
3520 \fi
3521 \if@ACM@balance
3522 \ifcase\ACM@format@nr
3523 \relax % manuscript
3524 \global\@ACM@balancefalse
3525 \or % acsmall
3526 \global\@ACM@balancefalse
3527 \or % acmlarge
3528 \global\@ACM@balancefalse

```

```

3529 \or % acmtog
3530 \RequirePackage{balance}%
3531 \or % sigconf
3532 \RequirePackage{balance}%
3533 \or % siggraph
3534 \RequirePackage{balance}%
3535 \or % sigplan
3536 \RequirePackage{balance}%
3537 \or % sigchi
3538 \RequirePackage{balance}%
3539 \or % sigchi-a
3540 \global\@ACM@balancefalse
3541 \or % acmengage
3542 \RequirePackage{balance}%
3543 \or % acmcp
3544 \global\@ACM@balancefalse
3545 \fi
3546 \fi
3547 }
3548 \AtEndDocument{%
3549 \if@ACM@balance
3550 \if@twocolumn
3551 \balance
3552 \fi\fi}

```

3.27 Acknowledgments

`\acksname`

```

3553 \newcommand\acksname{Acknowledgments}

```

`\acks` This is a comment-like structure

```

3554 \specialcomment{acks}{%
3555 \begin{group}
3556 \section*{\acksname}
3557 \phantomsection\addcontentsline{toc}{section}{\acksname}
3558 }{%
3559 \end{group}
3560 }

```

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

```

3561 \def\grantsponsor#1#2#3{#2}

```

`\grantnum`

```

3562 \newcommand\grantnum[3][{}]{#3%
3563 \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}

```

3.28 Conditional typesetting

We use the comment package for conditional typesetting:

```

3564 \AtEndPreamble{%
3565 \if@ACM@screen
3566 \includecomment{screenonly}
3567 \excludecomment{printonly}

```

```

3568 \else
3569   \excludecomment{screenonly}
3570   \includecomment{printonly}
3571 \fi
3572 \if@ACM@anonymous
3573   \excludecomment{anonsuppress}
3574   \excludecomment{acks}
3575 \else
3576   \includecomment{anonsuppress}
3577 \fi}

```

3.29 Additional bibliography commands

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

```

3578 \newcommand\showeprint[2][arxiv]{%
3579   \def\@tempa{#1}%
3580   \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
3581   \def\@tempb{arxiv}%
3582   \ifx\@tempa\@tempb\relax
3583     arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3584   \else
3585     \def\@tempb{arXiv}%
3586     \ifx\@tempa\@tempb\relax
3587       arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3588     \else
3589       #1:#2%
3590     \fi
3591   \fi}

```

3.30 Index

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

```

3592 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
3593   \columnseprule\z@ \columnsep 35\p@
3594   \@indextitlestyle
3595   \let\item\@idxitem
3596   \parindent\z@ \parskip\z@\@plus.3\p@\relax
3597   \raggedright
3598   \hyphenpenalty\@M
3599   \footnotesize}

```

3.31 End of Class

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

```

3600 \let\vspace@orig=\vspace
3601 \let\vspacer@orig=\vspacer
3602 \apptocmd{\vspace}{\ClassWarning{\@classname}{\string\vspace\space should
3603   only be used to provide space above/below surrounding
3604   objects}}{}{}
3605 \apptocmd{\vspacer}{\ClassWarning{\@classname}{\string\vspace\space should

```

```

3606     only be used to provide space above/below surrounding
3607     objects}}{}}
3608 \let\@vspace@acm=\@vspace
3609 \let\@vspacer@acm=\@vspacer

```

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

```

3610 \let\ACM@origbaselinestretch\baselinestretch
3611 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
3612   \ClassError{\@classname}{An attempt to redefine
3613     \string\baselinestretch\space detected. Please do not do this for
3614     ACM submissions!}\fi}

```

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

```

3615 \let\ACM@origsection\section
3616 \AtEndDocument{\ifx\section\ACM@origsection\else
3617   \ClassError{\@classname}{An attempt to redefine
3618     \string\section\space detected. Please do not do this for
3619     ACM submissions!}\fi}

```

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

```

3620 \let\ACM@origsubsection\subsection
3621 \AtEndDocument{\ifx\subsection\ACM@origsubsection\else
3622   \ClassError{\@classname}{An attempt to redefine
3623     \string\subsection\space detected. Please do not do this for
3624     ACM submissions!}\fi}

```

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

