

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

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2020/01/11, v1.67

Abstract

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

Contents

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1 Introduction

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

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

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

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

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

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

2 User's guide

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

2.1 Installation

Most probably, you already have this package installed in your favorite T_EX distribution; if not, you may want to upgrade. You may need to upgrade it anyway

¹<http://www.acm.org/>

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.

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

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

1. Run `latex acmart.ins`. This will produce the file `acmart.cls`
2. Put the files `acmart.cls` and `ACM-Reference-Format.bst` in places where \LaTeX can find them (see [?] or the documentation for your \TeX system).
3. Update the database of file names. Again, see [?] 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 ?? and ?? 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:

- `amscls`, <http://www.ctan.org/pkg/amscls>
- `amsfonts`, <http://www.ctan.org/pkg/amsfonts>
- `amsmath`, <http://www.ctan.org/pkg/amsmath>
- `binhex`, <http://www.ctan.org/pkg/binhex>
- `balance`, <http://www.ctan.org/pkg/balance>
- `booktabs`, <http://www.ctan.org/pkg/booktabs>
- `caption`, <http://www.ctan.org/pkg/caption>
- `comment`, <http://www.ctan.org/pkg/comment>
- `cm-super`, <http://www.ctan.org/pkg/cm-super>
- `cmap`, <http://www.ctan.org/pkg/cmap>
- `draftwatermark`, <http://www.ctan.org/pkg/draftwatermark>

- *environ*, <http://www.ctan.org/pkg/environ>
- *etoolbox*, <http://www.ctan.org/pkg/etoolbox>
- *fancyhdr*, <http://www.ctan.org/pkg/fancyhdr>
- *float*, <http://www.ctan.org/pkg/float>
- *fontaxes*, <http://www.ctan.org/pkg/fontaxes>
- *geometry*, <http://www.ctan.org/pkg/geometry>
- *graphics*, <http://www.ctan.org/pkg/graphics>
- *hyperref*, <http://www.ctan.org/pkg/hyperref>
- *ifluatex*, <http://www.ctan.org/pkg/ifluatex>
- *ifxetex*, <http://www.ctan.org/pkg/ifxetex>
- *inconsolata*, <http://www.ctan.org/pkg/inconsolata>
- *libertine*, <http://www.ctan.org/pkg/libertine>
- *manyfoot*, <http://www.ctan.org/pkg/manyfoot>
- *microtype*, <http://www.ctan.org/pkg/microtype>
- *mmap*, <http://www.ctan.org/pkg/mmap>
- *ms*, <http://www.ctan.org/pkg/ms>
- *mweights*, <http://www.ctan.org/pkg/mweights>
- *natbib*, <http://www.ctan.org/pkg/natbib>
- *nccfoots*, <http://www.ctan.org/pkg/nccfoots>
- *newtx*, <http://www.ctan.org/pkg/newtx>
- *oberdiek*, <http://www.ctan.org/pkg/oberdiek>
- *pdftex-def*, <http://www.ctan.org/pkg/pdftex-def>
- *refcount*, <http://www.ctan.org/pkg/refcount>
- *setspace*, <http://www.ctan.org/pkg/setspace>
- *textcase*, <http://www.ctan.org/pkg/textcase>
- *totpages*, <http://www.ctan.org/pkg/totpages>
- *trimspaces*, <http://www.ctan.org/pkg/trimspaces>
- *upquote*, <http://www.ctan.org/pkg/upquote>

- `url`, <http://www.ctan.org/pkg/url>
- `xcolor`, <http://www.ctan.org/pkg/xcolor>
- `xkeyval`, <http://www.ctan.org/pkg/xkeyval>
- `xstring`, <http://www.ctan.org/pkg/xstring>

2.2 Invocation and options

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

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

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

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

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

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

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

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

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

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

There are several Boolean options that can take `true` or `false` values. They are listed in Table ?? . 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.

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

Table 1: The possible values for the `format` option

Value	Meaning
<code>manuscript</code>	A manuscript. This is the default.
<code>acmsmall</code>	Small single-column format. Used for CIE, CSUR, JACM, JDIQ, JEA, JERIC, JETC, PACMCGIT, PACMHCI, PACMPL, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TDS, TEAC, TECS, TELO, THRI, THS, TIOT, TIS-SEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPS, TOS, TOSEM, TOSN, TQC, TRET, TSAS, TSC, TSLP and TWEB, including special issues.
<code>acmlarge</code>	Large single-column format. Used for DTRAP, HEALTH, IMWUT, JOCCH, POMACS and TAP, including special issues.
<code>acmtog</code>	Large double-column format. Used for TOG, including annual conference Technical Papers.
<code>sigconf</code>	Proceedings format for most ACM conferences (with the exceptions listed below) and all ICPS volumes.
<code>sigplan</code>	Proceedings format for SIGPLAN conferences.
<code>sigchi</code>	Proceedings format for SIGCHI conferences.
<code>sigchi-a</code>	Format for SIGCHI extended abstracts.

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

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

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

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

The option `balance` determines whether the last page in the two column mode has balanced columns. By default it is `true`; however, it may lead to problems for some documents. Set it to `false` if you encounter compilation errors. Note that for one page documents `\balance` command might cause problems.

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.

Table 2: Boolean options

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

2.3 Top matter

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

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

`\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 ?? . Note that conference proceedings published in *book* form do not set this macro.

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

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

name: the name of the conference.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

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

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

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


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

`\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` ORCID, <http://www.orcid.org/>), `\affiliation` and `\email`. In the simplest
`\affiliation` case, you enter them in this order:

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

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

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

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

```

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

```

Similarly you can repeat the `\email` command.

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

```

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

```

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

```

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

```

However, this format is not generally recommended.

`\additionalaffiliation`

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

```

\author{G. Tobin}
\author{Ben Trovato}
\additionalaffiliation{%
  \institution{The Th{\o}rv{\a}ld Group}
  \streetaddress{1 Th{\o}rv{\a}ld Circle}
}

```

```

\city{Hekla}
\country{Iceland}}
\affiliation{%
\institution{Institute for Clarity in Documentation}
\streetaddress{P.O. Box 1212}
\city{Dublin}
\state{Ohio}
\postcode{43017-6221}}

```

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

<pre> \position \institution \department \streetaddress \city \state \postcode \country </pre>	<p>The <code>\affiliation</code> and <code>\additionalaffiliation</code> commands are further structured to interact with the metadata extraction tools. Inside these commands you should use the <code>\position</code>, <code>\institution</code>, <code>\department</code>, <code>\city</code>, <code>\streetaddress</code>, <code>\state</code>, <code>\postcode</code> and <code>\country</code> 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 <i>are</i> necessary since they are used by the XML metadata extraction programs. Do <i>not</i> put commas or <code>\\</code> between the elements of <code>\affiliation</code>. They will be provided automatically.</p>
--	--

An example of the author block:

```

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

```

```
\country{Australia}}
```

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

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

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

and

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

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

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

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

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

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

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

will be typeset as

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

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

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

`\thanks` Like `amsart` (and unlike standard L^AT_EX), 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 ??).

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

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

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

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

follow the corresponding commands (`\title`, `\subtitle` and `\author`) generate such notes. For example,

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

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

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

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

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

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

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

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

`\acmArticleSeq` The articles in the same issue of a journal have a *sequence number*. It is used to vertically position the black blob on the first page of some formats. By default it is the same as the article number, but the command `\acmArticleSeq{n}` can be used to change it:

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

Setting this number to zero suppresses the blob.

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

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

`\acmPrice` The macro `\acmPrice{<price>}` sets the price for the article, for example,
`\acmPrice{25.00}`

Note that you do not need to put the dollar sign here, just the amount. By default the price is \$15.00, unless the copyright is set to `usgov`, `rightsretained`, `iw3c2w3`, or `iw3c2w3g`, when it is suppressed. Note that to override the defaults you need to set the price *after* the `\setcopyright` command. Also, the command `\acmPrice{}` suppresses the printing of the price.

`\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.

`\acmBadgeR` Some conference articles get special distinctions, for example, the artifact eval-
`\acmBadgeL` uation for PPOPP 2016 (see <http://ctuning.org/ae/ppopp2016.html>). These articles display special badges supplied by the conference organizers. This class provides commands to add these badges: `\acmBadgeR[<url>]{<graphics>}` and `\acmBadgeL[<url>]{<graphics>}`. The first command puts the badge to the right of the title, and the second one—to the left. The exception is the `sigchi-a` mode for SIGCHI extended abstracts, which puts the badges on the left margin. The arguments have the following meaning: `[<url>]`, if provided, sets the link to the badge authority in the screen version, while `{<graphics>}` sets the graphics file with the badge image. The file must be a cropped square, which is scaled to a standard size in the output. For example, if the badge image is `ae-logo.pdf`, the command is

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

`\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` ACM publications are classified according to the ACM Computing Classi-
`\ccsdesc` fication 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 transfer the rights to the ACM, license them to the ACM, some or all authors might be employees of the US or Canadian governments, etc. Accordingly the command `\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 ?? . This command must

Table 3: Parameters for the `\setcopyright` command

Parameter	Meaning
<code>none</code>	The copyright and permission information is not typeset. (This is the option for some ACM conferences.)
<code>acmcopyright</code>	The authors transfer the copyright to the ACM (the “traditional” choice).
<code>acmlicensed</code>	The authors retain the copyright but license the publication rights to ACM.
<code>rightsretained</code>	The authors retain the copyright and publication rights to themselves or somebody else.
<code>usgov</code>	All the authors are employees of the US government.
<code>usgovmixed</code>	Some authors are employees of the US government.
<code>cagov</code>	All the authors are employees of the Canadian government.
<code>cagovmixed</code>	Some authors are employees of the Canadian government.
<code>licensedusgovmixed</code>	Some authors are employees of the US government, and the publication rights are licensed to ACM.
<code>licensedcagov</code>	All the authors are employees of the Canadian government, and the publication rights are licensed to ACM.
<code>licensedcagovmixed</code>	Some authors are employees of the Canadian government, and the publication rights are licensed to ACM.
<code>othergov</code>	Authors are employees of a government other than the US or Canada.
<code>licensedothergov</code>	Authors are employees of a government other than the US or Canada, and the publication rights are licensed to ACM.
<code>iw3c2w3</code>	Special statement for conferences organized by IW3C2.
<code>iw3c2w3g</code>	Special statement for conferences organized by IW3C2, when some authors are approved Google employees.

be placed in the preamble, before `\begin{document}`.

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

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

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

\settopmatter Some information in the top matter is printed for certain journals or proceedings and suppressed for others. You can override these defaults using the command `\settopmatter{<settings>}`. The settings and their meanings are listed in Table ?? . 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. The `[<stage>]` argument is optional; the default is `Received` for the first date and `revised` for the subsequent ones. For example,

```
\received{February 2007}
```

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

```
\received[revised]{March 2009}
\received[accepted]{June 2009}
```

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

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

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

2.4 Algorithms

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

2.5 Figures and tables

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

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

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

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

teaserfigure: a special figure before `\maketitle`.

sidebar, marginfigure, margintable: in the `sigchi-a` format, special sidebars, tables and figures in the margin.

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`.
- (c) For `marginfigure`, use `\marginparwidth`.
- (d) For `figure*` in SIGCHI extended abstracts, use `\fulltextwidth`.

It is strongly recommended to use the package `booktabs` [?] 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 [?]. 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}
```

`sidebar` SIGCHI extended abstracts use margin space extensively. This package provides three environments for this with optional captions:
`marginfigure`
`margintable`

sidebar: textual information in the margin

marginfigure: a figure in the margin

margintable: a table in the margin

Tables and figures (including margin tables and margin 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`.

2.6 Descriptions of images

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

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

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

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

2.7 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.

2.8 Online-only and offline-only material

`printonly` Some supplementary material in ACM publications is put online but not in the
`screenonly` printed version. The text inside the environment `screenonly` will be typeset only when the option `screen` (see Section ??) 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.

2.9 Note about anonymous mode

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

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

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

2.10 Acknowledgments

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

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

`acks` The environment `acks` starts an unnumbered section “Acknowledgments” un-

less the anonymous mode is chosen. Put all thanks inside this environment.

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

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

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

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

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

Example:

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

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

2.11 Bibliography

The ACM uses the `natbib` package for formatting references and the BibTeX style file `ACM-Reference-Format.bst` for BibTeX processing. You can disable loading of `natbib` using the option `natbib=false` in `\documentclass`. However, it is not recommended, as well as the use of BibTeX 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 BibTeX entry types and fields in the ACM style file `ACM-Reference-Format.bst` that you may want to be aware of.

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

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

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

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

See the examples at <http://arxiv.org/hypertext/bibstyles/>.

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

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


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

```
@ArtifactSoftware{R,
  title = {R: A Language and Environment for Statistical Computing},
  author = {{R Core Team}},
  organization = {R Foundation for Statistical Computing},
  address = {Vienna, Austria},
  year = {2019},
  url = {https://www.R-project.org/},
}

@ArtifactDataset{UMassCitations,
  author = {Sam Anzaroot and Andrew McCallum},
  title = {{UMass} Citation Field Extraction Dataset},
  year = 2013,
  url =
    {http://www.iesl.cs.umass.edu/data/data-umasscitationfield},
  lastaccessed = {May 27, 2019}
}
```

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

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

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

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

```
@Inproceedings{Novak03,
  author = "Dave Novak",
  title = "Solder man",
  booktitle = "ACM SIGGRAPH 2003 Video Review on Animation theater Program",
  year = "2003",
  publisher = "ACM Press",
  address = "New York, NY",
  pages = "4",
}
```

```

month =      "March 21, 2008",
doi =        "10.9999/woot07-S422",
howpublished = "Video",
}

```

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

```

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

```

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

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

```

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

```

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

```

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

```

and then encode the author as

```

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

```

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

2.12 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 [?]: **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.

2.13 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

The package **subcaption** [?] is recommended for complex figures with several subplots or subfigures that require separate subcaptioning. The packages **nomenc1** [?] and **glossaries** [?] 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 [?], so the command `\NoCaseChange` inside the title may help to prevent extraneous uppercasing.

2.14 Disabled or forbidden commands

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

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

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

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

2.15 A note for wizards: `acmart-preload-hook.tex`

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 `color` 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.

2.16 Currently supported publications

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

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DGOV	Digital Government: Research and Practice
DTRAP	Digital Threats: Research and Practice
HEALTH	ACM Transactions on Computing for Healthcare
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
JDIQ	ACM Journal of Data and Information Quality
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
PACMCGIT	Proceedings of the ACM on Computer Graphics and Interactive Techniques
PACMHCI	PACM on Human-Computer Interaction
PACMPL	PACM on Programming Languages
POMACS	PACM on Measurement and Analysis of Computing Systems
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
TALG	ACM Transactions on Algorithms
TALLIP	ACM Transactions on Asian and Low-Resource Language Information Processing
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TDS	ACM Transactions on Data Science
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems

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

Abbreviation	Publication
TELO	ACM Transactions on Evolutionary Learning
THRI	ACM Transactions on Human-Robot Interaction
TIIS	ACM Transactions on Interactive Intelligent Systems
TIOT	ACM Transactions on Internet of Things
TISSEC	ACM Transactions on Information and System Security
TIST	ACM Transactions on Intelligent Systems and Technology
TKDD	ACM Transactions on Knowledge Discovery from Data
TMIS	ACM Transactions on Management Information Systems
TOCE	ACM Transactions on Computing Education
TOCHI	ACM Transactions on Computer-Human Interaction
TOCL	ACM Transactions on Computational Logic
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory
TODAES	ACM Transactions on Design Automation of Electronic Systems
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPS	ACM Transactions on Privacy and Security
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TQC	ACM Transactions on Quantum Computing
TRETS	ACM Transactions on Reconfigurable Technology and Systems
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

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

3 Implementation

3.1 Identification

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

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class>\ProvidesClass{acmart}
6 [2020/01/11 v1.67 Typesetting articles for the Association for Computing Machinery]
```

