

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

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Abstract

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

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1 Introduction

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

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

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

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

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

2 User's guide

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

2.1 Installation

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

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

¹<http://www.acm.org/>

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

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

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

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

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

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

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

2.2 Invocation and options

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

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

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

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

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

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

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

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

Table 1: The possible values for the format option

Value	Meaning
manuscript	A manuscript. This is the default.
acmsmall	Small single-column format. Used for ACMJCSS, 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, TRETS, TSAS, TSC, TSLP, and TWEB, including special issues.
acmlarge	Large single-column format. Used for DLT, DTRAP, HEALTH, IMWUT, JOCCH, and TAP, including special issues.
acmtog	Large double-column format. Used for TOG, including annual conference Technical Papers.
sigconf	Proceedings format for most ACM conferences (with the exception of SIGPLAN) and all ICPS volumes.
sigplan	Proceedings format for SIGPLAN conferences.
acmengage	ACM EngageCSEdu Course materials.
acmcp	ACM cover page.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.3 Top matter

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

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

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

```
\acmJournal{TOMS}
```

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

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

Table 2: Boolean options

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

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

name: the name of the conference.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

```

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

```

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

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

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

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

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

```

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

```

Similarly you can repeat the `\email` command.

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

```

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

```

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

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

However, this format is not generally recommended.

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

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

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

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

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

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

An example of the author block:

```
\author{A. U. Thor}
\orcid{1234-4564-1234-4565}
\affiliation{%
  \institution{University of New South Wales}
  \department{School of Biomedical Engineering}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}
\email{author@nsw.au.edu}
```

```

\author{A. N. Other}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}
\author{C. O. Respondent}
\orcid{1234-4565-4564-1234}
\affiliation{%
  \institution{University of Pennsylvania}
  \city{Philadelphia}
  \state{PA}
  \country{USA}}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}

```

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

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

```

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

```

and

```

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

```

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

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

```

\authorsaddresses{%
  Authors' addresses: G.~Zhou, Computer Science Department, College of

```

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

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

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

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

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

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

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

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

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

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

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

\acmArticleSeq The articles in the same issue of a journal have a *sequence number*. By default it is

the same as the article number, but the command `\acmArticleSeq{<n>}` can be used to change it:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

```
\begin{CCSXML}
```

```

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

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

```

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

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

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

`\setcctype` If Creative Commons license is used, the package by default chooses CC-BY 4.0 Attribution 4.0 International license. You can override this choice by the command `\setcctype[<version>]{<type>}`, where [*<version>*] can be either 3.0 or 4.0 (4.0 by default), and {*<type>*} can be one of zero, by, by-sa, by-nd, by-nc, by-nc-sa, by-nc-nd (see <https://creativecommons.org/licenses/> for the explanation). This command should be used in the preamble only.

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

Table 3: Parameters for the `\setcopyright` command

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

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

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

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

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

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

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

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

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

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

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

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

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

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

`\received` The command `\received[<stage>]{<date>}` sets the history of the publication.

Table 4: Settings for the `\settopmatter` command

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

The `[\stage]` argument is optional; the default is Received for the first date and revised for the subsequent ones. For example,

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

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

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

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

2.4 Top matter of ACM Engage materials

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

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

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

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

2.5 ACM cover page

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

There are several top matter commands specific for this format.

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

```
\acmArticleType{Review}
```

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

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

You may repeat these commands if you have several repositories.

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

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

ACM cover page should have the following obligatory sections:

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

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

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

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

2.6 Internationalization

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

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

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

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

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

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

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

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

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

while a paper in French should set

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

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

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

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

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

2.7 Algorithms

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

2.8 Figures and tables

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

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

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

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

teaserfigure: a special figure before `\maketitle`.

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

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

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

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

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

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

```
sourcenote. This is a table sourcenote. This is a table
sourcenote.
```

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

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

2.9 Descriptions of images

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

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

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

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

2.10 Theorems

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

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

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

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

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

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

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}{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
```

2.11 Online-only and offline-only material

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

```
\section{Supplementary materials}

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

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

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

2.12 Note about anonymous mode

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

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

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

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

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

2.13 Acknowledgments

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

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

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

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

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

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

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

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

Example:

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

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

2.14 Bibliography

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

2.14.1 Processing using Bib_{TeX}

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

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

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

```
\citestyle{acmauthoryear}
```

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

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

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

One of the more common versions is

```
\setcitestyle{nosort}
```

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

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

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

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

2.14.2 URL, DOI, eprint

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

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

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

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

```
lastaccessed = {March 2, 2005},
```

```
archived = {https://web.archive.org/web/20240505055615}
```

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

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

2.14.3 Special entry types

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

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

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

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

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

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

```
@online{Obama08,
  author = "Barack Obama",
  year = "2008",
```

```

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

```

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

```

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

```

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

```

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

```

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

```

@Presentation{Reiser2014,
  author = {Brian J. Reiser},
  year = 2014,
  title = {Designing coherent storylines aligned with NGSS for the
           K-12 classroom},
  venue = {National Science Education Leadership Association
           Meeting, Boston, MA, USA},
  url = {https://www.academia.edu/6884962/}
}

```

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

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

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

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

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

2.14.4 Dates and sorting

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

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

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

A note about sorting. The current ACM bibliography styles always sort the entries according to authors names and publication year. There is a controversy about sorting names with “von” or “van” part: should Ludwig van Beethoven be sorted under “V” or under “B”? The American practice is to use “van” in sorting, i.e. to file van Beethoven under “V”. However, some authorities recommend to sort Dutch persons according to their last names (see e.g. <https://www.ifla.org/files/assets/cataloguing/pubs/>

names-of-persons.1996.pdf). While I do not want to take a part in this dispute, I would like to point to the old “noopsort” trick by Oren Patashnik. Add to the .bib file the line

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

and then encode the author as

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

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

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

2.14.5 Processing using Bib_{La}TeX

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

There are a few key differences in how the _{La}TeX sources are set up when using Bib_{La}TeX instead of Bib_{TeX}, that we summarize briefly here (please refer to the official Bib_{La}TeX 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}TeX 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}TeX styles.

2.15 Colors

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

The ACM provides the following recommendation on color use.

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

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

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

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

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

2.15.1 Manual bibliography

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

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

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

2.16 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

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

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

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

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

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

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

2.17 Counting words

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

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

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

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

2.18 Disabled or forbidden commands

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

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

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

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

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

2.19 Notes for wizards

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

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

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

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

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

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

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

you will pass `dvipsnames` to `xcolor`.

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

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

2.20 Currently supported publications

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

Abbreviation	Publication
ACMJCSS	ACM Journal on Computing and Sustainable Societies
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/IMS Journal of Data Science
JEA	ACM Journal of Experimental Algorithmics
JERIC	ACM Journal of Educational Resources in Computing
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCCH	ACM Journal on Computing and Cultural Heritage
JRC	ACM Journal on Responsible Computing
PACMCGIT	Proceedings of the ACM on Computer Graphics and Interactive Techniques
PACMHCI	PACM on Human-Computer Interaction
PACMOD	PACM on Management of Data
PACMNET	PACM on Networking
PACMPL	PACM on Programming Languages
PACMSE	PACM on Software Engineering
POMACS	PACM on Measurement and Analysis of Computing Systems
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
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/IMS Transactions on Data Science
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
TELO	ACM Transactions on Evolutionary Learning and Optimization
THRI	ACM Transactions on Human-Robot Interaction
TIIS	ACM Transactions on Interactive Intelligent Systems
TIOT	ACM Transactions on Internet of Things
TISSEC	ACM Transactions on Information and System Security
TIST	ACM Transactions on Intelligent Systems and Technology
TKDD	ACM Transactions on Knowledge Discovery from Data

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.

2.21 Samples

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

Here is the list of the samples:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

sample-acmengage: A sample of ACM Engage publication.

2.22 A note about sigchi-a format

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

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

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

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

sidebar: textual information in the margin,

marginfigure: a figure in the margin,

margintable: a table in the margin.

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

The horizontal sizes of figures are:

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

2.23 Experiments with tagging

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

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

3 Implementation

3.1 Identification

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

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class&!tagged>\ProvidesClass{acmart}
6 <tagged>\ProvidesClass{acmart-tagged}
7 [2025/08/21 v2.15 Typesetting articles for the Association for Computing Machinery]
```

And the driver code:

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

3.2 Preload hook

We preload acmart-preload-hook:

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

3.3 Options

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

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

format The possible formats

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

\if@ACM@screen Whether we use screen mode

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

\if@ACM@urlbreakonhyphens

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

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

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

\if@ACM@review Whether we use review mode

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

```

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

\if@ACM@natbib Whether we use natbib mode

```

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

```

```

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

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

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

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

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

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

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

```


3.4 Setting switches

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

164 `\newif\if@ACM@manuscript`

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

165 `\newif\if@ACM@journal`

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

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

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

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

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

168 `\newif\if@ACM@sigchiamode`

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

169 `\newif\if@ACM@engage`

170 `\@ACM@engagefalse`

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

171 `\newif\if@ACM@acmcp`

172 `\@ACM@acmcpfalse`

Setting up switches

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

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

175 The format siggraph is now obsolete.\MessageBreak

176 I am switching to sigconf.}

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

178 `\fi`

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

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

181 The format sigchi is now obsolete.\MessageBreak

182 I am switching to sigconf.}

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

184 `\fi`

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

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

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

188 effective immediately. ACM is keeping this template\MessageBreak

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

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

191 accept documents in this format for publication and\MessageBreak

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

193 this template.\MessageBreak

194 ACM SIGCHI is directing Conference leaders and\MessageBreak

195 authors to publish their articles using the SIGCONF\MessageBreak

196 template call.}

```

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

```

3.5 Loading the base class and package

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

```

\@startsection@kernel
239 \let\@startsection@kernel\@startsection

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

```

```

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

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

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

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

Booktabs is now the default
273 \RequirePackage{booktabs}

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

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

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

```

```

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

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

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

```

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

```

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

```

3.6 Citations

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

```

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

```

```

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

```

\bibstyle@acmauthoryear The default author-year format:

```

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

```

`\bibstyle@acmnumeric` The default numeric format:

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

The default is numeric:

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

3.7 Internationalization

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

```

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

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

\@translatedtitle
442 \def\@translatedtitle{}

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

\@translatedsubtitle
445 \def\@translatedsubtitle{}

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

\@translatedkeywords
448 \def\@translatedkeywords{}

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

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

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

```

\@savetranslatedabstract And saving the abstract

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

3.8 Sectioning

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

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



```

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

```

```

554 \else
555 \def\@svsechd{#4{\hskip #1\relax #5}}%
556 \fi
557 \@xsect{#3}}
558 \end{class}&tagged)
559 \end{class}
560 \def\@seccntformat#1{\cname the#1\endcsname\quad}

```

[illegible]

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

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

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

\@makefntext We do not use indentation for footnotes

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

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

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

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

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

3.9 Hyperxmp and hyperref

Adding hyperref

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

```

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

```

`\bibliographystyle` The `amsart` package redefines `\bibliographystyle` since it prefers the AMS bibliography style. We turn it back to the \TeX definition:

```

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

```

3.10 Other packages

Graphics and color.

```

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

```

We define ACM colors according to [8]:

```

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

```

Author-draft mode or sigchi-a mode

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

3.11 Paper size and paragraphing

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

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

```

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

```

\parindent Paragraphing

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

```

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

```

`\normalparindent` The `amsart` package defines the `\normalparindent` length and initializes it to 12pt (the value of `\parindent` in `amsart`). It is later used to set the `\listparindent` length in the quotation environment and the `\parindent` length in the `\@footnotetext` command. We set `\normalparindent` to the value of `\parindent` as selected by `acmart` for consistent paragraph indents.

```

795 \setlength\normalparindent{\parindent}

```

Footnotes require some consideration. We have several layers of footnotes: front-matter footnotes, “regular” footnotes and the special insert for the bibstrip. In the old ACM classes, the bibstrip was a `\@float`. The problem with floats is that they tend to, well, float—and we want the guarantee they stay.

We use `manyfoot` for layered footnotes instead.

`copyrightpermissionfootnoterule` This is the footnote rule that separates the bibstrip from the rest of the paper. It is a full width rule.

```

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

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

```

`\footnoterule` Tschichold’s rules:

```

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

```

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

```

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

```

```

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

```

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

```

817 \def\@textbottom{\vskip \z@ \@plus 1pt}
818 \let\@texttop\relax

```

In two-column layouts, force both columns to be the same height by inserting extra internal vertical space to fill out the page.

```

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

```

3.12 Fonts

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

The code below is by Ross Moore.

```

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

```

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

```

851 \newif\if@ACM@newfonts

```



```

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

```

We use Libertine throughout. We use Libertine throughout.

```

862 \if@ACM@newfonts
863   \ifxetex
864     \RequirePackage{amssymb}
865     \RequirePackage{unicode-math}
866     \setmathfont[Scale=MatchUppercase]{LibertinusMath-Regular.otf}
867     \setmathfont{latinmodern-math.otf}[range={cal}]
868     \RequirePackage[tt=false]{libertine}
869     \setmonofont[StylisticSet=3]{inconsolata}
870   \else
871     \ifluatex
872       \RequirePackage{amssymb}
873       \RequirePackage{unicode-math}
874       \setmathfont[Scale=MatchUppercase]{LibertinusMath-Regular.otf}
875       \setmathfont{latinmodern-math.otf}[range={cal}]
876       \RequirePackage[tt=false]{libertine}
877       \setmonofont[StylisticSet=3]{inconsolata}
878     \else
879       \RequirePackage[T1]{fontenc}
880       \RequirePackage[tt=false, type1=true]{libertine}
881       \RequirePackage[varqu]{zi4}
882       \RequirePackage[libertine]{newtxmath}
883     \fi
884   \fi
885 \fi

```

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

```

886 \let\liningnums\@undefined
887 \AtEndPreamble{%
888   \DeclareTextFontCommand{\liningnums}{\libertineLF}}

```

The SIGCHI extended abstracts are sans serif:

```

889 \if@ACM@sigchiamode
890   \renewcommand{\familydefault}{\sfdefault}
891 \fi

```

3.13 Image descriptions

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

```

892 \newif\if@Description@present
893 \@Description@presenttrue

```

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

```
894 \newif\if@undescrbed@images
895 \@undescrbed@imagesfalse
```

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

```
896 \newcommand\Description[2][\global\@Description@presenttrue\ignorespaces]
```

The global warning

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

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

```
915 \AtBeginEnvironment{figure}{\@Description@presentfalse
916   \let\@vspace\@vspace@orig
917   \let\@vspacer\@vspacer@orig}
918 \AtBeginEnvironment{figure*}{\@Description@presentfalse
919   \let\@vspace\@vspace@orig
920   \let\@vspacer\@vspacer@orig}
921 \AtEndEnvironment{figure}{\if@Description@present\else
922   \global\@undescrbed@imagestrue
923   \ClassWarning{\@classname}{A possible image without description}\fi}
924 \AtEndEnvironment{figure*}{\if@Description@present\else
925   \global\@undescrbed@imagestrue
926   \ClassWarning{\@classname}{A possible image without description}\fi}
927 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
928   \let\@vspacer\@vspacer@orig}
929 \AtBeginEnvironment{table*}{\let\@vspace\@vspace@orig
930   \let\@vspacer\@vspacer@orig}
931 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
932   \let\@vspacer\@vspacer@orig}
933 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
934   \let\@vspacer\@vspacer@orig}
935 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
936   \let\@vspacer\@vspacer@orig}
937 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
938   \let\@vspacer\@vspacer@orig}
939 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
```

```

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

```

3.14 Floats

We use the caption package

```

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

```

sidebar The sidebar environment:

```

986 \newfloat{sidebar}{}{sbar}
987 \floatname{sidebar}{Sidebar}

```

```

988 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}

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

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

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

margintable The margintable environment:
1003 \newenvironment{margintable}{\Collect@Body\@margintable}{}

\@margintable The processing of the saved text
1004 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
1005 \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
1006 \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
1007 \newdimen\fulltextwidth
1008 \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)
1009 \if@ACM@sigchiamode
1010 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
1011 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
1012 \let\@endfloatbox\@endwidefloatbox
1013 \def\@fpsadddefault{\def\@fps{tp}}%
1014 \@float}
1015 \fi

\end@dblfloat And the end. Just adding a \bgroup.
1016 \if@ACM@sigchiamode
1017 \def\end@dblfloat{%
1018 \end@float\egroup}
1019 \fi

```

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

```
1020 \def\@endwidefloatbox{%
1021   \par\vskip\z@skip
1022   \@minipagefalse
1023   \outer@nobreak
1024   \egroup
1025   \color@endbox
1026   \global\setbox\@currbox=\vbox{\moveleft
1027     \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
1028   \wd\@currbox=\textwidth
1029 }
```

3.15 Lists

```
1030 \ifcase\ACM@format@nr
1031 \relax % manuscript
1032 \or % acmsmall
1033 \or % acmlarge
1034 \or % acmtog
1035 \or % sigconf
1036 \or % siggraph
1037 \or % sigplan
1038 \def\labelenumi{\theenumi.}
1039 \def\labelenumii{\theenumii.}
1040 \def\labelenumiii{\theenumiii.}
1041 \def\labelenumiv{\theenumiv.}
1042 \or % sigchi
1043 \or % sigchi-a
1044 \or % acmengage
1045 \or % acmcp
1046 \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`.

