

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 \TeX for its typesetting.

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

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

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

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

2 User’s guide

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

2.1 Installation

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

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

¹<http://www.acm.org/>

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

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

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

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

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

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

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

2.2 Invocation and options

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

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

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

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

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

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

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

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

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

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 2.23). The format `acmcp` is used for ACM cover pages discussed in Section 2.5.

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

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

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

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

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

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

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, THIS, TIOT, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPML, TOPS, TORS, TOS, TOSEM, TOSN, TQC, TRETTS, TSAS, TSC, TSLP, and TWEB, including special issues.
acmlarge	Large single-column format. Used for 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. Set it to `false` if you encounter compilation errors. Note that for one page documents `\balance` command might cause problems. An alternative is the (experimental) option `pbalance`, which uses the new package `pbalance` for this end.

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

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

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 OR-

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

`\affiliation` enter them in this order:

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

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

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

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

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

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

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

Similarly you can repeat the `\email` command.

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

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

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

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

However, this format is not generally recommended.

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

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

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

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

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

An example of the author block:

```

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

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

Sometimes an author works in several departments within the same 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}}

```

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

```

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

```

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

```

Fluginstitut
Sonnenallee 17
123456, Helm, Germany

```

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

```

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

```

will be typeset as

```

Fluginstitut
Sonnenallee 17
123456 Helm, Germany

```

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

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

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

`\authorsaddresses` In some formats, addresses are printed as a footnote on the first page. By default \TeX typesets them itself using the information you give it. However, you can override its choice using the 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 numerical. For example,
`\acmYear`
`\acmMonth` `\acmVolume{9}`

```

\acmNumber{4}
\acmArticle{39}
\acmYear{2010}
\acmMonth{3}

```

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

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

```

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

```

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

```

\acmSubmissionID{123-A56-BU3}

```

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

```

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

```

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

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

```

\acmDOI{10.1145/9999997.9999999}

```

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

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

```

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

```

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

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

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

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

```

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

```

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

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

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

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

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

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

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

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

Table 3: Parameters for the `\setcopyright` command

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Table 4: Settings for the `\settopmatter` command

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

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

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

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

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

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

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

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

2.4 Top matter of ACM Engage materials

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

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

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

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

2.5 ACM cover page

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

There are several top matter commands specific for this format.

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

```
\acmArticleType{Review}
```

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

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

You may repeat these commands if you have several repositories.

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

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

ACM cover page should have the following obligatory sections:

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

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

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

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

2.6 Internationalization

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

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

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

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

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

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

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

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

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

while a paper in French should set

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

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

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

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

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

2.7 Algorithms

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

2.8 Figures and tables

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

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

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

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

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

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

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

```

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

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

```

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

2.9 Descriptions of images

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

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

```

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

```

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

2.10 Theorems

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

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

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

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

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

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

2.11 Online-only and offline-only material

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

```
\section{Supplementary materials}

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

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

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

2.12 Note about anonymous mode

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

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

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

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

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


2.13 Acknowledgments

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

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

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

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

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

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

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

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

Example:

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

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

2.14 Bibliography

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

2.14.1 Processing using Bib_{TeX}

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

using the option `natbib=false` in `\documentclass`. However, it is not recommended, as well as the use of Bib_T_EX 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_T_EX entry types and fields in the ACM style file `ACM-Reference-Format.bst` that you may want to be aware of.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

and then encode the author as

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

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

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

2.14.2 Processing using Bib \LaTeX

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

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

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

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

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

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

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

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

2.15 Colors

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

The ACM provides the following recommendation on color use.

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

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

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

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

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

2.15.1 Manual bibliography

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

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

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

2.16 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

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

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

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

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

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

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

2.17 Counting words

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

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

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

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

2.18 Creative Commons licenses for ACM publications

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

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

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

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

2.19 Disabled or forbidden commands

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

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

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

2.20 Notes for wizards

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

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

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

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

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

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

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

you will pass `dvipsnames` to `xcolor`.

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

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

2.21 Currently supported publications

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

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

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

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

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

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

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

2.22 Samples

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

Here is the list of the samples:

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

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

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

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

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

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

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

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

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

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

sample-sigconf-lualatex: A proceedings paper in the sigconf format, Lua_{La}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.

2.23 A note about sigchi-a format

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

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

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

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

`marginfigure` (*env.*)

`marginfigure` (*env.*)

sidebar: textual information in the margin,

marginfigure: a figure in the margin,

marginfigure: a table in the margin.

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

The horizontal sizes of figures are:

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

3 Implementation

3.1 Identification

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

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class>\ProvidesClass{acmart}
6 [2024/03/31 v2.04 Typesetting articles for the Association for Computing Machinery]
```

And the driver code:

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

3.2 Preload hook

We preload acmart-preload-hook:

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

3.3 Options

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

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

format The possible formats

```

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

```

\if@ACM@screen Whether we use screen mode

```

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

```

\if@ACM@urlbreakonhyphens

```

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

```

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

```

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

```

\if@ACM@review Whether we use review mode

```

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

```

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

\if@ACM@natbib Whether we use natbib mode

```

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

```

```

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

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

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

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

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

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

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

```

3.4 Setting switches

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

162 `\newif\if@ACM@manuscript`

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

163 `\newif\if@ACM@journal`

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

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

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

165 `\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.

166 `\newif\if@ACM@sigchiamode`

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

167 `\newif\if@ACM@engage`

168 `\@ACM@engagefalse`

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

169 `\newif\if@ACM@acmcp`

170 `\@ACM@acmcpfalse`

Setting up switches

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

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

173 The format siggraph is now obsolete.\MessageBreak

174 I am switching to sigconf.}

175 `\setkeys{acmart.cls}{format=sigconf}`

176 `\fi`

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

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

179 The format sigchi is now obsolete.\MessageBreak

180 I am switching to sigconf.}

181 `\setkeys{acmart.cls}{format=sigconf}`

182 `\fi`

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

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

185 ACM SIGCHI has retired the SIGCHI-A template\MessageBreak

186 effective immediately. ACM is keeping this template\MessageBreak

187 option available to authors who are working on legacy\MessageBreak

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

189 accept documents in this format for publication and\MessageBreak

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

191 this template.\MessageBreak

192 ACM SIGCHI is directing Conference leaders and\MessageBreak

193 authors to publish their articles using the SIGCONF\MessageBreak

194 template call.}


```

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

```

3.5 Loading the base class and package

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

```

237 \ifx\ACM@fontsize\@empty
238   \ifcase\ACM@format@nr
239   \relax % manuscript
240     \def\ACM@fontsize{9pt}%
241   \or % acmsmall
242     \def\ACM@fontsize{10pt}%
243   \or % acmlarge
244     \def\ACM@fontsize{10pt}%

```

```

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

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

    Booktabs is now the default
267 \RequirePackage{booktabs}

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

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

    We use setspace for double spacing
271 \if@ACM@manuscript
272 \RequirePackage{setspace}
273 \onehalfspacing
274 \fi

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

276 \if@ACM@acmcp
277 \RequirePackage{framed}
278 \RequirePackage{zref-savepos, zref-user}
279 \fi

\@ACM@acmcp@delta We need to store the dimen to store the insert length of amcp box
280 \newdimen\@ACM@acmcp@delta
281 \@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.

```

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

```

```

332 \NAT@longnamestrue\fi
333 \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
334 \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
335 \expandafter\NAT@find@eq\@tempa=\relax\@nil
336 \if\@tempc\relax\else
337 \expandafter\NAT@rem@eq\@tempc
338 \def\@tempb{open}\ifx\@tempa\@tempb
339 \xdef\NAT@open{\@tempc}\fi
340 \def\@tempb{close}\ifx\@tempa\@tempb
341 \xdef\NAT@close{\@tempc}\fi
342 \def\@tempb{aysep}\ifx\@tempa\@tempb
343 \xdef\NAT@aysep{\@tempc}\fi
344 \def\@tempb{yysep}\ifx\@tempa\@tempb
345 \xdef\NAT@yrsep{\@tempc}\fi
346 \def\@tempb{noteseq}\ifx\@tempa\@tempb
347 \xdef\NAT@cmt{\@tempc}\fi
348 \def\@tempb{citesep}\ifx\@tempa\@tempb
349 \xdef\NAT@sep{\@tempc}\fi
350 \fi
351 }%
352 \NAT@setcites
353 }
354 \renewcommand\citestyle[1]{%
355 \ifcsname bibstyle@#1\endcsname%
356 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
357 \else%
358 \@latex@error{Undefined ‘#1’ citestyle}%
359 \fi
360 }%
361 \fi

```

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

```

362 \newcommand{\bibstyle@acmauthoryear}{%
363 \setcitestyle{%
364 authoryear,%
365 open={},close={}},citesep={;},%
366 aysep={},yysep={},%
367 noteseq={, }}

```

`\bibstyle@acmnumeric` The default numeric format:

```

368 \newcommand{\bibstyle@acmnumeric}{%
369 \setcitestyle{%
370 numbers,sort&compress,%
371 open={},close={}},citesep={,},%
372 noteseq={, }}

```

The default is numeric:

```

373 \if@ACM@natbib
374 \citestyle{acmnumeric}
375 \fi

```

3.7 Internationalization

```

376 \if@ACM@journal

```

```

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

```

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

```

423 \newcommand\ACM@lang@check[1]{%
424 \ifx\ACM@languages\@empty\relax
425 \ClassError{\@classname}{%
426 Command \string#1 \MessageBreak is used in monlingual document}{%
427 You used a command (\string#1) \MessageBreak
428 that does not have a meaning \MessageBreak

```

```

429   unless are languages are defined. \MessageBreak
430   Please choose the languages in \string\documentclass
431   \MessageBreak
432   (e.g. \string\documentclass[languages={french, english}]{acmart}),
433   \MessageBreak
434   or delete the command.}%
435   \fi}

\@translatedtitle

436 \def\@translatedtitle{}

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

\@translatedsubtitle

439 \def\@translatedsubtitle{}

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

\@translatedkeywords

442 \def\@translatedkeywords{}

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

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

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

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

```

3.8 Sectioning

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

```

453 \def\@startsection#1#2#3#4#5#6{%
454   \if@noskipsec \leavevmode \fi
455   \par
456   \@tempskipa #4\relax

```

```

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

```

```

511 \par \nobreak
512 \vskip \@tempskipa
513 \@afterheading
514 \else
515 \@nobreakfalse
516 \global\@noskipsectrue
517 \everypar{%
518 \if@noskipsec
519 \global\@noskipsecfalse
520 {\setbox\z@\lastbox}%
521 \clubpenalty\@M
522 \begingroup \svsechd \endgroup
523 \unskip
524 \@tempskipa #1\relax
525 \hskip -\@tempskipa
526 \else
527 \clubpenalty \@clubpenalty
528 \everypar{}%
529 \fi}%
530 \fi
531 \ignorespaces}
532 \def\@secntformat#1{\csname the#1\endcsname\quad}
533 \def\@ssect#1#2#3#4#5{%
534 \@tempskipa #3\relax
535 \ifdim \@tempskipa>\z@
536 \begingroup
537 #4{%
538 \hangfrom{\hskip #1}%
539 \interlinepenalty \@M #5\@par}%
540 \endgroup
541 \else
542 \def\svsechd{#4{\hskip #1\relax #5}}%
543 \fi
544 \@xsect{#3}}

```

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

```

545 \def\@starttoc#1#2{\begingroup\makeatletter
546 \setTrue{#1}%
547 \par\removelastskip\vskip\z@skip
548 \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
549 {.5\linespacing}{\centering\contentsnamefont}{#2}%
550 \@input{\jobname.#1}%
551 \if@filesw
552 \xpnewwrite\csname tf@#1\endcsname
553 \immediate\xpopenout\csname tf@#1\endcsname \jobname.#1\relax
554 \fi
555 \global\@nobreakfalse \endgroup
556 \addvspace{32\p@\@plus14\p@}%
557 }

```

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

```

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

```



```

\l@section The spacing in amsart is too large
559 \def\l@section{\@tocline{2}{0pt}{1pc}{3pc}{}}

\l@subsubsection The spacing in amsart is too large
560 \def\l@subsubsection{\@tocline{3}{0pt}{1pc}{5pc}{}}

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

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

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

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

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

```

3.9 Hyperxmp and hyperref

Adding hyperref

```

587 \let\@footnotemark@nolink\@footnotemark
588 \let\@footnotetext@nolink\@footnotetext
589 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
590 \RequirePackage{hyperxmp}
591 \pdfstringdefDisableCommands{%
592   \def\addtocounter#1#2{}%
593   \def\unskip{}%
594   \def\textbullet{- }%

```

```

595 \def\textrightarrow{ -> }%
596 \def\footnotemark{}%
597 }
598 \urlstyle{rm}
599 \ifcase\ACM@format@nr
600 \relax % manuscript
601 \or % acmsmall
602 \or % acmlarge
603 \or % acmtog
604 \or % sigconf
605 \or % siggraph
606 \or % sigplan
607 \urlstyle{sf}
608 \or % sigchi
609 \or % sigchi-a
610 \urlstyle{sf}
611 \or % acmengage
612 \or % acmcp
613 \fi
614 \AtEndPreamble{%
615 \if@ACM@urlbreakonhyphens
616 \def\do@url@hyp{\do\~}%
617 \fi
618 \if@ACM@screen
619 \hypersetup{colorlinks,
620 linkcolor=ACMPurple,
621 citecolor=ACMPurple,
622 urlcolor=ACMDarkBlue,
623 filecolor=ACMDarkBlue}
624 \else
625 \hypersetup{hidelinks}
626 \fi
627 \hypersetup{pdflang={en},
628 pdfdisplaydoctitle}}
    Bibliography mangling.
629 \if@ACM@natbib
630 \let\citeN\cite
631 \let\cite\citep
632 \let\citeANP\citeauthor
633 \let\citeNN\citeyearpar
634 \let\citeyearNP\citeyear
635 \let\citeNP\citealt
636 \DeclareRobustCommand\citeA
637 {\begingroup\NAT@swafalse
638 \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
639 \providecommand\newblock{}%
640 \else
641 \AtBeginDocument{%
642 \let\shortcite\cite%
643 \providecommand\citename[1]{#1}}
644 \fi
645 \newcommand\shortcite[2][]{%
646 \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:

```
647 \def\bibliographystyle#1{%
648   \ifx\@begindocumenthook\undefined\else
649     \expandafter\AtBeginDocument
650     \fi
651     {\if@filesw
652       \immediate\write\@auxout{\string\bibstyle{#1}}%
653       \fi}}
```

3.10 Other packages

Graphics and color.

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

We define ACM colors according to [8]:

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

Author-draft mode or sigchi-a mode

```
664 \if@ACM@authordraft
665   \RequirePackage{draftwatermark}
666   \SetWatermarkFontSize{0.5in}
667   \SetWatermarkColor[gray]{.9}
668   \SetWatermarkText{\parbox{12em}{\centering
669     Unpublished working draft.\\
670     Not for distribution.}}
671 \else
672   \if@ACM@sigchi-mode
673     \if@ACM@nonacm\else
674       \RequirePackage{draftwatermark}
675       \SetWatermarkFontSize{0.5in}
676       \SetWatermarkColor[gray]{.9}
677       \SetWatermarkText{\parbox{12em}{\centering
678         Legacy document. \\
679         Not for publication in an ACM venue}}
680     \fi
681   \fi
682 \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>.

