

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` 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>

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 CIE, CSUR, DLT, FAC, GAMES, JACM, JDIQ, JDS, JEA, JERIC, JETC, JRC, PACMCGIT, PACMHCI, PACMPL, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TDS, TEAC, TECS, TELO, THRI, TIIS, TIOT, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPS, TOS, TOSEM, TOSN, TQC, TRETS, TSAS, TSC, TSLP and TWEB, including special issues.
acmlarge	Large single-column format. Used for DTRAP, HEALTH, IMWUT, JOCCH, POMACS and TAP, including special issues.
acmtog	Large double-column format. Used for TOG, including annual conference Technical Papers.
sigconf	Proceedings format for most ACM conferences (with the exceptions listed below) and all ICPS volumes.
sigplan	Proceedings format for SIGPLAN conferences.
. acmengage	ACM EngageCSEdu Course materials.

2.2 Invocation and options

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

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

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

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

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

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

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

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

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

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

Starting in 2020, ACM retired formats `sigchi` and `sigchi-a`. SIGCHI conferences now use `sigconf` format for their publications. If a file uses `sigchi` format, a warning

is issued, and the format is automatically switched to `sigconf`. Format `sigchi-a` can be used for non-ACM documents only (see Section 2.20).

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

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

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

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

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

The option `natbib` is used when the corresponding \LaTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.13.

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 2.5.

2.3 Top matter

A number of commands set up *top matter* or (in computer science jargon) *metadata* for an article. They establish the publication name, article title, authors, DOI and other data. Some of these commands, like `\title` and `\author`, should be put by the authors. Others, like `\acmVolume` and `\acmDOI`—by the editors. Below we describe these commands and mention who should issue them. These macros should be used *before* the `\maketitle` command. Note that in previous versions of ACM classes some of these commands should be used before `\maketitle`, and some after it. Now they all must be used before `\maketitle`.

Table 2: Boolean options

Option	Default	Meaning
review	false	A review version: lines are numbered and hyperlinks are colored
screen	see text	A screen version: hyperlinks are colored
natbib	true	Whether to use the natbib package (see Section 2.13)
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 or permission statements
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 2.9
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

	<p>This class internally loads the <code>amsart</code> class, so many top-matter commands are inherited from <code>amsart</code> [2].</p>
<code>\acmJournal</code>	<p>The macro <code>\acmJournal{<shortName>}</code> sets the name of the journal or transaction for journals and transactions. The argument is the short name of the publication <i>in uppercase</i>, for example,</p> <pre>\acmJournal{TOMS}</pre>
	<p>The currently recognized journals are listed in Table 5. Note that conference proceedings published in <i>book</i> form do not set this macro.</p>
<code>\acmConference</code>	<p>The macro <code>\acmConference[<short name>]{<name>}{<date>}{<venue>}</code> is used for conference proceedings published in the book form. The arguments are the following:</p> <p>short name: the abbreviated name of the conference (optional).</p> <p>name: the name of the conference.</p> <p>date: the date(s) of the conference.</p> <p>venue: the place of the conference.</p> <p>Examples:</p> <pre>\acmConference[TD'15]{Technical Data Conference}{November 12--16}{Dallas, TX, USA} \acmConference{SA'15 Art Papers}{November 02--06, 2015}{Kobe, Japan}</pre>
<code>\acmBooktitle</code>	<p>By default we assume that conference proceedings are published in the book named <i>Proceedings of CONFERENCE</i>, where <i>CONFERENCE</i> is the name of the conference inferred from the command <code>\acmConference</code> above. However, sometimes the book title is different. The command <code>\acmBooktitle</code> can be used to set this title, for example,</p> <pre>\acmBooktitle{Companion to the first International Conference on the Art, Science and Engineering of Programming (Programming '17)}</pre> <p>An ACM paper should have either <code>\acmJournal</code> or <code>\acmConference</code> command. If it has both (or more) commands, the last one takes precedence. Note that if you have the command <code>\acmConference</code> in a journal format like <code>acmsmall</code>, the class will use conference format for bibstrip and reference citation formatting. In the samples directory there is a file <code>sample-acmsmall-conf.tex</code> with the example of this usage.</p> <p>An ACM Engage material should <i>not</i> use <code>\acmJournal</code> or <code>\acmConference</code> command. It may use <code>\acmBooktitle</code> to override the default <i>ACM EngageCSEdu</i>. It should use <code>\acmYear</code> to set the date of the material.</p>
<code>\editor</code>	<p>In most cases, conference proceedings are edited. You can use the command <code>\editor{<editor>}</code> to set the editor of the volume. This command can be repeated, for example,</p> <pre>\editor{Jennifer B. Sartor} \editor{Theo D'Hondt} \editor{Wolfgang De Meuter}</pre>

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

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

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

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

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

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

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

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

`\affiliation` enter them in this order:

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

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

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

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

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

An example of the author block:

```

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

```

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

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

```

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

```

and

```

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

```

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

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

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

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

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

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

will be typeset as

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

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

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

`\thanks` Like `amsart` (and unlike standard \LaTeX), we allow `\thanks` only *outside* of the commands `\title` and `\author`. This command is obsolete and should *not* be used in most cases. Do not list your acknowledgments or grant sponsors here. Put this information in the `acks` environment (see Section 2.12).

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

```
\authorsaddresses{%
  Authors' addresses: G.~Zhou, Computer Science Department, College of
  William and Mary, 104 Jameson Rd, Williamsburg, PA 23185, US;
  V.~B'eranger, Inria Paris-Rocquencourt, Rocquencourt, France;
  A.~Patel, Rajiv Gandhi University, Rono-Hills, Doimukh, Arunachal
```

Pradesh, India; H.~Chan, Tsinghua University, 30 Shuangqing Rd,
Haidian Qu, Beijing Shi, China; T.~Yan, Eaton Innovation Center,
Prague, Czech Republic; T.~He, C.~Huang, J.~A.~Stankovic University
of Virginia, School of Engineering Charlottesville, VA 22903, USA;
T. F. Abdelzaher, (Current address) NASA Ames Research Center,
Moffett Field, California 94035.}

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

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

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

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

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

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

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

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

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

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

`\acmArticleSeq` The articles in the same issue of a journal have a *sequence number*. It is used to
vertically position the black blob on the first page of some formats. 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
```

	<code>\acmArticleSeq{5}</code> % We redefine it to 5
	Setting this number to zero suppresses the blob.
<code>\acmSubmissionID</code>	If your paper got a Submission ID from the Conference Management System, put it here: <code>\acmSubmissionID{123-A56-BU3}</code>
<code>\acmPrice</code>	The macro <code>\acmPrice{<price>}</code> sets the price for the article, for example, <code>\acmPrice{25.00}</code> Note that you do not need to put the dollar sign here, just the amount. By default the price is \$15.00, unless the copyright is set to <code>usgov</code> , <code>rightsretained</code> , <code>iw3c2w3</code> , or <code>iw3c2w3g</code> , when it is suppressed. Note that to override the defaults you need to set the price <i>after</i> the <code>\setcopyright</code> command. Also, the command <code>\acmPrice{}</code> suppresses the printing of the price.
<code>\acmISBN</code>	Book-like volumes have ISBN numbers attached to them. The macro <code>\acmISBN{<ISBN>}</code> sets it. Normally it is set by the typesetter, for example, <code>\acmISBN{978-1-4503-3916-2}</code> Setting it to the empty string, as <code>\acmISBN{}</code> , suppresses printing the ISBN.
<code>\acmDOI</code>	The macro <code>\acmDOI{<DOI>}</code> sets the DOI of the article, for example, <code>\acmDOI{10.1145/9999997.9999999}</code> It is normally set by the typesetter. Setting it to the empty string, as <code>\acmDOI{}</code> , suppresses the DOI.
<code>\acmBadgeR</code> <code>\acmBadgeL</code>	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 commands to add these badges: <code>\acmBadgeR[<url>]{<graphics>}</code> and <code>\acmBadgeL[<url>]{<graphics>}</code> . The first command puts the badge to the right of the title, and the second one—to the left. The arguments have the following meaning: <code>[<url>]</code> , if provided, sets the link to the badge authority in the screen version, while <code>{<graphics>}</code> 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 <code>ae-logo.pdf</code> , the command is <code>\acmBadgeR[http://ctuning.org/ae/ppopp2016.html]{ae-logo}</code>
<code>\startPage</code>	The macro <code>\startPage{<page>}</code> sets the first page of the article in a journal or book. It is used by the typesetter.
<code>\terms</code> <code>\keywords</code>	The command <code>\keywords{<keyword, keyword,...>}</code> sets keywords for the article. They must be separated by commas, for example, <code>\keywords{wireless sensor networks, media access control, multi-channel, radio interference, time synchronization}</code>

CCSXML ACM publications are classified according to the ACM Computing Classification
\ccsdesc 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
 \backslash 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 transfer the rights to the ACM, license them to the ACM, some or all
authors might be employees of the US or Canadian governments, etc. Accordingly the
command \backslash setcopyright{...} is introduced. Its argument is the copyright status of
the paper, for example, \backslash setcopyright{acmcopyright}. The possible values for this
command are listed in Table 3. This command must be placed in the preamble, before
 \backslash begin{document}.

\setcctype If Creative Commons license is used, the package by default chooses CC-BY 4.0
Attribution 4.0 International license. You can override this choice by the command
 \backslash setcctype[\langle version \rangle]{ \langle type \rangle }, where [\langle version \rangle] can be either 3.0 or 4.0 (4.0 by de-
fault), and { \langle type \rangle } can be one of zero, by, by-sa, by-nd, by-nc, by-nc-sa, by-nc-nd

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>acmcopyright</code>	The authors transfer the copyright to the ACM (the “traditional” choice).
<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.

(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` 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` 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{February 2007}
\received[revised]{March 2009}
\received[accepted]{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 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>}title</code> , <code>\translatedsubtitle{<language>}subtitle</code> 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</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.

2.6 Algorithms

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

2.7 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`.

2.8 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.

2.9 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}}
```

2.10 Online-only and offline-only material

`printonly` Some supplementary material in ACM publications is put online but not in the printed
`screenonly` 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.

2.11 Note about anonymous mode

`anonsuppress` When the option `anonymous` is selected, TeX suppresses author information (including the number of authors) for a blind 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}.
```

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

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

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

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

Example:

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

The authors would also like to thank the anonymous referees for
their valuable comments and helpful suggestions. This work is
supported by the \grantsponsor{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}
```

2.13 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.

2.13.1 Processing using Bib_{TeX}

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

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

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

```
\citestyle{acmauthoryear}
```

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

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

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

One of the more common versions is

```
\setcitestyle{nosort}
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

and then encode the author as

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

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

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

2.13.2 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.

2.14 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 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.

2.16 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.

2.17 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.

2.18 Notes for wizards

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

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

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

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

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

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

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

you will pass `dvipsnames` to `xcolor`.

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

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

```
\AtBeginMaketitle{\acmPrice{125.00}}
```

2.19 Currently supported publications

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

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DLT	Distributed Ledger Technologies: Research and Practice
DGOV	Digital Government: Research and Practice
DTRAP	Digital Threats: Research and Practice
FAC	Formal Aspects of Computing
GAMES	ACM Games: Research and Practice
HEALTH	ACM Transactions on Computing for Healthcare
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
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
PACMPL	PACM on Programming Languages
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

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

Abbreviation	Publication
TOCL	ACM Transactions on Computational Logic
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory
TODAES	ACM Transactions on Design Automation of Electronic Systems
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPS	ACM Transactions on Privacy and Security
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.

2.20 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
marginfigure
margintable

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

sidebar: textual information in the margin,

marginfigure: a figure in the margin,

margintable: a table in the margin.

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

The horizontal sizes of figures are:

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

3 Implementation

3.1 Identification

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

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class>\ProvidesClass{acmart}
6 [2022/05/10 v1.85 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}[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 \ExecuteOptionsX{format}

```

\if@ACM@screen Whether we use screen mode

```

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

```

\if@ACM@urlbreakonhyphens

```

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

```

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

```

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

```

\if@ACM@review Whether we use review mode

```

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

```

```

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

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

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

\if@ACM@balance Whether to balance the last page
103 \define@boolkey+{acmart.cls}{@ACM@}{balance}[true]{}%
104   \PackageError{\@classname}{The option balance can be either true or
105     false}}
106 \ExecuteOptionsX{balance}

\if@ACM@pbalance Whether to balance the last page
107 \define@boolkey+{acmart.cls}{@ACM@}{pbalance}[true]{}%
108   \PackageError{\@classname}{The option pbalance can be either true or
109     false}}
110 \ExecuteOptionsX{pbalance=false}

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

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

```

```

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

```

```

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

```

```

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

```

```

\ACM@fontsize The font size to pass to the base class
145 \def\ACM@fontsize{}
146 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
147 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
148 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
149 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

```

```

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

155 \DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
156 \DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
157 \ProcessOptionsX
158 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}

```

3.4 Setting switches

<code>\if@ACM@manuscript</code>	Whether we use manuscript mode 159 <code>\newif\if@ACM@manuscript</code>
<code>\if@ACM@journal</code>	There are two kinds of publications: journals and books 160 <code>\newif\if@ACM@journal</code>
<code>\if@ACM@journal@bibstrip</code>	Sometimes ACM wants a journal-like publication to have conference information in the bibstrip and vice versa, so we have an additional switch. 161 <code>\newif\if@ACM@journal@bibstrip</code>
<code>\if@ACM@sigchiamode</code>	The formatting of SIGCHI extended abstracts is quite unusual. We have a special switch for them. 162 <code>\newif\if@ACM@sigchiamode</code>
<code>\if@ACM@engage</code>	ACM Engage course materials have special formatting 163 <code>\newif\if@ACM@engage</code> 164 <code>\@ACM@engagefalse</code>

Setting up switches

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

```

197 \relax % manuscript
198 \@ACM@journaltrue
199 \or % acmsmall
200 \@ACM@journaltrue
201 \or % acmlarge
202 \@ACM@journaltrue
203 \or % acmtog
204 \@ACM@journaltrue
205 \or % sigconf
206 \@ACM@journalfalse
207 \or % siggraph
208 \@ACM@journalfalse
209 \or % sigplan
210 \@ACM@journalfalse
211 \or % sigchi
212 \@ACM@journalfalse
213 \or % sigchi-a
214 \@ACM@journalfalse
215 \@ACM@sigchiamodetrue
216 \or % acmengage
217 \@ACM@journalfalse
218 \@ACM@engagetrue
219 \fi
220 \if@ACM@journal
221 \@ACM@journal@bibstriptrue
222 \else
223 \@ACM@journal@bibstripfalse
224 \fi

```

3.5 Loading the base class and package

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

```

225 \ifx\ACM@fontsize\empty
226 \ifcase\ACM@format@nr
227 \relax % manuscript
228 \def\ACM@fontsize{9pt}%
229 \or % acmsmall
230 \def\ACM@fontsize{10pt}%
231 \or % acmlarge
232 \def\ACM@fontsize{10pt}%
233 \or % acmtog
234 \def\ACM@fontsize{9pt}%
235 \or % sigconf
236 \def\ACM@fontsize{9pt}%
237 \or % siggraph
238 \def\ACM@fontsize{9pt}%
239 \or % sigplan
240 \def\ACM@fontsize{10pt}%
241 \or % sigchi
242 \def\ACM@fontsize{9pt}%
243 \or % sigchi-a
244 \def\ACM@fontsize{10pt}%
245 \fi
246 \fi

```

```

247 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
248 \LoadClass[\ACM@fontsize, reqno]{amsart}
249 \RequirePackage{microtype}

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

    Booktabs is now the default
251 \RequirePackage{booktabs}

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

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

    We use setspace for double spacing
255 \if@ACM@manuscript
256 \RequirePackage{setspace}
257 \onehalfspacing
258 \fi

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

```

3.6 Citations

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

```

260 \if@ACM@natbib
261 \RequirePackage{natbib}
262 \renewcommand{\bibsection}{%
263 \section*{\refname}%
264 \phantomsection\addcontentsline{toc}{section}{\refname}%
265 }
266 \renewcommand{\bibfont}{\bibliofont}
267 \renewcommand{\setcitestyle}[1]{
268 \@for\@tempa:=#1\do
269 {\def\@tempb{round}\ifx\@tempa\@tempb
270 \renewcommand\NAT@open{(\}\renewcommand\NAT@close{)}\fi
271 \def\@tempb{square}\ifx\@tempa\@tempb
272 \renewcommand\NAT@open{[\}\renewcommand\NAT@close{]}\fi
273 \def\@tempb{angle}\ifx\@tempa\@tempb
274 \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
275 \def\@tempb{curly}\ifx\@tempa\@tempb
276 \renewcommand\NAT@open{\{\}\renewcommand\NAT@close{\}}\fi
277 \def\@tempb{semicolon}\ifx\@tempa\@tempb
278 \renewcommand\NAT@sep{;}\fi
279 \def\@tempb{colon}\ifx\@tempa\@tempb
280 \renewcommand\NAT@sep{;}\fi
281 \def\@tempb{comma}\ifx\@tempa\@tempb
282 \renewcommand\NAT@sep{,}\fi
283 \def\@tempb{authoryear}\ifx\@tempa\@tempb

```



```

284 \NAT@numbersfalse\fi
285 \def\@tempb{numbers}\ifx\@tempa\@tempb
286 \NAT@numberstrue\NAT@superfalse\fi
287 \def\@tempb{super}\ifx\@tempa\@tempb
288 \NAT@numberstrue\NAT@supertrue\fi
289 \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
290 \let\bibstyle=\@gobble\fi
291 \def\@tempb{bibstyle}\ifx\@tempa\@tempb
292 \let\bibstyle=\@citestyle\fi
293 \def\@tempb{sort}\ifx\@tempa\@tempb
294 \def\NAT@sort{\@ne}\fi
295 \def\@tempb{nosort}\ifx\@tempa\@tempb
296 \def\NAT@sort{\z@}\fi
297 \def\@tempb{compress}\ifx\@tempa\@tempb
298 \def\NAT@cmprs{\@ne}\fi
299 \def\@tempb{nocompress}\ifx\@tempa\@tempb
300 \def\NAT@cmprs{\z@}\fi
301 \def\@tempb{sort&compress}\ifx\@tempa\@tempb
302 \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
303 \def\@tempb{mcite}\ifx\@tempa\@tempb
304 \let\NAT@merge\@ne\fi
305 \def\@tempb{merge}\ifx\@tempa\@tempb
306 \@ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}{\fi}
307 \def\@tempb{elide}\ifx\@tempa\@tempb
308 \@ifnum{\NAT@merge<\thr@}{\let\NAT@merge\thr@}{\fi}
309 \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
310 \NAT@longnamestrue\fi
311 \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
312 \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
313 \expandafter\NAT@find@eq\@tempa=\relax\@nil
314 \if\@tempc\relax\else
315 \expandafter\NAT@rem@eq\@tempc
316 \def\@tempb{open}\ifx\@tempa\@tempb
317 \xdef\NAT@open{\@tempc}\fi
318 \def\@tempb{close}\ifx\@tempa\@tempb
319 \xdef\NAT@close{\@tempc}\fi
320 \def\@tempb{aysep}\ifx\@tempa\@tempb
321 \xdef\NAT@aysep{\@tempc}\fi
322 \def\@tempb{yysep}\ifx\@tempa\@tempb
323 \xdef\NAT@yrsep{\@tempc}\fi
324 \def\@tempb{notesep}\ifx\@tempa\@tempb
325 \xdef\NAT@cmt{\@tempc}\fi
326 \def\@tempb{citesep}\ifx\@tempa\@tempb
327 \xdef\NAT@sep{\@tempc}\fi
328 \fi
329 }%
330 \NAT@setcites
331 }
332 \renewcommand\citestyle[1]{%
333 \ifcsname bibstyle@#1\endcsname%
334 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
335 \else%
336 \@latex@error{Undefined ‘#1’ citestyle}%
337 \fi