```
1047 \newdimen\@ACM@labelwidth
1048 \AtBeginDocument{%
1049   \setlength\labelsep{4pt}
1050   \setlength{\@ACM@labelwidth}{6.5pt}
1051
1052   %% First-level list: when beginning after the first line of an
1053   %% indented paragraph or ending before an indented paragraph, labels
1054   %% should not hang to the left of the preceding/following text.
1055   \setlength\leftmargini{\z@}
1056   \addtolength\leftmargini{\parindent}
1057   \addtolength\leftmargini{2\labelsep}
1058   \addtolength\leftmargini{\@ACM@labelwidth}
1059
1060   %% Second-level and higher lists.
1061   \setlength\leftmarginii{\z@}
1062   \addtolength\leftmarginii{0.5\labelsep}
```

```

1063 \addtolength\leftmarginii{\@ACM@labelwidth}
1064 \setlength\leftmarginiii{\leftmarginii}
1065 \setlength\leftmarginiv{\leftmarginiii}
1066 \setlength\leftmarginv{\leftmarginiv}
1067 \setlength\leftmarginvi{\leftmarginv}
1068 \@listi}
1069 \newskip\listisep
1070 \listisep\smallskipamount
1071 \def\@listI{\leftmargin\leftmargini
1072 \labelwidth\leftmargini \advance\labelwidth-\labelsep
1073 \listparindent\z@
1074 \topsep\listisep}
1075 \let\@listi\@listI
1076 \def\@listii{\leftmargin\leftmarginii
1077 \labelwidth\leftmarginii \advance\labelwidth-\labelsep
1078 \topsep\z@skip}
1079 \def\@listiii{\leftmargin\leftmarginiii
1080 \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
1081 \def\@listiv{\leftmargin\leftmarginiv
1082 \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
1083 \def\@listv{\leftmargin\leftmarginv
1084 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
1085 \def\@listvi{\leftmargin\leftmarginvi
1086 \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}

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

1087 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}

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

1088 \renewenvironment{description}{\list{}{%
1089 \labelwidth\@ACM@labelwidth
1090 \let\makelabel\descriptionlabel}%
1091 }{
1092 \endlist
1093 }
1094 \let\enddescription=\endlist % for efficiency

```

3.16 Top-matter data

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

```

1095 \newif\if@ACM@maketitle@typeset
1096 \@ACM@maketitle@typesetfalse

```

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

```

1097 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
1098 ACMJCSS,%
1099 ACMJDS,%
1100 AILET,%
1101 CIE,%
1102 CSUR,%
1103 DGOV,%
1104 DLT,%

```

1105 DTRAP,%
 1106 FAC,%
 1107 GAMES,%
 1108 HEALTH,%
 1109 IMWUT,%
 1110 JACM,%
 1111 JATS,%
 1112 JDIQ,%
 1113 JDS,%
 1114 JEA,%
 1115 JERIC,%
 1116 JETC,%
 1117 JOCCH,%
 1118 JRC,%
 1119 PACMCGIT,%
 1120 PACMHCI,%
 1121 PACMMOD,%
 1122 PACMNET,%
 1123 PACMPL,%
 1124 PACMSE,%
 1125 POMACS,%
 1126 TAAS,%
 1127 TACCESS,%
 1128 TACO,%
 1129 TAIS,%
 1130 TAISAP,%
 1131 TALG,%
 1132 TALLIP,%
 1133 TAP,%
 1134 TCPS,%
 1135 TDS,%
 1136 TEAC,%
 1137 TECS,%
 1138 TELO,%
 1139 THRI,%
 1140 TIIS,%
 1141 TIOT,%
 1142 TISSEC,%
 1143 TIST,%
 1144 TKDD,%
 1145 TMIS,%
 1146 TOCE,%
 1147 TOCHI,%
 1148 TOCL,%
 1149 TOCS,%
 1150 TOCT,%
 1151 TODAES,%
 1152 TODS,%
 1153 TOG,%
 1154 TOIS,%
 1155 TOIT,%
 1156 TOMACS,%
 1157 TOMM,%
 1158 TOMPECS,%

```

1159 TOMS,%
1160 TOPC,%
1161 TOPLAS,%
1162 TOPML,%
1163 TOPS,%
1164 TORS,%
1165 TOS,%
1166 TOSEM,%
1167 TOSN,%
1168 TQC,%
1169 TRETS,%
1170 TSAS,%
1171 TSC,%
1172 TSLP,%
1173 TWEB,%
1174 FACMP%
1175 }{%
1176 \ifcase\@journalCode@nr
1177 \relax % ACMJCSS
1178 \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
1179 \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%
1180 \def\@permissionCodeOne{2834-5533}%
1181 \def\@permissionCodeTwo{2834-5533}%
1182 \relax % ACMJCDS
1183 \def\@journalName{ACM Journal of Data Science}%
1184 \def\@journalNameShort{ACM J. Data Sci.}%
1185 \def\@permissionCodeOne{0000-0000}%
1186 \def\@permissionCodeTwo{0000-0000}%
1187 \relax % AILET
1188 \def\@journalName{ACM AI Letters}%
1189 \def\@journalNameShort{ACM AI Lett.}%
1190 \def\@permissionCodeOne{3068-8590}%
1191 \def\@permissionCodeTwo{3068-8590}%
1192 \or % CIE
1193 \def\@journalName{ACM Computers in Entertainment}%
1194 \def\@journalNameShort{ACM Comput. Entertain.}%
1195 \def\@permissionCodeOne{1544-3574}%
1196 \or % CSUR
1197 \def\@journalName{ACM Computing Surveys}%
1198 \def\@journalNameShort{ACM Comput. Surv.}%
1199 \def\@permissionCodeOne{0360-0300}%
1200 \def\@permissionCodeTwo{1557-7341}%
1201 \or % DGOV
1202 \def\@journalName{Digital Government: Research and Practice}%
1203 \def\@journalNameShort{Digit. Gov. Res. Pract.}%
1204 \def\@permissionCodeOne{2639-0175}%
1205 \def\@permissionCodeTwo{2639-0175}%
1206 \or % DLT
1207 \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
1208 \def\@journalNameShort{Distrib. Ledger Technol.}%
1209 \def\@permissionCodeOne{2769-6472}%
1210 \def\@permissionCodeTwo{2769-6480}%
1211 \or % DTRAP
1212 \def\@journalName{Digital Threats: Research and Practice}%

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1213 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1214 \def\@permissionCodeOne{2576-5337}%
1215 \def\@permissionCodeTwo{2576-5337}%
1216 \or % FAC
1217 \def\@journalName{Formal Aspects of Computing}%
1218 \def\@journalNameShort{Form. Asp. Comput.}%
1219 \def\@permissionCodeOne{0934-5043}%
1220 \def\@permissionCodeTwo{1433-299X}%
1221 \or % GAMES
1222 \def\@journalName{ACM Games: Research and Practice}%
1223 \def\@journalNameShort{ACM Games}%
1224 \def\@permissionCodeOne{2832-5516}%
1225 \def\@permissionCodeTwo{2832-5516}%
1226 \or % HEALTH
1227 \def\@journalName{ACM Transactions on Computing for Healthcare}%
1228 \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1229 \def\@permissionCodeOne{2637-8051}%
1230 \def\@permissionCodeTwo{2637-8051}%
1231 \or % IMWUT
1232 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1233   Wearable and Ubiquitous Technologies}%
1234 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
1235 \def\@permissionCodeOne{2474-9567}%
1236 \def\@permissionCodeTwo{2474-9567}%
1237 \@ACM@screentruer
1238 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1239 \or % JACM
1240 \def\@journalName{Journal of the ACM}%
1241 \def\@journalNameShort{J. ACM}%
1242 \def\@permissionCodeOne{0004-5411}%
1243 \def\@permissionCodeTwo{1557-735X}%
1244 \or % JATS
1245 \def\@journalName{Journal on Autonomous Transportation Systems}%
1246 \def\@journalNameShort{ACM J. Auton. Transport. Syst.}%
1247 \def\@permissionCodeOne{2833-0528}%
1248 \def\@permissionCodeTwo{2833-0528}%
1249 \or % JDIQ
1250 \def\@journalName{ACM Journal of Data and Information Quality}%
1251 \def\@journalNameShort{ACM J. Data Inform. Quality}%
1252 \def\@permissionCodeOne{1936-1955}%
1253 \def\@permissionCodeTwo{1936-1963}%
1254 \or % JDS
1255 \def\@journalName{ACM/IMS Journal of Data Science}%
1256 \def\@journalNameShort{ACM/IMS J. Data Sci.}%
1257 \def\@permissionCodeOne{2831-3194}%
1258 \def\@permissionCodeTwo{2831-3194}%
1259 \or % JEA
1260 \def\@journalName{ACM Journal of Experimental Algorithmics}%
1261 \def\@journalNameShort{ACM J. Exp. Algor.}%
1262 \def\@permissionCodeOne{1084-6654}%
1263 \def\@permissionCodeTwo{1084-6654}%
1264 \or % JERIC
1265 \def\@journalName{ACM Journal of Educational Resources in Computing}%
1266 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%

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1267 \def\@permissionCodeOne{1073-0516}%
1268 \or % JETC
1269 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
1270 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1271 \def\@permissionCodeOne{1550-4832}%
1272 \def\@permissionCodeTwo{1550-4840}%
1273 \or % JOCCH
1274 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1275 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1276 \def\@permissionCodeOne{1556-4673}%
1277 \def\@permissionCodeTwo{1556-4711}%
1278 \or % JRC
1279 \def\@journalName{ACM Journal on Responsible Computing}%
1280 \def\@journalNameShort{ACM J. Responsib. Comput.}%
1281 \def\@permissionCodeOne{2832-0565}%
1282 \def\@permissionCodeTwo{2832-0565}%
1283 \or % PACMCGIT
1284 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1285 \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1286 \def\@permissionCodeOne{2577-6193}%
1287 \def\@permissionCodeTwo{2577-6193}%
1288 \@ACM@screentruer
1289 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1290 \or % PACMHCI
1291 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
1292 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
1293 \def\@permissionCodeOne{2573-0142}%
1294 \def\@permissionCodeTwo{2573-0142}%
1295 \@ACM@screentruer
1296 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1297 \or % PACMMOD
1298 \def\@journalName{Proceedings of the ACM on Management of Data}%
1299 \def\@journalNameShort{Proc. ACM Manag. Data}%
1300 \def\@permissionCodeOne{2836-6573}%
1301 \def\@permissionCodeTwo{2836-6573}%
1302 \or % PACMNET
1303 \def\@journalName{Proceedings of the ACM on Networkng}%
1304 \def\@journalNameShort{Proc. ACM Netw.}%
1305 \def\@permissionCodeOne{2834-5509}%
1306 \def\@permissionCodeTwo{2834-5509}%
1307 \or % PACMPL
1308 \def\@journalName{Proceedings of the ACM on Programming Languages}%
1309 \def\@journalNameShort{Proc. ACM Program. Lang.}%
1310 \def\@permissionCodeOne{2475-1421}%
1311 \def\@permissionCodeTwo{2475-1421}%
1312 \@ACM@screentruer
1313 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1314 \or % PACMSE
1315 \def\@journalName{Proceedings of the ACM on Software Engineering}%
1316 \def\@journalNameShort{Proc. ACM Softw. Eng.}%
1317 \def\@permissionCodeOne{2994-970X}%
1318 \def\@permissionCodeTwo{2994-970X}%
1319 \@ACM@screentruer
1320 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%

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1321 \or % POMACS
1322 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1323 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1324 \def\@permissionCodeOne{2476-1249}%
1325 \def\@permissionCodeTwo{2476-1249}%
1326 \@ACM@screentru
1327 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1328 \or % TAAS
1329 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
1330 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
1331 \def\@permissionCodeOne{1556-4665}%
1332 \def\@permissionCodeTwo{1556-4703}%
1333 \or % TACCESS
1334 \def\@journalName{ACM Transactions on Accessible Computing}%
1335 \def\@journalNameShort{ACM Trans. Access. Comput.}%
1336 \def\@permissionCodeOne{1936-7228}%
1337 \def\@permissionCodeTwo{1936-7236}%
1338 \or % TACO
1339 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1340 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1341 \def\@permissionCodeOne{1544-3566}%
1342 \def\@permissionCodeTwo{1544-3973}%
1343 \or % TAIS
1344 \def\@journalName{ACM Transactions on AI for Science}%
1345 \def\@journalNameShort{ACM Trans. AI Sci.}%
1346 \def\@permissionCodeOne{3066-4438}%
1347 \def\@permissionCodeTwo{3066-4438}%
1348 \or % TAISAP
1349 \def\@journalName{ACM Transactions on AI Security and Privacy}%
1350 \def\@journalNameShort{ACM Trans. AI Secur. Priv.}%
1351 \def\@permissionCodeOne{3068-3564}%
1352 \def\@permissionCodeTwo{3068-3564}%
1353 \or % TALG
1354 \def\@journalName{ACM Transactions on Algorithms}%
1355 \def\@journalNameShort{ACM Trans. Algor.}%
1356 \def\@permissionCodeOne{1549-6325}%
1357 \def\@permissionCodeTwo{1549-6333}%
1358 \or % TALLIP
1359 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1360 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1361 \def\@permissionCodeOne{2375-4699}%
1362 \def\@permissionCodeTwo{2375-4702}%
1363 \or % TAP
1364 \def\@journalName{ACM Transactions on Applied Perception}%
1365 \def\@journalNameShort{ACM Trans. Appl. Percept.}%
1366 \def\@permissionCodeOne{1544-3558}%
1367 \def\@permissionCodeTwo{1544-3965}%
1368 \or % TCPS
1369 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1370 \def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%
1371 \def\@permissionCodeOne{2378-962X}%
1372 \def\@permissionCodeTwo{2378-9638}%
1373 \or % TDS
1374 \def\@journalName{ACM/IMS Transactions on Data Science}%

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1375 \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
1376 \def\@permissionCodeOne{2577-3224}%
1377 \or % TEAC
1378 \def\@journalName{ACM Transactions on Economics and Computation}%
1379 \def\@journalNameShort{ACM Trans. Econ. Comput.}%
1380 \def\@permissionCodeOne{2167-8375}%
1381 \def\@permissionCodeTwo{2167-8383}%
1382 \or % TECS
1383 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
1384 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1385 \def\@permissionCodeOne{1539-9087}%
1386 \def\@permissionCodeTwo{1558-3465}%
1387 \or % TELO
1388 \def\@journalName{ACM Transactions on Evolutionary Learning and Optimization}%
1389 \def\@journalNameShort{ACM Trans. Evol. Learn. Optim.}%
1390 \def\@permissionCodeOne{2688-299X}%
1391 \def\@permissionCodeTwo{2688-3007}%
1392 \or % THRI
1393 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
1394 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1395 \def\@permissionCodeOne{2573-9522}%
1396 \def\@permissionCodeTwo{2573-9522}%
1397 \or % TIIS
1398 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
1399 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1400 \def\@permissionCodeOne{2160-6455}%
1401 \def\@permissionCodeTwo{2160-6463}%
1402 \or % TIOT
1403 \def\@journalName{ACM Transactions on Internet of Things}%
1404 \def\@journalNameShort{ACM Trans. Internet Things}%
1405 \def\@permissionCodeOne{2577-6207}%
1406 \def\@permissionCodeTwo{2577-6207}%
1407 \or % TISSEC
1408 \def\@journalName{ACM Transactions on Information and System Security}%
1409 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1410 \def\@permissionCodeOne{1094-9224}%
1411 \or % TIST
1412 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1413 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1414 \def\@permissionCodeOne{2157-6904}%
1415 \def\@permissionCodeTwo{2157-6912}%
1416 \or % TKDD
1417 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
1418 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1419 \def\@permissionCodeOne{1556-4681}%
1420 \def\@permissionCodeTwo{1556-472X}%
1421 \or % TMIS
1422 \def\@journalName{ACM Transactions on Management Information Systems}%
1423 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1424 \def\@permissionCodeOne{2158-656X}%
1425 \def\@permissionCodeTwo{2158-6578}%
1426 \or % TOCE
1427 \def\@journalName{ACM Transactions on Computing Education}%
1428 \def\@journalNameShort{ACM Trans. Comput. Educ.}%

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1429 \def\@permissionCodeOne{1946-6226}%
1430 \def\@permissionCodeTwo{1946-6226}%
1431 \or % TOCHI
1432 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1433 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1434 \def\@permissionCodeOne{1073-0516}%
1435 \def\@permissionCodeTwo{1557-7325}%
1436 \or % TOCL
1437 \def\@journalName{ACM Transactions on Computational Logic}%
1438 \def\@journalNameShort{ACM Trans. Comput. Logic}%
1439 \def\@permissionCodeOne{1529-3785}%
1440 \def\@permissionCodeTwo{1557-945X}%
1441 \or % TOCS
1442 \def\@journalName{ACM Transactions on Computer Systems}%
1443 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1444 \def\@permissionCodeOne{0734-2071}%
1445 \def\@permissionCodeTwo{1557-7333}%
1446 \or % TOCT
1447 \def\@journalName{ACM Transactions on Computation Theory}%
1448 \def\@journalNameShort{ACM Trans. Comput. Theory}%
1449 \def\@permissionCodeOne{1942-3454}%
1450 \def\@permissionCodeTwo{1942-3462}%
1451 \or % TODAES
1452 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1453 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1454 \def\@permissionCodeOne{1084-4309}%
1455 \def\@permissionCodeTwo{1557-7309}%
1456 \or % TODS
1457 \def\@journalName{ACM Transactions on Database Systems}%
1458 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
1459 \def\@permissionCodeOne{0362-5915}%
1460 \def\@permissionCodeTwo{1557-4644}%
1461 \or % TOG
1462 \def\@journalName{ACM Transactions on Graphics}%
1463 \def\@journalNameShort{ACM Trans. Graph.}%
1464 \def\@permissionCodeOne{0730-0301}%
1465 \def\@permissionCodeTwo{1557-7368}%
1466 \or % TOIS
1467 \def\@journalName{ACM Transactions on Information Systems}%
1468 \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1469 \def\@permissionCodeOne{1046-8188}%
1470 \def\@permissionCodeTwo{1558-2868}%
1471 \or % TOIT
1472 \def\@journalName{ACM Transactions on Internet Technology}%
1473 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1474 \def\@permissionCodeOne{1533-5399}%
1475 \def\@permissionCodeTwo{1557-6051}%
1476 \or % TOMACS
1477 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1478 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1479 \def\@permissionCodeOne{1049-3301}%
1480 \def\@permissionCodeTwo{1558-1195}%
1481 \or % TOMM
1482 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%