And the driver code:

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

3.2 Preload hook

We preload `acmart-preload-hook`:

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

3.3 Options

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

```
29 \RequirePackage{xkeyval}
```

We use `xstring` to check whether user input is valid

```
30 \RequirePackage{xstring}
```

format The possible formats

```

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

```

\if@ACM@screen Whether we use screen mode

```

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

```

\if@ACM@urlbreakonhyphens

```

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

```

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

```

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

```



```

\if@ACM@review Whether we use review mode
72 \define@boolkey+{acmart.cls}[@ACM@]{review}[true]{%
73   \if@ACM@review
74     \PackageInfo{\@classname}{Using review mode}%
75     \AtBeginDocument{\@ACM@printfoliostrue}%
76   \else
77     \PackageInfo{\@classname}{Not using review mode}%
78   \fi}{\PackageError{\@classname}{The option review can be either true or
79     false}}
80 \ExecuteOptionsX{review=false}

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

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

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

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

\if@ACM@natbib Whether we use natbib mode
105 \define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
106   \if@ACM@natbib
107     \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
108   \else
109     \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%

```

```

110 \fi}{\PackageError{\@classname}{The option natbib can be either true or
111     false}}
112 \ExecuteOptionsX{natbib=true}

\if@ACM@anonymous Whether we use anonymous mode
113 \define@boolkey+{acmart.cls}{@ACM@}{anonymous}[true]{%
114     \if@ACM@anonymous
115         \PackageInfo{\@classname}{Using anonymous mode}%
116     \else
117         \PackageInfo{\@classname}{Not using anonymous mode}%
118     \fi}{\PackageError{\@classname}{The option anonymous can be either true or
119         false}}
120 \ExecuteOptionsX{anonymous=false}

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

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

\ACM@fontsize The font size to pass to the base class
139 \def\ACM@fontsize{
140 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
141 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
142 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
143 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

144 \DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
145 \DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
146 \ProcessOptionsX
147 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}

```

3.4 Setting switches

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

\if@ACM@journal There are two kinds of publications: journals and books
149 \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.
150 \newif\if@ACM@journal@bibstrip

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

Setting up switches
152 \ifnum\ACM@format@nr=5\relax % siggraph
153 \ClassWarning{\@classname}{The format siggraph is now obsolete.}
154 I am switching to sigconf.}
155 \setkeys{acmart.cls}{format=sigconf}
156 \fi
157 \ifnum\ACM@format@nr=0\relax
158 \@ACM@manuscripttrue
159 \else
160 \@ACM@manuscriptfalse
161 \fi
162 \@ACM@sigchiamodefalse
163 \ifcase\ACM@format@nr
164 \relax % manuscript
165 \@ACM@journaltrue
166 \or % acmsmall
167 \@ACM@journaltrue
168 \or % acmlarge
169 \@ACM@journaltrue
170 \or % acmtog
171 \@ACM@journaltrue
172 \or % sigconf
173 \@ACM@journalfalse
174 \or % siggraph
175 \@ACM@journalfalse
176 \or % sigplan
177 \@ACM@journalfalse
178 \or % sigchi
179 \@ACM@journalfalse
180 \or % sigchi-a
181 \@ACM@journalfalse
182 \@ACM@sigchiamodetrue
183 \fi
```

```

184 \if@ACM@journal
185 \@ACM@journal@bibstriptrue
186 \else
187 \@ACM@journal@bibstripfalse
188 \fi

```

3.5 Loading the base class and package

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

```

189 \ifx\ACM@fontsize\@empty
190 \ifcase\ACM@format@nr
191 \relax % manuscript
192 \def\ACM@fontsize{9pt}%
193 \or % acmsmall
194 \def\ACM@fontsize{10pt}%
195 \or % acmlarge
196 \def\ACM@fontsize{10pt}%
197 \or % acmtog
198 \def\ACM@fontsize{9pt}%
199 \or % sigconf
200 \def\ACM@fontsize{9pt}%
201 \or % siggraph
202 \def\ACM@fontsize{9pt}%
203 \or % sigplan
204 \def\ACM@fontsize{10pt}%
205 \or % sigchi
206 \def\ACM@fontsize{10pt}%
207 \or % sigchi-a
208 \def\ACM@fontsize{10pt}%
209 \fi
210 \fi
211 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
212 \LoadClass[\ACM@fontsize, reqno]{amsart}
213 \RequirePackage{microtype}

```

We need `etoolbox` for delayed code

```
214 \RequirePackage{etoolbox}
```

Booktabs is now the default

```
215 \RequirePackage{booktabs}
```

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

```
216 \RequirePackage{refcount}
217 \RequirePackage{totpages}
```

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

```
218 \RequirePackage{environ}
```

We use `setspace` for double spacing

```
219 \if@ACM@manuscript
220 \RequirePackage{setspace}
221 \onehalfspacing
222 \fi
```

We need `textcase` for better upcasing

```
223 \RequirePackage{textcase}
```

3.6 Citations

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

```
224 \if@ACM@natbib
225   \RequirePackage{natbib}
226   \renewcommand{\bibsection}{%
227     \section*{\refname}%
228     \phantomsection\addcontentsline{toc}{section}{\refname}%
229   }
230   \renewcommand{\bibfont}{\bibliofont}
231   \renewcommand\setcitestyle[1]{
232     \@for\@tempa:=#1\do
233     {\def\@tempb{round}\ifx\@tempa\@tempb
234       \renewcommand\NAT@open{(\}\renewcommand\NAT@close{)}\fi
235       \def\@tempb{square}\ifx\@tempa\@tempb
236         \renewcommand\NAT@open{[\}\renewcommand\NAT@close{]}\fi
237       \def\@tempb{angle}\ifx\@tempa\@tempb
238         \renewcommand\NAT@open{<\}\renewcommand\NAT@close{>}\fi
239       \def\@tempb{curly}\ifx\@tempa\@tempb
240         \renewcommand\NAT@open{\{\}\renewcommand\NAT@close{\}}\fi
241       \def\@tempb{semicolon}\ifx\@tempa\@tempb
242         \renewcommand\NAT@sep{;}\fi
243       \def\@tempb{colon}\ifx\@tempa\@tempb
244         \renewcommand\NAT@sep{;}\fi
245       \def\@tempb{comma}\ifx\@tempa\@tempb
246         \renewcommand\NAT@sep{,}\fi
247       \def\@tempb{authoryear}\ifx\@tempa\@tempb
248         \NAT@numbersfalse\fi
249       \def\@tempb{numbers}\ifx\@tempa\@tempb
250         \NAT@numberstrue\NAT@superfalse\fi
251       \def\@tempb{super}\ifx\@tempa\@tempb
252         \NAT@numberstrue\NAT@supertrue\fi
253       \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
254         \let\bibstyle=\@gobble\fi
255       \def\@tempb{bibstyle}\ifx\@tempa\@tempb
256         \let\bibstyle=\@citestyle\fi
257       \def\@tempb{sort}\ifx\@tempa\@tempb
258         \def\NAT@sort{\@ne}\fi
```

```

259 \def\@tempb{nosort}\ifx\@tempa\@tempb
260 \def\NAT@sort{\z@}\fi
261 \def\@tempb{compress}\ifx\@tempa\@tempb
262 \def\NAT@cmprs{\@ne}\fi
263 \def\@tempb{nocompress}\ifx\@tempa\@tempb
264 \def\NAT@cmprs{\z@}\fi
265 \def\@tempb{sort&compress}\ifx\@tempa\@tempb
266 \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
267 \def\@tempb{mcite}\ifx\@tempa\@tempb
268 \let\NAT@merge\@ne\fi
269 \def\@tempb{merge}\ifx\@tempa\@tempb
270 \ifnum{\NAT@merge<tw@}{\let\NAT@merge\tw@}{\fi
271 \def\@tempb{elide}\ifx\@tempa\@tempb
272 \ifnum{\NAT@merge<thr@@}{\let\NAT@merge\thr@@}{\fi
273 \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
274 \NAT@longnamestrue\fi
275 \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
276 \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
277 \expandafter\NAT@find@eq\@tempa=\relax\@nil
278 \if\@tempc\relax\else
279 \expandafter\NAT@rem@eq\@tempc
280 \def\@tempb{open}\ifx\@tempa\@tempb
281 \xdef\NAT@open{\@tempc}\fi
282 \def\@tempb{close}\ifx\@tempa\@tempb
283 \xdef\NAT@close{\@tempc}\fi
284 \def\@tempb{aysep}\ifx\@tempa\@tempb
285 \xdef\NAT@aysep{\@tempc}\fi
286 \def\@tempb{yysep}\ifx\@tempa\@tempb
287 \xdef\NAT@yrsep{\@tempc}\fi
288 \def\@tempb{notesep}\ifx\@tempa\@tempb
289 \xdef\NAT@cmt{\@tempc}\fi
290 \def\@tempb{citesep}\ifx\@tempa\@tempb
291 \xdef\NAT@sep{\@tempc}\fi
292 \fi
293 }%
294 \NAT@@setcites
295 }
296 \renewcommand\citestyle[1]{%
297 \ifcsname bibstyle@#1\endcsname%
298 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
299 \else%
300 \@latex@error{Undefined ‘#1’ citestyle}%
301 \fi
302 }%
303 \fi

```

\bibstyle@acmauthoryear The default author-year format:

```

304 \newcommand{\bibstyle@acmauthoryear}{%
305 \setcitestyle{%
306 authoryear,%

```

```

307     open={[],close={}},citesep={;},%
308     aysep={},yysep={,},%
309     notesep={, }}}
```

`\bibstyle@acmnumeric` The default numeric format:

```

310 \newcommand{\bibstyle@acmnumeric}{%
311   \setcitestyle{%
312     numbers,sort&compress,%
313     open={[],close={}},citesep={,},%
314     notesep={, }}}
```

The default is numeric:

```

315 \if@ACM@natbib
316 \citestyle{acmnumeric}
317 \fi
```

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

```

318 \def\@startsection#1#2#3#4#5#6{%
319   \if@noskipsec \leavevmode \fi
320   \par
321   \@tempskipa #4\relax
322   \@afterindenttrue
323   \ifdim \@tempskipa <\z@
324     \@tempskipa -\@tempskipa \@afterindentfalse
325   \fi
326   \if@nobreak
327     \everypar{}%
328   \else
329     \addpenalty\@secpenalty\addvspace\@tempskipa
330   \fi
331   \@ifstar
332     {\@ssect{#3}{#4}{#5}{#6}}%
333     {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}%
334 \def\@sect#1#2#3#4#5#6[#7]#8{%
335   \edef\@toclevel{\ifnum#2=\@m 0\else\number#2\fi}%
336   \ifnum #2>\c@secnumdepth
337     \let\@svsec\@empty
338   \else
339     \refstepcounter{#1}%
340     \protected@edef\@svsec{\@secntformat{#1}\relax}%
341   \fi
342   \@tempskipa #5\relax
343   \ifdim \@tempskipa>\z@
344     \begingroup
345       #6{%
346         \@hangfrom{\hskip #3\relax\@svsec}%
347         \interlinepenalty \@M #8\@@par}%
348     \endgroup
349   \fi
350 }
```

```

348 \endgroup
349 \csname #1mark\endcsname{#7}%
350 \ifnum #2>\c@secnumdepth \else
351 \tochangmeasure{\csname the#1\endcsname}%
352 \fi
353 \addcontentsline{toc}{#1}{%
354 \ifnum #2>\c@secnumdepth \else
355 \protect\numberline{\csname the#1\endcsname}%
356 \fi
357 #7}%
358 \else
359 \def\@svsechd{%
360 #6{\hskip #3\relax
361 \@svsec #8}%
362 \csname #1mark\endcsname{#7}%
363 \ifnum #2>\c@secnumdepth \else
364 \tochangmeasure{\csname the#1\endcsname\space}%
365 \fi
366 \addcontentsline{toc}{#1}{%
367 \ifnum #2>\c@secnumdepth \else
368 \protect\numberline{\csname the#1\endcsname}%
369 \fi
370 #7}}%
371 \fi
372 \xsect{#5}}
373 \def\@xsect#1{%
374 \@tempskipa #1\relax
375 \ifdim \@tempskipa>\z@
376 \par \nobreak
377 \vskip \@tempskipa
378 \@afterheading
379 \else
380 \@nobreakfalse
381 \global\@noskipsectrue
382 \everypar{%
383 \if@noskipsec
384 \global\@noskipsecfalse
385 {\setbox\z@\lastbox}%
386 \clubpenalty\@M
387 \begingroup \@svsechd \endgroup
388 \unskip
389 \@tempskipa #1\relax
390 \hskip -\@tempskipa
391 \else
392 \clubpenalty \@clubpenalty
393 \everypar{}%
394 \fi}%
395 \fi
396 \ignorespaces}
397 \def\@seccntformat#1{\csname the#1\endcsname\quad}

```



```

398 \def\ssect#1#2#3#4#5{%
399   \@tempskipa #3\relax
400   \ifdim \@tempskipa>\z@
401     \begingroup
402       #4{%
403         \@hangfrom{\hskip #1}%
404         \interlinepenalty \@M #5\@par}%
405     \endgroup
406   \else
407     \def\svsechd{#4{\hskip #1\relax #5}}%
408   \fi
409   \@xsect{#3}}

```

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

```

410 \def\@starttoc#1#2{\begingroup\makeatletter
411   \setTrue{#1}%
412   \par\removelastskip\vskip\z@skip
413   \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
414   {.5\linespacing}{\centering\contentsnamefont}{#2}%
415   \@input{\jobname.#1}%
416   \if@filesw
417     \xp\newwrite\csname tf@#1\endcsname
418     \immediate\xp\openout\csname tf@#1\endcsname \jobname.#1\relax
419   \fi
420   \global\@nobeakfalse \endgroup
421   \addvspace{32\p@\@plus14\p@}%
422 }

```

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

```

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

```

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

```

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

```

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

```

425 \def\l@subsubsection{\@tocline{2}{0pt}{1pc}{5pc}{}}

```

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

`\@makefnmark` We do not use indentation for footnotes

```

426 \def\@makefnmark{\noindent\@makefnmark}

```

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

```

427 \if@ACM@sigchiamode
428 \long\def\@footnotetext#1{\marginpar{%
429   \reset@font\small
430   \interlinepenalty\interfootnotelinepenalty
431   \protected@edef\@currentlabel{%

```

```

432     \csname p@footnote\endcsname\@thefnmark
433   }%
434   \color@begingroup
435     \makefnmark{%
436       \rule{z@footnotesep\ignorespaces#1\@finalstrut\strutbox}%
437     \color@endgroup}}%
438 \fi

