

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

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2026/05/31, v2.18

Abstract

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

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1 Introduction

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

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

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

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

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

2 User's guide

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

2.1 Installation

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

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

¹<http://www.acm.org/>

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

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

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

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

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

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

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

2.2 Invocation and options

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

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

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

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

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

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

Table 1: The possible values for the format option

Value	Meaning
manuscript	A manuscript. This is the default.
acmsmall	Small single-column format. Used for ACMJCSS, ACMJDS, AILET, CIE, CSUR, FAC, GAMES, JACM, JATS, JDIQ, JDS, JEA, JERIC, JETC, JRC, PACMCGIT, PACMHCI, PACMMOD, PACMNET, PACMPL, PACMSE, POMACS, TAAS, TACCESS, TACO, TAIS, TAISAP, TALG, TALLIP (formerly TALIP), TCPS, TDS, TEAC, TECS, TELO, THRI, TIIS, TIOT, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPML, TOPS, TORS, TOS, TOSEM, TOSN, TQC, TRET, TSAS, TSC, TSLP, and TWEB, including special issues.
acmlarge	Large single-column format. Used for DLT, DTRAP, HEALTH, IMWUT, JOCCH, and TAP, including special issues.
acmtog	Large double-column format. Used for TOG, including annual conference Technical Papers.
sigconf	Proceedings format for most ACM conferences (with the exception of SIGPLAN) and all ICPS volumes.
sigplan	Proceedings format for SIGPLAN conferences.
acmengage	ACM EngageCSEdu Course materials.
acmcp	ACM cover page.

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

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

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

Sometimes conference proceedings are published as a special issue (or issues) of an ACM journal. In this case, you should use the journal format. The templates `sample-acmsmall-conf.tex` and `sample-acmtog-conf.tex` show how to enter conference information. Note that you need to comment out `\acmJournal{...}` line for such papers to get the conference information in the footers and headers.

Starting in 2020, ACM retired formats `sigchi` and `sigchi-a`. SIGCHI conferences now use `sigconf` format for their publications. If a file uses `sigchi` format, a warning is issued, and the format is automatically switched to `sigconf`. Format `sigchi-a` can be used for non-ACM documents only (see Section 2.23). The format `acmcp` is used for ACM cover pages discussed in Section 2.5.

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

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

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

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

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

The option `natbib` is used when the corresponding \LaTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.15.

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

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

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

The option `balance` determines whether the last page in the two column mode has balanced columns. By default it is `true`; however, it may lead to problems for some documents. When there are many figures near the end of the document, the attempts to balance columns may lead to the loss of the figures. Set this option to `false` if you encounter problems. An alternative is the (experimental) option `pbalance`, which uses the new package `pbalance`. You may want to try `pbalance=true` to see if you get better results.

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

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

2.3 Top matter

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

This class internally loads the `amsart` class, so many top-matter commands are inherited from `amsart` [2].

`\acmJournal` The macro `\acmJournal{\shortName}` sets the name of the journal or transaction for journals and transactions. The argument is the short name of the publication *in uppercase*, for example,

```
\acmJournal{TOMS}
```

Table 2: Boolean options

Option	Default	Meaning
review	false	A review version: lines are numbered and hyperlinks are colored
screen	see text	A screen version: hyperlinks are colored
natbib	true	Whether to use the natbib package (see Section 2.15)
anonymous	false	Whether to make author(s) anonymous
authorversion	false	Whether to generate a special version for the authors' personal use or posting (see Section 2.3)
nonacm	false	Use the class typesetting options for a non-ACM document, which will not include the conference/journal header and footers. Currently such documents allow only a Creative Commons license.
timestamp	false	Whether to put a time stamp in the footer of each page
authordraft	false	Whether author's-draft mode is enabled
acmthm	true	Whether to define theorem-like environments, see Section 2.11
balance	true	Whether to balance the last page in two column mode
pbalance	false	Whether to balance the last page in two column mode using pbalance package
urlbreakonhyphens	true	Whether to break urls on hyphens

The currently recognized journals are listed in Table 5. Note that conference proceedings published in *book* form do not set this macro.

`\acmConference` The macro `\acmConference[<short name>]{<name>}{<date>}{<venue>}` is used for conference proceedings published in the book form. The arguments are the following:

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

name: the name of the conference.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

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

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

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

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

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

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

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

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

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

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

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

`\subtitle` Besides title, ACM classes allow a subtitle, set with the `\subtitle{<subtitle>}` macro. The commands for specifying authors are highly structured. The reason is they serve double duty: the authors' information is typeset in the manuscript *and* is used by the metadata extraction tools for indexing and cataloguing. Therefore it is very important to follow the guidelines exactly.

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

`\affiliation`

`\email`

```

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

```

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

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

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

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

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

```

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

```

Similarly you can repeat the `\email` command.

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

```

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

```

```

\affiliation{...}
\affiliation{...}
\email{...}

```

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

```

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

```

However, this format is not generally recommended.

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

```

\author{G. Tobin}
\author{Ben Trovato}
\additionalaffiliation{%
  \institution{The Th{ö}rv{a}ld Group}
  \city{Hekla}
  \country{Iceland}}
\affiliation{%
  \institution{Institute for Clarity in Documentation}
  \city{Dublin}
  \state{Ohio}}

```

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

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

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

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

An example of the author block:

```

\author{A. U. Thor}
\orcid{1234-4564-1234-4565}
\affiliation{%
  \institution{University of New South Wales}
}

```

```

\department{School of Biomedical Engineering}
\city{Sidney}
\state{NSW}
\country{Australia}}
\email{author@nsw.au.edu}
\author{A. N. Other}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}
\author{C. O. Respondent}
\orcid{1234-4565-4564-1234}
\affiliation{%
  \institution{University of Pennsylvania}
  \city{Philadelphia}
  \state{PA}
  \country{USA}}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}

```

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

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

```

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

```

and

```

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

```

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

`\thanks` Like `amsart` (and unlike standard \LaTeX), we allow `\thanks` only *outside* of the commands `\title` and `\author`. This command is obsolete and should *not* be used in most

cases. Do not list your acknowledgments or grant sponsors here. Put this information in the acks environment (see Section 2.14).

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

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

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

`\titlenote` While the command `\thanks` generates a note without a footnote mark, sometimes
`\subtitlenote` the authors might need notes more tightly connected to the title, subtitle or author. The
`\authornote` commands `\titlenote`, `\subtitlenote` and `\authornote` that follow the 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 confuses the metadata extraction software. (Actually these commands now produce errors.)

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

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

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

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

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

`\acmMonth{3}`

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

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

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

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

```
\acmSubmissionID{123-A56-BU3}
```

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

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

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

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

```
\acmDOI{10.1145/9999997.9999999}
```

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

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

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

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

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

`\keywords` The command `\keywords{<keyword, keyword,...>}` sets keywords for the article. Note that ACM now considers keywords obsolete and phases them out. If present, keywords must be separated by commas, for example,

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

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

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

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

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

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

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

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

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

Table 3: Parameters for the `\setcopyright` command

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

(see <https://creativecommons.org/licenses/> for the explanation). This command should be used in the preamble only.

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

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

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

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

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

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

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

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

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

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

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

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

Table 4: Settings for the `\settopmatter` command

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

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

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

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

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

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

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

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

2.4 Top matter of ACM Engage materials

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

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

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

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

2.5 ACM cover page

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

There are several top matter commands specific for this format.

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

```
\acmArticleType{Review}
```

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

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

You may repeat these commands if you have several repositories.

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

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

ACM cover page should have the following obligatory sections:

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

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

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

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

2.6 Internationalization

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

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

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

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

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

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

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

`\translatedtitle` The commands `\translatedtitle`, `\translatedsubtitle`, and (if keywords are
`\translatedsubtitle` used) `\translatedkeywords` have two mandatory arguments each: `{\langle language \rangle}` and
`\translatedkeywords` `{\langle keywords \rangle}`. They are used to set title, subtitle and keywords in the secondary language. For example, a paper in English with French title and abstract may set

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

while a paper in French should set

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

`translatedabstract (env.)` Similarly, `translatedabstract` environment has a mandatory `language` argument, for example,

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

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

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

2.7 Tagging

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

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

```
\DocumentMetadata{
  lang          = en,
  pdfstandard   = ua-2,
  pdfstandard   = a-4f,
  tagging=on,
  tagging-setup={math/setup=mathml-SE}
}
```

You must use `lualatex` to make the document fully tagged.

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

2.8 Algorithms

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

2.9 Figures and tables

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

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

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

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

teaserfigure: a special figure before `\maketitle`.

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

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

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

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

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

```
\begin{table}
\caption{Simulation Configuration}
\label{tab:conf}
\begin{minipage}{\columnwidth}
\begin{center}
\begin{tabular}{ll}
\toprule
TERRAIN\footnote{This is a table footnote. This is a
table footnote. This is a table footnote.} &
(200\,m$\times$200\,m) Square\\
Node Number & 289\\
Node Placement & Uniform\\
Application & Many-to-Many/Gossip CBR Streams\\
Payload Size & 32 bytes\\
Routing Layer & GF\\
MAC Layer & CSMA/MMSN\\
Radio Layer & RADIO-ACCNOISE\\
Radio Bandwidth & 250Kbps\\
Radio Range & 20m--45m\\
\bottomrule
\end{tabular}
\end{center}
\bigskip
\footnotesize\emph{Source:} This is a table
sourcenote. This is a table sourcenote. This is a table
sourcenote.

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

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

2.10 Descriptions of images

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

There are two ways to include descriptions in the figures.

`\Description` The old way, that predates L^AT_EX tagging project is based on the `\Description` command. The command `\Description[<short description>]{<long description>}` should be placed inside every figure, `teaserfigure` or `marginfigure` environment to provide a

description of the image(s) used in the figure. Unlike `\caption`, which is used alongside the image, `\Description` is intended to be used instead of the image, for example,

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

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

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

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

2.11 Theorems

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

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

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

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

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

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

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

```
\newtheorem{theorem}{Theorem}[section]
\newtheorem{lemma}[theorem]{Lemma}
% Theorems and lemmas share counters
```

```

...
\begin{theorem}\label{thm:test} % This is a theorem
...
\begin{lemma}\label[lemma]{test-lemma} % This is a lemma

```

2.12 Online-only and offline-only material

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

```

\section{Supplementary materials}

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

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

```

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

2.13 Note about anonymous mode

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

```

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

```

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

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

```

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

```

2.14 Acknowledgments

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

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

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

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

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

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

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

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

Example:

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

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

2.15 Bibliography

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

2.15.1 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. You can use these commands to produce in-text citations, for example,

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

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

2.15.2 URL, DOI, eprint

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

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

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

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

or other service. In this case the field `archived` will give the reference of the archival version. Examples:

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

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

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

2.15.3 Special entry types

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

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

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

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

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

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

```
@online{Obama08,
```

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

```
url = {https://www.academia.edu/6884962/}
}
```

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

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

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

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

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

2.15.4 Dates and sorting

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

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

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

A note about sorting. The current ACM bibliography styles always sort the entries according to authors names and publication year. There is a controversy about sorting

names with “von” or “van” part: should Ludwig van Beethoven be sorted under “V” or under “B”? The American practice is to use “van” in sorting, i.e. to file van Beethoven under “V”. However, some authorities recommend to sort Dutch persons according to their last names (see e.g. <https://www.ifla.org/files/assets/cataloguing/pubs/names-of-persons-1996.pdf>). While I do not want to take a part in this dispute, I would like to point to the old “noopsort” trick by Oren Patashnik. Add to the .bib file the line

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

and then encode the author as

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

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

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

2.15.5 Processing using Bib_{La}T_EX

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

There are a few key differences in how the _{La}T_EX sources are set up when using Bib_{La}T_EX instead of Bib_TE_X, that we summarize briefly here (please refer to the official Bib_{La}T_EX documentation for more details).

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

Then, in the preamble of your document you need to load the Bib_{La}T_EX package and select the appropriate bibliography style, as follows

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

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

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

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

Look at the `sample-*-biblatex.tex` files that can be found in the `samples` directory after running `make` for templates showcasing these Bib_{La}T_EX styles.

2.15.6 Manual bibliography

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

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

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

2.16 Colors

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

The ACM provides the following recommendation on color use.

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

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

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

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

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

2.17 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

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

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

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

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

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

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

2.18 Counting words

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

2.19 Disabled or forbidden commands

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

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

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

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

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

2.20 Notes for wizards

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

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

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

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

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

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

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

you will pass `dvipsnames` to `xcolor`.

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

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

2.21 Currently supported publications

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

Abbreviation	Publication
ACMJCSS	ACM Journal on Computing and Sustainable Societies
ACMJDS	ACM Journal of Data Science
AILET	ACM AI Letters

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

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

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

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

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

2.22 Samples

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

Here is the list of the samples:

manuscript: A proceedings paper in the manuscript format.

acmsmall: A journal paper in the acmsmall format.

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

acmlarge: A journal paper in the acmlarge format.

acmtog: A journal paper in the acmtog format.

sigconf: A proceedings paper in the standard sigconf format.

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

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

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

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

sigplan: A proceedings paper in the sigplan format.

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

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

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

acmengage: A sample of ACM Engage publication.

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

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

2.23 A note about sigchi-a format

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

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

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

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

sidebar: textual information in the margin,

marginfigure: a figure in the margin,

marginfigure: a table in the margin.

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

The horizontal sizes of figures are:

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

3 Implementation

3.1 Identification

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

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class&!tagged>\ProvidesClass{acmart}
6 <tagged>\ProvidesClass{acmart-tagged}
7 [2026/05/31 v2.18 Typesetting articles for the Association for Computing Machinery]
```

And the driver code:

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

3.2 Preload hook

We preload acmart-preload-hook:

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

3.3 Tagging and old package

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

```
\IfDocumentMetadata
20 \providecommand{\IfDocumentMetadataTF}{\@secondoftwo}
31 \providecommand{\IfDocumentMetadataT}{\@gobble}
32 \providecommand{\IfDocumentMetadataF}{\@firstofone}
```

3.4 Options

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

```
33 \RequirePackage{xkeyval}
```

We use xstring to check whether user input is valid

```
34 \RequirePackage{xstring}
```

We need iftex to check the engine

```
35 \RequirePackage{iftex}
```

format The possible formats

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

\if@ACM@screen Whether we use screen mode

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

\if@ACM@urlbreakonhyphens

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

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

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

```

72 \if@ACM@acmthm
73   \PackageInfo{\@classname}{Requiring acmthm}%
74 \else
75   \PackageInfo{\@classname}{Suppressing acmthm}%
76 \fi}{\PackageError{\@classname}{The option acmthm can be either true or
77   false}}
78 \ExecuteOptionsX{acmthm=true}

\if@ACM@review Whether we use review mode
79 \define@boolkey+{\@classname.cls}[@ACM@]{review}[true]{%
80   \if@ACM@review
81     \PackageInfo{\@classname}{Using review mode}%
82     \AtBeginDocument{\@ACM@printfoliostrue}%
83   \else
84     \PackageInfo{\@classname}{Not using review mode}%
85   \fi}{\PackageError{\@classname}{The option review can be either true or
86     false}}
87 \ExecuteOptionsX{review=false}

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

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

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

\if@ACM@pbalance Whether to balance the last page
112 \define@boolkey+{\@classname.cls}[@ACM@]{pbalance}[true]{}%
113 \PackageError{\@classname}{The option pbalance can be either true or
114   false}}
115 \ExecuteOptionsX{pbalance=false}

```

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

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

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

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

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

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

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

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

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

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

```
150 % \changes{v1.87}{2022/08/27}{Added fontsize 8pt}
151 \def\ACM@fontsize{}
152 \DeclareOptionX{8pt}{\edef\ACM@fontsize{\CurrentOption}}
153 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
154 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
155 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
156 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}
```

\ACM@languages The languages of the document

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

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

3.5 Setting switches

\if@ACM@manuscript Whether we use manuscript mode

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

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

```
167 \newif\if@ACM@journal
```

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

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

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

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

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

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

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

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

\if@ACM@acmcp ACM cover page formatting

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

Setting up switches

```
175 \ifnum\ACM@format@nr=5\relax % siggraph
176 \ClassWarning{\@classname}{%
177   The format siggraph is now obsolete.\MessageBreak
178   I am switching to sigconf.}
179 \setkeys{\@classname.cls}{format=sigconf}
180 \fi
181 \ifnum\ACM@format@nr=7\relax % sigchi
182 \ClassWarning{\@classname}{%
183   The format sigchi is now obsolete.\MessageBreak
184   I am switching to sigconf.}
185 \setkeys{\@classname.cls}{format=sigconf}
```

```

186 \fi
187 \ifnum\ACM@format@nr=8\relax % sigchi
188 \ClassWarning{\@classname}{%
189   ACM SIGCHI has retired the SIGCHI-A template\MessageBreak
190   effective immediately. ACM is keeping this template\MessageBreak
191   option available to authors who are working on legacy\MessageBreak
192   documents only. ACM will not, under any circumstances,\MessageBreak
193   accept documents in this format for publication and\MessageBreak
194   will not offer technical support to the authors who use\MessageBreak
195   this template.\MessageBreak
196   ACM SIGCHI is directing Conference leaders and\MessageBreak
197   authors to publish their articles using the SIGCONF\MessageBreak
198   template call.}
199 \fi
200 \ifnum\ACM@format@nr=0\relax
201   \@ACM@manuscripttrue
202 \else
203   \@ACM@manuscriptfalse
204 \fi
205 \@ACM@sigchiamodefalse
206 \ifcase\ACM@format@nr
207 \relax % manuscript
208   \@ACM@journaltrue
209 \or % acsmall
210   \@ACM@journaltrue
211 \or % acmlarge
212   \@ACM@journaltrue
213 \or % acmtog
214   \@ACM@journaltrue
215   \@ACM@journal@bibstrip@or@togtrue
216 \or % sigconf
217   \@ACM@journalfalse
218 \or % siggraph
219   \@ACM@journalfalse
220 \or % sigplan
221   \@ACM@journalfalse
222 \or % sigchi
223   \@ACM@journalfalse
224 \or % sigchi-a
225   \@ACM@journalfalse
226   \@ACM@sigchiamodetrue
227 \or % acmengage
228   \@ACM@journalfalse
229   \@ACM@engagetrue
230 \or % acmcp
231   \@ACM@journaltrue
232   \@ACM@acmcptrue
233   \AtBeginDocument{\@ACM@printacmreffalse}%
234 \fi
235 \if@ACM@journal
236   \@ACM@journal@bibstriptrue
237   \@ACM@journal@bibstrip@or@togtrue
238 \else
239   \@ACM@journal@bibstripfalse

```

```
240 \fi
```

3.6 Loading the base class and package

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

```
\@startsection@kernel
```

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

```
\@xsect@kernel
```

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

```
\@sect@kernel
```

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

```
\@ssect@kernel
```

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

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

```
245 \ifx\ACM@fontsize\empty
246   \ifcase\ACM@format@nr
247     \relax % manuscript
248     \def\ACM@fontsize{9pt}%
249     \or % acmsmall
250     \def\ACM@fontsize{10pt}%
251     \or % acmlarge
252     \def\ACM@fontsize{10pt}%
253     \or % acmtog
254     \def\ACM@fontsize{9pt}%
255     \or % sigconf
256     \def\ACM@fontsize{9pt}%
257     \or % siggraph
258     \def\ACM@fontsize{9pt}%
259     \or % sigplan
260     \def\ACM@fontsize{10pt}%
261     \or % sigchi
262     \def\ACM@fontsize{9pt}%
263     \or % sigchi-a
264     \def\ACM@fontsize{10pt}%
265     \or % acmengage
266     \def\ACM@fontsize{10pt}%
267     \or % acmcp
268     \def\ACM@fontsize{9pt}%
269   \fi
270 \fi
```

```
271 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
272 \LoadClass[\ACM@fontsize, reqno]{amsart}
273 \RequirePackage{microtype}
```

We need etoolbox for delayed code

```
274 \RequirePackage{etoolbox}
```

Booktabs is now the default

```
275 \RequirePackage{booktabs}
```

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

```
276 \RequirePackage{refcount}
277 \RequirePackage{totpages}
```

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

```
278 \RequirePackage{environ}
```

We use `setspace` for double spacing

```
279 \if@ACM@manuscript
280 \RequirePackage{setspace}
281 \onehalfspacing
282 \fi
```

We no longer need `textcase` for better upcasing.

```
283 % \RequirePackage{textcase}

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

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

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

3.7 Citations

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