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1483 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1484 \def\@permissionCodeOne{1551-6857}%
1485 \def\@permissionCodeTwo{1551-6865}%
1486 \or % TOMPECS
1487 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1488 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1489 \def\@permissionCodeOne{2376-3639}%
1490 \def\@permissionCodeTwo{2376-3647}%
1491 \or % TOMS
1492 \def\@journalName{ACM Transactions on Mathematical Software}%
1493 \def\@journalNameShort{ACM Trans. Math. Softw.}%
1494 \def\@permissionCodeOne{0098-3500}%
1495 \def\@permissionCodeTwo{1557-7295}%
1496 \or % TOPC
1497 \def\@journalName{ACM Transactions on Parallel Computing}%
1498 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1499 \def\@permissionCodeOne{2329-4949}%
1500 \def\@permissionCodeTwo{2329-4957}%
1501 \or % TOPLAS
1502 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1503 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1504 \def\@permissionCodeOne{0164-0925}%
1505 \def\@permissionCodeTwo{1558-4593}%
1506 \or % TOPML
1507 \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
1508 \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
1509 \def\@permissionCodeOne{2836-8924}%
1510 \def\@permissionCodeTwo{2836-8924}%
1511 \or % TOPS
1512 \def\@journalName{ACM Transactions on Privacy and Security}%
1513 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1514 \def\@permissionCodeOne{2471-2566}%
1515 \def\@permissionCodeTwo{2471-2574}%
1516 \or % TORS
1517 \def\@journalName{ACM Transactions on Recommender Systems}%
1518 \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
1519 \def\@permissionCodeOne{2770-6699}%
1520 \def\@permissionCodeTwo{2770-6699}%
1521 \or % TOS
1522 \def\@journalName{ACM Transactions on Storage}%
1523 \def\@journalNameShort{ACM Trans. Storage}%
1524 \def\@permissionCodeOne{1553-3077}%
1525 \def\@permissionCodeTwo{1553-3093}%
1526 \or % TOSEM
1527 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1528 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1529 \def\@permissionCodeOne{1049-331X}%
1530 \def\@permissionCodeTwo{1557-7392}%
1531 \or % TOSN
1532 \def\@journalName{ACM Transactions on Sensor Networks}%
1533 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1534 \def\@permissionCodeOne{1550-4859}%
1535 \def\@permissionCodeTwo{1550-4867}%
1536 \or % TQC

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1537 \def\@journalName{ACM Transactions on Quantum Computing}%
1538 \def\@journalNameShort{ACM Trans. Quantum Comput.}%
1539 \def\@permissionCodeOne{2643-6817}%
1540 \def\@permissionCodeTwo{2643-6817}%
1541 \or % TRET
1542 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1543 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1544 \def\@permissionCodeOne{1936-7406}%
1545 \def\@permissionCodeTwo{1936-7414}%
1546 \or % TSAS
1547 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1548 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1549 \def\@permissionCodeOne{2374-0353}%
1550 \def\@permissionCodeTwo{2374-0361}%
1551 \or % TSC
1552 \def\@journalName{ACM Transactions on Social Computing}%
1553 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1554 \def\@permissionCodeOne{2469-7818}%
1555 \def\@permissionCodeTwo{2469-7826}%
1556 \or % TSLP
1557 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1558 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1559 \def\@permissionCodeOne{1550-4875}%
1560 \def\@permissionCodeTwo{2329-9304}%
1561 \or % TWEB
1562 \def\@journalName{ACM Transactions on the Web}%
1563 \def\@journalNameShort{ACM Trans. Web}%
1564 \def\@permissionCodeOne{1559-1131}%
1565 \def\@permissionCodeTwo{1559-114X}%
1566 \else % FACMP, a dummy journal
1567 \def\@journalName{ACM Just Accepted}%
1568 \def\@journalNameShort{ACM Accepted}%
1569 \def\@permissionCodeOne{XXXX-XXXX}%
1570 \fi
1571 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1572 }{%
1573 \ClassError{\@classname}{Incorrect journal #1}%
1574 }%

```

\acmJournal And the syntactic sugar around it

```

1575 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
1576 \global\@ACM@journal@bibstriptrue
1577 \global\@ACM@journal@bibstrip@or@togtrue}

```

The defaults:

```

1578 \def\@journalCode@nr{0}
1579 \def\@journalName{}%
1580 \def\@journalNameShort{\@journalName}%
1581 \def\@permissionCodeOne{XXXX-XXXX}%
1582 \def\@permissionCodeTwo{\@permissionCodeOne}%

```

\acmConference This is the conference command

```

1583 \newcommand\acmConference[4][{}]{%
1584 \gdef\acmConference@shortname{#1}%

```

```

1585 \gdef\acmConference@name{#2}%
1586 \gdef\acmConference@date{#3}%
1587 \gdef\acmConference@venue{#4}%
1588 \ifx\acmConference@shortname\empty
1589 \gdef\acmConference@shortname{#2}%
1590 \fi
1591 \global\@ACM@journal@bibstripfalse
1592 \ifx\@acmBooktitle\empty\relax
1593 \acmBooktitle{Proceedings of \acmConference@name
1594 \ifx\acmConference@name\acmConference@shortname\else
1595 \ (\acmConference@shortname)\fi}%
1596 \fi
1597 }
1598 \if@ACM@journal\else
1599 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1600 DC, USA}%
1601 \fi

```

\acmBooktitle The book title of the conference:

```

\@acmBooktitle 1602 \def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
1603 \acmBooktitle{}

```

\@editorsAbbrev How to abbreviate editors

```
1604 \def\@editorsAbbrev{(Ed.)}
```

\@acmEditors The list of editors

```
1605 \def\@acmEditors{}
```

\editor Add a new editor to the list

```

1606 \def\editor#1{\ifx\@acmEditors\empty
1607 \gdef\@acmEditors{#1}%
1608 \else
1609 \gdef\@editorsAbbrev{(Eds.)}%
1610 \g@addto@macro\@acmEditors{\and#1}%
1611 \fi}

```

\subtitle The subtitle macro

```

1612 \def\subtitle#1{\def\@subtitle{#1}}
1613 \subtitle{}

```

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

```

1614 \newcount\num@authorgroups
1615 \num@authorgroups=0\relax

```

\num@author The total number of authors

```

1616 \newcount\num@author
1617 \num@author=0\relax

```

\if@insideauthorgroup Whether we are continuing an author group

```

1618 \newif\if@insideauthorgroup
1619 \@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.

```

1620 \renewcommand\author[2][{}]{%
1621   \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\@classname}{Do not put several
1622     authors in the same \string\author\space macro!}}{}%
1623   \global\advance\num@authors by 1\relax
1624   \if@insideauthorgroup\else
1625     \global\advance\num@authorgroups by 1\relax
1626     \global\@insideauthorgrouptrue
1627   \fi
1628   \ifx\addresses\@empty
1629     \if@ACM@anonymous
1630       \gdef\addresses{\@author{Anonymous Author(s)}%
1631         \ifx\@acmSubmissionID\@empty\else\Submission Id:
1632           \@acmSubmissionID\fi}%
1633       \gdef\authors{Anonymous Author(s)}%
1634     \else
1635       \expandafter\gdef\expandafter\addresses\expandafter{%
1636         \expandafter\@author\expandafter{%
1637           \csname typeset@author\the\num@authors\endcsname{#2}}}%
1638       \gdef\authors{#2}%
1639     \fi
1640   \else
1641     \if@ACM@anonymous\else
1642       \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
1643         \expandafter\and\expandafter\@author\expandafter{%
1644           \csname typeset@author\the\num@authors\endcsname{#2}}}%
1645       \g@addto@macro\authors{\and#2}%
1646     \fi
1647   \fi
1648   \if@ACM@anonymous
1649     \ifx\shortauthors\@empty
1650       \gdef\shortauthors{Anon.
1651         \ifx\@acmSubmissionID\@empty\else Submission Id:
1652           \@acmSubmissionID\fi}%
1653     \fi
1654   \else
1655     \def\@tempa{#1}%
1656     \ifx\@tempa\@empty
1657       \ifx\shortauthors\@empty
1658         \gdef\shortauthors{#2}%
1659       \else
1660         \g@addto@macro\shortauthors{\and#2}%
1661       \fi
1662     \else
1663       \ifx\shortauthors\@empty
1664         \gdef\shortauthors{#1}%
1665       \else
1666         \g@addto@macro\shortauthors{\and#1}%

```

```

1667     \fi
1668     \fi
1669 \fi}

```

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

```

1670 \newcommand{\affiliation}[2][{}]{%
1671   \global\@insideauthorgroupfalse
1672   \if@ACM@anonymous\else
1673     \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1674   \fi}

```

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

```

1675 \define@boolkey+{@ACM@affiliation@}[@ACM@affiliation@]{obeypunctuation}%
1676 [true]{}{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

```

`\additionalaffiliation` Additional affiliations go to footnotes

```

1677 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

```

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

```

1678 \def\@additionalaffiliation#1{\bgroup
1679   \def\position##1{\ignorespaces}%
1680   \def\institution##1{##1\ignorespaces}%
1681   \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1682   \def\@department[##1]##2{##2, \ignorespaces}%
1683   \let\city\position
1684   \let\state\position
1685   \let\country\position
1686   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.

```

1687 \renewcommand{\email}[2][{}]{%
1688   \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1689     addresses in the same \string\email\space macro!}}{}%
1690   \if@ACM@anonymous\else
1691     \g@addto@macro\addresses{\email{#1}{#2}}%
1692   \fi}

```

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

```

1693 \def\orcid#1{\unskip\ignorespaces%
1694   \protected\def\orcidsite{https://orcid.org/}%
1695   \IfBeginWith{#1}{http}{%
1696     \expandafter\gdef\csname
1697       typeset@author\the\num@authors\endcsname##1{%
1698       \href{#1}{##1}}}%
1699   \expandafter\gdef\csname
1700     typeset@author\the\num@authors\endcsname##1{%
1701     \href{\orcidsite#1}{##1}}}%

```

`\authorsaddresses` Setting up authors' addresses

```

1702 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1703 \authorsaddresses{\@mkauthorsaddresses}

```

```

\mktranslatedkeywords We have two argument: the language to typeset keywords and the keywords.
1704 \newcommand\mktranslatedkeywords[2]{\bgroup
1705   \selectlanguage{#1}%
1706   {\@specialsection{\keywordsname}%
1707     \noindent#2\par}\egroup}

\@titlenotes The title notes
1708 \def\@titlenotes{}

\titlenote Adding a note to the title
1709 \def\titlenote#1{%
1710   \g@addto@macro\@title{\footnotemark}%
1711   \if@ACM@anonymous
1712     \g@addto@macro\@titlenotes{%
1713       \stepcounter{footnote}\footnotetext{Title note}}%
1714   \else
1715     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1716   \fi}

\@subtitlenotes The subtitle notes
1717 \def\@subtitlenotes{}

\subtitlenote Adding a note to the subtitle
1718 \def\subtitlenote#1{%
1719   \g@addto@macro\@subtitle{\footnotemark}%
1720   \if@ACM@anonymous
1721     \g@addto@macro\@subtitlenotes{%
1722       \stepcounter{footnote}\footnotetext{Subtitle note}}%
1723   \else
1724     \g@addto@macro\@subtitlenotes{%
1725       \stepcounter{footnote}\footnotetext{#1}}%
1726   \fi}

\@authornotes The author notes
1727 \def\@authornotes{}

\authornote Adding a note to the author
1728 \def\authornote#1{%
1729   \if@ACM@anonymous\else
1730     \g@addto@macro\addresses{\@authornotemark}%
1731     \g@addto@macro\@authornotes{%
1732       \stepcounter{footnote}\footnotetext{#1}}%
1733   \fi}

\authornotemark Adding a footnote mark to the authors
1734 \newcommand\authornotemark[1][\relax]{%
1735   \if@ACM@anonymous\else
1736     \ifx#1\relax\relax\relax
1737       \g@addto@macro\addresses{\@authornotemark}%
1738     \else
1739       \g@addto@macro\addresses{\@authornotemark{#1}}%
1740     \fi
1741   \fi}

```

`\acmVolume` The current volume
1742 `\def\acmVolume#1{\def\@acmVolume{#1}}`
1743 `\acmVolume{1}`

`\acmNumber` The current number
1744 `\def\acmNumber#1{\def\@acmNumber{#1}}`
1745 `\acmNumber{1}`

`\acmArticle` The current article
1746 `\def\acmArticle#1{\def\@acmArticle{#1}}`
1747 `\acmArticle{}`

`\acmArticleSeq` The sequence number
1748 `\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}`
1749 `\acmArticleSeq{\@acmArticle}`

`\acmYear` The current year
1750 `\def\acmYear#1{\def\@acmYear{#1}}`
1751 `\acmYear{\the\year}`

`\acmMonth` The current month
1752 `\def\acmMonth#1{\def\@acmMonth{#1}}`
1753 `\acmMonth{\the\month}`

`\@acmPubDate` The publication date
1754 `\def\@acmPubDate{\ifcase\@acmMonth\or`
1755 `January\or February\or March\or April\or May\or June\or`
1756 `July\or August\or September\or October\or November\or`
1757 `December\fi}\@acmYear}`

`\acmPrice` The price—obsolete
1758 `\def\acmPrice#1{\ClassWarning{\@classname}{The macro \string\acmPrice`
1759 `is obsolete. ACM no longer prints the price in bibstrip.}}`

`\acmSubmissionID` The submission ID
1760 `\def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}`
1761 `\acmSubmissionID{}`

`\acmISBN` The book ISBN
1762 `\def\acmISBN#1{\def\@acmISBN{#1}}`
1763 `\acmISBN{978-x-xxxx-xxxx-x/YYYY/MM}`

`\acmDOI` The paper DOI
1764 `\def\acmDOI#1{\def\@acmDOI{#1}}`
1765 `\acmDOI{10.1145/nnnnnnn.nnnnnnn}`

`\if@ACM@badge`

`\@ACM@badge@width` The width of the badge
1766 `\newlength\@ACM@badge@width`
1767 `\setlength\@ACM@badge@width{3pc}`

```

\@ACM@title@width The width of the title
1768 \newlength\@ACM@title@width

\@ACM@badge@skip The spacing between badges
1769 \newlength\@ACM@badge@skip
1770 \setlength\@ACM@badge@skip{1pt}

\@acmBadgeR
1771 \def\@acmBadgeR{}

\@acmBadgeL
1772 \def\@acmBadgeL{}

\acmBadgeR Setting the right badge
1773 \newcommand\acmBadgeR[2][{}]{%
1774   \ifx\@acmBadgeR\@empty
1775     \gdef\@acmBadgeR{%
1776       \smash{%
1777         \raisebox{0.5\height}{%
1778           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1779   \else
1780     \g@addto@macro{\@acmBadgeR}{%
1781       \hspace{\@ACM@badge@skip}%
1782       \smash{%
1783         \raisebox{0.5\height}{%
1784           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1785   \fi}

\acmBadgeL Setting the left badge
1786 \newcommand\acmBadgeL[2][{}]{%
1787   \ifx\@acmBadgeL\@empty
1788     \gdef\@acmBadgeL{%
1789       \smash{%
1790         \raisebox{0.5\height}{%
1791           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1792   \else
1793     \g@addto@macro{\@acmBadgeL}{%
1794       \hspace{\@ACM@badge@skip}%
1795       \smash{%
1796         \raisebox{0.5\height}{%
1797           \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}}%
1798   \fi}

\acmBadge Just a syntax sugar for \acmBadgeR
1799 \let\acmBadge=\acmBadgeR

\startPage The start page of the paper
1800 \def\startPage#1{\def\@startPage{#1}}
1801 \startPage{}

\terms Terms are obsolete. We use CCS now.
1802 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
1803   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.

```
1804 \def\keywords#1{\def\@keywords{#1}}
1805 \let\@keywords\@empty

1806 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty
1807   \ifnum\getrefnumber{TotPages}>2\relax
1808   \ClassWarningNoLine{\@classname}{ACM keywords are mandatory
1809     for papers over two pages}%
1810   \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

```
1811 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}
```

`\@saveabstract` And saving the abstract

```
1812 \long\def\@saveabstract#1{\if@ACM@maketitle@typeset
1813   \ClassError{\@classname}{Abstract must be defined before maketitle
1814     command. Please move it!}\fi
1815   \long\gdef\@abstract{#1}}
1816 \@saveabstract{}
```

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

```
1817 \long\def\@empty{}
```

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

```
1818 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
1819   \if@ACM@printccs
1820     \ClassInfo{\@classname}{Printing CCS}%
1821   \else
1822     \ClassInfo{\@classname}{Suppressing CCS}%
1823   \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}
```

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

```
1824 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1825   \if@ACM@printacmref
1826     \ClassInfo{\@classname}{Printing bibformat}%
1827   \else
1828     \ClassInfo{\@classname}{Suppressing bibformat}%
1829   \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}
```

```
1830 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
1831   \ifnum\getrefnumber{TotPages}>1\relax
1832   \ClassWarningNoLine{\@classname}{%
1833     ACM reference format is mandatory \MessageBreak
1834     for papers over one page. \MessageBreak
1835     Please add printacmref=true to the \MessageBreak
1836     \string\settopmatter\space command.}%
1837   \fi\fi\fi}
```

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

```
1838 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1839   \if@ACM@printfolios
```

```

1840 \ClassInfo{\@classname}{Printing folios}%
1841 \else
1842 \ClassInfo{\@classname}{Suppressing folios}%
1843 \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}

\@ACM@authorsperrow The number of authors per row. 0 means use the default algorithm.
1844 \definecmdkey{\@ACM@topmatter@}{\@ACM@}{authorsperrow}[0]{%
1845 \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrow to
1846 #1}}{\ClassWarning{\@classname}{The parameter authorsperrow must be
1847 numerical. Ignoring the input #1}}\gdef\@ACM@authorsperrow{0}}