\@mpfootnotetext We want the footnotes in minipages centered:
439 \long\def\@mpfootnotetext#1{%
440   \global\setbox\@mpfootins\vbox{%
441     \unvbox\@mpfootins
442     \reset@font\footnotesize
443     \hsize\columnwidth
444     \parboxrestore
445     \protected@edef\@currentlabel
446       {\csname p@mpfootnote\endcsname\@thefnmark}%
447     \color@begingroup\centering
448       \makefnmark{%
449         \rule{z@footnotesep\ignorespaces#1\@finalstrut\strutbox}%
450       \color@endgroup}}

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

And now, hyperref
452 \let\@footnotemark@nolink\@footnotemark
453 \let\@footnotetext@nolink\@footnotetext
454 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
455 \pdfstringdefDisableCommands{%
456   \def\addtocounter#1#2{%
457     \def\unskip{}}%
458   \def\textbullet{- }%
459   \def\textrightarrow{-> }%
460   \def\footnotemark{}}%
461 }
462 \urlstyle{rm}
463 \ifcase\ACM@format@nr
464 \relax % manuscript
465 \or % acmsmall
466 \or % acmlarge
467 \or % acmtog
468 \or % sigconf
469 \or % siggraph
470 \or % sigplan
471   \urlstyle{sf}
472 \or % sigchi
473 \or % sigchi-a

```

```

474 \urlstyle{sf}
475 \fi
476 \AtEndPreamble{%
477 \if@ACM@urlbreakonhyphens
478 \def\do@url@hyp{\do\-%}
479 \fi
480 \if@ACM@screen
481 \hypersetup{colorlinks,
482 linkcolor=ACMPurple,
483 citecolor=ACMPurple,
484 urlcolor=ACMDarkBlue,
485 filecolor=ACMDarkBlue}
486 \else
487 \hypersetup{hidelinks}
488 \fi
489 \hypersetup{pdflang={en},
490 pdfdisplaydoctitle}}
Bibliography mangling.
491 \if@ACM@natbib
492 \let\citeN\cite
493 \let\cite\citep
494 \let\citeANP\citeauthor
495 \let\citeNN\citeyearpar
496 \let\citeyearNP\citeyear
497 \let\citeNP\citealt
498 \DeclareRobustCommand\citeA
499 {\begingroup\NAT@swafalse
500 \let\NAT@cotype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
501 \providecommand\newblock{}%
502 \else
503 \AtBeginDocument{%
504 \let\shortcite\cite%
505 \providecommand\citename[1]{#1}}
506 \fi
507 \newcommand\shortcite[2][]{%
508 \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 L^AT_EX definition:

```

509 \def\bibliographystyle#1{%
510 \ifx\@begindocumenthook\@undefined\else
511 \expandafter\AtBeginDocument
512 \fi
513 {\if@filesw
514 \immediate\write\@auxout{\string\bibstyle{#1}}%
515 \fi}}

```

Graphics and color.

```

516 \RequirePackage{graphicx}

```

```

517 \RequirePackage[prologue]{xcolor}
    We define ACM colors according to [?]:
518 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
519 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
520 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
521 \definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
522 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
523 \definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
524 \definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
525 \definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}

    Author-draft mode
526 \if@ACM@authordraft
527   \RequirePackage{draftwatermark}
528   \SetWatermarkFontSize{0.5in}
529   \SetWatermarkColor[gray]{.9}
530   \SetWatermarkText{\parbox{12em}{\centering
531     Unpublished working draft.\}
532     Not for distribution.}}
533 \fi

```

3.7 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>.

```

534 \RequirePackage{geometry}
535 \ifcase\ACM@format@nr
536 \relax % manuscript
537   \geometry{letterpaper,head=13pt,
538     marginparwidth=6pc,heightrounded}%
539 \or % acmsmall
540   \geometry{twoside=true,
541     includeheadfoot, head=13pt, foot=2pc,
542     paperwidth=6.75in, paperheight=10in,
543     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
544     marginparwidth=2pc,heightrounded
545   }%
546 \or % acmlarge
547   \geometry{twoside=true, head=13pt, foot=2pc,
548     paperwidth=8.5in, paperheight=11in,
549     includeheadfoot,
550     top=78pt, bottom=114pt, inner=81pt, outer=81pt,
551     marginparwidth=4pc,heightrounded
552   }%
553 \or % acmtog
554   \geometry{twoside=true, head=13pt, foot=2pc,
555     paperwidth=8.5in, paperheight=11in,
556     includeheadfoot, columnsep=24pt,

```

```

557     top=52pt, bottom=75pt, inner=52pt, outer=52pt,
558     marginparwidth=2pc,heightrounded
559     }%
560 \or % sigconf
561     \geometry{twoside=true, head=13pt,
562     paperwidth=8.5in, paperheight=11in,
563     includeheadfoot, columnsep=2pc,
564     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
565     marginparwidth=2pc,heightrounded
566     }%
567 \or % siggraph
568     \geometry{twoside=true, head=13pt,
569     paperwidth=8.5in, paperheight=11in,
570     includeheadfoot, columnsep=2pc,
571     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
572     marginparwidth=2pc,heightrounded
573     }%
574 \or % sigplan
575     \geometry{twoside=true, head=13pt,
576     paperwidth=8.5in, paperheight=11in,
577     includeheadfoot=false, columnsep=2pc,
578     top=1in, bottom=1in, inner=0.75in, outer=0.75in,
579     marginparwidth=2pc,heightrounded
580     }%
581 \or % sigchi
582     \geometry{twoside=true, head=13pt,
583     paperwidth=8.5in, paperheight=11in,
584     includeheadfoot, columnsep=2pc,
585     top=66pt, bottom=73pt, inner=54pt, outer=54pt,
586     marginparwidth=2pc,heightrounded
587     }%
588 \or % sigchi-a
589     \geometry{twoside=false, head=13pt,
590     paperwidth=11in, paperheight=8.5in,
591     includeheadfoot, marginparsep=72pt,
592     marginparwidth=170pt, columnsep=20pt,
593     top=72pt, bottom=72pt, left=314pt, right=72pt
594     }%
595     \@mparswitchfalse
596     \reversemarginpar
597 \fi

\parindent Paraphrasing
\parskip 598 \setlength\parindent{10\p@}
599 \setlength\parskip{\z@}
600 \ifcase\ACM@format@nr
601 \relax % manuscript
602 \or % acmsmall
603 \or % acmlarge
604 \or % acmtog

```

```

605 \setlength\parindent{9\p@}%
606 \or % sigconf
607 \or % siggraph
608 \or % sigplan
609 \or % sigchi
610 \or % sigchi-a
611 \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.
612 \setlength\normalparindent{\parindent}

Footnotes require some consideration. We have several layers of footnotes:
frontmatter 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.
613 \def\copyrightpermissionfootnoterule{\kern-3\p@
614 \hrule \@width \columnwidth \kern 2.6\p@}

615 \RequirePackage{manyfoot}
616 \SelectFootnoteRule[2]{copyrightpermission}
617 \DeclareNewFootnote{authorsaddresses}
618 \SelectFootnoteRule[2]{copyrightpermission}
619 \DeclareNewFootnote{copyrightpermission}

\footnoterule Tschichold’s rules:
620 \def\footnoterule{\kern-3\p@
621 \hrule \@width 4pc \kern 2.6\p@}

\endminipage We do not use footnote rules in minipages
622 \def\endminipage{%
623 \par
624 \unskip
625 \ifvoid\@mpfootins\else
626 \vskip\skip\@mpfootins
627 \normalcolor
628 \unvbox\@mpfootins
629 \fi
630 \@minipagefalse
631 \color@endgroup
632 \egroup
633 \expandafter\@iiparbox\@mpargs{\unvbox\@tempboxa}}

```

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

```
634 \def\@textbottom{\vskip \z@ \@plus 1pt}
635 \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.

```
636 \ifcase\ACM@format@nr
637 \relax % manuscript
638 \or % acmsmall
639 \or % acmlarge
640 \or % acmtog
641 \flushbottom
642 \or % sigconf
643 \flushbottom
644 \or % siggraph
645 \flushbottom
646 \or % sigplan
647 \flushbottom
648 \or % sigchi
649 \flushbottom
650 \or % sigchi-a
651 \fi
```

3.8 Fonts

Somehow PDF_{TeX} and Xe_{TeX} require different incantations to make a PDF compliant with the current Acrobat bugs. Xpdf is much better.

The code below is by Ross Moore.

```
652 \RequirePackage{iftex}
653 \ifPDFTeX
654 \input{glyphtounicode}
655 \pdfglyphtounicode{f_f}{FB00}
656 \pdfglyphtounicode{f_f_i}{FB03}
657 \pdfglyphtounicode{f_f_l}{FB04}
658 \pdfglyphtounicode{f_i}{FB01}
659 \pdfglyphtounicode{t_t}{0074 0074}
660 \pdfglyphtounicode{f_t}{0066 0074}
661 \pdfglyphtounicode{T_h}{0054 0068}
662 \pdfgentounicode=1
663 \fi
664 \RequirePackage{cmap}
```

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

```
665 \newif\if@ACM@newfonts
666 \@ACM@newfontstrue
667 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
668     have the libertine package installed. Please upgrade your
```

```

669 TeX}\@ACM@newfontsfalse}
670 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
671 have the zi4 package installed. Please upgrade your
672 TeX}\@ACM@newfontsfalse}
673 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
674 have the newtxmath package installed. Please upgrade your
675 TeX}\@ACM@newfontsfalse}

```

We use Libertine throughout.

```

676 \if@ACM@newfonts
677 \RequirePackage[T1]{fontenc}
678 \ifxetex
679 \RequirePackage[tt=false]{libertine}
680 \setmonofont{inconsolata}
681 \else
682 \RequirePackage[tt=false, type1=true]{libertine}
683 \fi
684 \RequirePackage[varqu]{zi4}
685 \RequirePackage[libertine]{newtxmath}
686 \fi

```

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

```

687 \let\liningnums\@undefined
688 \AtEndPreamble{%
689 \DeclareTextFontCommand{\liningnums}{\libertineLF}}

```

The SIGCHI extended abstracts are sans serif:

```

690 \if@ACM@sigchiamode
691 \renewcommand{\familydefault}{\sfdefault}
692 \fi

```

3.9 Image descriptions

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

```

693 \newif\if@Description@present
694 \@Description@presenttrue

```

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

```

695 \newif\if@undescribed@images
696 \@undescribed@imagesfalse

```

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

```

697 \newcommand\Description[2] [] {\global\@Description@presenttrue\ignorespaces}

```

The global warning

```

698 \AtEndDocument{\if@undescribed@images
699 \ClassWarningNoLine{\@classname}{Some images may lack descriptions}\fi}

```


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

```

700 \AtBeginEnvironment{figure}{\@Description@presentfalse
701   \let\@vspace\@vspace@orig
702   \let\@vspacer\@vspacer@orig}
703 \AtBeginEnvironment{figure*}{\@Description@presentfalse
704   \let\@vspace\@vspace@orig
705   \let\@vspacer\@vspacer@orig}
706 \AtEndEnvironment{figure}{\if@Description@present\else
707   \global\@undescribed@imagestrue
708   \ClassWarning{\@classname}{A possible image without description}\fi}
709 \AtEndEnvironment{figure*}{\if@Description@present\else
710   \global\@undescribed@imagestrue
711   \ClassWarning{\@classname}{A possible image without description}\fi}
712 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
713   \let\@vspacer\@vspacer@orig}
714 \AtBeginEnvironment{table*}{\let\@vspace\@vspace@orig
715   \let\@vspacer\@vspacer@orig}
716 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
717   \let\@vspacer\@vspacer@orig}
718 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
719   \let\@vspacer\@vspacer@orig}
720 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
721   \let\@vspacer\@vspacer@orig}
722 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
723   \let\@vspacer\@vspacer@orig}
724

```

3.10 Floats

We use the `caption` package

```

725 \RequirePackage{caption, float}
726 \captionsetup[table]{position=top}
727 \if@ACM@journal
728   \captionsetup{labelfont={sf, small},
729     textfont={sf, small}, margin=\z@}
730   \captionsetup[figure]{name={Fig.}}
731 \else
732   \captionsetup{labelfont={bf},
733     textfont={bf}, labelsep=colon, margin=\z@}
734   \ifcase\ACM@format@nr
735     \relax % manuscript
736     \or % acmsmall
737     \or % acmlarge
738     \or % acmtog
739     \or % sigconf
740     \or % siggraph
741     \captionsetup{textfont={it}}
742     \or % sigplan

```

```

743     \captionsetup{labelfont={bf},
744         textfont={normalfont}, labelsep=period, margin=\z@}
745 \or % sigchi
746     \captionsetup[figure]{labelfont={bf, small},
747         textfont={bf, small}}
748     \captionsetup[table]{labelfont={bf, small},
749         textfont={bf, small}}
750 \or % sigchi-a
751     \captionsetup[figure]{labelfont={bf, small},
752         textfont={bf, small}}
753     \captionsetup[table]{labelfont={bf, small},
754         textfont={bf, small}}
755 \fi
756 \fi

sidebar The sidebar environment:
757 \newfloat{sidebar}{sbar}
758 \floatname{sidebar}{Sidebar}
759 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{

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

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

\@marginfigure The processing of the saved text
764 \long\def\@marginfigure#1{\bgroup
765     \let\@vspace\@vspace@orig
766     \let\@vspacer\@vspacer@orig
767     \captionsetup{type=figure}%
768     \marginpar{\@Description@presentfalse\centering
769         \small#1\if@Description@present\else
770             \global\@undescribed@imagestrue
771             \ClassWarning{\@classname}{A possible image without description}
772             \fi}%
773     \egroup}

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

\@margintable The processing of the saved text
775 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
776     \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
777     \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
778 \newdimen\fulltextwidth
779 \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)
780 \if@ACM@sigchiamode
781 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
782 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
783 \let\@endfloatbox\@endwidefloatbox
784 \def\@fpsaddddefault{\def\@fps{tp}}}%
785 \@float}
786 \fi

\end@dblfloat And the end. Just adding a \bgroup.
787 \if@ACM@sigchiamode
788 \def\end@dblfloat{%
789 \end@float\egroup}
790 \fi

\@endwidefloatbox This is the end of a wide box—we basically move everything to the left
791 \def\@endwidefloatbox{%
792 \par\vskip\z@skip
793 \@minipagefalse
794 \outer@nobreak
795 \egroup
796 \color@endbox
797 \global\setbox\@currbox=\vbox{\moveleft
798 \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
799 \wd\@currbox=\textwidth
800 }

```

3.11 Lists