```

```

338 }%
339 \fi

```

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

```

340 \newcommand{\bibstyle@acmauthoryear}{%
341   \setcitestyle{%
342     authoryear,%
343     open={},close={},citesep={;},%
344     aysep={},yysep={},,%
345     notesep={, }}

```

`\bibstyle@acmnumeric` The default numeric format:

```

346 \newcommand{\bibstyle@acmnumeric}{%
347   \setcitestyle{%
348     numbers,sort&compress,%
349     open={},close={},citesep={,},%
350     notesep={, }}

```

The default is numeric:

```

351 \if@ACM@natbib
352 \citestyle{acmnumeric}
353 \fi

```

3.7 Internationalization

```

354 \if@ACM@journal
355   \renewcommand\keywordsname{Additional Key Words and Phrases}%
356 \else
357   \renewcommand\keywordsname{Keywords}%
358 \fi
359 \if@ACM@engage
360   \renewcommand\abstractname{Synopsis}%
361 \fi
362 \ifx\ACM@languages\@empty
363 \else
364   \RequirePackage[\ACM@languages]{babel}%
365   \addto\captionsenglish{%
366     \if@ACM@journal
367       \renewcommand\keywordsname{Additional Key Words and Phrases}%
368     \else
369       \renewcommand\keywordsname{Keywords}%
370     \fi
371     \renewcommand\acksname{Acknowledgements}%
372     \if@ACM@engage
373       \renewcommand\abstractname{Synopsis}%
374     \fi
375   }%
376   \addto\captionsfrench{%
377     \if@ACM@journal
378       \renewcommand\keywordsname{Mots Clés et Phrases Supplémentaires}%
379     \else
380       \renewcommand\keywordsname{Mots clés}%
381     \fi
382     \renewcommand\acksname{Remerciements}%

```

```

383 }%
384 \addto\captionsgerman{%
385     \if@ACM@journal
386         \renewcommand\keywordsname{Zusätzliche Schlagwörter und Phrasen}%
387     \else
388         \renewcommand\keywordsname{Schlagwörter}%
389     \fi
390     \renewcommand\acksname{Danksagungen}%
391 }%
392 \addto\captionsspanish{%
393     \if@ACM@journal
394         \renewcommand\keywordsname{Palabras y Frases Claves Adicionales}%
395     \else
396         \renewcommand\keywordsname{Palabras claves}%
397     \fi
398     \renewcommand\acksname{Expresiones de gratitud}%
399 }%
400 \fi

\ACM@lang@check Some commands should not be used if the document is monlingual
401 \newcommand\ACM@lang@check[1]{%
402     \ifx\ACM@languages\empty\relax
403     \ClassError{\@classname}{%
404         Command \string#1 \MessageBreak is used in monlingual document}{%
405         You used a command (\string#1) \MessageBreak
406         that does not have a meaning \MessageBreak
407         unless are languages are defined. \MessageBreak
408         Please choose the languages in \string\documentclass
409         \MessageBreak
410         (e.g. \string\documentclass[languages={french, english}]{acmart}),
411         \MessageBreak
412         or delete the command.}%
413     \fi}

\@translatedtitle
414 \def\@translatedtitle{}

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

\@translatedsubtitle
417 \def\@translatedsubtitle{}

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

\@translatedkeywords
420 \def\@translatedkeywords{}

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

```

```

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

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

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

```

3.8 Sectioning

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

```

431 \def\@startsection#1#2#3#4#5#6{%
432   \if@noskipsec \leavevmode \fi
433   \par
434   \@tempskipa #4\relax
435   \@afterindenttrue
436   \ifdim \@tempskipa <\z@
437     \@tempskipa -\@tempskipa \@afterindentfalse
438   \fi
439   \if@nobreak
440     \everypar{}%
441   \else
442     \addpenalty\@secpenalty\addvspace\@tempskipa
443   \fi
444   \@ifstar
445     {\@ssect{#3}{#4}{#5}{#6}}%
446     {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}%
447 \def\@sect#1#2#3#4#5#6[#7]#8{%
448   \edef\@toclevel{\ifnum#2=\@m 0\else\number#2\fi}%
449   \ifnum #2>\c@secnumdepth
450     \let\@svsec\@empty
451   \else
452     \refstepcounter{#1}%
453     \protected@edef\@svsec{\@secntformat{#1}\relax}%
454   \fi
455   \@tempskipa #5\relax
456   \ifdim \@tempskipa>\z@
457     \begingroup
458       #6{%
459         \@hangfrom{\hskip #3\relax\@svsec}%
460         \interlinepenalty \@M #8\@par}%
461     \endgroup
462     \csname #1mark\endcsname{#7}%
463     \ifnum #2>\c@secnumdepth \else
464       \@tochangmeasure{\csname the#1\endcsname}%

```

```

465 \fi
466 \addcontentsline{toc}{#1}{%
467 \ifnum #2>\c@secnumdepth \else
468 \protect\numberline{\csname the#1\endcsname}%
469 \fi
470 #7}%
471 \else
472 \def\@svsechd{%
473 #6{\hskip #3\relax
474 \@svsec #8}%
475 \csname #1mark\endcsname{#7}%
476 \ifnum #2>\c@secnumdepth \else
477 \tochangmeasure{\csname the#1\endcsname\space}%
478 \fi
479 \addcontentsline{toc}{#1}{%
480 \ifnum #2>\c@secnumdepth \else
481 \protect\numberline{\csname the#1\endcsname}%
482 \fi
483 #7}}%
484 \fi
485 \@xsect{#5}}
486 \def\@xsect#1{%
487 \@tempskipa #1\relax
488 \ifdim \@tempskipa>\z@
489 \par \nobreak
490 \vskip \@tempskipa
491 \@afterheading
492 \else
493 \@nobreakfalse
494 \global\@noskipsectrue
495 \everypar{%
496 \if@noskipsec
497 \global\@noskipsecfalse
498 {\setbox\z@\lastbox}%
499 \clubpenalty\@M
500 \begingroup \@svsechd \endgroup
501 \unskip
502 \@tempskipa #1\relax
503 \hskip -\@tempskipa
504 \else
505 \clubpenalty \@clubpenalty
506 \everypar{}%
507 \fi}%
508 \fi
509 \ignorespaces}
510 \def\@secntformat#1{\csname the#1\endcsname\quad}
511 \def\@ssect#1#2#3#4#5{%
512 \@tempskipa #3\relax
513 \ifdim \@tempskipa>\z@
514 \begingroup
515 #4{%
516 \@hangfrom{\hskip #1}%
517 \interlinepenalty \@M #5\@par}%
518 \endgroup

```

```

519 \else
520   \def\@svsechd{#4{\hskip #1\relax #5}}%
521 \fi
522 \@xsect{#3}}

```

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

```

523 \def\@starttoc#1#2{\begingroup\makeatletter
524   \setTrue{#1}%
525   \par\removeatlastskip\vskip\z@skip
526   \@startsection{section}\M\z@{\linespacing\@plus\linespacing}%
527     {.5\linespacing}{\centering\contentsnamefont}{#2}%
528   \@input{\jobname.#1}%
529   \if@files
530     \exp\newwrite\csname tf@#1\endcsname
531     \immediate\exp\openout\csname tf@#1\endcsname \jobname.#1\relax
532   \fi
533   \global\@nobeckfalse \endgroup
534   \addvspace{32\p@\@plus14\p@}%
535 }

```

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

```

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

```

`\l@subsection` The spacing in `amsart` is too large

```

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

```

`\l@subsubsection` The spacing in `amsart` is too large

```

538 \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

```

539 \def\@makefnmark{\noindent\@makefnmark}

```

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

```

540 \if@ACM@sigchi-mode
541 \long\def\@footnotetext#1{\marginpar{%
542   \reset@font\small
543   \interlinepenalty\interfootnotelinepenalty
544   \protected@edef\@currentlabel{%
545     \csname p@footnote\endcsname\@thefnmark
546   }%
547   \color@begingroup
548     \@makefnmark{%
549       \rule{z@footnotesep}{\ignorespaces#1\@finalstrut\strutbox}%
550     \color@endgroup}}%
551 \fi

```

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

```

552 \long\def\@mpfootnotetext#1{%
553   \global\setbox\@mpfootins\vbox{%
554     \unvbox\@mpfootins

```

```

555 \reset@font\footnotesize
556 \hsize\columnwidth
557 \@parboxrestore
558 \protected@edef\@currentlabel
559 {\csname p@mpfootnote\endcsname\@thefnmark}%
560 \color@begingroup\centering
561 \makefnmark{\rule{z@footnotesep}{\ignorespaces#1}\@finalstrut\strutbox}%
562 \color@endgroup}}
563 \color@endgroup}}

```

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

```

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

```

3.9 Hyperxmp and hyperref

Adding hyperxmp

```

565 \RequirePackage{hyperxmp}

And now, hyperref

566 \let\@footnotemark@nolink\@footnotemark
567 \let\@footnotetext@nolink\@footnotetext
568 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
569 \pdfstringdefDisableCommands{%
570 \def\addtocounter#1#2{%
571 \def\unskip}%
572 \def\textbullet{-}%
573 \def\textrightarrow{->}%
574 \def\footnotemark{%
575 }
576 \urlstyle{rm}
577 \ifcase\ACM@format@nr
578 \relax % manuscript
579 \or % acmsmall
580 \or % acmlarge
581 \or % acmtog
582 \or % sigconf
583 \or % siggraph
584 \or % sigplan
585 \urlstyle{sf}
586 \or % sigchi
587 \or % sigchi-a
588 \urlstyle{sf}
589 \or % acmengage
590 \fi
591 \AtEndPreamble{%
592 \if@ACM@urlbreakonhyphens
593 \def\do@url@hyp{\do{-}}%
594 \fi
595 \if@ACM@screen
596 \hypersetup{colorlinks,
597 linkcolor=ACMPurple,
598 citecolor=ACMPurple,
599 urlcolor=ACMDarkBlue,
600 filecolor=ACMDarkBlue}

```

```

601 \else
602 \hypersetup{hidelinks}
603 \fi
604 \hypersetup{pdflang={en},
605 pdfdisplaydoctitle}}
    Bibliography mangling.
606 \if@ACM@natbib
607 \let\citeN\cite
608 \let\cite\citep
609 \let\citeANP\citeauthor
610 \let\citeNN\citeyearpar
611 \let\citeyearNP\citeyear
612 \let\citeNP\citealt
613 \DeclareRobustCommand\citeA
614 {\begingroup\NAT@swafalse
615 \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
616 \providecommand\newblock{}%
617 \else
618 \AtBeginDocument{%
619 \let\shortcite\cite%
620 \providecommand\citename[1]{#1}}
621 \fi
622 \newcommand\shortcite[2][]{%
623 \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:

```

624 \def\bibliographystyle#1{%
625 \ifx\@begindocumenthook\@undefined\else
626 \expandafter\AtBeginDocument
627 \fi
628 {\if@filesw
629 \immediate\write\@auxout{\string\bibstyle{#1}}%
630 \fi}}

```

3.10 Other packages

Graphics and color.

```

631 \RequirePackage{graphicx}
632 \RequirePackage[prologue]{xcolor}

```

We define ACM colors according to [8]:

```

633 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
634 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
635 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
636 \definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
637 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
638 \definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
639 \definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
640 \definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}

```

Author-draft mode or sigchi-a mode

```

641 \if@ACM@authordraft
642 \RequirePackage{draftwatermark}

```



```

643 \SetWatermarkFontSize{0.5in}
644 \SetWatermarkColor[gray]{.9}
645 \SetWatermarkText{\parbox{12em}{\centering
646     Unpublished working draft.\
647     Not for distribution.}}
648 \else
649 \if@ACM@sigchiamode
650 \if@ACM@nonacm\else
651 \RequirePackage{draftwatermark}
652 \SetWatermarkFontSize{0.5in}
653 \SetWatermarkColor[gray]{.9}
654 \SetWatermarkText{\parbox{12em}{\centering
655     Legacy document. \
656     Not for publication in an ACM venue}}
657 \fi
658 \fi
659 \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>.

```

660 \RequirePackage{geometry}
661 \ifcase\ACM@format@nr
662 \relax % manuscript
663 \geometry{letterpaper,head=13pt,
664     marginparwidth=6pc,heightrounded}%
665 \or % acmsmall
666 \geometry{twoside=true,
667     includeheadfoot, head=13pt, foot=2pc,
668     paperwidth=6.75in, paperheight=10in,
669     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
670     marginparwidth=2pc,heightrounded
671 }%
672 \or % acmlarge
673 \geometry{twoside=true, head=13pt, foot=2pc,
674     paperwidth=8.5in, paperheight=11in,
675     includeheadfoot,
676     top=78pt, bottom=114pt, inner=81pt, outer=81pt,
677     marginparwidth=4pc,heightrounded
678 }%
679 \or % acmtog
680 \geometry{twoside=true, head=13pt, foot=2pc,
681     paperwidth=8.5in, paperheight=11in,
682     includeheadfoot, columnsep=24pt,
683     top=52pt, bottom=75pt, inner=52pt, outer=52pt,
684     marginparwidth=2pc,heightrounded
685 }%
686 \or % sigconf
687 \geometry{twoside=true, head=13pt,
688     paperwidth=8.5in, paperheight=11in,
689     includeheadfoot, columnsep=2pc,

```

```

690     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
691     marginparwidth=2pc,heightrounded
692   }%
693 \or % siggraph
694   \geometry{twoside=true, head=13pt,
695     paperwidth=8.5in, paperheight=11in,
696     includeheadfoot, columnsep=2pc,
697     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
698     marginparwidth=2pc,heightrounded
699   }%
700 \or % sigplan
701   \geometry{twoside=true, head=13pt,
702     paperwidth=8.5in, paperheight=11in,
703     includeheadfoot=false, columnsep=2pc,
704     top=1in, bottom=1in, inner=0.75in, outer=0.75in,
705     marginparwidth=2pc,heightrounded
706   }%
707 \or % sigchi
708   \geometry{twoside=true, head=13pt,
709     paperwidth=8.5in, paperheight=11in,
710     includeheadfoot, columnsep=2pc,
711     top=66pt, bottom=73pt, inner=54pt, outer=54pt,
712     marginparwidth=2pc,heightrounded
713   }%
714 \or % sigchi-a
715   \geometry{twoside=false, head=13pt,
716     paperwidth=11in, paperheight=8.5in,
717     includeheadfoot, marginparsep=72pt,
718     marginparwidth=170pt, columnsep=20pt,
719     top=72pt, bottom=72pt, left=314pt, right=72pt
720   }%
721   \@mparswitchfalse
722   \reversemarginpar
723 \or % acmengage
724   \geometry{twoside=true, head=13pt,
725     paperwidth=8.5in, paperheight=11in,
726     includeheadfoot, columnsep=2pc,
727     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
728     marginparwidth=2pc,heightrounded
729   }%
730 \fi

```

\parindent Paragraphing

```

\parskip
731 \setlength\parindent{10\p@}
732 \setlength\parskip{\z@}
733 \ifcase\ACM@format@nr
734 \relax % manuscript
735 \or % acmsmall
736 \or % acmlarge
737 \or % acmtog
738   \setlength\parindent{9\p@}%
739 \or % sigconf
740 \or % siggraph
741 \or % sigplan

```

```

742 \or % sigchi
743 \or % sigchi-a
744 \or % acmengage
745 \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.

```

746 \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.

```

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

749 \RequirePackage{manyfoot}
750 \SelectFootnoteRule[2]{copyrightpermission}
751 \DeclareNewFootnote{authorsaddresses}
752 \SelectFootnoteRule[2]{copyrightpermission}
753 \DeclareNewFootnote{copyrightpermission}

```

`\footnoterule` Tschichold’s rules:

```

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

```

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

```

756 \def\endminipage{%
757   \par
758   \unskip
759   \ifvoid\@mpfootins\else
760     \vskip\skip\@mpfootins
761     \normalcolor
762     \unvbox\@mpfootins
763   \fi
764   \@minipagefalse
765   \color@endgroup
766   \egroup
767   \expandafter\@iiparbox\@mpargs{\unvbox\@tempboxa}}

```

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

```

768 \def\@textbottom{\vskip \z@ \@plus 1pt}
769 \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.

```

770 \ifcase\ACM@format@nr
771 \relax % manuscript
772 \or % acmsmall
773 \or % acmlarge
774 \or % acmtog
775 \flushbottom
776 \or % sigconf
777 \flushbottom
778 \or % siggraph
779 \flushbottom
780 \or % sigplan
781 \flushbottom
782 \or % sigchi
783 \flushbottom
784 \or % sigchi-a
785 \or % acmengage
786 \flushbottom
787 \fi

```

3.12 Fonts

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

The code below is by Ross Moore.

```

788 \ifPDFTeX
789 \input{glyphtounicode}
790 \pdfglyphtounicode{f_f}{FB00}
791 \pdfglyphtounicode{f_f_i}{FB03}
792 \pdfglyphtounicode{f_f_l}{FB04}
793 \pdfglyphtounicode{f_i}{FB01}
794 \pdfglyphtounicode{t_t}{0074 0074}
795 \pdfglyphtounicode{f_t}{0066 0074}
796 \pdfglyphtounicode{T_h}{0054 0068}
797 \pdfgentounicode=1
798 \RequirePackage{cmap}
799 \fi

```

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

```

800 \newif\if@ACM@newfonts
801 \@ACM@newfontstrue
802 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
803   have the libertine package installed. Please upgrade your
804   TeX}\@ACM@newfontsfalse}
805 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
806   have the inconsolata (zi4.sty) package installed. Please upgrade your
807   TeX}\@ACM@newfontsfalse}
808 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
809   have the newtxmath package installed. Please upgrade your
810   TeX}\@ACM@newfontsfalse}

```

We use Libertine throughout.

```

811 \if@ACM@newfonts
812   \RequirePackage[T1]{fontenc}
813   % Note that the order in which packages are loaded matters,
814   % and the correct order depends on the LaTeX engine used.
815   % See https://github.com/borisveytsman/acmart/issues/402
816   % and https://github.com/borisveytsman/acmart/issues/410
817   \ifxetex
818     \RequirePackage[libertine]{newtxmath}
819     \RequirePackage[tt=false]{libertine}
820     \setmonofont[StylisticSet=3]{inconsolata}
821   \else
822     \ifluatex
823       \RequirePackage[libertine]{newtxmath}
824       \RequirePackage[tt=false]{libertine}
825       \setmonofont[StylisticSet=3]{inconsolata}
826     \else
827       \RequirePackage[tt=false, type1=true]{libertine}
828       \RequirePackage[varqu]{zi4}
829       \RequirePackage[libertine]{newtxmath}
830     \fi
831   \fi
832 \fi