\settopmatter The usual syntactic sugar
1848 \def\settopmatter#1{\setkeys{\@ACM@topmatter@}{#1}}

Now the settings
1849 \settopmatter{printccs=true, printacmref=true}
1850 \if@ACM@manuscript
1851 \settopmatter{printfolios=true}
1852 \else
1853 \if@ACM@journal
1854 \settopmatter{printfolios=true}
1855 \else
1856 \settopmatter{printfolios=false}
1857 \fi
1858 \fi
1859 \settopmatter{authorsperrow=0}

\@received The container for the paper history
1860 \def\@received{}

\received The \received command
1861 \newcommand\received[2][\def\@tempa{#1}%
1862 \ifx\@tempa\@empty
1863 \ifx\@received\@empty
1864 \gdef\@received{Received #2}%
1865 \else
1866 \g@addto@macro{\@received}{; revised #2}%
1867 \fi
1868 \else
1869 \ifx\@received\@empty
1870 \gdef\@received{#1 #2}%
1871 \else
1872 \g@addto@macro{\@received}{; #1 #2}%
1873 \fi
1874 \fi}
1875 \AtEndDocument{%
1876 \ifx\@received\@empty\else
1877 \par\bigskip\noindent{\small\normalfont\@received\par}%
1878 \fi}

\acmArticleType Article type. We set up the color.
1879 \define@choicekey+{ACM}{articletype}[\@ACM@ArticleType\@ACM@ArticleType@nr]{%
1880 Research,Review,Discussion,Invited,Position}[Review]{%

```

```

1881 \ifcase\ACM@ArticleType@nr
1882 \relax % Research
1883 \colorlet{@ACM@Article@color}{ACMBlue}%
1884 \or % Review
1885 \colorlet{@ACM@Article@color}{ACMOrange}%
1886 \or % Discussion
1887 \colorlet{@ACM@Article@color}{ACMGreen}%
1888 \or % Invited
1889 \colorlet{@ACM@Article@color}{ACMPurple}%
1890 \or % Position
1891 \colorlet{@ACM@Article@color}{ACMRed}%
1892 \fi
1893 }{%
1894 \ClassError{\@classname}{Article Type must be Research, Review,\MessageBreak
1895 Discussion, Invited, or Position}}
1896 \def\acmArticleType#1{\setkeys{ACM}{articletype=#1}}
1897 \if@ACM@acmcp
1898 \acmArticleType{Research}%
1899 \fi
1900

\@ACM@color@frame The colored frame for the acmcp
1901 \newenvironment{@ACM@color@frame}{%
1902 \def\FrameCommand{\hspace*{-6.5pc}}%
1903 \colorbox{@ACM@Article@color!10!white}}%
1904 \MakeFramed {\advance\hsize
1905 -6.5pc\relax\FrameRestore}}{\zsavaposy{@ACM@acmcpframe@y}}%
1906 \endMakeFramed}

\acmCodeDataLink The code link
1907 \def\acmCodeLink#1{%
1908 \ifx\@acmCodeDataLink\@empty
1909 \gdef\@acmCodeDataLink{\url{#1}}}%
1910 \else
1911 \g@addto@macro{\@acmCodeDataLink}{\ \url{#1}}%
1912 \fi}
1913 \def\@acmCodeDataLink{}

\acmContributions The authors' contrubution statement
1914 \def\acmContributions#1{\gdef\@acmContributions{#1}}
1915 \acmContributions{}

\acmDataLink The code link
1916 \let\acmDataLink\acmCodeLink

```

3.17 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```

1917 \RequirePackage{comment}
1918 \excludecomment{CCSXML}

\@concepts This is the storage macro and counter for concepts
1919 \let\@concepts\@empty
1920 \newcounter{@concepts}

```


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

```
1921 \newcommand\ccsdesc[2][100]{%
1922   \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!

```
1923 \def\textrightarrow{$\rightarrow$}
1924 \def\ccsdesc@parse#1~#2~#3~{%
1925   \stepcounter{@concepts}%
1926   \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1927     \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1928       \textbf{#2}}%
1929     \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{;}%
1930     \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1931     \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
1932       \csname CCS@Punctuation@#2\endcsname
1933       \csname CCS@Specific@#2\endcsname}%
1934     \fi
1935     \ifx#3\relax\relax\else
1936       \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
1937         \textrightarrow\ }%
1938       \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1939         \addtocounter{@concepts}{-1}%
1940         \ifnum#1>499\textbf{#3}\else
1941         \ifnum#1>299\textit{#3}\else
1942         #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
1943       \fi
1944 \ccsdesc@parse@finish}

1945 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\empty\relax
1946   \ifnum\getrefnumber{TotPages}>2\relax
1947   \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
1948     for papers over two pages}%
1949   \fi\fi\fi}
```

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

```
1950 \def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}
```

3.18 Copyright system

This is from acmcopyright.sty

\if@printcopyright Whether to print a copyright symbol

```
1951 \newif\if@printcopyright
1952 \@printcopyrighttrue
```

\if@printpermission Whether to print the permission block

```
1953 \newif\if@printpermission
1954 \@printpermissiontrue
```

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

```
1955 \newif\if@acmowned
1956 \@acmownedtrue
```

Keys:

```

1957 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1958   \acm@copyrightinput\acm@copyrightmode]{none,%
1959     acmcopyright,acmlicensed,rightsretained,%
1960     usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1961     licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
1962     iw3c2w3,iw3c2w3g,cc}{%
1963   \@printpermissiontrue
1964   \@printcopyrighttrue
1965   \@acmownedtrue
1966   \ifnum\acm@copyrightmode=0\relax % none
1967     \@printpermissionfalse
1968     \@printcopyrightfalse
1969     \@acmownedfalse
1970   \fi
1971   \ifnum\acm@copyrightmode=2\relax % acmlicensed
1972     \@acmownedfalse
1973   \fi
1974   \ifnum\acm@copyrightmode=3\relax % rightsretained
1975     \@acmownedfalse
1976   \fi
1977   \ifnum\acm@copyrightmode=4\relax % usgov
1978     \@printpermissiontrue
1979     \@printcopyrightfalse
1980     \@acmownedfalse
1981   \fi
1982   \ifnum\acm@copyrightmode=6\relax % cagov
1983     \@acmownedfalse
1984   \fi
1985   \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1986     \@acmownedfalse
1987   \fi
1988   \ifnum\acm@copyrightmode=9\relax % licensedcagov
1989     \@acmownedfalse
1990   \fi
1991   \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1992     \@acmownedfalse
1993   \fi
1994   \ifnum\acm@copyrightmode=11\relax % othergov
1995     \@acmownedtrue
1996   \fi
1997   \ifnum\acm@copyrightmode=12\relax % licensedothergov
1998     \@acmownedfalse
1999   \fi
2000   \ifnum\acm@copyrightmode=13\relax % iw3c2w3
2001     \@acmownedfalse
2002   \fi
2003   \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
2004     \@acmownedfalse
2005   \fi
2006   \ifnum\acm@copyrightmode=15\relax % cc
2007     \@acmownedfalse
2008   \fi}

```

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

```
2009 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
2010 \setcopyright{acmlicensed}
```

`\setcctype` The type of Creative Commons license used

```
2011 \newcommand\setcctype[2][4.0]{%
2012   \def\ACM@cc@version{#1}%
2013   \def\ACM@cc@type{#2}}
2014 \setcctype{by}
```

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

```
2015 \def\@copyrightowner{%
2016   \ifcase\acm@copyrightmode\relax % none
2017   \or % acmcopyright
2018   ACM\@.
2019   \or % acmlicensed
2020   Copyright held by the owner/author(s). Publication rights licensed to
2021   ACM\@.
2022   \or % rightsretained
2023   Copyright held by the owner/author(s).
2024   \or % usgov
2025   \or % usgovmixed
2026   Copyright held by the owner/author(s).
2027   \or % cagov
2028   Copyright Crown in Right of Canada.
2029   \or %cagovmixed
2030   Copyright held by the owner/author(s).
2031   \or %licensedusgovmixed
2032   Copyright held by the owner/author(s). Publication rights licensed to
2033   ACM\@.
2034   \or % licensedcagov
2035   Copyright held by the owner/author(s).
2036   \or %licensedcagovmixed
2037   Copyright held by the owner/author(s). Publication rights licensed to
2038   ACM\@.
2039   \or % othergov
2040   Copyright held by the owner/author(s).
2041   \or % licensedothergov
2042   Copyright held by the owner/author(s). Publication rights licensed to
2043   ACM\@.
2044   \or % ic2w3www
2045   IW3C2 (International World Wide Web Conference Committee), published
2046   under Creative Commons CC-BY~4.0 License.
2047   \or % ic2w3wwwgoogle
2048   IW3C2 (International World Wide Web Conference Committee), published
2049   under Creative Commons CC-BY-NC-ND~4.0 License.
2050   \or % cc
2051   Copyright held by the owner/author(s).
2052   \fi}
```

`\@formatdoi` Print a clickable DOI

```
2053 \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.

```
2054 \def\@copyrightpermission{%
2055   \ifcase\acm@copyrightmode\relax % none
2056   \or % acmcopyright
2057     Permission to make digital or hard copies of all or part of this
2058     work for personal or classroom use is granted without fee provided
2059     that copies are not made or distributed for profit or commercial
2060     advantage and that copies bear this notice and the full citation on
2061     the first page. Copyrights for components of this work owned by
2062     others than ACM must be honored. Abstracting with credit is
2063     permitted. To copy otherwise, or republish, to post on servers or
2064     to redistribute to lists, requires prior specific permission
2065     and\hspace*{.5pt}/or
2066     a fee. Request permissions from permissions@acm.org.
2067   \or % acmlicensed
2068     Permission to make digital or hard copies of all or part of this
2069     work for personal or classroom use is granted without fee provided
2070     that copies are not made or distributed for profit or commercial
2071     advantage and that copies bear this notice and the full citation on
2072     the first page. Copyrights for components of this work owned by
2073     others than the author(s) must be honored. Abstracting with credit
2074     is permitted. To copy otherwise, or republish, to post on servers
2075     or to redistribute to lists, requires prior specific permission
2076     and\hspace*{.5pt}/or a fee. Request permissions from
2077     permissions@acm.org.
2078   \or % rightsretained
2079     Permission to make digital or hard copies of all or part of this
2080     work for personal or classroom use is granted without fee provided
2081     that copies are not made or distributed for profit or commercial
2082     advantage and that copies bear this notice and the full citation on
2083     the first page. Copyrights for third-party components of this work
2084     must be honored. For all other uses, contact the
2085     owner\hspace*{.5pt}/author(s).
2086   \or % usgov
2087     This paper is authored by an employee(s) of the United States
2088     Government and is in the public domain. Non-exclusive copying or
2089     redistribution is allowed, provided that the article citation is
2090     given and the authors and agency are clearly identified as its
2091     source. Request permissions from
2092     owner\hspace*{.5pt}/author(s).
2093   \or % usgovmixed
2094     ACM acknowledges that this contribution was authored or co-authored
2095     by an employee, contractor, or affiliate of the United States
2096     government. As such, the United States government retains a
2097     nonexclusive, royalty-free right to publish or reproduce this
2098     article, or to allow others to do so, for government purposes
2099     only. Request permissions from owner\hspace*{.5pt}/author(s).
2100   \or % cagov
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2173 disseminate the work on their personal and corporate Web sites with
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2177 Attribution-NonCommercial-NoDerivs~4.0 International
2178 (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
2179 disseminate the work on their personal and corporate Web sites with
2180 the appropriate attribution.
2181 \or % CC
2182 \IfEq{\ACM@cc@type}{zero}{%
2183   \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0}}{%
2184   \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version}}%
2185   \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\\
2186   \href{\ACM@CC@Url}{%
2187     This work is licensed under a Creative Commons
2188     \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}{%
2189       \IfEq{\ACM@cc@type}{by}{Attribution}{%
2190         \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}{%
2191           \IfEq{\ACM@cc@type}{by-nd}{Attribution-NoDerivatives}{%
2192             \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}{%
2193               \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{%
2194                 \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{%
2195                   ~\IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}%
2196                 }
2197               License.}%
2198             \fi}

```

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

```

2199 \def\copyrightyear#1{\def\@copyrightyear{#1}}
2200 \copyrightyear{\@acmYear}

```

\@teaserfigures The teaser figures container

```

2201 \def\@teaserfigures{}

```

teaserfigure The teaser figure

```

2202 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

```

\@saveteaser Saving the teaser

```

2203 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

```

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

```

2204 \renewcommand{\thanks}[1]{%
2205   \ifnotempty{#1}{%
2206     \if@ACM@anonymous
2207       \g@addto@macro\thankses{\thanks{A note}}%
2208     \else
2209       \g@addto@macro\thankses{\thanks{#1}}%
2210     \fi}}

```

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

```

2211 \newcommand{\anon}[2][ANONYMIZED]{%
2212   \if@ACM@anonymous%
2213     {\color{ACMOrange}#1}%
2214   \else%
2215     #2%
2216   \fi}

```

3.19 Maketitle hook

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

`\@beginmaketitlehook` The hook

```

2217 \ifx\@beginmaketitlehook\undefined
2218   \let\@beginmaketitlehook\empty
2219 \fi

```

`\AtBeginMaketitle` Adding to the hook

```

2220 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}

```

3.20 ACM Engage top matter

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

```

2221 \def\@acmengagemetadata{}

```

`\setengagemetadata` Adding topic to engage metadata

```

2222 \def\setengagemetadata#1#2{%
2223   \g@addto@macro{\@acmengagemetadata}{%
2224     \@setengagemetadata{#1}{#2}}}

```

3.21 Typesetting top matter

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

```

2225 \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.

```

2226 \def\maketitle{\@beginmaketitlehook
2227 \@ACM@maketitle@typesettrue
2228 \if@ACM@anonymous
2229 % Anonymize omission of \author-s
2230 \ifnum\num@authorgroups=0\author{}\fi
2231 \fi
2232 \begingroup
2233 \let\@vspace\@vspace@orig
2234 \let\@vspacer\@vspacer@orig
2235 \let\@footnotemark\@footnotemark@nolink
2236 \let\@footnotetext\@footnotetext@nolink
2237 \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
2238 \hsize=\textwidth
2239 \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
2240 \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
2241 \@printtopmatter
2242 \if@ACM@sigchiamode\@mkauthors\fi
2243 \setcounter{footnote}{0}%
2244 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
2245 \@titlenotes
2246 \@subtitlenotes
2247 \@authornotes
2248 \let\@makefnmark\relax
2249 \let\@thefnmark\relax
2250 \let\@makefntext\noindent
2251 \ifx\@empty\thankses\else
2252 \footnotetextauthorsaddresses{%
2253 \def\par{\let\par\@par}\parindent\z@\@setthanks}%
2254 \fi
2255 \if@ACM@acmcp\else
2256 \ifx\@empty\authorsaddresses\else
2257 \if@ACM@anonymous\else
2258 \if@ACM@journal@bibstrip@or@tog
2259 \footnotetextauthorsaddresses{%
2260 \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2261 \fi
2262 \fi
2263 \fi
2264 \fi
2265 \if@ACM@nonacm
2266 \ifnum\acm@copyrightmode=15\relax % cc
2267 \footnotetextcopyrightpermission{\@copyrightpermission}%
2268 \fi
2269 \else
2270 \if@ACM@acmcp\else
2271 \footnotetextcopyrightpermission{%
2272 \if@ACM@authordraft
2273 \raisebox{-2ex}{\z@\z@{\makebox[0pt][l]{\large\bfseries
2274 Unpublished working draft. Not for distribution.}}}%
2275 \color[gray]{0.9}%
2276 \fi
2277 \parindent\z@\parskip0.1\baselineskip
2278 \if@ACM@authorversion\else
2279 \if@printpermission\@copyrightpermission\par\fi

```



```

2280 \fi
2281 \if@ACM@manuscript\else
2282 \if@ACM@journal@bibstrip\else % Print the conference information
2283 \if@ACM@engage
2284 {\itshape \@acmBooktitle, \@acmYear.}\par
2285 \else
2286 {\itshape \acmConference@shortname, \acmConference@venue}\par
2287 \fi
2288 \fi
2289 \fi
2290 \if@printcopyright
2291 \copyright\ \@copyrightyear\ \@copyrightowner\
2292 \else
2293 \ifx\@copyrightyear\@empty\else
2294 \@copyrightyear.\
2295 \fi
2296 \fi
2297 \if@ACM@manuscript
2298 Manuscript submitted to ACM\
2299 \else
2300 \if@ACM@authorversion
2301 This is the author's version of the work. It is posted here for
2302 your personal use. Not for redistribution. The definitive Version
2303 of Record was published in
2304 \if@ACM@journal@bibstrip
2305 \emph{\@journalName}%
2306 \else
2307 \emph{\@acmBooktitle}%
2308 \fi
2309 \ifx\@acmDOI\@empty
2310 .
2311 \else
2312 , \@formatdoi{\@acmDOI}.
2313 \fi\
2314 \else
2315 \if@ACM@nonacm\else
2316 \if@ACM@journal@bibstrip
2317 ACM~\@permissionCodeTwo/\@acmYear/\@acmMonth-ART\@acmArticle\
2318 \@formatdoi{\@acmDOI}%
2319 \else % Conference
2320 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN\\\fi
2321 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
2322 \fi
2323 \fi
2324 \fi
2325 \fi}%
2326 \fi
2327 \fi
2328 \endgroup
2329 \if@ACM@engage\@typesetengagemetadata\fi
2330 \setcounter{footnote}{0}%
2331 \@mkabstract
2332 \ifx\@translatedabstracts\@empty\else
2333 \@translatedabstracts\fi

```