```

801 \ifcase\ACM@format@nr
802 \relax % manuscript
803 \or % acmsmall
804 \or % acmlarge
805 \or % acmtog
806 \or % sigconf
807 \or % siggraph
808 \or % sigplan
809 \def\labelenumi{\theenumi.}
810 \def\labelenumii{\theenumii.}
811 \def\labelenumiii{\theenumiii.}
812 \def\labelenumiv{\theenumiv.}
813 \or % sigchi
814 \or % sigchi-a
815 \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`.

```

816 \newdimen\@ACM@labelwidth
817 \AtBeginDocument{%
818   \setlength\labelsep{4pt}
819   \setlength{\@ACM@labelwidth}{6.5pt}
820
821   %% First-level list: when beginning after the first line of an
822   %% indented paragraph or ending before an indented paragraph, labels
823   %% should not hang to the left of the preceding/following text.
824   \setlength\leftmargini{\z@}
825   \addtolength\leftmargini{\parindent}
826   \addtolength\leftmargini{2\labelsep}
827   \addtolength\leftmargini{\@ACM@labelwidth}
828
829   %% Second-level and higher lists.
830   \setlength\leftmarginii{\z@}
831   \addtolength\leftmarginii{0.5\labelsep}
832   \addtolength\leftmarginii{\@ACM@labelwidth}
833   \setlength\leftmarginiii{\leftmarginii}
834   \setlength\leftmarginiv{\leftmarginiii}
835   \setlength\leftmarginv{\leftmarginiv}
836   \setlength\leftmarginvi{\leftmarginv}
837   \@listi}
838 \newskip\listisep
839 \listisep\smallskipamount
840 \def\@listI{\leftmargin\leftmargini
841   \labelwidth\leftmargini \advance\labelwidth-\labelsep
842   \listparindent\z@
843   \topsep\listisep}
844 \let\@listi\@listI
845 \def\@listii{\leftmargin\leftmarginii
846   \labelwidth\leftmarginii \advance\labelwidth-\labelsep
847   \topsep\z@skip}
848 \def\@listiii{\leftmargin\leftmarginiii
849   \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
850 \def\@listiv{\leftmargin\leftmarginiv
851   \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
852 \def\@listv{\leftmargin\leftmarginv
853   \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
854 \def\@listvi{\leftmargin\leftmarginvi
855   \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}

```

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

```

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

```

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

```
857 \renewenvironment{description}{\list{}{}}{
858   \labelwidth\@ACM@labelwidth
859   \let\makelabel\descriptionlabel}%
860 }{
861   \endlist
862 }
863 \let\enddescription=\endlist % for efficiency
```

3.12 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.

```
864 \newif\if@ACM@maketitle@typeset
865 \@ACM@maketitle@typesetfalse
```

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

```
866 \define@choicekey*+{ACM}{acmJournal}{\@journalCode\@journalCode@nr}{%
867   CIE,%
868   CSUR,%
869   DGOV,%
870   DTRAP,%
871   HEALTH,%
872   IMWUT,%
873   JACM,%
874   JDIQ,%
875   JEA,%
876   JERIC,%
877   JETC,%
878   JOCCH,%
879   PACMCGIT,%
880   PACMHCI,%
881   PACMPL,%
882   POMACS,%
883   TAAS,%
884   TACCESS,%
885   TACO,%
886   TALG,%
887   TALLIP,%
888   TAP,%
889   TCPS,%
890   TDS,%
891   TEAC,%
892   TECS,%
893   TELO,%
894   THRI,%
895   TIIS,%
```

```

896 TIOT,%
897 TISSEC,%
898 TIST,%
899 TKDD,%
900 TMIS,%
901 TOCE,%
902 TOCHI,%
903 TOCL,%
904 TOCS,%
905 TOCT,%
906 TODAES,%
907 TODS,%
908 TOG,%
909 TOIS,%
910 TOIT,%
911 TOMACS,%
912 TOMM,%
913 TOMPECS,%
914 TOMS,%
915 TOPC,%
916 TOPS,%
917 TOPLAS,%
918 TOS,%
919 TOSEM,%
920 TOSN,%
921 TQC,%
922 TRETS,%
923 TSAS,%
924 TSC,%
925 TSLP,%
926 TWEB,%
927 FACMP%
928 }{%
929 \ifcase\@journalCode@nr
930 \relax % CIE
931 \def\@journalName{ACM Computers in Entertainment}%
932 \def\@journalNameShort{ACM Comput. Entertain.}%
933 \def\@permissionCodeOne{1544-3574}%
934 \or % CSUR
935 \def\@journalName{ACM Computing Surveys}%
936 \def\@journalNameShort{ACM Comput. Surv.}%
937 \def\@permissionCodeOne{0360-0300}%
938 \or % DGOV
939 \def\@journalName{Digital Government: Research and Practice}%
940 \def\@journalNameShort{Digit. Gov. Res. Pract.}%
941 \def\@permissionCodeOne{2639-0175}%
942 \or % DTRAP
943 \def\@journalName{Digital Threats: Research and Practice}%
944 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
945 \def\@permissionCodeOne{2576-5337}%

```

```

946 \or % HEALTH
947   \def\@journalName{ACM Transactions on Computing for Healthcare}%
948   \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
949   \def\@permissionCodeOne{2637-8051}%
950 \or % IMWUT
951   \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
952     Wearable and Ubiquitous Technologies}%
953   \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
954   \def\@permissionCodeOne{2474-9567}%
955   \@ACM@screentruer
956   \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
957 \or % JACM
958   \def\@journalName{Journal of the ACM}%
959   \def\@journalNameShort{J. ACM}%
960   \def\@permissionCodeOne{0004-5411}%
961 \or % JDIQ
962   \def\@journalName{ACM Journal of Data and Information Quality}%
963   \def\@journalNameShort{ACM J. Data Inform. Quality}%
964   \def\@permissionCodeOne{1936-1955}%
965 \or % JEA
966   \def\@journalName{ACM Journal of Experimental Algorithmics}%
967   \def\@journalNameShort{ACM J. Exp. Algor.}%
968   \def\@permissionCodeOne{1084-6654}%
969 \or % JERIC
970   \def\@journalName{ACM Journal of Educational Resources in Computing}%
971   \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
972   \def\@permissionCodeOne{1073-0516}%
973 \or % JETC
974   \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
975   \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
976   \def\@permissionCodeOne{1550-4832}%
977 \or % JOCCH
978   \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
979   \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
980 \or % PACMCGIT
981   \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
982   \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
983   \def\@permissionCodeOne{2577-6193}%
984   \@ACM@screentruer
985   \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
986 \or % PACMHCI
987   \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
988   \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
989   \def\@permissionCodeOne{2573-0142}%
990   \@ACM@screentruer
991   \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
992 \or % PACMPL
993   \def\@journalName{Proceedings of the ACM on Programming Languages}%
994   \def\@journalNameShort{Proc. ACM Program. Lang.}%
995   \def\@permissionCodeOne{2475-1421}%

```

```

996 \@ACM@screentruer
997 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
998 \or % POMACS
999 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1000 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1001 \def\@permissionCodeOne{2476-1249}%
1002 \@ACM@screentruer
1003 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1004 \or % TAAS
1005 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
1006 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
1007 \def\@permissionCodeOne{1556-4665}%
1008 \or % TACCESS
1009 \def\@journalName{ACM Transactions on Accessible Computing}%
1010 \def\@journalNameShort{ACM Trans. Access. Comput.}%
1011 \def\@permissionCodeOne{1936-7228}%
1012 \or % TACO
1013 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1014 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1015 \or % TALG
1016 \def\@journalName{ACM Transactions on Algorithms}%
1017 \def\@journalNameShort{ACM Trans. Algor.}%
1018 \def\@permissionCodeOne{1549-6325}%
1019 \or % TALLIP
1020 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1021 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1022 \def\@permissionCodeOne{2375-4699}%
1023 \or % TAP
1024 \def\@journalName{ACM Transactions on Applied Perception}%
1025 \or % TCPS
1026 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1027 \or % TDS
1028 \def\@journalName{ACM Transactions on Data Science}%
1029 \def\@journalNameShort{ACM Trans. Data Sci.}%
1030 \def\@permissionCodeOne{2577-3224}%
1031 \or % TEAC
1032 \def\@journalName{ACM Transactions on Economics and Computation}%
1033 \or % TECS
1034 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
1035 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1036 \def\@permissionCodeOne{1539-9087}%
1037 \or % TELO
1038 \def\@journalName{ACM Transactions on Evolutionary Learning}%
1039 \def\@journalNameShort{ACM Trans. Evol. Learn.}%
1040 \def\@permissionCodeOne{2688-3007}%
1041 \or % THRI
1042 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
1043 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1044 \def\@permissionCodeOne{2573-9522}%
1045 \or % TIIS

```



```

1046 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
1047 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1048 \def\@permissionCodeOne{2160-6455}%
1049 \or % TIOT
1050 \def\@journalName{ACM Transactions on Internet of Things}%
1051 \def\@journalNameShort{ACM Trans. Internet Things}%
1052 \def\@permissionCodeOne{2577-6207}%
1053 \or % TISSEC
1054 \def\@journalName{ACM Transactions on Information and System Security}%
1055 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1056 \def\@permissionCodeOne{1094-9224}%
1057 \or % TIST
1058 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1059 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1060 \def\@permissionCodeOne{2157-6904}%
1061 \or % TKDD
1062 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
1063 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1064 \def\@permissionCodeOne{1556-4681}%
1065 \or % TMIS
1066 \def\@journalName{ACM Transactions on Management Information Systems}%
1067 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1068 \def\@permissionCodeOne{2158-656X}%
1069 \or % TOCE
1070 \def\@journalName{ACM Transactions on Computing Education}%
1071 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
1072 \def\@permissionCodeOne{1946-6226}%
1073 \or % TOCHI
1074 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1075 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1076 \def\@permissionCodeOne{1073-0516}%
1077 \or % TOCL
1078 \def\@journalName{ACM Transactions on Computational Logic}%
1079 \def\@journalNameShort{ACM Trans. Comput. Logic}%
1080 \def\@permissionCodeOne{1529-3785}%
1081 \or % TOCS
1082 \def\@journalName{ACM Transactions on Computer Systems}%
1083 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1084 \def\@permissionCodeOne{0734-2071}%
1085 \or % TOCT
1086 \def\@journalName{ACM Transactions on Computation Theory}%
1087 \def\@journalNameShort{ACM Trans. Comput. Theory}%
1088 \def\@permissionCodeOne{1942-3454}%
1089 \or % TODAES
1090 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1091 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1092 \def\@permissionCodeOne{1084-4309}%
1093 \or % TODS
1094 \def\@journalName{ACM Transactions on Database Systems}%
1095 \def\@journalNameShort{ACM Trans. Datab. Syst.}%

```

```

1096 \def\@permissionCodeOne{0362-5915}%
1097 \or % TOG
1098 \def\@journalName{ACM Transactions on Graphics}%
1099 \def\@journalNameShort{ACM Trans. Graph.}%
1100 \def\@permissionCodeOne{0730-0301}
1101 \or % TOIS
1102 \def\@journalName{ACM Transactions on Information Systems}%
1103 \def\@permissionCodeOne{1046-8188}%
1104 \or % TOIT
1105 \def\@journalName{ACM Transactions on Internet Technology}%
1106 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1107 \def\@permissionCodeOne{1533-5399}%
1108 \or % TOMACS
1109 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1110 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1111 \or % TOMM
1112 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
1113 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1114 \def\@permissionCodeOne{1551-6857}%
1115 \def\@permissionCodeTwo{0100}%
1116 \or % TOMPECS
1117 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing System}%
1118 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1119 \def\@permissionCodeOne{2376-3639}%
1120 \or % TOMS
1121 \def\@journalName{ACM Transactions on Mathematical Software}%
1122 \def\@journalNameShort{ACM Trans. Math. Softw.}%
1123 \def\@permissionCodeOne{0098-3500}%
1124 \or % TOPC
1125 \def\@journalName{ACM Transactions on Parallel Computing}%
1126 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1127 \def\@permissionCodeOne{1539-9087}%
1128 \or % TOPS
1129 \def\@journalName{ACM Transactions on Privacy and Security}%
1130 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1131 \def\@permissionCodeOne{2471-2566}%
1132 \or % TOPLAS
1133 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1134 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1135 \def\@permissionCodeOne{0164-0925}%
1136 \or % TOS
1137 \def\@journalName{ACM Transactions on Storage}%
1138 \def\@journalNameShort{ACM Trans. Storage}%
1139 \def\@permissionCodeOne{1553-3077}%
1140 \or % TOSEM
1141 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1142 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1143 \def\@permissionCodeOne{1049-331X}%
1144 \or % TOSN
1145 \def\@journalName{ACM Transactions on Sensor Networks}%

```

```

1146 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1147 \def\@permissionCodeOne{1550-4859}%
1148 \or % TQC
1149 \def\@journalName{ACM Transactions on Quantum Computing}%
1150 \def\@journalNameShort{ACM Trans. Quantum Comput.}%
1151 \def\@permissionCodeOne{2643-6817}%
1152 \or % TRET
1153 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1154 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1155 \def\@permissionCodeOne{1936-7406}%
1156 \or % TSAS
1157 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1158 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1159 \def\@permissionCodeOne{2374-0353}%
1160 \or % TSC
1161 \def\@journalName{ACM Transactions on Social Computing}%
1162 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1163 \def\@permissionCodeOne{2469-7818}%
1164 \or % TSLP
1165 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1166 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1167 \def\@permissionCodeOne{1550-4875}%
1168 \or % TWEB
1169 \def\@journalName{ACM Transactions on the Web}%
1170 \def\@journalNameShort{ACM Trans. Web}%
1171 \def\@permissionCodeOne{1559-1131}%
1172 \else % FACMP, a dummy journal
1173 \def\@journalName{Forthcoming ACM Publication}%
1174 \def\@journalNameShort{ACM Forthcoming}%
1175 \def\@permissionCodeOne{XXXX-XXXX}%
1176 \fi
1177 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1178 }{%
1179 \ClassError{\@classname}{Incorrect journal #1}%
1180 }%

```

`\acmJournal` And the syntactic sugar around it

```

1181 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
1182 \global\@ACM@journal@bibstriptrue}

```

The defaults:

```

1183 \def\@journalCode@nr{0}
1184 \def\@journalName{}%
1185 \def\@journalNameShort{\@journalName}%
1186 \def\@permissionCodeOne{XXXX-XXXX}%
1187 \def\@permissionCodeTwo{}%

```

`\acmConference` This is the conference command

```

1188 \newcommand\acmConference[4][{}]{%

```

```

1189 \gdef\acmConference@shortname{#1}%
1190 \gdef\acmConference@name{#2}%
1191 \gdef\acmConference@date{#3}%
1192 \gdef\acmConference@venue{#4}%
1193 \ifx\acmConference@shortname\@empty
1194   \gdef\acmConference@shortname{#2}%
1195 \fi
1196 \global\@ACM@journal@bibstripfalse
1197 }
1198 \if@ACM@journal\else
1199 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1200   DC, USA}%
1201 \fi

\acmBooktitle The book title of the conference:
\@acmBooktitle 1202 \def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
1203 \acmBooktitle{Proceedings of \acmConference@name
1204   \ifx\acmConference@name\acmConference@shortname\else
1205     \ (\acmConference@shortname)\fi}

\@editorsAbbrev How to abbreviate editors
1206 \def\@editorsAbbrev{(Ed.)}

\@acmEditors The list of editors
1207 \def\@acmEditors{}

\editor Add a new editor to the list
1208 \def\editor#1{\ifx\@acmEditors\@empty
1209   \gdef\@acmEditors{#1}%
1210 \else
1211   \gdef\@editorsAbbrev{(Eds.)}%
1212   \g@addto@macro\@acmEditors{\and#1}%
1213 \fi}

\subtitle The subtitle macro
1214 \def\subtitle#1{\def\@subtitle{#1}}
1215 \subtitle{}

\num@authorgroups The total number of “groups”. Each group is several authors with the same
affiliations(s)
1216 \newcount\num@authorgroups
1217 \num@authorgroups=0\relax

\num@authors The total number of authors
1218 \newcount\num@authors
1219 \num@authors=0\relax

\if@insideauthorgroup Whether we are continuing an author group
1220 \newif\if@insideauthorgroup
1221 \@insideauthorgroupfalse