```
290 \if@ACM@natbib
291   \RequirePackage{natbib}
292   \renewcommand{\bibsection}{%
293     \section*{\refname}%
294     \phantomsection\addcontentsline{toc}{section}{\refname}%
295   }
296   \renewcommand{\bibfont}{\bibliofont}
297   \renewcommand{\setcitestyle}[1]{
298     \@for\@tempa:=#1\do
299     {\def\@tempb{round}\ifx\@tempa\@tempb
300       \renewcommand\NAT@open{(\}\renewcommand\NAT@close{)}\fi
301       \def\@tempb{square}\ifx\@tempa\@tempb
302         \renewcommand\NAT@open{[\}\renewcommand\NAT@close{]}\fi
303       \def\@tempb{angle}\ifx\@tempa\@tempb
304         \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
305       \def\@tempb{curly}\ifx\@tempa\@tempb
306         \renewcommand\NAT@open{\{\}\renewcommand\NAT@close{\}}\fi
307       \def\@tempb{semicolon}\ifx\@tempa\@tempb
308         \renewcommand\NAT@sep{;}\fi
309       \def\@tempb{colon}\ifx\@tempa\@tempb
310         \renewcommand\NAT@sep{;}\fi
311       \def\@tempb{comma}\ifx\@tempa\@tempb
312         \renewcommand\NAT@sep{,}\fi
```

```

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

```

```

367   \fi
368 }%
369 \fi

```

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

```

370 \newcommand{\bibstyle@acmauthoryear}{%
371   \setcitestyle{%
372     authoryear,%
373     open={},close={},citesep={;},%
374     aysep={},yysep={},,%
375     notesep={, }}

```

`\bibstyle@acmnumeric` The default numeric format:

```

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

```

The default is numeric:

```

381 \if@ACM@natbib
382 \citestyle{acmnumeric}
383 \fi

```

3.8 Internationalization

```

384 \if@ACM@journal
385   \renewcommand\keywordsname{Additional Key Words and Phrases}%
386 \else
387   \renewcommand\keywordsname{Keywords}%
388 \fi
389 \if@ACM@engage
390   \renewcommand\abstractname{Synopsis}%
391 \fi
392 \ifx\ACM@languages\@empty
393 \else
394   \RequirePackage[\ACM@languages]{babel}%
395   \addto\captionsenglish{%
396     \if@ACM@journal
397       \renewcommand\keywordsname{Additional Key Words and Phrases}%
398     \else
399       \renewcommand\keywordsname{Keywords}%
400     \fi
401     \renewcommand\acksname{Acknowledgements}%
402     \if@ACM@engage
403       \renewcommand\abstractname{Synopsis}%
404     \fi
405   }%
406   \addto\captionsfrench{%
407     \if@ACM@journal
408       \renewcommand\keywordsname{Mots Clés et Phrases Supplémentaires}%
409     \else
410       \renewcommand\keywordsname{Mots clés}%
411     \fi

```

```

412     \renewcommand\acksname{Remerciements}%
413 }%
414 \addto\captionsspanish{%
415     \if@ACM@journal
416         \renewcommand\keywordsname{Zusätzliche Schlagwörter und Phrasen}%
417     \else
418         \renewcommand\keywordsname{Schlagwörter}%
419     \fi
420     \renewcommand\acksname{Danksagungen}%
421 }%
422 \addto\captionsspanish{%
423     \if@ACM@journal
424         \renewcommand\keywordsname{Palabras y Frases Claves Adicionales}%
425     \else
426         \renewcommand\keywordsname{Palabras claves}%
427     \fi
428     \renewcommand\acksname{Expresiones de gratitud}%
429 }%
430 \fi

```

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

```

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

```

\@translatedtitle

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

\translatedtitle The title of the paper in a different language

```

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

```

\@translatedsubtitle

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

\translatedsubtitle The subtitle of the paper in a different language

```

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

```

\@translatedkeywords

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

\translatedkeywords Add keywords to the paper in the language specified

```

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

```

`\@translatedabstracts` The container for translated abstracts.

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

`translatedabstract` We save translated abstracts into `\@translatedabstracts`

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

`\@savetranslatedabstract` And saving the abstract

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

3.9 Sectioning

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

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

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

```
469 \def\@starttoc#1#2{\begingroup\makeatletter
470   \setTrue{#1}%
471   \par\removelastskip\vskip\z@skip
472   \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
473     {.5\linespacing}{\centering\contentsnamefont}{#2}%
474   \@input{\jobname.#1}%
475   \if@filesw
476     \xp@newwrite\csname tf@#1\endcsname
477     \immediate\xp@openout\csname tf@#1\endcsname \jobname.#1\relax
478   \fi
479   \global\@nobreakfalse \endgroup
480   \addvspace{32\p@\@plus14\p@}%
481 }
```

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

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

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

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

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

```
484 \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

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

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

```
486 \if@ACM@sigchiamode
487 \long\def\@footnotetext#1{\marginpar{%
488   \reset@font\small
489   \interlinepenalty\interfootnotelinepenalty
490   \protected@edef\@currentlabel{%
491     \csname p@footnote\endcsname\@thefnmark
492   }%
493   \color@begingroup
494     \@makefnmark{%
495       \rule{z@footnotesep}{\ignorespaces#1\@finalstrut\strutbox}%
496     \color@endgroup}}%
497 \fi
```

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

```
498 \long\def\@mpfootnotetext#1{%
499   \global\setbox\@mpfootins\vbox{%
500     \unvbox\@mpfootins
501     \reset@font\footnotesize
502     \hsize\columnwidth
503     \@parboxrestore
504     \protected@edef\@currentlabel
505       {\csname p@mpfootnote\endcsname\@thefnmark}%
506     \color@begingroup\centering
507       \@makefnmark{%
508         \rule{z@footnotesep}{\ignorespaces#1\@finalstrut\strutbox}%
509       \color@endgroup}}
```

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

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

3.10 Hyperxmp and hyperref

Adding hyperref

```
511 \let\@footnotemark@nolink\@footnotemark
512 \let\@footnotetext@nolink\@footnotetext
513 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
514 \RequirePackage{hyperxmp}
515 \pdfstringdefDisableCommands{%
516   \def\addtocounter#1#2{%
517     \def\unskip{}%
518     \def\textbullet{- }%
519     \def\texttrightarrow{ -> }%
520     \def\footnotemark{}%
521   }
522 \urlstyle{rm}
523 \ifcase\ACM@format@nr
524 \relax % manuscript
```

```

525 \or % acmsmall
526 \or % acmlarge
527 \or % acmtog
528 \or % sigconf
529 \or % siggraph
530 \or % sigplan
531 \urlstyle{sf}
532 \or % sigchi
533 \or % sigchi-a
534 \urlstyle{sf}
535 \or % acmengage
536 \or % acmcp
537 \fi
538 \AtEndPreamble{%
539   \if@ACM@urlbreakonhyphens
540     \def\do@url@hyp{\do\~}%
541   \fi
542   \if@ACM@screen
543     \hypersetup{colorlinks,
544       linkcolor=ACMPurple,
545       citecolor=ACMPurple,
546       urlcolor=ACMDarkBlue,
547       filecolor=ACMDarkBlue}
548   \else
549     \hypersetup{hidelinks}
550   \fi
551   \hypersetup{pdflang={en},
552     pdfdisplaydoctitle}}
  Bibliography mangling.
553 \if@ACM@natbib
554   \let\cite\cite
555   \let\cite\citep
556   \let\citeANP\citeauthor
557   \let\citeNN\citeyearpar
558   \let\citeyearNP\citeyear
559   \let\citeNP\citealt
560   \DeclareRobustCommand\citeA
561     {\begingroup\NAT@swafalse
562       \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
563   \providecommand\newblock{}%
564 \else
565   \AtBeginDocument{%
566     \let\shortcite\cite%
567     \providecommand\citename[1]{#1}}
568 \fi
569 \newcommand\shortcite[2][]{%
570   \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 \TeX definition:

```

571 \def\bibliographystyle#1{%
572   \ifx\@begindocumenthook\@undefined\else
573     \expandafter\AtBeginDocument

```

```

574 \fi
575 {\if@filesw
576 \immediate\write\auxout{\string\bibstyle{#1}}%
577 \fi}}

```

3.11 Other packages

Graphics and color.

```

578 \RequirePackage{graphicx}
579 \RequirePackage[prologue]{xcolor}

We define ACM colors according to [8]:
580 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
581 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
582 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
583 \definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
584 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
585 \definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
586 \definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
587 \definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}

```

Author-draft mode or sigchi-a mode

```

588 \if@ACM@authordraft
589 \RequirePackage{draftwatermark}
590 \SetWatermarkFontSize{0.5in}
591 \SetWatermarkColor[gray]{.9}
592 \SetWatermarkText{\parbox{12em}{\centering
593     Unpublished working draft.\
594     Not for distribution.}}
595 \else
596 \if@ACM@sigchiamode
597 \if@ACM@nonacm\else
598 \RequirePackage{draftwatermark}
599 \SetWatermarkFontSize{0.5in}
600 \SetWatermarkColor[gray]{.9}
601 \SetWatermarkText{\parbox{12em}{\centering
602     Legacy document. \
603     Not for publication in an ACM venue}}
604 \fi
605 \fi
606 \fi

```

3.12 Paper size and paragraphing

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

```

607 \RequirePackage{geometry}
608 \ifcase\ACM@format@nr
609 \relax % manuscript
610 \geometry{letterpaper,head=13pt,
611     marginparwidth=6pc,heightrounded}%
612 \or % acmsmall
613 \geometry{twoside=true,

```

```

614     includeheadfoot, head=13pt, foot=2pc,
615     paperwidth=6.75in, paperheight=10in,
616     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
617     marginparwidth=2pc,heightrounded
618 }%
619 \or % acmlarge
620 \geometry{twoside=true, head=13pt, foot=2pc,
621     paperwidth=8.5in, paperheight=11in,
622     includeheadfoot,
623     top=78pt, bottom=114pt, inner=81pt, outer=81pt,
624     marginparwidth=4pc,heightrounded
625 }%
626 \or % acmtog
627 \geometry{twoside=true, head=13pt, foot=2pc,
628     paperwidth=8.5in, paperheight=11in,
629     includeheadfoot, columnsep=24pt,
630     top=52pt, bottom=75pt, inner=52pt, outer=52pt,
631     marginparwidth=2pc,heightrounded
632 }%
633 \or % sigconf
634 \geometry{twoside=true, head=13pt,
635     paperwidth=8.5in, paperheight=11in,
636     includeheadfoot, columnsep=2pc,
637     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
638     marginparwidth=2pc,heightrounded
639 }%
640 \or % siggraph
641 \geometry{twoside=true, head=13pt,
642     paperwidth=8.5in, paperheight=11in,
643     includeheadfoot, columnsep=2pc,
644     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
645     marginparwidth=2pc,heightrounded
646 }%
647 \or % sigplan
648 \geometry{twoside=true, head=13pt,
649     paperwidth=8.5in, paperheight=11in,
650     includeheadfoot=false, columnsep=2pc,
651     top=1in, bottom=1in, inner=0.75in, outer=0.75in,
652     marginparwidth=2pc,heightrounded
653 }%
654 \or % sigchi
655 \geometry{twoside=true, head=13pt,
656     paperwidth=8.5in, paperheight=11in,
657     includeheadfoot, columnsep=2pc,
658     top=66pt, bottom=73pt, inner=54pt, outer=54pt,
659     marginparwidth=2pc,heightrounded
660 }%
661 \or % sigchi-a
662 \geometry{twoside=false, head=13pt,
663     paperwidth=11in, paperheight=8.5in,
664     includeheadfoot, marginparsep=72pt,
665     marginparwidth=170pt, columnsep=20pt,
666     top=72pt, bottom=72pt, left=314pt, right=72pt
667 }%

```

```

668 \mparswitchfalse
669 \reversemarginpar
670 \or % acmengage
671 \geometry{twoside=true, head=13pt,
672   paperwidth=8.5in, paperheight=11in,
673   includeheadfoot, columnsep=2pc,
674   top=57pt, bottom=73pt, inner=54pt, outer=54pt,
675   marginparwidth=2pc,heightrounded
676   }%
677 \or % acmcp
678 \geometry{twoside=true,
679   includeheadfoot, head=13pt, foot=2pc,
680   paperwidth=6.75in, paperheight=10in,
681   top=58pt, bottom=44pt, inner=46pt, outer=46pt,
682   marginparwidth=2pc,heightrounded
683   }%
684 \fi

```

\parindent Paragraphing

```

\parskip 685 \setlength\parindent{10\p@}
686 \setlength\parskip{\z@}
687 \ifcase\ACM@format@nr
688 \relax % manuscript
689 \or % acmsmall
690 \or % acmlarge
691 \or % acmtog
692 \setlength\parindent{9\p@}%
693 \or % sigconf
694 \or % siggraph
695 \or % sigplan
696 \or % sigchi
697 \or % sigchi-a
698 \or % acmengage
699 \or % acmcp
700 \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.

```
701 \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.

```

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

```

```

704 \RequirePackage{manyfoot}
705 \SelectFootnoteRule[2]{copyrightpermission}
706 \DeclareNewFootnote{authorsaddresses}
707 \SelectFootnoteRule[2]{copyrightpermission}
708 \DeclareNewFootnote{copyrightpermission}

```

\footnoterule Tschichold's rules:

```

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

```

\endminipage We do not use footnote rules in minipages

```

711 \def\endminipage{%
712   \par
713   \unskip
714   \ifvoid\@mpfootins\else
715     \vskip\skip\@mpfootins
716     \normalcolor
717     \unvbox\@mpfootins
718   \fi
719   \@minipagefalse
720   \color@endgroup
721   \egroup
722   \expandafter\@iiparbox\@mpargs{\unvbox\@tempboxa}}

```

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

```

723 \def\@textbottom{\vskip \z@ \@plus 1pt}
724 \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.

```

725 \ifcase\ACM@format@nr
726 \relax % manuscript
727 \or % acmsmall
728 \or % acmlarge
729 \or % acmtog
730   \flushbottom
731 \or % sigconf
732   \flushbottom
733 \or % siggraph
734   \flushbottom
735 \or % sigplan
736   \flushbottom
737 \or % sigchi
738   \flushbottom
739 \or % sigchi-a
740 \or % acmengage
741   \flushbottom
742 \or % acmcp
743   \flushbottom
744 \fi

```

3.13 Fonts

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

The code below is by Ross Moore.

```
745 \ifPDFTeX
746 \input{glyptounicode}
747 \pdfglyptounicode{f_f}{FB00}
748 \pdfglyptounicode{f_f_i}{FB03}
749 \pdfglyptounicode{f_f_l}{FB04}
750 \pdfglyptounicode{f_i}{FB01}
751 \pdfglyptounicode{t_t}{0074 0074}
752 \pdfglyptounicode{f_t}{0066 0074}
753 \pdfglyptounicode{T_h}{0054 0068}
754 \pdfgentounicode=1
755 \RequirePackage{cmap}
756 \fi
```

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

```
757 \newif\if@ACM@newfonts
758 \@ACM@newfontstrue
759 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
760   have the libertine package installed. Please upgrade your
761   TeX}\@ACM@newfontsfalse}
762 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
763   have the inconsolata (zi4.sty) package installed. Please upgrade your
764   TeX}\@ACM@newfontsfalse}
765 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
766   have the newtxmath package installed. Please upgrade your
767   TeX}\@ACM@newfontsfalse}
```

We use Libertine throughout. We use Libertine throughout.

```
768 \if@ACM@newfonts
769   \ifxetex
770     \RequirePackage{amssymb}
771     \RequirePackage{unicode-math}
772     \setmathfont[Scale=MatchUppercase]{LibertinusMath-Regular.otf}
773     \setmathfont{latinmodern-math.otf}[range={cal}]
774     \RequirePackage[tt=false]{libertine}
775     \setmonofont[StylisticSet=3]{inconsolata}
776   \else
777     \ifluatex
778       \RequirePackage{amssymb}
779       \RequirePackage{unicode-math}
780       \setmathfont[Scale=MatchUppercase]{LibertinusMath-Regular.otf}
781       \setmathfont{latinmodern-math.otf}[range={cal}]
782       \RequirePackage[tt=false]{libertine}
783       \setmonofont[StylisticSet=3]{inconsolata}
784     \else
785       \RequirePackage[T1]{fontenc}
786       \RequirePackage[tt=false, type1=true]{libertine}
787       \RequirePackage[varqu]{zi4}
788       \RequirePackage[libertine]{newtxmath}
789     \fi
```

```

790 \fi
791 \fi

```

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

```

792 \let\liningnums\@undefined
793 \AtEndPreamble{%
794   \DeclareTextFontCommand{\liningnums}{\libertinelF}}

```

The SIGCHI extended abstracts are sans serif:

```

795 \if@ACM@sigchiamode
796   \renewcommand{\familydefault}{\sfdefault}
797 \fi

798 \RequirePackage{pifont}

```

3.14 Image descriptions

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

```

799 \newif\if@Description@present
800 \@Description@presenttrue

```

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

```

801 \newif\if@undescrbed@images
802 \@undescrbed@imagesfalse

```

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

```

803 \newcommand\Description[2][\global\@Description@presenttrue\ignorespaces}

```

The global warning

```

804 \IfDocumentMetadataF{%
805 \AtEndDocument{\if@undescrbed@images
806   \ClassWarningNoLine{\@classname}{Some images may lack
807     descriptions.\MessageBreak
808   ACM is committed to complying with the upcoming US ADA
809   https://accessiblyapp.com/accessibility-compliance/ada/ and European
810   Accessibility Act
811   (EAA) https://accessiblyapp.com/accessibility-compliance/eea/
812   regulations by actively working to ensure our publications and
813   application services are accessible to individuals with
814   disabilities, adhering to the WCAG guidelines to provide a seamless
815   experience for all users, and regularly reviewing our accessibility
816   practices to maintain compliance with evolving standards. \MessageBreak
817   To this end, we strongly encourage our authors to provide
818   alternative text and captions for images and multimedia content. It
819   is also important to optimize color contrast for the visually
820   impaired. Taking these important steps when creating your papers
821   will ensure that the widest possible audience can ingest your
822   work.}\fi}
823 }

```

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

```

824 \AtBeginEnvironment{figure}{\@Description@presentfalse
825   \let\@vspace\@vspace@orig
826   \let\@vspacer\@vspacer@orig}
827 \AtBeginEnvironment{figure*}{\@Description@presentfalse
828   \let\@vspace\@vspace@orig
829   \let\@vspacer\@vspacer@orig}
830 \AtEndEnvironment{figure}{\if@Description@present\else
831   \global\@undescribed@imagestrue
832   \ClassWarning{\@classname}{A possible image without description}\fi}
833 \AtEndEnvironment{figure*}{\if@Description@present\else
834   \global\@undescribed@imagestrue
835   \ClassWarning{\@classname}{A possible image without description}\fi}
836 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
837   \let\@vspacer\@vspacer@orig}
838 \AtBeginEnvironment{table*}{\let\@vspace\@vspace@orig
839   \let\@vspacer\@vspacer@orig}
840 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
841   \let\@vspacer\@vspacer@orig}
842 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
843   \let\@vspacer\@vspacer@orig}
844 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
845   \let\@vspacer\@vspacer@orig}
846 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
847   \let\@vspacer\@vspacer@orig}
848 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
849   \let\@vspacer\@vspacer@orig}
850 \AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig
851   \let\@vspacer\@vspacer@orig}
852 \AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig
853   \let\@vspacer\@vspacer@orig}
854 \AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig
855   \let\@vspacer\@vspacer@orig}
856 \AtBeginEnvironment{lstinputlisting}{\let\@vspace\@vspace@orig
857   \let\@vspacer\@vspacer@orig}
858 \AtBeginEnvironment{lstinputlisting*}{\let\@vspace\@vspace@orig
859   \let\@vspacer\@vspacer@orig}
860

```

3.15 Floats

We use `caption` package

```

861 \RequirePackage{caption, float}
862 \captionsetup[table]{position=top}
863 \if@ACM@journal
864   \captionsetup{labelfont={sf, small},
865     textfont={sf, small}, margin=\z@}
866   \captionsetup[figure]{name={Fig.}}
867 \else
868   \captionsetup{labelfont={bf},
869     textfont={bf}, labelsep=colon, margin=\z@}
870 \ifcase\ACM@format@nr