```

2334 \if@ACM@printccs
2335 \ifx\@concepts\@empty\else\bgroup
2336     {\@specialsection{CCS Concepts}%
2337      \noindent\@concepts\par}\egroup
2338 \fi
2339 \fi
2340 \if@ACM@acmcp\else
2341     \ifx\@keywords\@empty\else\bgroup
2342         {\@specialsection{\keywordsname}%
2343          \noindent\@keywords\par}\egroup
2344     \fi
2345     \ifx\@translatedkeywords\@empty\else
2346         \@translatedkeywords
2347     \fi
2348 \fi
2349 \let\metadata@authors=\authors
2350 \nxandlist{, }{, }{\, }\metadata@authors
2351 \def\@ACM@checkaffil{%
2352 \hypersetup{%
2353     pdfauthor={\metadata@authors},
2354     pdftitle={\@title},
2355     pdfsubject={\@concepts},
2356     pdfkeywords={\@keywords},
2357     pdfcreator={LaTeX with acmart
2358               \csname ver@\@classname.cls\endcsname\space
2359               and hyperref
2360               \csname ver@hyperref.sty\endcsname}}}%
2361 \andify\authors
2362 \andify\shortauthors
2363 \global\let\authors=\authors
2364 \global\let\shortauthors=\shortauthors
2365 \if@ACM@printacmref
2366     \mkbibcitation
2367 \fi
2368 \global\@topnum\z@ % this prevents floats from falling
2369                   % at the top of page 1
2370 \global\@botnum\z@ % we do not want them to be on the bottom either
2371 \@printendtopmatter
2372 \@afterindentfalse
2373 \@afterheading
2374 \if@ACM@acmcp
2375     \set@ACM@acmcpbox
2376     \AtEndDocument{\end@ACM@color@frame}%
2377     \@ACM@color@frame
2378 \fi
2379 }

```

\set@ACM@acmcpbox Setting infobox for acmcp

```

2380 \newbox\@ACM@acmcpbox
2381 \def\set@ACM@acmcpbox{%
2382     \bgroup
2383     \hsize=5pc
2384     \global\setbox\@ACM@acmcpbox=\vbox{%
2385         \setlength{\parindent}{\z@}%

```

```

2386 {\includegraphics[width=\hsize]{acm-jdslogo}\par}%
2387 \scriptsize
2388 \ifnum\getrefnumber{TotPages}>1\else
2389   \zrefused{@ACM@acmcpbox@y}%
2390   \zrefused{@ACM@acmcpframe@y}%
2391   \@tempdima=\dimexpr\zposy{@ACM@acmcpbox@y}sp -
2392   \zposy{@ACM@acmcpframe@y}sp+0.3\FrameSep+
2393   \@ACM@acmcp@delta\relax
2394   \ifdim\@tempdima>0pt\relax
2395     \vspace*{\@tempdima}%
2396     \protected@write\@auxout{%
2397       {\string\global\@ACM@acmcp@delta=\the\@tempdima\relax}%
2398     \fi
2399   \fi
2400   \ifx\@acmCodeDataLink\@empty\else\bigskip
2401   Code and data links:\\ \@acmCodeDataLink\par\bigskip
2402   \fi
2403   \ifx\@keywords\@empty\else\bigskip
2404   Keywords: \@keywords\par
2405   \fi
2406   \ifx\@acmContributions\@empty\else\bigskip
2407   \@acmContributions\par
2408   \fi
2409   \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
2410   \zsaveposy{@ACM@acmcpbox@y}%
2411   \par
2412 }
2413 \egroup}

```

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

```

2414 \def\@specialsection#1{%
2415   \let\@vspace\@vspace@orig
2416   \let\@vspacer\@vspacer@orig
2417   \ifcase\ACM@format@nr
2418   \relax % manuscript
2419   \par\medskip\small\noindent#1: %
2420   \or % acmsmall
2421   \par\medskip\small\noindent#1: %
2422   \or % acmlarge
2423   \par\medskip\small\noindent#1: %
2424   \or % acmtog
2425   \par\medskip\small\noindent#1: %
2426   \or % sigconf
2427   \section*{#1}%
2428   \or % siggraph
2429   \section*{#1}%
2430   \or % sigplan
2431   \noindentparagraph*{#1:~}%
2432   \or % sigchi
2433   \section*{#1}%
2434   \or % sigchi-a
2435   \section*{#1}%
2436   \or % acmengage
2437   \section*{#1}%

```

```

2438 \or % acmcp
2439 \section*{#1}%
2440 \fi
2441 \let\@vspace\@vspace@acm
2442 \let\@vspacer\@vspacer@acm
2443 }

```

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

Note that if there are too many authors, \mkttitle@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.

```

2444 \def\@printtopmatter{%
2445 \ifx\@startPage\@empty
2446 \gdef\@startPage{1}%
2447 \else
2448 \setcounter{page}{\@startPage}%
2449 \fi
2450 \@tempdima=\ht\mkttitle@bx
2451 \advance\@tempdima by \dp\mkttitle@bx
2452 \ifdim\@tempdima>0.9\textheight
2453 \loop
2454 \setbox\@tempboxa=\vsplit \mkttitle@bx to 0.9\textheight
2455 \thispagestyle{firstpagestyle}%
2456 \noindent\unvbox\@tempboxa
2457 \clearpage
2458 \@tempdima=\ht\mkttitle@bx
2459 \advance\@tempdima by \dp\mkttitle@bx
2460 \ifdim\@tempdima>0.9\textheight\repeat
2461 \fi
2462 \thispagestyle{firstpagestyle}%
2463 \noindent
2464 \ifcase\ACM@format@nr
2465 \relax % manuscript
2466 \box\mkttitle@bx\par
2467 \or % acmsmall
2468 \box\mkttitle@bx\par
2469 \or % acmlarge
2470 \box\mkttitle@bx\par
2471 \or % acmtog
2472 \twocolumn[\box\mkttitle@bx]%
2473 \or % sigconf
2474 \twocolumn[\box\mkttitle@bx]%
2475 \or % siggraph
2476 \twocolumn[\box\mkttitle@bx]%
2477 \or % sigplan
2478 \twocolumn[\box\mkttitle@bx]%
2479 \or % sigchi
2480 \twocolumn[\box\mkttitle@bx]%
2481 \or % sigchi-a
2482 \par\box\mkttitle@bx\par\bigskip
2483 \or % acmengage
2484 \twocolumn[\box\mkttitle@bx]%
2485 \or % acmcp
2486 \box\mkttitle@bx\par

```

```

2487 \fi
2488 }

```

`\@mktitle` The title of the article

```

2489 \def\@mktitle{%
2490 \ifcase\ACM@format@nr
2491 \relax % manuscript
2492 \@mktitle@i
2493 \or % acmsmall
2494 \@mktitle@i
2495 \or % acmlarge
2496 \@mktitle@i
2497 \or % acmtog
2498 \@mktitle@i
2499 \or % sigconf
2500 \@mktitle@iii
2501 \or % siggraph
2502 \@mktitle@iii
2503 \or % sigplan
2504 \@mktitle@iii
2505 \or % sigchi
2506 \@mktitle@iii
2507 \or % sigchi-a
2508 \@mktitle@iv
2509 \or % acmengage
2510 \@mktitle@iii
2511 \or % acmcp
2512 \@mktitle@i
2513 \fi
2514 }

```

`\@titlefont` The font to typeset the title

```

2515 \def\@titlefont{%
2516 \ifcase\ACM@format@nr
2517 \relax % manuscript
2518 \LARGE\sffamily\bfseries
2519 \or % acmsmall
2520 \LARGE\sffamily\bfseries
2521 \or % acmlarge
2522 \LARGE\sffamily\bfseries
2523 \or % acmtog
2524 \Huge\sffamily
2525 \or % sigconf
2526 \Huge\sffamily\bfseries
2527 \or % siggraph
2528 \Huge\sffamily\bfseries
2529 \or % sigplan
2530 \Huge\bfseries
2531 \or % sigchi
2532 \Huge\sffamily\bfseries
2533 \or % sigchi-a
2534 \Huge\bfseries
2535 \or % acmengage
2536 \Huge\sffamily\bfseries

```

```

2537 \or % acmcp
2538 \LARGE\sffamily\bfseries
2539 \fi}

```

`\@subtitlefont` The font to typeset the subtitle

```

2540 \def\@subtitlefont{\normalsize
2541 \ifcase\ACM@format@nr
2542 \relax % manuscript
2543 \mdseries
2544 \or % acmsmall
2545 \mdseries
2546 \or % acmlarge
2547 \mdseries
2548 \or % acmtog
2549 \LARGE
2550 \or % sigconf
2551 \LARGE\mdseries
2552 \or % siggraph
2553 \LARGE\mdseries
2554 \or % sigplan
2555 \LARGE\mdseries
2556 \or % sigchi
2557 \LARGE\mdseries
2558 \or % sigchi-a
2559 \mdseries
2560 \or % acmengage
2561 \LARGE\mdseries
2562 \or % acmcp
2563 \mdseries
2564 \fi}

```

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

```

2565 \def\@mkttitle@i{\hsize=\textwidth
2566 \if@ACM@acmcp
2567 \advance\hsize by -6pc%
2568 \fi
2569 \@ACM@title@width=\hsize
2570 \setbox\mkttitle@bx=\vbox{\noindent\@titlefont
2571 \parbox[t]{\@ACM@title@width}{\raggedright
2572 \@titlefont\noindent
2573 \@title\@translatedtitle%
2574 \ifx\@subtitle\@empty\else
2575 \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
2576 \fi}%
2577 \par\bigskip}}%

```

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

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

```

2578 \def\@mkttitle@iii{\hsize=\textwidth
2579 \setbox\mkttitle@bx=\vbox{\@titlefont\centering
2580 \@ACM@title@width=\hsize
2581 \parbox[t]{\@ACM@title@width}{\centering\@titlefont

```

```

2582      \@title\@translatedtitle%
2583      \ifx\@subtitle\@empty\else
2584        \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
2585      \fi
2586    }%
2587    \par\bigskip}}%

```

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

```

2588 \def\@mktitle@iv{\hsize=\textwidth
2589   \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
2590     \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
2591     \noindent\@title\@translatedtitle%
2592     \ifx\@subtitle\@empty\else
2593       \par\noindent\@subtitlefont\@subtitle\@translatedsubtitle%
2594     \fi
2595   \par\bigskip}}%

```

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

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

```

2596 \newbox\@ACM@commabox
2597 \def\@ACM@addtoaddress#1{%
2598   \ifvmode\else
2599     \if@ACM@affiliation@obeypunctuation\else
2600       \setbox\@ACM@commabox=\hbox{, }%
2601       \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
2602     \fi\fi
2603   #1}

```

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

```

\streetaddress 2604 \def\streetaddress#1{\ClassWarning{\@classname}{ACM no longer collects
  \city 2605 authors' postal addresses. I am ignoring your street
  \state 2606 address}\unskip\ignorespaces}
\postcode 2607 \def\postcode#1{\ClassWarning{\@classname}{ACM no longer collects
  \country 2608 authors' postal addresses. I am ignoring your postal
  2609 code}\unskip\ignorespaces}
2610 \if@ACM@journal
2611   \def\position#1{\unskip\ignorespaces}
2612   \def\institution#1{\global\@ACM@instpresenttrue
2613     \unskip~#1\ignorespaces}
2614   \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
2615   \def\state#1{\unskip\ignorespaces}
2616   \newcommand\department[2][0]{\unskip\ignorespaces}
2617   \def\country#1{\StrDel{#1}{ }[\@tempa]%
2618     \ifx\@tempa\@empty\else
2619       \global\@ACM@countrypresenttrue\fi
2620     \if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}

```

```

2621 \else
2622   \def\position#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2623   \def\institution#1{\global\@ACM@instpresenttrue
2624     \if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
2625   \newcommand\department[2][0]{\if@ACM@affiliation@obexpunctuation
2626     #2\else#2\par\fi}%
2627   \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
2628   \let\state\@ACM@addtoaddress
2629   \def\country#1{\global\@ACM@countrypresenttrue\@ACM@addtoaddress{#1}}%
2630 \fi

```

\@mkauthors Typesetting the authors

```

2631 \def\@mkauthors{\begingroup
2632   \hsize=\textwidth
2633   \ifcase\ACM@format@nr
2634     \relax % manuscript
2635     \@mkauthors@i
2636   \or % acmsmall
2637     \@mkauthors@i
2638   \or % acmlarge
2639     \@mkauthors@i
2640   \or % acmtog
2641     \@mkauthors@i
2642   \or % sigconf
2643     \@mkauthors@iii
2644   \or % siggraph
2645     \@mkauthors@iii
2646   \or % sigplan
2647     \@mkauthors@iii
2648   \or % sigchi
2649     \@mkauthors@iii
2650   \or % sigchi-a
2651     \@mkauthors@iv
2652   \or % acmengage
2653     \@mkauthors@iii
2654   \or % acmcp
2655     \@mkauthors@i
2656   \fi
2657 \endgroup
2658 }

```

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

```

2659 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```

2660 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

2661 \ifcase\ACM@format@nr
2662 \relax % manuscript
2663 \or % acmsmall
2664   \def\@authorfont{\large\sffamily}
2665   \def\@affiliationfont{\small\normalfont}
2666 \or % acmlarge

```



```

2667 \or % acmtog
2668 \def\@authorfont{\LARGE\sffamily}
2669 \def\@affiliationfont{\large}
2670 \or % sigconf
2671 \def\@authorfont{\LARGE}
2672 \def\@affiliationfont{\large}
2673 \or % siggraph
2674 \def\@authorfont{\normalsize\normalfont}
2675 \def\@affiliationfont{\normalsize\normalfont}
2676 \or % sigplan
2677 \def\@authorfont{\Large\normalfont}
2678 \def\@affiliationfont{\normalsize\normalfont}
2679 \or % sigchi
2680 \def\@authorfont{\bfseries}
2681 \def\@affiliationfont{\mdseries}
2682 \or % sigchi-a
2683 \def\@authorfont{\bfseries}
2684 \def\@affiliationfont{\mdseries}
2685 \or % acmengage
2686 \def\@authorfont{\LARGE}
2687 \def\@affiliationfont{\large}
2688 \or % acmcp
2689 \def\@authorfont{\large\sffamily}
2690 \def\@affiliationfont{\small\normalfont}
2691 \fi

```

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

```

2692 \def\@typeset@author@line{%
2693 \andify\@currentauthors\par\noindent
2694 \@currentauthors\def\@currentauthors{}%
2695 \ifx\@currentaffiliations\empty\else
2696 \andify\@currentaffiliations
2697 \unskip, {\@currentaffiliations}\par
2698 \fi
2699 \def\@currentaffiliations{}}

```

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

```

2700 \newif\if@ACM@instpresent
2701 \@ACM@instpresenttrue

```

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

```

2702 \newif\if@ACM@citypresent
2703 \@ACM@citypresenttrue

```

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

```

2704 \newif\if@ACM@countrypresent
2705 \@ACM@countrypresenttrue

```

\@ACM@resetaffil Reset affiliation flags

```

2706 \def\@ACM@resetaffil{%
2707 \global\@ACM@instpresentfalse
2708 \global\@ACM@citypresentfalse

```

```

2709 \global\@ACM@countrypresentfalse
2710 }

\@ACM@checkaffil Check affiliation flags
2711 \def\@ACM@checkaffil{%
2712   \if@ACM@instpresent\else
2713     \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
2714     \fi
2715     \if@ACM@citypresent\else
2716       \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
2717       \fi
2718     \if@ACM@countrypresent\else
2719       \ClassError{\@classname}{No country present for an affiliation}{ACM
2720         requires each author to indicate their country using country macro.}%
2721       \fi
2722 }

\@mkauthors@i This version is used in most journal formats. Note that \and between authors with the
same affiliation becomes _and_:
2723 \def\@mkauthors@i{%
2724   \def\@currentauthors{}%
2725   \def\@currentaffiliations{}%
2726   \global\let\and\@typeset@author@line
2727   \def\@author##1{%
2728     \ifx\@currentauthors\@empty
2729       \gdef\@currentauthors{\@authorfont\MakeUppercase{##1}}%
2730     \else
2731       \g@addto@macro{\@currentauthors}{\and\MakeUppercase{##1}}%
2732     \fi
2733     \gdef\and{}}%
2734   \def\email##1##2{%
2735     \def\affiliation##1##2{%
2736       \def\@tempa{##2}\ifx\@tempa\@empty\else
2737         \ifx\@currentaffiliations\@empty
2738           \gdef\@currentaffiliations{%
2739             \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2740             \setkeys{@ACM@affiliation@}{##1}%
2741             \@ACM@resetaffil
2742             \@affiliationfont##2\@ACM@checkaffil}%
2743           \else
2744             \g@addto@macro{\@currentaffiliations}{\and
2745               \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2746               \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2747               ##2\@ACM@checkaffil}%
2748             \fi
2749             \fi
2750             \global\let\and\@typeset@author@line}%
2751     \if@ACM@acmcp
2752       \advance\hsize by -6pc%
2753     \fi
2754     \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
2755       \noindent\addresses\@typeset@author@line
2756       \par\medskip}%
2757 }

```

`\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
 2758 `\newbox\author@bx`

`\author@bx@wd` The width of the author box
 2759 `\newdimen\author@bx@wd`

`\author@bx@sep` The separation between author boxes
 2760 `\newskip\author@bx@sep`
 2761 `\author@bx@sep=1pc\relax`

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

```
2762 \def\typeset@author@bx{\bgroup\hsize=\author@bx@wd
2763 \def\and{\par}\normalbaselines
2764 \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2765 \@authorfont\@currentauthors\par\@affiliationfont
2766 \@currentaffiliation}\egroup
2767 \box\author@bx\hspace{\author@bx@sep}%
2768 \gdef\@currentauthors{}}%
2769 \gdef\@currentaffiliation{}}
```

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

```
2770 \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.

```
2771 \author@bx@wd=\textwidth\relax
2772 \advance\author@bx@wd by -\author@bx@sep\relax
2773 \ifnum\@ACM@authorssperrow>0\relax
2774 \divide\author@bx@wd by \@ACM@authorssperrow\relax
2775 \else
2776 \ifcase\num@authorgroups
2777 \relax % 0?
2778 \or % 1=one author per row
2779 \or % 2=two authors per row
2780 \divide\author@bx@wd by \num@authorgroups\relax
2781 \or % 3=three authors per row
2782 \divide\author@bx@wd by \num@authorgroups\relax
2783 \or % 4=two authors per row (!)
2784 \divide\author@bx@wd by 2\relax
2785 \else % three authors per row
2786 \divide\author@bx@wd by 3\relax
2787 \fi
2788 \fi
2789 \advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of `\addresses`:

```
2790 \gdef\@currentauthors{}}%
2791 \gdef\@currentaffiliation{}}%
2792 \def\@author##1{\ifx\@currentauthors\@empty
```

```

2793 \gdef\@currentauthors{\par##1}%
2794 \else
2795 \g@addto@macro\@currentauthors{\par##1}%
2796 \fi
2797 \gdef\and{}}%
2798 \def\email##1##2{\ifx\@currentaffiliation\@empty
2799 \gdef\@currentaffiliation{\bgroup
2800 \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2801 \else
2802 \g@addto@macro\@currentaffiliation{\par\bgroup
2803 \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2804 \fi}%
2805 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2806 \gdef\@currentaffiliation{%
2807 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2808 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2809 ##2\@ACM@checkaffil}%
2810 \else
2811 \g@addto@macro\@currentaffiliation{\par
2812 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2813 \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2814 ##2\@ACM@checkaffil}%
2815 \fi
2816 \global\let\and\@typeset@author@bx
2817 }%

```

Actual typesetting is done by the \and macro:

```

2818 \hsize=\textwidth
2819 \global\setbox\mktitle@bx=\vbox{\noindent
2820 \unvbox\mktitle@bx\par\medskip\leavevmode
2821 \lineskip=1pc\relax\centering\hspace*{-1em}%
2822 \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.

```

2823 \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.