```

3625 \let\ACM@origsubsubsection\subsubsection
3626 \AtEndDocument{\ifx\subsubsection\ACM@origsubsubsection\else
3627   \ClassError{\@classname}{An attempt to redefine
3628     \string\subsubsection\space detected. Please do not do this for
3629     ACM submissions!}\fi}

```

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

```

3630 \let\ACM@origparagraph\paragraph
3631 \AtEndDocument{\ifx\paragraph\ACM@origparagraph\else
3632   \ClassError{\@classname}{An attempt to redefine
3633     \string\paragraph\space detected. Please do not do this for
3634     ACM submissions!}\fi}

```

```

3635 \normalsize\normalfont\frenchspacing
3636 </class>

```

References

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

Change History

1.48	General: Added prologue option to xcolor	51	\ccsdesc@parse: Added warning for missing concepts	80	
	Bib code cleanup (Zack Weinberg)	36	\if@ACM@printacmref: Added warning for longer papers	77	
	Documentation update (siggraph) .	36	\keywords: Added warning for missing keywords	76	
1.49	General: New journal: DTRAP	36	1.69	\vspace: Added the changed command to avoid grouping . . .	117
1.53	General: New journals: PACMCGIT, TIOT, TDSCI	36	1.70	General: Name change for TDS	61
	Rearranged docs	36	1.71	General: Bibliography change: volume for @inproceedings is now in brackets together with series . . .	36
1.54	General: Moved footnote stuff before hyperref call (Ross Moore)	36		LuaTeX now uses the OTF versions of fonts	36
1.56	General: Documented \Description	36		Retired sigchi and sigchi-a	36
1.57	General: Booktabs package is now the default	36	1.75	General: Documentation update . . .	36
1.58	General: Changes in samples (Enrico Gregorio)	36	1.78	General: Documentation update: Word count	36
	New journal: HEALTH. TDS is renamed to TDSCI	36	1.79	General: Updated indormation for TAP, TCPS, TEAC	61
1.60	General: New option: urlbreakonhyphens	36	1.80	General: Added DLT and FAC	61
	\if@ACM@urlbreakonhyphens: introduced macro	37	1.82	General: Updated abbreviations and codes for several journals	61
1.62	General: New journal: TELO	36	1.84	General: New journals: JDS, GAMES	36, 61
1.63	General: New journal: FACMP	36	1.85	General: Added CC licenses	36
	New journal: TQUANT	36		Added: acmengage	50
1.63a	General: Move: TQUANT to TQC . .	36		New journal: JRC	61
1.64	General: Putting abstract after \maketitle now causes an error .	36		\@mkauthors: Added: acmengage . .	94
1.65	General: New journal: DGOV	36		\@mktitle: Added: acmengage	91
1.66	General: ACM reference format is now mandatory for papers over one page; CCS concepts and keywords are now mandatory for papers over two pages	36		\@printtopmatter: Added: acmengage	90
	Authors' addresses are mandatory for journal articles	36		\@specialsection: Added: acmengage	90
	\@mkauthorsaddresses: Added warning for missing addresses .	100		\@subtitlefont: Added: acmengage	92
				\@titlefont: Added: acmengage . .	92
				\ACM@linecountR: Added: acmengage	103
				format: New format: acmengage . . .	37
				\parskip: Added: acmengage	53

1.87	General: New journals: ACMJCSS, JATS, TORS	61	v1.02	General: Added TOPS and TSC (closes https://github.com/borisveytsman/ acmart/issues/5)	36
	format: New format: acmcp	37			
1.88	General: Added ISSN for ACMJCSS	61		General: Added TOPS and TSC (closes https://github.com/borisveytsman/ acmart/issues/12)	36
	Added ISSN for GAMES	61		Documentation changes (closes https://github.com/borisveytsman/ acmart/issues/13)	36
	Added PACMNET	61			
1.89	General: Added PACMMOD	61			
	Added TOPML	61			
	\@printtopmatter: Moved badges to top header	90	v1.03	General: Added anonsuppress environment	36
1.90	General: Added TOPML eISSN	61		Added authorversion option (closes https://github.com/borisveytsman/ acmart/issues/9)	36
1.90a	General: Changes in the sample keywords and concepts	36		\@formatdoi: Added macro	82
1.92	General: Documentation update: use of ‘anonymous’ throughout	36		\if@ACM@authorversion: Added macro	38
	Moved hyperxmp again due to kernel update	50		\maketitle: Added special case of authorversion	86
