

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

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Abstract

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

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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 T_EX for its typesetting.

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

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

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

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

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

2 User’s guide

This class uses many commands and 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 T_EX Users Group. The world-wide T_EX Users Group is at <https://tug.org/>; please consider joining us if you use T_EX regularly.

2.1 Installation

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

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

¹<http://www.acm.org/>

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

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

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

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

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

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

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

2.2 Invocation and options

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

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

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

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

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

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

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

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

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

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 BibTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.14.

Table 1: The possible values for the format option

Value	Meaning
manuscript	A manuscript. This is the default.
acmsmall	Small single-column format. Used for ACMJCSS, CIE, CSUR, DLT, FAC, GAMES, JACM, JATS, JDIQ, JDS, JEA, JERIC, JETC, JRC, PACM-CGIT, PACMHCI, PACMMOD, PACMNET, PACMPL, PACMSE, POMACS, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TDS, TEAC, TECS, TELO, THRI, THS, 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, TRET, TSAS, TSC, TSLP, and TWEB, including special issues.
acmlarge	Large single-column format. Used for 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 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.

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

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:

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

`\affiliation` enter them in this order:

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

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

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

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

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

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

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

Similarly you can repeat the `\email` command.

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

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

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

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

However, this format is not generally recommended.

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

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

`\position` The `\affiliation` and `\additionalaffiliation` commands are further structured to interact with the metadata extraction tools. Inside these commands you should use

```
\institution
\department
  \city
  \state
  \country
```

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

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

Starting 2024, ACM no longer collects or print postal addresses of the authors. Thus the commands `\streetaddress` and `\postcode`, present in the previous versions of the class, now produce a 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 institution. 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 \LaTeX), we allow `\thanks` only *outside* of the commands `\title` and `\author`. This command is obsolete and should *not* be used in most cases. Do not list your acknowledgments or grant sponsors here. Put this information in the `acks` environment (see Section 2.13).

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

```

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

```

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

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

```

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

```

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

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

```

\author{A. U. Thor}

```

```

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

```

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

```

\acmVolume    The macros \acmVolume, \acmNumber, \acmArticle, \acmYear and \acmMonth are
\acmNumber    inserted by the editor and set the journal volume, issue, article number, year and month
\acmArticle    correspondingly. The arguments of all these commands, including \acmMonth, is numer-
\acmYear      ical. For example,
\acmMonth
\acmVolume{9}
\acmNumber{4}
\acmArticle{39}
\acmYear{2010}
\acmMonth{3}

```

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

```

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

```

```

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

```

```

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

```

```

\acmSubmissionID{123-A56-BU3}

```

```

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

```

```

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

```

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

```

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

```

```

\acmDOI{10.1145/9999997.9999999}

```

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

```

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

```

square, which is scaled to a standard size in the output. For example, if the badge image is `ae-logo.pdf`, the command is

```
\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`.

Table 3: Parameters for the `\setcopyright` command

Parameter	Meaning
<code>none</code>	The copyright and permission information is not typeset. (This is the option for some ACM conferences.)
<code>acmlicensed</code>	The authors retain the copyright but license the publication rights to ACM.
<code>rightsretained</code>	The authors retain the copyright and publication rights to themselves or somebody else.
<code>usgov</code>	All the authors are employees of the US government.
<code>usgovmixed</code>	Some authors are employees of the US government.
<code>cagov</code>	All the authors are employees of the Canadian government.
<code>cagovmixed</code>	Some authors are employees of the Canadian government.
<code>licensedusgovmixed</code>	Some authors are employees of the US government, and the publication rights are licensed to ACM.
<code>licensedcagov</code>	All the authors are employees of the Canadian government, and the publication rights are licensed to ACM.
<code>licensedcagovmixed</code>	Some authors are employees of the Canadian government, and the publication rights are licensed to ACM.
<code>othergov</code>	Authors are employees of a government other than the US or Canada.
<code>licensedothergov</code>	Authors are employees of a government other than the US or Canada, and the publication rights are licensed to ACM.
<code>iw3c2w3</code>	Special statement for conferences organized by IW3C2.
<code>iw3c2w3g</code>	Special statement for conferences organized by IW3C2, when some authors are approved Google employees.
<code>cc</code>	Creative Commons license. If this key is set, <i>doclicense</i> images are used to typeset the license. See also <code>\setcctype</code> command.
<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.

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 T_EX 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.

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

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

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

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

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

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

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

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

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

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

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

Table 4: Settings for the `\settopmatter` command

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

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

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

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

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

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

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

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

2.4 Top matter of ACM Engage materials

ACM Engage materials resemble conference proceedings, but have some special features. First, as a rule, they are released under a Creative Commons license. By default CC-BY is used. However, if you want to use another variant of CC license, use `\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 `\translatedkeywordslanguagekeywords` 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 L^AT_EX interface for figures and tables. There are some important items to be aware of, however.

1. The captions for figures must be entered *after* the figure bodies and for tables *before* the table bodies.
2. The ACM uses the standard types for figures and tables and adds several new ones. In total there are the following types:

figure, **table**: a standard figure or table taking a full text width in one-column formats and one column width in two-column formats.

figure*, **table*** in two-column formats, a special figure or table taking a full text width.

teaserfigure: a special figure before `\maketitle`.

3. Accordingly, when scaling images, one should use the following sizes:
 - (a) For `teaserfigure`, `figure` in one-column mode or `figure*` in two-column mode, use `\textwidth`. In one-column mode, you can also use `\columnwidth`, which coincides with `\textwidth` in this case.
 - (b) For `figure` in two-column mode, use `\columnwidth`.

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

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

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

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

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

```

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

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

```

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

2.9 Descriptions of images

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

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

```

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

```

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

2.10 Theorems

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

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

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

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

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

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

2.11 Online-only and offline-only material

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

```
\section{Supplementary materials}

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

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

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

2.12 Note about anonymous mode

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

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

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

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

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

2.13 Acknowledgments

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

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

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

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

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

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

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

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

Example:

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

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

2.14 Bibliography

The ACM lets you use either `BibTEX` or `BibLTEX` to process your references: they require slightly different setup of your `LTEX` 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 Bib \TeX styles other than `ACM-Reference-Format.bst`, and may delay the processing of the manuscript.

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

```
\citestyle{acmauthoryear}
```

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

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

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

One of the more common versions is

```
\setcitestyle{nosort}
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

and then encode the author as

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

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

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

2.14.2 Processing using Bib \LaTeX

You will find in this package two sets of style files for Bib \LaTeX , `acmnumeric` and `acmauthoryear`, that mimic the behavior of the `ACM-Reference-Format.bst` Bib \TeX style. They provide you access to all the power of Bib \LaTeX and already include support for advanced citation of software 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 \LaTeX instead of Bib \TeX , that we summarize briefly here (please refer to the official Bib \LaTeX documentation for more details).

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

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

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

Also in the preamble, you need to declare the bibliography sources files using the `\addbibresource` 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 \LaTeX styles.

2.15 Colors

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

The ACM provides the following recommendation on color use.

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

1. The most common type of inherited Color Vision Deficiency (CVD) is red-green (in which similar-brightness colors that differ only in their amounts of red or green are often confused), and it affects up to 8% of males and 0.5% of females of Northern European descent.
2. The most common type of acquired Color Vision Deficiency (CVD) is blue-yellow (including mild cases for many older adults).
3. Most printing is in black and white.

4. Situational impairments (e.g., bright sunlight shining on a mobile screen) tend to reduce the entire color gamut, reducing color discriminability.

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

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

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

2.15.1 Manual bibliography

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

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

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

2.16 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

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

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

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

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

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

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

2.17 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 typesetting 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
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCCH	ACM Journal on Computing and Cultural Heritage

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

Abbreviation	Publication
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
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems

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

Abbreviation	Publication
TOPML	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 \LaTeX 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.*)
`margintable` (*env.*)

sidebar: textual information in the margin,

marginfigure: a figure in the margin,

margintable: a table in the margin.

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

The horizontal sizes of figures are:

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

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 [2024/12/07 v2.11 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}
   We use xstring to check whether user input is valid
32 \RequirePackage{xstring}
   We need iftex to check the engine
33 \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@sigchiamodeffalse
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@sigchiamodetrue
225 \or % acmengage
226 \@ACM@journalfalse
227 \@ACM@engagetrue
228 \or % acmcp
229 \@ACM@journaltrue
230 \@ACM@acmcptrue
231 \AtBeginDocument{\@ACM@printacmreffalse}%
232 \fi
233 \if@ACM@journal
234 \@ACM@journal@bibstriptrue
235 \@ACM@journal@bibstrip@or@togtrue
236 \else
237 \@ACM@journal@bibstripfalse
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

\@ssect@kernel
242 \let\@ssect@kernel\@ssect

;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 % acsmall
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 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     notepsep={, }}}
```

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\@ssect#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

```


`\@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\@iiparbox\@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.

```

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

```

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

```

884 \let\liningnums\@undefined
885 \AtEndPreamble{%
886   \DeclareTextFontCommand{\liningnums}{\libertineLF}}

```

The SIGCHI extended abstracts are sans serif:

```

887 \if@ACM@sigchiamode
888   \renewcommand{\familydefault}{\sfdefault}
889 \fi

```

3.13 Image descriptions

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

```

890 \newif\if@Description@present
891 \@Description@presenttrue

```

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

```
892 \newif\if@undescrbed@images
893 \@undescrbed@imagesfalse
```

\Description The Description macro right now just sets switches

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

The global warning

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

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

```
897 \AtBeginEnvironment{figure}{\@Description@presentfalse
898 \let\@vspace\@vspace@orig
899 \let\@vspacer\@vspacer@orig}
900 \AtBeginEnvironment{figure*}{\@Description@presentfalse
901 \let\@vspace\@vspace@orig
902 \let\@vspacer\@vspacer@orig}
903 \AtEndEnvironment{figure}{\if@Description@present\else
904 \global\@undescrbed@imagestrue
905 \ClassWarning{\@classname}{A possible image without description}\fi}
906 \AtEndEnvironment{figure*}{\if@Description@present\else
907 \global\@undescrbed@imagestrue
908 \ClassWarning{\@classname}{A possible image without description}\fi}
909 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
910 \let\@vspacer\@vspacer@orig}
911 \AtBeginEnvironment{table*}{\let\@vspace\@vspace@orig
912 \let\@vspacer\@vspacer@orig}
913 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
914 \let\@vspacer\@vspacer@orig}
915 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
916 \let\@vspacer\@vspacer@orig}
917 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
918 \let\@vspacer\@vspacer@orig}
919 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
920 \let\@vspacer\@vspacer@orig}
921 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
922 \let\@vspacer\@vspacer@orig}
923 \AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig
924 \let\@vspacer\@vspacer@orig}
925 \AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig
926 \let\@vspacer\@vspacer@orig}
927 \AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig
928 \let\@vspacer\@vspacer@orig}
929 \AtBeginEnvironment{lstinputlisting}{\let\@vspace\@vspace@orig
930 \let\@vspacer\@vspacer@orig}
931 \AtBeginEnvironment{lstinputlisting*}{\let\@vspace\@vspace@orig
932 \let\@vspacer\@vspacer@orig}
933
```

3.14 Floats

We use the caption package

```
934 \RequirePackage{caption, float}
```



```

935 \captionsetup[table]{position=top}
936 \if@ACM@journal
937   \captionsetup{labelfont={sf, small},
938     textfont={sf, small}, margin=\z@}
939   \captionsetup[figure]{name={Fig.}}
940 \else
941   \captionsetup{labelfont={bf},
942     textfont={bf}, labelsep=colon, margin=\z@}
943   \ifcase\ACM@format@nr
944   \relax % manuscript
945   \or % acmsmall
946   \or % acmlarge
947   \or % acmtog
948   \or % sigconf
949   \or % siggraph
950     \captionsetup{textfont={it}}
951   \or % sigplan
952     \captionsetup{labelfont={bf},
953       textfont={normalfont}, labelsep=period, margin=\z@}
954   \or % sigchi
955     \captionsetup[figure]{labelfont={bf, small},
956       textfont={bf, small}}
957     \captionsetup[table]{labelfont={bf, small},
958       textfont={bf, small}}
959   \or % sigchi-a
960     \captionsetup[figure]{labelfont={bf, small},
961       textfont={bf, small}}
962     \captionsetup[table]{labelfont={bf, small},
963       textfont={bf, small}}
964   \or % acmengage
965   \or % acmcp
966   \fi
967 \fi

```

sidebar The sidebar environment:

```

968 \newfloat{sidebar}{}{sbar}
969 \floatname{sidebar}{Sidebar}
970 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}

```

\@sidebar The processing of the saved text

```

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

```

marginfigure The marginfigure environment:

```

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

```

\@marginfigure The processing of the saved text

```

975 \long\def\@marginfigure#1{\bgroup
976 \let\@vspace\@vspace@orig
977 \let\@vspacer\@vspacer@orig
978 \captionsetup{type=figure}%
979 \marginpar{\@Description@presentfalse\centering
980 \small#1\if@Description@present\else

```

```

981     \global\@undescribed@imagestrue
982     \ClassWarning{\@classname}{A possible image without description}
983     \fi}%
984 \egroup}

```

`\margintable` The `\margintable` environment:

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

`\@margintable` The processing of the saved text

```

986 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
987 \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
988 \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

```

989 \newdimen\fulltextwidth
990 \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)

```

991 \if@ACM@sigchiamode
992 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
993 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
994 \let\@endfloatbox\@endwidefloatbox
995 \def\@fpsaddefault{\def\@fps{tp}}%
996 \@float}
997 \fi

```

`\enddblfloat` And the end. Just adding a `\bgroup`.

```

998 \if@ACM@sigchiamode
999 \def\enddblfloat{%
1000 \endfloat\egroup}
1001 \fi

```

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

```

1002 \def\@endwidefloatbox{%
1003 \par\vskip\z@skip
1004 \@minipagefalse
1005 \outer@nobreak
1006 \egroup
1007 \color@endbox
1008 \global\setbox\@currbox=\vbox{\moveleft
1009 \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
1010 \wd\@currbox=\textwidth
1011 }

```

3.15 Lists

```

1012 \ifcase\ACM@format@nr
1013 \relax % manuscript
1014 \or % acmsmall

```

```

1015 \or % acmlarge
1016 \or % acmtog
1017 \or % sigconf
1018 \or % siggraph
1019 \or % sigplan
1020 \def\labelenumi{\theenumi.}
1021 \def\labelenumii{\theenumii.}
1022 \def\labelenumiii{\theenumiii.}
1023 \def\labelenumiv{\theenumiv.}
1024 \or % sigchi
1025 \or % sigchi-a
1026 \or % acmengage
1027 \or % acmcp
1028 \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`.

```

1029 \newdimen\@ACM@labelwidth
1030 \AtBeginDocument{%
1031   \setlength\labelsep{4pt}
1032   \setlength{\@ACM@labelwidth}{6.5pt}
1033
1034   %% First-level list: when beginning after the first line of an
1035   %% indented paragraph or ending before an indented paragraph, labels
1036   %% should not hang to the left of the preceding/following text.
1037   \setlength\leftmargini{\z@}
1038   \addtolength\leftmargini{\parindent}
1039   \addtolength\leftmargini{2\labelsep}
1040   \addtolength\leftmargini{\@ACM@labelwidth}
1041
1042   %% Second-level and higher lists.
1043   \setlength\leftmarginii{\z@}
1044   \addtolength\leftmarginii{0.5\labelsep}
1045   \addtolength\leftmarginii{\@ACM@labelwidth}
1046   \setlength\leftmarginiii{\leftmarginii}
1047   \setlength\leftmarginiv{\leftmarginiii}
1048   \setlength\leftmarginv{\leftmarginiv}
1049   \setlength\leftmarginvi{\leftmarginv}
1050   \listi}
1051 \newskip\listisep
1052 \listisep\smallskipamount
1053 \def\@listI{\leftmargin\leftmargini
1054   \labelwidth\leftmargini \advance\labelwidth-\labelsep
1055   \listparindent\z@
1056   \topsep\listisep}
1057 \let\@listi\@listI
1058 \def\@listii{\leftmargin\leftmarginii
1059   \labelwidth\leftmarginii \advance\labelwidth-\labelsep
1060   \topsep\z@skip}
1061 \def\@listiii{\leftmargin\leftmarginiii

```

```

1062 \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
1063 \def\@listiv{\leftmargin\leftmarginiv
1064 \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
1065 \def\@listv{\leftmargin\leftmarginv
1066 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
1067 \def\@listvi{\leftmargin\leftmarginvi
1068 \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
\descriptionlabel We do not use a colon by default like amsart does:
1069 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}

\description Make the description environment indentation consistent with that of the itemize
and enumerate environments.
1070 \renewenvironment{description}{\list{}}{%
1071 \labelwidth\@ACM@labelwidth
1072 \let\makelabel\descriptionlabel}%
1073 }{
1074 \endlist
1075 }
1076 \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.