```

2824 \author@bx@wd=\columnwidth\relax
2825 \advance\author@bx@wd by -\author@bx@sep\relax
2826 \ifnum\@ACM@authorsperrrow>0\relax
2827 \divide\author@bx@wd by \@ACM@authorsperrrow\relax
2828 \else
2829 \ifcase\@num@authorgroups
2830 \relax % 0?
2831 \or % 1=one author per row
2832 \else % 2=two authors per row
2833 \divide\author@bx@wd by 2\relax
2834 \fi
2835 \fi
2836 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2837 \gdef\@currentauthors{}%
2838 \gdef\@currentaffiliation{}%
2839 \def\@author##1{\ifx\@currentauthors\@empty
2840   \gdef\@currentauthors{\par##1}%
2841   \else
2842     \g@addto@macro\@currentauthors{\par##1}%
2843   \fi
2844   \gdef\and{}}%
2845 \def\email##1##2{\ifx\@currentaffiliation\@empty
2846   \gdef\@currentaffiliation{\nolinkurl{##2}}%
2847   \else
2848     \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2849   \fi}%
2850 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2851   \gdef\@currentaffiliation{%
2852     \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2853     \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2854     ##2\@ACM@checkaffil}%
2855   \else
2856     \g@addto@macro\@currentaffiliation{\par
2857       \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2858       \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2859       ##2\@ACM@checkaffil}%
2860   \fi
2861   \global\let\and\@typeset@author@bx}%
2862 %

```

Actual typesetting is done by the \and macro

```

2863   \bgroup\hsize=\columnwidth
2864   \par\raggedright\leftskip=\z@
2865   \lineskip=1pc\noindent
2866   \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

\mkauthorsaddresses Typesetting authors' addresses in the footnote style

```

2867 \def\mkauthorsaddresses{%
2868   \ifnum\num@authors>1\relax
2869   Authors' \else Author's \fi
2870   Contact Information:
2871   \bgroup
2872   \def\streetaddress##1{\ClassWarning{\@classname}{ACM no longer collects
2873     authors' postal addresses. I am ignoring your street
2874     address}\unskip\ignorespaces}%
2875   \def\postcode##1{\ClassWarning{\@classname}{ACM no longer collects
2876     authors' postal addresses. I am ignoring your postal
2877     code}\unskip\ignorespaces}%
2878   \def\position##1{\unskip\ignorespaces}%
2879   \gdef\@ACM@institution@separator{, }%
2880   \def\institution##1{\unskip\@ACM@institution@separator ##1\gdef\@ACM@institution@separator{ and }}
2881   \def\city##1{\unskip, ##1}%
2882   \def\state##1{\unskip, ##1}%
2883   \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2884   \def\country##1{\unskip, ##1}%
2885   \def\and{\unskip; \gdef\@ACM@institution@separator{, }}%

```

```

2886 \def\@author##1{##1}%
2887 \def\email##1##2{\unskip, \nolinkurl{##2}}%
2888 \addresses
2889 \egroup}

2890 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
2891 \ifx\@authorsaddresses\@empty
2892 \ClassWarningNoLine{\@classname}{Authors'
2893 addresses are mandatory for ACM journals}%
2894 \fi\fi\fi}

```

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

```
2895 \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

```

2896 \def\@authornotemark{\g@addto@macro\@currentauthors{%
2897 \advance\hfuzz by 5pt\relax\footnotemark\relax}}

```

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

```

2898 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{%
2899 \advance\hfuzz by 5pt\relax\footnotemark[#1]}}

```

\@mkteasers Typesetting the teasers

```

2900 \def\@mkteasers{%
2901 \ifx\@teaserfigures\@empty\else
2902 \def\@teaser##1{\par\bigskip\bgroup
2903 \captionsetup{type=figure}##1\egroup\par}
2904 \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
2905 \noindent\@Description@presentfalse
2906 \@teaserfigures\par\if@Description@present\else
2907 \global\@undescrbed@imagestrue
2908 \ClassWarning{\@classname}{A possible image without
2909 description}\fi
2910 \medskip}%
2911 \fi}

```

\@mkabstract Typesetting the abstract

```

2912 \def\@mkabstract{\bgroup
2913 \ifx\@abstract\@empty\else
2914 {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
2915 \if@ACM@journal
2916 \everypar{\setbox\z@\lastbox\everypar{}}\small
2917 \else
2918 \section*{\abstractname}%
2919 \fi
2920 \ignorespaces\@abstract\par}%
2921 \fi\egroup}

```

\@mktranslatedabstract Typesetting a translated abstract

```

2922 \def\@mktranslatedabstract#1{\selectlanguage{#1}%
2923 \if@ACM@journal

```

```

2924 \everypar{\setbox\z@\lastbox\everypar{}}\small
2925 \else
2926 \section*{\abstractname}%
2927 \fi
2928 \ignorespaces}

```

\mkbibcitation Print the bibcitation format

```

2929 \def\mkbibcitation{\bgroup
2930 \let\@vspace\@vspace@orig
2931 \let\@vspacer\@vspacer@orig
2932 \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2933 \def\footnotemark{}%
2934 \def\{\unskip{} \ignorespaces}%
2935 \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2936 inside a \string\title{} or \string\author{} command! Use
2937 \string\titlenote{} or \string\authornote{} instead!}}%
2938 \def\article@string{\ifx\@acmArticle\@empty{\ }else,
2939 Article~\@acmArticle\ }fi}%
2940 \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2941 \noindent\bgroup
2942 \def\{\unskip{}, \ignorespaces}\authors\egroup. \@acmYear. \@title
2943 \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2944 \if@ACM@nonacm\else
2945 % The 'nonacm' option disables 'printacmref' by default,
2946 % and the present \mkbibcitation definition is never used
2947 % in this case. The conditional remains useful if the user
2948 % explicitly sets \settopmatter{printacmref=true}.
2949 \if@ACM@journal@bibstrip
2950 \textit{\@journalNameShort}
2951 \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2952 \ref{TotPages}~\@pages@word.
2953 \else
2954 In \textit{\@acmBooktitle}%
2955 \ifx\@acmEditors\@empty\textit{.}\else
2956 \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
2957 \fi\
2958 ACM, New York, NY, USA%
2959 \@article@string\unskip, \ref{TotPages}~\@pages@word.
2960 \fi
2961 \fi
2962 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2963 \par\egroup}

```

\@printendtopmatter End the top matter

```

2964 \def\@printendtopmatter{%
2965 \let\@vspace\@vspace@orig
2966 \let\@vspacer\@vspacer@orig
2967 \par\bigskip
2968 \let\@vspace\@vspace@acm
2969 \let\@vspacer\@vspacer@acm
2970 }

```

\@setthanks We redefine \setthanks using \long

```

2971 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}

```

`\@setauthorsaddresses`

```
2972 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}
```

`\@typesetengagemetadata` Typesetting special metadata for ACM Engage

```
2973 \def\@typesetengagemetadata{%
2974   \def\@setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
2975   \@acmengagemetadata}
```

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

```
2976 \ExplSyntaxOn
2977 \AddToHook{cmd/maketitle/before}
2978 {\tagstructbegin{tag=Title}\tagmcbegin{} \tag_stop:}
2979 \AddToHook{cmd/maketitle/after}
2980 {\tag_start:\tagmcbend\tagstructend }
2981 \ExplSyntaxOff
i/tagged;
```

3.22 Headers and Footers

We use fancyhdr for our headers and footers:

```
2982 \RequirePackage{fancyhdr}
```

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

```
2983 \let\ACM@ps@plain\ps@plain
2984 \let\ACM@ps@myheadings\ps@myheadings
2985 \let\ACM@ps@headings\ps@headings
2986 \def\ACM@restore@pagestyle{%
2987   \let\ps@plain\ACM@ps@plain
2988   \let\ps@myheadings\ACM@ps@myheadings
2989   \let\ps@headings\ACM@ps@headings}
2990 \AtBeginDocument{\ACM@restore@pagestyle}
```

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

```
2991 \if@ACM@review
2992   \newsavebox{\ACM@linecount@bx}
2993   \newlength\ACM@linecount@bxht
2994   \newcount\ACM@linecount
2995   \ACM@linecount\@ne\relax
2996   \def\ACM@mk@linecount{%
2997     \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
2998       \normalsize
2999       \setlength{\ACM@linecount@bxht}{0pt}%
3000       \loop{\color{red}\scriptsize\the\ACM@linecount}\
3001         \global\advance\ACM@linecount by \@ne
3002         \addtolength{\ACM@linecount@bxht}{\baselineskip}%
3003         \ifdim\ACM@linecount@bxht<\textheight\repeat
3004         {\color{red}\scriptsize\the\ACM@linecount}\hfill
3005         \global\advance\ACM@linecount by \@ne}}
3006   \fi
```

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

```
3007 \def\ACM@linecountL{%
```



```

3008 \if@ACM@review
3009 \ACM@mk@linecount
3010 \begin{picture}(0,0)%
3011 \put(-26,-22){\usebox{\ACM@linecount@bx}}%
3012 \end{picture}%
3013 \fi}

```

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

```

3014 \def\ACM@linecountR{%
3015 \if@ACM@review
3016 \ifcase\ACM@format@nr
3017 \relax % manuscript
3018 \relax
3019 \or % acmsmall
3020 \relax
3021 \or % acmlarge
3022 \relax
3023 \or % acmtog
3024 \ACM@mk@linecount
3025 \or % sigconf
3026 \ACM@mk@linecount
3027 \or % siggraph
3028 \ACM@mk@linecount
3029 \or % sigplan
3030 \ACM@mk@linecount
3031 \or % sigchi
3032 \ACM@mk@linecount
3033 \or % sigchi-a
3034 \ACM@mk@linecount
3035 \or % acmengage
3036 \ACM@mk@linecount
3037 \or % acmcp
3038 \relax
3039 \fi
3040 \begin{picture}(0,0)%
3041 \put(20,-22){\usebox{\ACM@linecount@bx}}%
3042 \end{picture}%
3043 \fi}

```

\ACM@timestamp The timestamp system

```

3044 \if@ACM@timestamp
3045 % Subtracting 30 from \time gives us the effect of rounding down despite
3046 % \numexpr rounding to nearest
3047 \newcounter{ACM@time@hours}
3048 \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
3049 \newcounter{ACM@time@minutes}
3050 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
3051 \newcommand\ACM@timestamp{%
3052 \footnotesize%
3053 \ifx\@acmSubmissionID\@empty\relax\else
3054 Submission ID: \@acmSubmissionID.{ }%
3055 \fi
3056 \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
3057 \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%

```

```

3058   Page \thepage\ of \@startPage--\pageref*{TotPages}.\%
3059 }
3060 \fi

```

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

```

3061 \def\@shortauthors{%
3062   \if@ACM@anonymous
3063     Anon.
3064     \ifx\@acmSubmissionID\empty\else Submission Id: \@acmSubmissionID\fi
3065   \else\shortauthors\fi}

```

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

```

3066 \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

```

3067 \AtBeginDocument{%
3068   \fancypagestyle{standardpagestyle}{%
3069     \fancyhf{}%
3070     \renewcommand{\headrulewidth}{\z@}%
3071     \renewcommand{\footrulewidth}{\z@}%
3072     \def\@acmArticlePage{%
3073       \ifx\@acmArticle\empty%
3074         \if@ACM@printfolios\thepage\fi%
3075       \else%
3076         \@acmArticle\if@ACM@printfolios:\thepage\fi%
3077       \fi%
3078     }%
3079     \if@ACM@journal@bibstrip@or@tog
3080       \ifcase\ACM@format@nr
3081       \relax % manuscript
3082       \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
3083       \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
3084       \fancyhead[RE]{\@shortauthors}%
3085       \fancyhead[LO]{\ACM@linecountL\shorttitle}%
3086       \if@ACM@nonacm\else%
3087         \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
3088       \fi%
3089     \or % acmsmall
3090       \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
3091       \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
3092       \fancyhead[RE]{\@headfootfont\@shortauthors}%
3093       \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3094       \if@ACM@nonacm\else%
3095       \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3096         \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
3097       \fi
3098     \or % acmlarge
3099       \fancyhead[LE]{\ACM@linecountL\@headfootfont
3100         \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
3101       \fancyhead[LO]{\ACM@linecountL}%
3102       \fancyhead[RO]{\@headfootfont
3103         \shorttitle\quad\textbullet\quad\@acmArticlePage}%

```

```

3104     \if@ACM@nonacm\else%
3105     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3106       \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
3107     \fi
3108   \or % acmtog
3109     \fancyhead[LE]{\ACM@linecountL\@headfootfont
3110       \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
3111     \fancyhead[LO]{\ACM@linecountL}%
3112     \fancyhead[RE]{\ACM@linecountR}%
3113     \fancyhead[RO]{\@headfootfont
3114       \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
3115     \if@ACM@nonacm\else
3116       \if@ACM@journal@bibstrip
3117         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
3118           Vol. \@acmVolume, No.\@acmNumber, Article \@acmArticle.
3119           Publication date: \@acmPubDate.}%
3120       \else
3121         \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
3122           \acmConference@date, \acmConference@venue.}%
3123       \fi
3124     \fi
3125   \else % Proceedings
3126     \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3127     \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3128     \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3129     \if@ACM@nonacm
3130       \fancyhead[LE]{\ACM@linecountL}%
3131       \fancyhead[RO]{\ACM@linecountR}%
3132     \else%
3133       \if@ACM@engage
3134         \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3135           EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3136         \fancyhead[RO]{\@headfootfont
3137           EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3138           \ACM@linecountR}%
3139       \else
3140         \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3141           \acmConference@shortname,
3142           \acmConference@date, \acmConference@venue}%
3143         \fancyhead[RO]{\@headfootfont
3144           \acmConference@shortname,
3145           \acmConference@date, \acmConference@venue\ACM@linecountR}%
3146       \fi
3147     \fi
3148   \fi
3149 \else % Proceedings
3150   \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3151   \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3152   \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3153   \if@ACM@nonacm
3154     \fancyhead[LE]{\ACM@linecountL}%
3155     \fancyhead[RO]{\ACM@linecountR}%
3156   \else%
3157     \if@ACM@engage

```

```

3158 \fancyhead[LE]{\ACM@linecountL\@headfootfont
3159 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3160 \fancyhead[RO]{\@headfootfont
3161 EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3162 \ACM@linecountR}%
3163 \else
3164 \fancyhead[LE]{\ACM@linecountL\@headfootfont
3165 \acmConference@shortname,
3166 \acmConference@date, \acmConference@venue}%
3167 \fancyhead[RO]{\@headfootfont
3168 \acmConference@shortname,
3169 \acmConference@date, \acmConference@venue\ACM@linecountR}%
3170 \fi
3171 \fi
3172 \fi
3173 \if@ACM@sigchiamode
3174 \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
3175 \fi
3176 \if@ACM@timestamp
3177 \fancyfoot[LO,RE]{\ACM@timestamp}
3178 \fi
3179 \if@ACM@acmcp
3180 \renewcommand{\footrulewidth}{0.1\p}%
3181 \fancyheadoffset[L]{46pt}%
3182 \fancyhead[L]{\makebox[\z@][l]{%
3183 \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3184 \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3185 \strut\ACM@ArticleType~Article}}}%
3186 \ACM@linecountL}%
3187 \fancyhead[R]{\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3188 \fancyfoot[L,C]{}%
3189 \fancyfoot[R]{\footnotesize
3190 \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3191 \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3192 (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3193 \fi
3194 }%
3195 \pagestyle{standardpagestyle}
3196 }

```

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

\@folio@ht

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

\@folio@max

firstpagestyle The page style for the first page only.

```

3197 \AtBeginDocument{%
3198 \fancypagestyle{firstpagestyle}{%
3199 \fancyhf{}%
3200 \renewcommand{\headrulewidth}{\z@}%
3201 \renewcommand{\footrulewidth}{\z@}%
3202 \if@ACM@journal@bibstrip@or@tog
3203 \ifcase\ACM@format@nr
3204 \relax % manuscript
3205 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%

```

```

3206 \fancyhead[R]{\@acmBadgeR}%
3207 \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
3208 \if@ACM@nonacm\else%
3209 \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
3210 \fi%
3211 \or % acmsmall
3212 \if@ACM@nonacm\else%
3213 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3214 \@acmNumber, Article \@acmArticle. Publication date:
3215 \@acmPubDate.}%
3216 \fi%
3217 \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3218 \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3219 \fancyhead[RO]{\@acmBadgeR}%
3220 \fancyhead[RE]{\@acmBadgeR}%
3221 \or % acmlarge
3222 \if@ACM@nonacm\else%
3223 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3224 \@acmNumber, Article \@acmArticle. Publication date:
3225 \@acmPubDate.}%
3226 \fi%
3227 \fancyhead[RO]{\@acmBadgeR}%
3228 \fancyhead[RE]{\@acmBadgeR}%
3229 \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
3230 \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3231 \or % acmtog
3232 \if@ACM@nonacm\else%
3233 \if@ACM@journal@bibstrip
3234 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
3235 Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
3236 Publication date: \@acmPubDate.}%
3237 \else
3238 \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
3239 \acmConference@date, \acmConference@venue.}%
3240 \fi
3241 \fi%
3242 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3243 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3244 \else % Conference proceedings
3245 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3246 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3247 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3248 \fi
3249 \else
3250 \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3251 \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3252 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3253 \fi
3254 \if@ACM@timestamp
3255 \ifnum\ACM@format@nr=0\relax % Manuscript
3256 \fancyfoot[LO,RE]{\ACM@timestamp\quad
3257 \if@ACM@nonacm\else
3258 \footnotesize Manuscript submitted to ACM
3259 \fi}

```

```

3260 \else
3261 \fancyfoot[LO,RE]{\ACM@timestamp}
3262 \fi
3263 \fi
3264 \if@ACM@acmcp
3265 \renewcommand{\footrulewidth}{0.1\p@}%
3266 \fancyheadoffset[L]{46pt}%
3267 \fancyhead[L]{\makebox[\z@][l]{%
3268 \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3269 \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3270 \strut\ACM@ArticleType~Article}}}}}%
3271 \ACM@linecountL@acmBadgeL}%
3272 \fancyhead[R]{\@acmBadgeR\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3273 \fancyfoot[L,C]{}%
3274 \fancyfoot[R]{\footnotesize
3275 \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3276 \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3277 (\@acmPubDate)\ifx\@acmDOI\@empty\else\\@formatdoi{\@acmDOI}\fi}
3278 \fi
3279 }}

```

3.23 Sectioning

\ACM@NRadjust Ross Moore's macro.