2.04	General: Deleted loading ifdraft due to the new release of hyperxmp	50	v1.04	General: Updated bibliography for siggraph	36
	Explicitly load ifdraft since hyperxmp tries to load it inside a group	50		\acmArticleSeq: Name change by Matthew Fluet	74
2.05	General: New data for TELO	61		\acmDOI: Name change by Matthew Fluet	75
2.06	General: Added eISSN for a number of journals	61		\acmISBN: Name change by Matthew Fluet	75
2.07	General: Another change for TELO	61	v1.05	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	36
2.13	\orcid: Protected orchidcite against uppercasing	73		Patched \setcitestyle command; closes https://github.com/borisveytsman/ acmart/issues/19	36
v1.00	General: First released version	36	v1.06	\@ACM@badge@skip: Added macro	75
v1.01	General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/ acmart/issues/1)	36		\@ACM@badge@width: Added macro	75
	Defined ACM colors	36		\@ACM@title@width: Added macro	75
	Explicitly put draft option (closes https://github.com/borisveytsman/ acmart/issues/4)	39		\@mktitle@i: Added processing badges	93
	Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/ acmart/issues/4)	39		Made generic	93
				\@mktitle@ii: Now this macro is obsolete	93
				\@mktitle@iii: Added processing badges	93
				Made more generic	93
				\@mktitle@iv: Made more generic	93

\@printtopmatter: Added processing badges	90	\maketitle: Moved thankses to copyrightpermission box	86
\@subtitlefont: Added macro	92	\section@raggedright: Introduced macro	110
\@titlefont: Added macro	92		
\acmBadgeL: Added macro	76	v1.13	
\acmBadgeR: Added macro	75	General: Font adjustments for acmsmall	95
\if@ACM@badge: Added macro	75	Increased font size for ACM Large	41
v1.07		Print bibliographic information by default for the proceedings	77
\maketitle: Corrected a bug with abstract footnotes	86	\@mpfootnotetext: Made minipage footnotes centered	50
Corrected a bug with permssion and footnotes order	86	\bibliographystyle: Redefined macro	51
v1.08		\bibstyle@acmauthoryear: Added macro	44
General: SIGPLAN reformatting by Matthew Fluet	36	\bibstyle@acmnumeric: Added macro	45
Typos corrected (Tobias Pape)	36	\if@ACM@printfolios: Added macro	77
v1.09		standardpagestyle: Added headers for sigs	104
General: Revert SIGPLAN caption rules	36	Expanded headers for sigchi-a	104
v1.10		Suppressed folios if sig	104
General: Changes of 'licensedothergov' wording	80	v1.14	
\maketitle: Corrected a bug with doi in manuscript and author version, https://github.com/borisveytsman/acmart/issues/36	86	General: \citestyle updates (Matthew Fluet)	36
standardpagestyle: Reversed folios location	104	Patched \citestyle	43
v1.11		\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use	44
General: Customization of ACM theorem styles and proof environment by Matthew Fluet	36	\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use	45
v1.12		v1.15	
General: Added graceful behavior when libertine fonts are absent	55	\@ACM@addtoaddress: Added macro	94
Documentation updates	36	\@mkauthors@iii: New authors system	98
\@marginfigure: Now centering by default	59	\@shortauthors: Introduced macro	104
\@margintable: Now centering by default	59	\@typeset@author@bx: Moved to separate macro	97
\@mkauthors@i: Removed MakeTextUppercase due to a bug with new kernel	97	\acks: Added macro	116
\@parfont: Moved to \section@raggedright	110	\affiliation: Added code for author groups	72
\copyrightpermissionfootnoterule: Added macro	54	\author: Added code for author groups	71
\descriptionlabel: Redefined	61	\city: Added macro	94
\footnoterule: Made shorter	54	\country: Added macro	94
\if@ACM@natbib@override: Added macro	38	\department: Added macro	94
\if@ACM@newfonts: Added macro	55	\grantnum: Added macro	116
		\grantsponsor: Added macro	116
		\if@insideauthorgroup: Introduced macro	71
		\institution: Added macro	94
		\num@authorgroups: Renamed	71
		\orcid: Introduced macro	73

\position: Added macro	94	\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet)	116
\postcode: Added macro	94	v1.20	
\state: Added macro	94	General: Bug fixes for bst	36