```

1077 \newif\if@ACM@maketitle@typeset
1078 \@ACM@maketitle@typesetfalse

```

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

```

1079 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
1080 ACMJCSS,%
1081 CIE,%
1082 CSUR,%
1083 DGOV,%
1084 DLT,%
1085 DTRAP,%
1086 FAC,%
1087 GAMES,%
1088 HEALTH,%
1089 IMWUT,%
1090 JACM,%
1091 JATS,%
1092 JDIQ,%
1093 JDS,%
1094 JEA,%
1095 JERIC,%
1096 JETC,%
1097 JOCCH,%
1098 JRC,%
1099 PACMCGIT,%
1100 PACMHCI,%
1101 PACMMOD,%
1102 PACMNET,%
1103 PACMPL,%

```

1104 PACMSE,%
1105 POMACS,%
1106 TAAS,%
1107 TACCESS,%
1108 TACO,%
1109 TALG,%
1110 TALLIP,%
1111 TAP,%
1112 TCPS,%
1113 TDS,%
1114 TEAC,%
1115 TECS,%
1116 TELO,%
1117 THRI,%
1118 TIIS,%
1119 TIOT,%
1120 TISSEC,%
1121 TIST,%
1122 TKDD,%
1123 TMIS,%
1124 TOCE,%
1125 TOCHI,%
1126 TOCL,%
1127 TOCS,%
1128 TOCT,%
1129 TODAES,%
1130 TODS,%
1131 TOG,%
1132 TOIS,%
1133 TOIT,%
1134 TOMACS,%
1135 TOMM,%
1136 TOMPECS,%
1137 TOMS,%
1138 TOPC,%
1139 TOPLAS,%
1140 TOPML,%
1141 TOPS,%
1142 TORS,%
1143 TOS,%
1144 TOSEM,%
1145 TOSN,%
1146 TQC,%
1147 TRETTS,%
1148 TSAS,%
1149 TSC,%
1150 TSLP,%
1151 TWEB,%
1152 FACMP%
1153 }{%
1154 \ifcase\@journalCode@nr
1155 \relax % ACMJCSS
1156 \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
1157 \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%

```

1158 \def\@permissionCodeOne{2834-5533}%
1159 \def\@permissionCodeTwo{2834-5533}%
1160 \or % CIE
1161 \def\@journalName{ACM Computers in Entertainment}%
1162 \def\@journalNameShort{ACM Comput. Entertain.}%
1163 \def\@permissionCodeOne{1544-3574}%
1164 \or % CSUR
1165 \def\@journalName{ACM Computing Surveys}%
1166 \def\@journalNameShort{ACM Comput. Surv.}%
1167 \def\@permissionCodeOne{0360-0300}%
1168 \def\@permissionCodeTwo{1557-7341}%
1169 \or % DGOV
1170 \def\@journalName{Digital Government: Research and Practice}%
1171 \def\@journalNameShort{Digit. Gov. Res. Pract.}%
1172 \def\@permissionCodeOne{2639-0175}%
1173 \def\@permissionCodeTwo{2639-0175}%
1174 \or % DLT
1175 \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
1176 \def\@journalNameShort{Distrib. Ledger Technol.}%
1177 \def\@permissionCodeOne{2769-6472}%
1178 \def\@permissionCodeTwo{2769-6480}%
1179 \or % DTRAP
1180 \def\@journalName{Digital Threats: Research and Practice}%
1181 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1182 \def\@permissionCodeOne{2576-5337}%
1183 \def\@permissionCodeTwo{2576-5337}%
1184 \or % FAC
1185 \def\@journalName{Formal Aspects of Computing}%
1186 \def\@journalNameShort{Form. Asp. Comput.}%
1187 \def\@permissionCodeOne{0934-5043}%
1188 \def\@permissionCodeTwo{1433-299X}%
1189 \or % GAMES
1190 \def\@journalName{ACM Games: Research and Practice}%
1191 \def\@journalNameShort{ACM Games}%
1192 \def\@permissionCodeOne{2832-5516}%
1193 \def\@permissionCodeTwo{2832-5516}%
1194 \or % HEALTH
1195 \def\@journalName{ACM Transactions on Computing for Healthcare}%
1196 \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1197 \def\@permissionCodeOne{2637-8051}%
1198 \def\@permissionCodeTwo{2637-8051}%
1199 \or % IMWUT
1200 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1201 Wearable and Ubiquitous Technologies}%
1202 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
1203 \def\@permissionCodeOne{2474-9567}%
1204 \def\@permissionCodeTwo{2474-9567}%
1205 \@ACM@screentruer
1206 \PackageInfo{\classname}{Using screen mode due to \@journalCode}%
1207 \or % JACM
1208 \def\@journalName{Journal of the ACM}%
1209 \def\@journalNameShort{J. ACM}%
1210 \def\@permissionCodeOne{0004-5411}%
1211 \def\@permissionCodeTwo{1557-735X}%

```

```

1212 \or % JATS
1213 \def\@journalName{Journal on Autonomous Transportation Systems}%
1214 \def\@journalNameShort{ACM J. Auton. Transport. Syst.}%
1215 \def\@permissionCodeOne{2833-0528}%
1216 \def\@permissionCodeTwo{2833-0528}%
1217 \or % JDIQ
1218 \def\@journalName{ACM Journal of Data and Information Quality}%
1219 \def\@journalNameShort{ACM J. Data Inform. Quality}%
1220 \def\@permissionCodeOne{1936-1955}%
1221 \def\@permissionCodeTwo{1936-1963}%
1222 \or % JDS
1223 \def\@journalName{ACM/IMS Journal of Data Science}%
1224 \def\@journalNameShort{ACM/IMS J. Data Sci.}%
1225 \def\@permissionCodeOne{2831-3194}%
1226 \def\@permissionCodeTwo{2831-3194}%
1227 \or % JEA
1228 \def\@journalName{ACM Journal of Experimental Algorithmics}%
1229 \def\@journalNameShort{ACM J. Exp. Algor.}%
1230 \def\@permissionCodeOne{1084-6654}%
1231 \def\@permissionCodeTwo{1084-6654}%
1232 \or % JERIC
1233 \def\@journalName{ACM Journal of Educational Resources in Computing}%
1234 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
1235 \def\@permissionCodeOne{1073-0516}%
1236 \or % JETC
1237 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
1238 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1239 \def\@permissionCodeOne{1550-4832}%
1240 \def\@permissionCodeTwo{1550-4840}%
1241 \or % JOCCH
1242 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1243 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1244 \def\@permissionCodeOne{1556-4673}%
1245 \def\@permissionCodeTwo{1556-4711}%
1246 \or % JRC
1247 \def\@journalName{ACM Journal on Responsible Computing}%
1248 \def\@journalNameShort{ACM J. Responsib. Comput.}%
1249 \def\@permissionCodeOne{2832-0565}%
1250 \def\@permissionCodeTwo{2832-0565}%
1251 \or % PACMCGIT
1252 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1253 \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1254 \def\@permissionCodeOne{2577-6193}%
1255 \def\@permissionCodeTwo{2577-6193}%
1256 \@ACM@screentruer
1257 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1258 \or % PACMHCI
1259 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
1260 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
1261 \def\@permissionCodeOne{2573-0142}%
1262 \def\@permissionCodeTwo{2573-0142}%
1263 \@ACM@screentruer
1264 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1265 \or % PACMMOD

```

```

1266 \def\@journalName{Proceedings of the ACM on Management of Data}%
1267 \def\@journalNameShort{Proc. ACM Manag. Data}%
1268 \def\@permissionCodeOne{2836-6573}%
1269 \def\@permissionCodeTwo{2836-6573}%
1270 \or % PACMNET
1271 \def\@journalName{Proceedings of the ACM on Networkng}%
1272 \def\@journalNameShort{Proc. ACM Netw.}%
1273 \def\@permissionCodeOne{2834-5509}%
1274 \def\@permissionCodeTwo{2834-5509}%
1275 \or % PACMPL
1276 \def\@journalName{Proceedings of the ACM on Programming Languages}%
1277 \def\@journalNameShort{Proc. ACM Program. Lang.}%
1278 \def\@permissionCodeOne{2475-1421}%
1279 \def\@permissionCodeTwo{2475-1421}%
1280 \@ACM@screentruer
1281 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1282 \or % PACMSE
1283 \def\@journalName{Proceedings of the ACM on Software Engineering}%
1284 \def\@journalNameShort{Proc. ACM Softw. Eng.}%
1285 \def\@permissionCodeOne{2994-970X}%
1286 \def\@permissionCodeTwo{2994-970X}%
1287 \@ACM@screentruer
1288 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1289 \or % POMACS
1290 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1291 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1292 \def\@permissionCodeOne{2476-1249}%
1293 \def\@permissionCodeTwo{2476-1249}%
1294 \@ACM@screentruer
1295 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1296 \or % TAAS
1297 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
1298 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
1299 \def\@permissionCodeOne{1556-4665}%
1300 \def\@permissionCodeTwo{1556-4703}%
1301 \or % TACCESS
1302 \def\@journalName{ACM Transactions on Accessible Computing}%
1303 \def\@journalNameShort{ACM Trans. Access. Comput.}%
1304 \def\@permissionCodeOne{1936-7228}%
1305 \def\@permissionCodeTwo{1936-7236}%
1306 \or % TACO
1307 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1308 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1309 \def\@permissionCodeOne{1544-3566}%
1310 \def\@permissionCodeTwo{1544-3973}%
1311 \or % TALG
1312 \def\@journalName{ACM Transactions on Algorithms}%
1313 \def\@journalNameShort{ACM Trans. Algor.}%
1314 \def\@permissionCodeOne{1549-6325}%
1315 \def\@permissionCodeTwo{1549-6333}%
1316 \or % TALLIP
1317 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1318 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1319 \def\@permissionCodeOne{2375-4699}%

```



```

1320 \def\@permissionCodeTwo{2375-4702}%
1321 \or % TAP
1322 \def\@journalName{ACM Transactions on Applied Perception}%
1323 \def\@journalNameShort{ACM Trans. Appl. Percept.}%
1324 \def\@permissionCodeOne{1544-3558}%
1325 \def\@permissionCodeTwo{1544-3965}%
1326 \or % TCPS
1327 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1328 \def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%
1329 \def\@permissionCodeOne{2378-962X}%
1330 \def\@permissionCodeTwo{2378-9638}%
1331 \or % TDS
1332 \def\@journalName{ACM/IMS Transactions on Data Science}%
1333 \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
1334 \def\@permissionCodeOne{2577-3224}%
1335 \or % TEAC
1336 \def\@journalName{ACM Transactions on Economics and Computation}%
1337 \def\@journalNameShort{ACM Trans. Econ. Comput.}%
1338 \def\@permissionCodeOne{2167-8375}%
1339 \def\@permissionCodeTwo{2167-8383}%
1340 \or % TECS
1341 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
1342 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1343 \def\@permissionCodeOne{1539-9087}%
1344 \def\@permissionCodeTwo{1558-3465}%
1345 \or % TELO
1346 \def\@journalName{ACM Transactions on Evolutionary Learning and Optimization}%
1347 \def\@journalNameShort{ACM Trans. Evol. Learn. Optim.}%
1348 \def\@permissionCodeOne{2688-299X}%
1349 \def\@permissionCodeTwo{2688-3007}%
1350 \or % THRI
1351 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
1352 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1353 \def\@permissionCodeOne{2573-9522}%
1354 \def\@permissionCodeTwo{2573-9522}%
1355 \or % TIIS
1356 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
1357 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1358 \def\@permissionCodeOne{2160-6455}%
1359 \def\@permissionCodeTwo{2160-6463}%
1360 \or % TIOT
1361 \def\@journalName{ACM Transactions on Internet of Things}%
1362 \def\@journalNameShort{ACM Trans. Internet Things}%
1363 \def\@permissionCodeOne{2577-6207}%
1364 \def\@permissionCodeTwo{2577-6207}%
1365 \or % TISSEC
1366 \def\@journalName{ACM Transactions on Information and System Security}%
1367 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1368 \def\@permissionCodeOne{1094-9224}%
1369 \or % TIST
1370 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1371 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1372 \def\@permissionCodeOne{2157-6904}%
1373 \def\@permissionCodeTwo{2157-6912}%

```

```

1374 \or % TKDD
1375 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
1376 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1377 \def\@permissionCodeOne{1556-4681}%
1378 \def\@permissionCodeTwo{1556-472X}%
1379 \or % TMIS
1380 \def\@journalName{ACM Transactions on Management Information Systems}%
1381 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1382 \def\@permissionCodeOne{2158-656X}%
1383 \def\@permissionCodeTwo{2158-6578}%
1384 \or % TOCE
1385 \def\@journalName{ACM Transactions on Computing Education}%
1386 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
1387 \def\@permissionCodeOne{1946-6226}%
1388 \def\@permissionCodeTwo{1946-6226}%
1389 \or % TOCHI
1390 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1391 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1392 \def\@permissionCodeOne{1073-0516}%
1393 \def\@permissionCodeTwo{1557-7325}%
1394 \or % TOCL
1395 \def\@journalName{ACM Transactions on Computational Logic}%
1396 \def\@journalNameShort{ACM Trans. Comput. Logic}%
1397 \def\@permissionCodeOne{1529-3785}%
1398 \def\@permissionCodeTwo{1557-945X}%
1399 \or % TOCS
1400 \def\@journalName{ACM Transactions on Computer Systems}%
1401 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1402 \def\@permissionCodeOne{0734-2071}%
1403 \def\@permissionCodeTwo{1557-7333}%
1404 \or % TOCT
1405 \def\@journalName{ACM Transactions on Computation Theory}%
1406 \def\@journalNameShort{ACM Trans. Comput. Theory}%
1407 \def\@permissionCodeOne{1942-3454}%
1408 \def\@permissionCodeTwo{1942-3462}%
1409 \or % TODAES
1410 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1411 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1412 \def\@permissionCodeOne{1084-4309}%
1413 \def\@permissionCodeTwo{1557-7309}%
1414 \or % TODS
1415 \def\@journalName{ACM Transactions on Database Systems}%
1416 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
1417 \def\@permissionCodeOne{0362-5915}%
1418 \def\@permissionCodeTwo{1557-4644}%
1419 \or % TOG
1420 \def\@journalName{ACM Transactions on Graphics}%
1421 \def\@journalNameShort{ACM Trans. Graph.}%
1422 \def\@permissionCodeOne{0730-0301}%
1423 \def\@permissionCodeTwo{1557-7368}%
1424 \or % TOIS
1425 \def\@journalName{ACM Transactions on Information Systems}%
1426 \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1427 \def\@permissionCodeOne{1046-8188}%

```

```

1428 \def\@permissionCodeTwo{1558-2868}%
1429 \or % TOIT
1430 \def\@journalName{ACM Transactions on Internet Technology}%
1431 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1432 \def\@permissionCodeOne{1533-5399}%
1433 \def\@permissionCodeTwo{1557-6051}%
1434 \or % TOMACS
1435 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1436 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1437 \def\@permissionCodeOne{1049-3301}%
1438 \def\@permissionCodeTwo{1558-1195}%
1439 \or % TOMM
1440 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
1441 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1442 \def\@permissionCodeOne{1551-6857}%
1443 \def\@permissionCodeTwo{1551-6865}%
1444 \or % TOMPECS
1445 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1446 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1447 \def\@permissionCodeOne{2376-3639}%
1448 \def\@permissionCodeTwo{2376-3647}%
1449 \or % TOMS
1450 \def\@journalName{ACM Transactions on Mathematical Software}%
1451 \def\@journalNameShort{ACM Trans. Math. Softw.}%
1452 \def\@permissionCodeOne{0098-3500}%
1453 \def\@permissionCodeTwo{1557-7295}%
1454 \or % TOPC
1455 \def\@journalName{ACM Transactions on Parallel Computing}%
1456 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1457 \def\@permissionCodeOne{2329-4949}%
1458 \def\@permissionCodeTwo{2329-4957}%
1459 \or % TOPLAS
1460 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1461 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1462 \def\@permissionCodeOne{0164-0925}%
1463 \def\@permissionCodeTwo{1558-4593}%
1464 \or % TOPML
1465 \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
1466 \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
1467 \def\@permissionCodeOne{2836-8924}%
1468 \def\@permissionCodeTwo{2836-8924}%
1469 \or % TOPS
1470 \def\@journalName{ACM Transactions on Privacy and Security}%
1471 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1472 \def\@permissionCodeOne{2471-2566}%
1473 \def\@permissionCodeTwo{2471-2574}%
1474 \or % TORS
1475 \def\@journalName{ACM Transactions on Recommender Systems}%
1476 \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
1477 \def\@permissionCodeOne{2770-6699}%
1478 \def\@permissionCodeTwo{2770-6699}%
1479 \or % TOS
1480 \def\@journalName{ACM Transactions on Storage}%
1481 \def\@journalNameShort{ACM Trans. Storage}%

```