```
683 \RequirePackage{geometry}
```

```

684 \ifcase\ACM@format@nr
685 \relax % manuscript
686   \geometry{letterpaper,head=13pt,
687     marginparwidth=6pc,heightrounded}%
688 \or % acmsmall
689   \geometry{twoside=true,
690     includeheadfoot, head=13pt, foot=2pc,
691     paperwidth=6.75in, paperheight=10in,
692     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
693     marginparwidth=2pc,heightrounded
694   }%
695 \or % acmlarge
696   \geometry{twoside=true, head=13pt, foot=2pc,
697     paperwidth=8.5in, paperheight=11in,
698     includeheadfoot,
699     top=78pt, bottom=114pt, inner=81pt, outer=81pt,
700     marginparwidth=4pc,heightrounded
701   }%
702 \or % acmtog
703   \geometry{twoside=true, head=13pt, foot=2pc,
704     paperwidth=8.5in, paperheight=11in,
705     includeheadfoot, columnsep=24pt,
706     top=52pt, bottom=75pt, inner=52pt, outer=52pt,
707     marginparwidth=2pc,heightrounded
708   }%
709 \or % sigconf
710   \geometry{twoside=true, head=13pt,
711     paperwidth=8.5in, paperheight=11in,
712     includeheadfoot, columnsep=2pc,
713     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
714     marginparwidth=2pc,heightrounded
715   }%
716 \or % siggraph
717   \geometry{twoside=true, head=13pt,
718     paperwidth=8.5in, paperheight=11in,
719     includeheadfoot, columnsep=2pc,
720     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
721     marginparwidth=2pc,heightrounded
722   }%
723 \or % sigplan
724   \geometry{twoside=true, head=13pt,
725     paperwidth=8.5in, paperheight=11in,
726     includeheadfoot=false, columnsep=2pc,
727     top=1in, bottom=1in, inner=0.75in, outer=0.75in,
728     marginparwidth=2pc,heightrounded
729   }%
730 \or % sigchi
731   \geometry{twoside=true, head=13pt,
732     paperwidth=8.5in, paperheight=11in,
733     includeheadfoot, columnsep=2pc,
734     top=66pt, bottom=73pt, inner=54pt, outer=54pt,
735     marginparwidth=2pc,heightrounded
736   }%
737 \or % sigchi-a

```

```

738 \geometry{twoside=false, head=13pt,
739   paperwidth=11in, paperheight=8.5in,
740   includeheadfoot, marginparsep=72pt,
741   marginparwidth=170pt, columnsep=20pt,
742   top=72pt, bottom=72pt, left=314pt, right=72pt
743 }%
744 \@mparswitchfalse
745 \reversemarginpar
746 \or % acmengage
747 \geometry{twoside=true, head=13pt,
748   paperwidth=8.5in, paperheight=11in,
749   includeheadfoot, columnsep=2pc,
750   top=57pt, bottom=73pt, inner=54pt, outer=54pt,
751   marginparwidth=2pc,heightrounded
752 }%
753 \or % acmcp
754 \geometry{twoside=true,
755   includeheadfoot, head=13pt, foot=2pc,
756   paperwidth=6.75in, paperheight=10in,
757   top=58pt, bottom=44pt, inner=46pt, outer=46pt,
758   marginparwidth=2pc,heightrounded
759 }%
760 \fi

```

`\parindent` Paragraphing

```

\parskip 761 \setlength\parindent{10\p@}
762 \setlength\parskip{\z@}
763 \ifcase\ACM@format@nr
764 \relax % manuscript
765 \or % acmsmall
766 \or % acmlarge
767 \or % acmtog
768 \setlength\parindent{9\p@}%
769 \or % sigconf
770 \or % siggraph
771 \or % sigplan
772 \or % sigchi
773 \or % sigchi-a
774 \or % acmengage
775 \or % acmcp
776 \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.

```
777 \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.

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

780 \RequirePackage{manyfoot}
781 \SelectFootnoteRule[2]{copyrightpermission}
782 \DeclareNewFootnote{authorsaddresses}
783 \SelectFootnoteRule[2]{copyrightpermission}
784 \DeclareNewFootnote{copyrightpermission}
```

\footnoterule Tschichold's rules:

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

\endminipage We do not use footnote rules in minipages

```
787 \def\endminipage{%
788 \par
789 \unskip
790 \ifvoid\@mpfootins\else
791 \vskip\skip\@mpfootins
792 \normalcolor
793 \unvbox\@mpfootins
794 \fi
795 \@minipagefalse
796 \color@endgroup
797 \egroup
798 \expandafter\@iiparbox\@mpargs{\unvbox\@tempboxa}}
```

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

```
799 \def\@textbottom{\vskip \z@ \@plus 1pt}
800 \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.

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

```

818 \or % acmcp
819 \flushbottom
820 \fi

```

3.12 Fonts

Somehow PDF_TTeX 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.

```

821 \ifPDFTeX
822 \input{glyphtounicode}
823 \pdfglyphtounicode{f_f}{FB00}
824 \pdfglyphtounicode{f_f_i}{FB03}
825 \pdfglyphtounicode{f_f_l}{FB04}
826 \pdfglyphtounicode{f_i}{FB01}
827 \pdfglyphtounicode{t_t}{0074 0074}
828 \pdfglyphtounicode{f_t}{0066 0074}
829 \pdfglyphtounicode{T_h}{0054 0068}
830 \pdfgentounicode=1
831 \RequirePackage{cmap}
832 \fi

```

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

```

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

```

We use Libertine throughout.

```

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

```

```

861     \RequirePackage[varqu]{zi4}
862     \RequirePackage[libertine]{newtxmath}
863   \fi
864 \fi
865 \fi

```

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

```

866 \let\liningnums\@undefined
867 \AtEndPreamble{%
868   \DeclareTextFontCommand{\liningnums}{\libertineLF}}

```

The SIGCHI extended abstracts are sans serif:

```

869 \if@ACM@sigchiamode
870   \renewcommand{\familydefault}{\sfdefault}
871 \fi

```

3.13 Image descriptions

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

```

872 \newif\if@Description@present
873 \@Description@presenttrue

```

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

```

874 \newif\if@undescribed@images
875 \@undescribed@imagesfalse

```

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

```

876 \newcommand\Description[2][\global\@Description@presenttrue\ignorespaces]

```

The global warning

```

877 \AtEndDocument{\if@undescribed@images
878   \ClassWarningNoLine{\@classname}{Some images may lack descriptions}\fi}

```

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

```

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

```



```

896 \let\@vspacer\@vspacer@orig}
897 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
898 \let\@vspacer\@vspacer@orig}
899 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
900 \let\@vspacer\@vspacer@orig}
901 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
902 \let\@vspacer\@vspacer@orig}
903 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
904 \let\@vspacer\@vspacer@orig}
905 \AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig
906 \let\@vspacer\@vspacer@orig}
907 \AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig
908 \let\@vspacer\@vspacer@orig}
909 \AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig
910 \let\@vspacer\@vspacer@orig}
911

```

3.14 Floats

We use the caption package

```

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

```

```

sidebar The sidebar environment:
946 \newfloat{sidebar}{}{sbar}
947 \floatname{sidebar}{Sidebar}
948 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}

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

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

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

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

\@margintable The processing of the saved text
964 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
965 \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
966 \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
967 \newdimen\fulltextwidth
968 \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)
969 \if@ACM@sigchiamode
970 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
971 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
972 \let\@endfloatbox\@endwidefloatbox
973 \def\@fpsadddefault{\def\@fps{tp}}%
974 \@float}
975 \fi

\end@dblfloat And the end. Just adding a \bgroup.
976 \if@ACM@sigchiamode
977 \def\end@dblfloat{%
978 \end@float\egroup}
979 \fi

```

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

```
980 \def\@endwidefloatbox{%
981   \par\vskip\z@skip
982   \@minipagefalse
983   \outer@nobreak
984   \egroup
985   \color@endbox
986   \global\setbox\@currbox=\vbox{\moveleft
987     \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
988   \wd\@currbox=\textwidth
989 }
```

3.15 Lists

```
990 \ifcase\ACM@format@nr
991 \relax % manuscript
992 \or % acmsmall
993 \or % acmlarge
994 \or % acmtog
995 \or % sigconf
996 \or % siggraph
997 \or % sigplan
998 \def\labelenumi{\theenumi.}
999 \def\labelenumii{\theenumii.}
1000 \def\labelenumiii{\theenumiii.}
1001 \def\labelenumiv{\theenumiv.}
1002 \or % sigchi
1003 \or % sigchi-a
1004 \or % acmengage
1005 \or % acmcp
1006 \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`.

```
1007 \newdimen\@ACM@labelwidth
1008 \AtBeginDocument{%
1009   \setlength\labelsep{4pt}
1010   \setlength{\@ACM@labelwidth}{6.5pt}
1011
1012   %% First-level list: when beginning after the first line of an
1013   %% indented paragraph or ending before an indented paragraph, labels
1014   %% should not hang to the left of the preceding/following text.
1015   \setlength\leftmargini{\z@}
1016   \addtolength\leftmargini{\parindent}
1017   \addtolength\leftmargini{2\labelsep}
1018   \addtolength\leftmargini{\@ACM@labelwidth}
1019
1020   %% Second-level and higher lists.
1021   \setlength\leftmarginii{\z@}
1022   \addtolength\leftmarginii{0.5\labelsep}
```

```

1023 \addtolength\leftmarginii{\@ACM@labelwidth}
1024 \setlength\leftmarginiii{\leftmarginii}
1025 \setlength\leftmarginiv{\leftmarginiii}
1026 \setlength\leftmarginv{\leftmarginiv}
1027 \setlength\leftmarginvi{\leftmarginv}
1028 \@listi}
1029 \newskip\listisep
1030 \listisep\smallskipamount
1031 \def\@listI{\leftmargin\leftmargini
1032 \labelwidth\leftmargini \advance\labelwidth-\labelsep
1033 \listparindent\z@
1034 \topsep\listisep}
1035 \let\@listi\@listI
1036 \def\@listii{\leftmargin\leftmarginii
1037 \labelwidth\leftmarginii \advance\labelwidth-\labelsep
1038 \topsep\z@skip}
1039 \def\@listiii{\leftmargin\leftmarginiii
1040 \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
1041 \def\@listiv{\leftmargin\leftmarginiv
1042 \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
1043 \def\@listv{\leftmargin\leftmarginv
1044 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
1045 \def\@listvi{\leftmargin\leftmarginvi
1046 \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}

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

1047 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}

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

1048 \renewenvironment{description}{\list{}}{%
1049 \labelwidth\@ACM@labelwidth
1050 \let\makelabel\descriptionlabel}%
1051 }{
1052 \endlist
1053 }
1054 \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.

```

1055 \newif\if@ACM@maketitle@typeset
1056 \@ACM@maketitle@typesetfalse

```

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

```

1057 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
1058 ACMJCSS,%
1059 CIE,%
1060 CSUR,%
1061 DGOV,%
1062 DLT,%
1063 DTRAP,%
1064 FAC,%

```

1065	GAMES,%
1066	HEALTH,%
1067	IMWUT,%
1068	JACM,%
1069	JATS,%
1070	JDIQ,%
1071	JDS,%
1072	JEA,%
1073	JERIC,%
1074	JETC,%
1075	JOCCH,%
1076	JRC,%
1077	PACMCGIT,%
1078	PACMHCI,%
1079	PACMMOD,%
1080	PACMNET,%
1081	PACMPL,%
1082	PACMSE,%
1083	POMACS,%
1084	TAAS,%
1085	TACCESS,%
1086	TACO,%
1087	TALG,%
1088	TALLIP,%
1089	TAP,%
1090	TCPS,%
1091	TDS,%
1092	TEAC,%
1093	TECS,%
1094	TELO,%
1095	THRI,%
1096	TIIS,%
1097	TIOT,%
1098	TISSEC,%
1099	TIST,%
1100	TKDD,%
1101	TMIS,%
1102	TOCE,%
1103	TOCHI,%
1104	TOCL,%
1105	TOCS,%
1106	TOCT,%
1107	TODAES,%
1108	TODS,%
1109	TOG,%
1110	TOIS,%
1111	TOIT,%
1112	TOMACS,%
1113	TOMM,%
1114	TOMPECS,%
1115	TOMS,%
1116	TOPC,%
1117	TOPS,%
1118	TOPLAS,%

```

1119 TOPML,%
1120 TORS,%
1121 TOS,%
1122 TOSEM,%
1123 TOSN,%
1124 TQC,%
1125 TRETs,%
1126 TSAS,%
1127 TSC,%
1128 TSLP,%
1129 TWEB,%
1130 FACMP%
1131 }{%
1132 \ifcase\@journalCode@nr
1133 \relax % ACMJCSS
1134 \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
1135 \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%
1136 \def\@permissionCodeOne{2834-5533}%
1137 \or % CIE
1138 \def\@journalName{ACM Computers in Entertainment}%
1139 \def\@journalNameShort{ACM Comput. Entertain.}%
1140 \def\@permissionCodeOne{1544-3574}%
1141 \or % CSUR
1142 \def\@journalName{ACM Computing Surveys}%
1143 \def\@journalNameShort{ACM Comput. Surv.}%
1144 \def\@permissionCodeOne{0360-0300}%
1145 \or % DGOV
1146 \def\@journalName{Digital Government: Research and Practice}%
1147 \def\@journalNameShort{Digit. Gov. Res. Pract.}%
1148 \def\@permissionCodeOne{2639-0175}%
1149 \or % DLT
1150 \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
1151 \def\@journalNameShort{Distrib. Ledger Technol.}%
1152 \def\@permissionCodeOne{2769-6472}%
1153 \or % DTRAP
1154 \def\@journalName{Digital Threats: Research and Practice}%
1155 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1156 \def\@permissionCodeOne{2576-5337}%
1157 \or % FAC
1158 \def\@journalName{Formal Aspects of Computing}%
1159 \def\@journalNameShort{Form. Asp. Comput.}%
1160 \def\@permissionCodeOne{0934-5043}%
1161 \def\@permissionCodeTwo{1433-299X}%
1162 \or % GAMES
1163 \def\@journalName{ACM Games: Research and Practice}%
1164 \def\@journalNameShort{ACM Games}%
1165 \def\@permissionCodeOne{2832-5516}%
1166 \or % HEALTH
1167 \def\@journalName{ACM Transactions on Computing for Healthcare}%
1168 \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1169 \def\@permissionCodeOne{2637-8051}%
1170 \or % IMWUT
1171 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1172     Wearable and Ubiquitous Technologies}%

```

```

1173 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
1174 \def\@permissionCodeOne{2474-9567}%
1175 \@ACM@screentruer
1176 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1177 \or % JACM
1178 \def\@journalName{Journal of the ACM}%
1179 \def\@journalNameShort{J. ACM}%
1180 \def\@permissionCodeOne{0004-5411}%
1181 \or % JATS
1182 \def\@journalName{Journal on Autonomous Transportation Systems}%
1183 \def\@journalNameShort{ACM J. Auton. Transport. Syst.}%
1184 \def\@permissionCodeOne{2833-0528}%
1185 \or % JDIQ
1186 \def\@journalName{ACM Journal of Data and Information Quality}%
1187 \def\@journalNameShort{ACM J. Data Inform. Quality}%
1188 \def\@permissionCodeOne{1936-1955}%
1189 \or % JDS
1190 \def\@journalName{ACM/IMS Journal of Data Science}%
1191 \def\@journalNameShort{ACM/IMS J. Data Sci.}%
1192 \def\@permissionCodeOne{2831-3194}%
1193 \def\@permissionCodeTwo{2831-3194}%
1194 \or % JEA
1195 \def\@journalName{ACM Journal of Experimental Algorithmics}%
1196 \def\@journalNameShort{ACM J. Exp. Algor.}%
1197 \def\@permissionCodeOne{1084-6654}%
1198 \or % JERIC
1199 \def\@journalName{ACM Journal of Educational Resources in Computing}%
1200 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
1201 \def\@permissionCodeOne{1073-0516}%
1202 \or % JETC
1203 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
1204 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1205 \def\@permissionCodeOne{1550-4832}%
1206 \or % JOCCH
1207 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1208 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1209 \def\@permissionCodeOne{1556-4673}%
1210 \def\@permissionCodeTwo{1556-4711}%
1211 \or % JRC
1212 \def\@journalName{ACM Journal on Responsible Computing}%
1213 \def\@journalNameShort{ACM J. Responsib. Comput.}%
1214 \def\@permissionCodeOne{2832-0565}%
1215 \or % PACMCGIT
1216 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1217 \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1218 \def\@permissionCodeOne{2577-6193}%
1219 \@ACM@screentruer
1220 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1221 \or % PACMHCI
1222 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
1223 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
1224 \def\@permissionCodeOne{2573-0142}%
1225 \@ACM@screentruer
1226 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%

```