```

`\author` Adding an author to the list of authors and addresses

```

1222 \renewcommand\author[2][{}]{%
1223   \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1224     authors in the same \string\author\space macro!}}{}%
1225   \global\advance\num@authors by 1\relax
1226   \if@insideauthorgroup\else
1227     \global\advance\num@authorgroups by 1\relax
1228     \global\@insideauthorgroupttrue
1229   \fi
1230   \ifx\addresses\@empty
1231     \if@ACM@anonymous
1232       \gdef\addresses{\@author{Anonymous Author(s)}%
1233         \ifx\@acmSubmissionID\@empty\else\Submission Id:
1234           \@acmSubmissionID\fi}%
1235       \gdef\authors{Anonymous Author(s)}%
1236     \else
1237       \gdef\addresses{\@author{#2}}%
1238       \gdef\authors{#2}%
1239     \fi
1240   \else
1241     \if@ACM@anonymous\else
1242       \g@addto@macro\addresses{\and\@author{#2}}%
1243       \g@addto@macro\authors{\and#2}%
1244     \fi
1245   \fi
1246   \if@ACM@anonymous
1247     \ifx\shortauthors\@empty
1248       \gdef\shortauthors{Anon.
1249         \ifx\@acmSubmissionID\@empty\else Submission Id:
1250           \@acmSubmissionID\fi}%
1251     \fi
1252   \else
1253     \def\@tempa{#1}%
1254     \ifx\@tempa\@empty
1255       \ifx\shortauthors\@empty
1256         \gdef\shortauthors{#2}%
1257       \else
1258         \g@addto@macro\shortauthors{\and#2}%
1259       \fi
1260     \else
1261       \ifx\shortauthors\@empty
1262         \gdef\shortauthors{#1}%
1263       \else
1264         \g@addto@macro\shortauthors{\and#1}%
1265       \fi
1266     \fi
1267   \fi}

```

`\affiliation` The macro `\affiliation` mimics `\address` from `amsart`. Note that it has an

optional argument, which we use differently from `amsart`.

```
1268 \newcommand{\affiliation}[2] [] {%
1269   \global\@insideauthorgroupfalse
1270   \if@ACM@anonymous\else
1271     \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1272   \fi}
```

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

```
1273 \define@boolkey+{@ACM@affiliation@}{@ACM@affiliation@}{obeypunctuation}%
1274 [true]{}{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}
```

`\additionalaffiliation` Additional affiliations go to footnotes

```
1275 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}
```

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

```
1276 \def\@additionalaffiliation#1{\bgroup
1277   \def\position##1{\ignorespaces}%
1278   \def\institution##1{##1\ignorespaces}%
1279   \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1280   \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
1281   \let\streetaddress\position
1282   \let\city\position
1283   \let\state\position
1284   \let\postcode\position
1285   \let\country\position
1286   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.

```
1287 \renewcommand{\email}[2] [] {%
1288   \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1289     addresses in the same \string\email\space macro!}}{}%
1290   \if@ACM@anonymous\else
1291     \g@addto@macro\addresses{\email{#1}{#2}}%
1292   \fi}
```

`\orcid` Right now we do not typeset ORCIDs

```
1293 \def\orcid#1{\unskip\ignorespaces}
```

`\authorsaddresses` Setting up authors' addresses

```
1294 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1295 \authorsaddresses{\mkauthorsaddresses}
```

`\@titlenotes` The title notes

```
1296 \def\@titlenotes{}
```

```

\titlenote Adding a note to the title
1297 \def\titlenote#1{%
1298   \g@addto@macro\@title{\footnotemark}%
1299   \if@ACM@anonymous
1300     \g@addto@macro\@titlenotes{%
1301       \stepcounter{footnote}\footnotetext{Title note}}%
1302   \else
1303     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1304   \fi}

\@subtitlenotes The subtitle notes
1305 \def\@subtitlenotes{}

\subtitlenote Adding a note to the subtitle
1306 \def\subtitlenote#1{%
1307   \g@addto@macro\@subtitle{\footnotemark}%
1308   \if@ACM@anonymous
1309     \g@addto@macro\@subtitlenotes{%
1310       \stepcounter{footnote}\footnotetext{Subtitle note}}%
1311   \else
1312     \g@addto@macro\@subtitlenotes{%
1313       \stepcounter{footnote}\footnotetext{#1}}%
1314   \fi}

\@authornotes The author notes
1315 \def\@authornotes{}

\authornote Adding a note to the author
1316 \def\authornote#1{%
1317   \if@ACM@anonymous\else
1318     \g@addto@macro\addresses{\@authornotemark}%
1319     \g@addto@macro\@authornotes{%
1320       \stepcounter{footnote}\footnotetext{#1}}%
1321   \fi}

\authornotemark Adding a footnote mark to the authors
1322 \newcommand\authornotemark[1][\relax]{%
1323   \ifx#1\relax\relax\relax
1324     \g@addto@macro\addresses{\@authornotemark}%
1325   \else
1326     \g@addto@macro\addresses{\@@authornotemark{#1}}%
1327   \fi}

\acmVolume The current volume
1328 \def\acmVolume#1{\def\@acmVolume{#1}}
1329 \acmVolume{1}

\acmNumber The current number
1330 \def\acmNumber#1{\def\@acmNumber{#1}}
1331 \acmNumber{1}

```

```

\acmArticle The current article
1332 \def\acmArticle#1{\def\@acmArticle{#1}}
1333 \acmArticle{}

\acmArticleSeq The sequence number
1334 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
1335 \acmArticleSeq{\@acmArticle}

\acmYear The current year
1336 \def\acmYear#1{\def\@acmYear{#1}}
1337 \acmYear{\the\year}

\acmMonth The current month
1338 \def\acmMonth#1{\def\@acmMonth{#1}}
1339 \acmMonth{\the\month}

\@acmPubDate The publication date
1340 \def\@acmPubDate{\ifcase\@acmMonth\or
1341 January\or February\or March\or April\or May\or June\or
1342 July\or August\or September\or October\or November\or
1343 December\fi~\@acmYear}

\acmPrice The price
1344 \def\acmPrice#1{\def\@acmPrice{#1}}
1345 \acmPrice{15.00}

\acmSubmissionID The submission ID
1346 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
1347 \acmSubmissionID{}

\acmISBN The book ISBN
1348 \def\acmISBN#1{\def\@acmISBN{#1}}
1349 \acmISBN{978-x-xxxx-xxxx-x/YY/MM}

\acmDOI The paper DOI
1350 \def\acmDOI#1{\def\@acmDOI{#1}}
1351 \acmDOI{10.1145/nnnnnnn.nnnnnnn}

\if@ACM@badge Whether to print a badge. Note that either a left or right badge triggers it:
1352 \newif\if@ACM@badge
1353 \@ACM@badgefalse

\@ACM@badge@width The width of the badge
1354 \newlength\@ACM@badge@width
1355 \setlength\@ACM@badge@width{5pc}

\@ACM@title@width The width of the badge
1356 \newlength\@ACM@title@width

```



```

\@ACM@badge@skip The space between the badge and the title
1357 \newlength\@ACM@badge@skip
1358 \setlength\@ACM@badge@skip{1pc}

\acmBadgeR Setting the right badge
1359 \newcommand\acmBadgeR[2] [] {\@ACM@badgetrue
1360 \def\@acmBadgeR@url{#1}%
1361 \def\@acmBadgeR@image{#2}}
1362 \def\@acmBadgeR@url{}
1363 \def\@acmBadgeR@image{}

\acmBadgeL Setting the left badge
1364 \newcommand\acmBadgeL[2] [] {\@ACM@badgetrue
1365 \def\@acmBadgeL@url{#1}%
1366 \def\@acmBadgeL@image{#2}}
1367 \def\@acmBadgeL@url{}
1368 \def\@acmBadgeL@image{}

\startPage The start page of the paper
1369 \def\startPage#1{\def\@startPage{#1}}
1370 \startPage{}

\terms Terms are obsolete. We use CCS now.
1371 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
1372     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.
1373 \def\keywords#1{\def\@keywords{#1}}
1374 \let\@keywords\@empty

1375 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty
1376 \ifnum\getrefnumber{TotPages}>2\relax
1377 \ClassWarningNoLine{\@classname}{ACM keywords are mandatory
1378     for papers over two pages}%
1379 \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
1380 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{\}

\@saveabstract And saving the abstract
1381 \long\def\@saveabstract#1{\if@ACM@maketitle@typeset
1382 \ClassError{\@classname}{Abstract must be defined before maketitle
1383     command. Please move it!}\fi
1384 \long\gdef\@abstract{#1}}
1385 \@saveabstract{}

```

```

\@empty The long version of \@empty (to compare with \@abstract)
1386 \long\def\@empty{}

\if@ACM@printccs Whether to print CCS
1387 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
1388   \if@ACM@printccs
1389     \ClassInfo{\@classname}{Printing CCS}%
1390   \else
1391     \ClassInfo{\@classname}{Suppressing CCS}%
1392   \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}

\if@ACM@printacmref Whether to print the ACM bibstrip
1393 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1394   \if@ACM@printacmref
1395     \ClassInfo{\@classname}{Printing bibformat}%
1396   \else
1397     \ClassInfo{\@classname}{Suppressing bibformat}%
1398   \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}

1399 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
1400   \ifnum\getrefnumber{TotPages}>1\relax
1401   \ClassWarningNoLine{\@classname}{ACM reference format is mandatory
1402     for papers over one page}%
1403   \fi\fi\fi}

\if@ACM@printfolios Whether to print folios
1404 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1405   \if@ACM@printfolios
1406     \ClassInfo{\@classname}{Printing folios}%
1407   \else
1408     \ClassInfo{\@classname}{Suppressing folios}%
1409   \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}

\@ACM@authorsperrrow The number of authors per row. 0 means use the default algorithm.
1410 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrrow}[0]{%
1411   \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrrow to
1412     #1}}{\ClassWarning{\@classname}{The parameter authorsperrrow must be
1413     numerical. Ignoring the input #1}\gdef\@ACM@authorsperrrow{0}}}}

\settopmatter The usual syntactic sugar
1414 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

Now the settings
1415 \settopmatter{printccs=true, printacmref=true}
1416 \if@ACM@manuscript
1417   \settopmatter{printfolios=true}
1418 \else
1419   \if@ACM@journal
1420     \settopmatter{printfolios=true}

```

```

1421 \else
1422 \settopmatter{printfolios=false}
1423 \fi
1424 \fi
1425 \settopmatter{authorsperrow=0}

\@received The container for the paper history
1426 \def\@received{}

\received The \received command
1427 \newcommand\received[2][\def\@tempa{#1}%
1428 \ifx\@tempa\@empty
1429 \ifx\@received\@empty
1430 \gdef\@received{Received #2}%
1431 \else
1432 \g@addto@macro{\@received}{; revised #2}%
1433 \fi
1434 \else
1435 \ifx\@received\@empty
1436 \gdef\@received{#1 #2}%
1437 \else
1438 \g@addto@macro{\@received}{; #1 #2}%
1439 \fi
1440 \fi}
1441 \AtEndDocument{%
1442 \ifx\@received\@empty\else
1443 \par\bigskip\noindent\small\normalfont\@received\par
1444 \fi}

```

3.13 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```

1445 \RequirePackage{comment}
1446 \excludecomment{CCSXML}

\@concepts This is the storage macro and counter for concepts
1447 \let\@concepts\@empty
1448 \newcounter{concepts}

\ccsdesc The first argument is the significance, the second is the concept(s)
1449 \newcommand\ccsdesc[2][100]{%
1450 \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!
1451 \RequirePackage{textcomp}
1452 \def\ccsdesc@parse#1~#2~#3~{%
1453 \stepcounter{concepts}%

```

```

1454 \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1455 \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1456 \textbf{#2}}}%
1457 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
1458 \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1459 \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
1460 \csname CCS@Punctuation@#2\endcsname
1461 \csname CCS@Specific@#2\endcsname}%
1462 \fi
1463 \ifx#3\relax\relax\else
1464 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
1465 \textrightarrow }%
1466 \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1467 \addtocounter{@concepts}{-1}}%
1468 \ifnum#1>499\textbf{#3}\else
1469 \ifnum#1>299\textit{#3}\else
1470 #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
1471 \fi
1472 \ccsdesc@parse@finish}

1473 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\@empty\relax
1474 \ifnum\getrefnumber{TotPages}>2\relax
1475 \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
1476 for papers over two pages}%
1477 \fi\fi\fi}

```

```

\ccdesc@parse@finish Gobble everything to \ccsdesc@parse@end
1478 \def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}

```

3.14 Copyright system

This is from acmcopyright.sty

```

\if@printcopyright Whether to print a copyright symbol
1479 \newif\if@printcopyright
1480 \@printcopyrighttrue

\if@printpermission Whether to print the permission block
1481 \newif\if@printpermission
1482 \@printpermissiontrue

\if@acmowned Whether the ACM owns the rights to the paper
1483 \newif\if@acmowned
1484 \@acmownedtrue

```

Keys:

```

1485 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1486 \acm@copyrightinput\acm@copyrightmode]{none,%
1487 acmcopyright,acmlicensed,rightsretained,%

```

```

1488     usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1489     licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
1490     iw3c2w3,iw3c2w3g}{%
1491 \@printpermissiontrue
1492 \@printcopyrighttrue
1493 \@acmownedtrue
1494 \ifnum\acm@copyrightmode=0\relax % none
1495     \@printpermissionfalse
1496     \@printcopyrightfalse
1497     \@acmownedfalse
1498 \fi
1499 \ifnum\acm@copyrightmode=2\relax % acmlicensed
1500     \@acmownedfalse
1501 \fi
1502 \ifnum\acm@copyrightmode=3\relax % rightsretained
1503     \@acmownedfalse
1504     \AtBeginDocument{\acmPrice{}}%
1505 \fi
1506 \ifnum\acm@copyrightmode=4\relax % usgov
1507     \@printpermissiontrue
1508     \@printcopyrightfalse
1509     \@acmownedfalse
1510     \AtBeginDocument{\acmPrice{}}%
1511 \fi
1512 \ifnum\acm@copyrightmode=6\relax % cagov
1513     \@acmownedfalse
1514 \fi
1515 \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1516     \@acmownedfalse
1517 \fi
1518 \ifnum\acm@copyrightmode=9\relax % licensedcagov
1519     \@acmownedfalse
1520 \fi
1521 \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1522     \@acmownedfalse
1523 \fi
1524 \ifnum\acm@copyrightmode=11\relax % othergov
1525     \@acmownedtrue
1526 \fi
1527 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1528     \@acmownedfalse
1529 \fi
1530 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1531     \@acmownedfalse
1532     \AtBeginDocument{\acmPrice{}}%
1533 \fi
1534 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1535     \@acmownedfalse
1536     \AtBeginDocument{\acmPrice{}}%
1537 \fi}