```

1482 \def\@permissionCodeOne{1553-3077}%
1483 \def\@permissionCodeTwo{1553-3093}%
1484 \or % TOSEM
1485 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1486 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1487 \def\@permissionCodeOne{1049-331X}%
1488 \def\@permissionCodeTwo{1557-7392}%
1489 \or % TOSN
1490 \def\@journalName{ACM Transactions on Sensor Networks}%
1491 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1492 \def\@permissionCodeOne{1550-4859}%
1493 \def\@permissionCodeTwo{1550-4867}%
1494 \or % TQC
1495 \def\@journalName{ACM Transactions on Quantum Computing}%
1496 \def\@journalNameShort{ACM Trans. Quantum Comput.}%
1497 \def\@permissionCodeOne{2643-6817}%
1498 \def\@permissionCodeTwo{2643-6817}%
1499 \or % TRET
1500 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1501 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1502 \def\@permissionCodeOne{1936-7406}%
1503 \def\@permissionCodeTwo{1936-7414}%
1504 \or % TSAS
1505 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1506 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1507 \def\@permissionCodeOne{2374-0353}%
1508 \def\@permissionCodeTwo{2374-0361}%
1509 \or % TSC
1510 \def\@journalName{ACM Transactions on Social Computing}%
1511 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1512 \def\@permissionCodeOne{2469-7818}%
1513 \def\@permissionCodeTwo{2469-7826}%
1514 \or % TSLP
1515 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1516 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1517 \def\@permissionCodeOne{1550-4875}%
1518 \def\@permissionCodeTwo{2329-9304}%
1519 \or % TWEB
1520 \def\@journalName{ACM Transactions on the Web}%
1521 \def\@journalNameShort{ACM Trans. Web}%
1522 \def\@permissionCodeOne{1559-1131}%
1523 \def\@permissionCodeTwo{1559-114X}%
1524 \else % FACMP, a dummy journal
1525 \def\@journalName{ACM Just Accepted}%
1526 \def\@journalNameShort{ACM Accepted}%
1527 \def\@permissionCodeOne{XXXX-XXXX}%
1528 \fi
1529 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1530 }{
1531 \ClassError{\@classname}{Incorrect journal #1}%
1532 }%

```

\acmJournal And the syntactic sugar around it

```

1533 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%

```

```

1534 \global\@ACM@journal@bibstriptrue
1535 \global\@ACM@journal@bibstrip@or@togtrue}

```

The defaults:

```

1536 \def\@journalCode@nr{0}
1537 \def\@journalName{}%
1538 \def\@journalNameShort{\@journalName}%
1539 \def\@permissionCodeOne{XXXX-XXXX}%
1540 \def\@permissionCodeTwo{\@permissionCodeOne}%

```

`\acmConference` This is the conference command

```

1541 \newcommand\acmConference[4][[]]{%
1542 \gdef\acmConference@shortname{#1}%
1543 \gdef\acmConference@name{#2}%
1544 \gdef\acmConference@date{#3}%
1545 \gdef\acmConference@venue{#4}%
1546 \ifx\acmConference@shortname\@empty
1547 \gdef\acmConference@shortname{#2}%
1548 \fi
1549 \global\@ACM@journal@bibstripfalse
1550 \ifx\@acmBooktitle\@empty\relax
1551 \acmBooktitle{Proceedings of \acmConference@name
1552 \ifx\acmConference@name\acmConference@shortname\else
1553 \ (\acmConference@shortname)\fi}%
1554 \fi
1555 }
1556 \if@ACM@journal\else
1557 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1558 DC, USA}%
1559 \fi

```

`\acmBooktitle` The book title of the conference:

```

\@acmBooktitle 1560 \def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
1561 \acmBooktitle{}

```

`\@editorsAbbrev` How to abbreviate editors

```

1562 \def\@editorsAbbrev{(Ed.)}

```

`\@acmEditors` The list of editors

```

1563 \def\@acmEditors{}

```

`\editor` Add a new editor to the list

```

1564 \def\editor#1{\ifx\@acmEditors\@empty
1565 \gdef\@acmEditors{#1}%
1566 \else
1567 \gdef\@editorsAbbrev{(Eds.)}%
1568 \g@addto@macro\@acmEditors{\and#1}%
1569 \fi}

```

`\subtitle` The subtitle macro

```

1570 \def\subtitle#1{\def\@subtitle{#1}}
1571 \subtitle{}

```

`\num@authorgroups` The total number of “groups”. Each group is several authors with the same affiliations(s)
 1572 `\newcount\num@authorgroups`
 1573 `\num@authorgroups=0\relax`

`\num@author` The total number of authors
 1574 `\newcount\num@author`
 1575 `\num@author=0\relax`

`\if@insideauthorgroup` Whether we are continuing an author group
 1576 `\newif\if@insideauthorgroup`
 1577 `\@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@author\endcsname`, which is defined by `\orcid` command.

```

1578 \renewcommand\author[2][{}%
1579 \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\@classname}{Do not put several
1580   authors in the same \string\author\space macro!}}{}%
1581 \global\advance\num@author by 1\relax
1582 \if@insideauthorgroup\else
1583   \global\advance\num@authorgroups by 1\relax
1584   \global\@insideauthorgrouptrue
1585 \fi
1586 \ifx\addresses@empty
1587   \if@ACM@anonymous
1588     \gdef\addresses{\@author{Anonymous Author(s)}%
1589       \ifx\@acmSubmissionID@empty\else\Submission Id:
1590         \@acmSubmissionID\fi}}%
1591     \gdef\authors{Anonymous Author(s)}%
1592   \else
1593     \expandafter\gdef\expandafter\addresses\expandafter{%
1594       \expandafter\@author\expandafter{%
1595         \csname typeset@author\the\num@author\endcsname{#2}}}%
1596     \gdef\authors{#2}%
1597   \fi
1598 \else
1599   \if@ACM@anonymous\else
1600     \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
1601       \expandafter\and\expandafter\@author\expandafter{%
1602         \csname typeset@author\the\num@author\endcsname{#2}}}%
1603     \g@addto@macro\authors{\and#2}%
1604   \fi
1605 \fi
1606 \if@ACM@anonymous
1607   \ifx\shortauthors@empty
1608     \gdef\shortauthors{Anon.
1609       \ifx\@acmSubmissionID@empty\else Submission Id:
1610         \@acmSubmissionID\fi}%
1611   \fi
1612 \else

```

```

1613 \def\@tempa{#1}%
1614 \ifx\@tempa\@empty
1615 \ifx\shortauthors\@empty
1616 \gdef\shortauthors{#2}%
1617 \else
1618 \g@addto@macro\shortauthors{\and#2}%
1619 \fi
1620 \else
1621 \ifx\shortauthors\@empty
1622 \gdef\shortauthors{#1}%
1623 \else
1624 \g@addto@macro\shortauthors{\and#1}%
1625 \fi
1626 \fi
1627 \fi}

```

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

```

1628 \newcommand{\affiliation}[2][{}]{%
1629 \global\@insideauthorgroupfalse
1630 \if@ACM@anonymous\else
1631 \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1632 \fi}

```

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

```

1633 \define@boolkey+{@ACM@affiliation@}{@ACM@affiliation@}{obeypunctuation}%
1634 [true]{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

```

`\additionalaffiliation` Additional affiliations go to footnotes

```

1635 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

```

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

```

1636 \def\@additionalaffiliation#1{\bgroup
1637 \def\position##1{\ignorespaces}%
1638 \def\institution##1{##1\ignorespaces}%
1639 \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1640 \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
1641 \let\city\position
1642 \let\state\position
1643 \let\country\position
1644 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.

```

1645 \renewcommand{\email}[2][{}]{%
1646 \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1647 addresses in the same \string\email\space macro!}}{}%
1648 \if@ACM@anonymous\else
1649 \g@addto@macro\addresses{\email{#1}{#2}}%
1650 \fi}

```

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

```

1651 \def\orcid#1{\unskip\ignorespaces%
1652 \IfBeginWith{#1}{http}{%
1653 \expandafter\gdef\csname
1654 typeset@author\the\num@authors\endcsname##1{%
1655 \href{#1}{##1}}}%
1656 \expandafter\gdef\csname
1657 typeset@author\the\num@authors\endcsname##1{%
1658 \href{https://orcid.org/#1}{##1}}}}

```

`\authorsaddresses` Setting up authors' addresses

```

1659 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1660 \authorsaddresses{\@mkauthorsaddresses}

```

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

```

1661 \newcommand\@mktranslatedkeywords[2]{\bgroup
1662 \selectlanguage{#1}%
1663 {\@specialsection{\keywordsname}%
1664 \noindent#2\par}\egroup}

```

`\@titlenotes` The title notes

```

1665 \def\@titlenotes{}

```

`\titlenote` Adding a note to the title

```

1666 \def\titlenote#1{%
1667 \g@addto@macro\@title{\footnotemark}%
1668 \if@ACM@anonymous
1669 \g@addto@macro\@titlenotes{%
1670 \stepcounter{footnote}\footnotetext{Title note}}%
1671 \else
1672 \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1673 \fi}

```

`\@subtitlenotes` The subtitle notes

```

1674 \def\@subtitlenotes{}

```

`\subtitlenote` Adding a note to the subtitle

```

1675 \def\subtitlenote#1{%
1676 \g@addto@macro\@subtitle{\footnotemark}%
1677 \if@ACM@anonymous
1678 \g@addto@macro\@subtitlenotes{%
1679 \stepcounter{footnote}\footnotetext{Subtitle note}}%
1680 \else
1681 \g@addto@macro\@subtitlenotes{%
1682 \stepcounter{footnote}\footnotetext{#1}}%
1683 \fi}

```

`\@authornotes` The author notes

```

1684 \def\@authornotes{}

```

`\authornote` Adding a note to the author

```

1685 \def\authornote#1{%
1686 \if@ACM@anonymous\else
1687 \g@addto@macro\addresses{\@authornotemark}%

```



```

1688     \g@addto@macro\@authornotes{%
1689         \stepcounter{footnote}\footnotetext{#1}}%
1690     \fi}

\authornotemark Adding a footnote mark to the authors
1691 \newcommand\authornotemark[1][\relax]{%
1692     \if@ACM@anonymous\else
1693         \ifx#1\relax\relax\relax
1694             \g@addto@macro\addresses{\@authornotemark}%
1695         \else
1696             \g@addto@macro\addresses{\@authornotemark{#1}}%
1697         \fi
1698     \fi}

\acmVolume The current volume
1699 \def\acmVolume#1{\def\@acmVolume{#1}}
1700 \acmVolume{1}

\acmNumber The current number
1701 \def\acmNumber#1{\def\@acmNumber{#1}}
1702 \acmNumber{1}

\acmArticle The current article
1703 \def\acmArticle#1{\def\@acmArticle{#1}}
1704 \acmArticle{}

\acmArticleSeq The sequence number
1705 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
1706 \acmArticleSeq{\@acmArticle}

\acmYear The current year
1707 \def\acmYear#1{\def\@acmYear{#1}}
1708 \acmYear{\the\year}

\acmMonth The current month
1709 \def\acmMonth#1{\def\@acmMonth{#1}}
1710 \acmMonth{\the\month}

\@acmPubDate The publication date
1711 \def\@acmPubDate{\ifcase\@acmMonth\or
1712     January\or February\or March\or April\or May\or June\or
1713     July\or August\or September\or October\or November\or
1714     December\fi~\@acmYear}

\acmPrice The price—obsolete
1715 \def\acmPrice#1{\ClassWarning{\@classname}{The macro \string\acmPrice
1716     is obsolete. ACM no longer prints the price in bibstrip.}}

\acmSubmissionID The submission ID
1717 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
1718 \acmSubmissionID{}

```

```

\acmISBN The book ISBN
1719 \def\acmISBN#1{\def\@acmISBN{#1}}
1720 \acmISBN{978-x-xxxx-xxxx-x/YYYY/MM}

\acmDOI The paper DOI
1721 \def\acmDOI#1{\def\@acmDOI{#1}}
1722 \acmDOI{10.1145/nnnnnnn.nnnnnnn}

\if@ACM@badge

\@ACM@badge@width The width of the badge
1723 \newlength\@ACM@badge@width
1724 \setlength\@ACM@badge@width{3pc}

\@ACM@title@width The width of the title
1725 \newlength\@ACM@title@width

\@ACM@badge@skip The spacing between badges
1726 \newlength\@ACM@badge@skip
1727 \setlength\@ACM@badge@skip{1pt}

\@acmBadgeR
1728 \def\@acmBadgeR{}

\@acmBadgeL
1729 \def\@acmBadgeL{}

\acmBadgeR Setting the right badge
1730 \newcommand\acmBadgeR[2][]{%
1731 \ifx\@acmBadgeR\@empty
1732 \gdef\@acmBadgeR{%
1733 \smash{%
1734 \raisebox{0.5\height}{%
1735 \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1736 \else
1737 \g@addto@macro{\@acmBadgeR}{%
1738 \hspace{\@ACM@badge@skip}%
1739 \smash{%
1740 \raisebox{0.5\height}{%
1741 \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1742 \fi}

\acmBadgeL Setting the left badge
1743 \newcommand\acmBadgeL[2][]{%
1744 \ifx\@acmBadgeL\@empty
1745 \gdef\@acmBadgeL{%
1746 \smash{%
1747 \raisebox{0.5\height}{%
1748 \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1749 \else
1750 \g@addto@macro{\@acmBadgeL}{%
1751 \hspace{\@ACM@badge@skip}%
1752 \smash{%

```

```

1753     \raisebox{0.5\height}{%
1754     \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1755 \fi}

\acmBadge Just a syntax sugar for \acmBadgeR
1756 \let\acmBadge=\acmBadgeR

\startPage The start page of the paper
1757 \def\startPage#1{\def\@startPage{#1}}
1758 \startPage{}

\terms Terms are obsolete. We use CCS now.
1759 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
1760     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.
1761 \def\keywords#1{\def\@keywords{#1}}
1762 \let\@keywords\@empty

1763 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty
1764     \ifnum\getrefnumber{TotPages}>2\relax
1765     \ClassWarningNoLine{\@classname}{ACM keywords are mandatory
1766     for papers over two pages}%
1767     \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
1768 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}}

\@saveabstract And saving the abstract
1769 \long\def\@saveabstract#1{\if@ACM@maketitle@typeset
1770     \ClassError{\@classname}{Abstract must be defined before maketitle
1771     command. Please move it!}\fi
1772     \long\gdef\@abstract{#1}}
1773 \@saveabstract{}

\@empty The long version of \@empty (to compare with \@abstract)
1774 \long\def\@empty{}

\if@ACM@printccs Whether to print CCS
1775 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
1776     \if@ACM@printccs
1777     \ClassInfo{\@classname}{Printing CCS}%
1778     \else
1779     \ClassInfo{\@classname}{Suppressing CCS}%
1780     \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}

\if@ACM@printacmref Whether to print the ACM bibstrip
1781 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1782     \if@ACM@printacmref
1783     \ClassInfo{\@classname}{Printing bibformat}%
1784     \else
1785     \ClassInfo{\@classname}{Suppressing bibformat}%
1786     \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}

```

```

1787 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
1788 \ifnum\getrefnumber{TotPages}>1\relax
1789 \ClassWarningNoLine{\@classname}{%
1790 ACM reference format is mandatory \MessageBreak
1791 for papers over one page. \MessageBreak
1792 Please add printacmref=true to the \MessageBreak
1793 \string\settopmatter\space command.}%
1794 \fi\fi\fi}

```

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

```

1795 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1796 \if@ACM@printfolios
1797 \ClassInfo{\@classname}{Printing folios}%
1798 \else
1799 \ClassInfo{\@classname}{Suppressing folios}%
1800 \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}

```

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

```

1801 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrow}[0]{%
1802 \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrow to
1803 #1}}{\ClassWarning{\@classname}{The parameter authorsperrow must be
1804 numerical. Ignoring the input #1}\gdef\@ACM@authorsperrow{0}}}

```

`\settopmatter` The usual syntactic sugar

```

1805 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

```

Now the settings

```

1806 \settopmatter{printccs=true, printacmref=true}
1807 \if@ACM@manuscript
1808 \settopmatter{printfolios=true}
1809 \else
1810 \if@ACM@journal
1811 \settopmatter{printfolios=true}
1812 \else
1813 \settopmatter{printfolios=false}
1814 \fi
1815 \fi
1816 \settopmatter{authorsperrow=0}

```

`\@received` The container for the paper history

```

1817 \def\@received{}

```

`\received` The `\received` command

```

1818 \newcommand\received[2][\def\@tempa{#1}%
1819 \ifx\@tempa\@empty
1820 \ifx\@received\@empty
1821 \gdef\@received{Received #2}%
1822 \else
1823 \g@addto@macro{\@received}{; revised #2}%
1824 \fi
1825 \else
1826 \ifx\@received\@empty
1827 \gdef\@received{#1 #2}%

```

```

1828     \else
1829         \g@addto@macro{\@received}{; #1 #2}%
1830     \fi
1831 \fi}
1832 \AtEndDocument{%
1833 \ifx\@received\@empty\else
1834     \par\bigskip\noindent{\small\normalfont\@received\par}%
1835 \fi}