```

1227 \or % PACMMOD
1228 \def\@journalName{Proceedings of the ACM on Management of Data}%
1229 \def\@journalNameShort{Proc. ACM Manag. Data}%
1230 \def\@permissionCodeOne{2836-6573}%
1231 \or % PACMNET
1232 \def\@journalName{Proceedings of the ACM on Networkng}%
1233 \def\@journalNameShort{Proc. ACM Netw.}%
1234 \def\@permissionCodeOne{2834-5509}%
1235 \or % PACMPL
1236 \def\@journalName{Proceedings of the ACM on Programming Languages}%
1237 \def\@journalNameShort{Proc. ACM Program. Lang.}%
1238 \def\@permissionCodeOne{2475-1421}%
1239 \@ACM@screentruue
1240 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1241 \or % PACMSE
1242 \def\@journalName{Proceedings of the ACM on Software Engineering}%
1243 \def\@journalNameShort{Proc. ACM Softw. Eng.}%
1244 \def\@permissionCodeOne{2994-970X}%
1245 \@ACM@screentruue
1246 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1247 \or % POMACS
1248 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1249 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1250 \def\@permissionCodeOne{2476-1249}%
1251 \@ACM@screentruue
1252 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1253 \or % TAAS
1254 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
1255 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
1256 \def\@permissionCodeOne{1556-4665}%
1257 \or % TACCESS
1258 \def\@journalName{ACM Transactions on Accessible Computing}%
1259 \def\@journalNameShort{ACM Trans. Access. Comput.}%
1260 \def\@permissionCodeOne{1936-7228}%
1261 \or % TACO
1262 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1263 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1264 \def\@permissionCodeOne{1544-3566}%
1265 \def\@permissionCodeTwo{1544-3973}%
1266 \or % TALG
1267 \def\@journalName{ACM Transactions on Algorithms}%
1268 \def\@journalNameShort{ACM Trans. Algor.}%
1269 \def\@permissionCodeOne{1549-6325}%
1270 \or % TALLIP
1271 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1272 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1273 \def\@permissionCodeOne{2375-4699}%
1274 \or % TAP
1275 \def\@journalName{ACM Transactions on Applied Perception}%
1276 \def\@journalNameShort{ACM Trans. Appl. Percept.}%
1277 \def\@permissionCodeOne{1544-3558}%
1278 \or % TCPS
1279 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1280 \def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%

```



```

1281 \def\@permissionCodeOne{2378-962X}%
1282 \or % TDS
1283 \def\@journalName{ACM/IMS Transactions on Data Science}%
1284 \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
1285 \def\@permissionCodeOne{2577-3224}%
1286 \or % TEAC
1287 \def\@journalName{ACM Transactions on Economics and Computation}%
1288 \def\@journalNameShort{ACM Trans. Econ. Comput.}%
1289 \def\@permissionCodeOne{2167-8375}%
1290 \or % TECS
1291 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
1292 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1293 \def\@permissionCodeOne{1539-9087}%
1294 \or % TELO
1295 \def\@journalName{ACM Transactions on Evolutionary Learning}%
1296 \def\@journalNameShort{ACM Trans. Evol. Learn.}%
1297 \def\@permissionCodeOne{2688-3007}%
1298 \or % THRI
1299 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
1300 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1301 \def\@permissionCodeOne{2573-9522}%
1302 \or % TIIS
1303 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
1304 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1305 \def\@permissionCodeOne{2160-6455}%
1306 \or % TIOT
1307 \def\@journalName{ACM Transactions on Internet of Things}%
1308 \def\@journalNameShort{ACM Trans. Internet Things}%
1309 \def\@permissionCodeOne{2577-6207}%
1310 \or % TISSEC
1311 \def\@journalName{ACM Transactions on Information and System Security}%
1312 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1313 \def\@permissionCodeOne{1094-9224}%
1314 \or % TIST
1315 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1316 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1317 \def\@permissionCodeOne{2157-6904}%
1318 \or % TKDD
1319 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
1320 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1321 \def\@permissionCodeOne{1556-4681}%
1322 \or % TMIS
1323 \def\@journalName{ACM Transactions on Management Information Systems}%
1324 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1325 \def\@permissionCodeOne{2158-656X}%
1326 \or % TOCE
1327 \def\@journalName{ACM Transactions on Computing Education}%
1328 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
1329 \def\@permissionCodeOne{1946-6226}%
1330 \or % TOCHI
1331 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1332 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1333 \def\@permissionCodeOne{1073-0516}%
1334 \or % TOCL

```

```

1335 \def\@journalName{ACM Transactions on Computational Logic}%
1336 \def\@journalNameShort{ACM Trans. Comput. Logic}%
1337 \def\@permissionCodeOne{1529-3785}%
1338 \or % TOCS
1339 \def\@journalName{ACM Transactions on Computer Systems}%
1340 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1341 \def\@permissionCodeOne{0734-2071}%
1342 \or % TOCT
1343 \def\@journalName{ACM Transactions on Computation Theory}%
1344 \def\@journalNameShort{ACM Trans. Comput. Theory}%
1345 \def\@permissionCodeOne{1942-3454}%
1346 \or % TODAES
1347 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1348 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1349 \def\@permissionCodeOne{1084-4309}%
1350 \or % TODS
1351 \def\@journalName{ACM Transactions on Database Systems}%
1352 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
1353 \def\@permissionCodeOne{0362-5915}%
1354 \or % TOG
1355 \def\@journalName{ACM Transactions on Graphics}%
1356 \def\@journalNameShort{ACM Trans. Graph.}%
1357 \def\@permissionCodeOne{0730-0301}%
1358 \or % TOIS
1359 \def\@journalName{ACM Transactions on Information Systems}%
1360 \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1361 \def\@permissionCodeOne{1046-8188}%
1362 \or % TOIT
1363 \def\@journalName{ACM Transactions on Internet Technology}%
1364 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1365 \def\@permissionCodeOne{1533-5399}%
1366 \or % TOMACS
1367 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1368 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1369 \def\@permissionCodeOne{1049-3301}%
1370 \def\@permissionCodeTwo{1558-1195}%
1371 \or % TOMM
1372 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
1373 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1374 \def\@permissionCodeOne{1551-6857}%
1375 \def\@permissionCodeTwo{1551-6865}%
1376 \or % TOMPECS
1377 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1378 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1379 \def\@permissionCodeOne{2376-3639}%
1380 \or % TOMS
1381 \def\@journalName{ACM Transactions on Mathematical Software}%
1382 \def\@journalNameShort{ACM Trans. Math. Softw.}%
1383 \def\@permissionCodeOne{0098-3500}%
1384 \or % TOPC
1385 \def\@journalName{ACM Transactions on Parallel Computing}%
1386 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1387 \def\@permissionCodeOne{2329-4949}%
1388 \def\@permissionCodeTwo{2329-4957}%

```

```

1389 \or % TOPS
1390 \def\@journalName{ACM Transactions on Privacy and Security}%
1391 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1392 \def\@permissionCodeOne{2471-2566}%
1393 \or % TOPLAS
1394 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1395 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1396 \def\@permissionCodeOne{0164-0925}%
1397 \or % TOPML
1398 \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
1399 \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
1400 \def\@permissionCodeOne{2836-8924}%
1401 \or % TORS
1402 \def\@journalName{ACM Transactions on Recommender Systems}%
1403 \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
1404 \def\@permissionCodeOne{2770-6699}%
1405 \or % TOS
1406 \def\@journalName{ACM Transactions on Storage}%
1407 \def\@journalNameShort{ACM Trans. Storage}%
1408 \def\@permissionCodeOne{1553-3077}%
1409 \or % TOSEM
1410 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1411 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1412 \def\@permissionCodeOne{1049-331X}%
1413 \or % TOSN
1414 \def\@journalName{ACM Transactions on Sensor Networks}%
1415 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1416 \def\@permissionCodeOne{1550-4859}%
1417 \or % TQC
1418 \def\@journalName{ACM Transactions on Quantum Computing}%
1419 \def\@journalNameShort{ACM Trans. Quantum Comput.}%
1420 \def\@permissionCodeOne{2643-6817}%
1421 \or % TRETS
1422 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1423 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1424 \def\@permissionCodeOne{1936-7406}%
1425 \or % TSAS
1426 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1427 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1428 \def\@permissionCodeOne{2374-0353}%
1429 \or % TSC
1430 \def\@journalName{ACM Transactions on Social Computing}%
1431 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1432 \def\@permissionCodeOne{2469-7818}%
1433 \or % TSLP
1434 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1435 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1436 \def\@permissionCodeOne{1550-4875}%
1437 \or % TWEB
1438 \def\@journalName{ACM Transactions on the Web}%
1439 \def\@journalNameShort{ACM Trans. Web}%
1440 \def\@permissionCodeOne{1559-1131}%
1441 \else % FACMP, a dummy journal
1442 \def\@journalName{ACM Just Accepted}%

```

```

1443 \def\@journalNameShort{ACM Accepted}%
1444 \def\@permissionCodeOne{XXXX-XXXX}%
1445 \fi
1446 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1447 }{%
1448 \ClassError{\@classname}{Incorrect journal #1}%
1449 }%

```

`\acmJournal` And the syntactic sugar around it

```

1450 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
1451 \global\@ACM@journal@bibstriptrue
1452 \global\@ACM@journal@bibstrip@or@togtrue}

```

The defaults:

```

1453 \def\@journalCode@nr{0}
1454 \def\@journalName{}%
1455 \def\@journalNameShort{\@journalName}%
1456 \def\@permissionCodeOne{XXXX-XXXX}%
1457 \def\@permissionCodeTwo{\@permissionCodeOne}%

```

`\acmConference` This is the conference command

```

1458 \newcommand\acmConference[4][{}]{%
1459 \gdef\acmConference@shortname{#1}%
1460 \gdef\acmConference@name{#2}%
1461 \gdef\acmConference@date{#3}%
1462 \gdef\acmConference@venue{#4}%
1463 \ifx\acmConference@shortname\@empty
1464 \gdef\acmConference@shortname{#2}%
1465 \fi
1466 \global\@ACM@journal@bibstripfalse
1467 \ifx\@acmBooktitle\@empty\relax
1468 \acmBooktitle{Proceedings of \acmConference@name
1469 \ifx\acmConference@name\acmConference@shortname\else
1470 \ (\acmConference@shortname)\fi}%
1471 \fi
1472 }
1473 \if@ACM@journal\else
1474 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1475 DC, USA}%
1476 \fi

```

`\acmBooktitle` The book title of the conference:

```

\@acmBooktitle 1477 \def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
1478 \acmBooktitle{}

```

`\@editorsAbbrev` How to abbreviate editors

```

1479 \def\@editorsAbbrev{(Ed.)}

```

`\@acmEditors` The list of editors

```

1480 \def\@acmEditors{}

```

`\editor` Add a new editor to the list

```

1481 \def\editor#1{\ifx\@acmEditors\@empty

```

```

1482 \gdef\@acmEditors{#1}%
1483 \else
1484 \gdef\@editorsAbbrev{(Eds.)}%
1485 \g@addto@macro\@acmEditors{\and#1}%
1486 \fi}

\subtitle The subtitle macro
1487 \def\subtitle#1{\def\@subtitle{#1}}
1488 \subtitle{}

\num@authorgroups The total number of “groups”. Each group is several authors with the same affiliations(s)
1489 \newcount\num@authorgroups
1490 \num@authorgroups=0\relax

\num@authors The total number of authors
1491 \newcount\num@authors
1492 \num@authors=0\relax

\if@insideauthorgroup Whether we are continuing an author group
1493 \newif\if@insideauthorgroup
1494 \@insideauthorgroupfalse

\author Adding an author to the list of authors and addresses.
    Note that we want to typeset the link to the author’s orcid if known. The problem
    is, we know the orcid only after the author is entered. The trick is based on the idea
    that \csname...\endcsname is \relax unless defined. Therefore we typeset authors by
    the special macro \csname typeset@author\the\num@authors\endcsname, which is
    defined by \orcid command.
1495 \renewcommand\author[2][{}%
1496 \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\@classname}{Do not put several
1497 authors in the same \string\author\space macro!}}{}%
1498 \global\advance\num@authors by 1\relax
1499 \if@insideauthorgroup\else
1500 \global\advance\num@authorgroups by 1\relax
1501 \global\@insideauthorgrouptrue
1502 \fi
1503 \ifx\addresses\@empty
1504 \if@ACM@anonymous
1505 \gdef\addresses{\@author{Anonymous Author(s)}%
1506 \ifx\@acmSubmissionID\@empty\else\Submission Id:
1507 \@acmSubmissionID\fi}}%
1508 \gdef\authors{Anonymous Author(s)}%
1509 \else
1510 \expandafter\gdef\expandafter\addresses\expandafter{%
1511 \expandafter\@author\expandafter{%
1512 \csname typeset@author\the\num@authors\endcsname{#2}}}%
1513 \gdef\authors{#2}%
1514 \fi
1515 \else
1516 \if@ACM@anonymous\else
1517 \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
1518 \expandafter\and\expandafter\@author\expandafter{%
1519 \csname typeset@author\the\num@authors\endcsname{#2}}}%

```

```

1520     \g@addto@macro\authors{\and#2}%
1521     \fi
1522 \fi
1523 \if@ACM@anonymous
1524     \ifx\shortauthors\@empty
1525         \gdef\shortauthors{Anon.
1526             \ifx\@acmSubmissionID\@empty\else Submission Id:
1527                 \@acmSubmissionID\fi}%
1528     \fi
1529 \else
1530     \def\@tempa{#1}%
1531     \ifx\@tempa\@empty
1532         \ifx\shortauthors\@empty
1533             \gdef\shortauthors{#2}%
1534         \else
1535             \g@addto@macro\shortauthors{\and#2}%
1536         \fi
1537     \else
1538         \ifx\shortauthors\@empty
1539             \gdef\shortauthors{#1}%
1540         \else
1541             \g@addto@macro\shortauthors{\and#1}%
1542         \fi
1543     \fi
1544 \fi}

```

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

```

1545 \newcommand{\affiliation}[2][{}]{%
1546     \global\@insideauthorgroupfalse
1547     \if@ACM@anonymous\else
1548         \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1549     \fi}

```

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

```

1550 \define@boolkey+{@ACM@affiliation@}[@ACM@affiliation@]{obeypunctuation}%
1551 [true][{}]{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

```

`\additionalaffiliation` Additional affiliations go to footnotes

```

1552 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

```

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

```

1553 \def\@additionalaffiliation#1{\bgroup
1554     \def\position##1{\ignorespaces}%
1555     \def\institution##1{##1\ignorespaces}%
1556     \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1557     \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
1558     \let\streetaddress\position
1559     \let\city\position
1560     \let\state\position
1561     \let\postcode\position
1562     \let\country\position
1563     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.

```
1564 \renewcommand{\email}[2][{}]{%
1565   \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1566     addresses in the same \string\email\space macro!}}{}%
1567   \if@ACM@anonymous\else
1568     \g@addto@macro\addresses{\email{#1}{#2}}%
1569   \fi}
```

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

```
1570 \def\orcid#1{\unskip\ignorespaces%
1571   \IfBeginWith{#1}{http}{%
1572     \expandafter\gdef\csname
1573       typeset@author\the\num@authors\endcsname##1{%
1574         \href{#1}{##1}}}%
1575   \expandafter\gdef\csname
1576     typeset@author\the\num@authors\endcsname##1{%
1577     \href{https://orcid.org/#1}{##1}}}
```

`\authorsaddresses` Setting up authors' addresses

```
1578 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1579 \authorsaddresses{\@mkauthorsaddresses}
```

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

```
1580 \newcommand\@mktranslatedkeywords[2]{\bgroup
1581   \selectlanguage{#1}%
1582   {\@specialsection{\keywordsname}%
1583     \noindent#2\par}\egroup}
```

`\@titlenotes` The title notes

```
1584 \def\@titlenotes{}
```

`\titlenote` Adding a note to the title

```
1585 \def\titlenote#1{%
1586   \g@addto@macro\@title{\footnotemark}%
1587   \if@ACM@anonymous
1588     \g@addto@macro\@titlenotes{%
1589       \stepcounter{footnote}\footnotetext{Title note}}%
1590   \else
1591     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1592   \fi}
```