```

```

871 \relax % manuscript
872 \or % acmsmall
873 \or % acmlarge
874 \or % acmtog
875 \or % sigconf
876 \or % siggraph
877 \captionsetup{textfont={it}}
878 \or % sigplan
879 \captionsetup{labelfont={bf},
880 textfont={normalfont}, labelsep=period, margin=\z@}
881 \or % sigchi
882 \captionsetup[figure]{labelfont={bf, small},
883 textfont={bf, small}}
884 \captionsetup[table]{labelfont={bf, small},
885 textfont={bf, small}}
886 \or % sigchi-a
887 \captionsetup[figure]{labelfont={bf, small},
888 textfont={bf, small}}
889 \captionsetup[table]{labelfont={bf, small},
890 textfont={bf, small}}
891 \or % acmengage
892 \or % acmcp
893 \fi
894 \fi

```

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

```

895 \ExplSyntaxOn
896 \IfDocumentMetadataT{%
897 \RemoveFromHook{begindocument}[latex-lab-testphase-float]
898 \socket_new_plug:nnn{tag-support/parbox/before}{caption}
899 {
900 \tagpdfparaOn %restart para tagging
901 \tl_if_empty:NTF\@current@float@struct
902 {
903 \tag_struct_begin:n{tag=Caption,firstkid}
904 }
905 {
906 \tag_struct_begin:n{tag=Caption,parent=\@current@float@struct,firstkid}
907 }
908 }
909 \socket_new_plug:nnn{tag-support/parbox/after}{caption}
910 {
911 \tag_struct_end:
912 }
913 \l@addto@macro\caption@beginex@hook{%
914 \tagpdfparaOff %leavevmode in parbox should not start paragraph structure
915 \AssignSocketPlug{tag-support/parbox/before}{caption}
916 \AssignSocketPlug{tag-support/parbox/after}{caption}}
917 }
918 \ExplSyntaxOff

```

sidebar The sidebar environment:

```

919 \newfloat{sidebar}{}{sbar}
920 \floatname{sidebar}{Sidebar}
921 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}

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

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

\@marginfigure The processing of the saved text
926 \long\def\@marginfigure#1{\bgroup
927 \let\@vspace\@vspace@orig
928 \let\@vspacer\@vspacer@orig
929 \captionsetup{type=figure}%
930 \marginpar{\@Description@presentfalse\centering
931 \small#1\if@Description@present\else
932 \global\@undescrbed@imagestrue
933 \ClassWarning{\@classname}{A possible image without description}
934 \fi}%
935 \egroup}

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

\@margintable The processing of the saved text
937 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
938 \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
939 \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
940 \newdimen\fulltextwidth
941 \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)
942 \if@ACM@sigchiamode
943 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
944 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
945 \let\@endfloatbox\@endwidefloatbox
946 \def\@fpsadddefault{\def\@fps{tp}}%
947 \@float}
948 \fi

\end@dblfloat And the end. Just adding a \bgroup.
949 \if@ACM@sigchiamode
950 \def\end@dblfloat{%
951 \end@float\egroup}
952 \fi

```

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

```
953 \def\@endwidefloatbox{%
954   \par\vskip\z@skip
955   \@minipagefalse
956   \outer@nobreak
957   \egroup
958   \color@endbox
959   \global\setbox\@currbox=\vbox{\moveleft
960     \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
961   \wd\@currbox=\textwidth
962 }
```

3.16 Lists

```
963 \ifcase\ACM@format@nr
964 \relax % manuscript
965 \or % acmsmall
966 \or % acmlarge
967 \or % acmtog
968 \or % sigconf
969 \or % siggraph
970 \or % sigplan
971 \def\labelenumi{\theenumi.}
972 \def\labelenumii{\theenumii.}
973 \def\labelenumiii{\theenumiii.}
974 \def\labelenumiv{\theenumiv.}
975 \or % sigchi
976 \or % sigchi-a
977 \or % acmengage
978 \or % acmcp
979 \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`.

```
980 \newdimen\@ACM@labelwidth
981 \AtBeginDocument{%
982   \setlength\labelsep{4pt}
983   \setlength{\@ACM@labelwidth}{6.5pt}
984
985   %% First-level list: when beginning after the first line of an
986   %% indented paragraph or ending before an indented paragraph, labels
987   %% should not hang to the left of the preceding/following text.
988   \setlength\leftmargini{\z@}
989   \addtolength\leftmargini{\parindent}
990   \addtolength\leftmargini{2\labelsep}
991   \addtolength\leftmargini{\@ACM@labelwidth}
992
993   %% Second-level and higher lists.
994   \setlength\leftmarginii{\z@}
995   \addtolength\leftmarginii{0.5\labelsep}
```

```

996 \addtolength\leftmarginii{\@ACM@labelwidth}
997 \setlength\leftmarginiii{\leftmarginii}
998 \setlength\leftmarginiv{\leftmarginiii}
999 \setlength\leftmarginv{\leftmarginiv}
1000 \setlength\leftmarginvi{\leftmarginv}
1001 \@listi}
1002 \newskip\listisep
1003 \listisep\smallskipamount
1004 \def\@listI{\leftmargin\leftmargini
1005 \labelwidth\leftmargini \advance\labelwidth-\labelsep
1006 \listparindent\z@
1007 \topsep\listisep}
1008 \let\@listi\@listI
1009 \def\@listii{\leftmargin\leftmarginii
1010 \labelwidth\leftmarginii \advance\labelwidth-\labelsep
1011 \topsep\z@skip}
1012 \def\@listiii{\leftmargin\leftmarginiii
1013 \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
1014 \def\@listiv{\leftmargin\leftmarginiv
1015 \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
1016 \def\@listv{\leftmargin\leftmarginv
1017 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
1018 \def\@listvi{\leftmargin\leftmarginvi
1019 \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
\descriptionlabel We do not use a colon by default like amsart does:
1020 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}

\description Make the description environment indentation consistent with that of the itemize
and enumerate environments.
1021 \renewenvironment{description}{\list{}{%
1022 \labelwidth\@ACM@labelwidth
1023 \let\makelabel\descriptionlabel}%
1024 }{
1025 \endlist
1026 }
1027 \let\enddescription=\endlist % for efficiency

```

3.17 Top-matter data

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

```

1028 \newif\if@ACM@maketitle@typeset
1029 \@ACM@maketitle@typesetfalse

```

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

```

1030 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
1031 ACMJCSS,%
1032 ACMJDS,%
1033 AILET,%
1034 CIE,%
1035 CSUR,%
1036 DGOV,%
1037 DLT,%

```

1038 DTRAP,%
1039 FAC,%
1040 GAMES,%
1041 HEALTH,%
1042 IMWUT,%
1043 JACM,%
1044 JATS,%
1045 JDIQ,%
1046 JDS,%
1047 JEA,%
1048 JERIC,%
1049 JETC,%
1050 JOCCH,%
1051 JRC,%
1052 PACMCGIT,%
1053 PACMHCI,%
1054 PACMMOD,%
1055 PACMNET,%
1056 PACMPL,%
1057 PACMSE,%
1058 POMACS,%
1059 TAAS,%
1060 TACCESS,%
1061 TACO,%
1062 TAIS,%
1063 TAISAP,%
1064 TALG,%
1065 TALLIP,%
1066 TAP,%
1067 TCPS,%
1068 TDS,%
1069 TEAC,%
1070 TECS,%
1071 TELO,%
1072 THRI,%
1073 TIIS,%
1074 TIOT,%
1075 TISSEC,%
1076 TIST,%
1077 TKDD,%
1078 TMIS,%
1079 TOCE,%
1080 TOCHI,%
1081 TOCL,%
1082 TOCS,%
1083 TOCT,%
1084 TODAES,%
1085 TODS,%
1086 TOG,%
1087 TOIS,%
1088 TOIT,%
1089 TOMACS,%
1090 TOMM,%
1091 TOMPECS,%

```

1092 TOMS,%
1093 TOPC,%
1094 TOPLAS,%
1095 TOPML,%
1096 TOPS,%
1097 TORS,%
1098 TOS,%
1099 TOSEM,%
1100 TOSN,%
1101 TQC,%
1102 TRETS,%
1103 TSAS,%
1104 TSC,%
1105 TSLP,%
1106 TWEB,%
1107 FACMP%
1108 }{%
1109 \ifcase\@journalCode@nr
1110 \relax % ACMJCSS
1111 \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
1112 \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%
1113 \def\@permissionCodeOne{2834-5533}%
1114 \def\@permissionCodeTwo{2834-5533}%
1115 \or % ACMJDS
1116 \def\@journalName{ACM Journal of Data Science}%
1117 \def\@journalNameShort{ACM J. Data Sci.}%
1118 \def\@permissionCodeOne{3069-3497}%
1119 \def\@permissionCodeTwo{3069-3497}%
1120 \or % AILET
1121 \def\@journalName{ACM AI Letters}%
1122 \def\@journalNameShort{ACM AI Lett.}%
1123 \def\@permissionCodeOne{3068-8590}%
1124 \def\@permissionCodeTwo{3068-8590}%
1125 \or % CIE
1126 \def\@journalName{ACM Computers in Entertainment}%
1127 \def\@journalNameShort{ACM Comput. Entertain.}%
1128 \def\@permissionCodeOne{1544-3574}%
1129 \or % CSUR
1130 \def\@journalName{ACM Computing Surveys}%
1131 \def\@journalNameShort{ACM Comput. Surv.}%
1132 \def\@permissionCodeOne{0360-0300}%
1133 \def\@permissionCodeTwo{1557-7341}%
1134 \or % DGOV
1135 \def\@journalName{Digital Government: Research and Practice}%
1136 \def\@journalNameShort{Digit. Gov. Res. Pract.}%
1137 \def\@permissionCodeOne{2639-0175}%
1138 \def\@permissionCodeTwo{2639-0175}%
1139 \or % DLT
1140 \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
1141 \def\@journalNameShort{Distrib. Ledger Technol.}%
1142 \def\@permissionCodeOne{2769-6472}%
1143 \def\@permissionCodeTwo{2769-6480}%
1144 \or % DTRAP
1145 \def\@journalName{Digital Threats: Research and Practice}%

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1146 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1147 \def\@permissionCodeOne{2576-5337}%
1148 \def\@permissionCodeTwo{2576-5337}%
1149 \or % FAC
1150 \def\@journalName{Formal Aspects of Computing}%
1151 \def\@journalNameShort{Form. Asp. Comput.}%
1152 \def\@permissionCodeOne{0934-5043}%
1153 \def\@permissionCodeTwo{1433-299X}%
1154 \or % GAMES
1155 \def\@journalName{ACM Games: Research and Practice}%
1156 \def\@journalNameShort{ACM Games}%
1157 \def\@permissionCodeOne{2832-5516}%
1158 \def\@permissionCodeTwo{2832-5516}%
1159 \or % HEALTH
1160 \def\@journalName{ACM Transactions on Computing for Healthcare}%
1161 \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1162 \def\@permissionCodeOne{2637-8051}%
1163 \def\@permissionCodeTwo{2637-8051}%
1164 \or % IMWUT
1165 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1166 Wearable and Ubiquitous Technologies}%
1167 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
1168 \def\@permissionCodeOne{2474-9567}%
1169 \def\@permissionCodeTwo{2474-9567}%
1170 \@ACM@screentruer
1171 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1172 \or % JACM
1173 \def\@journalName{Journal of the ACM}%
1174 \def\@journalNameShort{J. ACM}%
1175 \def\@permissionCodeOne{0004-5411}%
1176 \def\@permissionCodeTwo{1557-735X}%
1177 \or % JATS
1178 \def\@journalName{Journal on Autonomous Transportation Systems}%
1179 \def\@journalNameShort{ACM J. Auton. Transport. Syst.}%
1180 \def\@permissionCodeOne{2833-0528}%
1181 \def\@permissionCodeTwo{2833-0528}%
1182 \or % JDIQ
1183 \def\@journalName{ACM Journal of Data and Information Quality}%
1184 \def\@journalNameShort{ACM J. Data Inform. Quality}%
1185 \def\@permissionCodeOne{1936-1955}%
1186 \def\@permissionCodeTwo{1936-1963}%
1187 \or % JDS
1188 \def\@journalName{ACM Journal of Data Science}%
1189 \def\@journalNameShort{ACM J. Data Sci.}%
1190 \def\@permissionCodeOne{2831-3194}%
1191 \def\@permissionCodeTwo{2831-3194}%
1192 \or % JEA
1193 \def\@journalName{ACM Journal of Experimental Algorithmics}%
1194 \def\@journalNameShort{ACM J. Exp. Algor.}%
1195 \def\@permissionCodeOne{1084-6654}%
1196 \def\@permissionCodeTwo{1084-6654}%
1197 \or % JERIC
1198 \def\@journalName{ACM Journal of Educational Resources in Computing}%
1199 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%

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1200 \def\@permissionCodeOne{1073-0516}%
1201 \or % JETC
1202 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
1203 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1204 \def\@permissionCodeOne{1550-4832}%
1205 \def\@permissionCodeTwo{1550-4840}%
1206 \or % JOCCH
1207 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1208 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1209 \def\@permissionCodeOne{1556-4673}%
1210 \def\@permissionCodeTwo{1556-4711}%
1211 \or % JRC
1212 \def\@journalName{ACM Journal on Responsible Computing}%
1213 \def\@journalNameShort{ACM J. Responsib. Comput.}%
1214 \def\@permissionCodeOne{2832-0565}%
1215 \def\@permissionCodeTwo{2832-0565}%
1216 \or % PACMCGIT
1217 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1218 \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1219 \def\@permissionCodeOne{2577-6193}%
1220 \def\@permissionCodeTwo{2577-6193}%
1221 \@ACM@screentruer
1222 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1223 \or % PACMHCI
1224 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
1225 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
1226 \def\@permissionCodeOne{2573-0142}%
1227 \def\@permissionCodeTwo{2573-0142}%
1228 \@ACM@screentruer
1229 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1230 \or % PACMMOD
1231 \def\@journalName{Proceedings of the ACM on Management of Data}%
1232 \def\@journalNameShort{Proc. ACM Manag. Data}%
1233 \def\@permissionCodeOne{2836-6573}%
1234 \def\@permissionCodeTwo{2836-6573}%
1235 \or % PACMNET
1236 \def\@journalName{Proceedings of the ACM on Networkng}%
1237 \def\@journalNameShort{Proc. ACM Netw.}%
1238 \def\@permissionCodeOne{2834-5509}%
1239 \def\@permissionCodeTwo{2834-5509}%
1240 \or % PACMPL
1241 \def\@journalName{Proceedings of the ACM on Programming Languages}%
1242 \def\@journalNameShort{Proc. ACM Program. Lang.}%
1243 \def\@permissionCodeOne{2475-1421}%
1244 \def\@permissionCodeTwo{2475-1421}%
1245 \@ACM@screentruer
1246 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1247 \or % PACMSE
1248 \def\@journalName{Proceedings of the ACM on Software Engineering}%
1249 \def\@journalNameShort{Proc. ACM Softw. Eng.}%
1250 \def\@permissionCodeOne{2994-970X}%
1251 \def\@permissionCodeTwo{2994-970X}%
1252 \@ACM@screentruer
1253 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%

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1254 \or % POMACS
1255 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1256 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1257 \def\@permissionCodeOne{2476-1249}%
1258 \def\@permissionCodeTwo{2476-1249}%
1259 \@ACM@screentru
1260 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1261 \or % TAAS
1262 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
1263 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
1264 \def\@permissionCodeOne{1556-4665}%
1265 \def\@permissionCodeTwo{1556-4703}%
1266 \or % TACCESS
1267 \def\@journalName{ACM Transactions on Accessible Computing}%
1268 \def\@journalNameShort{ACM Trans. Access. Comput.}%
1269 \def\@permissionCodeOne{1936-7228}%
1270 \def\@permissionCodeTwo{1936-7236}%
1271 \or % TACO
1272 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1273 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1274 \def\@permissionCodeOne{1544-3566}%
1275 \def\@permissionCodeTwo{1544-3973}%
1276 \or % TAIS
1277 \def\@journalName{ACM Transactions on AI for Science}%
1278 \def\@journalNameShort{ACM Trans. AI Sci.}%
1279 \def\@permissionCodeOne{3066-4438}%
1280 \def\@permissionCodeTwo{3066-4438}%
1281 \or % TAISAP
1282 \def\@journalName{ACM Transactions on AI Security and Privacy}%
1283 \def\@journalNameShort{ACM Trans. AI Secur. Priv.}%
1284 \def\@permissionCodeOne{3068-3564}%
1285 \def\@permissionCodeTwo{3068-3564}%
1286 \or % TALG
1287 \def\@journalName{ACM Transactions on Algorithms}%
1288 \def\@journalNameShort{ACM Trans. Algor.}%
1289 \def\@permissionCodeOne{1549-6325}%
1290 \def\@permissionCodeTwo{1549-6333}%
1291 \or % TALLIP
1292 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1293 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1294 \def\@permissionCodeOne{2375-4699}%
1295 \def\@permissionCodeTwo{2375-4702}%
1296 \or % TAP
1297 \def\@journalName{ACM Transactions on Applied Perception}%
1298 \def\@journalNameShort{ACM Trans. Appl. Percept.}%
1299 \def\@permissionCodeOne{1544-3558}%
1300 \def\@permissionCodeTwo{1544-3965}%
1301 \or % TCPS
1302 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1303 \def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%
1304 \def\@permissionCodeOne{2378-962X}%
1305 \def\@permissionCodeTwo{2378-9638}%
1306 \or % TDS
1307 \def\@journalName{ACM Transactions on Data Science}%

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1308 \def\@journalNameShort{ACM Trans. Data Sci.}%
1309 \def\@permissionCodeOne{2577-3224}%
1310 \or % TEAC
1311 \def\@journalName{ACM Transactions on Economics and Computation}%
1312 \def\@journalNameShort{ACM Trans. Econ. Comput.}%
1313 \def\@permissionCodeOne{2167-8375}%
1314 \def\@permissionCodeTwo{2167-8383}%
1315 \or % TECS
1316 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
1317 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1318 \def\@permissionCodeOne{1539-9087}%
1319 \def\@permissionCodeTwo{1558-3465}%
1320 \or % TELO
1321 \def\@journalName{ACM Transactions on Evolutionary Learning and Optimization}%
1322 \def\@journalNameShort{ACM Trans. Evol. Learn. Optim.}%
1323 \def\@permissionCodeOne{2688-299X}%
1324 \def\@permissionCodeTwo{2688-3007}%
1325 \or % THRI
1326 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
1327 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1328 \def\@permissionCodeOne{2573-9522}%
1329 \def\@permissionCodeTwo{2573-9522}%
1330 \or % TIIS
1331 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
1332 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1333 \def\@permissionCodeOne{2160-6455}%
1334 \def\@permissionCodeTwo{2160-6463}%
1335 \or % TIOT
1336 \def\@journalName{ACM Transactions on Internet of Things}%
1337 \def\@journalNameShort{ACM Trans. Internet Things}%
1338 \def\@permissionCodeOne{2577-6207}%
1339 \def\@permissionCodeTwo{2577-6207}%
1340 \or % TISSEC
1341 \def\@journalName{ACM Transactions on Information and System Security}%
1342 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1343 \def\@permissionCodeOne{1094-9224}%
1344 \or % TIST
1345 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1346 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1347 \def\@permissionCodeOne{2157-6904}%
1348 \def\@permissionCodeTwo{2157-6912}%
1349 \or % TKDD
1350 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
1351 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1352 \def\@permissionCodeOne{1556-4681}%
1353 \def\@permissionCodeTwo{1556-472X}%
1354 \or % TMIS
1355 \def\@journalName{ACM Transactions on Management Information Systems}%
1356 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1357 \def\@permissionCodeOne{2158-656X}%
1358 \def\@permissionCodeTwo{2158-6578}%
1359 \or % TOCE
1360 \def\@journalName{ACM Transactions on Computing Education}%
1361 \def\@journalNameShort{ACM Trans. Comput. Educ.}%