```

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

```

833 \let\liningnums\undefined
834 \AtEndPreamble{%
835   \DeclareTextFontCommand{\liningnums}{\libertineLF}}

```

The SIGCHI extended abstracts are sans serif:

```

836 \if@ACM@sigchiamode
837   \renewcommand{\familydefault}{\sfdefault}
838 \fi

```

3.13 Image descriptions

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

```

839 \newif\if@Description@present
840 \@Description@presenttrue

```

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

```

841 \newif\if@undescribed@images
842 \@undescribed@imagesfalse

```

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

```

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

```

The global warning

```

844 \AtEndDocument{\if@undescribed@images
845   \ClassWarningNoLine{\@classname}{Some images may lack descriptions}\fi}

```

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

```

846 \AtBeginEnvironment{figure}{\@Description@presentfalse
847   \let\@vspace\@vspace@orig
848   \let\@vspacer\@vspacer@orig}
849 \AtBeginEnvironment{figure*}{\@Description@presentfalse
850   \let\@vspace\@vspace@orig
851   \let\@vspacer\@vspacer@orig}
852 \AtEndEnvironment{figure}{\if@Description@present\else
853   \global\@undescribed@imagestrue
854   \ClassWarning{\@classname}{A possible image without description}\fi}
855 \AtEndEnvironment{figure*}{\if@Description@present\else
856   \global\@undescribed@imagestrue
857   \ClassWarning{\@classname}{A possible image without description}\fi}
858 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
859   \let\@vspacer\@vspacer@orig}
860 \AtBeginEnvironment{table*}{\let\@vspace\@vspace@orig
861   \let\@vspacer\@vspacer@orig}
862 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
863   \let\@vspacer\@vspacer@orig}
864 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
865   \let\@vspacer\@vspacer@orig}
866 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
867   \let\@vspacer\@vspacer@orig}
868 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
869   \let\@vspacer\@vspacer@orig}
870 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
871   \let\@vspacer\@vspacer@orig}
872 \AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig
873   \let\@vspacer\@vspacer@orig}
874 \AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig
875   \let\@vspacer\@vspacer@orig}
876 \AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig
877   \let\@vspacer\@vspacer@orig}
878

```

3.14 Floats

We use the `caption` package

```

879 \RequirePackage{caption, float}
880 \captionsetup[table]{position=top}
881 \if@ACM@journal
882   \captionsetup{labelfont={sf, small},
883     textfont={sf, small}, margin=\z@}
884   \captionsetup[figure]{name={Fig.}}
885 \else
886   \captionsetup{labelfont={bf},
887     textfont={bf}, labelsep=colon, margin=\z@}
888   \ifcase\ACM@format@nr
889     \relax % manuscript
890     \or % acmsmall
891     \or % acmlarge
892     \or % acmtog

```

```

893 \or % sigconf
894 \or % siggraph
895   \captionsetup{textfont={it}}
896 \or % sigplan
897   \captionsetup{labelfont={bf},
898     textfont={normalfont}, labelsep=period, margin=\z@}
899 \or % sigchi
900   \captionsetup[figure]{labelfont={bf, small},
901     textfont={bf, small}}
902   \captionsetup[table]{labelfont={bf, small},
903     textfont={bf, small}}
904 \or % sigchi-a
905   \captionsetup[figure]{labelfont={bf, small},
906     textfont={bf, small}}
907   \captionsetup[table]{labelfont={bf, small},
908     textfont={bf, small}}
909 \or % acmengage
910 \fi
911 \fi

sidebar The sidebar environment:
912 \newfloat{sidebar}{}{sbar}
913 \floatname{sidebar}{Sidebar}
914 \renewenvironment{sidebar}{}{\Collect@Body\@sidebar}{}

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

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

\@marginfigure The processing of the saved text
919 \long\def\@marginfigure#1{\bgroup
920   \let\@vspace\@vspace@orig
921   \let\@vspacer\@vspacer@orig
922   \captionsetup{type=figure}%
923   \marginpar{\@Description@presentfalse\centering
924     \small#1\if@Description@present\else
925       \global\@undescribed@imagestrue
926       \ClassWarning{\@classname}{A possible image without description}
927       \fi}%
928   \egroup}

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

\@margintable The processing of the saved text
930 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
931   \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
932   \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
933 \newdimen\fulltextwidth
934 \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)
935 \if@ACM@sigchiamode
936 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
937 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
938 \let\@endfloatbox\@endwidefloatbox
939 \def\@fpsaddddefault{\def\@fps{tp}}}%
940 \@float}
941 \fi

\enddblfloat And the end. Just adding a \bgroup.
942 \if@ACM@sigchiamode
943 \def\enddblfloat{%
944 \end@float\egroup}
945 \fi

\@endwidefloatbox This is the end of a wide box—we basically move everything to the left
946 \def\@endwidefloatbox{%
947 \par\vskip\z@skip
948 \@minipagefalse
949 \outer@nobreak
950 \egroup
951 \color@endbox
952 \global\setbox\@currbox=\vbox{\moveleft
953 \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
954 \wd\@currbox=\textwidth
955 }
```

3.15 Lists

```
956 \ifcase\ACM@format@nr
957 \relax % manuscript
958 \or % acmsmall
959 \or % acmlarge
960 \or % acmtog
961 \or % sigconf
962 \or % siggraph
963 \or % sigplan
964 \def\labelenumi{\theenumi.}
965 \def\labelenumii{\theenumii.}
966 \def\labelenumiii{\theenumiii.}
967 \def\labelenumiv{\theenumiv.}
968 \or % sigchi
969 \or % sigchi-a
970 \or % acmengage
971 \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`.

```

972 \newdimen\@ACM@labelwidth
973 \AtBeginDocument{%
974   \setlength\labelsep{4pt}
975   \setlength{\@ACM@labelwidth}{6.5pt}
976
977   %% First-level list: when beginning after the first line of an
978   %% indented paragraph or ending before an indented paragraph, labels
979   %% should not hang to the left of the preceding/following text.
980   \setlength\leftmargin{\z@}
981   \addtolength\leftmargin{\parindent}
982   \addtolength\leftmargin{2\labelsep}
983   \addtolength\leftmargin{\@ACM@labelwidth}
984
985   %% Second-level and higher lists.
986   \setlength\leftmarginii{\z@}
987   \addtolength\leftmarginii{0.5\labelsep}
988   \addtolength\leftmarginii{\@ACM@labelwidth}
989   \setlength\leftmarginiii{\leftmarginii}
990   \setlength\leftmarginiv{\leftmarginiii}
991   \setlength\leftmarginv{\leftmarginiv}
992   \setlength\leftmarginvi{\leftmarginv}
993   \@listi}
994 \newskip\listisep
995 \listisep\smallskipamount
996 \def\@listI{\leftmargin\leftmargini
997   \labelwidth\leftmargini \advance\labelwidth-\labelsep
998   \listparindent\z@
999   \topsep\listisep}
1000 \let\@listi\@listI
1001 \def\@listii{\leftmargin\leftmarginii
1002   \labelwidth\leftmarginii \advance\labelwidth-\labelsep
1003   \topsep\z@skip}
1004 \def\@listiii{\leftmargin\leftmarginiii
1005   \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
1006 \def\@listiv{\leftmargin\leftmarginiv
1007   \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
1008 \def\@listv{\leftmargin\leftmarginv
1009   \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
1010 \def\@listvi{\leftmargin\leftmarginvi
1011   \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}

```

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

```

1012 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}

```

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

```

1013 \renewenvironment{description}{\list{}{%
1014   \labelwidth\@ACM@labelwidth

```

```

1015 \let\makelabel\descriptionlabel}%
1016 }{
1017 \endlist
1018 }
1019 \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.

```

1020 \newif\if@ACM@maketitle@typeset
1021 \@ACM@maketitle@typesetfalse

```

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

```

1022 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
1023   CIE,%
1024   CSUR,%
1025   DGOV,%
1026   DLT,%
1027   DTRAP,%
1028   FAC,%
1029   GAMES,%
1030   HEALTH,%
1031   IMWUT,%
1032   JACM,%
1033   JDIQ,%
1034   JDS,%
1035   JEA,%
1036   JERIC,%
1037   JETC,%
1038   JOCCH,%
1039   JRC,%
1040   PACMCGIT,%
1041   PACMHCI,%
1042   PACMPL,%
1043   POMACS,%
1044   TAAS,%
1045   TACCESS,%
1046   TACO,%
1047   TALG,%
1048   TALLIP,%
1049   TAP,%
1050   TCPS,%
1051   TDS,%
1052   TEAC,%
1053   TECS,%
1054   TELO,%
1055   THRI,%
1056   TIIS,%
1057   TIOT,%
1058   TISSEC,%
1059   TIST,%
1060   TKDD,%

```

```

1061 TMIS,%
1062 TOCE,%
1063 TOCHI,%
1064 TOCL,%
1065 TOCS,%
1066 TOCT,%
1067 TODAES,%
1068 TODS,%
1069 TOG,%
1070 TOIS,%
1071 TOIT,%
1072 TOMACS,%
1073 TOMM,%
1074 TOMPECS,%
1075 TOMS,%
1076 TOPC,%
1077 TOPS,%
1078 TOPLAS,%
1079 TOS,%
1080 TOSEM,%
1081 TOSN,%
1082 TQC,%
1083 TRETS,%
1084 TSAS,%
1085 TSC,%
1086 TSLP,%
1087 TWEB,%
1088 FACMP%
1089 }{%
1090 \ifcase\@journalCode@nr
1091 \relax % CIE
1092 \def\@journalName{ACM Computers in Entertainment}%
1093 \def\@journalNameShort{ACM Comput. Entertain.}%
1094 \def\@permissionCodeOne{1544-3574}%
1095 \or % CSUR
1096 \def\@journalName{ACM Computing Surveys}%
1097 \def\@journalNameShort{ACM Comput. Surv.}%
1098 \def\@permissionCodeOne{0360-0300}%
1099 \or % DGOV
1100 \def\@journalName{Digital Government: Research and Practice}%
1101 \def\@journalNameShort{Digit. Gov. Res. Pract.}%
1102 \def\@permissionCodeOne{2639-0175}%
1103 \or % DLT
1104 \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
1105 \def\@journalNameShort{Distrib. Ledger Technol.}%
1106 \def\@permissionCodeOne{2769-6472}%
1107 \or % DTRAP
1108 \def\@journalName{Digital Threats: Research and Practice}%
1109 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1110 \def\@permissionCodeOne{2576-5337}%
1111 \or % FAC
1112 \def\@journalName{Formal Aspects of Computing}%
1113 \def\@journalNameShort{Form. Asp. Comput.}%
1114 \def\@permissionCodeOne{0934-5043}%

```

```

1115 \def\@permissionCodeTwo{1433-299X}%
1116 \or % GAMES
1117 \def\@journalName{ACM Games: Research and Practice}%
1118 \def\@journalNameShort{ACM Games}%
1119 \or % HEALTH
1120 \def\@journalName{ACM Transactions on Computing for Healthcare}%
1121 \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1122 \def\@permissionCodeOne{2637-8051}%
1123 \or % IMWUT
1124 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1125     Wearable and Ubiquitous Technologies}%
1126 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
1127 \def\@permissionCodeOne{2474-9567}%
1128 \@ACM@screentruer
1129 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1130 \or % JACM
1131 \def\@journalName{Journal of the ACM}%
1132 \def\@journalNameShort{J. ACM}%
1133 \def\@permissionCodeOne{0004-5411}%
1134 \or % JDIQ
1135 \def\@journalName{ACM Journal of Data and Information Quality}%
1136 \def\@journalNameShort{ACM J. Data Inform. Quality}%
1137 \def\@permissionCodeOne{1936-1955}%
1138 \or % JDS
1139 \def\@journalName{ACM/JMS Journal of Data Science}%
1140 \def\@journalNameShort{ACM/IMS J. Data Sci.}%
1141 \def\@permissionCodeOne{2831-3194}%
1142 \def\@permissionCodeTwo{2831-3194}%
1143 \or % JEA
1144 \def\@journalName{ACM Journal of Experimental Algorithmics}%
1145 \def\@journalNameShort{ACM J. Exp. Algor.}%
1146 \def\@permissionCodeOne{1084-6654}%
1147 \or % JERIC
1148 \def\@journalName{ACM Journal of Educational Resources in Computing}%
1149 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
1150 \def\@permissionCodeOne{1073-0516}%
1151 \or % JETC
1152 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
1153 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1154 \def\@permissionCodeOne{1550-4832}%
1155 \or % JOCCH
1156 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1157 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1158 \def\@permissionCodeOne{1556-4673}%
1159 \def\@permissionCodeTwo{1556-4711}%
1160 \or % JRC
1161 \def\@journalName{ACM Journal on Responsible Computing}%
1162 \def\@journalNameShort{ACM J. Responsib. Comput.}%
1163 \def\@permissionCodeOne{2832-0565}%
1164 \or % PACMCGIT
1165 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1166 \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1167 \def\@permissionCodeOne{2577-6193}%
1168 \@ACM@screentruer

```

```

1169 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1170 \or % PACMHCI
1171 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
1172 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
1173 \def\@permissionCodeOne{2573-0142}%
1174 \@ACM@screentruetrue
1175 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1176 \or % PACMPL
1177 \def\@journalName{Proceedings of the ACM on Programming Languages}%
1178 \def\@journalNameShort{Proc. ACM Program. Lang.}%
1179 \def\@permissionCodeOne{2475-1421}%
1180 \@ACM@screentruetrue
1181 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1182 \or % POMACS
1183 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1184 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1185 \def\@permissionCodeOne{2476-1249}%
1186 \@ACM@screentruetrue
1187 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1188 \or % TAAS
1189 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
1190 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
1191 \def\@permissionCodeOne{1556-4665}%
1192 \or % TACCESS
1193 \def\@journalName{ACM Transactions on Accessible Computing}%
1194 \def\@journalNameShort{ACM Trans. Access. Comput.}%
1195 \def\@permissionCodeOne{1936-7228}%
1196 \or % TACO
1197 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1198 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1199 \def\@permissionCodeOne{1544-3566}%
1200 \def\@permissionCodeTwo{1544-3973}%
1201 \or % TALG
1202 \def\@journalName{ACM Transactions on Algorithms}%
1203 \def\@journalNameShort{ACM Trans. Algor.}%
1204 \def\@permissionCodeOne{1549-6325}%
1205 \or % TALLIP
1206 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1207 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1208 \def\@permissionCodeOne{2375-4699}%
1209 \or % TAP
1210 \def\@journalName{ACM Transactions on Applied Perception}%
1211 \def\@journalNameShort{ACM Trans. Appl. Percept.}%
1212 \def\@permissionCodeOne{1544-3558}%
1213 \or % TCPS
1214 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1215 \def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%
1216 \def\@permissionCodeOne{2378-962X}%
1217 \or % TDS
1218 \def\@journalName{ACM/IMS Transactions on Data Science}%
1219 \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
1220 \def\@permissionCodeOne{2577-3224}%
1221 \or % TEAC
1222 \def\@journalName{ACM Transactions on Economics and Computation}%

```

```

1223 \def\@journalNameShort{ACM Trans. Econ. Comput.}%
1224 \def\@permissionCodeOne{2167-8375}%
1225 \or % TECS
1226 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
1227 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1228 \def\@permissionCodeOne{1539-9087}%
1229 \or % TELO
1230 \def\@journalName{ACM Transactions on Evolutionary Learning}%
1231 \def\@journalNameShort{ACM Trans. Evol. Learn.}%
1232 \def\@permissionCodeOne{2688-3007}%
1233 \or % THRI
1234 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
1235 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1236 \def\@permissionCodeOne{2573-9522}%
1237 \or % TIIS
1238 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
1239 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1240 \def\@permissionCodeOne{2160-6455}%
1241 \or % TIOT
1242 \def\@journalName{ACM Transactions on Internet of Things}%
1243 \def\@journalNameShort{ACM Trans. Internet Things}%
1244 \def\@permissionCodeOne{2577-6207}%
1245 \or % TISSEC
1246 \def\@journalName{ACM Transactions on Information and System Security}%
1247 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1248 \def\@permissionCodeOne{1094-9224}%
1249 \or % TIST
1250 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1251 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1252 \def\@permissionCodeOne{2157-6904}%
1253 \or % TKDD
1254 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
1255 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1256 \def\@permissionCodeOne{1556-4681}%
1257 \or % TMIS
1258 \def\@journalName{ACM Transactions on Management Information Systems}%
1259 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1260 \def\@permissionCodeOne{2158-656X}%
1261 \or % TOCE
1262 \def\@journalName{ACM Transactions on Computing Education}%
1263 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
1264 \def\@permissionCodeOne{1946-6226}%
1265 \or % TOCHI
1266 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1267 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1268 \def\@permissionCodeOne{1073-0516}%
1269 \or % TOCL
1270 \def\@journalName{ACM Transactions on Computational Logic}%
1271 \def\@journalNameShort{ACM Trans. Comput. Logic}%
1272 \def\@permissionCodeOne{1529-3785}%
1273 \or % TOCS
1274 \def\@journalName{ACM Transactions on Computer Systems}%
1275 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1276 \def\@permissionCodeOne{0734-2071}%

```

```

1277 \or % TOCT
1278 \def\@journalName{ACM Transactions on Computation Theory}%
1279 \def\@journalNameShort{ACM Trans. Comput. Theory}%
1280 \def\@permissionCodeOne{1942-3454}%
1281 \or % TODAES
1282 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1283 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1284 \def\@permissionCodeOne{1084-4309}%
1285 \or % TODS
1286 \def\@journalName{ACM Transactions on Database Systems}%
1287 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
1288 \def\@permissionCodeOne{0362-5915}%
1289 \or % TOG
1290 \def\@journalName{ACM Transactions on Graphics}%
1291 \def\@journalNameShort{ACM Trans. Graph.}%
1292 \def\@permissionCodeOne{0730-0301}%
1293 \or % TOIS
1294 \def\@journalName{ACM Transactions on Information Systems}%
1295 \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1296 \def\@permissionCodeOne{1046-8188}%
1297 \or % TOIT
1298 \def\@journalName{ACM Transactions on Internet Technology}%
1299 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1300 \def\@permissionCodeOne{1533-5399}%
1301 \or % TOMACS
1302 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1303 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1304 \def\@permissionCodeOne{1049-3301}%
1305 \def\@permissionCodeTwo{1558-1195}%
1306 \or % TOMM
1307 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
1308 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1309 \def\@permissionCodeOne{1551-6857}%
1310 \def\@permissionCodeTwo{1551-6865}%
1311 \or % TOMPECS
1312 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1313 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1314 \def\@permissionCodeOne{2376-3639}%
1315 \or % TOMS
1316 \def\@journalName{ACM Transactions on Mathematical Software}%
1317 \def\@journalNameShort{ACM Trans. Math. Softw.}%
1318 \def\@permissionCodeOne{0098-3500}%
1319 \or % TOPC
1320 \def\@journalName{ACM Transactions on Parallel Computing}%
1321 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1322 \def\@permissionCodeOne{1539-9087}%
1323 \or % TOPS
1324 \def\@journalName{ACM Transactions on Privacy and Security}%
1325 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1326 \def\@permissionCodeOne{2471-2566}%
1327 \or % TOPLAS
1328 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1329 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1330 \def\@permissionCodeOne{0164-0925}%