Initially \ACM@sect@format@ just passes through its #1 argument unchanged. When a sectioning macro such as \section occurs, the \ACM@NRadjust redefines \ACM@sect@format@ to expand into the styling commands; e.g., \@secfont. Then \Sectionformat is temporarily redefined to produce \realSectionformat{\ACM@sect@format{#1}}{#2}, which ultimately becomes \Sectionformat{\@secfont{#1}}{#2}. This is done to allow \Sectionformat to be variable, as may be needed in particular circumstances. Its current expansion is saved as \realSectionformat which is used with the modified 1st argument, then \Sectionformat is reverted to its former expansion.

To style the section-number, the line #1{ } is used at the end of \ACM@NRadjust. This imposes style-changing commands for fonts and sizes, but any \MakeUppercase acts on just the { }. It's a bit hacky, by essentially assuming that only numbers occur here, not letters to be case-changed. (This should be acceptable in a class-file, as it ought to be possible to change the case elsewhere, if that was ever desired.) Also, it can result in \@adddotafter being called too soon, so a slight adjustment is made, via \ACM@adddotafter, which now tests whether its argument is empty. But the coding has to allow for other packages to have also patched \@adddotafter.

```

3280 \def\ACM@NRadjust#1{%
3281 \begingroup
3282 \expandafter\ifx\csname Sectionformat\endcsname\relax
3283 % do nothing when \Sectionformat is unknown
3284 \def\next{\endgroup #1}%
3285 \else
3286 \def\next{\endgroup
3287 \let\realSectionformat\Sectionformat
3288 \def\ACM@sect@format@{#1}%

```

```

3289 \let\Sectionformat\ACM@NR@adjustedSectionformat
3290 %% next lines added 2018-06-17 to ensure section number is styled
3291 \let\real@adddotafter\@adddotafter
3292 \let\@adddotafter\ACM@adddotafter
3293 #1{ }% imposes the styles, but nullifies \MakeUppercase
3294 \let\@adddotafter\real@adddotafter
3295 }%
3296 \fi \next
3297 }

```

\ACM@NR@adjustedSectionformat

```

3298 \def\ACM@NR@adjustedSectionformat#1#2{%
3299 \realSectionformat{\ACM@sect@format{#1}}{#2}%
3300 \let\Sectionformat\realSectionformat}
3301 \DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
3302 \def\ACM@sect@format@null#1{#1}
3303 \let\ACM@sect@format@\ACM@sect@format@null
3304 \AtBeginDocument{%
3305 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
3306 \let\LTX@adddotafter\@adddotafter
3307 \fi
3308 }

```

\ACM@adddotafter

```

3309 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}

```

Sectioning is different for different levels

```

3310 \renewcommand\section{\def\@toclevel{1}%
3311 \@startsection{section}{1}{\z@}%
3312 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3313 {.25\baselineskip}%
3314 {\ACM@NRadjust\@secfont}}
3315 \renewcommand\subsection{\def\@toclevel{2}%
3316 \@startsection{subsection}{2}{\z@}%
3317 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3318 {.25\baselineskip}%
3319 {\ACM@NRadjust\@subsecfont}}
3320 \renewcommand\subsubsection{\def\@toclevel{3}%
3321 \@startsection{subsubsection}{3}{\z@}%
3322 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3323 {-3.5\p@}%
3324 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}
3325 \renewcommand\paragraph{\def\@toclevel{4}%
3326 \@startsection{paragraph}{4}{\parindent}%
3327 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3328 {-3.5\p@}%
3329 {\ACM@NRadjust{\@parfont\@adddotafter}}}
3330 \newcommand\noindentparagraph{\def\@toclevel{4}%
3331 \@startsection{paragraph}{4}{\z@}%
3332 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
3333 {-3.5\p@}%
3334 {\ACM@NRadjust{\@parfont}}}
3335 \renewcommand\part{\def\@toclevel{9}%
3336 \@startsection{part}{9}{\z@}%

```

```

3337 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
3338 {4\p@}%
3339 {\ACM@NRadjust\@parfont}}

```

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

```

3340 \def\section@raggedright{\@rightskip\@flushglue
3341 \rightskip\@rightskip
3342 \leftskip\z@skip
3343 \parindent\z@}

```

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

```

\@subsecfont 3344 \def\@secfont{\sffamily\bfseries\section@raggedright}
\@subsubsecfont 3345 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 3346 \def\@subsubsecfont{\sffamily\itshape}
3347 \def\@parfont{\itshape}
3348 \setcounter{secnumdepth}{3}
3349 \ifcase\ACM@format@nr
3350 \relax % manuscript
3351 \or % acmsmall
3352 \or % acmlarge
3353 \def\@secfont{\sffamily\large\section@raggedright}
3354 \def\@subsecfont{\sffamily\large\section@raggedright}
3355 \or % acmtog
3356 \def\@secfont{\sffamily\large\section@raggedright}
3357 \def\@subsecfont{\sffamily\large\section@raggedright}
3358 \or % sigconf
3359 \def\@secfont{\bfseries\Large\section@raggedright}
3360 \def\@subsecfont{\bfseries\Large\section@raggedright}
3361 \or % siggraph
3362 \def\@secfont{\sffamily\bfseries\Large\section@raggedright}
3363 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
3364 \or % sigplan
3365 \def\@secfont{\bfseries\Large\section@raggedright}
3366 \def\@subsecfont{\bfseries\section@raggedright}
3367 \def\@subsubsecfont{\bfseries\section@raggedright}
3368 \def\@parfont{\bfseries\itshape}
3369 \def\@subparfont{\itshape}
3370 \or % sigchi
3371 \setcounter{secnumdepth}{1}
3372 \def\@secfont{\sffamily\bfseries\section@raggedright}
3373 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3374 \or % sigchi-a
3375 \setcounter{secnumdepth}{0}
3376 \def\@secfont{\sffamily\bfseries\section@raggedright}
3377 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
3378 \or % acmengage
3379 \def\@secfont{\bfseries\Large\section@raggedright}
3380 \def\@subsecfont{\bfseries\Large\section@raggedright}
3381 \or % acmcp
3382 \fi

```

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

```

3383 \AtBeginDocument{%

```



```

3384 \@for\@tempa:=-1,0,1,2,3,4,5\do{%
3385   \ifundefined{r@tocindent\@tempa}{%
3386     \xp@gdef\csname r@tocindent\@tempa\endcsname{0pt}}{%
3387   }%
3388 }
3389 \def\@writetocindents{%
3390   \begingroup
3391   \@for\@tempa:=-1,0,1,2,3,4,5\do{%
3392     \immediate\write\@auxout{%
3393       \string\newlabel{tocindent\@tempa}{%
3394         \csname r@tocindent\@tempa\endcsname}}%
3395     }%
3396   \endgroup}

```

\@adddotafter Add punctuation after a sectioning command

```

3397 \def\@adddotafter#1{#1\@addpunct{.}}

```

\@addspaceafter Add space after a sectioning command

```

3398 \def\@addspaceafter#1{#1\@addpunct{\enspace}}

```

```

3399 \if@ACM@acmcp

```

```

3400   \setcounter{secnumdepth}{-1}%

```

```

3401 \fi

```

3.24 TOC lists

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

```

3402 \providecommand*\@dotsep{4.5}

```

3.25 Theorems

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

```

3403 \def\@acmplainbodyfont{\itshape}

```

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

```

3404 \def\@acmplainindent{\parindent}

```

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

```

3405 \def\@acmplainheadfont{\scshape}

```

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

```

3406 \def\@acmplainnotefont{\@empty}

```

Customization of the acmplain theorem style:

```

3407 \ifcase\ACM@format@nr

```

```

3408 \relax % manuscript

```

```

3409 \or % acmsmall

```

```

3410 \or % acmlarge

```

```

3411 \or % acmtog

```

```

3412 \or % sigconf
3413 \or % siggraph
3414 \or % sigplan
3415 \def\@acmplainbodyfont{\itshape}
3416 \def\@acmplainindent{\z@}
3417 \def\@acmplainheadfont{\bfseries}
3418 \def\@acmplainnotefont{\normalfont}
3419 \or % sigchi
3420 \or % sigchi-a
3421 \or % acmengage
3422 \or % acmcp
3423 \fi

```

acmplain The acmplain theorem style

```

3424 \newtheoremstyle{acmplain}%
3425   {.5\baselineskip\@plus.2\baselineskip
3426     \@minus.2\baselineskip}% space above
3427   {.5\baselineskip\@plus.2\baselineskip
3428     \@minus.2\baselineskip}% space below
3429   {\@acmplainbodyfont}% body font
3430   {\@acmplainindent}% indent amount
3431   {\@acmplainheadfont}% head font
3432   {.}% punctuation after head
3433   {.5em}% spacing after head
3434   {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec

```

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

```
3435 \def\@acmdefinitionbodyfont{\normalfont}
```

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

```
3436 \def\@acmdefinitionindent{\parindent}
```

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

```
3437 \def\@acmdefinitionheadfont{\itshape}
```

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

```
3438 \def\@acmdefinitionnotefont{\@empty}
```

Customization of the acmdefinition theorem style:

```

3439 \ifcase\ACM@format@nr
3440 \relax % manuscript
3441 \or % acmsmall
3442 \or % acmlarge
3443 \or % acmtog
3444 \or % sigconf
3445 \or % siggraph
3446 \or % sigplan
3447 \def\@acmdefinitionbodyfont{\normalfont}
3448 \def\@acmdefinitionindent{\z@}
3449 \def\@acmdefinitionheadfont{\bfseries}
3450 \def\@acmdefinitionnotefont{\normalfont}
3451 \or % sigchi
3452 \or % sigchi-a

```

```

3453 \or % acmengage
3454 \or % acmcp
3455 \fi

```

acmdefinition The acmdefinition theorem style

```

3456 \newtheoremstyle{acmdefinition}%
3457   {.5\baselineskip\@plus.2\baselineskip
3458     \@minus.2\baselineskip}% space above
3459   {.5\baselineskip\@plus.2\baselineskip
3460     \@minus.2\baselineskip}% space below
3461   {\@acmdefinitionbodyfont}% body font
3462   {\@acmdefinitionindent}% indent amount
3463   {\@acmdefinitionheadfont}% head font
3464   {.}% punctuation after head
3465   {.5em}% spacing after head
3466   {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont{#3}}}}% head spec

```

Make acmplain the default theorem style.

```

3467 \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.

```

3468 \AtEndPreamble{%
3469   \if@ACM@acmthm
3470     \theoremstyle{acmplain}
3471     \@ifundefined{theorem}{%
3472       \newtheorem{theorem}{Theorem}[section]
3473     }{}
3474     \@ifundefined{conjecture}{%
3475       \newtheorem{conjecture}[theorem]{Conjecture}
3476     }{}
3477     \@ifundefined{proposition}{%
3478       \newtheorem{proposition}[theorem]{Proposition}
3479     }{}
3480     \@ifundefined{lemma}{%
3481       \newtheorem{lemma}[theorem]{Lemma}
3482     }{}
3483     \@ifundefined{corollary}{%
3484       \newtheorem{corollary}[theorem]{Corollary}
3485     }{}
3486     \theoremstyle{acmdefinition}
3487     \@ifundefined{example}{%
3488       \newtheorem{example}[theorem]{Example}
3489     }{}
3490     \@ifundefined{definition}{%
3491       \newtheorem{definition}[theorem]{Definition}
3492     }{}
3493   \fi

```

```

3494 \theoremstyle{acmplain}
3495 }

\@proofnamefont The font to typeset the proof name.
3496 \def\@proofnamefont{\scshape}

\@proofindent Whether or not to indent proofs.
3497 \def\@proofindent{\indent}

Customization of the proof environment.
3498 \ifcase\ACM@format@nr
3499 \relax % manuscript
3500 \or % acmsmall
3501 \or % acmlarge
3502 \or % acmtog
3503 \or % sigconf
3504 \or % siggraph
3505 \or % sigplan
3506 \def\@proofnamefont{\itshape}
3507 \def\@proofindent{\noindent}
3508 \or % sigchi
3509 \or % sigchi-a
3510 \or % acmengage
3511 \or % acmcp
3512 \fi

proof We want some customization of the proof environment.
3513 \renewenvironment{proof}[1][\proofname]{\par
3514 \pushQED{\qed}%
3515 \normalfont \topsep6\p@\@plus6\p@\relax
3516 \trivlist
3517 \item[\@proofindent\hskip\labelsep
3518 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
3519 }{\%
3520 \popQED\endtrivlist\@endpfalse
3521 }

```

3.26 Balancing columns

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

```

3522 \AtEndPreamble{%
3523 \if@ACM@pbalance
3524 \global\@ACM@balancefalse
3525 \ifcase\ACM@format@nr
3526 \relax % manuscript
3527 \or % acmsmall
3528 \or % acmlarge
3529 \or % acmtog
3530 \RequirePackage{pbalance}%
3531 \or % sigconf
3532 \RequirePackage{pbalance}%
3533 \or % siggraph

```

```

3534         \RequirePackage{pbalance}%
3535     \or % sigplan
3536         \RequirePackage{pbalance}%
3537     \or % sigchi
3538         \RequirePackage{pbalance}%
3539     \or % sigchi-a
3540     \or % acmengage
3541         \RequirePackage{pbalance}%
3542     \or % acmcp
3543 \fi
3544 \fi
3545 \if@ACM@balance
3546     \ifcase\ACM@format@nr
3547     \relax % manuscript
3548         \global\@ACM@balancefalse
3549     \or % acmsmall
3550         \global\@ACM@balancefalse
3551     \or % acmlarge
3552         \global\@ACM@balancefalse
3553     \or % acmtog
3554         \RequirePackage{balance}%
3555     \or % sigconf
3556         \RequirePackage{balance}%
3557     \or % siggraph
3558         \RequirePackage{balance}%
3559     \or % sigplan
3560         \RequirePackage{balance}%
3561     \or % sigchi
3562         \RequirePackage{balance}%
3563     \or % sigchi-a
3564         \global\@ACM@balancefalse
3565     \or % acmengage
3566         \RequirePackage{balance}%
3567     \or % acmcp
3568         \global\@ACM@balancefalse
3569 \fi
3570 \fi
3571 }
3572 \AtEndDocument{%
3573     \if@ACM@balance
3574     \if@twocolumn
3575     \balance
3576     \fi\fi}

```

3.27 Acknowledgments

\acksname

```

3577 \newcommand\acksname{Acknowledgments}

```

\acks This is a comment-like structure

```

3578 \specialcomment{acks}{%
3579     \begin{group}
3580     \section*{\acksname}
3581     \phantomsection\addcontentsline{toc}{section}{\acksname}

```

```

3582 }{%
3583   \endgroup
3584 }

```

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

```

3585 \def\grantsponsor#1#2#3{#2}

```

`\grantnum`

```

3586 \newcommand\grantnum[3][{}]{#3%
3587   \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}

```

3.28 Conditional typesetting

We use the `comment` package for conditional typesetting:

```

3588 \AtEndPreamble{%
3589   \if@ACM@screen
3590     \includecomment{screenonly}
3591     \excludecomment{printonly}
3592   \else
3593     \excludecomment{screenonly}
3594     \includecomment{printonly}
3595   \fi
3596   \if@ACM@anonymous
3597     \excludecomment{anonsuppress}
3598     \excludecomment{acks}
3599   \else
3600     \includecomment{anonsuppress}
3601   \fi}

```

3.29 Additional bibliography commands

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