```

`\acmArticleType` Article type. We set up the color.

```

1836 \define@choicekey+{ACM}{articletype}[\ACM@ArticleType\ACM@ArticleType@nr]{%
1837 Research,Review,Discussion,Invited,Position}[Review]{%
1838 \ifcase\ACM@ArticleType@nr
1839 \relax % Research
1840     \colorlet{@ACM@Article@color}{ACMBlue}%
1841 \or % Review
1842     \colorlet{@ACM@Article@color}{ACMOrange}%
1843 \or % Discussion
1844     \colorlet{@ACM@Article@color}{ACMGreen}%
1845 \or % Invited
1846     \colorlet{@ACM@Article@color}{ACMPurple}%
1847 \or % Position
1848     \colorlet{@ACM@Article@color}{ACMRed}%
1849 \fi
1850 }{%
1851 \ClassError{\@classname}{Article Type must be Research, Review,\MessageBreak
1852 Discussion, Invited, or Position}}
1853 \def\acmArticleType#1{\setkeys{ACM}{articletype=#1}}
1854 \if@ACM@acmcp
1855 \acmArticleType{Research}%
1856 \fi
1857

```

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

```

1858 \newenvironment{@ACM@color@frame}{%
1859 \def\FrameCommand{\hspace*{-6.5pc}}%
1860 \colorbox{@ACM@Article@color!10!white}}%
1861 \MakeFramed {\advance\hsize
1862 -6.5pc\relax\FrameRestore}}{\zsavesposy{@ACM@acmcpframe@y}}%
1863 \endMakeFramed}

```

`\acmCodeDataLink` The code link

```

1864 \def\acmCodeLink#1{%
1865 \ifx\@acmCodeDataLink\@empty
1866     \gdef\@acmCodeDataLink{\url{#1}}%
1867 \else
1868     \g@addto@macro{\@acmCodeDataLink}{\ \url{#1}}%
1869 \fi}
1870 \def\@acmCodeDataLink{}

```

`\acmContributions` The authors' contribution statement

```

1871 \def\acmContributions#1{\gdef\@acmContributions{#1}}
1872 \acmContributions{}

```

```
\acmDataLink The code link
1873 \let\acmDataLink\acmCodeLink
```

3.17 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```
1874 \RequirePackage{comment}
1875 \excludecomment{CCSXML}
```

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

```
1876 \let\@concepts\@empty
1877 \newcounter{@concepts}
```

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

```
1878 \newcommand\ccsdesc[2][100]{%
1879 \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!

```
1880 \def\textrightarrow{\rightarrow$}
1881 \def\ccsdesc@parse#1~#2~#3~{%
1882 \stepcounter{@concepts}%
1883 \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1884 \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1885 \textbf{#2}}%
1886 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{;}%
1887 \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1888 \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
1889 \csname CCS@Punctuation@#2\endcsname
1890 \csname CCS@Specific@#2\endcsname}%
1891 \fi
1892 \ifx#3\relax\relax\else
1893 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
1894 \textrightarrow\ }%
1895 \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1896 \addtocounter{@concepts}{-1}}%
1897 \ifnum#1>499\textbf{#3}\else
1898 \ifnum#1>299\textit{#3}\else
1899 #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
1900 \fi
1901 \ccsdesc@parse@finish}

1902 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\@empty\relax
1903 \ifnum\getrefnumber{TotPages}>2\relax
1904 \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
1905 for papers over two pages}%
1906 \fi\fi\fi}
```

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

```
1907 \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

```
1908 \newif\if@printcopyright
1909 \@printcopyrighttrue
```

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

```
1910 \newif\if@printpermission
1911 \@printpermissiontrue
```

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

```
1912 \newif\if@acmowned
1913 \@acmownedtrue
```

Keys:

```
1914 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1915 \acm@copyrightinput\acm@copyrightmode]{none,%
1916 acmcopyright,acmlicensed,rightsretained,%
1917 usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1918 licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
1919 iw3c2w3,iw3c2w3g,cc}{%
1920 \@printpermissiontrue
1921 \@printcopyrighttrue
1922 \@acmownedtrue
1923 \ifnum\acm@copyrightmode=0\relax % none
1924 \@printpermissionfalse
1925 \@printcopyrightfalse
1926 \@acmownedfalse
1927 \fi
1928 \ifnum\acm@copyrightmode=2\relax % acmlicensed
1929 \@acmownedfalse
1930 \fi
1931 \ifnum\acm@copyrightmode=3\relax % rightsretained
1932 \@acmownedfalse
1933 \fi
1934 \ifnum\acm@copyrightmode=4\relax % usgov
1935 \@printpermissiontrue
1936 \@printcopyrightfalse
1937 \@acmownedfalse
1938 \fi
1939 \ifnum\acm@copyrightmode=6\relax % cagov
1940 \@acmownedfalse
1941 \fi
1942 \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1943 \@acmownedfalse
1944 \fi
1945 \ifnum\acm@copyrightmode=9\relax % licensedcagov
1946 \@acmownedfalse
1947 \fi
1948 \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1949 \@acmownedfalse
1950 \fi
```

```

1951 \ifnum\acm@copyrightmode=11\relax % othergov
1952 \@acmownedtrue
1953 \fi
1954 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1955 \@acmownedfalse
1956 \fi
1957 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1958 \@acmownedfalse
1959 \fi
1960 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1961 \@acmownedfalse
1962 \fi
1963 \ifnum\acm@copyrightmode=15\relax % cc
1964 \@acmownedfalse
1965 \fi}

```

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

```

1966 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1967 \setcopyright{acmlicensed}

```

`\setcctype` The type of Creative Commons license used

```

1968 \newcommand\setcctype[2][4.0]{%
1969 \def\ACM@cc@version{#1}%
1970 \def\ACM@cc@type{#2}}
1971 \setcctype{by}

```

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

```

1972 \def\@copyrightowner{%
1973 \ifcase\acm@copyrightmode\relax % none
1974 \or % acmcopyright
1975 ACM\@.
1976 \or % acmlicensed
1977 Copyright held by the owner/author(s). Publication rights licensed to
1978 ACM\@.
1979 \or % rightsretained
1980 Copyright held by the owner/author(s).
1981 \or % usgov
1982 \or % usgovmixed
1983 Copyright held by the owner/author(s).
1984 \or % cagov
1985 Copyright Crown in Right of Canada.
1986 \or %cagovmixed
1987 Copyright held by the owner/author(s).
1988 \or %licensedusgovmixed
1989 Copyright held by the owner/author(s). Publication rights licensed to
1990 ACM\@.
1991 \or % licensedcagov
1992 Copyright held by the owner/author(s).
1993 \or %licensedcagovmixed
1994 Copyright held by the owner/author(s). Publication rights licensed to
1995 ACM\@.
1996 \or % othergov
1997 Copyright held by the owner/author(s).
1998 \or % licensedothergov

```


1999 Copyright held by the owner/author(s). Publication rights licensed to
2000 ACM\@.
2001 \or % ic2w3www
2002 IW3C2 (International World Wide Web Conference Committee), published
2003 under Creative Commons CC-BY~4.0 License.
2004 \or % ic2w3wwwgoogle
2005 IW3C2 (International World Wide Web Conference Committee), published
2006 under Creative Commons CC-BY-NC-ND~4.0 License.
2007 \or % cc
2008 Copyright held by the owner/author(s).
2009 \fi}

\@formatdoi Print a clickable DOI

2010 \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.

2011 \def\@copyrightpermission{%
2012 \ifcase\acm@copyrightmode\relax % none
2013 \or % acmcopyright
2014 Permission to make digital or hard copies of all or part of this
2015 work for personal or classroom use is granted without fee provided
2016 that copies are not made or distributed for profit or commercial
2017 advantage and that copies bear this notice and the full citation on
2018 the first page. Copyrights for components of this work owned by
2019 others than ACM must be honored. Abstracting with credit is
2020 permitted. To copy otherwise, or republish, to post on servers or
2021 to redistribute to lists, requires prior specific permission
2022 and\hspace*{.5pt}/or
2023 a fee. Request permissions from permissions@acm.org.
2024 \or % acmlicensed
2025 Permission to make digital or hard copies of all or part of this
2026 work for personal or classroom use is granted without fee provided
2027 that copies are not made or distributed for profit or commercial
2028 advantage and that copies bear this notice and the full citation on
2029 the first page. Copyrights for components of this work owned by
2030 others than the author(s) must be honored. Abstracting with credit
2031 is permitted. To copy otherwise, or republish, to post on servers
2032 or to redistribute to lists, requires prior specific permission
2033 and\hspace*{.5pt}/or a fee. Request permissions from
2034 permissions@acm.org.
2035 \or % rightsretained
2036 Permission to make digital or hard copies of all or part of this
2037 work for personal or classroom use is granted without fee provided
2038 that copies are not made or distributed for profit or commercial
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2135 (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
2136 disseminate the work on their personal and corporate Web sites with
2137 the appropriate attribution.

2138 \or % CC
2139 \IfEq{\ACM@cc@type}{zero}{%
2140 \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0}}{%
2141 \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version}}%
2142 \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\%
2143 \href{\ACM@CC@Url}{%
2144 This work is licensed under a Creative Commons
2145 \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}}{%
2146 \IfEq{\ACM@cc@type}{by}{Attribution}}{%
2147 \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}}{%
2148 \IfEq{\ACM@cc@type}{by-nd}{Attribution-NoDerivatives}}{%
2149 \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}}{%
2150 \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}}{%
2151 \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}}{%
2152 ~\IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}}%
2153 }
2154 License.}%

```

2155 \fi}

\copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
2156 \def\copyrightyear#1{\def\@copyrightyear{#1}}
2157 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container
2158 \def\@teaserfigures{}

teaserfigure The teaser figure
2159 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

\@saveteaser Saving the teaser
2160 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

\thanks We redefine amsart \thanks so the anonymous key works
2161 \renewcommand{\thanks}[1]{%
2162   \ifnotempty{#1}{%
2163     \if@ACM@anonymous
2164       \g@addto@macro\thankses{\thanks{A note}}%
2165     \else
2166       \g@addto@macro\thankses{\thanks{#1}}%
2167     \fi}}

\anon We provide \anon command, which obscures parts of the text if the package option
anonymous is set
2168 \newcommand{\anon}[2][ANONYMIZED]{%
2169   \if@ACM@anonymous%
2170     {\color{ACMOrange}#1}%
2171   \else%
2172     #2%
2173   \fi}

```

3.19 Maketitle hook

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

```

\@beginmaketitlehook The hook
2174 \ifx\@beginmaketitlehook\@undefined
2175   \let\@beginmaketitlehook\@empty
2176 \fi

\AtBeginMaketitle Adding to the hook
2177 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}

```

3.20 ACM Engage top matter

```

\@acmengagemetadadata The special metadata for ACM engage course materials
2178 \def\@acmengagemetadadata{}

\setengagemetadadata Adding topic to engage metadata
2179 \def\setengagemetadadata#1#2{%
2180   \g@addto@macro{\@acmengagemetadadata}{%
2181     \@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⟩]`.

```
2182 \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.

```
2183 \def\maketitle{\@beginmaketitlehook
2184 \@ACM@maketitle@typesettrue
2185 \if@ACM@anonymous
2186 % Anonymize omission of \author-s
2187 \ifnum\num@authorgroups=0\author{ }\fi
2188 \fi
2189 \begingroup
2190 \let\@vspace\@vspace@orig
2191 \let\@vspacer\@vspacer@orig
2192 \let\@footnotemark\@footnotemark@nolink
2193 \let\@footnotetext\@footnotetext@nolink
2194 \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
2195 \hsize=\textwidth
2196 \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
2197 \mktitle\if@ACM@sigchiamode\else\mkauthors\fi\mkteasers
2198 \@printtopmatter
2199 \if@ACM@sigchiamode\mkauthors\fi
2200 \setcounter{footnote}{0}%
2201 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
2202 \@titlenotes
2203 \@subtitlenotes
2204 \@authornotes
2205 \let\@makefnmark\relax
2206 \let\@thefnmark\relax
2207 \let\@makefntext\noindent
2208 \ifx\@empty\thankses\else
2209 \footnotetextauthorsaddresses{%
2210 \def\par{\let\par\@par}\parindent\z@\@setthanks}%
2211 \fi
2212 \if@ACM@acmcp\else
2213 \ifx\@empty\@authorsaddresses\else
2214 \if@ACM@anonymous\else
2215 \if@ACM@journal@bibstrip@or@tog
2216 \footnotetextauthorsaddresses{%
2217 \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2218 \fi
2219 \fi
2220 \fi
2221 \fi
2222 \if@ACM@nonacm
2223 \ifnum\acm@copyrightmode=15\relax % cc
2224 \footnotetextcopyrightpermission{\@copyrightpermission}%
```

```

2225 \fi
2226 \else
2227 \if@ACM@acmcp\else
2228 \footnotetextcopyrightpermission{%
2229 \if@ACM@authordraft
2230 \raisebox{-2ex}[\z@][\z@]{\makebox[0pt][l]{\large\bfseries
2231 Unpublished working draft. Not for distribution.}}%
2232 \color[gray]{0.9}%
2233 \fi
2234 \parindent\z@\parskip0.1\baselineskip
2235 \if@ACM@authorversion\else
2236 \if@printpermission\@copyrightpermission\par\fi
2237 \fi
2238 \if@ACM@manuscript\else
2239 \if@ACM@journal@bibstrip\else % Print the conference information
2240 \if@ACM@engage
2241 {\itshape \@acmBooktitle, \@acmYear.}\par
2242 \else
2243 {\itshape \acmConference@shortname, \acmConference@venue}\par
2244 \fi
2245 \fi
2246 \fi
2247 \if@printcopyright
2248 \copyright\ \@copyrightyear\ \@copyrightowner\
2249 \else
2250 \@copyrightyear.\
2251 \fi
2252 \if@ACM@manuscript
2253 Manuscript submitted to ACM\
2254 \else
2255 \if@ACM@authorversion
2256 This is the author's version of the work. It is posted here for
2257 your personal use. Not for redistribution. The definitive Version
2258 of Record was published in
2259 \if@ACM@journal@bibstrip
2260 \emph{\@journalName}%
2261 \else
2262 \emph{\@acmBooktitle}%
2263 \fi
2264 \ifx\@acmDOI\@empty
2265 .
2266 \else
2267 , \@formatdoi{\@acmDOI}.
2268 \fi\
2269 \else
2270 \if@ACM@nonacm\else
2271 \if@ACM@journal@bibstrip
2272 ACM~\@permissionCodeTwo/\@acmYear/\@acmMonth-ART\@acmArticle\
2273 \@formatdoi{\@acmDOI}%
2274 \else % Conference
2275 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN\\\fi
2276 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
2277 \fi
2278 \fi

```

```

2279     \fi
2280     \fi}%
2281     \fi
2282     \fi
2283 \endgroup
2284 \if@ACM@engage\@typesetengagemetadata\fi
2285 \setcounter{footnote}{0}%
2286 \@mkabstract
2287 \ifx\@translatedabstracts\@empty\else
2288 \@translatedabstracts\fi
2289 \if@ACM@printccs
2290 \ifx\@concepts\@empty\else\bgroup
2291     {\@specialsection{CCS Concepts}%
2292     \noindent\@concepts\par}\egroup
2293     \fi
2294 \fi
2295 \if@ACM@acmcp\else
2296     \ifx\@keywords\@empty\else\bgroup
2297         {\@specialsection{\keywordsname}%
2298         \noindent\@keywords\par}\egroup
2299         \fi
2300     \ifx\@translatedkeywords\@empty\else
2301         \@translatedkeywords
2302     \fi
2303 \fi
2304 \let\metadata@authors=\authors
2305 \nxandlist{, }{, }{\, }\metadata@authors
2306 \def\@ACM@checkaffil{}%
2307 \hypersetup{%
2308     pdfauthor={\metadata@authors},
2309     pdftitle={\@title},
2310     pdfsubject={\@concepts},
2311     pdfkeywords={\@keywords},
2312     pdfcreator={LaTeX with acmart
2313         \csname ver@\@classname.cls\endcsname\space
2314         and hyperref
2315         \csname ver@hyperref.sty\endcsname}}%
2316 \andify\authors
2317 \andify\shortauthors
2318 \global\let\authors=\authors
2319 \global\let\shortauthors=\shortauthors
2320 \if@ACM@printacmref
2321     \@mkbibcitation
2322 \fi
2323 \global\@topnum\z@ % this prevents floats from falling
2324                 % at the top of page 1
2325 \global\@botnum\z@ % we do not want them to be on the bottom either
2326 \@printendtopmatter
2327 \@afterindentfalse
2328 \@afterheading
2329 \if@ACM@acmcp
2330     \set@ACM@acmcpbox
2331     \AtEndDocument{\end@ACM@color@frame}%
2332     \@ACM@color@frame

```

```

2333 \fi
2334 }

\set@ACM@acmcpbox Setting infobox for acmcp
2335 \newbox\@ACM@acmcpbox
2336 \def\set@ACM@acmcpbox{%
2337 \bgroup
2338 \hsize=5pc
2339 \global\setbox\@ACM@acmcpbox=\vbox{%
2340 \setlength{\parindent}{\z@}%
2341 {\includegraphics[width=\hsize]{acm-jdslogo}\par}%
2342 \scriptsize
2343 \ifnum\getrefnumber{TotPages}>1\else
2344 \zrefused{@ACM@acmcpbox@y}%
2345 \zrefused{@ACM@acmcpframe@y}%
2346 \@tempdima=\dimexpr\zposy{@ACM@acmcpbox@y}sp -
2347 \zposy{@ACM@acmcpframe@y}sp+0.3\FrameSep+
2348 \@ACM@acmcp@delta\relax
2349 \ifdim\@tempdima>0pt\relax
2350 \vspace*{\@tempdima}%
2351 \protected@write\@auxout{%
2352 {\string\global\@ACM@acmcp@delta=\the\@tempdima\relax}%
2353 \fi
2354 \fi
2355 \ifx\@acmCodeDataLink\@empty\else\bigskip
2356 Code and data links:\\ \@acmCodeDataLink\par\bigskip
2357 \fi
2358 \ifx\@keywords\@empty\else\bigskip
2359 Keywords: \@keywords\par
2360 \fi
2361 \ifx\@acmContributions\@empty\else\bigskip
2362 \@acmContributions\par
2363 \fi
2364 \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
2365 \zsaveposy{@ACM@acmcpbox@y}%
2366 }
2367 \egroup}

\@specialsection This macro starts sections for proceedings and uses \small for journals
2368 \def\@specialsection#1{%
2369 \let\@vspace\@vspace@orig
2370 \let\@vspacer\@vspacer@orig
2371 \ifcase\ACM@format@nr
2372 \relax % manuscript
2373 \par\medskip\small\noindent#1: %
2374 \or % acmsmall
2375 \par\medskip\small\noindent#1: %
2376 \or % acmlarge
2377 \par\medskip\small\noindent#1: %
2378 \or % acmtog
2379 \par\medskip\small\noindent#1: %
2380 \or % sigconf
2381 \section*{#1}%
2382 \or % siggraph

```



```

2383   \section*{#1}%
2384   \or % sigplan
2385     \noindentparagraph*{#1:~}%
2386   \or % sigchi
2387     \section*{#1}%
2388   \or % sigchi-a
2389     \section*{#1}%
2390   \or % acmengage
2391     \section*{#1}%
2392   \or % acmcp
2393     \section*{#1}%
2394   \fi
2395   \let\@vspace\@vspace@acm
2396   \let\@vspacer\@vspacer@acm
2397 }

```

\@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.