```

```

1331 \or % TOS
1332 \def\@journalName{ACM Transactions on Storage}%
1333 \def\@journalNameShort{ACM Trans. Storage}%
1334 \def\@permissionCodeOne{1553-3077}%
1335 \or % TOSEM
1336 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1337 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1338 \def\@permissionCodeOne{1049-331X}%
1339 \or % TOSN
1340 \def\@journalName{ACM Transactions on Sensor Networks}%
1341 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1342 \def\@permissionCodeOne{1550-4859}%
1343 \or % TQC
1344 \def\@journalName{ACM Transactions on Quantum Computing}%
1345 \def\@journalNameShort{ACM Trans. Quantum Comput.}%
1346 \def\@permissionCodeOne{2643-6817}%
1347 \or % TRET
1348 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1349 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1350 \def\@permissionCodeOne{1936-7406}%
1351 \or % TSAS
1352 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1353 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1354 \def\@permissionCodeOne{2374-0353}%
1355 \or % TSC
1356 \def\@journalName{ACM Transactions on Social Computing}%
1357 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1358 \def\@permissionCodeOne{2469-7818}%
1359 \or % TSLP
1360 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1361 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1362 \def\@permissionCodeOne{1550-4875}%
1363 \or % TWEB
1364 \def\@journalName{ACM Transactions on the Web}%
1365 \def\@journalNameShort{ACM Trans. Web}%
1366 \def\@permissionCodeOne{1559-1131}%
1367 \else % FACMP, a dummy journal
1368 \def\@journalName{ACM Just Accepted}%
1369 \def\@journalNameShort{ACM Accepted}%
1370 \def\@permissionCodeOne{XXXX-XXXX}%
1371 \fi
1372 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1373 }{%
1374 \ClassError{\@classname}{Incorrect journal #1}%
1375 }%

```

\acmJournal And the syntactic sugar around it

```

1376 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
1377 \global\@ACM@journal@bibstripttrue}

```

The defaults:

```

1378 \def\@journalCode@nr{0}
1379 \def\@journalName{}%
1380 \def\@journalNameShort{\@journalName}%

```



```

1381 \def\@permissionCodeOne{XXXX-XXXX}%
1382 \def\@permissionCodeTwo{}%

\acmConference This is the conference command
1383 \newcommand\acmConference[4][{}%
1384   \gdef\acmConference@shortname{#1}%
1385   \gdef\acmConference@name{#2}%
1386   \gdef\acmConference@date{#3}%
1387   \gdef\acmConference@venue{#4}%
1388   \ifx\acmConference@shortname\@empty
1389     \gdef\acmConference@shortname{#2}%
1390   \fi
1391   \global\@ACM@journal@bibstripfalse
1392 }
1393 \if@ACM@journal\else
1394 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1395   DC, USA}%
1396 \fi

\acmBooktitle The book title of the conference:
\@acmBooktitle 1397 \def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
1398 \acmBooktitle{}
1399 \ifx\acmConference@name\@undefined\else
1400 \acmBooktitle{Proceedings of \acmConference@name
1401   \ifx\acmConference@name\acmConference@shortname\else
1402   \ (\acmConference@shortname)\fi}
1403 \fi

\@editorsAbbrev How to abbreviate editors
1404 \def\@editorsAbbrev{(Ed.)}

\@acmEditors The list of editors
1405 \def\@acmEditors{}

\editor Add a new editor to the list
1406 \def\editor#1{\ifx\@acmEditors\@empty
1407   \gdef\@acmEditors{#1}%
1408   \else
1409   \gdef\@editorsAbbrev{(Eds.)}%
1410   \g@addto@macro\@acmEditors{\and#1}%
1411 \fi}

\subtitle The subtitle macro
1412 \def\subtitle#1{\def\@subtitle{#1}}
1413 \subtitle{}

\num@authorgroups The total number of “groups”. Each group is several authors with the same affiliations(s)
1414 \newcount\num@authorgroups
1415 \num@authorgroups=0\relax

\num@authors The total number of authors
1416 \newcount\num@authors
1417 \num@authors=0\relax

```

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

```
1418 \newif\if@insideauthorgroup
1419 \@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.

```
1420 \renewcommand\author[2][{}%
1421 \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\@classname}{Do not put several
1422     authors in the same \string\author\space macro!}}{}%
1423 \global\advance\num@authors by 1\relax
1424 \if@insideauthorgroup\else
1425     \global\advance\num@authorgroups by 1\relax
1426     \global\@insideauthorgrouptrue
1427 \fi
1428 \ifx\addresses\@empty
1429     \if@ACM@anonymous
1430         \gdef\addresses{\@author{Anonymous Author(s)}%
1431             \ifx\@acmSubmissionID\@empty\else\Submission Id:
1432                 \@acmSubmissionID\fi}%
1433         \gdef\authors{Anonymous Author(s)}%
1434     \else
1435         \expandafter\gdef\expandafter\addresses\expandafter{%
1436             \expandafter\@author\expandafter{%
1437                 \csname typeset@author\the\num@authors\endcsname{#2}}}%
1438         \gdef\authors{#2}%
1439     \fi
1440 \else
1441     \if@ACM@anonymous\else
1442         \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
1443             \expandafter\and\expandafter\@author\expandafter{%
1444                 \csname typeset@author\the\num@authors\endcsname{#2}}}%
1445         \g@addto@macro\authors{\and#2}%
1446     \fi
1447 \fi
1448 \if@ACM@anonymous
1449     \ifx\shortauthors\@empty
1450         \gdef\shortauthors{Anon.
1451             \ifx\@acmSubmissionID\@empty\else Submission Id:
1452                 \@acmSubmissionID\fi}%
1453     \fi
1454 \else
1455     \def\@tempa{#1}%
1456     \ifx\@tempa\@empty
1457         \ifx\shortauthors\@empty
1458             \gdef\shortauthors{#2}%
1459         \else
1460             \g@addto@macro\shortauthors{\and#2}%
1461         \fi
1462     \else
```

```

1463     \ifx\shortauthors\empty
1464     \gdef\shortauthors{#1}%
1465     \else
1466     \g@addto@macro\shortauthors{\and#1}%
1467     \fi
1468     \fi
1469     \fi}

\affiliation The macro \affiliation mimics \address from amsart. Note that it has an optional
argument, which we use differently from amsart.
1470 \newcommand{\affiliation}[2][{}]{%
1471     \global\@insideauthorgroupfalse
1472     \if@ACM@anonymous\else
1473     \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1474     \fi}

\ACM@affiliation@obeypunctuation Whether to use the author's punctuation (false by default, which adds American-style
address punctuation)
1475 \define@boolkey+{@ACM@affiliation@}[@ACM@affiliation@]{obeypunctuation}%
1476 [true][{}]{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

\additionalaffiliation Additional affiliations go to footnotes
1477 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

\@additionalaffiliation Process \additionalaffiliation inside \authornote
1478 \def\@additionalaffiliation#1{\bgroup
1479     \def\position##1{\ignorespaces}%
1480     \def\institution##1{##1\ignorespaces}%
1481     \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1482     \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
1483     \let\streetaddress\position
1484     \let\city\position
1485     \let\state\position
1486     \let\postcode\position
1487     \let\country\position
1488     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.
1489 \renewcommand{\email}[2][{}]{%
1490     \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1491         addresses in the same \string\email\space macro!}}{}%
1492     \if@ACM@anonymous\else
1493     \g@addto@macro\addresses{\email{#1}{#2}}%
1494     \fi}

\orcid We redefine the command to typeset the current author
1495 \def\orcid#1{\unskip\ignorespaces%
1496     \IfBeginWith{#1}{http}{%
1497         \expandafter\gdef\csname
1498             typeset@author\the\@num@authors\endcsname##1{%
1499             \href{#1}{##1}}}%
1500     \expandafter\gdef\csname

```

```

1501         typeset@author\the\num@authors\endcsname##1{%
1502             \href{https://orcid.org/#1}{##1}}}}

\authorsaddresses Setting up authors' addresses
1503 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1504 \authorsaddresses{\mkauthorsaddresses}

\@mktranslatedkeywords We have two argument: the language to typeset keywords and the keywords.
1505 \newcommand\@mktranslatedkeywords[2]{\bgroup
1506     \selectlanguage{#1}%
1507     {\@specialsection{\keywordsname}%
1508         \noindent#2\par}\egroup}

\@titlenotes The title notes
1509 \def\@titlenotes{}

\titlenote Adding a note to the title
1510 \def\titlenote#1{%
1511     \g@addto@macro\@title{\footnotemark}%
1512     \if@ACM@anonymous
1513         \g@addto@macro\@titlenotes{%
1514             \stepcounter{footnote}\footnotetext{Title note}}}%
1515     \else
1516         \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}}%
1517     \fi}

\@subtitlenotes The subtitle notes
1518 \def\@subtitlenotes{}

\subtitlenote Adding a note to the subtitle
1519 \def\subtitlenote#1{%
1520     \g@addto@macro\@subtitle{\footnotemark}%
1521     \if@ACM@anonymous
1522         \g@addto@macro\@subtitlenotes{%
1523             \stepcounter{footnote}\footnotetext{Subtitle note}}}%
1524     \else
1525         \g@addto@macro\@subtitlenotes{%
1526             \stepcounter{footnote}\footnotetext{#1}}}%
1527     \fi}

\@authornotes The author notes
1528 \def\@authornotes{}

\authornote Adding a note to the author
1529 \def\authornote#1{%
1530     \if@ACM@anonymous\else
1531         \g@addto@macro\addresses{\@authornotemark}%
1532         \g@addto@macro\@authornotes{%
1533             \stepcounter{footnote}\footnotetext{#1}}}%
1534     \fi}

```

\authornotemark Adding a footnote mark to the authors

```

1535 \newcommand\authornotemark[1][\relax]{%
1536   \ifx#1\relax\relax\relax
1537   \g@addto@macro\addresses{\@authornotemark}%
1538   \else
1539   \g@addto@macro\addresses{\@authornotemark{#1}}%
1540   \fi}

```

\acmVolume The current volume

```

1541 \def\acmVolume#1{\def\@acmVolume{#1}}
1542 \acmVolume{1}

```

\acmNumber The current number

```

1543 \def\acmNumber#1{\def\@acmNumber{#1}}
1544 \acmNumber{1}

```

\acmArticle The current article

```

1545 \def\acmArticle#1{\def\@acmArticle{#1}}
1546 \acmArticle{}

```

\acmArticleSeq The sequence number

```

1547 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
1548 \acmArticleSeq{\@acmArticle}

```

\acmYear The current year

```

1549 \def\acmYear#1{\def\@acmYear{#1}}
1550 \acmYear{\the\year}

```

\acmMonth The current month

```

1551 \def\acmMonth#1{\def\@acmMonth{#1}}
1552 \acmMonth{\the\month}

```

\@acmPubDate The publication date

```

1553 \def\@acmPubDate{\ifcase\@acmMonth\or
1554   January\or February\or March\or April\or May\or June\or
1555   July\or August\or September\or October\or November\or
1556   December\fi}\@acmYear}

```

\acmPrice The price

```

1557 \def\acmPrice#1{\def\@acmPrice{#1}}
1558 \acmPrice{15.00}

```

\acmSubmissionID The submission ID

```

1559 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
1560 \acmSubmissionID{}

```

\acmISBN The book ISBN

```

1561 \def\acmISBN#1{\def\@acmISBN{#1}}
1562 \acmISBN{978-x-xxxx-xxxx-x/YY/MM}

```

\acmDOI The paper DOI

```

1563 \def\acmDOI#1{\def\@acmDOI{#1}}
1564 \acmDOI{10.1145/nnnnnnn.nnnnnnn}

```

`\if@ACM@badge` Whether to print a badge. Note that either a left or right badge triggers it:
1565 `\newif\if@ACM@badge`
1566 `\@ACM@badgefalse`

`\@ACM@badge@width` The width of the badge
1567 `\newlength\@ACM@badge@width`
1568 `\setlength\@ACM@badge@width{5pc}`

`\@ACM@title@width` The width of the badge
1569 `\newlength\@ACM@title@width`

`\@ACM@badge@skip` The space between the badge and the title
1570 `\newlength\@ACM@badge@skip`
1571 `\setlength\@ACM@badge@skip{1pc}`

`\acmBadgeR` Setting the right badge
1572 `\newcommand\acmBadgeR[2][\@ACM@badgetrue`
1573 `\def\@acmBadgeR@url{#1}%`
1574 `\def\@acmBadgeR@image{#2}}`
1575 `\def\@acmBadgeR@url{}`
1576 `\def\@acmBadgeR@image{}`

`\acmBadgeL` Setting the left badge
1577 `\newcommand\acmBadgeL[2][\@ACM@badgetrue`
1578 `\def\@acmBadgeL@url{#1}%`
1579 `\def\@acmBadgeL@image{#2}}`
1580 `\def\@acmBadgeL@url{}`
1581 `\def\@acmBadgeL@image{}`

`\startPage` The start page of the paper
1582 `\def\startPage#1{\def\@startPage{#1}}`
1583 `\startPage{}`

`\terms` Terms are obsolete. We use CCS now.
1584 `\def\terms#1{\ClassWarning{\@classname}{The command \string\terms{}` is
1585 `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.
1586 `\def\keywords#1{\def\@keywords{#1}}`
1587 `\let\@keywords\@empty`
1588 `\AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty`
1589 `\ifnum\getrefnumber{TotPages}>2\relax`
1590 `\ClassWarningNoLine{\@classname}{ACM keywords are mandatory`
1591 `for papers over two pages}%`
1592 `\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
1593 `\renewenvironment{abstract}{\Collect@Body\@saveabstract}{}`

`\saveabstract` And saving the abstract

```

1594 \long\def\saveabstract#1{\if@ACM@maketitle@typeset
1595   \ClassError{\@classname}{Abstract must be defined before maketitle
1596     command. Please move it!}\fi
1597   \long\gdef\abstract{#1}}
1598 \saveabstract{}

```

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

```

1599 \long\def\@empty{}

```

`\if@ACM@printccs` Whether to print CCS

```

1600 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
1601   \if@ACM@printccs
1602     \ClassInfo{\@classname}{Printing CCS}%
1603   \else
1604     \ClassInfo{\@classname}{Suppressing CCS}%
1605   \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}

```

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

```

1606 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1607   \if@ACM@printacmref
1608     \ClassInfo{\@classname}{Printing bibformat}%
1609   \else
1610     \ClassInfo{\@classname}{Suppressing bibformat}%
1611   \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}

1612 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
1613   \ifnum\getrefnumber{TotPages}>1\relax
1614   \ClassWarningNoLine{\@classname}{%
1615     ACM reference format is mandatory \MessageBreak
1616     for papers over one page. \MessageBreak
1617     Please add printacmref=true to the \MessageBreak
1618     \string\settopmatter\space command.}%
1619   \fi\fi\fi}

```

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

```

1620 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1621   \if@ACM@printfolios
1622     \ClassInfo{\@classname}{Printing folios}%
1623   \else
1624     \ClassInfo{\@classname}{Suppressing folios}%
1625   \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}

```

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

```

1626 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsprow}[0]{%
1627   \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsprow to
1628     #1}}{\ClassWarning{\@classname}{The parameter authorsprow must be
1629     numerical. Ignoring the input #1}\gdef\@ACM@authorsprow{0}}}

```

`\settopmatter` The usual syntactic sugar

```

1630 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

```

Now the settings

```

1631 \settopmatter{printccs=true, printacmref=true}
1632 \if@ACM@manuscript
1633   \settopmatter{printfolios=true}
1634 \else
1635   \if@ACM@journal
1636     \settopmatter{printfolios=true}
1637   \else
1638     \settopmatter{printfolios=false}
1639   \fi
1640 \fi
1641 \settopmatter{authorsperrow=0}

```

\@received The container for the paper history

```

1642 \def\@received{}

```

\received The \received command

```

1643 \newcommand\received[2][\def\@tempa{#1}%
1644   \ifx\@tempa\@empty
1645     \ifx\@received\@empty
1646       \gdef\@received{Received #2}%
1647     \else
1648       \g@addto@macro{\@received}{; revised #2}%
1649     \fi
1650   \else
1651     \ifx\@received\@empty
1652       \gdef\@received{#1 #2}%
1653     \else
1654       \g@addto@macro{\@received}{; #1 #2}%
1655     \fi
1656   \fi}
1657 \AtEndDocument{%
1658   \ifx\@received\@empty\else
1659     \par\bigskip\noindent\small\normalfont\@received\par
1660   \fi}

```

3.17 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```

1661 \RequirePackage{comment}
1662 \excludecomment{CCSXML}

```

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

```

1663 \let\@concepts\@empty
1664 \newcounter{@concepts}

```

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

```

1665 \newcommand\ccsdesc[2][100]{%
1666   \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!

```

1667 \def\textrightarrow{\rightarrow}

```



```

1668 \def\ccsdesc@parse#1~#2~#3~{%
1669   \stepcounter{@concepts}%
1670   \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1671     \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1672       \textbf{#2}}%
1673     \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{;}%
1674     \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1675     \g@addto@macro{@concepts}{\csname CCS@General@#2\endcsname
1676       \csname CCS@Punctuation@#2\endcsname
1677       \csname CCS@Specific@#2\endcsname}%
1678     \fi
1679     \ifx#3\relax\relax\else
1680       \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
1681         \textrightarrow\ }%
1682       \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1683         \addtocounter{@concepts}{-1}%
1684         \ifnum#1>499\textbf{#3}\else
1685         \ifnum#1>299\textit{#3}\else
1686         #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
1687       \fi
1688 \ccsdesc@parse@finish}

1689 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\@empty\relax
1690   \ifnum\getrefnumber{TotPages}>2\relax
1691     \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
1692       for papers over two pages}%
1693   \fi\fi\fi}

\ccsdesc@parse@finish  Gobble everything to \ccsdesc@parse@end
1694 \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
1695 \newif\if@printcopyright
1696 \@printcopyrighttrue

\if@printpermission  Whether to print the permission block
1697 \newif\if@printpermission
1698 \@printpermissiontrue

\if@acmowned  Whether the ACM owns the rights to the paper
1699 \newif\if@acmowned
1700 \@acmownedtrue
```

Keys:

```

1701 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1702   \acm@copyrightinput\acm@copyrightmode]{none,%
1703   acmcopyright,acmlicensed,rightsretained,%
1704   usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1705   licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
```

```

1706     iw3c2w3,iw3c2w3g,cc){%
1707 \@printpermissiontrue
1708 \@printcopyrighttrue
1709 \@acmownedtrue
1710 \ifnum\acm@copyrightmode=0\relax % none
1711 \@printpermissionfalse
1712 \@printcopyrightfalse
1713 \@acmownedfalse
1714 \fi
1715 \ifnum\acm@copyrightmode=2\relax % acmlicensed
1716 \@acmownedfalse
1717 \fi
1718 \ifnum\acm@copyrightmode=3\relax % rightsretained
1719 \@acmownedfalse
1720 \AtBeginDocument{\acmPrice{}}%
1721 \fi
1722 \ifnum\acm@copyrightmode=4\relax % usgov
1723 \@printpermissiontrue
1724 \@printcopyrightfalse
1725 \@acmownedfalse
1726 \AtBeginDocument{\acmPrice{}}%
1727 \fi
1728 \ifnum\acm@copyrightmode=6\relax % cagov
1729 \@acmownedfalse
1730 \fi
1731 \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1732 \@acmownedfalse
1733 \fi
1734 \ifnum\acm@copyrightmode=9\relax % licensedcagov
1735 \@acmownedfalse
1736 \fi
1737 \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1738 \@acmownedfalse
1739 \fi
1740 \ifnum\acm@copyrightmode=11\relax % othergov
1741 \@acmownedtrue
1742 \fi
1743 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1744 \@acmownedfalse
1745 \fi
1746 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1747 \@acmownedfalse
1748 \AtBeginDocument{\acmPrice{}}%
1749 \fi
1750 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1751 \@acmownedfalse
1752 \AtBeginDocument{\acmPrice{}}%
1753 \fi
1754 \ifnum\acm@copyrightmode=15\relax % cc
1755 \@acmownedfalse
1756 \AtBeginDocument{\acmPrice{}}%
1757 \fi}

```

\setcopyright This is the syntactic sugar around setting keys.