```

3602 \newcommand\showeprint[2][arxiv]{%
3603   \def\@tempa{#1}%
3604   \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
3605   \def\@tempb{arxiv}%
3606   \ifx\@tempa\@tempb\relax
3607     arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3608   \else
3609     \def\@tempb{arXiv}%
3610     \ifx\@tempa\@tempb\relax
3611       arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3612     \else
3613       #1:#2%
3614     \fi
3615   \fi}

```

3.30 Index

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

```

3616 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
3617 \columnseprule\z@ \columnsep 35\p@
3618 \@indextitlestyle
3619 \let\item\@idxitem
3620 \parindent\z@ \parskip\z@\@plus.3\p@\relax
3621 \raggedright
3622 \hyphenpenalty\@M
3623 \footnotesize}

```

3.31 End of Class

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

```

3624 \let\@vspace@orig=\vspace
3625 \let\@vspacer@orig=\vspacer
3626 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
3627   only be used to provide space above/below surrounding
3628   objects}}{}{}
3629 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
3630   only be used to provide space above/below surrounding
3631   objects}}{}{}
3632 \let\@vspace@acm=\@vspace
3633 \let\@vspacer@acm=\@vspacer

```

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

```

3634 \let\ACM@origbaselinestretch\baselinestretch
3635 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
3636   \ClassError{\@classname}{An attempt to redefine
3637     \string\baselinestretch\space detected. Please do not do this for
3638     ACM submissions!}\fi}

```

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

```

3639 \let\ACM@origsection\section
3640 \AtEndDocument{\ifx\section\ACM@origsection\else
3641   \ClassError{\@classname}{An attempt to redefine
3642     \string\section\space detected. Please do not do this for
3643     ACM submissions!}\fi}

```

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

```

3644 \let\ACM@origsubsection\subsection
3645 \AtEndDocument{\ifx\subsection\ACM@origsubsection\else
3646   \ClassError{\@classname}{An attempt to redefine
3647     \string\subsection\space detected. Please do not do this for
3648     ACM submissions!}\fi}

```

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

```

3649 \let\ACM@origsubsubsection\subsubsection
3650 \AtEndDocument{\ifx\subsubsection\ACM@origsubsubsection\else
3651   \ClassError{\@classname}{An attempt to redefine
3652     \string\subsubsection\space detected. Please do not do this for
3653     ACM submissions!}\fi}

```

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

```

3654 \let\ACM@origparagraph\paragraph

```

```
3655 \AtEndDocument{\ifx\paragraph\ACM@origparagraph\else
3656 \ClassError{\@classname}{An attempt to redefine
3657 \string\paragraph\space detected. Please do not do this for
3658 ACM submissions!}\fi}

3659 \normalsize\normalfont\frenchspacing
3660 </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)	37	\if@ACM@printacmref: Added warning for longer papers	78
	Documentation update (siggraph) .	37	\keywords: Added warning for missing keywords	78
1.49	General: New journal: DTRAP	37	1.69	
1.53	General: New journals: PACMCGIT, TIOT, TDSCI	37	\vspace: Added the changed command to avoid grouping . . .	119
	Rearranged docs	37	1.70	
1.54	General: Moved footnote stuff before hyperref call (Ross Moore)	37	General: Name change for TDS	62
1.56	General: Documented \Description	37	1.71	
1.57	General: Booktabs package is now the default	37	General: Bibliography change: volume for @inproceedings is now in brackets together with series . . .	37
1.58	General: Changes in samples (Enrico Gregorio)	37	LuaTeX now uses the OTF versions of fonts	37
	New journal: HEALTH. TDS is renamed to TDSCI	37	Retired sigchi and sigchi-a	37
1.60	General: New option: urlbreakonhyphens	37	1.75	
	\if@ACM@urlbreakonhyphens: introduced macro	38	General: Documentation update . . .	37
1.62	General: New journal: TELO	37	1.78	
1.63	General: New journal: FACMP	37	General: Documentation update: Word count	37
	New journal: TQUANT	37	1.79	
1.63a	General: Move: TQUANT to TQC . .	37	General: Updated indormation for TAP, TCPS, TEAC	62
1.64	General: Putting abstract after \maketitle now causes an error .	37	1.80	
1.65	General: New journal: DGOV	37	General: Added DLT and FAC	62
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	37	1.82	
	Authors' addresses are mandatory for journal articles	37	General: Updated abbreviations and codes for several journals	62
	\@mkauthorsaddresses: Added warning for missing addresses .	102	1.84	
			General: New journals: JDS, GAMES	37, 62
			1.85	
			General: Added CC licenses	37
			Added: acmengage	51
			New journal: JRC	62
			\@mkauthors: Added: acmengage . .	96
			\@mktitle: Added: acmengage . . .	93
			\@printtopmatter: Added: acmengage	92
			\@specialsection: Added: acmengage	91
			\@subtitlefont: Added: acmengage	94
			\@titlefont: Added: acmengage . .	93
			\ACM@linecountR: Added: acmengage	105
			format: New format: acmengage . . .	38
			\parskip: Added: acmengage	54

1.87	General: New journals: ACMJCSS, JATS, TORS	62	//github.com/borisveytsman/ acmart/issues/4)	40
	format: New format: acmcp	38	Set headheight to 1pc for all formats (closes https: //github.com/borisveytsman/ acmart/issues/5)	37
1.88	General: Added ISSN for ACMJCSS	62	v1.02	
	Added ISSN for GAMES	62	General: Added TOPS and TSC (closes https: //github.com/borisveytsman/ acmart/issues/12)	37
	Added PACMNET	62	Documentation changes (closes https: //github.com/borisveytsman/ acmart/issues/13)	37
1.89	General: Added PACMMOD	62	v1.03	
	Added TOPML	62	General: Added anonsuppress environment	37
	\@printtopmatter: Moved badges to top header	92	Added authorversion option (closes https: //github.com/borisveytsman/ acmart/issues/9)	37
1.90	General: Added TOPML eISSN	62	\@formatdoi: Added macro	83
1.90a	General: Changes in the sample keywords and concepts	37	\if@ACM@authorversion: Added macro	39
1.92	General: Documentation update: use of 'anonymous' throughout	37	\maketitle: Added special case of authorversion	87
	Moved hyperxmp again due to kernel update	51	v1.04	
2.04	General: Deleted loading ifdraft due to the new release of hyperxmp	51	General: Updated bibliography for siggraph	37
	Explicitly load ifdraft since hyperxmp tries to load it inside a group	51	\acmArticleSeq: Name change by Matthew Fluet	76
2.05	General: New data for TELO	62	\acmDOI: Name change by Matthew Fluet	76
2.06	General: Added eISSN for a number of journals	62	\acmISBN: Name change by Matthew Fluet	76
2.07	General: Another change for TELO	62	v1.05	
2.13	\orcid: Protected orchidcite against uppercasing	74	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	37
2.15	General: Added AILET, TAIS, TAISAP, ACMJDS	62	Patched \setcitestyle command; closes https: //github.com/borisveytsman/ acmart/issues/19	37
v1.00	General: First released version	37	v1.06	
v1.01	General: Changed hyperref colors in screen mode (closes https: //github.com/borisveytsman/ acmart/issues/1)	37	\@ACM@badge@skip: Added macro	77
	Defined ACM colors	37	\@ACM@badge@width: Added macro	76
	Explicitly put draft option (closes https: //github.com/borisveytsman/ acmart/issues/19)	37	\@ACM@title@width: Added macro	77
			\@mktitle@i: Added processing badges	94
			Made generic	94
			\@mktitle@ii: Now this macro is obsolete	94

\@mktitle@iii: Added processing badges	94	\if@ACM@natbib@override: Added macro	39
Made more generic	94	\if@ACM@newfonts: Added macro	56
\@mktitle@iv: Made more generic	95	\maketitle: Moved thankses to copyrightpermission box	87
\@printtopmatter: Added processing badges	92	\section@raggedright: Introduced macro	112
\@subtitlefont: Added macro	94		
\@titlefont: Added macro	93	v1.13	
\acmBadgeL: Added macro	77	General: Font adjustments for acmsmall	96
\acmBadgeR: Added macro	77	Increased font size for ACM Large	42
\if@ACM@badge: Added macro	76	Print bibliographic information by default for the proceedings	79
v1.07		\@mpfootnotetext: Made minipage footnotes centered	51
\maketitle: Corrected a bug with abstract footnotes	87	\bibliographystyle: Redefined macro	52
Corrected a bug with permssion and footnotes order	87	\bibstyle@acmauthoryear: Added macro	45
v1.08		\bibstyle@acmnumeric: Added macro	46
General: SIGPLAN reformatting by Matthew Fluet	37	\if@ACM@printfolios: Added macro	78
Typos corrected (Tobias Pape)	37	standardpagestyle: Added headers for sigs	106
v1.09		Expanded headers for sigchi-a	106
General: Revert SIGPLAN caption rules	37	Suppressed folios if sig	106
v1.10			
General: Changes of 'licensedothergov' wording	82	v1.14	
\maketitle: Corrected a bug with doi in manuscript and author vertson,		General: \citestyle updates (Matthew Fluet)	37
https://github.com/borisveytsman/acmart/issues/36	87	Patched \citestyle	44
standardpagestyle: Reversed folios location	106	\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use	45
v1.11		\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use	46
General: Customization of ACM theorem styles and proof environment by Matthew Fluet	37	v1.15	
v1.12		\@ACM@addtoaddress: Added macro	95
General: Added graceful behavior when libertine fonts are absent	56	\@mkauthors@iii: New authors system	99
Documentation updates	37	\@shortauthors: Introduced macro	106
\@marginfigure: Now centering by default	60	\@typeset@author@bx: Moved to separate macro	99
\@marginable: Now centering by default	60	\acks: Added macro	117
\@mkauthors@i: Removed MakeTextUppercase due to a bug with new kernel	98	\affiliation: Added code for author groups	74
\@parfont: Moved to \section@raggedright	112	\author: Added code for author groups	73
\copyrightpermissionfootnoterule: Added macro	55	\city: Added macro	95
\descriptionlabel: Redefined	62	\country: Added macro	95
\footnoterule: Made shorter	55	\department: Added macro	95
		\grantnum: Added macro	118
		\grantsponsor: Added macro	118
		\if@insideauthorgroup: Introduced macro	72

\institution: Added macro	95	Include 'References' in PDF bookmarks (Matthew Fluet)	44
\num@authorgroups: Renamed	72	\mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet)	102
\orcid: Introduced macro	74	\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet)	117
\position: Added macro	95	v1.20	
\postcode: Added macro	95	General: Bug fixes for bst	37
\state: Added macro	95	\mkabstract: Deleted spurious space	102
\streetaddress: Added macro	95	v1.21	
standardpagestyle: Better handling of anonymous mode	106	\showeprint: Added macro	118
v1.16		v1.22	
General: Formatting header/footer (Matthew Fluet)	37	General: More bibliography changes for Aptara	37
\@headfootfont: Added macro	106	v1.23	
standardpagestyle: Customize header/footer text font	106	General: Add PACMPL journal option	37
v1.17		v1.24	
General: Slightly decreased margins for sigs	53	General: Add IMWUT journal option	62
\@makefnmark: Redefined	51	v1.25	
\mkauthors: TOG now uses the same authors block as other journals	96	General: Updated PACMPL	62
\mkauthors@ii: Deleted	99	v1.26	
\mkbibcitation: Added \nobreak	103	General: Corrected \shortcite bug	37
Changed format for sigs	103	Documentation typos fixed (thanks to Stephen Spencer)	37
\acmArticle: The default is now numerical	76	v1.27	
\acmMonth: The default must be numerical. Closes #50.	76	\if@ACM@printccs: Typo corrected	78
\acmNumber: The default is now numerical	76	v1.28	
\acmVolume: The default is now numerical	76	General: Corrected option natbib behavior	46
\acmYear: The default is now numerical	76	Got rid of warnings in pdf keywords	51
\description: Decreased indent	62	\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato)	81
\grantnum: Added url	118	v1.29	
\grantsponsor: Renamed	118	General: Increased head to 13pt	53
\if@ACM@printacmref: Renamed from \if@ACM@printbib	78	\mkabstract: Removed spurious indentation (John Wickerson)	102
standardpagestyle: Added paper title to sigs	106	\ccsdesc@parse: Add spacing after bullet and around rightarrow; semicolon separators no longer in bold/italic (John Wickerson)	81
v1.18		standardpagestyle: Corrected printfolios (Matthew Fluet)	106
General: Natbib is now the default for all formats	37	v1.30	
\mkauthors@i: Now we andify affiliations	98	General: Added \frenchspacing	120
\@typeset@author@line: Added macro	97	Bibtex style now recognizes https:// in doi	37
v1.19		Switched to T1: looks like libertine has problems with \l in OT1	57
General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	37	Updated IMWUT and PACMPL	62
		\department: Added optional parameter	95

v1.31		\country: Added obeypunctuation code	95
General: Documentation changes . . .	37	\department: Added obeypunctuation code	95
\@additionalaffiliation: Added macro	74	\if@ACM@affiliation@obeypunctuation: Added macro	74
\@mkbibcitation: Disabled linebreak	103	\if@ACM@authordraft: Added macro	40
\@startsection: Added \tochangmeasure	48	\if@ACM@natbib@override: Deleted macro	39
\@starttoc: Redefined macro	50	\if@ACM@timestamp: Added macro (Michael D. Adams)	40
\@textbottom: Redefined	56	\institution: Added obeypunctuation code	95
\acmMonth: The default now is the current month (Matteo Riondato)	76	firstpagestyle: Added right linecount for two-column formats	108
\acmYear: The default now is the current year (Matteo Riondato) . .	76	Added timestamp (Michael D. Adams)	108
\additionalaffiliation: Added macro	74	\maketitle: Fixed the bug with figures on top and bottom of the title page, thanks to David Epstein	87
\l@section: Redefined macro . .	50	\position: Added obeypunctuation code	95
\l@subsection: Redefined macro	50	\postcode: Added obeypunctuation code	95
v1.32		\state: Added obeypunctuation code	95
General: Added POMACS journal option	37	\streetaddress: Added obeypunctuation code	95
Format siggraph is now obsolete .	37	standardpagestyle: Added right linecount for two-column formats	106
\@formatdoi: New doi format	83	Added timestamp (Michael D. Adams)	106
v1.33		v1.34	
General: Added acmart-preload-hook	37	\@mkbibcitation: Deleted DOI from doi numbers	103
Added cmap and glyptounicode .	56	\ACM@linecount@bx: Rulers now are continuous	104
BibTeX comma before articleno bug corrected	37	\ACM@linecountL: Rulers now are continuous	104
BibTeX crossref bug corrected . . .	37	\ACM@linecountR: Rulers now are continuous	105
BibTeX numpages bug corrected .	37	\maketitle: Added date to the bibstrip in conf proceedings	87
Documentation updates	37	Deleted 'DOI' from doi numbers .	87
Moved \citename definition for non-natbib bibliography, so a package may redefine it	52	Rearranged bibstrip	87
Switched to Type 1 fonts for libertine even if OTF-capable engine is used (Kai Mindermann) .	57	The \terms command is now obsolete	87
\@ACM@addtoaddress: Added obeypunctuation code	95	\terms: The \terms command now just produces a warning	77
\@mkauthors@i: Added obeypunctuation code	98	v1.35	
\@mkauthors@iii: Added obeypunctuation code	99	General: BibTeX bug fixed: et al. . . .	37
\@mkauthors@iv: Added obeypunctuation code	100	If the copyright is set to usgov or rigtsretained, the price is suppressed	82
\@subtitlefont: Added \normalsize	94		
\ACM@linecountL: Renamed macro .	104		
\ACM@linecountR: Added macro . .	105		
\ACM@timestamp: Added current page number	105		
Added macro (Michael D. Adams) .	105		
Added submission id	76		
\acmSubmissionID: Added macro . .	76		
\city: Added obeypunctuation code	95		

\bibstyle@acmauthoryear: Square brackets for author-year style . . .	45	\ccdesc@parse@finish: Added macro	81
v1.36		\city: We now do not print this even in SIG	95
General: Added PACMHCI journal options	62	\country: Fixed bugs with extra spaces	95
Added the possibility to adjust number of author boxes per row in conference formats	37	\l@section: Redefined macro . .	50
\@ACM@authorsperrrow: Added macro	79	\postcode: We now do not print this even in SIG	95
\@mkauthors@iii: Added authorsperrrow override	99	\state: We now do not print this even in SIG	95
\@mkauthors@iv: Added authorsperrrow override	100	\streetaddress: We now do not print this even in SIG	95
\if@ACM@authordraft: Corrected typo, thanks to bargteil	40	v1.41	
v1.37		General: Added new badges	37
General: Reduce list indentation (Matthew Fluet)	61	v1.42	
Set \normalparindent; Reduce list indentation (Matthew Fluet)	37	General: Deleted ACM badges	37
\description: Reduce list indentation (Matthew Fluet)	62	v1.43	
\descriptionlabel: Reduce list indentation (Matthew Fluet)	62	\@starttoc: Added \makeatletter	50
\normalparindent: Set \normalparindent (Matthew Fluet)	55	\country: Added comma before country for journals	95
v1.38		v1.44	
General: Increase default font size for SIGPLAN	37, 42	General: Added package refcount . . .	37
v1.39		Deleted package cleveref	37
\@authornotemark: Added macro .	102	Put theorem defs in a separate style	37
\authornotemark: Added macro . . .	75	\@acmBooktitle: Added macro	72
v1.40		\@acmEditors: Added macro	72
General: Added 'textcase' package . .	44	\@editorsAbbrev: Added macro . . .	72
Added heightrounded to geometry	53	\@folioblob: Suppress the blob if acmArticleSeq is empty	108
Added new copyright version: licensedcagov	37	\@mkbibcitation: If the paper has just one page, use 'page' instead of 'pages'	103
Added package cleveref	37	\ACM@restore@pagestyle: Added macro	104
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