`\@subtitlenotes` The subtitle notes

```
1593 \def\@subtitlenotes{}
```

`\subtitlenote` Adding a note to the subtitle

```
1594 \def\subtitlenote#1{%
1595   \g@addto@macro\@subtitle{\footnotemark}%
1596   \if@ACM@anonymous
1597     \g@addto@macro\@subtitlenotes{%
1598       \stepcounter{footnote}\footnotetext{Subtitle note}}%
1599   \else
1600     \g@addto@macro\@subtitlenotes{%
```

```

1601         \stepcounter{footnote}\footnotetext{#1}}%
1602     \fi}

\@authornotes The author notes
1603 \def\@authornotes{}

\authornote Adding a note to the author
1604 \def\authornote#1{%
1605     \if@ACM@anonymous\else
1606         \g@addto@macro\addresses{\@authornotemark}%
1607         \g@addto@macro\@authornotes{%
1608             \stepcounter{footnote}\footnotetext{#1}}%
1609     \fi}

\authornotemark Adding a footnote mark to the authors
1610 \newcommand\authornotemark[1][\relax]{%
1611     \ifx#1\relax\relax\relax
1612     \g@addto@macro\addresses{\@authornotemark}%
1613     \else
1614     \g@addto@macro\addresses{\@authornotemark{#1}}%
1615     \fi}

\acmVolume The current volume
1616 \def\acmVolume#1{\def\@acmVolume{#1}}
1617 \acmVolume{1}

\acmNumber The current number
1618 \def\acmNumber#1{\def\@acmNumber{#1}}
1619 \acmNumber{1}

\acmArticle The current article
1620 \def\acmArticle#1{\def\@acmArticle{#1}}
1621 \acmArticle{}

\acmArticleSeq The sequence number
1622 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
1623 \acmArticleSeq{\@acmArticle}

\acmYear The current year
1624 \def\acmYear#1{\def\@acmYear{#1}}
1625 \acmYear{\the\year}

\acmMonth The current month
1626 \def\acmMonth#1{\def\@acmMonth{#1}}
1627 \acmMonth{\the\month}

\@acmPubDate The publication date
1628 \def\@acmPubDate{\ifcase\@acmMonth\or
1629     January\or February\or March\or April\or May\or June\or
1630     July\or August\or September\or October\or November\or
1631     December\fi~\@acmYear}

```


`\acmPrice` The price—obsolete

```

1632 \def\acmPrice#1{\ClassWarning{\@classname}{The macro \string\acmPrice
1633      is obsolete. ACM no longer prints the price in bibstrip.}}
```

`\acmSubmissionID` The submission ID

```

1634 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
1635 \acmSubmissionID{}
```

`\acmISBN` The book ISBN

```

1636 \def\acmISBN#1{\def\@acmISBN{#1}}
1637 \acmISBN{978-x-xxxx-xxxx-x/YY/MM}
```

`\acmDOI` The paper DOI

```

1638 \def\acmDOI#1{\def\@acmDOI{#1}}
1639 \acmDOI{10.1145/nnnnnnnn.nnnnnnn}
```

`\if@ACM@badge`

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

```

1640 \newlength\@ACM@badge@width
1641 \setlength\@ACM@badge@width{3pc}
```

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

```

1642 \newlength\@ACM@title@width
```

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

```

1643 \newlength\@ACM@badge@skip
1644 \setlength\@ACM@badge@skip{1pt}
```

`\@acmBadgeR`

```

1645 \def\@acmBadgeR{}
```

`\@acmBadgeL`

```

1646 \def\@acmBadgeL{}
```

`\acmBadgeR` Setting the right badge

```

1647 \newcommand\acmBadgeR[2][\%
1648   \ifx\@acmBadgeR\@empty
1649     \gdef\@acmBadgeR{%
1650       \smash{%
1651         \raisebox{0.5\height}{%
1652           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1653   \else
1654     \g@addto@macro{\@acmBadgeR}{%
1655       \hspace{\@ACM@badge@skip}%
1656       \smash{%
1657         \raisebox{0.5\height}{%
1658           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1659   \fi}
```

`\acmBadgeL` Setting the left badge

```
1660 \newcommand\acmBadgeL[2][\{%  
1661   \ifx\@acmBadgeL\@empty  
1662     \gdef\@acmBadgeL{%  
1663       \smash{%  
1664         \raisebox{0.5\height}{%  
1665           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}%  
1666     \else  
1667       \g@addto@macro{\@acmBadgeL}{%  
1668         \hspace{\@ACM@badge@skip}%  
1669         \smash{%  
1670           \raisebox{0.5\height}{%  
1671             \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}%  
1672         \fi}  
1673     \fi}
```

`\acmBadge` Just a syntax sugar for `\acmBadgeR`

```
1673 \let\acmBadge=\acmBadgeR
```

`\startPage` The start page of the paper

```
1674 \def\startPage#1{\def\@startPage{#1}}  
1675 \startPage{}
```

`\terms` Terms are obsolete. We use CCS now.

```
1676 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is  
1677   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.

```
1678 \def\keywords#1{\def\@keywords{#1}}  
1679 \let\@keywords\@empty  
  
1680 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty  
1681   \ifnum\getrefnumber{TotPages}>2\relax  
1682     \ClassWarningNoLine{\@classname}{ACM keywords are mandatory  
1683       for papers over two pages}%  
1684   \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

```
1685 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}
```

`\@saveabstract` And saving the abstract

```
1686 \long\def\@saveabstract#1{\if@ACM@maketitle@typeset  
1687   \ClassError{\@classname}{Abstract must be defined before maketitle  
1688     command. Please move it!}\fi  
1689   \long\gdef\@abstract{#1}}  
1690 \@saveabstract{}
```

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

```
1691 \long\def\@empty{}
```

```

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

\if@ACM@printacmref Whether to print the ACM bibstrip
1698 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1699   \if@ACM@printacmref
1700     \ClassInfo{\@classname}{Printing bibformat}%
1701   \else
1702     \ClassInfo{\@classname}{Suppressing bibformat}%
1703   \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}

1704 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
1705   \ifnum\getrefnumber{TotPages}>1\relax
1706     \ClassWarningNoLine{\@classname}{%
1707       ACM reference format is mandatory \MessageBreak
1708       for papers over one page. \MessageBreak
1709       Please add printacmref=true to the \MessageBreak
1710       \string\settopmatter\space command.}%
1711   \fi\fi\fi}

\if@ACM@printfolios Whether to print folios
1712 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1713   \if@ACM@printfolios
1714     \ClassInfo{\@classname}{Printing folios}%
1715   \else
1716     \ClassInfo{\@classname}{Suppressing folios}%
1717   \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}

@ACM@authorsperrrow The number of authors per row. 0 means use the default algorithm.
1718 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrrow}[0]{%
1719   \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrrow to
1720     #1}}{\ClassWarning{\@classname}{The parameter authorsperrrow must be
1721     numerical. Ignoring the input #1}}\gdef\@ACM@authorsperrrow{0}}

\settopmatter The usual syntactic sugar
1722 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

Now the settings
1723 \settopmatter{printccs=true, printacmref=true}
1724 \if@ACM@manuscript
1725   \settopmatter{printfolios=true}
1726 \else
1727   \if@ACM@journal
1728     \settopmatter{printfolios=true}
1729   \else
1730     \settopmatter{printfolios=false}
1731   \fi
1732 \fi
1733 \settopmatter{authorsperrrow=0}

```

\received The container for the paper history

```
1734 \def\@received{}
```

\received The \received command

```
1735 \newcommand\received[2][\def\@tempa{#1}%
1736   \ifx\@tempa\@empty
1737     \ifx\@received\@empty
1738       \gdef\@received{Received #2}%
1739     \else
1740       \g@addto@macro{\@received}{; revised #2}%
1741     \fi
1742   \else
1743     \ifx\@received\@empty
1744       \gdef\@received{#1 #2}%
1745     \else
1746       \g@addto@macro{\@received}{; #1 #2}%
1747     \fi
1748   \fi}
1749 \AtEndDocument{%
1750   \ifx\@received\@empty\else
1751     \par\bigskip\noindent\small\normalfont\@received\par
1752   \fi}
```

\acmArticleType Article type. We set up the color.

```
1753 \define@choicekey+{ACM}{articletype}[\ACM@ArticleType\ACM@ArticleType@nr]{%
1754   Research,Review,Discussion,Invited,Position}[Review]{%
1755   \ifcase\ACM@ArticleType@nr
1756     \relax % Research
1757     \colorlet{@ACM@Article@color}{ACMBlue}%
1758   \or % Review
1759     \colorlet{@ACM@Article@color}{ACMOrange}%
1760   \or % Discussion
1761     \colorlet{@ACM@Article@color}{ACMGreen}%
1762   \or % Invited
1763     \colorlet{@ACM@Article@color}{ACMPurple}%
1764   \or % Position
1765     \colorlet{@ACM@Article@color}{ACMRed}%
1766   \fi
1767 }{%
1768   \ClassError{\@classname}{Article Type must be Research, Review, \MessageBreak
1769     Discussion, Invited, or Position}}
1770 \def\acmArticleType#1{\setkeys{ACM}{articletype=#1}}
1771 \if@ACM@acmcp
1772   \acmArticleType{Research}%
1773 \fi
1774
```

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

```
1775 \newenvironment{@ACM@color@frame}{%
1776   \def\FrameCommand{\hspace*{-6.5pc}%
1777     \colorbox{@ACM@Article@color!10!white}}%
1778   \MakeFramed {\advance\hsize
1779     -6.5pc\relax\FrameRestore}}{\zsavesposy{@ACM@acmcpframe@y}%
1780   \endMakeFramed}
```

`\acmCodeDataLink` The code link

```
1781 \def\acmCodeLink#1{%
1782   \ifx\@acmCodeDataLink\@empty
1783     \gdef\@acmCodeDataLink{\url{#1}}%
1784   \else
1785     \g@addto@macro{\@acmCodeDataLink}{\ \url{#1}}%
1786   \fi}
1787 \def\@acmCodeDataLink{}
```

`\acmContributions` The authors' contrubution statement

```
1788 \def\acmContributions#1{\gdef\@acmContributions{#1}}
1789 \acmContributions{}
```

`\acmDataLink` The code link

```
1790 \let\acmDataLink\acmCodeLink
```

3.17 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```
1791 \RequirePackage{comment}
1792 \excludecomment{CCSXML}
```

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

```
1793 \let\@concepts\@empty
1794 \newcounter{@concepts}
```

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

```
1795 \newcommand\ccsdesc[2][100]{%
1796   \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!

```
1797 \def\textrightarrow{\rightarrow}
1798 \def\ccsdesc@parse#1~#2~#3~{%
1799   \stepcounter{@concepts}%
1800   \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1801     \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1802       \textbf{#2}}%
1803   \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{;}%
1804   \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1805   \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
1806     \csname CCS@Punctuation@#2\endcsname
1807     \csname CCS@Specific@#2\endcsname}%
1808   \fi
1809   \ifx#3\relax\relax\else
1810     \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
1811       \textrightarrow\ }%
1812     \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1813       \addtocounter{@concepts}{-1}%
1814       \ifnum#1>499\textbf{#3}\else
1815         \ifnum#1>299\textit{#3}\else
1816           #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
1817     \fi
1818   \ccsdesc@parse@finish}
```

```

1819 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\@empty\relax
1820 \ifnum\getrefnumber{TotPages}>2\relax
1821 \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
1822   for papers over two pages}%
1823 \fi\fi\fi}

```

```

\ccdesc@parse@finish Gobble everything to \ccsdesc@parse@end
1824 \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
1825 \newif\if@printcopyright
1826 \@printcopyrighttrue

```

```

\if@printpermission Whether to print the permission block
1827 \newif\if@printpermission
1828 \@printpermissiontrue

```

```

\if@acmowned Whether the ACM owns the rights to the paper
1829 \newif\if@acmowned
1830 \@acmownedtrue

```

Keys:

```

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

```

```

1858 \fi
1859 \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1860 \@acmownedfalse
1861 \fi
1862 \ifnum\acm@copyrightmode=9\relax % licensedcagov
1863 \@acmownedfalse
1864 \fi
1865 \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1866 \@acmownedfalse
1867 \fi
1868 \ifnum\acm@copyrightmode=11\relax % othergov
1869 \@acmownedtrue
1870 \fi
1871 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1872 \@acmownedfalse
1873 \fi
1874 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1875 \@acmownedfalse
1876 \fi
1877 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1878 \@acmownedfalse
1879 \fi
1880 \ifnum\acm@copyrightmode=15\relax % cc
1881 \@acmownedfalse
1882 \fi}

```

\setcopyright This is the syntactic sugar around setting keys.

```

1883 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1884 \setcopyright{acmlicensed}

```

\setcctype The type of Creative Commons license used

```

1885 \newcommand\setcctype[2][4.0]{%
1886 \def\ACM@cc@version{#1}%
1887 \def\ACM@cc@type{#2}}
1888 \setcctype{by}

```

\@copyrightowner Here is the owner of the copyright

```

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

```

```

1906 Copyright held by the owner/author(s). Publication rights licensed to
1907 ACM\@.
1908 \or % licensedcagov
1909 Copyright held by the owner/author(s).
1910 \or %licensedcagovmixed
1911 Copyright held by the owner/author(s). Publication rights licensed to
1912 ACM\@.
1913 \or % othergov
1914 Copyright held by the owner/author(s).
1915 \or % licensedothergov
1916 Copyright held by the owner/author(s). Publication rights licensed to
1917 ACM\@.
1918 \or % ic2w3www
1919 IW3C2 (International World Wide Web Conference Committee), published
1920 under Creative Commons CC-BY~4.0 License.
1921 \or % ic2w3wwwgoogle
1922 IW3C2 (International World Wide Web Conference Committee), published
1923 under Creative Commons CC-BY-NC-ND~4.0 License.
1924 \or % cc
1925 Copyright held by the owner/author(s).
1926 \fi}

```

\@formatdoi Print a clickable DOI

```

1927 \def\@formatdoi#1{\url{https://doi.org/#1}}

```

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

```

1928 \def\@ACM@copyright@check@cc{%
1929   \if@ACM@nonacm
1930     \ClassInfo{\@classname}{Using CC license with a non-acm
1931       material}%
1932   \else
1933     \if@ACM@engage
1934       \ClassInfo{\@classname}{Using CC license with ACM Enage
1935         material}%
1936     \else
1937       \ClassWarning{\@classname}{%
1938         Sorry, Creative Commons licenses are\MessageBreak
1939         currently not used with ACM publications\MessageBreak
1940         typeset by the authors}{Please use nonacm
1941         option or ACM Engage class to enable CC licenses}%
1942     \fi
1943   \fi}

```

\@copyrightpermission The canned permission block.

```

1944 \def\@copyrightpermission{%
1945   \ifcase\acm@copyrightmode\relax % none
1946   \or % acmcopyright
1947     Permission to make digital or hard copies of all or part of this
1948     work for personal or classroom use is granted without fee provided
1949     that copies are not made or distributed for profit or commercial
1950     advantage and that copies bear this notice and the full citation on
1951     the first page. Copyrights for components of this work owned by
1952     others than ACM must be honored. Abstracting with credit is