```

1758 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1759 \setcopyright{acmcopyright}

\setcctype The type of Creative Commons license used
1760 \newcommand\setcctype[2][4.0]{%
1761   \def\ACM@cc@version{#1}%
1762   \def\ACM@cc@type{#2}}
1763 \setcctype{by}

\@copyrightowner Here is the owner of the copyright
1764 \def\@copyrightowner{%
1765   \ifcase\acm@copyrightmode\relax % none
1766   \or % acmcopyright
1767     Association for Computing Machinery.
1768   \or % acmlicensed
1769     Copyright held by the owner/author(s). Publication rights licensed to
1770     ACM\@.
1771   \or % rightsretained
1772     Copyright held by the owner/author(s).
1773   \or % usgov
1774   \or % usgovmixed
1775     Association for Computing Machinery.
1776   \or % cagov
1777     Crown in Right of Canada.
1778   \or %cagovmixed
1779     Association for Computing Machinery.
1780   \or %licensedusgovmixed
1781     Copyright held by the owner/author(s). Publication rights licensed to
1782     ACM\@.
1783   \or % licensedcagov
1784     Crown in Right of Canada. Publication rights licensed to
1785     ACM\@.
1786   \or %licensedcagovmixed
1787     Copyright held by the owner/author(s). Publication rights licensed to
1788     ACM\@.
1789   \or % othergov
1790     Association for Computing Machinery.
1791   \or % licensedothergov
1792     Copyright held by the owner/author(s). Publication rights licensed to
1793     ACM\@.
1794   \or % ic2w3www
1795     IW3C2 (International World Wide Web Conference Committee), published
1796     under Creative Commons CC-BY~4.0 License.
1797   \or % ic2w3wwwgoogle
1798     IW3C2 (International World Wide Web Conference Committee), published
1799     under Creative Commons CC-BY-NC-ND~4.0 License.
1800   \or % cc
1801     Copyright held by the owner/author(s).
1802   \fi}

\@formatdoi Print a clickable DOI
1803 \def\@formatdoi#1{\url{https://doi.org/#1}}

\@copyrightpermission The canned permission block.

```

```

1804 \def\@copyrightpermission{%
1805   \ifcase\acm@copyrightmode\relax % none
1806   \or % acmcopyright
1807     Permission to make digital or hard copies of all or part of this
1808     work for personal or classroom use is granted without fee provided
1809     that copies are not made or distributed for profit or commercial
1810     advantage and that copies bear this notice and the full citation on
1811     the first page. Copyrights for components of this work owned by
1812     others than ACM must be honored. Abstracting with credit is
1813     permitted. To copy otherwise, or republish, to post on servers or to
1814     redistribute to lists, requires prior specific permission
1815     and\hspace*{.5pt}/or a fee. Request permissions from
1816     permissions@acm.org.
1817   \or % acmlicensed
1818     Permission to make digital or hard copies of all or part of this
1819     work for personal or classroom use is granted without fee provided
1820     that copies are not made or distributed for profit or commercial
1821     advantage and that copies bear this notice and the full citation on
1822     the first page. Copyrights for components of this work owned by
1823     others than the author(s) must be honored. Abstracting with credit
1824     is permitted. To copy otherwise, or republish, to post on servers
1825     or to redistribute to lists, requires prior specific permission
1826     and\hspace*{.5pt}/or a fee. Request permissions from
1827     permissions@acm.org.
1828   \or % rightsretained
1829     Permission to make digital or hard copies of part or all of this work
1830     for personal or classroom use is granted without fee provided that
1831     copies are not made or distributed for profit or commercial advantage
1832     and that copies bear this notice and the full citation on the first
1833     page. Copyrights for third-party components of this work must be
1834     honored. For all other uses, contact the
1835     owner\hspace*{.5pt}/author(s).
1836   \or % usgov
1837     This paper is authored by an employee(s) of the United States
1838     Government and is in the public domain. Non-exclusive copying or
1839     redistribution is allowed, provided that the article citation is
1840     given and the authors and agency are clearly identified as its
1841     source.
1842   \or % usgovmixed
1843     ACM acknowledges that this contribution was authored or co-authored
1844     by an employee, contractor, or affiliate of the United States
1845     government. As such, the United States government retains a
1846     nonexclusive, royalty-free right to publish or reproduce this
1847     article, or to allow others to do so, for government purposes only.
1848   \or % cagov
1849     This article was authored by employees of the Government of Canada.
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1851     copyright to this work and grants to ACM a nonexclusive,
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```

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 1859 otherwise, distribute, republish, or post, requires prior specific
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 1861 permissions@acm.org.
 1862 \or % cagovmixed
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 1868 copies for personal or classroom use is granted. Copies must bear
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 1883 As such, the Canadian government retains all interest in the
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 1891 others than the Canadian Government must be honored. To copy
 1892 otherwise, distribute, republish, or post, requires prior specific
 1893 permission and\hspace*{.5pt}/or a fee. Request permissions from
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 1896 Publication rights licensed to ACM\@. ACM acknowledges that this
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```

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1913 this article, or to allow others to do so, for Government purposes
1914 only.
1915 \or % iw3c2w3
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1917 International (CC-BY~4.0) license. Authors reserve their rights to
1918 disseminate the work on their personal and corporate Web sites with
1919 the appropriate attribution.
1920 \or % iw3c2w3g
1921 This paper is published under the Creative Commons
1922 Attribution-NonCommercial-NoDerivs~4.0 International
1923 (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
1924 disseminate the work on their personal and corporate Web sites with
1925 the appropriate attribution.
1926 \or % CC
1927 \IfEq{\ACM@cc@type}{zero}{%
1928 \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0/legalcode}}{%
1929 \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version/legalcode}}%
1930 \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\
1931 \href{\ACM@CC@Url}{%
1932 This work is licensed under a Creative Commons
1933 \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}{%
1934 \IfEq{\ACM@cc@type}{by}{Attribution}{}%
1935 \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}{}%
1936 \IfEq{\ACM@cc@type}{by-nd}{Attribution-NoDerivatives}{}%
1937 \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}{}%
1938 \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{}%
1939 \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{}%
1940 ~\IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}%
1941 }
1942 License.}%
1943 \fi}

\copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
1944 \def\copyrightyear#1{\def\@copyrightyear{#1}}
1945 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container
1946 \def\@teaserfigures{}

teaserfigure The teaser figure
1947 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

\@saveteaser Saving the teaser
1948 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

\thanks We redefine amsart \thanks so the anonymous key works
1949 \renewcommand{\thanks}[1]{%
1950 \@ifnotempty{#1}{%
1951 \if@ACM@anonymous
1952 \g@addto@macro\thankses{\thanks{A note}}%
1953 \else
1954 \g@addto@macro\thankses{\thanks{#1}}%
1955 \fi}}

```

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

```
1956 \newcommand{\anon}[2][ANONYMIZED]{%
1957   \if@ACM@anonymous%
1958     {\color{ACMOrange}#1}%
1959   \else%
1960     #2%
1961   \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

```
1962 \ifx\@beginmaketitlehook\@undefined
1963   \let\@beginmaketitlehook\@empty
1964 \fi
```

`\AtBeginMaketitle` Adding to the hook

```
1965 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}
```

3.20 ACM Engage top matter

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

```
1966 \def\@acmengagemetadadata{}
```

`\setengagemetadadata` Adding topic to engage metadata

```
1967 \def\setengagemetadadata#1#2{%
1968   \g@addto@macro{\@acmengagemetadadata}{%
1969     \@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>]`.

```
1970 \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.

```
1971 \def\maketitle{\@beginmaketitlehook
1972   \@ACM@maketitle@typesettrue
1973   \if@ACM@anonymous
1974     % Anonymize omission of \author-s
1975     \ifnum\num@authorgroups=0\author{}\fi
1976   \fi
1977   \begingroup
```

```

1978 \let\@vspace\@vspace@orig
1979 \let\@vspacer\@vspacer@orig
1980 \let\@footnotemark\@footnotemark@nolink
1981 \let\@footnotetext\@footnotetext@nolink
1982 \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
1983 \hsize=\textwidth
1984 \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
1985 \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
1986 \@printtopmatter
1987 \if@ACM@sigchiamode\@mkauthors\fi
1988 \setcounter{footnote}{0}%
1989 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
1990 \@titlenotes
1991 \@subtitlenotes
1992 \@authornotes
1993 \let\@makefnmark\relax
1994 \let\@thefnmark\relax
1995 \let\@makefntext\noindent
1996 \ifx\@empty\thankses\else
1997   \footnotetextauthorsaddresses{%
1998     \def\par{\let\par\@par}\parindent\z@\@setthanks}%
1999   \fi
2000 \ifx\@empty\@authorsaddresses\else
2001   \if@ACM@anonymous\else
2002     \if@ACM@journal@bibstrip
2003       \footnotetextauthorsaddresses{%
2004         \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2005       \fi
2006     \fi
2007   \fi
2008 \if@ACM@nonacm\else\footnotetextcopyrightpermission{%
2009   \if@ACM@authordraft
2010     \raisebox{-2ex}{\z@\z@\makebox[0pt][l]{\large\bfseries
2011       Unpublished working draft. Not for distribution.}}%
2012     \color[gray]{0.9}%
2013   \fi
2014   \parindent\z@\parskip0.1\baselineskip
2015   \if@ACM@authorversion\else
2016     \if@printpermission\@copyrightpermission\par\fi
2017   \fi
2018   \if@ACM@manuscript\else
2019     \if@ACM@journal@bibstrip\else % Print the conference information
2020       \if@ACM@engage
2021         {\itshape \@acmBooktitle, \@acmYear.}\par
2022       \else
2023         {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
2024       \fi
2025     \fi
2026   \fi
2027   \if@printcopyright
2028     \copyright\ \@copyrightyear\ \@copyrightowner\
2029   \else
2030     \@copyrightyear.\
2031   \fi

```



```

2032 \if@ACM@manuscript
2033     Manuscript submitted to ACM\\
2034 \else
2035     \if@ACM@authorversion
2036         This is the author's version of the work. It is posted here for
2037         your personal use. Not for redistribution. The definitive Version
2038         of Record was published in
2039         \if@ACM@journal@bibstrip
2040             \emph{\@journalName}%
2041         \else
2042             \emph{\@acmBooktitle}%
2043         \fi
2044         \ifx\@acmDOI\@empty
2045             .
2046         \else
2047             , \@formatdoi{\@acmDOI}.
2048         \fi\\
2049     \else
2050         \if@ACM@nonacm\else
2051             \if@ACM@journal@bibstrip
2052                 \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle
2053                 \ifx\@acmPrice\@empty\else\ $\@acmPrice\fi\\
2054                 \@formatdoi{\@acmDOI}%
2055             \else % Conference
2056                 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN
2057                 \ifx\@acmPrice\@empty.\else\dots$\@acmPrice\fi\\
2058                 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
2059             \fi
2060         \fi
2061     \fi
2062 \fi}
2063 \fi
2064 \endgroup
2065 \if@ACM@engage\@typesetengagemetadata\fi
2066 \setcounter{footnote}{0}%
2067 \@mkabstract
2068 \ifx\@translatedabstracts\@empty\else
2069 \@translatedabstracts\fi
2070 \if@ACM@printccs
2071 \ifx\@concepts\@empty\else\bgroup
2072     {\@specialsection{CCS Concepts}%
2073     \noindent\@concepts\par}\egroup
2074 \fi
2075 \fi
2076 \ifx\@keywords\@empty\else\bgroup
2077     {\@specialsection{\keywordsname}%
2078     \noindent\@keywords\par}\egroup
2079 \fi
2080 \ifx\@translatedkeywords\@empty\else
2081 \@translatedkeywords
2082 \fi
2083 \let\metadata@authors=\authors
2084 \nxandlist{, }, {\, } \metadata@authors
2085 \def\@ACM@checkaffil{}%

```

```

2086 \hypersetup{%
2087   pdfauthor={\metadata@authors},
2088   pdftitle={\@title},
2089   pdfsubject={\@concepts},
2090   pdfkeywords={\@keywords},
2091   pdfcreator={LaTeX with acmart
2092     \csname ver@acmart.cls\endcsname\space
2093     and hyperref
2094     \csname ver@hyperref.sty\endcsname}}%
2095 \andify\authors
2096 \andify\shortauthors
2097 \global\let\authors=\authors
2098 \global\let\shortauthors=\shortauthors
2099 \if@ACM@printacmref
2100   \mkbibcitation
2101 \fi
2102 \global\@topnum\z@ % this prevents floats from falling
2103                   % at the top of page 1
2104 \global\@botnum\z@ % we do not want them to be on the bottom either
2105 \@printendtopmatter
2106 \@afterindentfalse
2107 \@afterheading
2108 }

```

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

```

2109 \def\@specialsection#1{%
2110   \let\@vspace\@vspace@orig
2111   \let\@vspacer\@vspacer@orig
2112   \ifcase\ACM@format@nr
2113   \relax % manuscript
2114     \par\medskip\small\noindent#1: %
2115   \or % acmsmall
2116     \par\medskip\small\noindent#1: %
2117   \or % acmlarge
2118     \par\medskip\small\noindent#1: %
2119   \or % acmtog
2120     \par\medskip\small\noindent#1: %
2121   \or % sigconf
2122     \section*{#1}%
2123   \or % siggraph
2124     \section*{#1}%
2125   \or % sigplan
2126     \noindentparagraph*{#1:~}%
2127   \or % sigchi
2128     \section*{#1}%
2129   \or % sigchi-a
2130     \section*{#1}%
2131   \or % acmengage
2132     \section*{#1}%
2133   \fi
2134   \let\@vspace\@vspace@acm
2135   \let\@vspacer\@vspacer@acm
2136 }

```

\@printtopmatter The printing of top matter starts a new page and uses the given title box. Note that for sigchi-a we print badges here rather than in \mktitle since we want them in the margins.

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.

```

2137 \def\@printtopmatter{%
2138   \ifx\@startPage\empty
2139     \gdef\@startPage{1}%
2140   \else
2141     \setcounter{page}{\@startPage}%
2142   \fi
2143   \@tempdima=\ht\mktitle@bx
2144   \advance\@tempdima by \dp\mktitle@bx
2145   \ifdim\@tempdima>0.9\textheight
2146     \loop
2147       \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
2148       \thispagestyle{firstpagestyle}%
2149       \noindent\unvbox\@tempboxa
2150       \clearpage
2151       \@tempdima=\ht\mktitle@bx
2152       \advance\@tempdima by \dp\mktitle@bx
2153     \ifdim\@tempdima>0.9\textheight\repeat
2154   \fi
2155   \thispagestyle{firstpagestyle}%
2156   \noindent
2157   \ifcase\ACM@format@nr
2158   \relax % manuscript
2159     \box\mktitle@bx\par
2160   \or % acmsmall
2161     \box\mktitle@bx\par
2162   \or % acmlarge
2163     \box\mktitle@bx\par
2164   \or % acmtog
2165     \twocolumn[\box\mktitle@bx]%
2166   \or % sigconf
2167     \twocolumn[\box\mktitle@bx]%
2168   \or % siggraph
2169     \twocolumn[\box\mktitle@bx]%
2170   \or % sigplan
2171     \twocolumn[\box\mktitle@bx]%
2172   \or % sigchi
2173     \twocolumn[\box\mktitle@bx]%
2174   \or % sigchi-a
2175     \par\box\mktitle@bx\par\bigskip
2176   \if@ACM@badge
2177     \marginpar{\noindent
2178       \ifx\@acmBadgeL@image\empty\else
2179         \href{\@acmBadgeL@url}{%
2180           \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
2181         \hspace{\@ACM@badge@skip}
2182       \fi
2183     \ifx\@acmBadgeR@image\empty\else

```

```

2184         \href{\@acmBadgeR@url}{%
2185             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
2186         \fi}%
2187     \fi
2188 \or % acmengage
2189     \twocolumn[\box\mktitle@bx]%
2190 \fi
2191 }

\@mktitle The title of the article
2192 \def\@mktitle{%
2193     \ifcase\ACM@format@nr
2194     \relax % manuscript
2195         \@mktitle@i
2196     \or % acmsmall
2197         \@mktitle@i
2198     \or % acmlarge
2199         \@mktitle@i
2200     \or % acmtog
2201         \@mktitle@i
2202     \or % sigconf
2203         \@mktitle@iii
2204     \or % siggraph
2205         \@mktitle@iii
2206     \or % sigplan
2207         \@mktitle@iii
2208     \or % sigchi
2209         \@mktitle@iii
2210     \or % sigchi-a
2211         \@mktitle@iv
2212     \or % acmengage
2213         \@mktitle@iii
2214     \fi
2215 }

\@titlefont The font to typeset the title
2216 \def\@titlefont{%
2217     \ifcase\ACM@format@nr
2218     \relax % manuscript
2219         \LARGE\sffamily\bfseries
2220     \or % acmsmall
2221         \LARGE\sffamily\bfseries
2222     \or % acmlarge
2223         \LARGE\sffamily\bfseries
2224     \or % acmtog
2225         \Huge\sffamily
2226     \or % sigconf
2227         \Huge\sffamily\bfseries
2228     \or % siggraph
2229         \Huge\sffamily\bfseries
2230     \or % sigplan
2231         \Huge\bfseries
2232     \or % sigchi
2233         \Huge\sffamily\bfseries

```

```

2234 \or % sigchi-a
2235     \Huge\bfseries
2236 \or % acmengage
2237     \Huge\sffamily\bfseries
2238 \fi}