```

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

```
1538 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1539 \setcopyright{acmcopyright}
```

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

```
1540 \def\@copyrightowner{%
1541   \ifcase\acm@copyrightmode\relax % none
1542   \or % acmcopyright
1543     Association for Computing Machinery.
1544   \or % acmlicensed
1545     Copyright held by the owner/author(s). Publication rights licensed to
1546     ACM\@.
1547   \or % rightsretained
1548     Copyright held by the owner/author(s).
1549   \or % usgov
1550   \or % usgovmixed
1551     Association for Computing Machinery.
1552   \or % cagov
1553     Crown in Right of Canada.
1554   \or %cagovmixed
1555     Association for Computing Machinery.
1556   \or %licensedusgovmixed
1557     Copyright held by the owner/author(s). Publication rights licensed to
1558     ACM\@.
1559   \or % licensedcagov
1560     Crown in Right of Canada. Publication rights licensed to
1561     ACM\@.
1562   \or %licensedcagovmixed
1563     Copyright held by the owner/author(s). Publication rights licensed to
1564     ACM\@.
1565   \or % othergov
1566     Association for Computing Machinery.
1567   \or % licensedothergov
1568     Copyright held by the owner/author(s). Publication rights licensed to
1569     ACM\@.
1570   \or % ic2w3www
1571     IW3C2 (International World Wide Web Conference Committee), published
1572     under Creative Commons CC-BY~4.0 License.
1573   \or % ic2w3wwwgoogle
1574     IW3C2 (International World Wide Web Conference Committee), published
1575     under Creative Commons CC-BY-NC-ND~4.0 License.
1576   \fi}
```

`\@formatdoi` Print a clickable DOI

```
1577 \def\@formatdoi#1{\url{https://doi.org/#1}}
```

`\@copyrightpermission` The canned permission block.

```
1578 \def\@copyrightpermission{%
1579   \ifcase\acm@copyrightmode\relax % none
```

1580 \or % acmcopyright
1581 Permission to make digital or hard copies of all or part of this
1582 work for personal or classroom use is granted without fee provided
1583 that copies are not made or distributed for profit or commercial
1584 advantage and that copies bear this notice and the full citation on
1585 the first page. Copyrights for components of this work owned by
1586 others than ACM must be honored. Abstracting with credit is
1587 permitted. To copy otherwise, or republish, to post on servers or to
1588 redistribute to lists, requires prior specific permission
1589 and\hspace*{.5pt}/or a fee. Request permissions from
1590 permissions@acm.org.
1591 \or % acmlicensed
1592 Permission to make digital or hard copies of all or part of this
1593 work for personal or classroom use is granted without fee provided
1594 that copies are not made or distributed for profit or commercial
1595 advantage and that copies bear this notice and the full citation on
1596 the first page. Copyrights for components of this work owned by
1597 others than the author(s) must be honored. Abstracting with credit
1598 is permitted. To copy otherwise, or republish, to post on servers
1599 or to redistribute to lists, requires prior specific permission
1600 and\hspace*{.5pt}/or a fee. Request permissions from
1601 permissions@acm.org.
1602 \or % rightsretained
1603 Permission to make digital or hard copies of part or all of this work
1604 for personal or classroom use is granted without fee provided that
1605 copies are not made or distributed for profit or commercial advantage
1606 and that copies bear this notice and the full citation on the first
1607 page. Copyrights for third-party components of this work must be
1608 honored. For all other uses, contact the
1609 owner\hspace*{.5pt}/author(s).
1610 \or % usgov
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1612 Government and is in the public domain. Non-exclusive copying or
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1614 given and the authors and agency are clearly identified as its
1615 source.
1616 \or % usgovmixed
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1619 government. As such, the United States government retains a
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1622 \or % cagov
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 1636 \or % cagovmixed
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 1679 such, the Government retains a nonexclusive, royalty-free right to


```

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1685   or affiliate of a national government. As such, the Government
1686   retains a nonexclusive, royalty-free right to publish or reproduce
1687   this article, or to allow others to do so, for Government purposes
1688   only.
1689   \or % iw3c2w3
1690   This paper is published under the Creative Commons Attribution~4.0
1691   International (CC-BY~4.0) license. Authors reserve their rights to
1692   disseminate the work on their personal and corporate Web sites with
1693   the appropriate attribution.
1694   \or % iw3c2w3g
1695   This paper is published under the Creative Commons
1696   Attribution-NonCommercial-NoDerivs~4.0 International
1697   (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
1698   disseminate the work on their personal and corporate Web sites with
1699   the appropriate attribution.
1700   \fi}

\copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
1701 \def\copyrightyear#1{\def\@copyrightyear{#1}}
1702 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container
1703 \def\@teaserfigures{}

teaserfigure The teaser figure
1704 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

\@saveteaser Saving the teaser
1705 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

\thanks We redefine amsart \thanks so the anonymous key works
1706 \renewcommand{\thanks}[1]{%
1707   \ifnotempty{#1}{%
1708     \if@ACM@anonymous
1709       \g@addto@macro\thankses{\thanks{A note}}}%
1710   \else
1711     \g@addto@macro\thankses{\thanks{#1}}}%
1712   \fi}}

```

3.15 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}]`.

```

1713 \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.

```

1714 \def\maketitle{%
1715   \@ACM@maketitle@typesettrue
1716   \if@ACM@anonymous
1717     % Anonymize omission of \author-s
1718     \ifnum\num@authorgroups=0\author{}\fi
1719   \fi
1720   \begingroup
1721   \let\@vspace\@vspace@orig
1722   \let\@vspacer\@vspacer@orig
1723   \let\@footnotemark\@footnotemark@nolink
1724   \let\@footnotetext\@footnotetext@nolink
1725   \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
1726   \hsize=\textwidth
1727   \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
1728   \@mkttitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
1729   \@printtopmatter
1730   \if@ACM@sigchiamode\@mkauthors\fi
1731   \setcounter{footnote}{0}%
1732   \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
1733   \@titlenotes
1734   \@subtitlenotes
1735   \@authornotes
1736   \let\@makefnmark\relax
1737   \let\@thefnmark\relax
1738   \let\@makefntext\noindent
1739   \ifx\@empty\thankses\else
1740     \footnotetextauthorsaddresses{%
1741       \def\par{\let\par\@par}\parindent\z@\@setthanks}%
1742   \fi
1743   \ifx\@empty\@authorsaddresses\else
1744     \if@ACM@anonymous\else
1745       \if@ACM@journal@bibstrip
1746         \footnotetextauthorsaddresses{%
1747           \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
1748       \fi
1749     \fi
1750   \fi
1751   \if@ACM@nonacm\else\footnotetextcopyrightpermission{%
1752     \if@ACM@authordraft
1753       \raisebox{-2ex}{\z@}{\z@}{\makebox[Opt][l]{\large\bfseries
1754         Unpublished working draft. Not for distribution.}}%
1755       \color{gray}{0.9}%
1756     \fi

```

```

1757 \parindent\z@\parskip0.1\baselineskip
1758 \if@ACM@authorversion\else
1759 \if@printpermission\@copyrightpermission\par\fi
1760 \fi
1761 \if@ACM@manuscript\else
1762 \if@ACM@journal@bibstrip\else % Print the conference information
1763 {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
1764 \fi
1765 \fi
1766 \if@printcopyright
1767 \copyright\ \@copyrightyear\ \@copyrightowner\\
1768 \else
1769 \@copyrightyear.\
1770 \fi
1771 \if@ACM@manuscript
1772 Manuscript submitted to ACM\\
1773 \else
1774 \if@ACM@authorversion
1775 This is the author's version of the work. It is posted here for
1776 your personal use. Not for redistribution. The definitive Version
1777 of Record was published in
1778 \if@ACM@journal@bibstrip
1779 \emph{\@journalName}%
1780 \else
1781 \emph{\@acmBooktitle}%
1782 \fi
1783 \ifx\@acmDOI\@empty
1784 .
1785 \else
1786 , \@formatdoi{\@acmDOI}.
1787 \fi\\
1788 \else
1789 \if@ACM@nonacm\else
1790 \if@ACM@journal@bibstrip
1791 \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle
1792 \ifx\@acmPrice\@empty\else\ $\@acmPrice\fi\\
1793 \@formatdoi{\@acmDOI}%
1794 \else % Conference
1795 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN
1796 \ifx\@acmPrice\@empty.\else\dots\$\@acmPrice\fi\\fi
1797 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
1798 \fi
1799 \fi
1800 \fi
1801 \fi}
1802 \fi
1803 \endgroup
1804 \setcounter{footnote}{0}%
1805 \@mkabstract
1806 \if@ACM@printccs

```

```

1807 \ifx\@concepts\@empty\else\bgroup
1808     {\@specialsection{CCS Concepts}%
1809      \noindent\@concepts\par}\egroup
1810 \fi
1811 \fi
1812 \ifx\@keywords\@empty\else\bgroup
1813     {\if@ACM@journal
1814      \@specialsection{Additional Key Words and Phrases}%
1815      \else
1816      \@specialsection{Keywords}%
1817      \fi
1818      \noindent\@keywords}\par\egroup
1819 \fi
1820 \andify\authors
1821 \andify\shortauthors
1822 \global\let\authors=\authors
1823 \global\let\shortauthors=\shortauthors
1824 \if@ACM@printacmref
1825     \@mkbibcitation
1826 \fi
1827 \hypersetup{%
1828     pdfauthor={\authors},
1829     pdftitle={\@title},
1830     pdfsubject={\@concepts},
1831     pdfkeywords={\@keywords},
1832     pdfcreator={LaTeX with acmart
1833               \csname ver@acmart.cls\endcsname\space
1834               and hyperref
1835               \csname ver@hyperref.sty\endcsname}}%
1836 \global\@topnum\z@ % this prevents floats from falling
1837                   % at the top of page 1
1838 \global\@botnum\z@ % we do not want them to be on the bottom either
1839 \@printendtopmatter
1840 \@afterindentfalse
1841 \@afterheading
1842 }

```

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

```

1843 \def\@specialsection#1{%
1844     \bgroup
1845     \let\@vspace\@vspace@orig
1846     \let\@vspacer\@vspacer@orig
1847     \ifcase\ACM@format@nr
1848     \relax % manuscript
1849     \par\medskip\small\noindent#1: %
1850 \or % acmsmall
1851     \par\medskip\small\noindent#1: %
1852 \or % acmlarge
1853     \par\medskip\small\noindent#1: %
1854 \or % acmtog

```

```

1855 \par\medskip\small\noindent#1: %
1856 \or % sigconf
1857 \section*{#1}%
1858 \or % siggraph
1859 \section*{#1}%
1860 \or % sigplan
1861 \noindent\emph{\bfseries#1.}~%
1862 \or % sigchi
1863 \section*{#1}%
1864 \or % sigchi-a
1865 \section*{#1}%
1866 \fi
1867 \egroup}

```

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

```

1868 \def\@printtopmatter{%
1869 \ifx\@startPage\@empty
1870 \gdef\@startPage{1}%
1871 \else
1872 \setcounter{page}{\@startPage}%
1873 \fi
1874 \thispagestyle{firstpagestyle}%
1875 \noindent
1876 \ifcase\ACM@format@nr
1877 \relax % manuscript
1878 \box\mktitle@bx\par
1879 \or % acmsmall
1880 \box\mktitle@bx\par
1881 \or % acmlarge
1882 \box\mktitle@bx\par
1883 \or % acmtog
1884 \twocolumn[\box\mktitle@bx]%
1885 \or % sigconf
1886 \twocolumn[\box\mktitle@bx]%
1887 \or % siggraph
1888 \twocolumn[\box\mktitle@bx]%
1889 \or % sigplan
1890 \twocolumn[\box\mktitle@bx]%
1891 \or % sigchi
1892 \twocolumn[\box\mktitle@bx]%
1893 \or % sigchi-a
1894 \par\box\mktitle@bx\par\bigskip
1895 \if@ACM@badge
1896 \marginpar{\noindent
1897 \ifx\@acmBadgeL@image\@empty\else
1898 \href{\@acmBadgeL@url}{%
1899 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
1900 \hskip\@ACM@badge@skip

```

```

1901         \fi
1902         \ifx\@acmBadgeR@image\@empty\else
1903             \href{\@acmBadgeR@url}{%
1904                 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
1905             \fi}%
1906     \fi
1907 \fi
1908 }

\@mktitle The title of the article
1909 \def\@mktitle{%
1910     \ifcase\ACM@format@nr
1911     \relax % manuscript
1912         \@mktitle@i
1913     \or % acmsmall
1914         \@mktitle@i
1915     \or % acmlarge
1916         \@mktitle@i
1917     \or % acmtog
1918         \@mktitle@i
1919     \or % sigconf
1920         \@mktitle@iii
1921     \or % siggraph
1922         \@mktitle@iii
1923     \or % sigplan
1924         \@mktitle@iii
1925     \or % sigchi
1926         \@mktitle@iii
1927     \or % sigchi-a
1928         \@mktitle@iv
1929     \fi
1930 }

\@titlefont The font to typeset the title
1931 \def\@titlefont{%
1932     \ifcase\ACM@format@nr
1933     \relax % manuscript
1934         \LARGE\sffamily\bfseries
1935     \or % acmsmall
1936         \LARGE\sffamily\bfseries
1937     \or % acmlarge
1938         \LARGE\sffamily\bfseries
1939     \or % acmtog
1940         \Huge\sffamily
1941     \or % sigconf
1942         \Huge\sffamily\bfseries
1943     \or % siggraph
1944         \Huge\sffamily\bfseries
1945     \or % sigplan
1946         \Huge\bfseries

```

```

1947 \or % sigchi
1948 \Huge\sffamily\bfseries
1949 \or % sigchi-a
1950 \Huge\bfseries
1951 \fi}

\@subtitlefont The font to typeset the subtitle
1952 \def\@subtitlefont{\normalsize
1953 \ifcase\ACM@format@nr
1954 \relax % manuscript
1955 \mdseries
1956 \or % acmsmall
1957 \mdseries
1958 \or % acmlarge
1959 \mdseries
1960 \or % acmtog
1961 \LARGE
1962 \or % sigconf
1963 \LARGE\mdseries
1964 \or % siggraph
1965 \LARGE\mdseries
1966 \or % sigplan
1967 \LARGE\mdseries
1968 \or % sigchi
1969 \LARGE\mdseries
1970 \or % sigchi-a
1971 \mdseries
1972 \fi}

\@mktitle@i The version of \mktitle for most journals
1973 \def\@mktitle@i{\hsize=\textwidth
1974 \@ACM@title@width=\hsize
1975 \ifx\@acmBadgeL@image\@empty\else
1976 \advance\@ACM@title@width by -\@ACM@badge@width
1977 \advance\@ACM@title@width by -\@ACM@badge@skip
1978 \fi
1979 \ifx\@acmBadgeR@image\@empty\else
1980 \advance\@ACM@title@width by -\@ACM@badge@width
1981 \advance\@ACM@title@width by -\@ACM@badge@skip
1982 \fi
1983 \setbox\mktitle@bx=\vbox{\noindent\@titlefont
1984 \ifx\@acmBadgeL@image\@empty\else
1985 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
1986 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
1987 \hskip\@ACM@badge@skip
1988 \fi
1989 \parbox[t]{\@ACM@title@width}{\raggedright
1990 \@titlefont\noindent
1991 \@title
1992 \ifx\@subtitle\@empty\else

```