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1362 \def\@permissionCodeOne{1946-6226}%
1363 \def\@permissionCodeTwo{1946-6226}%
1364 \or % TOCHI
1365 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1366 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1367 \def\@permissionCodeOne{1073-0516}%
1368 \def\@permissionCodeTwo{1557-7325}%
1369 \or % TOCL
1370 \def\@journalName{ACM Transactions on Computational Logic}%
1371 \def\@journalNameShort{ACM Trans. Comput. Logic}%
1372 \def\@permissionCodeOne{1529-3785}%
1373 \def\@permissionCodeTwo{1557-945X}%
1374 \or % TOCS
1375 \def\@journalName{ACM Transactions on Computer Systems}%
1376 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1377 \def\@permissionCodeOne{0734-2071}%
1378 \def\@permissionCodeTwo{1557-7333}%
1379 \or % TOCT
1380 \def\@journalName{ACM Transactions on Computation Theory}%
1381 \def\@journalNameShort{ACM Trans. Comput. Theory}%
1382 \def\@permissionCodeOne{1942-3454}%
1383 \def\@permissionCodeTwo{1942-3462}%
1384 \or % TODAES
1385 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1386 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1387 \def\@permissionCodeOne{1084-4309}%
1388 \def\@permissionCodeTwo{1557-7309}%
1389 \or % TODS
1390 \def\@journalName{ACM Transactions on Database Systems}%
1391 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
1392 \def\@permissionCodeOne{0362-5915}%
1393 \def\@permissionCodeTwo{1557-4644}%
1394 \or % TOG
1395 \def\@journalName{ACM Transactions on Graphics}%
1396 \def\@journalNameShort{ACM Trans. Graph.}%
1397 \def\@permissionCodeOne{0730-0301}%
1398 \def\@permissionCodeTwo{1557-7368}%
1399 \or % TOIS
1400 \def\@journalName{ACM Transactions on Information Systems}%
1401 \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1402 \def\@permissionCodeOne{1046-8188}%
1403 \def\@permissionCodeTwo{1558-2868}%
1404 \or % TOIT
1405 \def\@journalName{ACM Transactions on Internet Technology}%
1406 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1407 \def\@permissionCodeOne{1533-5399}%
1408 \def\@permissionCodeTwo{1557-6051}%
1409 \or % TOMACS
1410 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1411 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1412 \def\@permissionCodeOne{1049-3301}%
1413 \def\@permissionCodeTwo{1558-1195}%
1414 \or % TOMM
1415 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%

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```

1416 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1417 \def\@permissionCodeOne{1551-6857}%
1418 \def\@permissionCodeTwo{1551-6865}%
1419 \or % TOMPECS
1420 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1421 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1422 \def\@permissionCodeOne{2376-3639}%
1423 \def\@permissionCodeTwo{2376-3647}%
1424 \or % TOMS
1425 \def\@journalName{ACM Transactions on Mathematical Software}%
1426 \def\@journalNameShort{ACM Trans. Math. Softw.}%
1427 \def\@permissionCodeOne{0098-3500}%
1428 \def\@permissionCodeTwo{1557-7295}%
1429 \or % TOPC
1430 \def\@journalName{ACM Transactions on Parallel Computing}%
1431 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1432 \def\@permissionCodeOne{2329-4949}%
1433 \def\@permissionCodeTwo{2329-4957}%
1434 \or % TOPLAS
1435 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1436 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1437 \def\@permissionCodeOne{0164-0925}%
1438 \def\@permissionCodeTwo{1558-4593}%
1439 \or % TOPML
1440 \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
1441 \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
1442 \def\@permissionCodeOne{2836-8924}%
1443 \def\@permissionCodeTwo{2836-8924}%
1444 \or % TOPS
1445 \def\@journalName{ACM Transactions on Privacy and Security}%
1446 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1447 \def\@permissionCodeOne{2471-2566}%
1448 \def\@permissionCodeTwo{2471-2574}%
1449 \or % TORS
1450 \def\@journalName{ACM Transactions on Recommender Systems}%
1451 \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
1452 \def\@permissionCodeOne{2770-6699}%
1453 \def\@permissionCodeTwo{2770-6699}%
1454 \or % TOS
1455 \def\@journalName{ACM Transactions on Storage}%
1456 \def\@journalNameShort{ACM Trans. Storage}%
1457 \def\@permissionCodeOne{1553-3077}%
1458 \def\@permissionCodeTwo{1553-3093}%
1459 \or % TOSEM
1460 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1461 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1462 \def\@permissionCodeOne{1049-331X}%
1463 \def\@permissionCodeTwo{1557-7392}%
1464 \or % TOSN
1465 \def\@journalName{ACM Transactions on Sensor Networks}%
1466 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1467 \def\@permissionCodeOne{1550-4859}%
1468 \def\@permissionCodeTwo{1550-4867}%
1469 \or % TQC

```

```

1470 \def\@journalName{ACM Transactions on Quantum Computing}%
1471 \def\@journalNameShort{ACM Trans. Quantum Comput.}%
1472 \def\@permissionCodeOne{2643-6817}%
1473 \def\@permissionCodeTwo{2643-6817}%
1474 \or % TRET
1475 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1476 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1477 \def\@permissionCodeOne{1936-7406}%
1478 \def\@permissionCodeTwo{1936-7414}%
1479 \or % TSAS
1480 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1481 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1482 \def\@permissionCodeOne{2374-0353}%
1483 \def\@permissionCodeTwo{2374-0361}%
1484 \or % TSC
1485 \def\@journalName{ACM Transactions on Social Computing}%
1486 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1487 \def\@permissionCodeOne{2469-7818}%
1488 \def\@permissionCodeTwo{2469-7826}%
1489 \or % TSLP
1490 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1491 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1492 \def\@permissionCodeOne{1550-4875}%
1493 \def\@permissionCodeTwo{2329-9304}%
1494 \or % TWEB
1495 \def\@journalName{ACM Transactions on the Web}%
1496 \def\@journalNameShort{ACM Trans. Web}%
1497 \def\@permissionCodeOne{1559-1131}%
1498 \def\@permissionCodeTwo{1559-114X}%
1499 \else % FACMP, a dummy journal
1500 \def\@journalName{ACM Just Accepted}%
1501 \def\@journalNameShort{ACM Accepted}%
1502 \def\@permissionCodeOne{XXXX-XXXX}%
1503 \fi
1504 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1505 }{%
1506 \ClassError{\@classname}{Incorrect journal #1}%
1507 }%

```

`\acmJournal` And the syntactic sugar around it

```

1508 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
1509 \global\@ACM@journal@bibstriptrue
1510 \global\@ACM@journal@bibstrip@or@togtrue}

```

The defaults:

```

1511 \def\@journalCode@nr{0}
1512 \def\@journalName{}%
1513 \def\@journalNameShort{\@journalName}%
1514 \def\@permissionCodeOne{XXXX-XXXX}%
1515 \def\@permissionCodeTwo{\@permissionCodeOne}%

```

`\acmConference` This is the conference command

```

1516 \newcommand\acmConference[4][{}]{%
1517 \gdef\acmConference@shortname{#1}%

```

```

1518 \gdef\acmConference@name{#2}%
1519 \gdef\acmConference@date{#3}%
1520 \gdef\acmConference@venue{#4}%
1521 \ifx\acmConference@shortname\empty
1522 \gdef\acmConference@shortname{#2}%
1523 \fi
1524 \global\@ACM@journal@bibstripfalse
1525 \ifx\@acmBooktitle\empty\relax
1526 \acmBooktitle{Proceedings of \acmConference@name
1527 \ifx\acmConference@name\acmConference@shortname\else
1528 \ (\acmConference@shortname)\fi}%
1529 \fi
1530 }
1531 \if@ACM@journal\else
1532 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1533 DC, USA}%
1534 \fi

```

\acmBooktitle The book title of the conference:

```

\@acmBooktitle 1535 \def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
1536 \acmBooktitle{}

```

\@editorsAbbrev How to abbreviate editors

```
1537 \def\@editorsAbbrev{(Ed.)}
```

\@acmEditors The list of editors

```
1538 \def\@acmEditors{}
```

\editor Add a new editor to the list

```

1539 \def\editor#1{\ifx\@acmEditors\empty
1540 \gdef\@acmEditors{#1}%
1541 \else
1542 \gdef\@editorsAbbrev{(Eds.)}%
1543 \g@addto@macro\@acmEditors{\and#1}%
1544 \fi}

```

\subtitle The subtitle macro

```

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

```

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

```

1547 \newcount\num@authorgroups
1548 \num@authorgroups=0\relax

```

\num@author The total number of authors

```

1549 \newcount\num@author
1550 \num@author=0\relax

```

\if@insideauthorgroup Whether we are continuing an author group

```

1551 \newif\if@insideauthorgroup
1552 \@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.

```

1553 \renewcommand\author[2][{}]{%
1554   \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\@classname}{Do not put several
1555     authors in the same \string\author\space macro!}}{}%
1556   \global\advance\num@authors by 1\relax
1557   \if@insideauthorgroup\else
1558     \global\advance\num@authorgroups by 1\relax
1559     \global\@insideauthorgrouptrue
1560   \fi
1561   \ifx\addresses\@empty
1562     \if@ACM@anonymous
1563       \gdef\addresses{\@author{Anonymous Author(s)}%
1564         \ifx\@acmSubmissionID\@empty\else\Submission Id:
1565           \@acmSubmissionID\fi}%
1566       \gdef\authors{Anonymous Author(s)}%
1567     \else
1568       \expandafter\gdef\expandafter\addresses\expandafter{%
1569         \expandafter\@author\expandafter{%
1570           \csname typeset@author\the\num@authors\endcsname{#2}}}%
1571       \gdef\authors{#2}%
1572     \fi
1573   \else
1574     \if@ACM@anonymous\else
1575       \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
1576         \expandafter\and\expandafter\@author\expandafter{%
1577           \csname typeset@author\the\num@authors\endcsname{#2}}}%
1578       \g@addto@macro\authors{\and#2}%
1579     \fi
1580   \fi
1581   \if@ACM@anonymous
1582     \ifx\shortauthors\@empty
1583       \gdef\shortauthors{Anon.
1584         \ifx\@acmSubmissionID\@empty\else Submission Id:
1585           \@acmSubmissionID\fi}%
1586     \fi
1587   \else
1588     \def\@tempa{#1}%
1589     \ifx\@tempa\@empty
1590       \ifx\shortauthors\@empty
1591         \gdef\shortauthors{#2}%
1592       \else
1593         \g@addto@macro\shortauthors{\and#2}%
1594       \fi
1595     \else
1596       \ifx\shortauthors\@empty
1597         \gdef\shortauthors{#1}%
1598       \else
1599         \g@addto@macro\shortauthors{\and#1}%

```

```

1600     \fi
1601     \fi
1602 \fi}

```

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

```

1603 \newcommand{\affiliation}[2][{}]{%
1604   \global\@insideauthorgroupfalse
1605   \if@ACM@anonymous\else
1606     \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1607   \fi}

```

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

```

1608 \define@boolkey+{@ACM@affiliation@}[@ACM@affiliation@]{obeypunctuation}%
1609 [true]{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

```

`\additionalaffiliation` Additional affiliations go to footnotes

```

1610 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

```

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

```

1611 \def\@additionalaffiliation#1{\bgroup
1612   \def\position##1{\ignorespaces}%
1613   \def\institution##1{##1\ignorespaces}%
1614   \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1615   \def\@department[##1]##2{##2, \ignorespaces}%
1616   \let\city\position
1617   \let\state\position
1618   \let\country\position
1619   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.

```

1620 \renewcommand{\email}[2][{}]{%
1621   \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1622     addresses in the same \string\email\space macro!}}{}%
1623   \if@ACM@anonymous\else
1624     \g@addto@macro\addresses{\email{#1}{#2}}%
1625   \fi}

```

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

```

1626 \def\orcid#1{\unskip\ignorespaces%
1627   \protected\def\orcidsite{https://orcid.org/}%
1628   \IfBeginWith{#1}{http}{%
1629     \expandafter\gdef\csname
1630       typeset@author\the\num@authors\endcsname##1{%
1631       \href{#1}{##1}}}%
1632   \expandafter\gdef\csname
1633     typeset@author\the\num@authors\endcsname##1{%
1634     \href{\orcidsite#1}{##1}}}%

```

`\authorsaddresses` Setting up authors' addresses

```

1635 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1636 \authorsaddresses{\@mkauthorsaddresses}

```

```

\mktranslatedkeywords We have two argument: the language to typeset keywords and the keywords.
1637 \newcommand\mktranslatedkeywords[2]{\bgroup
1638 \selectlanguage{#1}%
1639 {\@specialsection{\keywordsname}%
1640 \noindent#2\par}\egroup}

\@titlenotes The title notes
1641 \def\@titlenotes{}

\titlenote Adding a note to the title
1642 \def\titlenote#1{%
1643 \g@addto@macro\@title{\footnotemark}%
1644 \if@ACM@anonymous
1645 \g@addto@macro\@titlenotes{%
1646 \stepcounter{footnote}\footnotetext{Title note}}%
1647 \else
1648 \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1649 \fi}

\@subtitlenotes The subtitle notes
1650 \def\@subtitlenotes{}

\subtitlenote Adding a note to the subtitle
1651 \def\subtitlenote#1{%
1652 \g@addto@macro\@subtitle{\footnotemark}%
1653 \if@ACM@anonymous
1654 \g@addto@macro\@subtitlenotes{%
1655 \stepcounter{footnote}\footnotetext{Subtitle note}}%
1656 \else
1657 \g@addto@macro\@subtitlenotes{%
1658 \stepcounter{footnote}\footnotetext{#1}}%
1659 \fi}

\@authornotes The author notes
1660 \def\@authornotes{}

\authornote Adding a note to the author
1661 \def\authornote#1{%
1662 \if@ACM@anonymous\else
1663 \g@addto@macro\addresses{\@authornotemark}%
1664 \g@addto@macro\@authornotes{%
1665 \stepcounter{footnote}\footnotetext{#1}}%
1666 \fi}

\correspondingauthor Mark the author as corresponding author
1667 \newcommand\correspondingauthor{%
1668 \if@ACM@anonymous\else
1669 \g@addto@macro\addresses{\@correspondingauthormark}%
1670 \fi}

\@correspondingauthormark Print the envelope
1671 \def\@correspondingauthormark{\g@addto@macro\@currentauthors{%
1672 \advance\hfuzz by 5pt\relax\textsuperscript{\ding{41}}\relax}}

```

`\authornotemark` Adding a footnote mark to the authors

```

1673 \newcommand\authornotemark[1][\relax]{%
1674   \if@ACM@anonymous\else
1675     \ifx#1\relax\relax\relax
1676     \g@addto@macro\addresses{\@authornotemark}%
1677   \else
1678     \g@addto@macro\addresses{\@authornotemark{#1}}%
1679   \fi
1680 \fi}

```

`\acmVolume` The current volume

```

1681 \def\acmVolume#1{\def\@acmVolume{#1}}
1682 \acmVolume{1}

```

`\acmNumber` The current number

```

1683 \def\acmNumber#1{\def\@acmNumber{#1}}
1684 \acmNumber{1}

```

`\acmArticle` The current article

```

1685 \def\acmArticle#1{\def\@acmArticle{#1}}
1686 \acmArticle{}

```

`\acmArticleSeq` The sequence number

```

1687 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
1688 \acmArticleSeq{\@acmArticle}

```

`\acmYear` The current year

```

1689 \def\acmYear#1{\def\@acmYear{#1}}
1690 \acmYear{\the\year}

```

`\acmMonth` The current month

```

1691 \def\acmMonth#1{\def\@acmMonth{#1}}
1692 \acmMonth{\the\month}

```

`\@acmPubDate` The publication date

```

1693 \def\@acmPubDate{\ifcase\@acmMonth\or
1694   January\or February\or March\or April\or May\or June\or
1695   July\or August\or September\or October\or November\or
1696   December\fi~\@acmYear}

```

`\acmPrice` The price—obsolete

```

1697 \def\acmPrice#1{\ClassWarning{\@classname}{The macro \string\acmPrice
1698   is obsolete.  ACM no longer prints the price in bibstrip.}}

```

`\acmSubmissionID` The submission ID

```

1699 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
1700 \acmSubmissionID{}

```

`\acmISBN` The book ISBN

```

1701 \def\acmISBN#1{\def\@acmISBN{#1}}
1702 \acmISBN{978-x-xxxx-xxxx-x/YYYY/MM}

```

```

\acmDOI The paper DOI
1703 \def\acmDOI#1{\def\@acmDOI{#1}}
1704 \acmDOI{10.1145/nnnnnnn.nnnnnnn}

\if@ACM@badge

\@ACM@badge@width The width of the badge
1705 \newlength\@ACM@badge@width
1706 \setlength\@ACM@badge@width{3pc}

\@ACM@title@width The width of the title
1707 \newlength\@ACM@title@width

\@ACM@badge@skip The spacing between badges
1708 \newlength\@ACM@badge@skip
1709 \setlength\@ACM@badge@skip{1pt}

\@acmBadgeR
1710 \def\@acmBadgeR{}

\@acmBadgeL
1711 \def\@acmBadgeL{}

\acmBadgeR Setting the right badge
1712 \newcommand\acmBadgeR[2][{}]{%
1713   \ifx\@acmBadgeR\@empty
1714     \gdef\@acmBadgeR{%
1715       \smash{%
1716         \raisebox{0.5\height}{%
1717           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1718   \else
1719     \g@addto@macro{\@acmBadgeR}{%
1720       \hspace{\@ACM@badge@skip}%
1721       \smash{%
1722         \raisebox{0.5\height}{%
1723           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1724   \fi}

\acmBadgeL Setting the left badge
1725 \newcommand\acmBadgeL[2][{}]{%
1726   \ifx\@acmBadgeL\@empty
1727     \gdef\@acmBadgeL{%
1728       \smash{%
1729         \raisebox{0.5\height}{%
1730           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1731   \else
1732     \g@addto@macro{\@acmBadgeL}{%
1733       \hspace{\@ACM@badge@skip}%
1734       \smash{%
1735         \raisebox{0.5\height}{%
1736           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1737   \fi}

```

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

```
1738 \let\acmBadge=\acmBadgeR
```

`\startPage` The start page of the paper

```
1739 \def\startPage#1{\def\@startPage{#1}}
```

```
1740 \startPage{}
```

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

```
1741 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
```

```
1742   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.

```
1743 \def\keywords#1{\def\@keywords{#1}}
```

```
1744 \let\@keywords\@empty
```

```
1745 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty
```

```
1746   \ifnum\getrefnumber{TotPages}>2\relax
```

```
1747   \ClassWarningNoLine{\@classname}{ACM keywords are mandatory
```

```
1748     for papers over two pages}%
```

```
1749   \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

```
1750 \renewenvironment{abstract}{\Collect@Body\@saveabstract{}}
```

`\@saveabstract` And saving the abstract

```
1751 \long\def\@saveabstract#1{\if@ACM@maketitle@typeset
```

```
1752   \ClassError{\@classname}{Abstract must be defined before maketitle
```

```
1753     command. Please move it!}\fi
```

```
1754   \long\gdef\@abstract{#1}}
```

```
1755 \@saveabstract{}
```

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

```
1756 \long\def\@empty{}
```

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

```
1757 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
```

```
1758   \if@ACM@printccs
```

```
1759     \ClassInfo{\@classname}{Printing CCS}%
```

```
1760   \else
```

```
1761     \ClassInfo{\@classname}{Suppressing CCS}%
```

```
1762   \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}
```

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

```
1763 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
```

```
1764   \if@ACM@printacmref
```

```
1765     \ClassInfo{\@classname}{Printing bibformat}%
```

```
1766   \else
```

```
1767     \ClassInfo{\@classname}{Suppressing bibformat}%
```

```
1768   \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}
```

```

1769 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
1770   \ifnum\getrefnumber{TotPages}>1\relax
1771   \ClassWarningNoLine{\@classname}{%
1772     ACM reference format is mandatory \MessageBreak
1773     for papers over one page. \MessageBreak
1774     Please add printacmref=true to the \MessageBreak
1775     \string\settopmatter\space command.}%
1776   \fi\fi\fi}

\if@ACM@printfolios Whether to print folios
1777 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1778   \if@ACM@printfolios
1779     \ClassInfo{\@classname}{Printing folios}%
1780   \else
1781     \ClassInfo{\@classname}{Suppressing folios}%
1782   \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}

\@ACM@authorsperrrow The number of authors per row. 0 means use the default algorithm.
1783 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrrow}[0]{%
1784   \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrrow to
1785     #1}}{\ClassWarning{\@classname}{The parameter authorsperrrow must be
1786     numerical. Ignoring the input #1}}\gdef\@ACM@authorsperrrow{0}}

\settopmatter The usual syntactic sugar
1787 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

Now the settings
1788 \settopmatter{printccs=true, printacmref=true}
1789 \if@ACM@manuscript
1790   \settopmatter{printfolios=true}
1791 \else
1792   \if@ACM@journal
1793     \settopmatter{printfolios=true}
1794   \else
1795     \settopmatter{printfolios=false}
1796   \fi
1797 \fi
1798 \settopmatter{authorsperrrow=0}