```

2398 \def\@printtopmatter{%
2399   \ifx\@startPage\@empty
2400     \gdef\@startPage{1}%
2401   \else
2402     \setcounter{page}{\@startPage}%
2403   \fi
2404   \@tempdima=\ht\mktitle@bx
2405   \advance\@tempdima by \dp\mktitle@bx
2406   \ifdim\@tempdima>0.9\textheight
2407     \loop
2408       \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
2409       \thispagestyle{firstpagestyle}%
2410       \noindent\unvbox\@tempboxa
2411       \clearpage
2412       \@tempdima=\ht\mktitle@bx
2413       \advance\@tempdima by \dp\mktitle@bx
2414       \ifdim\@tempdima>0.9\textheight\repeat
2415   \fi
2416   \thispagestyle{firstpagestyle}%
2417   \noindent
2418   \ifcase\ACM@format@nr
2419     \relax % manuscript
2420     \box\mktitle@bx\par
2421   \or % acmsmall
2422     \box\mktitle@bx\par
2423   \or % acmlarge
2424     \box\mktitle@bx\par
2425   \or % acmtog
2426     \twocolumn[\box\mktitle@bx]%
2427   \or % sigconf
2428     \twocolumn[\box\mktitle@bx]%
2429   \or % siggraph
2430     \twocolumn[\box\mktitle@bx]%
2431   \or % sigplan

```

```

2432   \twocolumn[\box\mktitle@bx]%
2433   \or % sigchi
2434   \twocolumn[\box\mktitle@bx]%
2435   \or % sigchi-a
2436   \par\box\mktitle@bx\par\bigskip
2437   \or % acmengage
2438   \twocolumn[\box\mktitle@bx]%
2439   \or % acmcp
2440   \box\mktitle@bx\par
2441   \fi
2442 }

```

`\@mktitle` The title of the article

```

2443 \def\@mktitle{%
2444   \ifcase\ACM@format@nr
2445   \relax % manuscript
2446   \@mktitle@i
2447   \or % acmsmall
2448   \@mktitle@i
2449   \or % acmlarge
2450   \@mktitle@i
2451   \or % acmtog
2452   \@mktitle@i
2453   \or % sigconf
2454   \@mktitle@iii
2455   \or % siggraph
2456   \@mktitle@iii
2457   \or % sigplan
2458   \@mktitle@iii
2459   \or % sigchi
2460   \@mktitle@iii
2461   \or % sigchi-a
2462   \@mktitle@iv
2463   \or % acmengage
2464   \@mktitle@iii
2465   \or % acmcp
2466   \@mktitle@i
2467   \fi
2468 }

```

`\@titlefont` The font to typeset the title

```

2469 \def\@titlefont{%
2470   \ifcase\ACM@format@nr
2471   \relax % manuscript
2472   \LARGE\sffamily\bfseries
2473   \or % acmsmall
2474   \LARGE\sffamily\bfseries
2475   \or % acmlarge
2476   \LARGE\sffamily\bfseries
2477   \or % acmtog
2478   \Huge\sffamily
2479   \or % sigconf
2480   \Huge\sffamily\bfseries
2481   \or % siggraph

```

```

2482 \Huge\sffamily\bfseries
2483 \or % sigplan
2484 \Huge\bfseries
2485 \or % sigchi
2486 \Huge\sffamily\bfseries
2487 \or % sigchi-a
2488 \Huge\bfseries
2489 \or % acmengage
2490 \Huge\sffamily\bfseries
2491 \or % acmcp
2492 \LARGE\sffamily\bfseries
2493 \fi}

```

`\@subtitlefont` The font to typeset the subtitle

```

2494 \def\@subtitlefont{\normalsize
2495 \ifcase\ACM@format@nr
2496 \relax % manuscript
2497 \mdseries
2498 \or % acmsmall
2499 \mdseries
2500 \or % acmlarge
2501 \mdseries
2502 \or % acmtog
2503 \LARGE
2504 \or % sigconf
2505 \LARGE\mdseries
2506 \or % siggraph
2507 \LARGE\mdseries
2508 \or % sigplan
2509 \LARGE\mdseries
2510 \or % sigchi
2511 \LARGE\mdseries
2512 \or % sigchi-a
2513 \mdseries
2514 \or % acmengage
2515 \LARGE\mdseries
2516 \or % acmcp
2517 \mdseries
2518 \fi}

```

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

```

2519 \def\@mktitle@i{\hsize=\textwidth
2520 \if@ACM@acmcp
2521 \advance\hsize by -6pc%
2522 \fi
2523 \@ACM@title@width=\hsize
2524 \setbox\mktitle@bx=\vbox{\noindent\@titlefont
2525 \parbox[t]{\@ACM@title@width}{\raggedright
2526 \@titlefont\noindent
2527 \@title\@translatedtitle%
2528 \ifx\@subtitle\@empty\else
2529 \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
2530 \fi}%
2531 \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.

```
2532 \def\mktitle@iii{\hsize=\textwidth
2533   \setbox\mktitle@bx=\vbox{\@titlefont\centering
2534     \@ACM@title@width=\hsize
2535     \parbox[t]{\@ACM@title@width}{\centering\@titlefont
2536       \@title\@translatedtitle%
2537       \ifx\@subtitle\@empty\else
2538         \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
2539       \fi
2540     }%
2541   \par\bigskip}}%
```

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

```
2542 \def\mktitle@iv{\hsize=\textwidth
2543   \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
2544     \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
2545     \noindent\@title\@translatedtitle%
2546     \ifx\@subtitle\@empty\else
2547       \par\noindent\@subtitlefont\@subtitle\@translatedsubtitle%
2548     \fi
2549   \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.

```
2550 \newbox\@ACM@commabox
2551 \def\@ACM@addtoaddress#1{%
2552   \ifvmode\else
2553     \if@ACM@affiliation@obeypunctuation\else
2554       \setbox\@ACM@commabox=\hbox{, }%
2555       \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
2556     \fi\fi
2557   #1}
```

`\institution` Theoretically we can define the macros for `\affiliation` inside the `\mkauthors`-style `\position` 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 2558 \def\streetaddress#1{\ClassWarning{\@classname}{ACM no longer collects
  \city 2559 authors' postal addresses. I am ignoring your street
  \state 2560 address}\unskip\ignorespaces}
\postcode 2561 \def\postcode#1{\ClassWarning{\@classname}{ACM no longer collects
  \country 2562 authors' postal addresses. I am ignoring your postal
  2563 code}\unskip\ignorespaces}
2564 \if@ACM@journal
2565 \def\position#1{\unskip\ignorespaces}
```

```

2566 \def\institution#1{\global\@ACM@instpresenttrue
2567 \unskip~#1\ignorespaces}
2568 \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
2569 \def\state#1{\unskip\ignorespaces}
2570 \newcommand\department[2][0]{\unskip\ignorespaces}
2571 \def\country#1{\StrDel{#1}{ }[\@tempa]%
2572 \ifx\@tempa\@empty\else
2573 \global\@ACM@countrypresenttrue\fi
2574 \if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
2575 \else
2576 \def\position#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
2577 \def\institution#1{\global\@ACM@instpresenttrue
2578 \if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
2579 \newcommand\department[2][0]{\if@ACM@affiliation@obeypunctuation
2580 #2\else#2\par\fi}%
2581 \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
2582 \let\state\@ACM@addtoaddress
2583 \def\country#1{\global\@ACM@countrypresenttrue\@ACM@addtoaddress{#1}}%
2584 \fi

```

\@mkauthors Typesetting the authors

```

2585 \def\@mkauthors{\begingroup
2586 \hsize=\textwidth
2587 \ifcase\ACM@format@nr
2588 \relax % manuscript
2589 \@mkauthors@i
2590 \or % acsmall
2591 \@mkauthors@i
2592 \or % acmlarge
2593 \@mkauthors@i
2594 \or % acmtog
2595 \@mkauthors@i
2596 \or % sigconf
2597 \@mkauthors@iii
2598 \or % siggraph
2599 \@mkauthors@iii
2600 \or % sigplan
2601 \@mkauthors@iii
2602 \or % sigchi
2603 \@mkauthors@iii
2604 \or % sigchi-a
2605 \@mkauthors@iv
2606 \or % acmengage
2607 \@mkauthors@iii
2608 \or % acmcp
2609 \@mkauthors@i
2610 \fi
2611 \endgroup
2612 }

```

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

```

2613 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```
2614 \def\@affiliationfont{\normalsize\normalfont}
```

Adjusting fonts for different formats

```
2615 \ifcase\ACM@format@nr
2616 \relax % manuscript
2617 \or % acmsmall
2618 \def\@authorfont{\large\sffamily}
2619 \def\@affiliationfont{\small\normalfont}
2620 \or % acmlarge
2621 \or % acmtog
2622 \def\@authorfont{\LARGE\sffamily}
2623 \def\@affiliationfont{\large}
2624 \or % sigconf
2625 \def\@authorfont{\LARGE}
2626 \def\@affiliationfont{\large}
2627 \or % siggraph
2628 \def\@authorfont{\normalsize\normalfont}
2629 \def\@affiliationfont{\normalsize\normalfont}
2630 \or % sigplan
2631 \def\@authorfont{\Large\normalfont}
2632 \def\@affiliationfont{\normalsize\normalfont}
2633 \or % sigchi
2634 \def\@authorfont{\bfseries}
2635 \def\@affiliationfont{\mdseries}
2636 \or % sigchi-a
2637 \def\@authorfont{\bfseries}
2638 \def\@affiliationfont{\mdseries}
2639 \or % acmengage
2640 \def\@authorfont{\LARGE}
2641 \def\@affiliationfont{\large}
2642 \or % acmcp
2643 \def\@authorfont{\large\sffamily}
2644 \def\@affiliationfont{\small\normalfont}
2645 \fi
```

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

```
2646 \def\@typeset@author@line{%
2647 \andify\@currentauthors\par\noindent
2648 \@currentauthors\def\@currentauthors{}%
2649 \ifx\@currentaffiliations\@empty\else
2650 \andify\@currentaffiliations
2651 \unskip, {\@currentaffiliations}\par
2652 \fi
2653 \def\@currentaffiliations{}}
```

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

```
2654 \newif\if@ACM@instpresent
2655 \@ACM@instpresenttrue
```

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

```
2656 \newif\if@ACM@citypresent
2657 \@ACM@citypresenttrue
```

```

\if@ACM@countrypresent Whether the given affiliation has country
2658 \newif\if@ACM@countrypresent
2659 \@ACM@countrypresenttrue

\@ACM@resetaffil Reset affiliation flags
2660 \def\@ACM@resetaffil{%
2661 \global\@ACM@instpresentfalse
2662 \global\@ACM@citypresentfalse
2663 \global\@ACM@countrypresentfalse
2664 }

\@ACM@checkaffil Check affiliation flags
2665 \def\@ACM@checkaffil{%
2666 \if@ACM@instpresent\else
2667 \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
2668 \fi
2669 \if@ACM@citypresent\else
2670 \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
2671 \fi
2672 \if@ACM@countrypresent\else
2673 \ClassError{\@classname}{No country present for an affiliation}{ACM
2674 requires each author to indicate their country using country macro.}%
2675 \fi
2676 }

\@mkauthors@i This version is used in most journal formats. Note that \and between authors with the
same affiliation becomes _and_:
2677 \def\@mkauthors@i{%
2678 \def\@currentauthors{}%
2679 \def\@currentaffiliations{}%
2680 \global\let\and\@typeset@author@line
2681 \def\@author##1{%
2682 \ifx\@currentauthors@empty
2683 \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
2684 \else
2685 \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
2686 \fi
2687 \gdef\and{}}%
2688 \def\email##1##2{%
2689 \def\affiliation##1##2{%
2690 \def\@tempa{##2}\ifx\@tempa@empty\else
2691 \ifx\@currentaffiliations@empty
2692 \gdef\@currentaffiliations{%
2693 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2694 \setkeys{@ACM@affiliation@}{##1}%
2695 \@ACM@resetaffil
2696 \@affiliationfont##2\@ACM@checkaffil}%
2697 \else
2698 \g@addto@macro{\@currentaffiliations}{\and
2699 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2700 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2701 ##2\@ACM@checkaffil}%
2702 \fi

```

```

2703   \fi
2704   \global\let\and\@typeset@author@line}%
2705 \if@ACM@acmcp
2706   \advance\hsize by -6pc%
2707 \fi
2708 \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
2709   \noindent\addresses\@typeset@author@line
2710   \par\medskip}%
2711 }

```

`\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

```
2712 \newbox\author@bx
```

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

```
2713 \newdimen\author@bx@wd
```

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

```
2714 \newskip\author@bx@sep
2715 \author@bx@sep=1pc\relax
```

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

```

2716 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd
2717   \def\and{\par}\normalbaselines
2718   \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2719     \@authorfont\@currentauthors\par\@affiliationfont
2720     \@currentaffiliation}\egroup
2721   \box\author@bx\hspace{\author@bx@sep}%
2722   \gdef\@currentauthors{}}%
2723   \gdef\@currentaffiliation{}}

```

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

```
2724 \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.