```

1993     \par\noindent{\@subtitlefont\@subtitle}
1994 \fi}%
1995 \ifx\@acmBadgeR@image\@empty\else
1996     \hskip\@ACM@badge@skip
1997     \raisebox{-.5\baselineskip}{\z@}{\z@}{\href{\@acmBadgeR@url}{%
1998         \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
1999 \fi
2000 \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. Note that since the title is cen-
tered, we leave space for the left badge even if only the right badge is defined.
2001 \def\@mkttitle@iii{\hsize=\textwidth
2002     \setbox\mkttitle@bx=\vbox{\@titlefont\centering
2003         \@ACM@title@width=\hsize
2004         \if@ACM@badge
2005             \advance\@ACM@title@width by -2\@ACM@badge@width
2006             \advance\@ACM@title@width by -2\@ACM@badge@skip
2007             \parbox[b]{\@ACM@badge@width}{\strut
2008                 \ifx\@acmBadgeL@image\@empty\else
2009                     \raisebox{-.5\baselineskip}{\z@}{\z@}{\href{\@acmBadgeL@url}{%
2010                         \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
2011                 \fi}%
2012             \hskip\@ACM@badge@skip
2013         \fi
2014         \parbox[t]{\@ACM@title@width}{\centering\@titlefont
2015             \@title
2016             \ifx\@subtitle\@empty\else
2017                 \par\noindent{\@subtitlefont\@subtitle}
2018             \fi
2019         }%
2020         \if@ACM@badge
2021             \hskip\@ACM@badge@skip
2022             \parbox[b]{\@ACM@badge@width}{\strut
2023                 \ifx\@acmBadgeR@image\@empty\else
2024                     \raisebox{-.5\baselineskip}{\z@}{\z@}{\href{\@acmBadgeR@url}{%
2025                         \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
2026                 \fi}%
2027             \fi
2028         \par\bigskip}}%

\@mkttitle@iv The version of \@mkttitle for sigchi-a
2029 \def\@mkttitle@iv{\hsize=\textwidth
2030     \setbox\mkttitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
2031         \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
2032         \noindent\@title
2033         \ifx\@subtitle\@empty\else
2034             \par\noindent\@subtitlefont\@subtitle

```



```

2035     \fi
2036     \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.

```

2037 \newbox\@ACM@commabox
2038 \def\@ACM@addtoaddress#1{%
2039   \ifvmode\else
2040     \if@ACM@affiliation@obeypunctuation\else
2041       \setbox\@ACM@commabox=\hbox{, }%
2042       \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
2043     \fi\fi
2044   #1}
```

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

```

\city 2045 \def\streetaddress#1{\unskip\ignorespaces}
\state 2046 \def\postcode#1{\unskip\ignorespaces}
\postcode 2047 \if@ACM@journal
\country 2048 \def\position#1{\unskip\ignorespaces}
2049 \def\institution#1{\unskip~#1\ignorespaces}
2050 \def\city#1{\unskip\ignorespaces}
2051 \def\state#1{\unskip\ignorespaces}
2052 \newcommand\department[2][0]{\unskip\ignorespaces}
2053 \def\country#1{\if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
2054 \else
2055 \def\position#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
2056 \def\institution#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
2057 \newcommand\department[2][0]{\if@ACM@affiliation@obeypunctuation
2058   #2\else#2\par\fi}%
2059 % \def\streetaddress#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
2060 \let\city\@ACM@addtoaddress
2061 \let\state\@ACM@addtoaddress
2062 % \def\postcode#1{\if@ACM@affiliation@obeypunctuation#1\else\unskip\space#1\fi}%
2063 \let\country\@ACM@addtoaddress
2064 \fi
```

`\@mkauthors` Typesetting the authors

```

2065 \def\@mkauthors{\begingroup
2066   \hsize=\textwidth
2067   \ifcase\ACM@format@nr
```

```

2068 \relax % manuscript
2069 \mkauthors@i
2070 \or % acmsmall
2071 \mkauthors@i
2072 \or % acmlarge
2073 \mkauthors@i
2074 \or % acmtog
2075 \mkauthors@i
2076 \or % sigconf
2077 \mkauthors@iii
2078 \or % siggraph
2079 \mkauthors@iii
2080 \or % sigplan
2081 \mkauthors@iii
2082 \or % sigchi
2083 \mkauthors@iii
2084 \or % sigchi-a
2085 \mkauthors@iv
2086 \fi
2087 \endgroup
2088 }

```

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

```

2089 \def\@authorfont{\Large\sffamily}

```

`\@affiliationfont` Font for affiliations

```

2090 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

2091 \ifcase\ACM@format@nr
2092 \relax % manuscript
2093 \or % acmsmall
2094 \def\@authorfont{\large\sffamily}
2095 \def\@affiliationfont{\small\normalfont}
2096 \or % acmlarge
2097 \or % acmtog
2098 \def\@authorfont{\LARGE\sffamily}
2099 \def\@affiliationfont{\large}
2100 \or % sigconf
2101 \def\@authorfont{\LARGE}
2102 \def\@affiliationfont{\large}
2103 \or % siggraph
2104 \def\@authorfont{\normalsize\normalfont}
2105 \def\@affiliationfont{\normalsize\normalfont}
2106 \or % sigplan
2107 \def\@authorfont{\Large\normalfont}
2108 \def\@affiliationfont{\normalsize\normalfont}
2109 \or % sigchi
2110 \def\@authorfont{\bfseries}

```

```

2111 \def\@affiliationfont{\mdseries}
2112 \or % sigchi-a
2113 \def\@authorfont{\bfseries}
2114 \def\@affiliationfont{\mdseries}
2115 \fi

```

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

```

2116 \def\@typeset@author@line{%
2117 \andify\@currentauthors\par\noindent
2118 \@currentauthors\def\@currentauthors{}%
2119 \ifx\@currentaffiliations\@empty\else
2120 \andify\@currentaffiliations
2121 \unskip, {\@currentaffiliations}\par
2122 \fi
2123 \def\@currentaffiliations{}}

```

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

```

2124 \def\@mkauthors@i{%
2125 \def\@currentauthors{}%
2126 \def\@currentaffiliations{}%
2127 \global\let\and\@typeset@author@line
2128 \def\@author##1{%
2129 \ifx\@currentauthors\@empty
2130 \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
2131 \else
2132 \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
2133 \fi
2134 \gdef\and{}}%
2135 \def\email##1##2{%
2136 \def\affiliation##1##2{%
2137 \def\@tempa{##2}\ifx\@tempa\@empty\else
2138 \ifx\@currentaffiliations\@empty
2139 \gdef\@currentaffiliations{%
2140 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2141 \setkeys{@ACM@affiliation@}{##1}%
2142 \@affiliationfont##2}%
2143 \else
2144 \g@addto@macro{\@currentaffiliations}{\and
2145 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2146 \setkeys{@ACM@affiliation@}{##1}##2}%
2147 \fi
2148 \fi
2149 \global\let\and\@typeset@author@line}%
2150 \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par\medskip
2151 \noindent\addresses\@typeset@author@line
2152 \par\medskip}%
2153 }

```

`\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

2154 `\newbox\author@bx`

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

2155 `\newdimen\author@bx@wd`

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

2156 `\newskip\author@bx@sep`

2157 `\author@bx@sep=1pc\relax`

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

2158 `\def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd`

2159 `\def\and{\par}\normalbaselines`

2160 `\global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi`

2161 `\@authorfont\@currentauthors\par\@affiliationfont`

2162 `\@currentaffiliation}\egroup`

2163 `\box\author@bx\hspace{\author@bx@sep}}%`

2164 `\gdef\@currentauthors{}}%`

2165 `\gdef\@currentaffiliation{}}%`

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

2166 `\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 $(\texttt{\textbackslash textwidth} - \texttt{\textbackslash author@bx@sep})/N - \texttt{\textbackslash author@bx@sep}$, where N is the number of boxes per row.

2167 `\author@bx@wd=\textwidth\relax`

2168 `\advance\author@bx@wd by -\author@bx@sep\relax`

2169 `\ifnum\@ACM@authorsperrrow>0\relax`

2170 `\divide\author@bx@wd by \@ACM@authorsperrrow\relax`

2171 `\else`

2172 `\ifcase\num@authorgroups`

2173 `\relax % 0?`

2174 `\or % 1=one author per row`

2175 `\or % 2=two authors per row`

2176 `\divide\author@bx@wd by \num@authorgroups\relax`

2177 `\or % 3=three authors per row`

2178 `\divide\author@bx@wd by \num@authorgroups\relax`

2179 `\or % 4=two authors per row (!)`

2180 `\divide\author@bx@wd by 2\relax`

2181 `\else % three authors per row`

2182 `\divide\author@bx@wd by 3\relax`

2183 `\fi`

2184 `\fi`

2185 `\advance\author@bx@wd by -\author@bx@sep\relax`

Now, parsing of \addresses:

```

2186 \gdef\@currentauthors{}%
2187 \gdef\@currentaffiliation{}%
2188 \def\@author##1{\ifx\@currentauthors\@empty
2189   \gdef\@currentauthors{\par##1}%
2190 \else
2191   \g@addto@macro\@currentauthors{\par##1}%
2192 \fi
2193 \gdef\and{}}%
2194 \def\email##1##2{\ifx\@currentaffiliation\@empty
2195   \gdef\@currentaffiliation{\bgroup
2196     \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2197 \else
2198   \g@addto@macro\@currentaffiliation{\par\bgroup
2199     \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2200 \fi}%
2201 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2202   \gdef\@currentaffiliation{%
2203     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2204     \setkeys{@ACM@affiliation@}{##1}##2}%
2205 \else
2206   \g@addto@macro\@currentaffiliation{\par
2207     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2208     \setkeys{@ACM@affiliation@}{##1}##2}%
2209 \fi
2210 \global\let\and\@typeset@author@bx
2211 }%

```

Actual typesetting is done by the \and macro:

```

2212 \hsize=\textwidth
2213 \global\setbox\mktitle@bx=\vbox{\noindent
2214   \box\mktitle@bx\par\medskip\leavevmode
2215   \lineskip=1pc\relax\centering\hspace*{-1em}}%
2216 \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.

```

2217 \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.

```

2218 \author@bx@wd=\columnwidth\relax
2219 \advance\author@bx@wd by -\author@bx@sep\relax
2220 \ifnum\@ACM@authorsperrrow>0\relax
2221   \divide\author@bx@wd by \@ACM@authorsperrrow\relax
2222 \else
2223   \ifcase\num@authorgroups
2224     \relax % 0?

```

```

2225 \or % 1=one author per row
2226 \else % 2=two authors per row
2227 \divide\author@bx@wd by 2\relax
2228 \fi
2229 \fi
2230 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2231 \gdef\@currentauthors{}%
2232 \gdef\@currentaffiliation{}%
2233 \def\@author##1{\ifx\@currentauthors\@empty
2234 \gdef\@currentauthors{\par##1}%
2235 \else
2236 \g@addto@macro\@currentauthors{\par##1}%
2237 \fi
2238 \gdef\and{}}%
2239 \def\email##1##2{\ifx\@currentaffiliation\@empty
2240 \gdef\@currentaffiliation{\nolinkurl{##2}}%
2241 \else
2242 \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2243 \fi}%
2244 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2245 \gdef\@currentaffiliation{%
2246 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2247 \setkeys{@ACM@affiliation@}{##1}##2}%
2248 \else
2249 \g@addto@macro\@currentaffiliation{\par
2250 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2251 \setkeys{@ACM@affiliation@}{##1}##2}%
2252 \fi
2253 \global\let\and\@typeset@author@bx}%
2254 %

```

Actual typesetting is done by the \and macro

```

2255 \bgroup\hsize=\columnwidth
2256 \par\raggedright\leftskip=\z@
2257 \lineskip=1pc\noindent
2258 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

\mkauthorsaddresses Typesetting authors' addresses in the footnote style

```

2259 \def\mkauthorsaddresses{%
2260 \ifnum\num@authors>1\relax
2261 Authors' \else Author's \fi
2262 \ifnum\num@authorgroups>1\relax
2263 addresses: \else address: \fi
2264 \bgroup
2265 \def\streetaddress##1{\unskip, ##1}%
2266 \def\postcode##1{\unskip, ##1}%
2267 \def\position##1{\unskip\ignorespaces}%
2268 \def\institution##1{\unskip, ##1}%

```

```

2269 \def\city##1{\unskip, ##1}%
2270 \def\state##1{\unskip, ##1}%
2271 \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2272 \def\country##1{\unskip, ##1}%
2273 \def\and{\unskip; }%
2274 \def\@author##1{##1}%
2275 \def\email##1##2{\unskip, \nolinkurl{##2}}%
2276 \addresses
2277 \egroup

2278 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
2279 \ifx\@authorsaddresses\@empty
2280 \ClassWarningNoLine{\@classname}{Authors'
2281 addresses are mandatory for ACM journals}%
2282 \fi\fi\fi}

```

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

```
2283 \def\@setaddresses{}
```

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

```
2284 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}
```

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

```
2285 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}
```

`\@mkteasers` Typesetting the teasers

```

2286 \def\@mkteasers{%
2287 \ifx\@teaserfigures\@empty\else
2288 \def\@teaser##1{\par\bigskip\bgroup
2289 \captionsetup{type=figure}##1\egroup\par}
2290 \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par
2291 \noindent\@Description@presentfalse
2292 \@teaserfigures\par\if@Description@present\else
2293 \global\@undescrbed@imagestrue
2294 \ClassWarning{\@classname}{A possible image without
2295 description}\fi
2296 \medskip}%
2297 \fi}

```

`\@mkabstract` Typesetting the abstract

```

2298 \def\@mkabstract{\bgroup
2299 \ifx\@abstract\@empty\else
2300 {\phantomsection\addcontentsline{toc}{section}{Abstract}}%
2301 \if@ACM@journal
2302 \everypar{\setbox\z@=\lastbox\everypar{}}\small
2303 \else
2304 \section*{\abstractname}%
2305 \fi
2306 \ignorespaces\@abstract\par}%
2307 \fi\egroup}

```

\mkbibcitation Print the bibcitation format

```

2308 \def\mkbibcitation{\bgroup
2309   \let\@vspace\@vspace@orig
2310   \let\@vspacer\@vspacer@orig
2311   \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2312   \def\footnotemark{}%
2313   \def\{\unskip\} \ignorespaces}%
2314   \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2315     inside a \string\title{} or \string\author{} command! Use
2316     \string\titlenote{} or \string\authornote{} instead!}}%
2317   \def\@article@string{\ifx\@acmArticle\@empty{\ }else,
2318     Article~\@acmArticle\ \fi}%
2319   \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2320   \noindent\bgroup
2321     \def\{\unskip\}, \ignorespaces\authors\egroup. \@acmYear. \@title
2322     \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2323     \if@ACM@nonacm\else
2324       % The 'nonacm' option disables 'printacmref' by default,
2325       % and the present \mkbibcitation definition is never used
2326       % in this case. The conditional remains useful if the user
2327       % explicitly sets \settopmatter{printacmref=true}.
2328       \if@ACM@journal@bibstrip
2329         \textit{\@journalNameShort}
2330         \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2331         \ref{TotPages}~\@pages@word.
2332       \else
2333         In \textit{\@acmBooktitle}%
2334         \ifx\@acmEditors\@empty\textit{.}\else
2335           \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
2336         \fi\
2337         ACM, New York, NY, USA%
2338         \@article@string\unskip, \ref{TotPages}~\@pages@word.
2339       \fi
2340     \fi
2341     \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2342   \par\egroup}

```

\@printendtopmatter End the top matter