\@received The container for the paper history
1799 \def\@received{}

\received The \received command
1800 \newcommand\received[2][\def\@tempa{#1}%
1801   \ifx\@tempa\@empty
1802     \ifx\@received\@empty
1803       \gdef\@received{Received #2}%
1804     \else
1805       \g@addto@macro{\@received}{; revised #2}%
1806     \fi
1807   \else
1808     \ifx\@received\@empty
1809       \gdef\@received{#1 #2}%

```

```

1810 \else
1811 \g@addto@macro{\@received}{; #1 #2}%
1812 \fi
1813 \fi}
1814 \AtEndDocument{%
1815 \ifx\@received\@empty\else
1816 \par\bigskip\noindent{\small\normalfont\@received\par}%
1817 \fi}

```

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

```

1818 \define@choicekey+{ACM}{articletype}[\ACM@ArticleType\ACM@ArticleType@nr]{%
1819 Research,Review,Discussion,Invited,Position}[Review]{%
1820 \ifcase\ACM@ArticleType@nr
1821 \relax % Research
1822 \colorlet{@ACM@Article@color}{ACMBlue}%
1823 \or % Review
1824 \colorlet{@ACM@Article@color}{ACMOrange}%
1825 \or % Discussion
1826 \colorlet{@ACM@Article@color}{ACMGreen}%
1827 \or % Invited
1828 \colorlet{@ACM@Article@color}{ACMPurple}%
1829 \or % Position
1830 \colorlet{@ACM@Article@color}{ACMRed}%
1831 \fi
1832 }{%
1833 \ClassError{\@classname}{Article Type must be Research, Review,\MessageBreak
1834 Discussion, Invited, or Position}}
1835 \def\acmArticleType#1{\setkeys{ACM}{articletype=#1}}
1836 \if@ACM@acmcp
1837 \acmArticleType{Research}%
1838 \fi
1839

```

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

```

1840 \newenvironment{@ACM@color@frame}{%
1841 \def\FrameCommand{\hspace*{-6.5pc}}%
1842 \colorbox{@ACM@Article@color!10!white}}%
1843 \MakeFramed {\advance\hsize
1844 -6.5pc\relax\FrameRestore}}{\zsavesposy{@ACM@acmcpframe@y}}%
1845 \endMakeFramed}

```

`\acmCodeDataLink` The code link

```

1846 \def\acmCodeLink#1{%
1847 \ifx\@acmCodeDataLink\@empty
1848 \gdef\@acmCodeDataLink{\url{#1}}%
1849 \else
1850 \g@addto@macro{\@acmCodeDataLink}{\ \url{#1}}%
1851 \fi}
1852 \def\@acmCodeDataLink{}

```

`\acmContributions` The authors' contrubution statement

```

1853 \def\acmContributions#1{\gdef\@acmContributions{#1}}
1854 \acmContributions{}

```

\acmDataLink The code link

```
1855 \let\acmDataLink\acmCodeLink
```

3.18 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```
1856 \RequirePackage{comment}
```

```
1857 \excludecomment{CCSXML}
```

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

```
1858 \let\@concepts\@empty
```

```
1859 \newcounter{@concepts}
```

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

```
1860 \newcommand\ccsdesc[2][100]{%
```

```
1861 \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!

```
1862 \def\textrightarrow{$\rightarrow$}
```

```
1863 \def\ccsdesc@parse#1~#2~#3~{%
```

```
1864 \stepcounter{@concepts}%
```

```
1865 \expandafter\ifx\csname CCS@General@#2\endcsname\relax
```

```
1866 \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
```

```
1867 \textbf{#2}}%
```

```
1868 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
```

```
1869 \expandafter\gdef\csname CCS@Specific@#2\endcsname{ }%
```

```
1870 \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
```

```
1871 \csname CCS@Punctuation@#2\endcsname
```

```
1872 \csname CCS@Specific@#2\endcsname}%
```

```
1873 \fi
```

```
1874 \ifx#3\relax\relax\else
```

```
1875 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
```

```
1876 \textrightarrow\ }%
```

```
1877 \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
```

```
1878 \addtocounter{@concepts}{-1}%
```

```
1879 \ifnum#1>499\textbf{#3}\else
```

```
1880 \ifnum#1>299\textit{#3}\else
```

```
1881 #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
```

```
1882 \fi
```

```
1883 \ccsdesc@parse@finish}
```

```
1884 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\@empty\relax
```

```
1885 \ifnum\getrefnumber{TotPages}>2\relax
```

```
1886 \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
```

```
1887 for papers over two pages}%
```

```
1888 \fi\fi\fi}
```

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

```
1889 \def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}
```

3.19 Copyright system

This is from acmcopyright.sty

`\if@printcopyright` Whether to print a copyright symbol
1890 `\newif\if@printcopyright`
1891 `\@printcopyrighttrue`

`\if@printpermission` Whether to print the permission block
1892 `\newif\if@printpermission`
1893 `\@printpermissiontrue`

`\if@acmowned` Whether the ACM owns the rights to the paper
1894 `\newif\if@acmowned`
1895 `\@acmownedtrue`

Keys:

```
1896 \define@choicekey*{ACM@}{acmcopyrightmode}{[%
1897   \acm@copyrightinput\acm@copyrightmode]{none,%
1898   acmcopyright,acmlicensed,rightsretained,%
1899   usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1900   licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
1901   iw3c2w3,iw3c2w3g,cc}{%
1902   \@printpermissiontrue
1903   \@printcopyrighttrue
1904   \@acmownedtrue
1905   \ifnum\acm@copyrightmode=0\relax % none
1906   \@printpermissionfalse
1907   \@printcopyrightfalse
1908   \@acmownedfalse
1909   \fi
1910   \ifnum\acm@copyrightmode=2\relax % acmlicensed
1911   \@acmownedfalse
1912   \fi
1913   \ifnum\acm@copyrightmode=3\relax % rightsretained
1914   \@acmownedfalse
1915   \fi
1916   \ifnum\acm@copyrightmode=4\relax % usgov
1917   \@printpermissiontrue
1918   \@printcopyrightfalse
1919   \@acmownedfalse
1920   \fi
1921   \ifnum\acm@copyrightmode=6\relax % cagov
1922   \@acmownedfalse
1923   \fi
1924   \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1925   \@acmownedfalse
1926   \fi
1927   \ifnum\acm@copyrightmode=9\relax % licensedcagov
1928   \@acmownedfalse
1929   \fi
1930   \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1931   \@acmownedfalse
1932   \fi
```

```

1933 \ifnum\acm@copyrightmode=11\relax % othergov
1934 \@acmownedtrue
1935 \fi
1936 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1937 \@acmownedfalse
1938 \fi
1939 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1940 \@acmownedfalse
1941 \fi
1942 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1943 \@acmownedfalse
1944 \fi
1945 \ifnum\acm@copyrightmode=15\relax % cc
1946 \@acmownedfalse
1947 \fi}

```

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

```

1948 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1949 \setcopyright{acmlicensed}

```

`\setcctype` The type of Creative Commons license used

```

1950 \newcommand\setcctype[2][4.0]{%
1951 \def\ACM@cc@version{#1}%
1952 \def\ACM@cc@type{#2}}
1953 \setcctype{by}

```

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

```

1954 \def\@copyrightowner{%
1955 \ifcase\acm@copyrightmode\relax % none
1956 \or % acmcopyright
1957 ACM\@.
1958 \or % acmlicensed
1959 Copyright held by the owner/author(s). Publication rights licensed to
1960 ACM\@.
1961 \or % rightsretained
1962 Copyright held by the owner/author(s).
1963 \or % usgov
1964 \or % usgovmixed
1965 Copyright held by the owner/author(s).
1966 \or % cagov
1967 Copyright Crown in Right of Canada.
1968 \or %cagovmixed
1969 Copyright held by the owner/author(s).
1970 \or %licensedusgovmixed
1971 Copyright held by the owner/author(s). Publication rights licensed to
1972 ACM\@.
1973 \or % licensedcagov
1974 Copyright held by the owner/author(s).
1975 \or %licensedcagovmixed
1976 Copyright held by the owner/author(s). Publication rights licensed to
1977 ACM\@.
1978 \or % othergov
1979 Copyright held by the owner/author(s).
1980 \or % licensedothergov

```

1981 Copyright held by the owner/author(s). Publication rights licensed to
 1982 ACM\@.
 1983 \or % ic2w3www
 1984 IW3C2 (International World Wide Web Conference Committee), published
 1985 under Creative Commons CC-BY~4.0 License.
 1986 \or % ic2w3wwwgoogle
 1987 IW3C2 (International World Wide Web Conference Committee), published
 1988 under Creative Commons CC-BY-NC-ND~4.0 License.
 1989 \or % cc
 1990 Copyright held by the owner/author(s).
 1991 \fi}

\@formatdoi Print a clickable DOI

1992 \def\@formatdoi#1{\url{https://doi.org/#1}}

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

\@copyrightpermission The canned permission block.

1993 \def\@copyrightpermission{%
 1994 \ifcase\acm@copyrightmode\relax % none
 1995 \or % acmcopyright
 1996 Permission to make digital or hard copies of all or part of this
 1997 work for personal or classroom use is granted without fee provided
 1998 that copies are not made or distributed for profit or commercial
 1999 advantage and that copies bear this notice and the full citation on
 2000 the first page. Copyrights for components of this work owned by
 2001 others than ACM must be honored. Abstracting with credit is
 2002 permitted. To copy otherwise, or republish, to post on servers or
 2003 to redistribute to lists, requires prior specific permission
 2004 and\hspace*{.5pt}/or
 2005 a fee. Request permissions from permissions@acm.org.
 2006 \or % acmlicensed
 2007 Permission to make digital or hard copies of all or part of this
 2008 work for personal or classroom use is granted without fee provided
 2009 that copies are not made or distributed for profit or commercial
 2010 advantage and that copies bear this notice and the full citation on
 2011 the first page. Copyrights for components of this work owned by
 2012 others than the author(s) must be honored. Abstracting with credit
 2013 is permitted. To copy otherwise, or republish, to post on servers
 2014 or to redistribute to lists, requires prior specific permission
 2015 and\hspace*{.5pt}/or a fee. Request permissions from
 2016 permissions@acm.org.
 2017 \or % rightsretained
 2018 Permission to make digital or hard copies of all or part of this
 2019 work for personal or classroom use is granted without fee provided
 2020 that copies are not made or distributed for profit or commercial
 2021 advantage and that copies bear this notice and the full citation on
 2022 the first page. Copyrights for third-party components of this work
 2023 must be honored. For all other uses, contact the
 2024 owner\hspace*{.5pt}/author(s).
 2025 \or % usgov
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2108 only. Request permissions from owner\hspace*{.5pt}/author(s).

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2111 International (CC-BY~4.0) license. Authors reserve their rights to
2112 disseminate the work on their personal and corporate Web sites with
2113 the appropriate attribution.

2114 \or % iw3c2w3g
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2117 (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
2118 disseminate the work on their personal and corporate Web sites with
2119 the appropriate attribution.

2120 \or % CC
2121 \IfEq{\ACM@cc@type}{zero}{%
2122 \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0}}{%
2123 \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version}}%
2124 \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\\
2125 \href{\ACM@CC@Url}{%
2126 This work is licensed under a Creative Commons
2127 \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}{%
2128 \IfEq{\ACM@cc@type}{by}{Attribution}{}%
2129 \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}{}%
2130 \IfEq{\ACM@cc@type}{by-nd}{Attribution-NoDerivatives}{}%
2131 \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}{}%
2132 \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{}%
2133 \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{}%
2134 ~\IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}%
2135 }
2136 License.}%

```

2137 \fi}

\copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
2138 \def\copyrightyear#1{\def\@copyrightyear{#1}}
2139 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container
2140 \def\@teaserfigures{}

teaserfigure The teaser figure
2141 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

\@saveteaser Saving the teaser
2142 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

\thanks We redefine amsart \thanks so the anonymous key works
2143 \renewcommand{\thanks}[1]{%
2144   \ifnotempty{#1}{%
2145     \if@ACM@anonymous
2146       \g@addto@macro\thankses{\thanks{A note}}%
2147     \else
2148       \g@addto@macro\thankses{\thanks{#1}}%
2149     \fi}}

\anon We provide \anon command, which obscures parts of the text if the package option
anonymous is set
2150 \newcommand{\anon}[2][ANONYMIZED]{%
2151   \if@ACM@anonymous%
2152     {\color{ACMOrange}#1}%
2153   \else%
2154     #2%
2155   \fi}

```

3.20 Maketitle hook

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

```

\@beginmaketitlehook The hook
2156 \ifx\@beginmaketitlehook\@undefined
2157   \let\@beginmaketitlehook\@empty
2158 \fi

\AtBeginMaketitle Adding to the hook
2159 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}

```

3.21 ACM Engage top matter

```

\@acmengagemetadata The special metadata for ACM engage course materials
2160 \def\@acmengagemetadata{}

\setengagemetadata Adding topic to engage metadata
2161 \def\setengagemetadata#1#2{%
2162   \g@addto@macro{\@acmengagemetadata}{%
2163     \@setengagemetadata{#1}{#2}}}

```

3.22 Typesetting top matter

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

2164 `\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.

```

2165 \def\maketitle{\@beginmaketitlehook
2166   \@ACM@maketitle@typesettrue
2167   \if@ACM@anonymous
2168     % Anonymize omission of \author-s
2169     \ifnum\num@authorgroups=0\author{}\fi
2170   \fi
2171   \begingroup
2172   \let\@vspace\@vspace@orig
2173   \let\@vspacer\@vspacer@orig
2174   \let\@footnotemark\@footnotemark@nolink
2175   \let\@footnotetext\@footnotetext@nolink
2176   \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
2177   \hsize=\textwidth
2178   \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
2179   \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
2180   \@printtopmatter
2181   \if@ACM@sigchiamode\@mkauthors\fi
2182   \setcounter{footnote}{0}%
2183   \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
2184   \@titlenotes
2185   \@subtitlenotes
2186   \@authornotes
2187   \let\@makefnmark\relax
2188   \let\@thefnmark\relax
2189   \let\@makefntext\noindent
2190   \ifx\@empty\thankses\else
2191     \footnotetextauthorsaddresses{%
2192       \def\par{\let\par\@par}\parindent\z@\@setthanks}%
2193   \fi
2194   \if@ACM@acmcp\else
2195     \ifx\@empty\@authorsaddresses\else
2196       \if@ACM@anonymous\else
2197         \if@ACM@journal@bibstrip@or@tog
2198           \footnotetextauthorsaddresses{%
2199             \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2200         \fi
2201       \fi
2202     \fi
2203   \fi
2204   \if@ACM@nonacm
2205     \ifnum\acm@copyrightmode=15\relax % cc
2206       \footnotetextcopyrightpermission{\@copyrightpermission}%

```

```

2207 \fi
2208 \else
2209 \if@ACM@acmcp\else
2210 \footnotetextcopyrightpermission{%
2211 \if@ACM@authordraft
2212 \raisebox{-2ex}{\z@}{\z@}{\makebox[0pt][l]{\large\bfseries
2213 Unpublished working draft. Not for distribution.}}%
2214 \color[gray]{0.9}%
2215 \fi
2216 \parindent\z@\parskip0.1\baselineskip
2217 \if@ACM@authorversion\else
2218 \if@printpermission\@copyrightpermission\par\fi
2219 \fi
2220 \if@ACM@manuscript\else
2221 \if@ACM@journal@bibstrip\else % Print the conference information
2222 \if@ACM@engage
2223 {\itshape \@acmBooktitle, \@acmYear.}\par
2224 \else
2225 {\itshape \acmConference@shortname, \acmConference@venue}\par
2226 \fi
2227 \fi
2228 \fi
2229 \if@printcopyright
2230 \copyright\ \@copyrightyear\ \@copyrightowner\\
2231 \else
2232 \ifx\@copyrightyear\@empty\else
2233 \@copyrightyear.\
2234 \fi
2235 \fi
2236 \if@ACM@manuscript
2237 Manuscript submitted to ACM\\
2238 \else
2239 \if@ACM@authorversion
2240 This is the author's version of the work. It is posted here for
2241 your personal use. Not for redistribution. The definitive Version
2242 of Record was published in
2243 \if@ACM@journal@bibstrip
2244 \emph{\@journalName}%
2245 \else
2246 \emph{\@acmBooktitle}%
2247 \fi
2248 \ifx\@acmDOI\@empty
2249 .
2250 \else
2251 , \@formatdoi{\@acmDOI}.
2252 \fi\\
2253 \else
2254 \if@ACM@nonacm\else
2255 \if@ACM@journal@bibstrip
2256 ACM~\@permissionCodeTwo/\@acmYear/\@acmMonth-ART\@acmArticle\\
2257 \@formatdoi{\@acmDOI}%
2258 \else % Conference
2259 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN\\fi
2260 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%

```

```

2261         \fi
2262     \fi
2263     \fi
2264 \fi}%
2265 \fi
2266 \fi
2267 \endgroup
2268 \if@ACM@engage\@typesetengagemetadata\fi
2269 \setcounter{footnote}{0}%
2270 \@mkabstract
2271 \ifx\@translatedabstracts\@empty\else
2272 \@translatedabstracts\fi
2273 \if@ACM@printccs
2274 \ifx\@concepts\@empty\else\bgroup
2275     {\@specialsection{CCS Concepts}%
2276     \noindent\@concepts\par}\egroup
2277 \fi
2278 \fi
2279 \if@ACM@acmcp\else
2280     \ifx\@keywords\@empty\else\bgroup
2281         {\@specialsection{\keywordsname}%
2282         \noindent\@keywords\par}\egroup
2283     \fi
2284     \ifx\@translatedkeywords\@empty\else
2285         \@translatedkeywords
2286     \fi
2287 \fi
2288 \let\metadata@authors=\authors
2289 \nxandlist{, }{, }{\, }\metadata@authors
2290 \def\@ACM@checkaffil{}%
2291 \hypersetup{%
2292     pdfauthor={\metadata@authors},
2293     pdftitle={\@title},
2294     pdfsubject={\@concepts},
2295     pdfkeywords={\@keywords},
2296     pdfcreator={LaTeX with acmart
2297         \csname ver@\@classname.cls\endcsname\space
2298         and hyperref
2299         \csname ver@hyperref.sty\endcsname}}%
2300 \andify\authors
2301 \andify\shortauthors
2302 \global\let\authors=\authors
2303 \global\let\shortauthors=\shortauthors
2304 \if@ACM@printacmref
2305     \@mkbibcitation
2306 \fi
2307 \global\@topnum\z@ % this prevents floats from falling
2308                     % at the top of page 1
2309 \global\@botnum\z@ % we do not want them to be on the bottom either
2310 \@printendtopmatter
2311 \@afterindentfalse
2312 \@afterheading
2313 \if@ACM@acmcp
2314     \set@ACM@acmcpbox

```

```

2315 \AtEndDocument{\end@ACM@color@frame}%
2316 \@ACM@color@frame
2317 \fi
2318 }

```

\set@ACM@acmcpbox Setting infobox for acmcp

```

2319 \newbox\@ACM@acmcpbox
2320 \def\set@ACM@acmcpbox{%
2321   \bgroup
2322   \hsize=5pc
2323   \global\setbox\@ACM@acmcpbox=\vbox{%
2324     \setlength{\parindent}{\z@}%
2325     {\includegraphics[width=\hsize]{acm-jdslogo}\par}%
2326     \scriptsize
2327     \ifnum\getrefnumber{TotPages}>1\else
2328       \zrefused{\@ACM@acmcpbox@y}%
2329       \zrefused{\@ACM@acmcpframe@y}%
2330       \@tempdima=\dimexpr\zposy{\@ACM@acmcpbox@y}sp -
2331       \zposy{\@ACM@acmcpframe@y}sp+0.3\FrameSep+
2332       \@ACM@acmcp@delta\relax
2333       \ifdim\@tempdima>0pt\relax
2334         \vspace*{\@tempdima}%
2335         \protected@write\@auxout{%
2336           {\string\global\@ACM@acmcp@delta=\the\@tempdima\relax}%
2337         \fi
2338       \fi
2339       \ifx\@acmCodeDataLink\@empty\else\bigskip
2340         Code and data links:\\ \@acmCodeDataLink\par\bigskip
2341       \fi
2342       \ifx\@keywords\@empty\else\bigskip
2343         Keywords: \@keywords\par
2344       \fi
2345       \ifx\@acmContributions\@empty\else\bigskip
2346         \@acmContributions\par
2347       \fi
2348       \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
2349       \zsaveposy{\@ACM@acmcpbox@y}%
2350     \par
2351   }
2352 \egroup}

```

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

```

2353 \def\@specialsection#1{%
2354   \let\@vspace\@vspace@orig
2355   \let\@vspacer\@vspacer@orig
2356   \ifcase\ACM@format@nr
2357     \relax % manuscript
2358     \par\medskip\small\noindent#1: %
2359   \or % acmsmall
2360     \par\medskip\small\noindent#1: %
2361   \or % acmlarge
2362     \par\medskip\small\noindent#1: %
2363   \or % acmtog
2364     \par\medskip\small\noindent#1: %

```

```

2365 \or % sigconf
2366     \section*{#1}%
2367 \or % siggraph
2368     \section*{#1}%
2369 \or % sigplan
2370     \noindentparagraph*{#1:~}%
2371 \or % sigchi
2372     \section*{#1}%
2373 \or % sigchi-a
2374     \section*{#1}%
2375 \or % acmengage
2376     \section*{#1}%
2377 \or % acmcp
2378     \section*{#1}%
2379     \fi
2380 \let\@vspace\@vspace@acm
2381 \let\@vspacer\@vspacer@acm
2382 }

```

\@printtopmatter The printing of top matter starts a new page and uses the given title box.

Note that if there are too many authors, \mktitle@bx might overflow the page. Therefore we start with checking this and if this happens, we split the box and print it page by page.