\streetaddress: Added macro	94	\mkabstract: Deleted spurious space	101
standardpagestyle: Better handling of anonymous mode	104	v1.21	
v1.16		\showeprint: Added macro	117
General: Formatting header/footer (Matthew Fluet)	36	v1.22	
\@headfootfont: Added macro	104	General: More bibliography changes for Aptara	36
standardpagestyle: Customize header/footer text font	104	v1.23	
v1.17		General: Add PACMPL journal option	36
General: Slightly decreased margins for sigs	52	v1.24	
\@makefnmark: Redefined	50	General: Add IMWUT journal option	61
\mkauthors: TOG now uses the same authors block as other journals	94	v1.25	
\mkauthors@ii: Deleted	97	General: Updated PACMPL	61
\mkbibcitation: Added \nobreak	101	v1.26	
Changed format for sigs	101	General: Corrected \shortcite bug	36
\acmArticle: The default is now numerical	74	Documentation typos fixed (thanks to Stephen Spencer)	36
\acmMonth: The default must be numerical. Closes #50.	75	v1.27	
\acmNumber: The default is now numerical	74	\if@ACM@printccs: Typo corrected	77
\acmVolume: The default is now numerical	74	v1.28	
\acmYear: The default is now numerical	74	General: Corrected option natbib behavior	45
\description: Decreased indent	61	Got rid of warnings in pdf keywords	50
\grantnum: Added url	116	\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato)	79
\grantsponsor: Renamed	116	v1.29	
\if@ACM@printacmref: Renamed from \if@ACM@printbib	77	General: Increased head to 13pt	52
standardpagestyle: Added paper title to sigs	104	\mkabstract: Removed spurious indentation (John Wickerson)	101
v1.18		\ccsdesc@parse: Add spacing after bullet and around rightarrow; semicolon separators no longer in bold/italic (John Wickerson)	79
General: Natbib is now the default for all formats	36	standardpagestyle: Corrected printfolios (Matthew Fluet)	104
\mkauthors@i: Now we andify affiliations	97	v1.30	
\@typeset@author@line: Added macro	96	General: Added \frenchspacing	118
v1.19		Bibtex style now recognizes https:// in doi	36
General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	36	Switched to T1: looks like libertine has problems with \l in OT1	56
Include 'References' in PDF bookmarks (Matthew Fluet)	43	Updated IMWUT and PACMPL	61
\mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet)	101	\department: Added optional parameter	94
		v1.31	
		General: Documentation changes	36
		\@additionalaffiliation: Added macro	72
		\mkbibcitation: Disabled linebreak	101

\@startsection: Added		\if@ACM@affiliation@obeypunctuation:	
\tochangmeasure	47	Added macro	72
\@starttoc: Redefined macro	49	\if@ACM@authordraft: Added macro	39
\@textbottom: Redefined	55	\if@ACM@natbib@override: Deleted	
\acmMonth: The default now is the		macro	38
current month (Matteo Riondato)	75	\if@ACM@timestamp: Added macro	
\acmYear: The default now is the		(Michael D. Adams)	39
current year (Matteo Riondato)	74	\institution: Added	
\additionalaffiliation: Added		obeypunctuation code	94
macro	72	firstpagestyle: Added right	
\l@section: Redefined macro	49	linecount for two-column formats	107
\l@subsection: Redefined macro	49	Added timestamp (Michael	
		D. Adams)	107
v1.32		\maketitle: Fixed the bug with	
General: Added POMACS journal		figures on top and bottom of the	
option	36	title page, thanks to David Epstein	86
Format siggraph is now obsolete	36	\position: Added obeypunctuation	
\@formatdoi: New doi format	82	code	94
v1.33		\postcode: Added obeypunctuation	
General: Added acmart-preload-hook	36	code	94
Added cmap and glyphtounicode	55	\state: Added obeypunctuation code	94
BibTeX comma before articleno bug		\streetaddress: Added	
corrected	36	obeypunctuation code	94
BibTeX crossref bug corrected	36	standardpagestyle: Added right	
BibTeX numpages bug corrected	36	linecount for two-column formats	104
Documentation updates	36	Added timestamp (Michael	
Moved \citename definition for		D. Adams)	104
non-natbib bibliography, so a		v1.34	
package may redefine it	51	\@mkbibcitation: Deleted DOI from	
Switched to Type 1 fonts for		doi numbers	101
libertine even if OTF-capable		\ACM@linecount@bx: Rulers now are	