```

\@subtitlefont The font to typeset the subtitle

```

2239 \def\@subtitlefont{\normalsize
2240   \ifcase\ACM@format@nr
2241   \relax % manuscript
2242     \mdseries
2243 \or % acmsmall
2244     \mdseries
2245 \or % acmlarge
2246     \mdseries
2247 \or % acmtog
2248     \LARGE
2249 \or % sigconf
2250     \LARGE\mdseries
2251 \or % siggraph
2252     \LARGE\mdseries
2253 \or % sigplan
2254     \LARGE\mdseries
2255 \or % sigchi
2256     \LARGE\mdseries
2257 \or % sigchi-a
2258     \mdseries
2259 \or % acmengage
2260     \LARGE\mdseries
2261 \fi}

```

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

```

2262 \def\@mktitle@i{\hsize=\textwidth
2263   \@ACM@title@width=\hsize
2264   \ifx\@acmBadgeL@image\@empty\else
2265     \advance\@ACM@title@width by -\@ACM@badge@width
2266     \advance\@ACM@title@width by -\@ACM@badge@skip
2267   \fi
2268   \ifx\@acmBadgeR@image\@empty\else
2269     \advance\@ACM@title@width by -\@ACM@badge@width
2270     \advance\@ACM@title@width by -\@ACM@badge@skip
2271   \fi
2272   \setbox\mktitle@bx=\vbox{\noindent\@titlefont
2273     \ifx\@acmBadgeL@image\@empty\else
2274       \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
2275         \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
2276       \hskip\@ACM@badge@skip
2277     \fi
2278     \parbox[t]{\@ACM@title@width}{\raggedright
2279       \@titlefont\noindent
2280       \@title\@translatedtitle%
2281     \ifx\@subtitle\@empty\else
2282       \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
2283     \fi}%

```

```

2284 \ifx\@acmBadgeR@image\@empty\else
2285 \hskip\@ACM@badge@skip
2286 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
2287 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
2288 \fi
2289 \par\bigskip}}%

```

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

`\@mktitle@iii` The version of `\mktitle` for SIG proceedings. Note that since the title is centered, we leave space for the left badge even if only the right badge is defined.

```

2290 \def\@mktitle@iii{\hsize=\textwidth
2291 \setbox\mktitle@bx=\vbox{\@titlefont\centering
2292 \@ACM@title@width=\hsize
2293 \if@ACM@badge
2294 \advance\@ACM@title@width by -2\@ACM@badge@width
2295 \advance\@ACM@title@width by -2\@ACM@badge@skip
2296 \parbox[b]{\@ACM@badge@width}{\strut
2297 \ifx\@acmBadgeL@image\@empty\else
2298 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
2299 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
2300 \fi}%
2301 \hskip\@ACM@badge@skip
2302 \fi
2303 \parbox[t]{\@ACM@title@width}{\centering\@titlefont
2304 \@title\@translatedtitle%
2305 \ifx\@subtitle\@empty\else
2306 \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
2307 \fi
2308 }%
2309 \if@ACM@badge
2310 \hskip\@ACM@badge@skip
2311 \parbox[b]{\@ACM@badge@width}{\strut
2312 \ifx\@acmBadgeR@image\@empty\else
2313 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
2314 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
2315 \fi}%
2316 \fi
2317 \par\bigskip}}%

```

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

```

2318 \def\@mktitle@iv{\hsize=\textwidth
2319 \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
2320 \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
2321 \noindent\@title\@translatedtitle%
2322 \ifx\@subtitle\@empty\else
2323 \par\noindent\@subtitlefont\@subtitle\@translatedsubtitle%
2324 \fi
2325 \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.

```

2326 \newbox\@ACM@commabox
2327 \def\@ACM@addtoaddress#1{%
2328   \ifvmode\else
2329     \if@ACM@affiliation@obexpunctuation\else
2330       \setbox\@ACM@commabox=\hbox{, }%
2331       \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
2332     \fi\fi
2333   #1}

```

```

\institution Theoretically we can define the macros for \affiliation inside the \mkauthors-style
\position commands. However, this would lead to a strange error if an author uses them outside
\department \affiliation. Of course we can make them produce an error message, but...
\streetaddress 2334 \def\streetaddress#1{\unskip\ignorespaces}
\city 2335 \def\postcode#1{\unskip\ignorespaces}
\state 2336 \if@ACM@journal
\postcode 2337 \def\position#1{\unskip\ignorespaces}
\country 2338 \def\institution#1{\global\@ACM@instpresenttrue
2339   \unskip~#1\ignorespaces}
2340 \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
2341 \def\state#1{\unskip\ignorespaces}
2342 \newcommand\department[2][0]{\unskip\ignorespaces}
2343 \def\country#1{\global\@ACM@countrypresenttrue
2344   \if@ACM@affiliation@obexpunctuation\else, \fi#1\ignorespaces}
2345 \else
2346 \def\position#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2347 \def\institution#1{\global\@ACM@instpresenttrue
2348   \if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2349 \newcommand\department[2][0]{\if@ACM@affiliation@obexpunctuation
2350   #2\else#2\par\fi}%
2351 % \def\streetaddress#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2352 \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
2353 \let\state\@ACM@addtoaddress
2354 % \def\postcode#1{\if@ACM@affiliation@obexpunctuation#1\else\unskip\space#1\fi}%
2355 \def\country#1{\global\@ACM@countrypresenttrue\@ACM@addtoaddress{#1}}%
2356 \fi

```

`\mkauthors` Typesetting the authors

```

2357 \def\mkauthors{\begingroup
2358   \hsize=\textwidth
2359   \ifcase\ACM@format@nr
2360     \relax % manuscript
2361     \mkauthors@i
2362   \or % acmsmall
2363     \mkauthors@i
2364   \or % acmlarge
2365     \mkauthors@i
2366   \or % acmtog
2367     \mkauthors@i
2368   \or % sigconf

```

```

2369 \mkauthors@iii
2370 \or % siggraph
2371 \mkauthors@iii
2372 \or % sigplan
2373 \mkauthors@iii
2374 \or % sigchi
2375 \mkauthors@iii
2376 \or % sigchi-a
2377 \mkauthors@iv
2378 \or % acmengage
2379 \mkauthors@iii
2380 \fi
2381 \endgroup
2382 }

```

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

```

2383 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```

2384 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

2385 \ifcase\ACM@format@nr
2386 \relax % manuscript
2387 \or % acmsmall
2388 \def\@authorfont{\large\sffamily}
2389 \def\@affiliationfont{\small\normalfont}
2390 \or % acmlarge
2391 \or % acmtog
2392 \def\@authorfont{\LARGE\sffamily}
2393 \def\@affiliationfont{\large}
2394 \or % sigconf
2395 \def\@authorfont{\LARGE}
2396 \def\@affiliationfont{\large}
2397 \or % siggraph
2398 \def\@authorfont{\normalsize\normalfont}
2399 \def\@affiliationfont{\normalsize\normalfont}
2400 \or % sigplan
2401 \def\@authorfont{\Large\normalfont}
2402 \def\@affiliationfont{\normalsize\normalfont}
2403 \or % sigchi
2404 \def\@authorfont{\bfseries}
2405 \def\@affiliationfont{\mdseries}
2406 \or % sigchi-a
2407 \def\@authorfont{\bfseries}
2408 \def\@affiliationfont{\mdseries}
2409 \or % acmengage
2410 \def\@authorfont{\LARGE}
2411 \def\@affiliationfont{\large}
2412 \fi

```

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


```

2413 \def\@typeset@author@line{%
2414   \andify\@currentauthors\par\noindent
2415   \@currentauthors\def\@currentauthors{}%
2416   \ifx\@currentaffiliations\@empty\else
2417     \andify\@currentaffiliations
2418     \unskip, {\@currentaffiliations}\par
2419   \fi
2420   \def\@currentaffiliations{}}

\if@ACM@instpresent Whether the given affiliation has institution
2421 \newif\if@ACM@instpresent
2422 \@ACM@instpresenttrue

\if@ACM@citypresent Whether the given affiliation has city
2423 \newif\if@ACM@citypresent
2424 \@ACM@citypresenttrue

\if@ACM@countrypresent Whether the given affiliation has country
2425 \newif\if@ACM@countrypresent
2426 \@ACM@countrypresenttrue

\@ACM@resetaffil Reset affiliation flags
2427 \def\@ACM@resetaffil{%
2428   \global\@ACM@instpresentfalse
2429   \global\@ACM@citypresentfalse
2430   \global\@ACM@countrypresentfalse
2431 }

\@ACM@checkaffil Check affiliation flags
2432 \def\@ACM@checkaffil{%
2433   \if@ACM@instpresent\else
2434     \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
2435     \fi
2436   \if@ACM@citypresent\else
2437     \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
2438     \fi
2439   \if@ACM@countrypresent\else
2440     \ClassError{\@classname}{No country present for an affiliation}{ACM
2441     requires each author to indicate their country using country macro.}%
2442     \fi
2443 }

\@mkauthors@i This version is used in most journal formats. Note that \and between authors with the
same affiliation becomes _and_:
2444 \def\@mkauthors@i{%
2445   \def\@currentauthors{}%
2446   \def\@currentaffiliations{}%
2447   \global\let\and\@typeset@author@line
2448   \def\@author##1{%
2449     \ifx\@currentauthors\@empty
2450       \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
2451     \else
2452       \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%

```

```

2453 \fi
2454 \gdef\and{}}%
2455 \def\email##1##2{%
2456 \def\affiliation##1##2{%
2457 \def\@tempa{##2}\ifx\@tempa\@empty\else
2458 \ifx\@currentaffiliations\@empty
2459 \gdef\@currentaffiliations{%
2460 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2461 \setkeys{@ACM@affiliation@}{##1}%
2462 \@ACM@resetaffil
2463 \@affiliationfont##2\@ACM@checkaffil}%
2464 \else
2465 \g@addto@macro{\@currentaffiliations}{\and
2466 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2467 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2468 ##2\@ACM@checkaffil}%
2469 \fi
2470 \fi
2471 \global\let\and\@typeset@author@line}%
2472 \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
2473 \noindent\addresses\@typeset@author@line
2474 \par\medskip}%
2475 }

```

`\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

```
2476 \newbox\author@bx
```

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

```
2477 \newdimen\author@bx@wd
```

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

```
2478 \newskip\author@bx@sep
2479 \author@bx@sep=1pc\relax
```

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

```

2480 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd
2481 \def\and{\par}\normalbaselines
2482 \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2483 \@authorfont\@currentauthors\par\@affiliationfont
2484 \@currentaffiliation}\egroup
2485 \box\author@bx\hspace{\author@bx@sep}%
2486 \gdef\@currentauthors{}}%
2487 \gdef\@currentaffiliation{}}

```

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

```
2488 \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.

```

2489 \author@bx@wd=\textwidth\relax
2490 \advance\author@bx@wd by -\author@bx@sep\relax
2491 \ifnum\@ACM@authorsperrow>0\relax
2492   \divide\author@bx@wd by \@ACM@authorsperrow\relax
2493 \else
2494   \ifcase\num@authorgroups
2495     \relax % 0?
2496     \or % 1=one author per row
2497     \or % 2=two authors per row
2498       \divide\author@bx@wd by \num@authorgroups\relax
2499     \or % 3=three authors per row
2500       \divide\author@bx@wd by \num@authorgroups\relax
2501     \or % 4=two authors per row (!)
2502       \divide\author@bx@wd by 2\relax
2503   \else % three authors per row
2504     \divide\author@bx@wd by 3\relax
2505   \fi
2506 \fi
2507 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2508 \gdef\@currentauthors{}%
2509 \gdef\@currentaffiliation{}%
2510 \def\@author##1{\ifx\@currentauthors\@empty
2511   \gdef\@currentauthors{\par##1}%
2512 \else
2513   \g@addto@macro\@currentauthors{\par##1}%
2514 \fi
2515 \gdef\and{}}%
2516 \def\email##1##2{\ifx\@currentaffiliation\@empty
2517   \gdef\@currentaffiliation{\bgroup
2518     \mathchardef\UrbreakPenalty=10000\nolinkurl{##2}\egroup}%
2519 \else
2520   \g@addto@macro\@currentaffiliation{\par\bgroup
2521     \mathchardef\UrbreakPenalty=10000\nolinkurl{##2}\egroup}%
2522 \fi}%
2523 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2524   \gdef\@currentaffiliation{%
2525     \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2526     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2527     ##2\@ACM@checkaffil}%
2528 \else
2529   \g@addto@macro\@currentaffiliation{\par
2530     \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2531     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2532     ##2\@ACM@checkaffil}%
2533 \fi
2534 \global\let\and\@typeset@author@bx
2535 }%

```

Actual typesetting is done by the \and macro:

```

2536 \hspace=\textwidth
2537 \global\setbox\mktitle@bx=\vbox{\noindent
2538   \unvbox\mktitle@bx\par\medskip\leavevmode
2539   \lineskip=1pc\relax\centering\hspace*{-1em}%

```

```

2540 \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.
2541 \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.
2542 \author@bx@wd=\columnwidth\relax
2543 \advance\author@bx@wd by -\author@bx@sep\relax
2544 \ifnum\@ACM@authorsperrrow>0\relax
2545 \divide\author@bx@wd by \@ACM@authorsperrrow\relax
2546 \else
2547 \ifcase\num@authorgroups
2548 \relax % 0?
2549 \or % 1=one author per row
2550 \else % 2=two authors per row
2551 \divide\author@bx@wd by 2\relax
2552 \fi
2553 \fi
2554 \advance\author@bx@wd by -\author@bx@sep\relax
Now, parsing of \addresses:
2555 \gdef\@currentauthors{}%
2556 \gdef\@currentaffiliation{}%
2557 \def\@author##1{\ifx\@currentauthors\@empty
2558 \gdef\@currentauthors{\par##1}%
2559 \else
2560 \g@addto@macro\@currentauthors{\par##1}%
2561 \fi
2562 \gdef\and{}}%
2563 \def\email##1##2{\ifx\@currentaffiliation\@empty
2564 \gdef\@currentaffiliation{\nolinkurl{##2}}%
2565 \else
2566 \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2567 \fi}%
2568 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2569 \gdef\@currentaffiliation{%
2570 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2571 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2572 ##2\@ACM@checkaffil}%
2573 \else
2574 \g@addto@macro\@currentaffiliation{\par
2575 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2576 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2577 ##2\@ACM@checkaffil}%
2578 \fi
2579 \global\let\and\@typeset@author@bx}%
2580 %
Actual typesetting is done by the \and macro
2581 \bgroup\hsize=\columnwidth
2582 \par\raggedright\leftskip=\z@

```

```

2583 \lineskip=1pc\noindent
2584 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

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

```

2585 \def\@mkauthorsaddresses{%
2586 \ifnum\num@authors>1\relax
2587 Authors' \else Author's \fi
2588 \ifnum\num@authorgroups>1\relax
2589 addresses: \else address: \fi
2590 \bgroup
2591 \def\streetaddress##1{\unskip, ##1}%
2592 \def\postcode##1{\unskip, ##1}%
2593 \def\position##1{\unskip\ignorespaces}%
2594 \gdef\@ACM@institution@separator{,}%
2595 \def\institution##1{\unskip\@ACM@institution@separator ##1\gdef\@ACM@institution@separator{ and }}
2596 \def\city##1{\unskip, ##1}%
2597 \def\state##1{\unskip, ##1}%
2598 \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2599 \def\country##1{\unskip, ##1}%
2600 \def\and{\unskip; \gdef\@ACM@institution@separator{,}}%
2601 \def\@author##1{##1}%
2602 \def\email##1##2{\unskip, \nolinkurl{##2}}%
2603 \addresses
2604 \egroup}

2605 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
2606 \ifx\@authorsaddresses\empty
2607 \ClassWarningNoLine{\@classname}{Authors'
2608 addresses are mandatory for ACM journals}%
2609 \fi\fi\fi}

```

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

```

2610 \def\@setaddresses{}

```

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

```

2611 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}

```

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

```

2612 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}

```

`\@mkteasers` Typesetting the teasers

```

2613 \def\@mkteasers{%
2614 \ifx\@teaserfigures\empty\else
2615 \def\@teaser##1{\par\bigskip\bgroup
2616 \captionsetup{type=figure}##1\egroup\par}
2617 \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
2618 \noindent\@Description@presentfalse
2619 \@teaserfigures\par\if@Description@present\else
2620 \global\@undescrbed@imagestrue
2621 \ClassWarning{\@classname}{A possible image without
2622 description}\fi
2623 \medskip}%
2624 \fi}

```

\mkabstract Typesetting the abstract

```
2625 \def\mkabstract{\bgroup
2626   \ifx\@abstract\@empty\else
2627     {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
2628     \if@ACM@journal
2629       \everypar{\setbox\z@\lastbox\everypar{}}\small
2630     \else
2631       \section*{\abstractname}%
2632     \fi
2633     \ignorespaces\@abstract\par}%
2634 \fi\egroup}
```

\mktranslatedabstract Typesetting a translated abstract

```
2635 \def\mktranslatedabstract#1{\selectlanguage{#1}%
2636   \if@ACM@journal
2637     \everypar{\setbox\z@\lastbox\everypar{}}\small
2638   \else
2639     \section*{\abstractname}%
2640   \fi
2641   \ignorespaces}
```

\mkbibcitation Print the bibcitation format

```
2642 \def\mkbibcitation{\bgroup
2643   \let\@vspace\@vspace@orig
2644   \let\@vspacer\@vspacer@orig
2645   \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2646   \def\footnotemark{}%
2647   \def\{\unskip{} \ignorespaces}%
2648   \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2649     inside a \string\title{} or \string\author{} command! Use
2650     \string\titlenote{} or \string\authornote{} instead!}}%
2651   \def\@article@string{\ifx\@acmArticle\@empty{\ } \else,
2652     Article~\@acmArticle\ } \fi}%
2653   \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2654   \noindent\bgroup
2655     \def\{\unskip{}, \ignorespaces}\authors\egroup. \@acmYear. \@title
2656     \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2657   \if@ACM@nonacm\else
2658     % The 'nonacm' option disables 'printacmref' by default,
2659     % and the present \mkbibcitation definition is never used
2660     % in this case. The conditional remains useful if the user
2661     % explicitly sets \settopmatter{printacmref=true}.
2662     \if@ACM@journal@bibstrip
2663       \textit{\@journalNameShort}
2664       \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2665       \ref{TotPages}~\@pages@word.
2666     \else
2667       In \textit{\@acmBooktitle}%
2668       \ifx\@acmEditors\@empty\textit{.}\else
2669         \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
2670       \fi\
2671       ACM, New York, NY, USA%
2672       \@article@string\unskip, \ref{TotPages}~\@pages@word.
2673     \fi
```

```

2674 \fi
2675 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2676 \par\egroup}

```

\@printendtopmatter End the top matter

```

2677 \def\@printendtopmatter{%
2678 \let\@vspace\@vspace@orig
2679 \let\@vspacer\@vspacer@orig
2680 \par\bigskip
2681 \let\@vspace\@vspace@acm
2682 \let\@vspacer\@vspacer@acm
2683 }

```

\@setthanks We redefine \@setthanks using \@long

```

2684 \def\@setthanks{\@long\def\thanks##1{\par##1\@addpunct.}\thankses}

```

\@setauthorsaddresses

```

2685 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}

```

\@typesetengagemetadata Typesetting special metadata for ACM Engage

```

2686 \def\@typesetengagemetadata{%
2687 \def\@setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
2688 \@acmengagemetadata}

```

3.22 Headers and Footers

We use fancyhdr for our headers and footers:

```

2689 \RequirePackage{fancyhdr}

```

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

```

2690 \let\ACM@ps@plain\ps@plain
2691 \let\ACM@ps@myheadings\ps@myheadings
2692 \let\ACM@ps@headings\ps@headings
2693 \def\ACM@restore@pagestyle{%
2694 \let\ps@plain\ACM@ps@plain
2695 \let\ps@myheadings\ACM@ps@myheadings
2696 \let\ps@headings\ACM@ps@headings}
2697 \AtBeginDocument{\ACM@restore@pagestyle}

```

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

```

2698 \if@ACM@review
2699 \newsavebox{\ACM@linecount@bx}
2700 \newlength\ACM@linecount@bxht
2701 \newcount\ACM@linecount
2702 \ACM@linecount\@ne\relax
2703 \def\ACM@mk@linecount{%
2704 \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
2705 \normalsize
2706 \setlength{\ACM@linecount@bxht}{0pt}%
2707 \loop{\color{red}\scriptsize\the\ACM@linecount}\@
2708 \global\advance\ACM@linecount by \@ne
2709 \addtolength{\ACM@linecount@bxht}{\baselineskip}}%
2710 \ifdim\ACM@linecount@bxht<\textheight\repeat

```

```

2711         {\color{red}\scriptsize\the\ACM@linecount}\hfill
2712         \global\advance\ACM@linecount by \@ne}}}
2713 \fi

```

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

```

2714 \def\ACM@linecountL{%
2715   \if@ACM@review
2716   \ACM@mk@linecount
2717   \begin{picture}(0,0)%
2718     \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2719   \end{picture}%
2720 \fi}

```

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

```

2721 \def\ACM@linecountR{%
2722   \if@ACM@review
2723     \ifcase\ACM@format@nr
2724       \relax % manuscript
2725       \relax
2726       \or % acmsmall
2727       \relax
2728       \or % acmlarge
2729       \relax
2730       \or % acmtog
2731       \ACM@mk@linecount
2732       \or % sigconf
2733       \ACM@mk@linecount
2734       \or % siggraph
2735       \ACM@mk@linecount
2736       \or % sigplan
2737       \ACM@mk@linecount
2738       \or % sigchi
2739       \ACM@mk@linecount
2740       \or % sigchi-a
2741       \ACM@mk@linecount
2742       \or % acmengage
2743       \ACM@mk@linecount
2744   \fi
2745   \begin{picture}(0,0)%
2746     \put(20,-22){\usebox{\ACM@linecount@bx}}%
2747   \end{picture}%
2748 \fi}

```

\ACM@timestamp The timestamp system

```

2749 \if@ACM@timestamp
2750 % Subtracting 30 from \time gives us the effect of rounding down despite
2751 % \numexpr rounding to nearest
2752 \newcounter{ACM@time@hours}
2753 \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
2754 \newcounter{ACM@time@minutes}
2755 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
2756 \newcommand\ACM@timestamp{%
2757   \footnotesize%
2758   \ifx\@acmSubmissionID\empty\relax\else

```



```

2759 Submission ID: \@acmSubmissionID.{ }%
2760 \fi
2761 \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
2762 \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
2763 Page \thepage\ of \@startPage--\pageref*{TotPages}.%
2764 }
2765 \fi

\@shortauthors Even if the author redefined \@shortauthors, we do not print it in the headers when in
anonymous mode:
2766 \def\@shortauthors{%
2767   \if@ACM@anonymous
2768     Anon.
2769     \ifx\@acmSubmissionID\empty\else Submission Id: \@acmSubmissionID\fi
2770   \else\@shortauthors\fi}

\@headfootfont The font to typeset header and footer text.
2771 \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
2772 \AtBeginDocument{%
2773 \fancypagestyle{standardpagestyle}{%
2774   \fancyhf{}%
2775   \renewcommand{\headrulewidth}{\z@}%
2776   \renewcommand{\footrulewidth}{\z@}%
2777   \def\@acmArticlePage{%
2778     \ifx\@acmArticle\empty%
2779       \if@ACM@printfolios\thepage\fi
2780     \else%
2781       \@acmArticle\if@ACM@printfolios:\thepage\fi
2782     \fi%
2783   }%
2784   \if@ACM@journal@bibstrip
2785     \ifcase\ACM@format@nr
2786       \relax % manuscript
2787       \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
2788       \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
2789       \fancyhead[RE]{\@shortauthors}%
2790       \fancyhead[LO]{\ACM@linecountL\shorttitle}%
2791       \if@ACM@nonacm\else%
2792         \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
2793       \fi%
2794     \or % acmsmall
2795       \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
2796       \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
2797       \fancyhead[RE]{\@headfootfont\@shortauthors}%
2798       \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2799       \if@ACM@nonacm\else%
2800         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2801           \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2802       \fi
2803     \or % acmlarge
2804       \fancyhead[LE]{\ACM@linecountL\@headfootfont

```

```

2805 \acmArticlePage\quad\textbullet\quad\@shortauthors}%
2806 \fancyhead[LO]{\ACM@linecountL}%
2807 \fancyhead[RO]{\@headfootfont
2808 \shorttitle\quad\textbullet\quad\acmArticlePage}%
2809 \if@ACM@nonacm\else%
2810 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \acmVolume, No.
2811 \acmNumber, Article \acmArticle. Publication date: \acmPubDate.}%
2812 \fi
2813 \or % acmtog
2814 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2815 \acmArticlePage\quad\textbullet\quad\@shortauthors}%
2816 \fancyhead[LO]{\ACM@linecountL}%
2817 \fancyhead[RE]{\ACM@linecountR}%
2818 \fancyhead[RO]{\@headfootfont
2819 \shorttitle\quad\textbullet\quad\acmArticlePage\ACM@linecountR}%
2820 \if@ACM@nonacm\else%
2821 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \acmVolume, No.
2822 \acmNumber, Article \acmArticle. Publication date: \acmPubDate.}%
2823 \fi
2824 \else % Proceedings
2825 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2826 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2827 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
2828 \if@ACM@nonacm
2829 \fancyhead[LE]{\ACM@linecountL}%
2830 \fancyhead[RO]{\ACM@linecountR}%
2831 \else%
2832 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
2833 \acmConference@shortname,
2834 \acmConference@date, \acmConference@venue}%
2835 \fancyhead[RO]{\@headfootfont
2836 \acmConference@shortname,
2837 \acmConference@date, \acmConference@venue\ACM@linecountR}%
2838 \fi
2839 \fi
2840 \else % Proceedings
2841 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2842 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2843 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
2844 \if@ACM@nonacm
2845 \fancyhead[LE]{\ACM@linecountL}%
2846 \fancyhead[RO]{\ACM@linecountR}%
2847 \else%
2848 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2849 \acmConference@shortname,
2850 \acmConference@date, \acmConference@venue}%
2851 \fancyhead[RO]{\@headfootfont
2852 \acmConference@shortname,
2853 \acmConference@date, \acmConference@venue\ACM@linecountR}%
2854 \fi
2855 \fi
2856 \if@ACM@sigchiamode
2857 \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
2858 \fi

```

```

2859 \if@ACM@timestamp
2860 \fancyfoot[LO,RE]{\ACM@timestamp}
2861 \fi
2862 }%
2863 \pagestyle{standardpagestyle}
2864 }

\@folio@wd Folio blob width, height, offsets and max number
\@folio@ht
\@folio@voffset
\@folio@max
2865 \newdimen\@folio@wd
2866 \@folio@wd=\z@
2867 \newdimen\@folio@ht
2868 \@folio@ht=\z@
2869 \newdimen\@folio@voffset
2870 \@folio@voffset=\z@
2871 \def\@folio@max{1}
2872 \ifcase\ACM@format@nr
2873 \relax % manuscript
2874 \or % acmsmall
2875 \@folio@wd=45.75pt\relax
2876 \@folio@ht=1.25in\relax
2877 \@folio@voffset=.2in\relax
2878 \def\@folio@max{8}
2879 \or % acmlarge
2880 \@folio@wd=43.25pt\relax
2881 \@folio@ht=79pt\relax
2882 \@folio@voffset=.55in\relax
2883 \def\@folio@max{10}
2884 \fi

\@folioblob The macro to typeset the folio blob.
2885 \def\@folioblob{\@tempcnta=0\@acmArticleSeq\relax
2886 \ifnum\@tempcnta=0\relax\else
First, we calculate \@acmArticleSeq modulo \@folio@max
2887 \loop
2888 \ifnum\@tempcnta>\@folio@max\relax
2889 \advance\@tempcnta by - \@folio@max
2890 \repeat
2891 \advance\@tempcnta by -1\relax
2892 \@tempdima=\@folio@ht\relax
2893 \multiply\@tempdima by \the\@tempcnta\relax
2894 \advance\@tempdima by -\@folio@voffset\relax
2895 \begin{picture}(0,0)
2896 \makebox[\z@]{\raisebox{-\@tempdima}{%
2897 \rlap{%
2898 \raisebox{-0.45\@folio@ht}{\z@}\z@}{%
2899 \rule{\@folio@wd}{\@folio@ht}}}%
2900 \parbox{\@folio@wd}{%
2901 \centering
2902 \textcolor{white}{\LARGE\sffamily\bfseries\@acmArticle}}}}
2903 \end{picture}\fi}
2904

firstpagestyle The page style for the first page only.

```

```

2905 \AtBeginDocument{%
2906 \fancypagestyle{firstpagestyle}{%
2907   \fancyhf{}%
2908   \renewcommand{\headrulewidth}{\z@}%
2909   \renewcommand{\footrulewidth}{\z@}%
2910   \if@ACM@journal@bibstrip
2911     \ifcase\ACM@format@nr
2912       \relax % manuscript
2913       \fancyhead[L]{\ACM@linecountL}%
2914       \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
2915       \if@ACM@nonacm\else%
2916         \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
2917       \fi%
2918     \or % acmsmall
2919       \if@ACM@nonacm\else%
2920         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2921           \@acmNumber, Article \@acmArticle. Publication date:
2922             \@acmPubDate.}%
2923         \fi%
2924         \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2925         \fancyhead[LO]{\ACM@linecountL}%
2926         \fancyhead[RO]{\@folioblob}%
2927         \fancyheadoffset[RO,LE]{0.6\@folio@wd}%
2928       \or % acmlarge
2929         \if@ACM@nonacm\else%
2930           \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2931             \@acmNumber, Article \@acmArticle. Publication date:
2932               \@acmPubDate.}%
2933           \fi%
2934           \fancyhead[RO]{\@folioblob}%
2935           \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2936           \fancyhead[LO]{\ACM@linecountL}%
2937           \fancyheadoffset[RO,LE]{1.4\@folio@wd}%
2938         \or % acmtog
2939           \if@ACM@nonacm\else%
2940             \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2941               \@acmNumber, Article \@acmArticle. Publication date:
2942                 \@acmPubDate.}%
2943             \fi%
2944             \fancyhead[L]{\ACM@linecountL}%
2945             \fancyhead[R]{\ACM@linecountR}%
2946           \else % Conference proceedings
2947             \fancyhead[L]{\ACM@linecountL}%
2948             \fancyhead[R]{\ACM@linecountR}%
2949             \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2950             \fi
2951           \else
2952             \fancyhead[L]{\ACM@linecountL}%
2953             \fancyhead[R]{\ACM@linecountR}%
2954             \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2955             \fi
2956           \if@ACM@timestamp
2957             \ifnum\ACM@format@nr=0\relax % Manuscript
2958             \fancyfoot[LO,RE]{\ACM@timestamp\quad

```

```

2959     \if@ACM@nonacm\else
2960         \footnotesize Manuscript submitted to ACM
2961     \fi}
2962 \else
2963     \fancyfoot[LO,RE]{\ACM@timestamp}
2964 \fi
2965 \fi
2966 }}

```

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.

```

2967 \def\ACM@NRadjust#1{%
2968   \begingroup
2969   \expandafter\ifx\csname Sectionformat\endcsname\relax
2970   % do nothing when \Sectionformat is unknown
2971   \def\next{\endgroup #1}%
2972 \else
2973   \def\next{\endgroup
2974     \let\realSectionformat\Sectionformat
2975     \def\ACM@sect@format@{#1}%
2976     \let\Sectionformat\ACM@NR@adjustedSectionformat
2977   %% next lines added 2018-06-17 to ensure section number is styled
2978     \let\real@adddotafter\@adddotafter
2979     \let\@adddotafter\ACM@adddotafter
2980     #1{ }% imposes the styles, but nullifies \MakeUppercase
2981     \let\@adddotafter\real@adddotafter
2982   }%
2983 \fi \next
2984 }

```

\ACM@NR@adjustedSectionformat

```

2985 \def\ACM@NR@adjustedSectionformat#1#2{%

```

```

2986 \realSectionformat{\ACM@sect@format{#1}}{#2}%
2987 \let\Sectionformat\realSectionformat}
2988 \DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
2989 \def\ACM@sect@format@null#1{#1}
2990 \let\ACM@sect@format\ACM@sect@format@null
2991 \AtBeginDocument{%
2992 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
2993 \let\LTX@adddotafter\@adddotafter
2994 \fi
2995 }

```

\ACM@adddotafter

```

2996 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}

```

Sectioning is different for different levels

```

2997 \renewcommand\section{\@startsection{section}{1}{\z@}%
2998 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2999 {.25\baselineskip}%
3000 {\ACM@NRadjust\@secfont}}
3001 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
3002 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3003 {.25\baselineskip}%
3004 {\ACM@NRadjust\@subsecfont}}
3005 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
3006 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3007 {-3.5\p@}%
3008 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}}
3009 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
3010 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3011 {-3.5\p@}%
3012 {\ACM@NRadjust{\@parfont\@adddotafter}}}}
3013 \newcommand\noindentparagraph{\@startsection{paragraph}{4}{\z@}%
3014 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3015 {-3.5\p@}%
3016 {\ACM@NRadjust{\@parfont}}}}
3017
3018 \renewcommand\part{\@startsection{part}{9}{\z@}%
3019 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
3020 {4\p@}%
3021 {\ACM@NRadjust{\@parfont}}}

```

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

```

3022 \def\section@raggedright{\@rightskip\@flushglue
3023 \rightskip\@rightskip
3024 \leftskip\z@skip
3025 \parindent\z@}

```

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

```

\@subsecfont 3026 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
\@subsubsecfont 3027 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 3028 \def\@subsubsecfont{\sffamily\itshape}
3029 \def\@parfont{\itshape}
3030 \setcounter{secnumdepth}{3}
3031 \ifcase\ACM@format@nr

```

```

3032 \relax % manuscript
3033 \or % acmsmall
3034 \or % acmlarge
3035 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
3036 \def\@subsecfont{\sffamily\large\section@raggedright}
3037 \or % acmtog
3038 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
3039 \def\@subsecfont{\sffamily\large\section@raggedright}
3040 \or % sigconf
3041 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
3042 \def\@subsecfont{\bfseries\Large\section@raggedright}
3043 \or % siggraph
3044 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
3045 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
3046 \or % sigplan
3047 \def\@secfont{\bfseries\Large\section@raggedright}
3048 \def\@subsecfont{\bfseries\section@raggedright}
3049 \def\@subsubsecfont{\bfseries\section@raggedright}
3050 \def\@parfont{\bfseries\itshape}
3051 \def\@subparfont{\itshape}
3052 \or % sigchi
3053 \setcounter{secnumdepth}{1}
3054 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
3055 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3056 \or % sigchi-a
3057 \setcounter{secnumdepth}{0}
3058 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
3059 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3060 \or % acmengage
3061 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
3062 \def\@subsecfont{\bfseries\Large\section@raggedright}
3063 \fi

```

\@adddotafter Add punctuation after a sectioning command

```
3064 \def\@adddotafter#1{#1\@addpunct{.}}
```

\@addspaceafter Add space after a sectioning command

```
3065 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

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.

```
3066 \providecommand*\@dotsep{4.5}
```

3.25 Theorems

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

```
3067 \def\@acmplainbodyfont{\itshape}
```

`\acmplainindent` The amount to indent the acmplain theorem style.
3068 `\def\acmplainindent{\parindent}`

`\acmplainheadfont` The font to typeset the head of the acmplain theorem style.
3069 `\def\acmplainheadfont{\scshape}`

`\acmplainnotefont` The font to typeset the note of the acmplain theorem style.
3070 `\def\acmplainnotefont{\@empty}`

Customization of the acmplain theorem style:

3071 `\ifcase\ACM@format@nr`
3072 `\relax % manuscript`
3073 `\or % acmsmall`
3074 `\or % acmlarge`
3075 `\or % acmtog`
3076 `\or % sigconf`
3077 `\or % siggraph`
3078 `\or % sigplan`
3079 `\def\acmplainbodyfont{\itshape}`
3080 `\def\acmplainindent{\z@}`
3081 `\def\acmplainheadfont{\bfseries}`
3082 `\def\acmplainnotefont{\normalfont}`
3083 `\or % sigchi`
3084 `\or % sigchi-a`
3085 `\or % acmengage`
3086 `\fi`

`acmplain` The acmplain theorem style
3087 `\newtheoremstyle{acmplain}%`
3088 `{.5\baselineskip\@plus.2\baselineskip`
3089 `\@minus.2\baselineskip}% space above`
3090 `{.5\baselineskip\@plus.2\baselineskip`
3091 `\@minus.2\baselineskip}% space below`
3092 `{\acmplainbodyfont}% body font`
3093 `{\acmplainindent}% indent amount`
3094 `{\acmplainheadfont}% head font`
3095 `{.}% punctuation after head`
3096 `{.5em}% spacing after head`
3097 `{\thmname{#1}\thmnumber{ #2}\thmnote{ {\acmplainnotefont(#3)}}}% head spec`

`\acmdefinitionbodyfont` The font to typeset the body of the acmdefinition theorem style.
3098 `\def\acmdefinitionbodyfont{\normalfont}`

`\acmdefinitionindent` The amount to indent the acmdefinition theorem style.
3099 `\def\acmdefinitionindent{\parindent}`

`\acmdefinitionheadfont` The font to typeset the head of the acmdefinition theorem style.
3100 `\def\acmdefinitionheadfont{\itshape}`

`\acmdefinitionnotefont` The font to typeset the note of the acmdefinition theorem style.
3101 `\def\acmdefinitionnotefont{\@empty}`

Customization of the acmdefinition theorem style:

```

3102 \ifcase\ACM@format@nr
3103 \relax % manuscript
3104 \or % acmsmall
3105 \or % acmlarge
3106 \or % acmtog
3107 \or % sigconf
3108 \or % siggraph
3109 \or % sigplan
3110 \def\acmdefinitionbodyfont{\normalfont}
3111 \def\acmdefinitionindent{\z@}
3112 \def\acmdefinitionheadfont{\bfseries}
3113 \def\acmdefinitionnotefont{\normalfont}
3114 \or % sigchi
3115 \or % sigchi-a
3116 \or % acmengage
3117 \fi

```

acmdefinition The acmdefinition theorem style

```

3118 \newtheoremstyle{acmdefinition}%
3119 { .5\baselineskip \@plus .2\baselineskip
3120 \@minus .2\baselineskip}% space above
3121 { .5\baselineskip \@plus .2\baselineskip
3122 \@minus .2\baselineskip}% space below
3123 {\@acmdefinitionbodyfont}% body font
3124 {\@acmdefinitionindent}% indent amount
3125 {\@acmdefinitionheadfont}% head font
3126 { .}% punctuation after head
3127 { .5em}% spacing after head
3128 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec

```

Make acmplain the default theorem style.

```

3129 \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.