```

2383 \def\@printtopmatter{%
2384     \ifx\@startPage\@empty
2385         \gdef\@startPage{1}%
2386     \else
2387         \setcounter{page}{\@startPage}%
2388     \fi
2389     \@tempdima=\ht\mktitle@bx
2390     \advance\@tempdima by \dp\mktitle@bx
2391     \ifdim\@tempdima>0.9\textheight
2392         \loop
2393             \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
2394             \thispagestyle{firstpagestyle}%
2395             \noindent\unvbox\@tempboxa
2396             \clearpage
2397             \@tempdima=\ht\mktitle@bx
2398             \advance\@tempdima by \dp\mktitle@bx
2399             \ifdim\@tempdima>0.9\textheight\repeat
2400         \fi
2401     \thispagestyle{firstpagestyle}%
2402     \noindent
2403     \ifcase\ACM@format@nr
2404     \relax % manuscript
2405         \box\mktitle@bx\par
2406     \or % acmsmall
2407         \box\mktitle@bx\par
2408     \or % acmlarge
2409         \box\mktitle@bx\par
2410     \or % acmtog
2411         \twocolumn[\box\mktitle@bx]%
2412     \or % sigconf
2413         \twocolumn[\box\mktitle@bx]%

```

```

2414 \or % siggraph
2415 \twocolumn[\box\mktitle@bx]%
2416 \or % sigplan
2417 \twocolumn[\box\mktitle@bx]%
2418 \or % sigchi
2419 \twocolumn[\box\mktitle@bx]%
2420 \or % sigchi-a
2421 \par\box\mktitle@bx\par\bigskip
2422 \or % acmengage
2423 \twocolumn[\box\mktitle@bx]%
2424 \or % acmcp
2425 \box\mktitle@bx\par
2426 \fi
2427 }

```

`\@mktitle` The title of the article

```

2428 \def\@mktitle{%
2429 \ifcase\ACM@format@nr
2430 \relax % manuscript
2431 \@mktitle@i
2432 \or % acmsmall
2433 \@mktitle@i
2434 \or % acmlarge
2435 \@mktitle@i
2436 \or % acmtog
2437 \@mktitle@i
2438 \or % sigconf
2439 \@mktitle@iii
2440 \or % siggraph
2441 \@mktitle@iii
2442 \or % sigplan
2443 \@mktitle@iii
2444 \or % sigchi
2445 \@mktitle@iii
2446 \or % sigchi-a
2447 \@mktitle@iv
2448 \or % acmengage
2449 \@mktitle@iii
2450 \or % acmcp
2451 \@mktitle@i
2452 \fi
2453 }

```

`\@titlefont` The font to typeset the title

```

2454 \def\@titlefont{%
2455 \ifcase\ACM@format@nr
2456 \relax % manuscript
2457 \LARGE\sffamily\bfseries
2458 \or % acmsmall
2459 \LARGE\sffamily\bfseries
2460 \or % acmlarge
2461 \LARGE\sffamily\bfseries
2462 \or % acmtog
2463 \Huge\sffamily

```

```

2464 \or % sigconf
2465 \Huge\sffamily\bfseries
2466 \or % siggraph
2467 \Huge\sffamily\bfseries
2468 \or % sigplan
2469 \Huge\bfseries
2470 \or % sigchi
2471 \Huge\sffamily\bfseries
2472 \or % sigchi-a
2473 \Huge\bfseries
2474 \or % acmengage
2475 \Huge\sffamily\bfseries
2476 \or % acmcp
2477 \LARGE\sffamily\bfseries
2478 \fi}

```

`\@subtitlefont` The font to typeset the subtitle

```

2479 \def\@subtitlefont{\normalsize
2480 \ifcase\ACM@format@nr
2481 \relax % manuscript
2482 \mdseries
2483 \or % acmsmall
2484 \mdseries
2485 \or % acmlarge
2486 \mdseries
2487 \or % acmtog
2488 \LARGE
2489 \or % sigconf
2490 \LARGE\mdseries
2491 \or % siggraph
2492 \LARGE\mdseries
2493 \or % sigplan
2494 \LARGE\mdseries
2495 \or % sigchi
2496 \LARGE\mdseries
2497 \or % sigchi-a
2498 \mdseries
2499 \or % acmengage
2500 \LARGE\mdseries
2501 \or % acmcp
2502 \mdseries
2503 \fi}

```

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

```

2504 \def\@mkttitle@i{\hsize=\textwidth
2505 \if@ACM@acmcp
2506 \advance\hsize by -6pc%
2507 \fi
2508 \@ACM@title@width=\hsize
2509 \setbox\mkttitle@bx=\vbox{\noindent\@titlefont
2510 \parbox[t]{\@ACM@title@width}{\raggedright
2511 \@titlefont\noindent
2512 \@title\@translatedtitle%
2513 \ifx\@subtitle\@empty\else

```

```

2514 \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
2515 \fi}%
2516 \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.

```

2517 \def\mktitle@iii{\hsize=\textwidth
2518 \setbox\mktitle@bx=\vbox{\@titlefont\centering
2519 \@ACM@title@width=\hsize
2520 \parbox[t]{\@ACM@title@width}{\centering\@titlefont
2521 \@title\@translatedtitle%
2522 \ifx\@subtitle\@empty\else
2523 \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
2524 \fi
2525 }%
2526 \par\bigskip}}%

```

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

```

2527 \def\mktitle@iv{\hsize=\textwidth
2528 \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
2529 \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
2530 \noindent\@title\@translatedtitle%
2531 \ifx\@subtitle\@empty\else
2532 \par\noindent\@subtitlefont\@subtitle\@translatedsubtitle%
2533 \fi
2534 \par\bigskip}}%

```

\@ACM@addtoaddress

```

2535 \newbox\@ACM@commabox
2536 \def\@ACM@addtoaddress#1{%
2537 \ifvmode\else
2538 \if@ACM@affiliation@obeypunctuation\else
2539 \unskip,~%
2540 \fi\fi
2541 #1}

```

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

```

\streetaddress 2542 \def\streetaddress#1{\ClassWarning{\@classname}{ACM no longer collects
\city 2543 authors' postal addresses. I am ignoring your street
\state 2544 address}\unskip\ignorespaces}
\postcode 2545 \def\postcode#1{\ClassWarning{\@classname}{ACM no longer collects
\country 2546 authors' postal addresses. I am ignoring your postal
2547 code}\unskip\ignorespaces}
2548 \if@ACM@journal
2549 \def\position#1{\unskip\ignorespaces}
2550 \def\institution#1{\global\@ACM@instpresenttrue
2551 \unskip~#1\ignorespaces}
2552 \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
2553 \def\state#1{\unskip\ignorespaces}

```

```

2554 \newcommand\department[2][0]{\unskip\ignorespaces}
2555 \def\country#1{\StrDel{#1}{ }[\@tempa]%
2556   \ifx\@tempa\empty\else
2557     \global\@ACM@countrypresenttrue\fi
2558     \if@ACM@affiliation@obexpunctuation\else, \fi#1\ignorespaces}
2559 \else
2560 \def\position#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2561 \def\institution#1{\global\@ACM@instpresenttrue
2562   \if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2563 \newcommand\department[2][0]{\if@ACM@affiliation@obexpunctuation
2564   #2\else#2\par\fi}%
2565 \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
2566 \let\state\@ACM@addtoaddress
2567 \def\country#1{\global\@ACM@countrypresenttrue\@ACM@addtoaddress{#1}}%
2568 \fi

```

\@mkauthors Typesetting the authors

```

2569 \def\@mkauthors{\begingroup
2570   \hsize=\textwidth
2571   \ifcase\ACM@format@nr
2572     \relax % manuscript
2573     \@mkauthors@i
2574   \or % acmsmall
2575     \@mkauthors@i
2576   \or % acmlarge
2577     \@mkauthors@i
2578   \or % acmtog
2579     \@mkauthors@i
2580   \or % sigconf
2581     \@mkauthors@iii
2582   \or % siggraph
2583     \@mkauthors@iii
2584   \or % sigplan
2585     \@mkauthors@iii
2586   \or % sigchi
2587     \@mkauthors@iii
2588   \or % sigchi-a
2589     \@mkauthors@iv
2590   \or % acmengage
2591     \@mkauthors@iii
2592   \or % acmcp
2593     \@mkauthors@i
2594   \fi
2595 \endgroup
2596 }

```

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

```

2597 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```

2598 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

2599 \ifcase\ACM@format@nr

```

```

2600 \relax % manuscript
2601 \or % acmsmall
2602   \def\@authorfont{\large\sffamily}
2603   \def\@affiliationfont{\small\normalfont}
2604 \or % acmlarge
2605 \or % acmtog
2606   \def\@authorfont{\LARGE\sffamily}
2607   \def\@affiliationfont{\large}
2608 \or % sigconf
2609   \def\@authorfont{\LARGE}
2610   \def\@affiliationfont{\large}
2611 \or % siggraph
2612   \def\@authorfont{\normalsize\normalfont}
2613   \def\@affiliationfont{\normalsize\normalfont}
2614 \or % sigplan
2615   \def\@authorfont{\Large\normalfont}
2616   \def\@affiliationfont{\normalsize\normalfont}
2617 \or % sigchi
2618   \def\@authorfont{\bfseries}
2619   \def\@affiliationfont{\mdseries}
2620 \or % sigchi-a
2621   \def\@authorfont{\bfseries}
2622   \def\@affiliationfont{\mdseries}
2623 \or % acmengage
2624   \def\@authorfont{\LARGE}
2625   \def\@affiliationfont{\large}
2626 \or % acmcp
2627   \def\@authorfont{\large\sffamily}
2628   \def\@affiliationfont{\small\normalfont}
2629 \fi

```

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

```

2630 \def\@typeset@author@line{%
2631   \andify\@currentauthors\par\noindent
2632   \@currentauthors\def\@currentauthors{}%
2633   \ifx\@currentaffiliations\@empty\else
2634     \andify\@currentaffiliations
2635     \unskip, {\@currentaffiliations}\par
2636   \fi
2637   \def\@currentaffiliations{}}

```

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

```

2638 \newif\if@ACM@instpresent
2639 \@ACM@instpresenttrue

```

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

```

2640 \newif\if@ACM@citypresent
2641 \@ACM@citypresenttrue

```

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

```

2642 \newif\if@ACM@countrypresent
2643 \@ACM@countrypresenttrue

```

\@ACM@resetaffil Reset affiliation flags

```
2644 \def\@ACM@resetaffil{%
2645   \global\@ACM@instpresentfalse
2646   \global\@ACM@citypresentfalse
2647   \global\@ACM@countrypresentfalse
2648 }
```

\@ACM@checkaffil Check affiliation flags

```
2649 \def\@ACM@checkaffil{%
2650   \if@ACM@instpresent\else
2651     \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
2652   \fi
2653   \if@ACM@citypresent\else
2654     \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
2655   \fi
2656   \if@ACM@countrypresent\else
2657     \ClassError{\@classname}{No country present for an affiliation}{ACM
2658       requires each author to indicate their country using country macro.}%
2659   \fi
2660 }
```

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

```
2661 \def\@mkauthorsi{%
2662   \def\@currentauthors{}%
2663   \def\@currentaffiliations{}%
2664   \global\let\and\@typeset@author@line
2665   \def\@author##1{%
2666     \ifx\@currentauthors\@empty
2667       \gdef\@currentauthors{\@authorfont\MakeUppercase{##1}}%
2668     \else
2669       \g@addto@macro{\@currentauthors}{\and\MakeUppercase{##1}}%
2670     \fi
2671     \gdef\and{}}%
2672   \def\email##1##2{%
2673     \def\affiliation##1##2{%
2674       \def\@tempa{##2}\ifx\@tempa\@empty\else
2675         \ifx\@currentaffiliations\@empty
2676           \gdef\@currentaffiliations{%
2677             \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2678             \setkeys{@ACM@affiliation@}{##1}%
2679             \@ACM@resetaffil
2680             \@affiliationfont##2\@ACM@checkaffil}%
2681           \else
2682             \g@addto@macro{\@currentaffiliations}{\and
2683               \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2684               \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2685               ##2\@ACM@checkaffil}%
2686           \fi
2687         \fi
2688         \global\let\and\@typeset@author@line}%
2689     \if@ACM@acmcp
2690       \advance\hsize by -6pc%
2691     \fi
```

```

2692 \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
2693 \noindent\addresses\@typeset@author@line
2694 \par\medskip}%
2695 }

```

\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

```

2696 \newbox\author@bx

```

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

```

2697 \newdimen\author@bx@wd

```

\author@bx@sep The separation between author boxes

```

2698 \newskip\author@bx@sep
2699 \author@bx@sep=1pc\relax

```

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

```

2700 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd
2701 \def\and{\par}\normalbaselines
2702 \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2703 \@authorfont\@currentauthors\par\@affiliationfont
2704 \@currentaffiliation}\egroup
2705 \box\author@bx\hspace{\author@bx@sep}%
2706 \gdef\@currentauthors{}}%
2707 \gdef\@currentaffiliation{}}

```

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

```

2708 \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.

```

2709 \author@bx@wd=\textwidth\relax
2710 \advance\author@bx@wd by -\author@bx@sep\relax
2711 \ifnum\@ACM@authorsperrrow>0\relax
2712 \divide\author@bx@wd by \@ACM@authorsperrrow\relax
2713 \else
2714 \ifcase\@num@authorgroups
2715 \relax % 0?
2716 \or % 1=one author per row
2717 \or % 2=two authors per row
2718 \divide\author@bx@wd by \@num@authorgroups\relax
2719 \or % 3=three authors per row
2720 \divide\author@bx@wd by \@num@authorgroups\relax
2721 \or % 4=two authors per row (!)
2722 \divide\author@bx@wd by 2\relax
2723 \else % three authors per row
2724 \divide\author@bx@wd by 3\relax
2725 \fi
2726 \fi
2727 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2728 \gdef\@currentauthors{}%
2729 \gdef\@currentaffiliation{}%
2730 \def\@author##1{\ifx\@currentauthors\@empty
2731   \gdef\@currentauthors{\par##1}%
2732 \else
2733   \g@addto@macro\@currentauthors{\par##1}%
2734 \fi
2735 \gdef\and{}}%
2736 \def\email##1##2{\ifx\@currentaffiliation\@empty
2737   \gdef\@currentaffiliation{\bgroup
2738     \mathchardef\UrlBreakPenalty=10000\href{mailto:##2}{##2}\egroup}%
2739 \else
2740   \g@addto@macro\@currentaffiliation{\par\bgroup
2741     \mathchardef\UrlBreakPenalty=10000\href{mailto:##2}{##2}\egroup}%
2742 \fi}%
2743 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2744   \gdef\@currentaffiliation{%
2745     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2746     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2747     ##2\@ACM@checkaffil}%
2748 \else
2749   \g@addto@macro\@currentaffiliation{\par
2750     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2751     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2752     ##2\@ACM@checkaffil}%
2753 \fi
2754 \global\let\and\@typeset@author@bx
2755 }%

```

Actual typesetting is done by the \and macro:

```

2756 \hsize=\textwidth
2757 \global\setbox\mktitle@bx=\vbox{\noindent
2758   \unvbox\mktitle@bx\par\medskip\leavevmode
2759   \lineskip=1pc\relax\centering\hspace*{-1em}%
2760   \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.

```

2761 \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.

```

2762 \author@bx@wd=\columnwidth\relax
2763 \advance\author@bx@wd by -\author@bx@sep\relax
2764 \ifnum\@ACM@authorsperrrow>0\relax
2765   \divide\author@bx@wd by \@ACM@authorsperrrow\relax
2766 \else
2767   \ifcase\@num@authorgroups
2768     \relax % 0?
2769     \or % 1=one author per row
2770     \else % 2=two authors per row

```

```

2771      \divide\author@bx@wd by 2\relax
2772      \fi
2773 \fi
2774 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2775 \gdef\@currentauthors{%
2776 \gdef\@currentaffiliation{%
2777 \def\@author##1{\ifx\@currentauthors\@empty
2778 \gdef\@currentauthors{\par##1}%
2779 \else
2780 \g@addto@macro\@currentauthors{\par##1}%
2781 \fi
2782 \gdef\and{}}%
2783 \def\email##1##2{\ifx\@currentaffiliation\@empty
2784 \gdef\@currentaffiliation{\href{mailto:##2}{##2}}%
2785 \else
2786 \g@addto@macro\@currentaffiliation{\par\href{mailto:##2}{##2}}%
2787 \fi}%
2788 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2789 \gdef\@currentaffiliation{%
2790 \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2791 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2792 ##2\@ACM@checkaffil}%
2793 \else
2794 \g@addto@macro\@currentaffiliation{\par
2795 \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2796 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2797 ##2\@ACM@checkaffil}%
2798 \fi
2799 \global\let\and\@typeset@author@bx}%
2800 %

```

Actual typesetting is done by the \and macro

```

2801 \bgroup\hsize=\columnwidth
2802 \par\raggedright\leftskip=\z@
2803 \lineskip=1pc\noindent
2804 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup

```

\@mkauthorsaddresses Typesetting authors' addresses in the footnote style

```

2805 \def\@mkauthorsaddresses{%
2806 \ifnum\num@authors>1\relax
2807 Authors' \else Author's \fi
2808 Contact Information:
2809 \bgroup
2810 \def\streetaddress##1{\ClassWarning{\@classname}{ACM no longer collects
2811 authors' postal addresses. I am ignoring your street
2812 address}\unskip\ignorespaces}%
2813 \def\postcode##1{\ClassWarning{\@classname}{ACM no longer collects
2814 authors' postal addresses. I am ignoring your postal
2815 code}\unskip\ignorespaces}%
2816 \def\position##1{\unskip\ignorespaces}%
2817 \gdef\@ACM@institution@separator{,}%
2818 \def\institution##1{\unskip\@ACM@institution@separator ##1\gdef\@ACM@institution@separator{ and }}
2819 \def\city##1{\unskip, ##1}%

```

```

2820 \def\state##1{\unskip, ##1}%
2821 \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2822 \def\country##1{\unskip, ##1}%
2823 \def\and{\unskip; \gdef\ACM@institution@separator{, }}%
2824 \def\@author##1{##1}%
2825 \def\email##1##2{\unskip, \href{mailto:##2}{##2}}%
2826 \addresses
2827 \egroup}

2828 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
2829 \ifx\@authorsaddresses\empty
2830 \ClassWarningNoLine{\@classname}{Authors'
2831 addresses are mandatory for ACM journals}%
2832 \fi\fi\fi}

```

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

```

2833 \def\@setaddresses{}

```

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

```

2834 \def\@authornotemark{\g@addto@macro\@currentauthors{%
2835 \advance\hfuzz by 5pt\relax\footnotemark\relax}}

```

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

```

2836 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{%
2837 \advance\hfuzz by 5pt\relax\footnotemark[#1]}}

```

\@mkteasers Typesetting the teasers