```


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 1954 to redistribute to lists, requires prior specific permission
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 1956 a fee. Request permissions from permissions@acm.org.
 1957 \or % acmlicensed
 1958 Permission to make digital or hard copies of all or part of this
 1959 work for personal or classroom use is granted without fee provided
 1960 that copies are not made or distributed for profit or commercial
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 1963 others than the author(s) must be honored. Abstracting with credit
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 1965 or to redistribute to lists, requires prior specific permission
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 1971 that copies are not made or distributed for profit or commercial
 1972 advantage and that copies bear this notice and the full citation on
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 1998 classroom use is granted. Copies must bear this notice and the full
 1999 citation on the first page. Copyrights for components of this work
 2000 owned by others than the Canadian Government must be honored. To
 2001 copy otherwise, distribute, republish, or post, requires prior
 2002 specific permission and/or a fee. Request permissions from
 2003 owner\hspace*{.5pt}/author(s).
 2004 \or % cagovmixed
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 2032 classroom use is granted. Copies must bear this notice and the full
 2033 citation on the first page. Copyrights for components of this work
 2034 owned by others than the Canadian Government must be honored. To
 2035 copy otherwise, distribute, republish, or post, requires prior
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 2059 only. Request permissions from owner\hspace*{.5pt}/author(s).
 2060 \or % iw3c2w3

```

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2063 disseminate the work on their personal and corporate Web sites with
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2068 (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
2069 disseminate the work on their personal and corporate Web sites with
2070 the appropriate attribution.
2071 \or % CC
2072 \@ACMcopyright@check@cc
2073 \IfEq{\ACMcc@type}{zero}{%
2074 \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0/legalcode}}{%
2075 \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACMcc@type/\ACMcc@version/legalcode}}%
2076 \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACMcc@type-88x31}}\
2077 \href{\ACM@CC@Url}{%
2078 This work is licensed under a Creative Commons
2079 \IfEq{\ACMcc@type}{zero}{CC0 1.0 Universal}{%
2080 \IfEq{\ACMcc@type}{by}{Attribution}{}%
2081 \IfEq{\ACMcc@type}{by-sa}{Attribution-ShareAlike}{}%
2082 \IfEq{\ACMcc@type}{by-nd}{Attribution-NoDerivatives}{}%
2083 \IfEq{\ACMcc@type}{by-nc}{Attribution-NonCommercial}{}%
2084 \IfEq{\ACMcc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{}%
2085 \IfEq{\ACMcc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{}%
2086 ~\IfEq{\ACMcc@version}{4.0}{4.0 International}{3.0 Unported}%
2087 }
2088 License.}%
2089 \fi}

\copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
2090 \def\copyrightyear#1{\def\@copyrightyear{#1}}
2091 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container
2092 \def\@teaserfigures{}

teaserfigure The teaser figure
2093 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

\@saveteaser Saving the teaser
2094 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

\thanks We redefine amsart \thanks so the anonymous key works
2095 \renewcommand{\thanks}[1]{%
2096 \@ifnotempty{#1}{%
2097 \if@ACM@anonymous
2098 \g@addto@macro\thankses{\thanks{A note}}%
2099 \else
2100 \g@addto@macro\thankses{\thanks{#1}}%
2101 \fi}}

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

```

```

2102 \newcommand{\anon}[2][ANONYMIZED]{%
2103   \if@ACM@anonymous%
2104     {\color{ACMOrange}#1}%
2105   \else%
2106     #2%
2107   \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

```

2108 \ifx\@beginmaketitlehook\undefined
2109   \let\@beginmaketitlehook\empty
2110 \fi

```

`\AtBeginMaketitle` Adding to the hook

```

2111 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}

```

3.20 ACM Engage top matter

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

```

2112 \def\@acmengagemetadadata{}

```

`\setengagemetadadata` Adding topic to engage metadata

```

2113 \def\setengagemetadadata#1#2{%
2114   \g@addto@macro{\@acmengagemetadadata}{%
2115     \@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>]`.

```

2116 \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.

```

2117 \def\maketitle{\@beginmaketitlehook
2118   \@ACM@maketitle@typesettrue
2119   \if@ACM@anonymous
2120     % Anonymize omission of \author-s
2121     \ifnum\num@authorgroups=0\author{}\fi
2122   \fi
2123   \begingroup
2124     \let\@vspace\@vspace@orig
2125     \let\@vspacer\@vspacer@orig
2126     \let\@footnotemark\@footnotemark@nolink

```

```

2127 \let\@footnotetext\@footnotetext@nolink
2128 \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
2129 \hsize=\textwidth
2130 \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
2131 \mktitle\if@ACM@sigchiamode\else\mkauthors\fi\mkteasers
2132 \@printtopmatter
2133 \if@ACM@sigchiamode\mkauthors\fi
2134 \setcounter{footnote}{0}%
2135 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
2136 \@titlenotes
2137 \@subtitlenotes
2138 \@authornotes
2139 \let\@makefnmark\relax
2140 \let\@thefnmark\relax
2141 \let\@makefntext\noindent
2142 \ifx\@empty\thankses\else
2143   \footnotetextauthorsaddresses{%
2144     \def\par{\let\par\@par}\parindent\z@\@setthanks}%
2145   \fi
2146 \if@ACM@acmcp\else
2147   \ifx\@empty\@authorsaddresses\else
2148     \if@ACM@anonymous\else
2149       \if@ACM@journal@bibstrip@or@tog
2150         \footnotetextauthorsaddresses{%
2151           \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2152         \fi
2153       \fi
2154     \fi
2155   \fi
2156 \if@ACM@nonacm
2157   \ifnum\acm@copyrightmode=15\relax % cc
2158     \footnotetextcopyrightpermission{\@copyrightpermission}%
2159   \fi
2160 \else
2161   \if@ACM@acmcp\else
2162     \footnotetextcopyrightpermission{%
2163       \if@ACM@authordraft
2164         \raisebox{-2ex}{\z@\z@\makebox[0pt][l]{\large\bfseries
2165           Unpublished working draft. Not for distribution.}}%
2166         \color[gray]{0.9}%
2167       \fi
2168       \parindent\z@\parskip0.1\baselineskip
2169       \if@ACM@authorversion\else
2170         \if@printpermission\@copyrightpermission\par\fi
2171       \fi
2172       \if@ACM@manuscript\else
2173         \if@ACM@journal@bibstrip\else % Print the conference information
2174           \if@ACM@engage
2175             {\itshape \@acmBooktitle, \@acmYear.}\par
2176           \else
2177             {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
2178           \fi
2179         \fi
2180       \fi

```

```

2181 \if@printcopyright
2182 \copyright\ \@copyrightyear\ \@copyrightowner\
2183 \else
2184 \@copyrightyear.\
2185 \fi
2186 \if@ACM@manuscript
2187 Manuscript submitted to ACM\
2188 \else
2189 \if@ACM@authorversion
2190 This is the author's version of the work. It is posted here for
2191 your personal use. Not for redistribution. The definitive Version
2192 of Record was published in
2193 \if@ACM@journal@bibstrip
2194 \emph{\@journalName}%
2195 \else
2196 \emph{\@acmBooktitle}%
2197 \fi
2198 \ifx\@acmDOI\@empty
2199 .
2200 \else
2201 , \@formatdoi{\@acmDOI}.
2202 \fi\
2203 \else
2204 \if@ACM@nonacm\else
2205 \if@ACM@journal@bibstrip
2206 ACM~\@permissionCodeTwo/\@acmYear/\@acmMonth-ART\@acmArticle\
2207 \@formatdoi{\@acmDOI}%
2208 \else % Conference
2209 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN\\fi
2210 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
2211 \fi
2212 \fi
2213 \fi
2214 \fi}%
2215 \fi
2216 \fi
2217 \endgroup
2218 \if@ACM@engage\@typesetengagemetadata\fi
2219 \setcounter{footnote}{0}%
2220 \@mkabstract
2221 \ifx\@translatedabstracts\@empty\else
2222 \@translatedabstracts\fi
2223 \if@ACM@printccs
2224 \ifx\@concepts\@empty\else\bgroup
2225 {\@specialsection{CCS Concepts}%
2226 \noindent\@concepts\par}\egroup
2227 \fi
2228 \fi
2229 \if@ACM@acmcp\else
2230 \ifx\@keywords\@empty\else\bgroup
2231 {\@specialsection{\keywordsname}%
2232 \noindent\@keywords\par}\egroup
2233 \fi
2234 \ifx\@translatedkeywords\@empty\else

```

```

2235     \@translatedkeywords
2236   \fi
2237 \fi
2238 \let\metadata@authors=\authors
2239 \nxandlist{, }{, }{\metadata@authors
2240 \def\@ACM@checkaffil{}%
2241 \hypersetup{%
2242   pdfauthor={\metadata@authors},
2243   pdftitle={\@title},
2244   pdfsubject={\@concepts},
2245   pdfkeywords={\@keywords},
2246   pdfcreator={LaTeX with acmart
2247     \csname ver@acmart.cls\endcsname\space
2248     and hyperref
2249     \csname ver@hyperref.sty\endcsname}}%
2250 \andify\authors
2251 \andify\shortauthors
2252 \global\let\authors=\authors
2253 \global\let\shortauthors=\shortauthors
2254 \if@ACM@printacmref
2255   \mkbibcitation
2256 \fi
2257 \global\@topnum\z@ % this prevents floats from falling
2258                   % at the top of page 1
2259 \global\@botnum\z@ % we do not want them to be on the bottom either
2260 \@printendtopmatter
2261 \@afterindentfalse
2262 \@afterheading
2263 \if@ACM@acmcp
2264   \set@ACM@acmcpbox
2265   \AtEndDocument{\end@ACM@color@frame}%
2266   \@ACM@color@frame
2267 \fi
2268 }

```

\set@ACM@acmcpbox Setting infobox for acmcp

```

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

```

```

2287     \fi
2288     \fi
2289     \ifx\@acmCodeDataLink\@empty\else\bigskip
2290     Code and data links:\\ \@acmCodeDataLink\par\bigskip
2291     \fi
2292     \ifx\@keywords\@empty\else\bigskip
2293     Keywords: \@keywords\par
2294     \fi
2295     \ifx\@acmContributions\@empty\else\bigskip
2296     \@acmContributions\par
2297     \fi
2298     \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
2299     \zsavaposy{\ACM@acmcpbox@y}%
2300   }
2301 \egroup}

```

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

```

2302 \def\@specialsection#1{%
2303   \let\@vspace\@vspace@orig
2304   \let\@vspacer\@vspacer@orig
2305   \ifcase\ACM@format@nr
2306   \relax % manuscript
2307     \par\medskip\small\noindent#1: %
2308   \or % acmsmall
2309     \par\medskip\small\noindent#1: %
2310   \or % acmlarge
2311     \par\medskip\small\noindent#1: %
2312   \or % acmtog
2313     \par\medskip\small\noindent#1: %
2314   \or % sigconf
2315     \section*{#1}%
2316   \or % siggraph
2317     \section*{#1}%
2318   \or % sigplan
2319     \noindentparagraph*{#1:~}%
2320   \or % sigchi
2321     \section*{#1}%
2322   \or % sigchi-a
2323     \section*{#1}%
2324   \or % acmengage
2325     \section*{#1}%
2326   \or % acmcp
2327     \section*{#1}%
2328   \fi
2329   \let\@vspace\@vspace@acm
2330   \let\@vspacer\@vspacer@acm
2331 }

```

`\@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.

```

2332 \def\@printtopmatter{%
2333   \ifx\@startPage\@empty

```



```

2334 \gdef\@startPage{1}%
2335 \else
2336 \setcounter{page}{\@startPage}%
2337 \fi
2338 \@tempdima=\ht\mktitle@bx
2339 \advance\@tempdima by \dp\mktitle@bx
2340 \ifdim\@tempdima>0.9\textheight
2341 \loop
2342 \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
2343 \thispagestyle{firstpagestyle}%
2344 \noindent\unvbox\@tempboxa
2345 \clearpage
2346 \@tempdima=\ht\mktitle@bx
2347 \advance\@tempdima by \dp\mktitle@bx
2348 \ifdim\@tempdima>0.9\textheight\repeat
2349 \fi
2350 \thispagestyle{firstpagestyle}%
2351 \noindent
2352 \ifcase\ACM@format@nr
2353 \relax % manuscript
2354 \box\mktitle@bx\par
2355 \or % acmsmall
2356 \box\mktitle@bx\par
2357 \or % acmlarge
2358 \box\mktitle@bx\par
2359 \or % acmtog
2360 \twocolumn[\box\mktitle@bx]%
2361 \or % sigconf
2362 \twocolumn[\box\mktitle@bx]%
2363 \or % siggraph
2364 \twocolumn[\box\mktitle@bx]%
2365 \or % sigplan
2366 \twocolumn[\box\mktitle@bx]%
2367 \or % sigchi
2368 \twocolumn[\box\mktitle@bx]%
2369 \or % sigchi-a
2370 \par\box\mktitle@bx\par\bigskip
2371 \or % acmengage
2372 \twocolumn[\box\mktitle@bx]%
2373 \or % acmcp
2374 \box\mktitle@bx\par
2375 \fi
2376 }

```

\@mktitle The title of the article

```

2377 \def\@mktitle{%
2378 \ifcase\ACM@format@nr
2379 \relax % manuscript
2380 \@mktitle@i
2381 \or % acmsmall
2382 \@mktitle@i
2383 \or % acmlarge
2384 \@mktitle@i
2385 \or % acmtog

```

```

2386 \mktitle@i
2387 \or % sigconf
2388 \mktitle@iii
2389 \or % siggraph
2390 \mktitle@iii
2391 \or % sigplan
2392 \mktitle@iii
2393 \or % sigchi
2394 \mktitle@iii
2395 \or % sigchi-a
2396 \mktitle@iv
2397 \or % acmengage
2398 \mktitle@iii
2399 \or % acmcp
2400 \mktitle@i
2401 \fi
2402 }

```

\@titlefont The font to typeset the title

```

2403 \def\@titlefont{%
2404 \ifcase\ACM@format@nr
2405 \relax % manuscript
2406 \LARGE\sffamily\bfseries
2407 \or % acmsmall
2408 \LARGE\sffamily\bfseries
2409 \or % acmlarge
2410 \LARGE\sffamily\bfseries
2411 \or % acmtog
2412 \Huge\sffamily
2413 \or % sigconf
2414 \Huge\sffamily\bfseries
2415 \or % siggraph
2416 \Huge\sffamily\bfseries
2417 \or % sigplan
2418 \Huge\bfseries
2419 \or % sigchi
2420 \Huge\sffamily\bfseries
2421 \or % sigchi-a
2422 \Huge\bfseries
2423 \or % acmengage
2424 \Huge\sffamily\bfseries
2425 \or % acmcp
2426 \LARGE\sffamily\bfseries
2427 \fi}

```

\@subtitlefont The font to typeset the subtitle

```

2428 \def\@subtitlefont{\normalsize
2429 \ifcase\ACM@format@nr
2430 \relax % manuscript
2431 \mdseries
2432 \or % acmsmall
2433 \mdseries
2434 \or % acmlarge
2435 \mdseries

```

```

2436 \or % acmtog
2437 \LARGE
2438 \or % sigconf
2439 \LARGE\mdseries
2440 \or % siggraph
2441 \LARGE\mdseries
2442 \or % sigplan
2443 \LARGE\mdseries
2444 \or % sigchi
2445 \LARGE\mdseries
2446 \or % sigchi-a
2447 \mdseries
2448 \or % acmengage
2449 \LARGE\mdseries
2450 \or % acmcp
2451 \mdseries
2452 \fi}

```

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

```

2453 \def\@mkttitle@i{\hsize=\textwidth
2454 \if@ACM@acmcp
2455 \advance\hsize by -6pc%
2456 \fi
2457 \@ACM@title@width=\hsize
2458 \setbox\mkttitle@bx=\vbox{\noindent\@titlefont
2459 \parbox[t]{\@ACM@title@width}{\raggedright
2460 \@titlefont\noindent
2461 \@title\@translatedtitle%
2462 \ifx\@subtitle\@empty\else
2463 \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
2464 \fi}%
2465 \par\bigskip}}%

```

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

`\@mkttitle@iii` The version of `\@mkttitle` for SIG proceedings.