```

2725 \author@bx@wd=\textwidth\relax
2726 \advance\author@bx@wd by -\author@bx@sep\relax
2727 \ifnum\@ACM@authorsperrow>0\relax
2728   \divide\author@bx@wd by \@ACM@authorsperrow\relax
2729 \else
2730   \ifcase\@num@authorgroups
2731     \relax % 0?
2732     \or % 1=one author per row
2733     \or % 2=two authors per row
2734       \divide\author@bx@wd by \@num@authorgroups\relax
2735     \or % 3=three authors per row
2736       \divide\author@bx@wd by \@num@authorgroups\relax
2737     \or % 4=two authors per row (!)
2738       \divide\author@bx@wd by 2\relax

```



```

2739 \else % three authors per row
2740 \divide\author@bx@wd by 3\relax
2741 \fi
2742 \fi
2743 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2744 \gdef\@currentauthors{}%
2745 \gdef\@currentaffiliation{}%
2746 \def\@author##1{\ifx\@currentauthors\@empty
2747 \gdef\@currentauthors{\par##1}%
2748 \else
2749 \g@addto@macro\@currentauthors{\par##1}%
2750 \fi
2751 \gdef\and{}}%
2752 \def\email##1##2{\ifx\@currentaffiliation\@empty
2753 \gdef\@currentaffiliation{\bgroup
2754 \mathchardef\UrbreakPenalty=10000\nolinkurl{##2}\egroup}%
2755 \else
2756 \g@addto@macro\@currentaffiliation{\par\bgroup
2757 \mathchardef\UrbreakPenalty=10000\nolinkurl{##2}\egroup}%
2758 \fi}%
2759 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2760 \gdef\@currentaffiliation{%
2761 \setkeys{@ACM@affiliation@}{obypunctuation=false}%
2762 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2763 ##2\@ACM@checkaffil}%
2764 \else
2765 \g@addto@macro\@currentaffiliation{\par
2766 \setkeys{@ACM@affiliation@}{obypunctuation=false}%
2767 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2768 ##2\@ACM@checkaffil}%
2769 \fi
2770 \global\let\and\@typeset@author@bx
2771 }%

```

Actual typesetting is done by the \and macro:

```

2772 \hsize=\textwidth
2773 \global\setbox\mktitle@bx=\vbox{\noindent
2774 \unvbox\mktitle@bx\par\medskip\leavevmode
2775 \lineskip=1pc\relax\centering\hspace*{-1em}%
2776 \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.

```

2777 \def\@mkauthors@iv{%

```

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

```

2778 \author@bx@wd=\columnwidth\relax
2779 \advance\author@bx@wd by -\author@bx@sep\relax
2780 \ifnum\@ACM@authorsperrow>0\relax
2781 \divide\author@bx@wd by \@ACM@authorsperrow\relax

```

```

2782 \else
2783 \ifcase\num@authorgroups
2784 \relax % 0?
2785 \or % 1=one author per row
2786 \else % 2=two authors per row
2787 \divide\author@bx@wd by 2\relax
2788 \fi
2789 \fi
2790 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2791 \gdef\@currentauthors{}%
2792 \gdef\@currentaffiliation{}%
2793 \def\@author##1{\ifx\@currentauthors\@empty
2794 \gdef\@currentauthors{\par##1}%
2795 \else
2796 \g@addto@macro\@currentauthors{\par##1}%
2797 \fi
2798 \gdef\and{}}%
2799 \def\email##1##2{\ifx\@currentaffiliation\@empty
2800 \gdef\@currentaffiliation{\nolinkurl{##2}}%
2801 \else
2802 \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2803 \fi}%
2804 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2805 \gdef\@currentaffiliation{%
2806 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2807 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2808 ##2\@ACM@checkaffil}%
2809 \else
2810 \g@addto@macro\@currentaffiliation{\par
2811 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2812 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2813 ##2\@ACM@checkaffil}%
2814 \fi
2815 \global\let\and\@typeset@author@bx}%
2816 %

```

Actual typesetting is done by the \and macro

```

2817 \bgroup\hsize=\columnwidth
2818 \par\raggedright\leftskip=\z@
2819 \lineskip=1pc\noindent
2820 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

\@mkauthorsaddresses Typesetting authors' addresses in the footnote style

```

2821 \def\@mkauthorsaddresses{%
2822 \ifnum\num@authors>1\relax
2823 Authors' \else Author's \fi
2824 Contact Information:
2825 \bgroup
2826 \def\streetaddress##1{\ClassWarning{\@classname}{ACM no longer collects
2827 authors' postal addresses. I am ignoring your street
2828 address}\unskip\ignorespaces}%
2829 \def\postcode##1{\ClassWarning{\@classname}{ACM no longer collects
2830 authors' postal addresses. I am ignoring your postal

```

```

2831 code}\unskip\ignorespaces}%
2832 \def\position##1{\unskip\ignorespaces}%
2833 \gdef\@ACM@institution@separator{,}%
2834 \def\institution##1{\unskip\@ACM@institution@separator##1\gdef\@ACM@institution@separator{ and }}
2835 \def\city##1{\unskip, ##1}%
2836 \def\state##1{\unskip, ##1}%
2837 \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2838 \def\country##1{\unskip, ##1}%
2839 \def\and{\unskip; \gdef\@ACM@institution@separator{,}}%
2840 \def\@author##1{##1}%
2841 \def\email##1##2{\unskip, \nolinkurl{##2}}%
2842 \addresses
2843 \egroup}

2844 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
2845 \ifx\@authorsaddresses\empty
2846 \ClassWarningNoLine{\@classname}{Authors'
2847 addresses are mandatory for ACM journals}%
2848 \fi\fi\fi}

```

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

```
2849 \def\@setaddresses{}
```

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

```
2850 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}
```

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

```
2851 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}
```

\@mkteasers Typesetting the teasers

```

2852 \def\@mkteasers{%
2853 \ifx\@teaserfigures\empty\else
2854 \def\@teaser##1{\par\bigskip\bgroup
2855 \captionsetup{type=figure}##1\egroup\par}
2856 \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
2857 \noindent\@Description@presentfalse
2858 \@teaserfigures\par\if@Description@present\else
2859 \global\@undescrbed@imagestrue
2860 \ClassWarning{\@classname}{A possible image without
2861 description}\fi
2862 \medskip}%
2863 \fi}

```

\@mkabstract Typesetting the abstract

```

2864 \def\@mkabstract{\bgroup
2865 \ifx\@abstract\empty\else
2866 {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
2867 \if@ACM@journal
2868 \everypar{\setbox\z@\lastbox\everypar{}}\small
2869 \else
2870 \section*{\abstractname}%
2871 \fi
2872 \ignorespaces\@abstract\par}%
2873 \fi\egroup}

```

`\@mktranslatedabstract` Typesetting a translated abstract

```
2874 \def\@mktranslatedabstract#1{\selectlanguage{#1}%
2875   \if@ACM@journal
2876     \everypar{\setbox\z@\lastbox\everypar{}}\small
2877   \else
2878     \section*{\abstractname}%
2879   \fi
2880 \ignorespaces}
```

`\@mkbibcitation` Print the bibcitation format

```
2881 \def\@mkbibcitation{\bgroup
2882   \let\@vspace\@vspace@orig
2883   \let\@vspacer\@vspacer@orig
2884   \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2885   \def\footnotemark{}%
2886   \def\unskip{\ignorespaces}%
2887   \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2888     inside a \string\title{} or \string\author{} command! Use
2889     \string\titlenote{} or \string\authornote{} instead!}}%
2890   \def\@article@string{\ifx\@acmArticle\@empty{\ } \else,
2891     Article~\@acmArticle\ \fi}%
2892   \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2893   \noindent\bgroup
2894     \def\unskip{\ignorespaces}\authors\egroup. \@acmYear. \@title
2895     \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2896     \if@ACM@nonacm\else
2897       % The 'nonacm' option disables 'printacmref' by default,
2898       % and the present \@mkbibcitation definition is never used
2899       % in this case. The conditional remains useful if the user
2900       % explicitly sets \settopmatter{printacmref=true}.
2901       \if@ACM@journal@bibstrip
2902         \textit{\@journalNameShort}
2903         \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2904         \ref{TotPages}~\@pages@word.
2905       \else
2906         In \textit{\@acmBooktitle}%
2907         \ifx\@acmEditors\@empty\textit{.}\else
2908           \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
2909         \fi\
2910         ACM, New York, NY, USA%
2911         \@article@string\unskip, \ref{TotPages}~\@pages@word.
2912       \fi
2913     \fi
2914     \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2915 \par\egroup}
```

`\@printendtopmatter` End the top matter

```
2916 \def\@printendtopmatter{%
2917   \let\@vspace\@vspace@orig
2918   \let\@vspacer\@vspacer@orig
2919   \par\bigskip
2920   \let\@vspace\@vspace@acm
2921   \let\@vspacer\@vspacer@acm
2922 }
```

```
\@setthanks We redefine \@setthanks using \long
2923 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}
```

```
\@setauthorsaddresses
```

```
2924 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}
```

```
\@typesetengagemetadata Typesetting special metadata for ACM Engage
```

```
2925 \def\@typesetengagemetadata{%
2926 \def\@setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
2927 \@acmengagemetadata}
```

*i**tagged_¿ We stop tagging inside maketitle for now. Ulrike's code again.

```
2928 \ExplSyntaxOn
2929 \AddToHook{cmd/maketitle/before}
2930 {\tagstructbegin{tag=Title}\tagmcbegin{} \tag_stop:}
2931 \AddToHook{cmd/maketitle/after}
2932 {\tag_start:\tagmcbegin\tagstructend }
2933 \ExplSyntaxOff
i/tagged¿
```

3.22 Headers and Footers

We use fancyhdr for our headers and footers:

```
2934 \RequirePackage{fancyhdr}
```

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

```
2935 \let\ACM@ps@plain\ps@plain
2936 \let\ACM@ps@myheadings\ps@myheadings
2937 \let\ACM@ps@headings\ps@headings
2938 \def\ACM@restore@pagestyle{%
2939 \let\ps@plain\ACM@ps@plain
2940 \let\ps@myheadings\ACM@ps@myheadings
2941 \let\ps@headings\ACM@ps@headings}
2942 \AtBeginDocument{\ACM@restore@pagestyle}
```

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

```
2943 \if@ACM@review
2944 \newsavebox{\ACM@linecount@bx}
2945 \newlength\ACM@linecount@bxht
2946 \newcount\ACM@linecount
2947 \ACM@linecount\@ne\relax
2948 \def\ACM@mk@linecount{%
2949 \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
2950 \normalsize
2951 \setlength{\ACM@linecount@bxht}{0pt}%
2952 \loop{\color{red}\scriptsize\the\ACM@linecount}\@
2953 \global\advance\ACM@linecount by \@ne
2954 \addtolength{\ACM@linecount@bxht}{\baselineskip}%
2955 \ifdim\ACM@linecount@bxht<\textheight\repeat
2956 {\color{red}\scriptsize\the\ACM@linecount}\hfill
2957 \global\advance\ACM@linecount by \@ne}}
2958 \fi
```

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

```
2959 \def\ACM@linecountL{%
2960   \if@ACM@review
2961   \ACM@mk@linecount
2962   \begin{picture}(0,0)%
2963     \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2964   \end{picture}%
2965   \fi}
```

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

```
2966 \def\ACM@linecountR{%
2967   \if@ACM@review
2968     \ifcase\ACM@format@nr
2969     \relax % manuscript
2970         \relax
2971     \or % acmsmall
2972         \relax
2973     \or % acmlarge
2974         \relax
2975     \or % acmtog
2976         \ACM@mk@linecount
2977     \or % sigconf
2978         \ACM@mk@linecount
2979     \or % siggraph
2980         \ACM@mk@linecount
2981     \or % sigplan
2982         \ACM@mk@linecount
2983     \or % sigchi
2984         \ACM@mk@linecount
2985     \or % sigchi-a
2986         \ACM@mk@linecount
2987     \or % acmengage
2988         \ACM@mk@linecount
2989     \or % acmcp
2990         \relax
2991   \fi
2992   \begin{picture}(0,0)%
2993     \put(20,-22){\usebox{\ACM@linecount@bx}}%
2994   \end{picture}%
2995   \fi}
```

`\ACM@timestamp` The timestamp system

```
2996 \if@ACM@timestamp
2997 % Subtracting 30 from \time gives us the effect of rounding down despite
2998 % \numexpr rounding to nearest
2999 \newcounter{ACM@time@hours}
3000 \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
3001 \newcounter{ACM@time@minutes}
3002 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
3003 \newcommand\ACM@timestamp{%
3004   \footnotesize%
3005   \ifx\@acmSubmissionID\@empty\relax\else
3006     Submission ID: \@acmSubmissionID.{ }%
3007   \fi}
```

```

3008 \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
3009 \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
3010 Page \thepage\ of \@startPage--\pageref*{TotPages}.%
3011 }
3012 \fi

```

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

```

3013 \def\@shortauthors{%
3014 \if@ACM@anonymous
3015 Anon.
3016 \ifx\@acmSubmissionID\empty\else Submission Id: \@acmSubmissionID\fi
3017 \else\@shortauthors\fi}

```

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

```

3018 \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

```

3019 \AtBeginDocument{%
3020 \fancypagestyle{standardpagestyle}{%
3021 \fancyhf{}%
3022 \renewcommand{\headrulewidth}{\z@}%
3023 \renewcommand{\footrulewidth}{\z@}%
3024 \def\@acmArticlePage{%
3025 \ifx\@acmArticle\empty%
3026 \if@ACM@printfolios\thepage\fi%
3027 \else%
3028 \@acmArticle\if@ACM@printfolios:\thepage\fi%
3029 \fi%
3030 }%
3031 \if@ACM@journal@bibstrip@or@tog
3032 \ifcase\ACM@format@nr
3033 \relax % manuscript
3034 \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
3035 \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
3036 \fancyhead[RE]{\@shortauthors}%
3037 \fancyhead[LO]{\ACM@linecountL\shorttitle}%
3038 \if@ACM@nonacm\else%
3039 \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
3040 \fi%
3041 \or % acmsmall
3042 \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
3043 \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
3044 \fancyhead[RE]{\@headfootfont\@shortauthors}%
3045 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3046 \if@ACM@nonacm\else%
3047 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3048 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
3049 \fi
3050 \or % acmlarge
3051 \fancyhead[LE]{\ACM@linecountL\@headfootfont
3052 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
3053 \fancyhead[LO]{\ACM@linecountL}%

```

```

3054 \fancyhead[RO]{\@headfootfont
3055 \shorttitle\quad\textbullet\quad\@acmArticlePage}%
3056 \if@ACM@nonacm\else%
3057 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3058 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
3059 \fi
3060 \or % acmtog
3061 \fancyhead[LE]{\ACM@linecountL\@headfootfont
3062 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
3063 \fancyhead[LO]{\ACM@linecountL}%
3064 \fancyhead[RE]{\ACM@linecountR}%
3065 \fancyhead[RO]{\@headfootfont
3066 \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
3067 \if@ACM@nonacm\else
3068 \if@ACM@journal@bibstrip
3069 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
3070 Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
3071 Publication date: \@acmPubDate.}%
3072 \else
3073 \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
3074 \acmConference@date, \acmConference@venue.}%
3075 \fi
3076 \fi
3077 \else % Proceedings
3078 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3079 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3080 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3081 \if@ACM@nonacm
3082 \fancyhead[LE]{\ACM@linecountL}%
3083 \fancyhead[RO]{\ACM@linecountR}%
3084 \else%
3085 \if@ACM@engage
3086 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3087 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3088 \fancyhead[RO]{\@headfootfont
3089 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3090 \ACM@linecountR}%
3091 \else
3092 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3093 \acmConference@shortname,
3094 \acmConference@date, \acmConference@venue}%
3095 \fancyhead[RO]{\@headfootfont
3096 \acmConference@shortname,
3097 \acmConference@date, \acmConference@venue\ACM@linecountR}%
3098 \fi
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
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
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 \if@ACM@sigchiamode
3126 \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
3127 \fi
3128 \if@ACM@timestamp
3129 \fancyfoot[LO,RE]{\ACM@timestamp}
3130 \fi
3131 \if@ACM@acmcp
3132 \renewcommand{\footrulewidth}{0.1\p@}%
3133 \fancyheadoffset[L]{46pt}%
3134 \fancyhead[L]{\makebox[\z@][l]{%
3135 \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3136 \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3137 \strut\ACM@ArticleType~Article}}}}}%
3138 \ACM@linecountL}%
3139 \fancyhead[R]{\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3140 \fancyfoot[L,C]{}%
3141 \fancyfoot[R]{\footnotesize
3142 \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3143 \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3144 (\@acmPubDate)\ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}
3145 \fi
3146 }%
3147 \pagestyle{standardpagestyle}
3148 }

```

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

\@folio@ht

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

\@folio@max

firstpagestyle The page style for the first page only.

```

3149 \AtBeginDocument{%
3150 \fancypagestyle{firstpagestyle}{%
3151 \fancyhf{}%
3152 \renewcommand{\headrulewidth}{\z@}%
3153 \renewcommand{\footrulewidth}{\z@}%
3154 \if@ACM@journal@bibstrip@or@tog
3155 \ifcase\ACM@format@nr

```

```

3156 \relax % manuscript
3157 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3158 \fancyhead[R]{\@acmBadgeR}%
3159 \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
3160 \if@ACM@nonacm\else%
3161 \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
3162 \fi%
3163 \or % acmsmall
3164 \if@ACM@nonacm\else%
3165 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3166 \@acmNumber, Article \@acmArticle. Publication date:
3167 \@acmPubDate.}%
3168 \fi%
3169 \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3170 \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3171 \fancyhead[RO]{\@acmBadgeR}%
3172 \fancyhead[RE]{\@acmBadgeR}%
3173 \or % acmlarge
3174 \if@ACM@nonacm\else%
3175 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3176 \@acmNumber, Article \@acmArticle. Publication date:
3177 \@acmPubDate.}%
3178 \fi%
3179 \fancyhead[RO]{\@acmBadgeR}%
3180 \fancyhead[RE]{\@acmBadgeR}%
3181 \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3182 \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3183 \or % acmtog
3184 \if@ACM@nonacm\else%
3185 \if@ACM@journal@bibstrip
3186 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
3187 Vol. \@acmVolume, No.\@acmNumber, Article \@acmArticle.
3188 Publication date: \@acmPubDate.}%
3189 \else
3190 \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
3191 \acmConference@date, \acmConference@venue.}%
3192 \fi
3193 \fi%
3194 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3195 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3196 \else % Conference proceedings
3197 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3198 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3199 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3200 \fi
3201 \else
3202 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3203 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3204 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3205 \fi
3206 \if@ACM@timestamp
3207 \ifnum\ACM@format@nr=0\relax % Manuscript
3208 \fancyfoot[LO,RE]{\ACM@timestamp\quad
3209 \if@ACM@nonacm\else