```

2838 \def\@mkteasers{%
2839 \ifx\@teaserfigures\empty\else
2840 \def\@teaser##1{\par\bigskip\bgroup
2841 \captionsetup{type=figure}##1\egroup\par}
2842 \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
2843 \noindent\@Description@presentfalse
2844 \@teaserfigures\par\if@Description@present\else
2845 \global\@undescrbed@imagestrue
2846 \ClassWarning{\@classname}{A possible image without
2847 description}\fi
2848 \medskip}%
2849 \fi}

```

\@mkabstract Typesetting the abstract

```

2850 \def\@mkabstract{\bgroup
2851 \ifx\@abstract\empty\else
2852 {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
2853 \if@ACM@journal
2854 \everypar{\setbox\z@=\lastbox\everypar{}}\small
2855 \else
2856 \section*{\abstractname}%
2857 \fi
2858 \ignorespaces\@abstract\par}%
2859 \fi\egroup}

```

`\@mktranslatedabstract` Typesetting a translated abstract

```
2860 \def\@mktranslatedabstract#1{\selectlanguage{#1}%
2861   \if@ACM@journal
2862     \everypar{\setbox\z@\lastbox\everypar{}}\small
2863   \else
2864     \section*{\abstractname}%
2865   \fi
2866   \ignorespaces}
```

`\@mkbibcitation` Print the bibcitation format

```
2867 \def\@mkbibcitation{\bgroup
2868   \let\@vspace\@vspace@orig
2869   \let\@vspacer\@vspacer@orig
2870   \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2871   \def\footnotemark{}%
2872   \def\@{\unskip{} \ignorespaces}%
2873   \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2874     inside a \string\title{} or \string\author{} command! Use
2875     \string\titlenote{} or \string\authornote{} instead!}}%
2876   \def\@article@string{\ifx\@acmArticle\@empty{\ } \else,
2877     Article~\@acmArticle\ } \fi}%
2878   \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2879   \noindent\bgroup
2880     \def\@{\unskip{}, \ignorespaces}\authors\egroup. \@acmYear. \@title
2881     \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2882     \if@ACM@nonacm\else
2883       % The 'nonacm' option disables 'printacmref' by default,
2884       % and the present \@mkbibcitation definition is never used
2885       % in this case. The conditional remains useful if the user
2886       % explicitly sets \settopmatter{printacmref=true}.
2887       \if@ACM@journal@bibstrip
2888         \textit{\@journalNameShort}
2889         \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2890         \ref{TotPages}~\@pages@word.
2891       \else
2892         In \textit{\@acmBooktitle}%
2893         \ifx\@acmEditors\@empty\textit{.}\else
2894           \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
2895         \fi\
2896         ACM, New York, NY, USA%
2897         \@article@string\unskip, \ref{TotPages}~\@pages@word.
2898       \fi
2899     \fi
2900     \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2901   \par\egroup}
```

`\@printendtopmatter` End the top matter

```
2902 \def\@printendtopmatter{%
2903   \let\@vspace\@vspace@orig
2904   \let\@vspacer\@vspacer@orig
2905   \par\bigskip
2906   \let\@vspace\@vspace@acm
2907   \let\@vspacer\@vspacer@acm
2908 }
```

```
\setthanks We redefine \setthanks using \long
2909 \def\setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}
```

```
\setauthorsaddresses
2910 \def\setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}
```

```
\typesetengagemetadata Typesetting special metadata for ACM Engage
2911 \def\typesetengagemetadata{%
2912   \def\setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
2913   \@acmengagemetadata}
```

3.23 Headers and Footers

We use fancyhdr for our headers and footers:

```
2914 \RequirePackage{fancyhdr}
```

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

```
2915 \let\ACM@ps@plain\ps@plain
2916 \let\ACM@ps@myheadings\ps@myheadings
2917 \let\ACM@ps@headings\ps@headings
2918 \def\ACM@restore@pagestyle{%
2919   \let\ps@plain\ACM@ps@plain
2920   \let\ps@myheadings\ACM@ps@myheadings
2921   \let\ps@headings\ACM@ps@headings}
2922 \AtBeginDocument{\ACM@restore@pagestyle}
```

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

```
2923 \if@ACM@review
2924   \newsavebox{\ACM@linecount@bx}
2925   \newlength\ACM@linecount@bxht
2926   \newcount\ACM@linecount
2927   \ACM@linecount\@ne\relax
2928   \def\ACM@mk@linecount{%
2929     \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
2930       \normalsize
2931       \setlength{\ACM@linecount@bxht}{0pt}%
2932       \loop{\color{red}\scriptsize\the\ACM@linecount}\
2933       \global\advance\ACM@linecount by \@ne
2934       \addtolength{\ACM@linecount@bxht}{\baselineskip}}%
2935       \ifdim\ACM@linecount@bxht<\textheight\repeat
2936       {\color{red}\scriptsize\the\ACM@linecount}\hfill
2937       \global\advance\ACM@linecount by \@ne}}
2938 \fi
```

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

```
2939 \def\ACM@linecountL{%
2940   \if@ACM@review
2941     \ACM@mk@linecount
2942     \begin{picture}(0,0)%
2943       \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2944     \end{picture}%
2945   \fi}
```

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

```

2946 \def\ACM@linecountR{%
2947   \if@ACM@review
2948     \ifcase\ACM@format@nr
2949       \relax % manuscript
2950       \relax
2951       \or % acmsmall
2952       \relax
2953       \or % acmlarge
2954       \relax
2955       \or % acmtog
2956       \ACM@mk@linecount
2957       \or % sigconf
2958       \ACM@mk@linecount
2959       \or % siggraph
2960       \ACM@mk@linecount
2961       \or % sigplan
2962       \ACM@mk@linecount
2963       \or % sigchi
2964       \ACM@mk@linecount
2965       \or % sigchi-a
2966       \ACM@mk@linecount
2967       \or % acmengage
2968       \ACM@mk@linecount
2969       \or % acmcp
2970       \relax
2971   \fi
2972   \begin{picture}(0,0)%
2973     \put(20,-22){\usebox{\ACM@linecount@bx}}%
2974   \end{picture}%
2975 \fi}

```

\ACM@timestamp The timestamp system

```

2976 \if@ACM@timestamp
2977 % Subtracting 30 from \time gives us the effect of rounding down despite
2978 % \numexpr rounding to nearest
2979 \newcounter{ACM@time@hours}
2980 \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
2981 \newcounter{ACM@time@minutes}
2982 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
2983 \newcommand\ACM@timestamp{%
2984   \footnotesize%
2985   \ifx\@acmSubmissionID\empty\relax\else
2986     Submission ID: \@acmSubmissionID.{ }%
2987   \fi
2988   \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
2989   \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
2990   Page \thepage of \@startPage--\pageref*{TotPages}.%
2991 }
2992 \fi

```

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

```

2993 \def\@shortauthors{%

```

```

2994 \if@ACM@anonymous
2995     Anon.
2996     \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
2997 \else\shortauthors\fi}

```

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

```
2998 \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

```

2999 \AtBeginDocument{%
3000 \fancypagestyle{standardpagestyle}{%
3001     \fancyhf{}%
3002     \renewcommand{\headrulewidth}{\z@}%
3003     \renewcommand{\footrulewidth}{\z@}%
3004     \def\@acmArticlePage{%
3005         \ifx\@acmArticle\empty%
3006             \if@ACM@printfolios\thepage\fi%
3007         \else%
3008             \@acmArticle\if@ACM@printfolios:\thepage\fi%
3009         \fi%
3010     }%
3011     \if@ACM@journal@bibstrip@or@tog
3012         \ifcase\ACM@format@nr
3013             \relax % manuscript
3014             \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
3015             \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
3016             \fancyhead[RE]{\@shortauthors}%
3017             \fancyhead[LO]{\ACM@linecountL\shorttitle}%
3018             \if@ACM@nonacm\else%
3019                 \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}%
3020             \fi%
3021         \or % acmsmall
3022             \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
3023             \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
3024             \fancyhead[RE]{\@headfootfont\@shortauthors}%
3025             \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3026             \if@ACM@nonacm\else%
3027                 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3028                     \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
3029             \fi
3030         \or % acmlarge
3031             \fancyhead[LE]{\ACM@linecountL\@headfootfont
3032                 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
3033             \fancyhead[LO]{\ACM@linecountL}%
3034             \fancyhead[RO]{\@headfootfont
3035                 \shorttitle\quad\textbullet\quad\@acmArticlePage}%
3036             \if@ACM@nonacm\else%
3037                 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3038                     \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
3039             \fi
3040         \or % acmtog
3041             \fancyhead[LE]{\ACM@linecountL\@headfootfont
3042                 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%

```

```

3043 \fancyhead[LO]{\ACM@linecountL}%
3044 \fancyhead[RE]{\ACM@linecountR}%
3045 \fancyhead[RO]{\@headfootfont
3046 \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
3047 \if@ACM@nonacm\else
3048 \if@ACM@journal@bibstrip
3049 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
3050 Vol. \@acmVolume, No.\@acmNumber, Article \@acmArticle.
3051 Publication date: \@acmPubDate.}%
3052 \else
3053 \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
3054 \acmConference@date, \acmConference@venue.}%
3055 \fi
3056 \fi
3057 \else % Proceedings
3058 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3059 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3060 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3061 \if@ACM@nonacm
3062 \fancyhead[LE]{\ACM@linecountL}%
3063 \fancyhead[RO]{\ACM@linecountR}%
3064 \else%
3065 \if@ACM@engage
3066 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3067 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3068 \fancyhead[RO]{\@headfootfont
3069 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3070 \ACM@linecountR}%
3071 \else
3072 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3073 \acmConference@shortname,
3074 \acmConference@date, \acmConference@venue}%
3075 \fancyhead[RO]{\@headfootfont
3076 \acmConference@shortname,
3077 \acmConference@date, \acmConference@venue\ACM@linecountR}%
3078 \fi
3079 \fi
3080 \fi
3081 \else % Proceedings
3082 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3083 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3084 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3085 \if@ACM@nonacm
3086 \fancyhead[LE]{\ACM@linecountL}%
3087 \fancyhead[RO]{\ACM@linecountR}%
3088 \else%
3089 \if@ACM@engage
3090 \fancyhead[LE]{\ACM@linecountL\@headfootfont
3091 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3092 \fancyhead[RO]{\@headfootfont
3093 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3094 \ACM@linecountR}%
3095 \else
3096 \fancyhead[LE]{\ACM@linecountL\@headfootfont

```

```

3097         \acmConference@shortname,
3098         \acmConference@date, \acmConference@venue}%
3099         \fancyhead[RO]{\@headfootfont
3100         \acmConference@shortname,
3101         \acmConference@date, \acmConference@venue\ACM@linecountR}%
3102     \fi
3103 \fi
3104 \fi
3105 \if@ACM@sigchiamode
3106     \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
3107 \fi
3108 \if@ACM@timestamp
3109     \fancyfoot[LO,RE]{\ACM@timestamp}
3110 \fi
3111 \if@ACM@acmcp
3112 \renewcommand{\footrulewidth}{0.1\p@}%
3113 \fancyheadoffset[L]{46pt}%
3114 \fancyhead[L]{\makebox[\z@][l]{%
3115     \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3116     \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3117     \strut\ACM@ArticleType~Article}}}%
3118     \ACM@linecountL}%
3119 \fancyhead[R]{\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3120 \fancyfoot[L,C]{}%
3121 \fancyfoot[R]{\footnotesize
3122     \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3123     \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3124     (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3125 \fi
3126 }%
3127 \pagestyle{standardpagestyle}
3128 }

```

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

\@folio@ht

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

\@folio@evoffset

\@folio@max

firstpagestyle The page style for the first page only.

```

3129 \AtBeginDocument{%
3130 \fancypagestyle{firstpagestyle}{%
3131     \fancyhf{}%
3132     \renewcommand{\headrulewidth}{\z@}%
3133     \renewcommand{\footrulewidth}{\z@}%
3134     \if@ACM@journal@bibstrip@or@tog
3135         \ifcase\ACM@format@nr
3136         \relax % manuscript
3137         \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3138         \fancyhead[R]{\@acmBadgeR}%
3139         \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
3140         \if@ACM@nonacm\else%
3141             \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
3142         \fi%
3143     \or % acmsmall
3144         \if@ACM@nonacm\else%

```

```

3145 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3146 \acmNumber, Article \@acmArticle. Publication date:
3147 \@acmPubDate.}%
3148 \fi%
3149 \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3150 \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3151 \fancyhead[RO]{\@acmBadgeR}%
3152 \fancyhead[RE]{\@acmBadgeR}%
3153 \or % acmlarge
3154 \if@ACM@nonacm\else%
3155 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3156 \acmNumber, Article \@acmArticle. Publication date:
3157 \@acmPubDate.}%
3158 \fi%
3159 \fancyhead[RO]{\@acmBadgeR}%
3160 \fancyhead[RE]{\@acmBadgeR}%
3161 \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3162 \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3163 \or % acmtog
3164 \if@ACM@nonacm\else%
3165 \if@ACM@journal@bibstrip
3166 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
3167 Vol. \@acmVolume, No.\@acmNumber, Article \@acmArticle.
3168 Publication date: \@acmPubDate.}%
3169 \else
3170 \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
3171 \acmConference@date, \acmConference@venue.}%
3172 \fi
3173 \fi%
3174 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3175 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3176 \else % Conference proceedings
3177 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3178 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3179 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3180 \fi
3181 \else
3182 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3183 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3184 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3185 \fi
3186 \if@ACM@timestamp
3187 \ifnum\ACM@format@nr=0\relax % Manuscript
3188 \fancyfoot[LO,RE]{\ACM@timestamp\quad
3189 \if@ACM@nonacm\else
3190 \footnotesize Manuscript submitted to ACM
3191 \fi}
3192 \else
3193 \fancyfoot[LO,RE]{\ACM@timestamp}
3194 \fi
3195 \fi
3196 \if@ACM@acmcp
3197 \renewcommand{\footrulewidth}{0.1\p@}%
3198 \fancyheadoffset[L]{46pt}%

```

```

3199 \fancyhead[L]{\makebox[\z@][l]{%
3200     \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3201     \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3202     \strut\ACM@ArticleType~Article}}}%
3203     \ACM@linecountL\@acmBadgeL}%
3204 \fancyhead[R]{\@acmBadgeR\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3205 \fancyfoot[L,C]{}%
3206 \fancyfoot[R]{\footnotesize
3207     \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3208     \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3209     (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3210 \fi
3211 }}

```

3.24 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.

```

3212 \def\ACM@NRadjust#1{%
3213   \begingroup
3214   \expandafter\ifx\csname Sectionformat\endcsname\relax
3215   % do nothing when \Sectionformat is unknown
3216   \def\next{\endgroup #1}%
3217   \else
3218   \def\next{\endgroup
3219     \let\realSectionformat\Sectionformat
3220     \def\ACM@sect@format@{#1}%
3221     \let\Sectionformat\ACM@NR@adjustedSectionformat
3222     %% next lines added 2018-06-17 to ensure section number is styled
3223     \let\real@adddotafter\@adddotafter
3224     \let\@adddotafter\ACM@adddotafter
3225     #1{}% imposes the styles, but nullifies \MakeUppercase
3226     \let\@adddotafter\real@adddotafter
3227   }%

```

```

3228 \fi \next
3229 }

```

\ACM@NR@adjustedSectionformat

```

3230 \def\ACM@NR@adjustedSectionformat#1#2{%
3231 \realSectionformat{\ACM@sect@format{#1}}{#2}%
3232 \let\Sectionformat\realSectionformat}
3233 \DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
3234 \def\ACM@sect@format@null#1{#1}
3235 \let\ACM@sect@format@ACM@sect@format@null
3236 \AtBeginDocument{%
3237 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
3238 \let\LTX@adddotafter\@adddotafter
3239 \fi
3240 }

```

\ACM@adddotafter

```

3241 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}

```

Sectioning is different for different levels

```

3242 \renewcommand\section{\def\@toclevel{1}%
3243 \@startsection{section}{1}{\z@}%
3244 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3245 {.25\baselineskip}%
3246 {\ACM@NRadjust\@secfont}}
3247 \renewcommand\subsection{\def\@toclevel{2}%
3248 \@startsection{subsection}{2}{\z@}%
3249 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3250 {.25\baselineskip}%
3251 {\ACM@NRadjust\@subsecfont}}
3252 \renewcommand\subsubsection{\def\@toclevel{3}%
3253 \@startsection{subsubsection}{3}{\z@}%
3254 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3255 {-3.5\p@}%
3256 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}}
3257 \renewcommand\paragraph{\def\@toclevel{4}%
3258 \@startsection{paragraph}{4}{\parindent}%
3259 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3260 {-3.5\p@}%
3261 {\ACM@NRadjust{\@parfont\@adddotafter}}}}
3262 \newcommand\noindentparagraph{\def\@toclevel{4}%
3263 \@startsection{paragraph}{4}{\z@}%
3264 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3265 {-3.5\p@}%
3266 {\ACM@NRadjust{\@parfont}}}}
3267 \renewcommand\part{\def\@toclevel{9}%
3268 \@startsection{part}{9}{\z@}%
3269 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
3270 {4\p@}%
3271 {\ACM@NRadjust\@parfont}}

```

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

```

3272 \def\section@raggedright{\@rightskip\@flushglue
3273 \rightskip\@rightskip

```

```

3274 \leftskip\z@skip
3275 \parindent\z@}

\@secfont Fonts for sections etc. are different for different formats.
\@subsecfont 3276 \def\@secfont{\sffamily\bfseries\section@raggedright}
\@subsubsecfont 3277 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 3278 \def\@subsubsecfont{\sffamily\itshape}
3279 \def\@parfont{\itshape}
3280 \setcounter{secnumdepth}{3}
3281 \ifcase\ACM@format@nr
3282 \relax % manuscript
3283 \or % acmsmall
3284 \or % acmlarge
3285 \def\@secfont{\sffamily\large\section@raggedright}
3286 \def\@subsecfont{\sffamily\large\section@raggedright}
3287 \or % acmtog
3288 \def\@secfont{\sffamily\large\section@raggedright}
3289 \def\@subsecfont{\sffamily\large\section@raggedright}
3290 \or % sigconf
3291 \def\@secfont{\bfseries\Large\section@raggedright}
3292 \def\@subsecfont{\bfseries\Large\section@raggedright}
3293 \or % siggraph
3294 \def\@secfont{\sffamily\bfseries\Large\section@raggedright}
3295 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
3296 \or % sigplan
3297 \def\@secfont{\bfseries\Large\section@raggedright}
3298 \def\@subsecfont{\bfseries\section@raggedright}
3299 \def\@subsubsecfont{\bfseries\section@raggedright}
3300 \def\@parfont{\bfseries\itshape}
3301 \def\@subparfont{\itshape}
3302 \or % sigchi
3303 \setcounter{secnumdepth}{1}
3304 \def\@secfont{\sffamily\bfseries\section@raggedright}
3305 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3306 \or % sigchi-a
3307 \setcounter{secnumdepth}{0}
3308 \def\@secfont{\sffamily\bfseries\section@raggedright}
3309 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3310 \or % acmengage
3311 \def\@secfont{\bfseries\Large\section@raggedright}
3312 \def\@subsecfont{\bfseries\Large\section@raggedright}
3313 \or %acmcp
3314 \fi

```

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

```

3315 \AtBeginDocument{%
3316 \@for\@tempa:=-1,0,1,2,3,4,5\do{%
3317 \ifundefined{r@tocindent\@tempa}{%
3318 \exp\gdef\cename{r@tocindent\@tempa}\endcsname{0pt}}{}%
3319 }%
3320 }
3321 \def\@writetocindent{%
3322 \beginngroup

```

```

3323 \for\@tempa:=-1,0,1,2,3,4,5\do{%
3324     \immediate\write\@auxout{%
3325         \string\newlabel{tocindent\@tempa}{%
3326             \csname r@tocindent\@tempa\endcsname}}%
3327     }%
3328 \endgroup}

```

`\@adddotafter` Add punctuation after a sectioning command

```
3329 \def\@adddotafter#1{#1\@addpunct{.}}
```

`\@addspaceafter` Add space after a sectioning command

```
3330 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

```

3331 \if@ACM@acmcp
3332     \setcounter{secnumdepth}{-1}%
3333 \fi

```

3.25 TOC lists

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

```
3334 \providecommand*\@dotsep{4.5}
```

3.26 Theorems

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

```
3335 \def\@acmplainbodyfont{\itshape}
```

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

```
3336 \def\@acmplainindent{\parindent}
```

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

```
3337 \def\@acmplainheadfont{\scshape}
```

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

```
3338 \def\@acmplainnotefont{\@empty}
```

Customization of the `acmplain` theorem style:

```

3339 \ifcase\ACM@format@nr
3340 \relax % manuscript
3341 \or % acmsmall
3342 \or % acmlarge
3343 \or % acmtog
3344 \or % sigconf
3345 \or % siggraph
3346 \or % sigplan
3347     \def\@acmplainbodyfont{\itshape}
3348     \def\@acmplainindent{\z@}
3349     \def\@acmplainheadfont{\bfseries}
3350     \def\@acmplainnotefont{\normalfont}

```

```

3351 \or % sigchi
3352 \or % sigchi-a
3353 \or % acmengage
3354 \or % acmcp
3355 \fi

```

acmplain The acmplain theorem style

```

3356 \newtheoremstyle{acmplain}%
3357   {.5\baselineskip\@plus.2\baselineskip
3358     \@minus.2\baselineskip}% space above
3359   {.5\baselineskip\@plus.2\baselineskip
3360     \@minus.2\baselineskip}% space below
3361   {\@acmplainbodyfont}% body font
3362   {\@acmplainindent}% indent amount
3363   {\@acmplainheadfont}% head font
3364   {.}% punctuation after head
3365   {.5em}% spacing after head
3366   {\thmname{#1}\thmnumber{#2}\thmnote{ {\@acmplainnotefont{#3}}}}% head spec

```

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

```

3367 \def\acmdefinitionbodyfont{\normalfont}

```

\acmdefinitionindent The amount to indent the acmdefinition theorem style.