```

2466 \def\@mkttitle@iii{\hsize=\textwidth
2467 \setbox\mkttitle@bx=\vbox{\@titlefont\centering
2468 \@ACM@title@width=\hsize
2469 \parbox[t]{\@ACM@title@width}{\centering\@titlefont
2470 \@title\@translatedtitle%
2471 \ifx\@subtitle\@empty\else
2472 \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
2473 \fi
2474 }%
2475 \par\bigskip}}%

```

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

```

2476 \def\@mkttitle@iv{\hsize=\textwidth
2477 \setbox\mkttitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
2478 \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
2479 \noindent\@title\@translatedtitle%
2480 \ifx\@subtitle\@empty\else

```

```

2481 \par\noindent\@subtitlefont\@subtitle\@translatedsubtitle%
2482 \fi
2483 \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.

```

2484 \newbox\@ACM@commabox
2485 \def\@ACM@addtoaddress#1{%
2486 \ifvmode\else
2487 \if@ACM@affiliation@obexpunctuation\else
2488 \setbox\@ACM@commabox=\hbox{, }%
2489 \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
2490 \fi\fi
2491 #1}

```

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

```

\streetaddress 2492 \def\streetaddress#1{\unskip\ignorespaces}
\city 2493 \def\postcode#1{\unskip\ignorespaces}
\state 2494 \if@ACM@journal
\postcode 2495 \def\position#1{\unskip\ignorespaces}
\country 2496 \def\institution#1{\global\@ACM@instpresenttrue
2497 \unskip~#1\ignorespaces}
2498 \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
2499 \def\state#1{\unskip\ignorespaces}
2500 \newcommand\department[2][0]{\unskip\ignorespaces}
2501 \def\country#1{\StrDel{#1}{ }[\@tempa]%
2502 \ifx\@tempa\empty\else
2503 \global\@ACM@countrypresenttrue\fi
2504 \if@ACM@affiliation@obexpunctuation\else, \fi#1\ignorespaces}
2505 \else
2506 \def\position#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2507 \def\institution#1{\global\@ACM@instpresenttrue
2508 \if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2509 \newcommand\department[2][0]{\if@ACM@affiliation@obexpunctuation
2510 #2\else#2\par\fi}%
2511 % \def\streetaddress#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2512 \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
2513 \let\state\@ACM@addtoaddress
2514 % \def\postcode#1{\if@ACM@affiliation@obexpunctuation#1\else\unskip\space#1\fi}%
2515 \def\country#1{\global\@ACM@countrypresenttrue\@ACM@addtoaddress{#1}}%
2516 \fi

```

\@mkauthors Typesetting the authors

```

2517 \def\@mkauthors{\begingroup
2518 \hsize=\textwidth
2519 \ifcase\ACM@format@nr

```

```

2520 \relax % manuscript
2521 \mkauthors@i
2522 \or % acmsmall
2523 \mkauthors@i
2524 \or % acmlarge
2525 \mkauthors@i
2526 \or % acmtog
2527 \mkauthors@i
2528 \or % sigconf
2529 \mkauthors@iii
2530 \or % siggraph
2531 \mkauthors@iii
2532 \or % sigplan
2533 \mkauthors@iii
2534 \or % sigchi
2535 \mkauthors@iii
2536 \or % sigchi-a
2537 \mkauthors@iv
2538 \or % acmengage
2539 \mkauthors@iii
2540 \or % acmcp
2541 \mkauthors@i
2542 \fi
2543 \endgroup
2544 }

```

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

```

2545 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```

2546 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

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

```

```

2568 \or % sigchi-a
2569 \def\@authorfont{\bfseries}
2570 \def\@affiliationfont{\mdseries}
2571 \or % acmengage
2572 \def\@authorfont{\LARGE}
2573 \def\@affiliationfont{\large}
2574 \or % acmcp
2575 \def\@authorfont{\large\sffamily}
2576 \def\@affiliationfont{\small\normalfont}
2577 \fi

\@typeset@author@line At this point we have \@currentauthors and \@currentaffiliations. We typeset
them in the journal style
2578 \def\@typeset@author@line{%
2579 \andify\@currentauthors\par\noindent
2580 \@currentauthors\def\@currentauthors{}%
2581 \ifx\@currentaffiliations\empty\else
2582 \andify\@currentaffiliations
2583 \unskip, {\@currentaffiliations}\par
2584 \fi
2585 \def\@currentaffiliations{}}

\if@ACM@instpresent Whether the given affiliation has institution
2586 \newif\if@ACM@instpresent
2587 \@ACM@instpresenttrue

\if@ACM@citypresent Whether the given affiliation has city
2588 \newif\if@ACM@citypresent
2589 \@ACM@citypresenttrue

\if@ACM@countrypresent Whether the given affiliation has country
2590 \newif\if@ACM@countrypresent
2591 \@ACM@countrypresenttrue

\@ACM@resetaffil Reset affiliation flags
2592 \def\@ACM@resetaffil{%
2593 \global\@ACM@instpresentfalse
2594 \global\@ACM@citypresentfalse
2595 \global\@ACM@countrypresentfalse
2596 }

\@ACM@checkaffil Check affiliation flags
2597 \def\@ACM@checkaffil{%
2598 \if@ACM@instpresent\else
2599 \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
2600 \fi
2601 \if@ACM@citypresent\else
2602 \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
2603 \fi
2604 \if@ACM@countrypresent\else
2605 \ClassError{\@classname}{No country present for an affiliation}{ACM
2606 requires each author to indicate their country using country macro.}%
2607 \fi
2608 }

```

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

```

2609 \def\mkauthors@i{%
2610   \def\@currentauthors{}%
2611   \def\@currentaffiliations{}%
2612   \global\let\and\@typeset@author@line
2613   \def\@author##1{%
2614     \ifx\@currentauthors\@empty
2615       \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
2616     \else
2617       \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
2618     \fi
2619     \gdef\and{}}%
2620   \def\email##1##2{%
2621     \def\affiliation##1##2{%
2622       \def\@tempa{##2}\ifx\@tempa\@empty\else
2623         \ifx\@currentaffiliations\@empty
2624           \gdef\@currentaffiliations{%
2625             \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2626             \setkeys{@ACM@affiliation@}{##1}%
2627             \@ACM@resetaffil
2628             \@affiliationfont##2\@ACM@checkaffil}%
2629           \else
2630             \g@addto@macro{\@currentaffiliations}{\and
2631               \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2632               \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2633               ##2\@ACM@checkaffil}%
2634             \fi
2635           \fi
2636           \global\let\and\@typeset@author@line}%
2637     \if@ACM@acmcp
2638       \advance\hsize by -6pc%
2639     \fi
2640     \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
2641       \noindent\addresses\@typeset@author@line
2642       \par\medskip}%
2643   }

```

`\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

```
2644 \newbox\author@bx
```

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

```
2645 \newdimen\author@bx@wd
```

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

```

2646 \newskip\author@bx@sep
2647 \author@bx@sep=1pc\relax

```

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

```
2648 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd
```

```

2649 \def\and{\par}\normalbaselines
2650 \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2651   \@authorfont\@currentauthors\par\@affiliationfont
2652   \@currentaffiliation}\egroup
2653 \box\author@bx\hspace{\author@bx@sep}%
2654 \gdef\@currentauthors{}%
2655 \gdef\@currentaffiliation{}%

```

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

```

2656 \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.

```

2657 \author@bx@wd=\textwidth\relax
2658 \advance\author@bx@wd by -\author@bx@sep\relax
2659 \ifnum\@ACM@authorsperrow>0\relax
2660   \divide\author@bx@wd by \@ACM@authorsperrow\relax
2661 \else
2662   \ifcase\@num@authorgroups
2663     \relax % 0?
2664     \or % 1=one author per row
2665     \or % 2=two authors per row
2666       \divide\author@bx@wd by \@num@authorgroups\relax
2667     \or % 3=three authors per row
2668       \divide\author@bx@wd by \@num@authorgroups\relax
2669     \or % 4=two authors per row (!)
2670       \divide\author@bx@wd by 2\relax
2671     \else % three authors per row
2672       \divide\author@bx@wd by 3\relax
2673   \fi
2674 \fi
2675 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

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

```



```

2695     ##2\@ACM@checkaffil}%
2696 \else
2697   \g@addto@macro\@currentaffiliation{\par
2698     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2699     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2700     ##2\@ACM@checkaffil}%
2701 \fi
2702 \global\let\and\@typeset@author@bx
2703 }%

Actual typesetting is done by the \and macro:

2704 \hsize=\textwidth
2705 \global\setbox\mktitle@bx=\vbox{\noindent
2706   \unvbox\mktitle@bx\par\medskip\leavevmode
2707   \lineskip=1pc\relax\centering\hspace*{-1em}%
2708   \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.

```

2709 \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.

```

```

2710 \author@bx@wd=\columnwidth\relax
2711 \advance\author@bx@wd by -\author@bx@sep\relax
2712 \ifnum\@ACM@authorsprow>0\relax
2713   \divide\author@bx@wd by \@ACM@authorsprow\relax
2714 \else
2715   \ifcase\@num@authorgroups
2716     \relax % 0?
2717   \or % 1=one author per row
2718     \else % 2=two authors per row
2719       \divide\author@bx@wd by 2\relax
2720   \fi
2721 \fi
2722 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2723 \gdef\@currentauthors{}%
2724 \gdef\@currentaffiliation{}%
2725 \def\author##1{\ifx\@currentauthors\@empty
2726   \gdef\@currentauthors{\par##1}%
2727 \else
2728   \g@addto@macro\@currentauthors{\par##1}%
2729 \fi
2730 \gdef\and{}}%
2731 \def\email##1##2{\ifx\@currentaffiliation\@empty
2732   \gdef\@currentaffiliation{\nolinkurl{##2}}%
2733 \else
2734   \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2735 \fi}%
2736 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2737   \gdef\@currentaffiliation{%

```

```

2738 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2739 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2740 ##2\@ACM@checkaffil}%
2741 \else
2742 \g@addto@macro\@currentaffiliation{\par
2743 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2744 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2745 ##2\@ACM@checkaffil}%
2746 \fi
2747 \global\let\and\@typeset@author@bx}%
2748 %
Actual typesetting is done by the \and macro
2749 \bgroup\hsize=\columnwidth
2750 \par\raggedright\leftskip=\z@
2751 \lineskip=1pc\noindent
2752 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

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

```

2753 \def\@mkauthorsaddresses{%
2754 \ifnum\@num@authors>1\relax
2755 Authors' \else Author's \fi
2756 \ifnum\@num@authorgroups>1\relax
2757 addresses: \else address: \fi
2758 \bgroup
2759 \def\streetaddress##1{\unskip, ##1}%
2760 \def\postcode##1{\unskip, ##1}%
2761 \def\position##1{\unskip\ignorespaces}%
2762 \gdef\@ACM@institution@separator{, }%
2763 \def\institution##1{\unskip\@ACM@institution@separator ##1\gdef\@ACM@institution@separator{ and }}
2764 \def\city##1{\unskip, ##1}%
2765 \def\state##1{\unskip, ##1}%
2766 \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2767 \def\country##1{\unskip, ##1}%
2768 \def\and{\unskip; \gdef\@ACM@institution@separator{, }}%
2769 \def\author##1{##1}%
2770 \def\email##1##2{\unskip, \nolinkurl{##2}}%
2771 \addresses
2772 \egroup}

2773 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
2774 \ifx\@authorsaddresses\@empty
2775 \ClassWarningNoLine{\@classname}{Authors'
2776 addresses are mandatory for ACM journals}%
2777 \fi\fi\fi}

```

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

```

2778 \def\@setaddresses{}

```

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

```

2779 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}

```

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

```

2780 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}

```

\@mkteasers Typesetting the teasers

```
2781 \def\@mkteasers{%
2782   \ifx\@teaserfigures\@empty\else
2783     \def\@teaser##1{\par\bigskip\bgroup
2784       \captionsetup{type=figure}##1\egroup\par}
2785     \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
2786       \noindent\@Description@presentfalse
2787       \@teaserfigures\par\if@Description@present\else
2788         \global\@undescrbed@imagestrue
2789         \ClassWarning{\@classname}{A possible image without
2790           description}\fi
2791       \medskip}%
2792   \fi}
```

\@mkabstract Typesetting the abstract

```
2793 \def\@mkabstract{\bgroup
2794   \ifx\@abstract\@empty\else
2795     {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
2796       \if@ACM@journal
2797         \everypar{\setbox\z@\lastbox\everypar{}}\small
2798       \else
2799         \section*{\abstractname}%
2800       \fi
2801       \ignorespaces\@abstract\par}%
2802   \fi\egroup}
```

\@mktranslatedabstract Typesetting a translated abstract

```
2803 \def\@mktranslatedabstract#1{\selectlanguage{#1}%
2804   \if@ACM@journal
2805     \everypar{\setbox\z@\lastbox\everypar{}}\small
2806   \else
2807     \section*{\abstractname}%
2808   \fi
2809   \ignorespaces}
```

\@mkbibcitation Print the bibcitation format

```
2810 \def\@mkbibcitation{\bgroup
2811   \let\@vspace\@vspace@orig
2812   \let\@vspacer\@vspacer@orig
2813   \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2814   \def\footnotemark{}%
2815   \def\{\unskip}\ignorespaces}%
2816   \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2817     inside a \string\title{} or \string\author{} command! Use
2818     \string\titlenote{} or \string\authornote{} instead!}}%
2819   \def\@article@string{\ifx\@acmArticle\@empty{\ } \else,
2820     Article~\@acmArticle\ } \fi}%
2821   \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2822   \noindent\bgroup
2823     \def\{\unskip}, \ignorespaces\authors\egroup. \@acmYear. \@title
2824     \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2825     \if@ACM@nonacm\else
2826       % The 'nonacm' option disables 'printacmref' by default,
2827       % and the present \@mkbibcitation definition is never used
```

```

2828 % in this case. The conditional remains useful if the user
2829 % explicitly sets \settopmatter{printacmref=true}.
2830 \if@ACM@journal@bibstrip
2831   \textit{\@journalNameShort}
2832   \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2833   \ref{TotPages}~\@pages@word.
2834 \else
2835   In \textit{\@acmBooktitle}%
2836   \ifx\@acmEditors\@empty\textit{.}\else
2837     \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
2838   \fi\
2839   ACM, New York, NY, USA%
2840   \@article@string\unskip, \ref{TotPages}~\@pages@word.
2841 \fi
2842 \fi
2843 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2844 \par\egroup}

```

\@printendtopmatter End the top matter

```

2845 \def\@printendtopmatter{%
2846   \let\@vspace\@vspace@orig
2847   \let\@vspacer\@vspacer@orig
2848   \par\bigskip
2849   \let\@vspace\@vspace@acm
2850   \let\@vspacer\@vspacer@acm
2851 }

```

\@setthanks We redefine \setthanks using \long

```

2852 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}

```

\@setauthorsaddresses

```

2853 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}

```

\@typesetengagemetadata Typesetting special metadata for ACM Engage

```

2854 \def\@typesetengagemetadata{%
2855   \def\@setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
2856   \@acmengagemetadata}

```

3.22 Headers and Footers

We use fancyhdr for our headers and footers:

```

2857 \RequirePackage{fancyhdr}

```

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

```

2858 \let\ACM@ps@plain\ps@plain
2859 \let\ACM@ps@myheadings\ps@myheadings
2860 \let\ACM@ps@headings\ps@headings
2861 \def\ACM@restore@pagestyle{%
2862   \let\ps@plain\ACM@ps@plain
2863   \let\ps@myheadings\ACM@ps@myheadings
2864   \let\ps@headings\ACM@ps@headings}
2865 \AtBeginDocument{\ACM@restore@pagestyle}

```

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

```
2866 \if@ACM@review
2867   \newsavebox{\ACM@linecount@bx}
2868   \newlength\ACM@linecount@bxht
2869   \newcount\ACM@linecount
2870   \ACM@linecount\@ne\relax
2871   \def\ACM@mk@linecount{%
2872     \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
2873       \normalsize
2874       \setlength{\ACM@linecount@bxht}{0pt}%
2875       \loop{\color{red}\scriptsize\the\ACM@linecount}\
2876       \global\advance\ACM@linecount by \@ne
2877       \addtolength{\ACM@linecount@bxht}{\baselineskip}%
2878       \ifdim\ACM@linecount@bxht<\textheight\repeat
2879       {\color{red}\scriptsize\the\ACM@linecount}\hfill
2880       \global\advance\ACM@linecount by \@ne}}
2881 \fi
```

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

```
2882 \def\ACM@linecountL{%
2883   \if@ACM@review
2884     \ACM@mk@linecount
2885     \begin{picture}(0,0)%
2886       \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2887     \end{picture}%
2888   \fi}
```

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