```

```

3210     \footnotesize Manuscript submitted to ACM
3211     \fi}
3212     \else
3213     \fancyfoot[LO,RE]{\ACM@timestamp}
3214     \fi
3215 \fi
3216 \if@ACM@acmcp
3217 \renewcommand{\footrulewidth}{0.1\p@}%
3218 \fancyheadoffset[L]{46pt}%
3219 \fancyhead[L]{\makebox[\z@][l]{%
3220     \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3221     \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3222     \strut\ACM@ArticleType~Article}}}}%
3223     \ACM@linecountL@acmBadgeL}%
3224 \fancyhead[R]{\@acmBadgeR\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3225 \fancyfoot[L,C]{}%
3226 \fancyfoot[R]{\footnotesize
3227     \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3228     \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3229     (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3230 \fi
3231 }}

```

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.

```

3232 \def\ACM@NRadjust#1{%
3233 \begingroup
3234 \expandafter\ifx\csname Sectionformat\endcsname\relax
3235 % do nothing when \Sectionformat is unknown
3236 \def\next{\endgroup #1}%
3237 \else
3238 \def\next{\endgroup

```

```

3239 \let\realSectionformat\Sectionformat
3240 \def\ACM@sect@format{#1}%
3241 \let\Sectionformat\ACM@NR@adjustedSectionformat
3242 %% next lines added 2018-06-17 to ensure section number is styled
3243 \let\real@adddotafter\@adddotafter
3244 \let\@adddotafter\ACM@adddotafter
3245 #1{ }% imposes the styles, but nullifies \MakeUppercase
3246 \let\@adddotafter\real@adddotafter
3247 }%
3248 \fi \next
3249 }

```

\ACM@NR@adjustedSectionformat

```

3250 \def\ACM@NR@adjustedSectionformat#1#2{%
3251 \realSectionformat{\ACM@sect@format{#1}}{#2}%
3252 \let\Sectionformat\realSectionformat}
3253 \DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
3254 \def\ACM@sect@format@null#1{#1}
3255 \let\ACM@sect@format@\ACM@sect@format@null
3256 \AtBeginDocument{%
3257 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
3258 \let\LTX@adddotafter\@adddotafter
3259 \fi
3260 }

```

\ACM@adddotafter

```

3261 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}

```

Sectioning is different for different levels

```

3262 \renewcommand\section{\def\@toclevel{1}%
3263 \@startsection{section}{1}{\z@}%
3264 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3265 {.25\baselineskip}%
3266 {\ACM@NRadjust\@secfont}}
3267 \renewcommand\subsection{\def\@toclevel{2}%
3268 \@startsection{subsection}{2}{\z@}%
3269 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3270 {.25\baselineskip}%
3271 {\ACM@NRadjust\@subsecfont}}
3272 \renewcommand\subsubsection{\def\@toclevel{3}%
3273 \@startsection{subsubsection}{3}{\z@}%
3274 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3275 {-3.5\p@}%
3276 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}
3277 \renewcommand\paragraph{\def\@toclevel{4}%
3278 \@startsection{paragraph}{4}{\parindent}%
3279 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3280 {-3.5\p@}%
3281 {\ACM@NRadjust{\@parfont\@adddotafter}}}
3282 \newcommand\noindentparagraph{\def\@toclevel{4}%
3283 \@startsection{paragraph}{4}{\z@}%
3284 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3285 {-3.5\p@}%
3286 {\ACM@NRadjust{\@parfont}}}

```

```

3287 \renewcommand\part{\def\@toclevel{9}%
3288 \startsection{part}{9}{\z@}%
3289 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
3290 {4\p@}%
3291 {\ACM@NRadjust\@parfont}}

```

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

```

3292 \def\section@raggedright{\@rightskip\@flushglue
3293 \rightskip\@rightskip
3294 \leftskip\z@skip
3295 \parindent\z@}

```

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

```

\@subsecfont 3296 \def\@secfont{\sffamily\bfseries\section@raggedright}
\@subsubsecfont 3297 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 3298 \def\@subsubsecfont{\sffamily\itshape}
3299 \def\@parfont{\itshape}
3300 \setcounter{secnumdepth}{3}
3301 \ifcase\ACM@format@nr
3302 \relax % manuscript
3303 \or % acmsmall
3304 \or % acmlarge
3305 \def\@secfont{\sffamily\large\section@raggedright}
3306 \def\@subsecfont{\sffamily\large\section@raggedright}
3307 \or % acmtog
3308 \def\@secfont{\sffamily\large\section@raggedright}
3309 \def\@subsecfont{\sffamily\large\section@raggedright}
3310 \or % sigconf
3311 \def\@secfont{\bfseries\Large\section@raggedright}
3312 \def\@subsecfont{\bfseries\Large\section@raggedright}
3313 \or % siggraph
3314 \def\@secfont{\sffamily\bfseries\Large\section@raggedright}
3315 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
3316 \or % sigplan
3317 \def\@secfont{\bfseries\Large\section@raggedright}
3318 \def\@subsecfont{\bfseries\section@raggedright}
3319 \def\@subsubsecfont{\bfseries\section@raggedright}
3320 \def\@parfont{\bfseries\itshape}
3321 \def\@subparfont{\itshape}
3322 \or % sigchi
3323 \setcounter{secnumdepth}{1}
3324 \def\@secfont{\sffamily\bfseries\section@raggedright}
3325 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3326 \or % sigchi-a
3327 \setcounter{secnumdepth}{0}
3328 \def\@secfont{\sffamily\bfseries\section@raggedright}
3329 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3330 \or % acmengage
3331 \def\@secfont{\bfseries\Large\section@raggedright}
3332 \def\@subsecfont{\bfseries\Large\section@raggedright}
3333 \or % acmcp
3334 \fi

```

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

```

3335 \AtBeginDocument{%
3336   \for\@tempa:=-1,0,1,2,3,4,5\do{%
3337     \ifundefined{r@tocindent\@tempa}{%
3338       \xp@gdef\csname r@tocindent\@tempa\endcsname{0pt}}{%
3339     }%
3340 }
3341 \def\@writetocindent{%
3342   \begingroup
3343   \for\@tempa:=-1,0,1,2,3,4,5\do{%
3344     \immediate\write\@auxout{%
3345       \string\newlabel{tocindent\@tempa}{%
3346         \csname r@tocindent\@tempa\endcsname}}%
3347     }%
3348   \endgroup}

```

\@adddotafter Add punctuation after a sectioning command

```
3349 \def\@adddotafter#1{#1\@addpunct{.}}
```

\@addspaceafter Add space after a sectioning command

```
3350 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

```
3351 \if@ACM@acmcp
```

```
3352   \setcounter{secnumdepth}{-1}%
```

```
3353 \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 amasart does not provide this, we copy the standard variant from article here.

```
3354 \providecommand*\@dotsep{4.5}
```

3.25 Theorems

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

```
3355 \def\@acmplainbodyfont{\itshape}
```

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

```
3356 \def\@acmplainindent{\parindent}
```

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

```
3357 \def\@acmplainheadfont{\scshape}
```

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

```
3358 \def\@acmplainnotefont{\@empty}
```

Customization of the acmplain theorem style:

```
3359 \ifcase\ACM@format@nr
3360 \relax % manuscript
3361 \or % acmsmall
3362 \or % acmlarge
3363 \or % acmtog
3364 \or % sigconf
3365 \or % siggraph
3366 \or % sigplan
3367 \def\@acmplainbodyfont{\itshape}
3368 \def\@acmplainindent{\z@}
3369 \def\@acmplainheadfont{\bfseries}
3370 \def\@acmplainnotefont{\normalfont}
3371 \or % sigchi
3372 \or % sigchi-a
3373 \or % acmengage
3374 \or % acmcp
3375 \fi
```

acmplain The acmplain theorem style

```
3376 \newtheoremstyle{acmplain}%
3377 { .5\baselineskip \@plus .2\baselineskip
3378 \@minus .2\baselineskip}% space above
3379 { .5\baselineskip \@plus .2\baselineskip
3380 \@minus .2\baselineskip}% space below
3381 {\@acmplainbodyfont}% body font
3382 {\@acmplainindent}% indent amount
3383 {\@acmplainheadfont}% head font
3384 { .}% punctuation after head
3385 { .5em}% spacing after head
3386 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec
```

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

```
3387 \def\@acmdefinitionbodyfont{\normalfont}
```

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

```
3388 \def\@acmdefinitionindent{\parindent}
```

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

```
3389 \def\@acmdefinitionheadfont{\itshape}
```

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

```
3390 \def\@acmdefinitionnotefont{\@empty}
```

Customization of the acmdefinition theorem style:

```
3391 \ifcase\ACM@format@nr
3392 \relax % manuscript
3393 \or % acmsmall
3394 \or % acmlarge
3395 \or % acmtog
3396 \or % sigconf
3397 \or % siggraph
3398 \or % sigplan
```

```

3399 \def\acmdefinitionbodyfont{\normalfont}
3400 \def\acmdefinitionindent{\z@}
3401 \def\acmdefinitionheadfont{\bfseries}
3402 \def\acmdefinitionnotefont{\normalfont}
3403 \or % sigchi
3404 \or % sigchi-a
3405 \or % acmengage
3406 \or % acmcp
3407 \fi

```

acmdefinition The acmdefinition theorem style

```

3408 \newtheoremstyle{acmdefinition}%
3409   {.5\baselineskip\@plus.2\baselineskip
3410   \@minus.2\baselineskip}% space above
3411   {.5\baselineskip\@plus.2\baselineskip
3412   \@minus.2\baselineskip}% space below
3413   {\@acmdefinitionbodyfont}% body font
3414   {\@acmdefinitionindent}% indent amount
3415   {\@acmdefinitionheadfont}% head font
3416   {.% punctuation after head
3417   {.5em}% spacing after head
3418   {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec

```

Make acmplain the default theorem style.

```

3419 \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.

```

3420 \AtEndPreamble{%
3421   \if@ACM@acmthm
3422   \theoremstyle{acmplain}
3423   \@ifundefined{theorem}{%
3424     \newtheorem{theorem}{Theorem}[section]
3425   }{}
3426   \@ifundefined{conjecture}{%
3427     \newtheorem{conjecture}[theorem]{Conjecture}
3428   }{}
3429   \@ifundefined{proposition}{%
3430     \newtheorem{proposition}[theorem]{Proposition}
3431   }{}
3432   \@ifundefined{lemma}{%
3433     \newtheorem{lemma}[theorem]{Lemma}
3434   }{}
3435   \@ifundefined{corollary}{%
3436     \newtheorem{corollary}[theorem]{Corollary}
3437   }{}
3438   \theoremstyle{acmdefinition}
3439   \@ifundefined{example}{%

```



```

3440 \newtheorem{example}[theorem]{Example}
3441 }{}
3442 \@ifundefined{definition}{%
3443 \newtheorem{definition}[theorem]{Definition}
3444 }{}
3445 \fi
3446 \theoremstyle{acmplain}
3447 }

```

`\@proofnamefont` The font to typeset the proof name.
3448 `\def\@proofnamefont{\scshape}`

`\@proofindent` Whether or not to indent proofs.
3449 `\def\@proofindent{\indent}`

Customization of the proof environment.

```

3450 \ifcase\ACM@format@nr
3451 \relax % manuscript
3452 \or % acmsmall
3453 \or % acmlarge
3454 \or % acmtog
3455 \or % sigconf
3456 \or % siggraph
3457 \or % sigplan
3458 \def\@proofnamefont{\itshape}
3459 \def\@proofindent{\noindent}
3460 \or % sigchi
3461 \or % sigchi-a
3462 \or % acmengage
3463 \or % acmcp
3464 \fi

```

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

```

3465 \renewenvironment{proof}[1][\proofname]{\par
3466 \pushQED{\qed}%
3467 \normalfont \topsep6\p@\@plus6\p@\relax
3468 \trivlist
3469 \item[\@proofindent\hskip\labelsep
3470 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
3471 }{}%
3472 \popQED\endtrivlist\endpfalse
3473 }

```

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.

```

3474 \AtEndPreamble{%
3475 \if@ACM@pbalance
3476 \global\@ACM@balancefalse
3477 \ifcase\ACM@format@nr
3478 \relax % manuscript
3479 \or % acmsmall

```

```

3480 \or % acmlarge
3481 \or % acmtog
3482 \RequirePackage{pbalance}%
3483 \or % sigconf
3484 \RequirePackage{pbalance}%
3485 \or % siggraph
3486 \RequirePackage{pbalance}%
3487 \or % sigplan
3488 \RequirePackage{pbalance}%
3489 \or % sigchi
3490 \RequirePackage{pbalance}%
3491 \or % sigchi-a
3492 \or % acmengage
3493 \RequirePackage{pbalance}%
3494 \or % acmcp
3495 \fi
3496 \fi
3497 \if@ACM@balance
3498 \ifcase\ACM@format@nr
3499 \relax % manuscript
3500 \global\@ACM@balancefalse
3501 \or % acmsmall
3502 \global\@ACM@balancefalse
3503 \or % acmlarge
3504 \global\@ACM@balancefalse
3505 \or % acmtog
3506 \RequirePackage{balance}%
3507 \or % sigconf
3508 \RequirePackage{balance}%
3509 \or % siggraph
3510 \RequirePackage{balance}%
3511 \or % sigplan
3512 \RequirePackage{balance}%
3513 \or % sigchi
3514 \RequirePackage{balance}%
3515 \or % sigchi-a
3516 \global\@ACM@balancefalse
3517 \or % acmengage
3518 \RequirePackage{balance}%
3519 \or % acmcp
3520 \global\@ACM@balancefalse
3521 \fi
3522 \fi
3523 }
3524 \AtEndDocument{%
3525 \if@ACM@balance
3526 \if@twocolumn
3527 \balance
3528 \fi\fi}

```

3.27 Acknowledgments

\acksname

```
3529 \newcommand\acksname{Acknowledgments}
```

`\acks` This is a comment-like structure

```
3530 \specialcomment{acks}{%
3531   \begingroup
3532   \section*{\acksname}
3533   \phantomsection\addcontentsline{toc}{section}{\acksname}
3534 }{%
3535   \endgroup
3536 }
```

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

```
3537 \def\grantsponsor#1#2#3{#2}
```

`\grantnum`

```
3538 \newcommand\grantnum[3][]{#3%
3539   \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}
```

3.28 Conditional typesetting

We use the `comment` package for conditional typesetting:

```
3540 \AtEndPreamble{%
3541   \if@ACM@screen
3542     \includecomment{screenonly}
3543     \excludecomment{printonly}
3544   \else
3545     \excludecomment{screenonly}
3546     \includecomment{printonly}
3547   \fi
3548   \if@ACM@anonymous
3549     \excludecomment{anonsuppress}
3550     \excludecomment{acks}
3551   \else
3552     \includecomment{anonsuppress}
3553   \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’.

```
3554 \newcommand\showeprint[2][arxiv]{%
3555   \def\@tempa{#1}%
3556   \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
3557   \def\@tempb{arxiv}%
3558   \ifx\@tempa\@tempb\relax
3559     arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3560   \else
3561     \def\@tempb{arXiv}%
3562     \ifx\@tempa\@tempb\relax
3563       arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3564     \else
3565       #1:#2%
3566     \fi
3567   \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.