```

3130 \AtEndPreamble{%
3131 \if@ACM@acmthm
3132 \theoremstyle{acmplain}
3133 \@ifundefined{theorem}{%
3134 \newtheorem{theorem}{Theorem}[section]
3135 }{}
3136 \@ifundefined{conjecture}{%
3137 \newtheorem{conjecture}{Conjecture}
3138 }{}
3139 \@ifundefined{proposition}{%
3140 \newtheorem{proposition}{Proposition}

```

```

3141 }{}
3142 \@ifundefined{lemma}{%
3143 \newtheorem{lemma}[theorem]{Lemma}
3144 }{}
3145 \@ifundefined{corollary}{%
3146 \newtheorem{corollary}[theorem]{Corollary}
3147 }{}
3148 \theoremstyle{acmdefinition}
3149 \@ifundefined{example}{%
3150 \newtheorem{example}[theorem]{Example}
3151 }{}
3152 \@ifundefined{definition}{%
3153 \newtheorem{definition}[theorem]{Definition}
3154 }{}
3155 \fi
3156 \theoremstyle{acmplain}
3157 }

\@proofnamefont The font to typeset the proof name.
3158 \def\@proofnamefont{\scshape}

\@proofindent Whether or not to indent proofs.
3159 \def\@proofindent{\indent}

Customization of the proof environment.
3160 \ifcase\ACM@format@nr
3161 \relax % manuscript
3162 \or % acmsmall
3163 \or % acmlarge
3164 \or % acmtog
3165 \or % sigconf
3166 \or % siggraph
3167 \or % sigplan
3168 \def\@proofnamefont{\itshape}
3169 \def\@proofindent{\noindent}
3170 \or % sigchi
3171 \or % sigchi-a
3172 \or % acmengage
3173 \fi

proof We want some customization of the proof environment.
3174 \renewenvironment{proof}[1][\proofname]{\par
3175 \pushQED{\qed}%
3176 \normalfont \topsep6\p@\@plus6\p@\relax
3177 \trivlist
3178 \item[\@proofindent\hspace\labelsep
3179 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
3180 }{%
3181 \popQED\endtrivlist\@endpfalse
3182 }

```

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.

```
3183 \AtEndPreamble{%
3184   \if@ACM@pbalance
3185     \global\@ACM@balancefalse
3186     \ifcase\ACM@format@nr
3187       \relax % manuscript
3188       \or % acsmall
3189       \or % acmlarge
3190       \or % acmtog
3191       \RequirePackage{pbalance}%
3192       \or % sigconf
3193       \RequirePackage{pbalance}%
3194       \or % siggraph
3195       \RequirePackage{pbalance}%
3196       \or % sigplan
3197       \RequirePackage{pbalance}%
3198       \or % sigchi
3199       \RequirePackage{pbalance}%
3200       \or % sigchi-a
3201       \or % acmengage
3202       \RequirePackage{pbalance}%
3203     \fi
3204   \fi
3205   \if@ACM@balance
3206     \ifcase\ACM@format@nr
3207       \relax % manuscript
3208       \global\@ACM@balancefalse
3209       \or % acsmall
3210       \global\@ACM@balancefalse
3211       \or % acmlarge
3212       \global\@ACM@balancefalse
3213       \or % acmtog
3214       \RequirePackage{balance}%
3215       \or % sigconf
3216       \RequirePackage{balance}%
3217       \or % siggraph
3218       \RequirePackage{balance}%
3219       \or % sigplan
3220       \RequirePackage{balance}%
3221       \or % sigchi
3222       \RequirePackage{balance}%
3223       \or % sigchi-a
3224       \global\@ACM@balancefalse
3225       \or % acmengage
3226       \RequirePackage{balance}%
3227     \fi
3228   \fi
3229 }
3230 \AtEndDocument{%
3231   \if@ACM@balance
3232     \if@twocolumn
```

```

3233 \balance
3234 \fi\fi}

```

3.27 Acknowledgments

```

\acksname
3235 \newcommand\acksname{Acknowledgments}

\acks This is a comment-like structure
3236 \specialcomment{acks}{%
3237 \begin{group
3238 \section*\acksname}
3239 \phantomsection\addcontentsline{toc}{section}{\acksname}
3240 }{%
3241 \end{group}
3242 }

\grantsponsor We just typeset the name of the sponsor
3243 \def\grantsponsor#1#2#3{#2}

\grantnum
3244 \newcommand\grantnum[3][{}]{#3%
3245 \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}

```

3.28 Conditional typesetting

We use the comment package for conditional typesetting:

```

3246 \AtEndPreamble{%
3247 \if@ACM@screen
3248 \includecomment{screenonly}
3249 \excludecomment{printonly}
3250 \else
3251 \excludecomment{screenonly}
3252 \includecomment{printonly}
3253 \fi
3254 \if@ACM@anonymous
3255 \excludecomment{anonsuppress}
3256 \excludecomment{acks}
3257 \else
3258 \includecomment{anonsuppress}
3259 \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’.
3260 \newcommand\showeprint[2][arxiv]{%
3261 \def\@tempa{#1}%
3262 \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
3263 \def\@tempb{arxiv}%
3264 \ifx\@tempa\@tempb\relax
3265 arXiv:\href{https://arxiv.org/abs/#2}{#2}%

```

```

3266 \else
3267   \def\@tempb{arXiv}%
3268   \ifx\@tempa\@tempb\relax
3269     arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3270   \else
3271     #1:#2%
3272   \fi
3273 \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.

```

3274 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
3275   \columnseprule\z@ \columnsep 35\p@
3276   \@indextitlestyle
3277   \let\item\@idxitem
3278   \parindent\z@ \parskip\z@\@plus.3\p@\relax
3279   \raggedright
3280   \hyphenpenalty\@M
3281   \footnotesize}

```

3.31 End of Class

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

```

3282 \let\@vspace@orig=\@vspace
3283 \let\@vspacer@orig=\@vspacer
3284 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
3285   only be used to provide space above/below surrounding
3286   objects}}{}{}
3287 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
3288   only be used to provide space above/below surrounding
3289   objects}}{}{}
3290 \let\@vspace@acm=\@vspace
3291 \let\@vspacer@acm=\@vspacer

```

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

```

3292 \let\ACM@origbaselinestretch\baselinestretch
3293 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
3294   \ClassError{\@classname}{An attempt to redefine
3295     \string\baselinestretch\space detected. Please do not do this for
3296     ACM submissions!}\fi}

3297 \normalsize\normalfont\frenchspacing
3298 </class>

```

References

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Change History

1.48	General: Added prologue option to xcolor	48	General: ACM reference format is now mandatory for papers over one page; CCS concepts and keywords are now mandatory for papers over two pages	34
	Bib code cleanup (Zack Weinberg)	34	Authors' addresses are mandatory for journal articles	34
	Documentation update (siggraph)	34		
1.49	General: New journal: DTRAP	34		
1.53	General: New journals: PACMCGIT, TIOT, TDSCI	34	1.69	\vspace: Added the changed command to avoid grouping
	Rearranged docs	34	1.70	General: Name change for TDS
1.54	General: Moved footnote stuff before hyperref call (Ross Moore)	34	1.71	General: Bibliography change: volume for @inproceedings is now in brackets together with series
1.56	General: Documented \Description	34		LuaTeX now uses the OTF versions of fonts
1.57	General: Booktabs package is now the default	34		Retired sigchi and sigchi-a
1.58	General: Changes in samples (Enrico Gregorio)	34	1.75	General: Documentation update
	New journal: HEALTH. TDS is renamed to TDSCI	34	1.78	General: Documentation update: Word count
1.60	\if@ACM@urlbreakonhyphens: introduced macro	35	1.79	General: Updated indormation for TAP, TCPS, TEAC
	General: New option: urlbreakonhyphens	34	1.80	General: Added DLT and FAC
1.62	General: New journal: TELO	34	1.82	General: Updated abbreviations and codes for several journals
1.63	General: New journal: FACMP	34	1.84	General: New journals: JDS, GAMES
	New journal: TQUANT	34	1.85	\@mkauthors: Added: acmengage
1.63a	General: Move: TQUANT to TQC	34		\@mktitle: Added: acmengage
1.64	General: Putting abstract after \maketitle now causes an error	34		\@parfont: Added: acmengage
1.65	General: New journal: DGOV	34		\@printtopmatter: Added: acmengage
1.66	\@mkauthorsaddresses: Added warning for missing addresses	93		\@specialsection: Added: acmengage
	\ccsdesc@parse: Added warning for missing concepts	73		\@subtitlefont: Added: acmengage
	\if@ACM@printacmref: Added warning for longer papers	71		\@titlefont: Added: acmengage
	\keywords: Added warning for missing keywords	70		\ACM@linecountR: Added: acmengage
				\parskip: Added: acmengage
				General: Added CC licenses
				Added: acmengage
				New journal: JRC
				format: New format: acmengage

v1.00	General: First released version	34	v1.06	\@ACM@badge@skip: Added macro . . .	70
v1.01	General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/acmart/issues/1)	34		\@ACM@badge@width: Added macro . . .	70
	Defined ACM colors	34		\@ACM@title@width: Added macro . . .	70
	Explicitly put draft option (closes https://github.com/borisveytsman/acmart/issues/4)	37		\@mktitle@i: Added processing badges	85
	Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/acmart/issues/5)	34		Made generic	85
v1.02	General: Added TOPS and TSC (closes https://github.com/borisveytsman/acmart/issues/12)	34		\@mktitle@ii: Now this macro is obsolete	86
	Documentation changes (closes https://github.com/borisveytsman/acmart/issues/13)	34		\@mktitle@iii: Added processing badges	86
v1.03	\@formatdoi: Added macro	75		Made more generic	86
	\if@ACM@authorversion: Added macro	36		\@mktitle@iv: Made more generic . . .	86
	\maketitle: Added special case of authorversion	79		\@printtopmatter: Added processing badges	82
	General: Added anonsuppress environment	34		\@subtitlefont: Added macro	85
	Added authorversion option (closes https://github.com/borisveytsman/acmart/issues/9)	34		\@titlefont: Added macro	84
v1.04	\acmArticleSeq: Name change by Matthew Fluet	69		\acmBadgeL: Added macro	70
	\acmDOI: Name change by Matthew Fluet	69		\acmBadgeR: Added macro	70
	\acmISBN: Name change by Matthew Fluet	69		\if@ACM@badge: Added macro	70
	General: Updated bibliography for siggraph	34	v1.07	\maketitle: Corrected a bug with abstract footnotes	79
v1.05	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	34		Corrected a bug with permission and footnotes order	79
	Patched \setcitestyle command; closes https://github.com/borisveytsman/acmart/issues/19	34	v1.08	General: SIGPLAN reformatting by Matthew Fluet	34
				Typos corrected (Tobias Pape) . . .	34
			v1.09	General: Revert SIGPLAN caption rules	34
			v1.10	\maketitle: Corrected a bug with doi in manuscript and author version, https://github.com/borisveytsman/acmart/issues/36	79
				General: Changes of 'licensedothergov' wording	73
				standardpagestyle: Reversed folios location	97
			v1.11	General: Customization of ACM theorem styles and proof environment by Matthew Fluet . . .	34
			v1.12	\@marginfigure: Now centering by default	55
				\@marginable: Now centering by default	55
				\@parfont: Moved to \section@raggedright	102

\copyrightpermissionfootnoterule: Added macro	51	\city: Added macro	87
\descriptionlabel: Redefined	57	\country: Added macro	87
\footnoterule: Made shorter	51	\department: Added macro	87
\if@ACM@natbib@override: Added macro	36	\grantnum: Added macro	108
\if@ACM@newfonts: Added macro	52	\grantsponsor: Added macro	108
\maketitle: Moved thankses to copyrightpermission box	79	\if@insideauthorgroup: Introduced macro	66
\section@raggedright: Introduced macro	102	\institution: Added macro	87
General: Added graceful behavior when libertine fonts are absent	52	\num@authorgroups: Renamed	65
Documentation updates	34	\orcid: Introduced macro	67
v1.13		\position: Added macro	87
\empfootnotetext: Made minipage footnotes centered	46	\postcode: Added macro	87
\bibliographystyle: Redefined macro	48	\state: Added macro	87
\bibstyle@acmauthoryear: Added macro	42	\streetaddress: Added macro	87
\bibstyle@acmnumeric: Added macro	42	standardpagestyle: Better handling of anonymous mode	97
\if@ACM@printfolios: Added macro	71	v1.16	
General: Font adjustments for acmsmall	88	\@headfootfont: Added macro	97
Increased font size for ACM Large	39	General: Formatting header/footer (Matthew Fluet)	34
Print bibliographic information by default for the proceedings	72	standardpagestyle: Customize header/footer text font	97
standardpagestyle: Added headers for sigs	97	v1.17	
Expanded headers for sigchi-a	97	\@makefnmark: Redefined	47
Suppressed folios if sig	97	\@mkauthors: TOG now uses the same authors block as other journals	87
v1.14		\@mkauthors@ii: Deleted	90
\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use	42	\@mkbibcitation: Added \nobreak Changed format for sigs	94
\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use	42	\acmArticle: The default is now numerical	69
General: \citestyle updates (Matthew Fluet)	34	\acmMonth: The default must be numerical. Closes #50.	69
Patched \citestyle	40	\acmNumber: The default is now numerical	69
v1.15		\acmVolume: The default is now numerical	69
\@ACM@addtoaddress: Added macro	86	\acmYear: The default is now numerical	69
\@mkauthors@iii: New authors system	90	\description: Decreased indent	57
\@shortauthors: Introduced macro	97	\grantnum: Added url	108
\@typeset@author@bx: Moved to separate macro	90	\grantsponsor: Renamed	108
\acks: Added macro	108	\if@ACM@printacmref: Renamed from \if@ACM@printbib	71
\affiliation: Added code for author groups	67	General: Slightly decreased margins for sigs	49
\author: Added code for author groups	66	standardpagestyle: Added paper title to sigs	97
		v1.18	
		\@mkauthors@i: Now we andify affiliations	89
		\@typeset@author@line: Added macro	88

General: Natbib is now the default for all formats	34	Bibtex style now recognizes https:// in doi	34
v1.19		Switched to T1: looks like libertine has problems with \l in OT1 . . .	52
\mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet) .	94	Updated IMWUT and PACMPL . .	58
\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet)	108	v1.31	
General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	34	\@additionalaffiliation: Added macro	67
Include 'References' in PDF bookmarks (Matthew Fluet)	40	\mkbibcitation: Disabled linebreak	94
v1.20		\@startsection: Added \tochangmeasure	44
\mkabstract: Deleted spurious space	94	Redefined macro	46
General: Bug fixes for bst	34	\@textbottom: Redefined	51
v1.21		\acmMonth: The default now is the current month (Matteo Riondato)	69
\showeprint: Added macro	108	\acmYear: The default now is the current year (Matteo Riondato) . .	69
v1.22		\additionalaffiliation: Added macro	67
General: More bibliography changes for Aptara	34	\l@section: Redefined macro . .	46
v1.23		\l@subsection: Redefined macro	46
General: Add PACMPL journal option	34	General: Documentation changes . . .	34
v1.24		v1.32	
General: Add IMWUT journal option	58	\@formatdoi: New doi format	75
v1.25		General: Added POMACS journal option	34
General: Updated PACMPL	58	Format siggraph is now obsolete .	34
v1.26		v1.33	
General: Corrected \shortcite bug .	34	\@ACM@addtoaddress: Added obeypunctuation code	86
Documentation typos fixed (thanks to Stephen Spencer)	34	\mkauthors@i: Added obeypunctuation code	89
v1.27		\mkauthors@iii: Added obeypunctuation code	90
\if@ACM@printccs: Typo corrected .	71	\mkauthors@iv: Added obeypunctuation code	92
v1.28		\@subtitlefont: Added \normalsize	85
\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato)	72	\ACM@linecountL: Renamed macro .	96
General: Corrected option natbib behavior	42	\ACM@linecountR: Added macro . . .	96
Got rid of warnings in pdf keywords	47	\ACM@timestamp: Added current page number	96
v1.29		Added macro (Michael D. Adams) .	96
\mkabstract: Removed spurious indentation (John Wickerson) . . .	94	Added submission id	96
\ccsdesc@parse: Add spacing after bullet and around rightrightarrow; semicolon separators no longer in bold/italic (John Wickerson)	72	\acmSubmissionID: Added macro . .	69
General: Increased head to 13pt	49	\city: Added obeypunctuation code	87
standardpagestyle: Corrected printfolios (Matthew Fluet)	97	\country: Added obeypunctuation code	87
v1.30		\department: Added obeypunctuation code	87
\department: Added optional parameter	87	\if@ACM@affiliation@obeypunctuation: Added macro	67
General: Added \frenchspacing . . .	109	\if@ACM@authordraft: Added macro	37

\if@ACM@natbib@override: Deleted macro	36	v1.35	\bibstyle@acmauthoryear: Square brackets for author-year style . . .	42
\if@ACM@timestamp: Added macro (Michael D. Adams)	37		General: BibTeX bug fixed: et al. . . .	34
\institution: Added obeypunctuation code	87		If the copyright is set to usgov or rightsretained, the price is suppressed	73
\maketitle: Fixed the bug with figures on top and bottom of the title page, thanks to David Epstein	79	v1.36	\@ACM@authorsperrrow: Added macro	71
\position: Added obeypunctuation code	87		\@mkauthors@iii: Added authorsperrrow override	90
\postcode: Added obeypunctuation code	87		\@mkauthors@iv: Added authorsperrrow override	92
\state: Added obeypunctuation code	87		\if@ACM@authordraft: Corrected typo, thanks to bargteil	37
\streetaddress: Added obeypunctuation code	87		General: Added PACMHCI journal options	58
General: Added acmart-preload-hook	34		Added the possibility to adjust number of author boxes per row in conference formats	34
Added cmap and glyptounicode	52			
BibTeX comma before articleno bug corrected	34	v1.37	\description: Reduce list indentation (Matthew Fluet)	57
BibTeX crossref bug corrected	34		\descriptionlabel: Reduce list indentation (Matthew Fluet)	57
BibTeX numpages bug corrected	34		\normalparindent: Set \normalparindent (Matthew Fluet)	51
Documentation updates	34		General: Reduce list indentation (Matthew Fluet)	57
Moved \citename definition for non-natbib bibliography, so a package may redefine it	48		Set \normalparindent; Reduce list indentation (Matthew Fluet)	34
Switched to Type 1 fonts for libertine even if OTF-capable engine is used (Kai Mindermann)	52	v1.38	General: Increase default font size for SIGPLAN	34, 39
firstpagestyle: Added right linecount for two-column formats	99	v1.39	\@@authornotemark: Added macro	93
Added timestamp (Michael D. Adams)	99		\authornotemark: Added macro	69
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