```
2889 \def\ACM@linecountR{%
2890   \if@ACM@review
2891     \ifcase\ACM@format@nr
2892       \relax % manuscript
2893       \relax
2894       \or % acmsmall
2895       \relax
2896       \or % acmlarge
2897       \relax
2898       \or % acmtog
2899       \ACM@mk@linecount
2900       \or % sigconf
2901       \ACM@mk@linecount
2902       \or % siggraph
2903       \ACM@mk@linecount
2904       \or % sigplan
2905       \ACM@mk@linecount
2906       \or % sigchi
2907       \ACM@mk@linecount
2908       \or % sigchi-a
2909       \ACM@mk@linecount
2910       \or % acmengage
2911       \ACM@mk@linecount
2912       \or % acmcp
2913       \relax
2914     \fi
```

```

2915 \begin{picture}(0,0)%
2916 \put(20,-22){\usebox{\ACM@linecount@bx}}%
2917 \end{picture}%
2918 \fi}

```

\ACM@timestamp The timestamp system

```

2919 \if@ACM@timestamp
2920 % Subtracting 30 from \time gives us the effect of rounding down despite
2921 % \numexpr rounding to nearest
2922 \newcounter{ACM@time@hours}
2923 \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
2924 \newcounter{ACM@time@minutes}
2925 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
2926 \newcommand\ACM@timestamp{%
2927 \footnotesize%
2928 \ifx\@acmSubmissionID\@empty\relax\else
2929 Submission ID: \@acmSubmissionID.{ }%
2930 \fi
2931 \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
2932 \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
2933 Page \thepage\ of \@startPage--\pageref*{TotPages}.%
2934 }
2935 \fi

```

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

```

2936 \def\@shortauthors{%
2937 \if@ACM@anonymous
2938 Anon.
2939 \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
2940 \else\shortauthors\fi}

```

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

```

2941 \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

```

2942 \AtBeginDocument{%
2943 \fancypagestyle{standardpagestyle}{%
2944 \fancyhf{}%
2945 \renewcommand{\headrulewidth}{\z@}%
2946 \renewcommand{\footrulewidth}{\z@}%
2947 \def\@acmArticlePage{%
2948 \ifx\@acmArticle\empty%
2949 \if@ACM@printfolios\thepage\fi%
2950 \else%
2951 \@acmArticle\if@ACM@printfolios:\thepage\fi%
2952 \fi%
2953 }%
2954 \if@ACM@journal@bibstrip@or@tog
2955 \ifcase\ACM@format@nr
2956 \relax % manuscript
2957 \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%

```

```

2958 \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
2959 \fancyhead[RE]{\@shortauthors}%
2960 \fancyhead[LO]{\ACM@linecountL\shorttitle}%
2961 \if@ACM@nonacm\else%
2962 \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
2963 \fi%
2964 \or % acmsmall
2965 \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
2966 \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
2967 \fancyhead[RE]{\@headfootfont\@shortauthors}%
2968 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2969 \if@ACM@nonacm\else%
2970 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2971 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2972 \fi
2973 \or % acmlarge
2974 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2975 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2976 \fancyhead[LO]{\ACM@linecountL}%
2977 \fancyhead[RO]{\@headfootfont
2978 \shorttitle\quad\textbullet\quad\@acmArticlePage}%
2979 \if@ACM@nonacm\else%
2980 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2981 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2982 \fi
2983 \or % acmtog
2984 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2985 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2986 \fancyhead[LO]{\ACM@linecountL}%
2987 \fancyhead[RE]{\ACM@linecountR}%
2988 \fancyhead[RO]{\@headfootfont
2989 \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
2990 \if@ACM@nonacm\else
2991 \if@ACM@journal@bibstrip
2992 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
2993 Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
2994 Publication date: \@acmPubDate.}%
2995 \else
2996 \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
2997 \acmConference@date, \acmConference@venue.}%
2998 \fi
2999 \fi
3000 \else % Proceedings
3001 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3002 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3003 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3004 \if@ACM@nonacm
3005 \fancyhead[LE]{\ACM@linecountL}%
3006 \fancyhead[RO]{\ACM@linecountR}%
3007 \else%
3008 \if@ACM@engage
3009 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3010 EngageCSEdu. \ifx\@acmDOI\empty\else\@formatdoi{\@acmDOI}\fi}%
3011 \fancyhead[RO]{\@headfootfont

```

```

3012 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3013 \ACM@linecountR}%
3014 \else
3015 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3016 \acmConference@shortname,
3017 \acmConference@date, \acmConference@venue}%
3018 \fancyhead[RO]{\@headfootfont
3019 \acmConference@shortname,
3020 \acmConference@date, \acmConference@venue\ACM@linecountR}%
3021 \fi
3022 \fi
3023 \fi
3024 \else % Proceedings
3025 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3026 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3027 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3028 \if@ACM@nonacm
3029 \fancyhead[LE]{\ACM@linecountL}%
3030 \fancyhead[RO]{\ACM@linecountR}%
3031 \else%
3032 \if@ACM@engage
3033 \fancyhead[LE]{\ACM@linecountL\@headfootfont
3034 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3035 \fancyhead[RO]{\@headfootfont
3036 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3037 \ACM@linecountR}%
3038 \else
3039 \fancyhead[LE]{\ACM@linecountL\@headfootfont
3040 \acmConference@shortname,
3041 \acmConference@date, \acmConference@venue}%
3042 \fancyhead[RO]{\@headfootfont
3043 \acmConference@shortname,
3044 \acmConference@date, \acmConference@venue\ACM@linecountR}%
3045 \fi
3046 \fi
3047 \fi
3048 \if@ACM@sigchiamode
3049 \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
3050 \fi
3051 \if@ACM@timestamp
3052 \fancyfoot[LO,RE]{\ACM@timestamp}
3053 \fi
3054 \if@ACM@acmcp
3055 \renewcommand{\footrulewidth}{0.1\p@}%
3056 \fancyheadoffset[L]{46pt}%
3057 \fancyhead[L]{\makebox[\z@][l]{%
3058 \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3059 \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3060 \strut\ACM@ArticleType~Article}}}%
3061 \ACM@linecountL}%
3062 \fancyhead[R]{\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3063 \fancyfoot[L,C]{}%
3064 \fancyfoot[R]{\footnotesize
3065 \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,

```



```

3066     \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3067     (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3068   \fi
3069 }%
3070 \pagestyle{standardpagestyle}
3071 }

\@folio@wd Folio blob width, height, offsets and max number
\@folio@ht
\@folio@topset The macro to typeset the folio blob.
\@folio@max
firstpagestyle The page style for the first page only.
3072 \AtBeginDocument{%
3073 \fancypagestyle{firstpagestyle}{%
3074   \fancyhf{}%
3075   \renewcommand{\headrulewidth}{\z@}%
3076   \renewcommand{\footrulewidth}{\z@}%
3077   \if@ACM@journal@bibstrip@or@tog
3078     \ifcase\ACM@format@nr
3079     \relax % manuscript
3080     \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3081     \fancyhead[R]{\@acmBadgeR}%
3082     \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
3083     \if@ACM@nonacm\else%
3084     \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
3085     \fi%
3086   \or % acmsmall
3087     \if@ACM@nonacm\else%
3088     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3089       \@acmNumber, Article \@acmArticle. Publication date:
3090       \@acmPubDate.}%
3091     \fi%
3092     \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3093     \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3094     \fancyhead[RO]{\@acmBadgeR}%
3095     \fancyhead[RE]{\@acmBadgeR}%
3096   \or % acmlarge
3097     \if@ACM@nonacm\else%
3098     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3099       \@acmNumber, Article \@acmArticle. Publication date:
3100       \@acmPubDate.}%
3101     \fi%
3102     \fancyhead[RO]{\@acmBadgeR}%
3103     \fancyhead[RE]{\@acmBadgeR}%
3104     \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3105     \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3106   \or % acmtog
3107     \if@ACM@nonacm\else%
3108     \if@ACM@journal@bibstrip
3109     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
3110       Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
3111       Publication date: \@acmPubDate.}%
3112     \else
3113     \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,

```

```

3114         \acmConference@date, \acmConference@venue.}%
3115     \fi
3116 \fi%
3117 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3118 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3119 \else % Conference proceedings
3120 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3121 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3122 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3123 \fi
3124 \else
3125 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3126 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3127 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3128 \fi
3129 \if@ACM@timestamp
3130 \ifnum\ACM@format@nr=0\relax % Manuscript
3131 \fancyfoot[LO,RE]{\ACM@timestamp\quad
3132 \if@ACM@nonacm\else
3133 \footnotesize Manuscript submitted to ACM
3134 \fi}
3135 \else
3136 \fancyfoot[LO,RE]{\ACM@timestamp}
3137 \fi
3138 \fi
3139 \if@ACM@acmcp
3140 \renewcommand{\footrulewidth}{0.1\p@}%
3141 \fancyheadoffset[L]{46pt}%
3142 \fancyhead[L]{\makebox[\z@][l]{%
3143 \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3144 \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3145 \strut\ACM@ArticleType~Article}}}}}%
3146 \ACM@linecountL\@acmBadgeL}%
3147 \fancyhead[R]{\@acmBadgeR\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3148 \fancyfoot[L,C]{}%
3149 \fancyfoot[R]{\footnotesize
3150 \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3151 \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3152 (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3153 \fi
3154 }}

```

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.

```

3155 \def\ACM@NRadjust#1{%
3156   \begingroup
3157   \expandafter\ifx\csname Sectionformat\endcsname\relax
3158   % do nothing when \Sectionformat is unknown
3159   \def\next{\endgroup #1}%
3160   \else
3161   \def\next{\endgroup
3162     \let\realSectionformat\Sectionformat
3163     \def\ACM@sect@format@{#1}%
3164     \let\Sectionformat\ACM@NR@adjustedSectionformat
3165     %% next lines added 2018-06-17 to ensure section number is styled
3166     \let\real@adddotafter\@adddotafter
3167     \let\@adddotafter\ACM@adddotafter
3168     #1{}% imposes the styles, but nullifies \MakeUppercase
3169     \let\@adddotafter\real@adddotafter
3170   }%
3171   \fi \next
3172 }
```

\ACM@NR@adjustedSectionformat

```

3173 \def\ACM@NR@adjustedSectionformat#1#2{%
3174   \realSectionformat{\ACM@sect@format@{#1}}{#2}%
3175   \let\Sectionformat\realSectionformat}
3176 \DeclareRobustCommand{\ACM@sect@format@}{\ACM@sect@format@}
3177 \def\ACM@sect@format@null#1{#1}
3178 \let\ACM@sect@format@\ACM@sect@format@null
3179 \AtBeginDocument{%
3180   \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
3181   \let\LTX@adddotafter\@adddotafter
3182   \fi
3183 }
```

\ACM@adddotafter

```

3184 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}
```

Sectioning is different for different levels

```

3185 \renewcommand\section{\@startsection{section}{1}{\z@}%
3186   {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3187   {.25\baselineskip}%
3188   {\ACM@NRadjust\@secfont}}
3189 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
3190   {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%

```

```

3191 { .25\baselineskip}%
3192 {\ACM@NRadjust\@subsecfont}}
3193 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
3194 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3195 {-3.5\p@}%
3196 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}}
3197 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
3198 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3199 {-3.5\p@}%
3200 {\ACM@NRadjust{\@parfont\@adddotafter}}}}
3201 \newcommand\noindentparagraph{\@startsection{paragraph}{4}{\z@}%
3202 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3203 {-3.5\p@}%
3204 {\ACM@NRadjust{\@parfont}}}}
3205
3206 \renewcommand\part{\@startsection{part}{9}{\z@}%
3207 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
3208 {4\p@}%
3209 {\ACM@NRadjust\@parfont}}

```

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

```

3210 \def\section@raggedright{\@rightskip\@flushglue
3211 \rightskip\@rightskip
3212 \leftskip\z@skip
3213 \parindent\z@}

```

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

```

\@subsecfont 3214 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
\@subsubsecfont 3215 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 3216 \def\@subsubsecfont{\sffamily\itshape}
3217 \def\@parfont{\itshape}
3218 \setcounter{secnumdepth}{3}
3219 \ifcase\ACM@format@nr
3220 \relax % manuscript
3221 \or % acmsmall
3222 \or % acmlarge
3223 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
3224 \def\@subsecfont{\sffamily\large\section@raggedright}
3225 \or % acmtog
3226 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
3227 \def\@subsecfont{\sffamily\large\section@raggedright}
3228 \or % sigconf
3229 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
3230 \def\@subsecfont{\bfseries\Large\section@raggedright}
3231 \or % siggraph
3232 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
3233 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
3234 \or % sigplan
3235 \def\@secfont{\bfseries\Large\section@raggedright}
3236 \def\@subsecfont{\bfseries\section@raggedright}
3237 \def\@subsubsecfont{\bfseries\section@raggedright}
3238 \def\@parfont{\bfseries\itshape}
3239 \def\@subparfont{\itshape}
3240 \or % sigchi

```

```

3241 \setcounter{secnumdepth}{1}
3242 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
3243 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3244 \or % sigchi-a
3245 \setcounter{secnumdepth}{0}
3246 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
3247 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3248 \or % acmengage
3249 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
3250 \def\@subsecfont{\bfseries\Large\section@raggedright}
3251 \or %acmcp
3252 \fi

```

\@adddotafter Add punctuation after a sectioning command

```

3253 \def\@adddotafter#1{#1\@addpunct{.}}

```

\@addspaceafter Add space after a sectioning command

```

3254 \def\@addspaceafter#1{#1\@addpunct{\enspace}}

```

```

3255 \if@ACM@acmcp

```

```

3256     \setcounter{secnumdepth}{-1}%

```

```

3257 \fi

```

3.24 TOC lists

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

```

3258 \providecommand*\@dotsep{4.5}

```

3.25 Theorems

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

```

3259 \def\@acmplainbodyfont{\itshape}

```

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

```

3260 \def\@acmplainindent{\parindent}

```

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

```

3261 \def\@acmplainheadfont{\scshape}

```

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

```

3262 \def\@acmplainnotefont{\@empty}

```

Customization of the acmplain theorem style:

```

3263 \ifcase\ACM@format@nr

```

```

3264 \relax % manuscript

```

```

3265 \or % acmsmall

```

```

3266 \or % acmlarge

```

```

3267 \or % acmtog

```

```

3268 \or % sigconf

```

```

3269 \or % siggraph
3270 \or % sigplan
3271 \def\acmplainbodyfont{\itshape}
3272 \def\acmplainindent{\z@}
3273 \def\acmplainheadfont{\bfseries}
3274 \def\acmplainnotefont{\normalfont}
3275 \or % sigchi
3276 \or % sigchi-a
3277 \or % acmengage
3278 \or % acmcp
3279 \fi

```

acmplain The acmplain theorem style

```

3280 \newtheoremstyle{acmplain}%
3281 { .5\baselineskip \@plus.2\baselineskip
3282 \@minus.2\baselineskip}% space above
3283 { .5\baselineskip \@plus.2\baselineskip
3284 \@minus.2\baselineskip}% space below
3285 {\acmplainbodyfont}% body font
3286 {\acmplainindent}% indent amount
3287 {\acmplainheadfont}% head font
3288 { .}% punctuation after head
3289 { .5em}% spacing after head
3290 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\acmplainnotefont{#3}}}}% head spec

```

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

```

3291 \def\acmdefinitionbodyfont{\normalfont}

```

\acmdefinitionindent The amount to indent the acmdefinition theorem style.

```

3292 \def\acmdefinitionindent{\parindent}

```

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

```

3293 \def\acmdefinitionheadfont{\itshape}

```

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

```

3294 \def\acmdefinitionnotefont{\@empty}

```

Customization of the acmdefinition theorem style:

```

3295 \ifcase\ACM@format@nr
3296 \relax % manuscript
3297 \or % acmsmall
3298 \or % acmlarge
3299 \or % acmtog
3300 \or % sigconf
3301 \or % siggraph
3302 \or % sigplan
3303 \def\acmdefinitionbodyfont{\normalfont}
3304 \def\acmdefinitionindent{\z@}
3305 \def\acmdefinitionheadfont{\bfseries}
3306 \def\acmdefinitionnotefont{\normalfont}
3307 \or % sigchi
3308 \or % sigchi-a
3309 \or % acmengage
3310 \or % acmcp
3311 \fi

```

acmdefinition The acmdefinition theorem style

```
3312 \newtheoremstyle{acmdefinition}%  
3313   {.5\baselineskip\@plus.2\baselineskip  
3314     \@minus.2\baselineskip}% space above  
3315   {.5\baselineskip\@plus.2\baselineskip  
3316     \@minus.2\baselineskip}% space below  
3317   {\@acmdefinitionbodyfont}% body font  
3318   {\@acmdefinitionindent}% indent amount  
3319   {\@acmdefinitionheadfont}% head font  
3320   {.}% punctuation after head  
3321   {.5em}% spacing after head  
3322   {\thmname{#1}\thmnumber{#2}\thmnote{ {\@acmdefinitionnotefont{#3}}}}% head spec
```

Make acmplain the default theorem style.

```
3323 \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.