```
3568 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
3569 \columnseprule\z@ \columnsep 35\p@
3570 \@indextitlestyle
3571 \let\item\@idxitem
3572 \parindent\z@ \parskip\z@\@plus.3\p@\relax
3573 \raggedright
3574 \hyphenpenalty\@M
3575 \footnotesize}
```

3.31 End of Class

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

```
3576 \let\@vspace@orig=\@vspace
3577 \let\@vspacer@orig=\@vspacer
3578 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
3579 only be used to provide space above/below surrounding
3580 objects}}{}}
3581 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
3582 only be used to provide space above/below surrounding
3583 objects}}{}}
3584 \let\@vspace@acm=\@vspace
3585 \let\@vspacer@acm=\@vspacer
```

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

```
3586 \let\ACM@origbaselinestretch\baselinestretch
3587 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
3588 \ClassError{\@classname}{An attempt to redefine
3589 \string\baselinestretch\space detected. Please do not do this for
3590 ACM submissions!}\fi}

3591 \normalsize\normalfont\frenchspacing
3592 </class>
```

References

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

Change History

1.48	General: Added prologue option to xcolor	50	\ccsdesc@parse: Added warning for missing concepts	78
	Bib code cleanup (Zack Weinberg)	35	\if@ACM@printacmref: Added warning for longer papers	76
	Documentation update (siggraph)	35	\keywords: Added warning for missing keywords	75
1.49	General: New journal: DTRAP	35	1.69	\vspace: Added the changed command to avoid grouping
1.53	General: New journals: PACMCGIT, TIOT, TDSCI	35	1.70	General: Name change for TDS
	Rearranged docs	35	1.71	General: Bibliography change: volume for @inproceedings is now in brackets together with series
1.54	General: Moved footnote stuff before hyperref call (Ross Moore)	35	1.75	General: Documentation update
1.56	General: Documented \Description	35	1.78	General: Documentation update: Word count
1.57	General: Booktabs package is now the default	35	1.79	General: Updated indormation for TAP, TCPS, TEAC
1.58	General: Changes in samples (Enrico Gregorio)	35	1.80	General: Added DLT and FAC
	New journal: HEALTH. TDS is renamed to TDSCI	35	1.82	General: Updated abbreviations and codes for several journals
1.60	General: New option: urlbreakonhyphens	35	1.84	General: New journals: JDS, GAMES
	\if@ACM@urlbreakonhyphens: introduced macro	36	1.85	General: Added CC licenses
1.62	General: New journal: TELO	35		Added: acmengage
1.63	General: New journal: FACMP	35		New journal: JRC
	New journal: TQUANT	35		\@mkauthors: Added: acmengage
1.63a	General: Move: TQUANT to TQC	35		\@mktitle: Added: acmengage
1.64	General: Putting abstract after \maketitle now causes an error	35		\@printtopmatter: Added: acmengage
1.65	General: New journal: DGOV	35		\@specialsection: Added: acmengage
1.66	General: ACM reference format is now mandatory for papers over one page; CCS concepts and keywords are now mandatory for papers over two pages	35		\@subtitlefont: Added: acmengage
	Authors' addresses are mandatory for journal articles	35		\@titlefont: Added: acmengage
	\@mkauthorsaddresses: Added warning for missing addresses	99		\ACM@linecountR: Added: acmengage
				format: New format: acmengage
				\parskip: Added: acmengage

1.87	General: New journals: ACMJCSS, JATS, TORS	60	v1.02	General: Added TOPS and TSC (closes https: //github.com/borisveytsman/ acmart/issues/12)	35
	format: New format: acmcp	36		Documentation changes (closes https: //github.com/borisveytsman/ acmart/issues/13)	35
1.88	General: Added ISSN for ACMJCSS	60			
	Added ISSN for GAMES	60			
	Added PACMNET	60			
1.89	General: Added PACMMOD	60	v1.03	General: Added anonsuppress environment	35
	Added TOPML	60		Added authorversion option (closes https: //github.com/borisveytsman/ acmart/issues/9)	35
	\@printtopmatter: Moved badges to top header	89		\@formatdoi: Added macro	81
1.90	General: Added TOPML eISSN	60		\if@ACM@authorversion: Added macro	37
1.90a	General: Changes in the sample keywords and concepts	35		\maketitle: Added special case of authorversion	85
1.92	General: Documentation update: use of 'anonymous' throughout	35	v1.04	General: Updated bibliography for siggraph	35
	Moved hyperxmp again due to kernel update	49		\acmArticleSeq: Name change by Matthew Fluet	73
2.04	General: Deleted loading ifdraft due to the new release of hyperxmp	49		\acmDOI: Name change by Matthew Fluet	74
	Explicitly load ifdraft since hyperxmp tries to load it inside a group	49		\acmISBN: Name change by Matthew Fluet	74
2.05	General: New data for TELO	60	v1.05	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	35
2.06	General: Added eISSN for a number of journals	60		Patched \setcitestyle command; closes https: //github.com/borisveytsman/ acmart/issues/19	35
2.07	General: Another change for TELO	60	v1.06	\@ACM@badge@skip: Added macro	74
v1.00	General: First released version	35		\@ACM@badge@width: Added macro	74
v1.01	General: Changed hyperref colors in screen mode (closes https: //github.com/borisveytsman/ acmart/issues/1)	35		\@ACM@title@width: Added macro	74
	Defined ACM colors	35		\@mktitle@i: Added processing badges	91
	Explicitly put draft option (closes https: //github.com/borisveytsman/ acmart/issues/4)	38		Made generic	91
	Set headheight to 1pc for all formats (closes https: //github.com/borisveytsman/ acmart/issues/5)	35		\@mktitle@ii: Now this macro is obsolete	92
				\@mktitle@iii: Added processing badges	92
				Made more generic	92
				\@mktitle@iv: Made more generic	92
				\@printtopmatter: Added processing badges	89
				\@subtitlefont: Added macro	91

\@titlefont: Added macro	90	Increased font size for ACM Large	40
\acmBadgeL: Added macro	74	Print bibliographic information by default for the proceedings	76
\acmBadgeR: Added macro	74	\@mpfootnotetext: Made minipage footnotes centered	49
\if@ACM@badge: Added macro	74	\bibliographystyle: Redefined macro	50
v1.07		\bibstyle@acmauthoryear: Added macro	43
\maketitle: Corrected a bug with abstract footnotes	85	\bibstyle@acmnumeric: Added macro	44
Corrected a bug with permission and footnotes order	85	\if@ACM@printfolios: Added macro	76
v1.08		standardpagestyle: Added headers for sigs	103
General: SIGPLAN reformatting by Matthew Fluet	35	Expanded headers for sigchi-a . . .	103
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v1.09		v1.14	
General: Revert SIGPLAN caption rules	35	General: \citestyle updates (Matthew Fluet)	35
v1.10		Patched \citestyle	42
General: Changes of ‘licensedothergov’ wording	79	\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use	43
\maketitle: Corrected a bug with doi in manuscript and author version, https://github.com/borisveytsman/acmart/issues/36	85	\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use	44
standardpagestyle: Reversed folios location	103	v1.15	
v1.11		\@ACM@addtoaddress: Added macro	92
General: Customization of ACM theorem styles and proof environment by Matthew Fluet . . .	35	\@mkauthors@iii: New authors system	96
v1.12		\@shortauthors: Introduced macro . .	103
General: Added graceful behavior when libertine fonts are absent . . .	54	\@typeset@author@bx: Moved to separate macro	96
Documentation updates	35	\acks: Added macro	115
\@marginfigure: Now centering by default	57	\affiliation: Added code for author groups	71
\@marginfigure: Now centering by default	58	\author: Added code for author groups	70
\@parfont: Moved to \section@raggedright	109	\city: Added macro	92
\copyrightpermissionfootnoterule: Added macro	53	\country: Added macro	92
\descriptionlabel: Redefined	60	\department: Added macro	92
\footnoterule: Made shorter	53	\grantnum: Added macro	115
\if@ACM@natbib@override: Added macro	37	\grantsponsor: Added macro	115
\if@ACM@newfonts: Added macro . . .	54	\if@insideauthorgroup: Introduced macro	70
\maketitle: Moved thankses to copyrightpermission box	85	\institution: Added macro	92
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General: Font adjustments for acmsmall	94	\position: Added macro	92
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		\state: Added macro	92
		\streetaddress: Added macro	92
		standardpagestyle: Better handling of anonymous mode	103

v1.16	General: Formatting header/footer (Matthew Fluet)	35	v1.21	\showeprint: Added macro	115
	\@headfootfont: Added macro	103	v1.22	General: More bibliography changes for Aptara	35
	standardpagestyle: Customize header/footer text font	103	v1.23	General: Add PACMPL journal option	35
v1.17	General: Slightly decreased margins for sigs	51	v1.24	General: Add IMWUT journal option	60
	\@makefnmark: Redefined	49	v1.25	General: Updated PACMPL	60
	\@mkauthors: TOG now uses the same authors block as other journals . . .	93	v1.26	General: Corrected \shortcite bug . . .	35
	\@mkauthors@ii: Deleted	96		Documentation typos fixed (thanks to Stephen Spencer)	35
	\@mkbibcitation: Added \nobreak	100	v1.27	\if@ACM@printccs: Typo corrected . . .	75
	Changed format for sigs	100	v1.28	General: Corrected option natbib behavior	44
	\acmArticle: The default is now numerical	73		Got rid of warnings in pdf keywords	49
	\acmMonth: The default must be numerical. Closes #50.	73		\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato)	78
	\acmNumber: The default is now numerical	73	v1.29	General: Increased head to 13pt	51
	\acmVolume: The default is now numerical	73		\@mkabstract: Removed spurious indentation (John Wickerson)	99
	\acmYear: The default is now numerical	73		\ccsdesc@parse: Add spacing after bullet and around rightarrow; semicolon separators no longer in bold/italic (John Wickerson)	78
	\description: Decreased indent	60		standardpagestyle: Corrected printfolios (Matthew Fluet)	103
	\grantnum: Added url	115	v1.30	General: Added \frenchspacing	116
	\grantsponsor: Renamed	115		Bibtex style now recognizes https:// in doi	35
	\if@ACM@printacmref: Renamed from \if@ACM@printbib	75		Switched to T1: looks like libertine has problems with \l in OT1	55
	standardpagestyle: Added paper title to sigs	103		Updated IMWUT and PACMPL	60
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	\@mkauthors@i: Now we andify affiliations	95	v1.31	General: Documentation changes	35
	\@typeset@author@line: Added macro	94		\@additionalaffiliation: Added macro	71
v1.19	General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	35		\@mkbibcitation: Disabled linebreak	100
	Include 'References' in PDF bookmarks (Matthew Fluet)	42		\@startsection: Added \tochangmeasure	46
	\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet)	99		\@starttoc: Redefined macro	48
	\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet)	115		\@textbottom: Redefined	54
v1.20	General: Bug fixes for bst	35		\acmMonth: The default now is the current month (Matteo Riondato)	73
	\@mkabstract: Deleted spurious space	99			

\acmYear: The default now is the current year (Matteo Riondato) . . .	73	\institution: Added	
\additionalaffiliation: Added macro	71	obeypunctuation code	92
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\l@subsection: Redefined macro . . .	48	linecount for two-column formats	105
v1.32		Added timestamp (Michael D. Adams)	105
General: Added POMACS journal option	35	\maketitle: Fixed the bug with figures on top and bottom of the title page, thanks to David Epstein	85
Format siggraph is now obsolete . . .	35	\position: Added obeypunctuation code	92
\@formatdoi: New doi format	81	\postcode: Added obeypunctuation code	92
v1.33		\state: Added obeypunctuation code	92
General: Added acmart-preload-hook	35	\streetaddress: Added obeypunctuation code	92
Added cmap and glyphtounicode . . .	54	standardpagestyle: Added right	
BibTeX comma before articleno bug corrected	35	linecount for two-column formats	103
BibTeX crossref bug corrected	35	Added timestamp (Michael D. Adams)	103
BibTeX numpages bug corrected	35	v1.34	
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Switched to Type 1 fonts for libertine even if OTF-capable engine is used (Kai Mindermann) . . .	55	\ACM@linecountL: Rulers now are continuous	102
\@ACM@addtoaddress: Added obeypunctuation code	92	\ACM@linecountR: Rulers now are continuous	102
\@mkauthors@i: Added obeypunctuation code	95	\maketitle: Added date to the bibstrip in conf proceedings	85
\@mkauthors@iii: Added obeypunctuation code	96	Deleted ‘DOI’ from doi numbers . . .	85
\@mkauthors@iv: Added obeypunctuation code	97	Rearranged bibstrip	85
\@subtitlefont: Added \normalsize	91	The \terms command is now obsolete	85
\ACM@linecountL: Renamed macro . . .	102	\terms: The \terms command now just produces a warning	75
\ACM@linecountR: Added macro	102	v1.35	
\ACM@timestamp: Added current page number	102	General: BibTeX bug fixed: et al. . . .	35
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\country: Added obeypunctuation code	92	Added the possibility to adjust number of author boxes per row in conference formats	35
\department: Added obeypunctuation code	92	\@ACM@authorsperrow: Added macro	76
\if@ACM@affiliation@obeypunctuation: Added macro	71	\@mkauthors@iii: Added authorsperrow override	96
\if@ACM@authordraft: Added macro . . .	38		
\if@ACM@natbib@override: Deleted macro	37		
\if@ACM@timestamp: Added macro (Michael D. Adams)	38		

\@mkauthors@iv: Added	\streetaddress: We now do not
authorsperrow override 97	print this even in SIG 92
\if@ACM@authordraft: Corrected	v1.41
typo, thanks to bargteil 38	General: Added new badges 35
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General: Reduce list indentation	General: Deleted ACM badges 35
(Matthew Fluet) 59	v1.43
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indentation (Matthew Fluet) 35	\country: Added comma before
\description: Reduce list	country for journals 92
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\descriptionlabel: Reduce list	General: Added package refcount 35
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\@@authornotemark: Added macro 99	just one page, use ‘page’ instead of
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General: Added ‘textcase’ package 42	macro 101
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licensedcagov 35	\acmArticleSeq: Now acmArticle
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\@copyrightpermission: Added new	v1.45
copyright version: licensedcagov 81	\@folioblob: Switched
\@mkauthors@i: Switched to	\bfeseries\sffamily to
MakeTextUppercase 95	\sffamily\bfseries 105
\@parfont: Switched to	\@parfont: Switched
MakeTextUppercase 109	\bfeseries\sffamily to
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\ccdesc@parse@finish: Added	\sffamily\bfseries 90
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\l@section: Redefined macro 48	options may change screen mode 49
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even in SIG 92	Restore theorem defs to class file 35
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in SIG 92	macro 98
	\@mkbibcitation: Added subtitle 100

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<code>\ACM@linecount@bx</code> : Rearranged the code to get rid of spurious underfull messages (Benjamin Byholm)	101	<code>standardpagestyle</code> : We now use journal abbreviation for footers	103
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<code>\if@ACM@acmthm</code> : Modified description	36	v1.53	
<code>\liningnums</code> : Workaround for compatibility with fontspec	55	General: Added PACMCGIT, TIOT, TDSCI	60
<code>\maketitle</code> : Added authors' addresses	85	v1.54	
Thankses go before authors' addresses	85	General: Added Ross's patch for sectioning	108
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Typos fixed (Jamie Davis)	35	<code>\if@ACM@nonacm</code> : Added macro	37
<code>\@headfootfont</code> : Deleted unnecessary switch (Michael D. Adams)	103	v1.55	
<code>\@mkabstract</code> : Removed spurious indentation if abstract is followed by an empty line	99	General: Now we use purple color for links	49
<code>\ACM@timestamp</code> : Formatting change (Michael D. Adams)	102	Table captions for SIGCHI now use the same font size as figure captions (Luis Leiva)	56
<code>\if@ACM@review</code> : Review mode now switches on folios	36	Typo corrected (Zack Weinberg)	42
<code>\maketitle</code> : Added acmart and version info to pdfcreator tag	85	<code>\@mkbibcitation</code> : Bug corrected	100
Added language and doctitle attributes to PDF (Andreas Reichinger)	85	<code>\maketitle</code> : Fixes topnum	85
Suppressed empty DOI (Serguei Mokhov)	85	v1.56	
v1.50		General: Looks like XeTeX requires explicit monotype font declaration	55
<code>\@copyrightpermission</code> : New copyright statements for iw3c2w3[g]	81	Make two-column layouts flush (Philip Quinn)	51
		<code>\@marginfigure</code> : Added checking for description	57
		<code>\@mkteasers</code> : Added check for description	99

\acksname: Added macro (Philip Quinn)	114	standardpagestyle: Added logic for conference papers using journal format	103
\ccsdesc@parse: End the concepts list with a period (Philip Quinn)	78	Moved page styles to \AtBeginDocument	103
\Description: Added macro	56	v1.60	
\if@Description@present: Added macro	55	\@headfootfont: Moved to footnotesize	103
\if@undescribed@images: Added macro	55	v1.61	
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\author: Added warning if \author has comma	70	\ACM@linecount@bx: Bug fix: made the spacing on the left and the right size equal	101
\email: Added warning if \author has comma	71	\if@ACM@maketitle@typeset: Introduced macro	60
\if@ACM@balance: Added macro	37	\maketitle: Added a switch setting to show that \maketitle is typeset	85
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General: Added HEALTH. TDS CI is renamed to TDS	60	v1.66	
Suppressed \addtocounter in pdf subject	49	General: Patching algorithm and algorithm* to prevent spurious space warnings	56
\@dblfloat: Deleted spurious \vspace warning	58	\@specialsection: Suppress warnings about \vspace	88
\@marginfigure: Deleted spurious \vspace warning	57	v1.67	
\@margintable: Deleted spurious \vspace warning	58	General: Patching lstlisting and lstlisting* to prevent spurious space warnings	56
\@mkbibcitation: Deleted spurious \vspace warning	100	\@parfont: Deleted redefinitions of sections	109
\@printendtopmatter: Deleted spurious \vspace warning	100	\@specialsection: Paragraph inside group does not print its argument. Added a bugfix	88
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\vspace: Preserved old versions as \@vspace@orig and \@vspace@orig	116	\@specialsection: Deleted grouping altogether	88
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\if@ACM@journal@bibstrip: Introduced macro	39	\@specialsection: Changed dot to colon for sigplan	88
firstpagestyle: Added logic for conference papers using journal format	105	\ACM@linecountR: Do not increase numbers in one column format	102
Moved page styles to \AtBeginDocument	105	\ccsdesc@parse: Use math right arrow in text	78

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	\l@subsection: Bug fixed (thanks to Andrew Black)	standardpagestyle: Fixed bug with no line numbers for nonacm	103
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	\author: Added \detokenize (Kuldeep S. Meel)	\@mkauthorsaddresses: New separator of institutions	98
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v1.73		\@mkauthors@i: Unboxing \mktitle@bx	95
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	\@ACM@checkaffil: Added macro	\@mkteasers: Unboxing \mktitle@bx	99
	\@ACM@resetaffil: Added macro	\@printtopmatter: Added processing the overflowing title box	89
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