engine is used (Kai Mindermann)	56	continuous	103
\@ACM@addtoaddress: Added		\ACM@linecountL: Rulers now are	
obeypunctuation code	94	continuous	103
\@mkauthors@i: Added		\ACM@linecountR: Rulers now are	
obeypunctuation code	97	continuous	103
\@mkauthors@iii: Added		\maketitle: Added date to the	
obeypunctuation code	98	bibstrip in conf proceedings	86
\@mkauthors@iv: Added		Deleted ‘DOI’ from doi numbers	86
obeypunctuation code	99	Rearranged bibstrip	86
\@subtitlefont: Added		The \terms command is now	
\normalsize	92	obsolete	86
\ACM@linecountL: Renamed macro	103	\terms: The \terms command now	
\ACM@linecountR: Added macro	103	just produces a warning	76
\ACM@timestamp: Added current page		v1.35	
number	104	General: BibTeX bug fixed: et al.	36
Added macro (Michael D. Adams)	104	If the copyright is set to usgov or	
Added submission id	104	rigtsretained, the price is	
\acmSubmissionID: Added macro	75	suppressed	80
\city: Added obeypunctuation code	94	\bibstyle@acmauthoryear: Square	
\country: Added obeypunctuation		brackets for author-year style	44
code	94	v1.36	
\department: Added obeypunctuation		General: Added PACMHCI journal	
code	94	options	61

Added the possibility to adjust number of author boxes per row in conference formats	36	\l@section: Redefined macro . . .	49
\@ACM@authorsperrrow: Added macro	77	\postcode: We now do not print this even in SIG	94
\@mkauthors@iii: Added authorsperrrow override	98	\state: We now do not print this even in SIG	94
\@mkauthors@iv: Added authorsperrrow override	99	\streetaddress: We now do not print this even in SIG	94
\if@ACM@authordraft: Corrected typo, thanks to bargteil	39	v1.41 General: Added new badges	36
v1.37		v1.42 General: Deleted ACM badges	36
General: Reduce list indentation (Matthew Fluet)	60	v1.43 \@starttoc: Added \makeatletter	49
Set \normalparindent; Reduce list indentation (Matthew Fluet)	36	\country: Added comma before country for journals	94
\description: Reduce list indentation (Matthew Fluet)	61	v1.44 General: Added package refcount . . .	36
\descriptionlabel: Reduce list indentation (Matthew Fluet)	61	Deleted package cleveref	36
\normalparindent: Set \normalparindent (Matthew Fluet)	54	Put theorem defs in a separate style	36
v1.38		\@acmBooktitle: Added macro	70
General: Increase default font size for SIGPLAN	36, 41	\@acmEditors: Added macro	71
v1.39		\@editorsAbbrev: Added macro . . .	70
\@authornotemark: Added macro . .	101	\@folioblob: Suppress the blob if acmArticleSeq is empty	107
\authornotemark: Added macro . . .	74	\@mkbibcitation: If the paper has just one page, use 'page' instead of 'pages'	101
v1.40		\ACM@restore@pagestyle: Added macro	103
General: Added 'textcase' package . .	43	\acmArticle: The default is now empty	74
Added heightrounded to geometry	52	\acmArticleSeq: Now acmArticle might be empty	74
Added new copyright version: licensedcagov	36	\acmBooktitle: Added macro	70
Added package cleveref	36	\editor: Added macro	71
Added Ross Moore code for glyphtounicode	55	\if@ACM@acmthm: Added macro	37
Bibliography changes	36	\maketitle: Empty DOI or ISBN are not printed (by Michael Ekstrand)	86
\@copyrightowner: Added new copyright version: licensedcagov . .	81	v1.45 \@folioblob: Switched \bfseries\sffamily to \sffamily\bfseries	107
\@copyrightpermission: Added new copyright version: licensedcagov . .	82	\@parfont: Switched \bfseries\sffamily to \sffamily\bfseries	110
\@mkauthors@i: Switched to MakeTextUppercase	97	\@titlefont: Switched \bfseries\sffamily to \sffamily\bfseries	92
\@parfont: Switched to MakeTextUppercase	110	v1.46 General: Added etoolbox	36
\ACM@linecount@bx: Work around a bug in xcolor: looks like cmyk colors in boxes do not work . . .	103	Bst file bug fixes: label width is calculated correctly	36
\ccdesc@parse@finish: Added macro	80	Delayed hypersetup since journal options may change screen mode	50
\city: We now do not print this even in SIG	94		
\country: Fixed bugs with extra spaces	94		

PACM now set screen to true	61	Suppressed empty DOI (Serguei Mokhov)	86
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