```
3324 \AtEndPreamble{%  
3325   \if@ACM@acmthm  
3326     \theoremstyle{acmplain}  
3327     \@ifundefined{theorem}{%  
3328       \newtheorem{theorem}{Theorem}[section]  
3329     }{}  
3330     \@ifundefined{conjecture}{%  
3331       \newtheorem{conjecture}{Conjecture}  
3332     }{}  
3333     \@ifundefined{proposition}{%  
3334       \newtheorem{proposition}{Proposition}  
3335     }{}  
3336     \@ifundefined{lemma}{%  
3337       \newtheorem{lemma}{Lemma}  
3338     }{}  
3339     \@ifundefined{corollary}{%  
3340       \newtheorem{corollary}{Corollary}  
3341     }{}  
3342     \theoremstyle{acmdefinition}  
3343     \@ifundefined{example}{%  
3344       \newtheorem{example}{Example}  
3345     }{}  
3346     \@ifundefined{definition}{%  
3347       \newtheorem{definition}{Definition}  
3348     }{}  
3349   \fi  
3350   \theoremstyle{acmplain}  
3351 }
```

\@proofnamefont The font to typeset the proof name.

```

3352 \def\@proofnamefont{\scshape}

\@proofindent Whether or not to indent proofs.
3353 \def\@proofindent{\indent}

Customization of the proof environment.
3354 \ifcase\ACM@format@nr
3355 \relax % manuscript
3356 \or % acmsmall
3357 \or % acmlarge
3358 \or % acmtog
3359 \or % sigconf
3360 \or % siggraph
3361 \or % sigplan
3362 \def\@proofnamefont{\itshape}
3363 \def\@proofindent{\noindent}
3364 \or % sigchi
3365 \or % sigchi-a
3366 \or % acmengage
3367 \or % acmcp
3368 \fi

proof We want some customization of the proof environment.
3369 \renewenvironment{proof}[1][\proofname]{\par
3370 \pushQED{\qed}%
3371 \normalfont \topsep6\p@\@plus6\p@\relax
3372 \trivlist
3373 \item[\@proofindent\hskip\labelsep
3374 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
3375 }{%
3376 \popQED\endtrivlist\endpfalse
3377 }

```

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.

```

3378 \AtEndPreamble{%
3379 \if@ACM@pbalance
3380 \global\@ACM@balancefalse
3381 \ifcase\ACM@format@nr
3382 \relax % manuscript
3383 \or % acmsmall
3384 \or % acmlarge
3385 \or % acmtog
3386 \RequirePackage{pbalance}%
3387 \or % sigconf
3388 \RequirePackage{pbalance}%
3389 \or % siggraph
3390 \RequirePackage{pbalance}%
3391 \or % sigplan
3392 \RequirePackage{pbalance}%
3393 \or % sigchi

```



```

3394         \RequirePackage{pbalance}%
3395         \or % sigchi-a
3396         \or % acmengage
3397         \RequirePackage{pbalance}%
3398         \or % acmcp
3399     \fi
3400 \fi
3401 \if@ACM@balance
3402     \ifcase\ACM@format@nr
3403     \relax % manuscript
3404         \global\@ACM@balancefalse
3405         \or % acmsmall
3406         \global\@ACM@balancefalse
3407         \or % acmlarge
3408         \global\@ACM@balancefalse
3409         \or % acmtog
3410         \RequirePackage{balance}%
3411         \or % sigconf
3412         \RequirePackage{balance}%
3413         \or % siggraph
3414         \RequirePackage{balance}%
3415         \or % sigplan
3416         \RequirePackage{balance}%
3417         \or % sigchi
3418         \RequirePackage{balance}%
3419         \or % sigchi-a
3420         \global\@ACM@balancefalse
3421         \or % acmengage
3422         \RequirePackage{balance}%
3423         \or % acmcp
3424         \global\@ACM@balancefalse
3425     \fi
3426 \fi
3427 }
3428 \AtEndDocument{%
3429     \if@ACM@balance
3430     \if@twocolumn
3431     \balance
3432     \fi\fi}

```

3.27 Acknowledgments

\acksname

```

3433 \newcommand\acksname{Acknowledgments}

```

\acks This is a comment-like structure

```

3434 \specialcomment{acks}{%
3435     \begin{group}
3436     \section*{\acksname}
3437     \phantomsection\addcontentsline{toc}{section}{\acksname}
3438 }{%
3439     \end{group}
3440 }

```

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

```
3441 \def\grantsponsor#1#2#3{#2}
```

`\grantnum`

```
3442 \newcommand\grantnum[3][{}]{#3%
```

```
3443 \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}
```

3.28 Conditional typesetting

We use the comment package for conditional typesetting:

```
3444 \AtEndPreamble{%
```

```
3445 \if@ACM@screen
```

```
3446 \includecomment{screenonly}
```

```
3447 \excludecomment{printonly}
```

```
3448 \else
```

```
3449 \excludecomment{screenonly}
```

```
3450 \includecomment{printonly}
```

```
3451 \fi
```

```
3452 \if@ACM@anonymous
```

```
3453 \excludecomment{anonsuppress}
```

```
3454 \excludecomment{acks}
```

```
3455 \else
```

```
3456 \includecomment{anonsuppress}
```

```
3457 \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’.

```
3458 \newcommand\showeprint[2][arxiv]{%
```

```
3459 \def\@tempa{#1}%
```

```
3460 \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
```

```
3461 \def\@tempb{arxiv}%
```

```
3462 \ifx\@tempa\@tempb\relax
```

```
3463 arXiv:\href{https://arxiv.org/abs/#2}{#2}%
```

```
3464 \else
```

```
3465 \def\@tempb{arXiv}%
```

```
3466 \ifx\@tempa\@tempb\relax
```

```
3467 arXiv:\href{https://arxiv.org/abs/#2}{#2}%
```

```
3468 \else
```

```
3469 #1:#2%
```

```
3470 \fi
```

```
3471 \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.

```
3472 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
```

```
3473 \columnseprule\z@ \columnsep 35\p@
```

```
3474 \@indextitlestyle
```

```
3475 \let\item\@idxitem
```

```

3476 \parindent\z@ \parskip\z@\@plus.3\p@\relax
3477 \raggedright
3478 \hyphenpenalty\@M
3479 \footnotesize}

```

3.31 End of Class

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

```

3480 \let\vspace@orig=\vspace
3481 \let\vspacer@orig=\vspacer
3482 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
3483   only be used to provide space above/below surrounding
3484   objects}}{}{}
3485 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
3486   only be used to provide space above/below surrounding
3487   objects}}{}{}
3488 \let\vspace@acm=\vspace
3489 \let\vspacer@acm=\vspacer

```

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

```

3490 \let\ACM@origbaselinestretch\baselinestretch
3491 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
3492   \ClassError{\@classname}{An attempt to redefine
3493     \string\baselinestretch\space detected. Please do not do this for
3494     ACM submissions!}\fi}

```

```

3495 \normalsize\normalfont\frenchspacing
3496 </class>

```

References

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Change History

1.48	General: Added prologue option to xcolor	51	\ccsdesc@parse: Added warning for missing concepts	78	
	Bib code cleanup (Zack Weinberg)	36	\if@ACM@printacmref: Added warning for longer papers	75	
	Documentation update (siggraph) .	36	\keywords: Added warning for missing keywords	74	
1.49	General: New journal: DTRAP	36	1.69	\vspace: Added the changed command to avoid grouping . . .	115
1.53	General: New journals: PACMCGIT, TIOT, TDSCI	36	1.70	General: Name change for TDS	60
	Rearranged docs	36	1.71	General: Bibliography change: volume for @inproceedings is now in brackets together with series . . .	36
1.54	General: Moved footnote stuff before hyperref call (Ross Moore)	36		LuaTeX now uses the OTF versions of fonts	36
1.56	General: Documented \Description	36		Retired sigchi and sigchi-a	36
1.57	General: Booktabs package is now the default	36	1.75	General: Documentation update . . .	36
1.58	General: Changes in samples (Enrico Gregorio)	36	1.78	General: Documentation update: Word count	36
	New journal: HEALTH. TDS is renamed to TDSCI	36	1.79	General: Updated indormation for TAP, TCPS, TEAC	60
1.60	General: New option: urlbreakonhyphens	36	1.80	General: Added DLT and FAC	60
	\if@ACM@urlbreakonhyphens: introduced macro	37	1.82	General: Updated abbreviations and codes for several journals	60
1.62	General: New journal: TELO	36	1.84	General: New journals: JDS, GAMES	36, 60
1.63	General: New journal: FACMP	36	1.85	General: Added CC licenses	36
	New journal: TQUANT	36		Added: acmengage	49
1.63a	General: Move: TQUANT to TQC . .	36		New journal: JRC	60
1.64	General: Putting abstract after \maketitle now causes an error .	36		\@mkauthors: Added: acmengage . .	92
1.65	General: New journal: DGOV	36		\@mktitle: Added: acmengage	89
1.66	General: ACM reference format is now mandatory for papers over one page; CCS concepts and keywords are now mandatory for papers over two pages	36		\@parfont: Added: acmengage	108
	Authors' addresses are mandatory for journal articles	36		\@printtopmatter: Added: acmengage	88
	\@mkauthorsaddresses: Added warning for missing addresses . .	98		\@specialsection: Added: acmengage	88
				\@subtitlefont: Added: acmengage	90
				\@titlefont: Added: acmengage . .	90
				\ACM@linecountR: Added: acmengage	101
				format: New format: acmengage . . .	37
				\parskip: Added: acmengage	53

1.87	General: New journals: ACMJCSS, JATS, TORS	60	v1.03	General: Added anonsuppress environment	36
	format: New format: acmcp	37		Added authorversion option (closes https: //github.com/borisveytsman/ acmart/issues/13)	36
1.88	General: Added ISSN for ACMJCSS	60		Added authorversion option (closes https: //github.com/borisveytsman/ acmart/issues/9)	36
	Added ISSN for GAMES	60			
	Added PACMNET	60			
1.89	General: Added PACMMOD	60		\@formatdoi: Added macro	80
	Added TOPML	60		\if@ACM@authorversion: Added macro	38
	\@printtopmatter: Moved badges to top header	88		\maketitle: Added special case of authorversion	84
1.90	General: Added TOPML eISSN	60	v1.04	General: Updated bibliography for siggraph	36
1.90a	General: Changes in the sample keywords and concepts	36		\acmArticleSeq: Name change by Matthew Fluet	72
1.92	General: Documentation update: use of ‘anonymous’ throughout	36		\acmDOI: Name change by Matthew Fluet	73
	Moved hyperxmp again due to kernel update	49		\acmISBN: Name change by Matthew Fluet	73
2.04	General: Deleted loading ifdraft due to the new release of hyperxmp	49	v1.05	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	36
	Explicitly load ifdraft since hyperxmp tries to load it inside a group	49		Patched \setcitestyle command; closes https: //github.com/borisveytsman/ acmart/issues/19	36
v1.00	General: First released version	36	v1.06	\@ACM@badge@skip: Added macro	73
v1.01	General: Changed hyperref colors in screen mode (closes https: //github.com/borisveytsman/ acmart/issues/1)	36		\@ACM@badge@width: Added macro	73
	Defined ACM colors	36		\@ACM@title@width: Added macro	73
	Explicitly put draft option (closes https: //github.com/borisveytsman/ acmart/issues/4)	39		\@mktitle@i: Added processing badges	91
	Set headheight to 1pc for all formats (closes https: //github.com/borisveytsman/ acmart/issues/5)	36		Made generic	91
v1.02	General: Added TOPS and TSC (closes https: //github.com/borisveytsman/ acmart/issues/12)	36		\@mktitle@ii: Now this macro is obsolete	91
	Documentation changes (closes https: //github.com/borisveytsman/ acmart/issues/12)	36		\@mktitle@iii: Added processing badges	91
				Made more generic	91
				\@mktitle@iv: Made more generic	91
				\@printtopmatter: Added processing badges	88
				\@subtitlefont: Added macro	90
				\@titlefont: Added macro	90
				\acmBadgeL: Added macro	74
				\acmBadgeR: Added macro	73
				\if@ACM@badge: Added macro	73
			v1.07	\maketitle: Corrected a bug with abstract footnotes	84

Corrected a bug with permission and footnotes order	84	\bibstyle@acmauthoryear: Added macro	44
v1.08		\bibstyle@acmnumeric: Added macro	44
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v1.09		Expanded headers for sigchi-a	102
General: Revert SIGPLAN caption rules	36	Suppressed folios if sig	102
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General: Changes of ‘licensedothergov’ wording	78	General: \citestyle updates (Matthew Fluet)	36
\maketitle: Corrected a bug with doi in manuscript and author version, https://github.com/borisveytsman/acmart/issues/36	84	Patched \citestyle	43
standardpagestyle: Reversed folios location	102	\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use	44
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General: Customization of ACM theorem styles and proof environment by Matthew Fluet	36	v1.15	
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General: Added graceful behavior when libertine fonts are absent	55	\@mkauthors@iii: New authors system	96
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\@marginfigure: Now centering by default	58	\@typeset@author@bx: Moved to separate macro	95
\@margintable: Now centering by default	58	\acks: Added macro	113
\@parfont: Moved to \section@raggedright	108	\affiliation: Added code for author groups	70
\copyrightpermissionfootnoterule: Added macro	54	\author: Added code for author groups	69
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\footnoterule: Made shorter	54	\country: Added macro	92
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\if@ACM@newfonts: Added macro	55	\grantnum: Added macro	114
\maketitle: Moved thankses to copyrightpermission box	84	\grantsponsor: Added macro	114
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\bibliographystyle: Redefined macro	50	\state: Added macro	92
		\streetaddress: Added macro	92
		standardpagestyle: Better handling of anonymous mode	102
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		General: Formatting header/footer (Matthew Fluet)	36
		\@headfootfont: Added macro	102
		standardpagestyle: Customize header/footer text font	102

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	\@makefnmark: Redefined	49	v1.25	General: Updated PACMPL	60
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	\@mkauthors@ii: Deleted	95		Documentation typos fixed (thanks to Stephen Spencer)	36
	\@mkbibcitation: Added \nobreak Changed format for sigs	99	v1.27	\if@ACM@printccs: Typo corrected	75
	\acmArticle: The default is now numerical	72	v1.28	General: Corrected option natbib behavior	44
	\acmMonth: The default must be numerical. Closes #50.	72		Got rid of warnings in pdf keywords	49
	\acmNumber: The default is now numerical	72	\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato)	77	
	\acmVolume: The default is now numerical	72	v1.29	General: Increased head to 13pt	51
	\acmYear: The default is now numerical	72	\@mkabstract: Removed spurious indentation (John Wickerson)	99	
	\description: Decreased indent	60	\ccsdesc@parse: Add spacing after bullet and around rightrightarrow; semicolon separators no longer in bold/italic (John Wickerson)	77	
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	\@typeset@author@line: Added macro	94	v1.31	General: Documentation changes	36
v1.19	General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	36	\@additionalaffiliation: Added macro	70	
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	\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet)	99	\@startsection: Added \tochangmeasure	46	
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	\@mkabstract: Deleted spurious space	99	\acmMonth: The default now is the current month (Matteo Riondato)	72	
v1.21	\showeprint: Added macro	114	\acmYear: The default now is the current year (Matteo Riondato)	72	
v1.22	General: More bibliography changes for Aptara	36	\additionalaffiliation: Added macro	70	
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			\l@subsubsection: Redefined macro	49	

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		code	92
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General: Added acmart-preload-hook	36	code	92
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