```

3368 \def\acmdefinitionindent{\parindent}

```

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

```

3369 \def\acmdefinitionheadfont{\itshape}

```

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

```

3370 \def\acmdefinitionnotefont{\@empty}

```

Customization of the acmdefinition theorem style:

```

3371 \ifcase\ACM@format@nr
3372 \relax % manuscript
3373 \or % acmsmall
3374 \or % acmlarge
3375 \or % acmtog
3376 \or % sigconf
3377 \or % siggraph
3378 \or % sigplan
3379   \def\acmdefinitionbodyfont{\normalfont}
3380   \def\acmdefinitionindent{\z@}
3381   \def\acmdefinitionheadfont{\bfseries}
3382   \def\acmdefinitionnotefont{\normalfont}
3383 \or % sigchi
3384 \or % sigchi-a
3385 \or % acmengage
3386 \or % acmcp
3387 \fi

```

acmdefinition The acmdefinition theorem style

```

3388 \newtheoremstyle{acmdefinition}%
3389   {.5\baselineskip\@plus.2\baselineskip

```

```

3390 \@minus.2\baselineskip}% space above
3391 {.5\baselineskip\@plus.2\baselineskip
3392 \@minus.2\baselineskip}% space below
3393 {\@acmdefinitionbodyfont}% body font
3394 {\@acmdefinitionindent}% indent amount
3395 {\@acmdefinitionheadfont}% head font
3396 {.}% punctuation after head
3397 {.5em}% spacing after head
3398 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec

```

Make acmplain the default theorem style.

```

3399 \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.

```

3400 \AtEndPreamble{%
3401 \if@ACM@acmthm
3402 \theoremstyle{acmplain}
3403 \@ifundefined{theorem}{%
3404 \newtheorem{theorem}{Theorem}[section]
3405 }{}
3406 \@ifundefined{conjecture}{%
3407 \newtheorem{conjecture}[theorem]{Conjecture}
3408 }{}
3409 \@ifundefined{proposition}{%
3410 \newtheorem{proposition}[theorem]{Proposition}
3411 }{}
3412 \@ifundefined{lemma}{%
3413 \newtheorem{lemma}[theorem]{Lemma}
3414 }{}
3415 \@ifundefined{corollary}{%
3416 \newtheorem{corollary}[theorem]{Corollary}
3417 }{}
3418 \theoremstyle{acmdefinition}
3419 \@ifundefined{example}{%
3420 \newtheorem{example}[theorem]{Example}
3421 }{}
3422 \@ifundefined{definition}{%
3423 \newtheorem{definition}[theorem]{Definition}
3424 }{}
3425 \fi
3426 \theoremstyle{acmplain}
3427 }

```

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

```

3428 \def\@proofnamefont{\scshape}

```

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

```
3429 \def\@proofindent{\indent}
```

Customization of the proof environment.

```
3430 \ifcase\ACM@format@nr
3431 \relax % manuscript
3432 \or % acmsmall
3433 \or % acmlarge
3434 \or % acmtog
3435 \or % sigconf
3436 \or % siggraph
3437 \or % sigplan
3438 \def\@proofnamefont{\itshape}
3439 \def\@proofindent{\noindent}
3440 \or % sigchi
3441 \or % sigchi-a
3442 \or % acmengage
3443 \or % acmcp
3444 \fi
```

proof We want some customization of the proof environment.

```
3445 \renewenvironment{proof}[1][\proofname]{\par
3446 \pushQED{\qed}%
3447 \normalfont \topsep6\p@\@plus6\p@\relax
3448 \trivlist
3449 \item[\@proofindent\hskip\labelsep
3450 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
3451 }{%
3452 \popQED\endtrivlist\endpfalse
3453 }
```

3.27 Balancing columns

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

```
3454 \AtEndPreamble{%
3455 \if@ACM@pbalance
3456 \global\@ACM@balancefalse
3457 \ifcase\ACM@format@nr
3458 \relax % manuscript
3459 \or % acmsmall
3460 \or % acmlarge
3461 \or % acmtog
3462 \RequirePackage{pbalance}%
3463 \or % sigconf
3464 \RequirePackage{pbalance}%
3465 \or % siggraph
3466 \RequirePackage{pbalance}%
3467 \or % sigplan
3468 \RequirePackage{pbalance}%
3469 \or % sigchi
3470 \RequirePackage{pbalance}%
3471 \or % sigchi-a
3472 \or % acmengage
```

```

3473         \RequirePackage{pbalance}%
3474         \or % acmcp
3475     \fi
3476 \fi
3477 \if@ACM@balance
3478     \ifcase\ACM@format@nr
3479     \relax % manuscript
3480         \global\@ACM@balancefalse
3481     \or % acmsmall
3482         \global\@ACM@balancefalse
3483     \or % acmlarge
3484         \global\@ACM@balancefalse
3485     \or % acmtog
3486         \RequirePackage{balance}%
3487     \or % sigconf
3488         \RequirePackage{balance}%
3489     \or % siggraph
3490         \RequirePackage{balance}%
3491     \or % sigplan
3492         \RequirePackage{balance}%
3493     \or % sigchi
3494         \RequirePackage{balance}%
3495     \or % sigchi-a
3496         \global\@ACM@balancefalse
3497     \or % acmengage
3498         \RequirePackage{balance}%
3499     \or % acmcp
3500         \global\@ACM@balancefalse
3501     \fi
3502 \fi
3503 }
3504 \AtEndDocument{%
3505     \if@ACM@balance
3506     \if@twocolumn
3507     \balance
3508     \fi\fi}

```

3.28 Acknowledgments

\acksname

```

3509 \newcommand\acksname{Acknowledgments}

```

\acks This is a comment-like structure

```

3510 \specialcomment{acks}{%
3511     \begin{group}
3512     \section*{\acksname}
3513     \phantomsection\addcontentsline{toc}{section}{\acksname}
3514 }{%
3515     \end{group}
3516 }

```

\grantsponsor We just typeset the name of the sponsor

```

3517 \def\grantsponsor#1#2#3{#2}

```

`\grantnum`

```
3518 \newcommand\grantnum[3][\]{#3%
3519 \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}
```

3.29 Conditional typesetting

We use the comment package for conditional typesetting:

```
3520 \AtEndPreamble{%
3521 \if@ACM@screen
3522 \includecomment{screenonly}
3523 \excludecomment{printonly}
3524 \else
3525 \excludecomment{screenonly}
3526 \includecomment{printonly}
3527 \fi
3528 \if@ACM@anonymous
3529 \excludecomment{anonsuppress}
3530 \excludecomment{acks}
3531 \else
3532 \includecomment{anonsuppress}
3533 \fi}
```

3.30 Additional bibliography commands

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

```
3534 \newcommand\showeprint[2][arxiv]{%
3535 \def\@tempa{#1}%
3536 \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
3537 \def\@tempb{arxiv}%
3538 \ifx\@tempa\@tempb\relax
3539 \arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3540 \else
3541 \def\@tempb{arXiv}%
3542 \ifx\@tempa\@tempb\relax
3543 \arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3544 \else
3545 #1:#2%
3546 \fi
3547 \fi}
```

3.31 Index

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

```
3548 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
3549 \columnseprule\z@ \columnsep 35\p@
3550 \@indextitlestyle
3551 \let\item\@idxitem
3552 \parindent\z@ \parskip\z@\@plus.3\p@\relax
3553 \raggedright
3554 \hyphenpenalty\@M
3555 \footnotesize}
```

3.32 End of Class

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

```
3556 \let\@vspace@orig=\@vspace
3557 \let\@vspacer@orig=\@vspacer
3558 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
3559     only be used to provide space above/below surrounding
3560     objects}}{}{}
3561 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
3562     only be used to provide space above/below surrounding
3563     objects}}{}{}
3564 \let\@vspace@acm=\@vspace
3565 \let\@vspacer@acm=\@vspacer
```

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

```
3566 \let\ACM@origbaselinestretch\baselinestretch
3567 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
3568   \ClassError{\@classname}{An attempt to redefine
3569     \string\baselinestretch\space detected. Please do not do this for
3570     ACM submissions!}\fi}
```

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

```
3571 \let\ACM@origsection\section
3572 \AtEndDocument{\ifx\section\ACM@origsection\else
3573   \ClassError{\@classname}{An attempt to redefine
3574     \string\section\space detected. Please do not do this for
3575     ACM submissions!}\fi}
```

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

```
3576 \let\ACM@origsubsection\subsection
3577 \AtEndDocument{\ifx\subsection\ACM@origsubsection\else
3578   \ClassError{\@classname}{An attempt to redefine
3579     \string\subsection\space detected. Please do not do this for
3580     ACM submissions!}\fi}
```

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

```
3581 \let\ACM@origsubsubsection\subsubsection
3582 \AtEndDocument{\ifx\subsubsection\ACM@origsubsubsection\else
3583   \ClassError{\@classname}{An attempt to redefine
3584     \string\subsubsection\space detected. Please do not do this for
3585     ACM submissions!}\fi}
```

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

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

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

References

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Change History

1.48	General: Added prologue option to xcolor	52	\ccsdesc@parse: Added warning for missing concepts	81
	Bib code cleanup (Zack Weinberg)	38	\if@ACM@printacmref: Added warning for longer papers	79
	Documentation update (siggraph) .	38	\keywords: Added warning for missing keywords	78
1.49	General: New journal: DTRAP	38	1.69	\vspace: Added the changed command to avoid grouping . . .
1.53	General: New journals: PACMCGIT, TIOT, TDSCI	38	1.70	General: Name change for TDS
	Rearranged docs	38	1.71	General: Bibliography change: volume for @inproceedings is now in brackets together with series . . .
1.54	General: Moved footnote stuff before hyperref call (Ross Moore)	38		LuaTeX now uses the OTF versions of fonts
1.56	General: Documented \Description	38		Retired sigchi and sigchi-a
1.57	General: Booktabs package is now the default	38	1.75	General: Documentation update . . .
1.58	General: Changes in samples (Enrico Gregorio)	38	1.78	General: Documentation update: Word count
	New journal: HEALTH. TDS is renamed to TDSCI	38	1.79	General: Updated indormation for TAP, TCPS, TEAC
1.60	General: New option: urlbreakonhyphens	38	1.80	General: Added DLT and FAC
	\if@ACM@urlbreakonhyphens: introduced macro	39	1.82	General: Updated abbreviations and codes for several journals
1.62	General: New journal: TELO	38	1.84	General: New journals: JDS, GAMES
1.63	General: New journal: FACMP	38	1.85	General: Added CC licenses
	New journal: TQUANT	38		Added: acmengage
1.63a	General: Move: TQUANT to TQC . .	38		New journal: JRC
1.64	General: Putting abstract after \maketitle now causes an error .	38		\@mkauthors: Added: acmengage . .
1.65	General: New journal: DGOV	38		\@mktitle: Added: acmengage . . .
1.66	General: ACM reference format is now mandatory for papers over one page; CCS concepts and keywords are now mandatory for papers over two pages	38		\@printtopmatter: Added: acmengage
	Authors' addresses are mandatory for journal articles	38		\@specialsection: Added: acmengage
	\@mkauthorsaddresses: Added warning for missing addresses .	102		\@subtitlefont: Added: acmengage .
				\@titlefont: Added: acmengage . .
				\ACM@linecountR: Added: acmengage
				format: New format: acmengage . . .
				\parskip: Added: acmengage

1.87	General: New journals: ACMJCSS, JATS, TORS	62	//github.com/borisveytsman/ acmart/issues/1)	38
	format: New format: acmcp	39	Defined ACM colors	38
1.88	General: Added ISSN for ACMJCSS	62	Explicitly put draft option (closes https: //github.com/borisveytsman/ acmart/issues/4)	42
	Added ISSN for GAMES	62	Set headheight to 1pc for all formats (closes https: //github.com/borisveytsman/ acmart/issues/5)	38
	Added PACMNET	62		
1.89	General: Added PACMMOD	62		
	Added TOPML	62		
	\@printtopmatter: Moved badges to top header	92	v1.02 General: Added TOPS and TSC (closes https: //github.com/borisveytsman/ acmart/issues/12)	38
1.90	General: Added TOPML eISSN	62	Documentation changes (closes https: //github.com/borisveytsman/ acmart/issues/13)	38
1.90a	General: Changes in the sample keywords and concepts	38		
1.92	General: Documentation update: use of 'anonymous' throughout	38	v1.03 General: Added anonsuppress environment	38
	Moved hyperxmp again due to kernel update	50	Added authorversion option (closes https: //github.com/borisveytsman/ acmart/issues/9)	38
2.04	General: Deleted loading ifdraft due to the new release of hyperxmp	50	\@formatdoi: Added macro	84
	Explicitly load ifdraft since hyperxmp tries to load it inside a group	50	\if@ACM@authorversion: Added macro	40
2.05	General: New data for TELO	62	\maketitle: Added special case of authorversion	88
2.06	General: Added eISSN for a number of journals	62	v1.04 General: Updated bibliography for siggraph	38
2.07	General: Another change for TELO	62	\acmArticleSeq: Name change by Matthew Fluet	76
2.13	\orcid: Protected orchidcite against uppercasing	74	\acmDOI: Name change by Matthew Fluet	77
2.15	General: Added AILET, TAIS, TAISAP, ACMJDS	62	\acmISBN: Name change by Matthew Fluet	76
2.16	General: Corrected handling of journals in the options	62	v1.05 General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	38
2.17	General: Fixed bug with ACMJDS	62	Patched \setcitestyle command; closes https: //github.com/borisveytsman/ acmart/issues/19	38
v1.00	General: First released version	38	v1.06 \@ACM@badge@skip: Added macro	77
v1.01	General: Changed hyperref colors in screen mode (closes https: //github.com/borisveytsman/ acmart/issues/19)	77	\@ACM@badge@width: Added macro	77
			\@ACM@title@width: Added macro	77

\@mktitle@i: Added processing		\@parfont: Moved to	
badges	94	\section@raggedright	112
Made generic	94	\copyrightpermissionfootnoterule:	
\@mktitle@ii: Now this macro is		Added macro	54
obsolete	95	\descriptionlabel: Redefined	62
\@mktitle@iii: Added processing		\footnoterule: Made shorter	55
badges	95	\if@ACM@natbib@override: Added	
Made more generic	95	macro	41
\@mktitle@iv: Made more generic	95	\if@ACM@newfonts: Added macro	56
\@printtopmatter: Added processing		\maketitle: Moved thankses to	
badges	92	copyrightpermission box	88
\@subtitlefont: Added macro	94	\section@raggedright: Introduced	
\@titlefont: Added macro	93	macro	111
\acmBadgeL: Added macro	77	v1.13	
\acmBadgeR: Added macro	77	General: Font adjustments for	
\if@ACM@badge: Added macro	77	acmsmall	96
v1.07		Increased font size for ACM Large	44
\maketitle: Corrected a bug with		Print bibliographic information by	
abstract footnotes	88	default for the proceedings	79
Corrected a bug with permssion		\@mpfootnotetext: Made minipage	
and footnotes order	88	footnotes centered	50
v1.08		\bibliographystyle: Redefined	
General: SIGPLAN reformatting by		macro	51
Matthew Fluet	38	\bibstyle@acmauthoryear: Added	
Typos corrected (Tobias Pape)	38	macro	47
v1.09		\bibstyle@acmnumeric: Added	
General: Revert SIGPLAN caption		macro	47
rules	38	\if@ACM@printfolios: Added macro	79
v1.10		standardpagestyle: Added headers	
General: Changes of		for sigs	106
‘licensedothergov’ wording	82	Expanded headers for sigchi-a	106
\maketitle: Corrected a bug with doi		Suppressed folios if sig	106
in manuscript and author vertsion,		v1.14	
https://github.com/borisveytsman/		General: \citestyle updates	
acmart/issues/36	88	(Matthew Fluet)	38
standardpagestyle: Reversed folios		Patched \citestyle	45
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v1.11		def of \bibstyle@acmauthoryear	
General: Customization of ACM		before use	47
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environment by Matthew Fluet	38	\bibstyle@numeric before use	47
v1.12		v1.15	
General: Added graceful behavior		\@ACM@addtoaddress: Added macro	95
when libertine fonts are absent	56	\@mkauthors@iii: New authors	
Documentation updates	38	system	99
\@marginfigure: Now centering by		\@shortauthors: Introduced macro	105
default	60	\@typeset@author@bx: Moved to	
\@marginable: Now centering by		separate macro	99
default	60	\acks: Added macro	117
\@mkauthors@i: Removed		\affiliation: Added code for author	
MakeTextUppercase due to a bug		groups	74
with new kernel	98	\author: Added code for author	
		groups	73
		\city: Added macro	95

\country: Added macro	95	v1.19	General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	38
\department: Added macro	95		Include 'References' in PDF bookmarks (Matthew Fluet)	45
\grantnum: Added macro	118		\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet)	102
\grantsponsor: Added macro	117		\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet)	117
\if@insideauthorgroup: Introduced macro	72	v1.20	General: Bug fixes for bst	38
\institution: Added macro	95		\@mkabstract: Deleted spurious space	102
\num@authorgroups: Renamed	72	v1.21	\showeprint: Added macro	118
\orcid: Introduced macro	74	v1.22	General: More bibliography changes for Aptara	38
\position: Added macro	95	v1.23	General: Add PACMPL journal option	38
\postcode: Added macro	95	v1.24	General: Add IMWUT journal option	62
\state: Added macro	95	v1.25	General: Updated PACMPL	62
\streetaddress: Added macro	95	v1.26	General: Corrected \shortcite bug .	38
standardpagestyle: Better handling of anonymous mode	106		Documentation typos fixed (thanks to Stephen Spencer)	38
v1.16		v1.27	\if@ACM@printccs: Typo corrected .	78
General: Formatting header/footer (Matthew Fluet)	38	v1.28	General: Corrected option natbib behavior	47
\@headfootfont: Added macro	106		Got rid of warnings in pdf keywords	50
standardpagestyle: Customize header/footer text font	106	v1.29	\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato)	81
v1.17		v1.30	General: Added \frenchspacing . . .	119
General: Slightly decreased margins for sigs	52		Bibtex style now recognizes https:// in doi	38
\@makefnmark: Redefined	50			
\@mkauthors: TOG now uses the same authors block as other journals . .	96			
\@mkauthors@ii: Deleted	99			
\@mkbibcitation: Added \nobreak Changed format for sigs	103			
\acmArticle: The default is now numerical	76			
\acmMonth: The default must be numerical. Closes #50.	76			
\acmNumber: The default is now numerical	76			
\acmVolume: The default is now numerical	76			
\acmYear: The default is now numerical	76			
\description: Decreased indent . . .	62			
\grantnum: Added url	118			
\grantsponsor: Renamed	117			
\if@ACM@printacmref: Renamed from \if@ACM@printbib	78			
standardpagestyle: Added paper title to sigs	106			
v1.18				
General: Natbib is now the default for all formats	38			
\@mkauthors@i: Now we andify affiliations	98			
\@typeset@author@line: Added macro	97			

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

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