```

2343 \def\@printendtopmatter{\bgroup
2344   \let\@vspace\@vspace@orig
2345   \let\@vspacer\@vspacer@orig
2346   \par\bigskip
2347   \egroup}

```

\@setthanks We redefine \setthanks using \long

```

2348 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}

```

\@setauthorsaddresses

```

2349 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}

```


3.16 Headers and Footers

We use fancyhdr for our headers and footers:

```
2350 \RequirePackage{fancyhdr}
```

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

```
2351 \let\ACM@ps@plain\ps@plain
2352 \let\ACM@ps@myheadings\ps@myheadings
2353 \let\ACM@ps@headings\ps@headings
2354 \def\ACM@restore@pagestyle{%
2355   \let\ps@plain\ACM@ps@plain
2356   \let\ps@myheadings\ACM@ps@myheadings
2357   \let\ps@headings\ACM@ps@headings}
2358 \AtBeginDocument{\ACM@restore@pagestyle}
```

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

```
2359 \if@ACM@review
2360   \newsavebox{\ACM@linecount@bx}
2361   \newlength\ACM@linecount@bxht
2362   \newcount\ACM@linecount
2363   \ACM@linecount\@ne\relax
2364   \def\ACM@mk@linecount{%
2365     \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
2366       \normalsize
2367       \setlength{\ACM@linecount@bxht}{0pt}%
2368       \loop{\color{red}\scriptsize\the\ACM@linecount}\%
2369       \global\advance\ACM@linecount by \@ne
2370       \addtolength{\ACM@linecount@bxht}{\baselineskip}%
2371       \ifdim\ACM@linecount@bxht<\textheight\repeat
2372       {\color{red}\scriptsize\the\ACM@linecount}\hfill
2373       \global\advance\ACM@linecount by \@ne}}
2374 \fi
```

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

```
2375 \def\ACM@linecountL{%
2376   \if@ACM@review
2377     \ACM@mk@linecount
2378     \begin{picture}(0,0)%
2379       \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2380     \end{picture}%
2381 \fi}
```

`\ACM@linecountR` How to display the box on the right

```
2382 \def\ACM@linecountR{%
2383   \if@ACM@review
2384     \ACM@mk@linecount
2385     \begin{picture}(0,0)%
2386       \put(20,-22){\usebox{\ACM@linecount@bx}}%
```

```

2387 \end{picture}%
2388 \fi}

```

\ACM@timestamp The timestamp system

```

2389 \if@ACM@timestamp
2390 % Subtracting 30 from \time gives us the effect of rounding down despite
2391 % \numexpr rounding to nearest
2392 \newcounter{ACM@time@hours}
2393 \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
2394 \newcounter{ACM@time@minutes}
2395 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
2396 \newcommand\ACM@timestamp{%
2397   \footnotesize%
2398   \ifx\@acmSubmissionID\@empty\relax\else
2399   Submission ID: \@acmSubmissionID.{ }%
2400   \fi
2401   \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
2402   \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
2403   Page \thepage\ of \@startPage--\pageref*{TotPages}.%
2404 }
2405 \fi

```

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

```

2406 \def\@shortauthors{%
2407   \if@ACM@anonymous
2408     Anon.
2409     \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
2410   \else\shortauthors\fi}

```

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

```

2411 \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

```

2412 \AtBeginDocument{%
2413 \fancypagestyle{standardpagestyle}{%
2414   \fancyhf{}%
2415   \renewcommand{\headrulewidth}{\z@}%
2416   \renewcommand{\footrulewidth}{\z@}%
2417   \def\@acmArticlePage{%
2418     \ifx\@acmArticle\empty%
2419     \if@ACM@printfolios\thepage\fi%
2420     \else%
2421     \@acmArticle\if@ACM@printfolios:\thepage\fi%
2422     \fi%
2423   }%
2424   \if@ACM@journal@bibstrip
2425     \ifcase\ACM@format@nr

```

```

2426 \relax % manuscript
2427 \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
2428 \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
2429 \fancyhead[RE]{\@shortauthors}%
2430 \fancyhead[LO]{\ACM@linecountL\shorttitle}%
2431 \if@ACM@nonacm\else%
2432 \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}%
2433 \fi%
2434 \or % acmsmall
2435 \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
2436 \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
2437 \fancyhead[RE]{\@headfootfont\@shortauthors}%
2438 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2439 \if@ACM@nonacm\else%
2440 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2441 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2442 \fi
2443 \or % acmlarge
2444 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2445 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2446 \fancyhead[LO]{\ACM@linecountL}%
2447 \fancyhead[RO]{\@headfootfont
2448 \shorttitle\quad\textbullet\quad\@acmArticlePage}%
2449 \if@ACM@nonacm\else%
2450 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2451 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2452 \fi
2453 \or % acmtog
2454 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2455 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2456 \fancyhead[LO]{\ACM@linecountL}%
2457 \fancyhead[RE]{\ACM@linecountR}%
2458 \fancyhead[RO]{\@headfootfont
2459 \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
2460 \if@ACM@nonacm\else%
2461 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2462 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2463 \fi
2464 \else % Proceedings
2465 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2466 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2467 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
2468 \if@ACM@nonacm\else%
2469 \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
2470 \acmConference@shortname,
2471 \acmConference@date, \acmConference@venue}%
2472 \fancyhead[RO]{\@headfootfont
2473 \acmConference@shortname,
2474 \acmConference@date, \acmConference@venue\ACM@linecountR}%
2475 \fi

```

```

2476 \fi
2477 \else % Proceedings
2478 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2479 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2480 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
2481 \if@ACM@nonacm\else%
2482 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2483 \acmConference@shortname,
2484 \acmConference@date, \acmConference@venue}%
2485 \fancyhead[RO]{\@headfootfont
2486 \acmConference@shortname,
2487 \acmConference@date, \acmConference@venue\ACM@linecountR}%
2488 \fi
2489 \fi
2490 \if@ACM@sigchiamode
2491 \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
2492 \fi
2493 \if@ACM@timestamp
2494 \fancyfoot[LO,RE]{\ACM@timestamp}
2495 \fi
2496 }%
2497 \pagestyle{standardpagestyle}
2498 }

\@folio@wd Folio blob width, height, offsets and max number
\@folio@ht 2499 \newdimen\@folio@wd
\@folio@voffset 2500 \@folio@wd=\z@
\@folio@max 2501 \newdimen\@folio@ht
2502 \@folio@ht=\z@
2503 \newdimen\@folio@voffset
2504 \@folio@voffset=\z@
2505 \def\@folio@max{1}
2506 \ifcase\ACM@format@nr
2507 \relax % manuscript
2508 \or % acmsmall
2509 \@folio@wd=45.75pt\relax
2510 \@folio@ht=1.25in\relax
2511 \@folio@voffset=.2in\relax
2512 \def\@folio@max{8}
2513 \or % acmlarge
2514 \@folio@wd=43.25pt\relax
2515 \@folio@ht=79pt\relax
2516 \@folio@voffset=.55in\relax
2517 \def\@folio@max{10}
2518 \fi

\@folioblob The macro to typeset the folio blob.
2519 \def\@folioblob{\@tempcnta=0\@acmArticleSeq\relax
2520 \ifnum\@tempcnta=0\relax\else

```

First, we calculate \@acmArticleSeq modulo \@folio@max

```

2521 \loop
2522   \ifnum\@tempcnta>\@folio@max\relax
2523   \advance\@tempcnta by - \@folio@max
2524 \repeat

2525 \advance\@tempcnta by -1\relax
2526 \@tempdima=\@folio@ht\relax
2527 \multiply\@tempdima by \the\@tempcnta\relax
2528 \advance\@tempdima by -\@folio@voffset\relax
2529 \begin{picture}(0,0)
2530 \makebox[\z@]{\raisebox{-\@tempdima}{%
2531   \rlap{%
2532     \raisebox{-0.45\@folio@ht}{\z@}[\z@]{%
2533       \rule{\@folio@wd}{\@folio@ht}}}%
2534   \parbox{\@folio@wd}{%
2535     \centering
2536     \textcolor{white}{\LARGE\sffamily\bfseries\@acmArticle}}}}
2537 \end{picture}\fi}
2538

```

firstpagestyle The page style for the first page only.

```

2539 \AtBeginDocument{%
2540 \fancypagestyle{firstpagestyle}{%
2541   \fancyhf{}%
2542   \renewcommand{\headrulewidth}{\z@}%
2543   \renewcommand{\footrulewidth}{\z@}%
2544   \if@ACM@journal@bibstrip
2545     \ifcase\ACM@format@nr
2546     \relax % manuscript
2547     \fancyhead[L]{\ACM@linecountL}%
2548     \fancyfoot[R0,LE]{\if@ACM@printfolios\small\thepage\fi}%
2549     \if@ACM@nonacm\else%
2550     \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
2551     \fi%
2552   \or % acmsmall
2553   \if@ACM@nonacm\else%
2554     \fancyfoot[R0,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2555       \@acmNumber, Article \@acmArticle. Publication date:
2556       \@acmPubDate.}%
2557   \fi%
2558   \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2559   \fancyhead[LO]{\ACM@linecountL}%
2560   \fancyhead[RO]{\@folioblob}%
2561   \fancyheadoffset[R0,LE]{0.6\@folio@wd}%
2562   \or % acmlarge
2563   \if@ACM@nonacm\else%
2564     \fancyfoot[R0,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2565       \@acmNumber, Article \@acmArticle. Publication date:
2566       \@acmPubDate.}%

```

```

2567 \fi%
2568 \fancyhead[RO]{\@folioblob}%
2569 \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2570 \fancyhead[LO]{\ACM@linecountL}%
2571 \fancyheadoffset[RO,LE]{1.4\@folio@wd}%
2572 \or % acmtog
2573 \if@ACM@nonacm\else%
2574 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2575 \@acmNumber, Article \@acmArticle. Publication date:
2576 \@acmPubDate.}%
2577 \fi%
2578 \fancyhead[L]{\ACM@linecountL}%
2579 \fancyhead[R]{\ACM@linecountR}%
2580 \else % Conference proceedings
2581 \fancyhead[L]{\ACM@linecountL}%
2582 \fancyhead[R]{\ACM@linecountR}%
2583 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2584 \fi
2585 \else
2586 \fancyhead[L]{\ACM@linecountL}%
2587 \fancyhead[R]{\ACM@linecountR}%
2588 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2589 \fi
2590 \if@ACM@timestamp
2591 \ifnum\ACM@format@nr=0\relax % Manuscript
2592 \fancyfoot[LO,RE]{\ACM@timestamp\quad
2593 \if@ACM@nonacm\else
2594 \footnotesize Manuscript submitted to ACM
2595 \fi}
2596 \else
2597 \fancyfoot[LO,RE]{\ACM@timestamp}
2598 \fi
2599 \fi
2600 }}

```

3.17 Sectioning

`\ACM@NAdjust` 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@NAdjust` 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`.

```

2601 \def\ACM@NRadjust#1{%
2602   \begingroup
2603   \expandafter\ifx\csname Sectionformat\endcsname\relax
2604     % do nothing when \Sectionformat is unknown
2605     \def\next{\endgroup #1}%
2606   \else
2607     \def\next{\endgroup
2608       \let\realSectionformat\Sectionformat
2609       \def\ACM@sect@format@{#1}%
2610       \let\Sectionformat\ACM@NR@adjustedSectionformat
2611     %% next lines added 2018-06-17 to ensure section number is styled
2612     \let\real@adddotafter\@adddotafter
2613     \let\@adddotafter\ACM@adddotafter
2614     #1{ }% imposes the styles, but nullifies \MakeUppercase
2615     \let\@adddotafter\real@adddotafter
2616   }%
2617 \fi \next
2618 }

```

`\ACM@NR@adjustedSectionformat`

```

2619 \def\ACM@NR@adjustedSectionformat#1#2{%
2620   \realSectionformat{\ACM@sect@format{#1}}{#2}%
2621   \let\Sectionformat\realSectionformat}
2622 \DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
2623 \def\ACM@sect@format@null#1{#1}
2624 \let\ACM@sect@format@\ACM@sect@format@null
2625 \AtBeginDocument{%
2626   \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
2627     \let\LTX@adddotafter\@adddotafter
2628   \fi
2629 }

```

`\ACM@adddotafter`

```

2630 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}

```

Sectioning is different for different levels

```

2631 \renewcommand\section{\@startsection{section}{1}{\z@}%
2632   {-0.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%

```

```

2633 {.25\baselineskip}%
2634 {\ACM@NRadjust\@secfont}}
2635 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
2636 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2637 {.25\baselineskip}%
2638 {\ACM@NRadjust\@subsecfont}}
2639 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
2640 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2641 {-3.5\p@}%
2642 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}}
2643 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
2644 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2645 {-3.5\p@}%
2646 {\ACM@NRadjust{\@parfont\@adddotafter}}}}
2647
2648 \renewcommand\part{\@startsection{part}{9}{\z@}%
2649 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
2650 {4\p@}%
2651 {\ACM@NRadjust\@parfont}}

```

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

```

2652 \def\section@raggedright{\@rightskip\@flushglue
2653 \rightskip\@rightskip
2654 \leftskip\z@skip
2655 \parindent\z@}

```

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

```

\@subsecfont 2656 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
\@subsubsecfont 2657 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 2658 \def\@subsubsecfont{\sffamily\itshape}
2659 \def\@parfont{\itshape}
2660 \setcounter{secnumdepth}{3}
2661 \ifcase\ACM@format@nr
2662 \relax % manuscript
2663 \or % acmsmall
2664 \or % acmlarge
2665 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
2666 \def\@subsecfont{\sffamily\large\section@raggedright}
2667 \or % acmtog
2668 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
2669 \def\@subsecfont{\sffamily\large\section@raggedright}
2670 \or % sigconf
2671 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
2672 \def\@subsecfont{\bfseries\Large\section@raggedright}
2673 \or % siggraph
2674 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
2675 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
2676 \or % sigplan
2677 \def\@secfont{\bfseries\Large\section@raggedright}
2678 \def\@subsecfont{\bfseries\section@raggedright}

```



```

2679 \def\@subsubsecfont{\bfseries\section@raggedright}
2680 \def\@parfont{\bfseries\itshape}
2681 \def\@subparfont{\itshape}
2682 \or % sigchi
2683 \setcounter{secnumdepth}{1}
2684 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
2685 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
2686 \or % sigchi-a
2687 \setcounter{secnumdepth}{0}
2688 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
2689 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
2690 \fi

```

`\@adddotafter` Add punctuation after a sectioning command

```
2691 \def\@adddotafter#1{#1\@addpunct{.}}
```

`\@addspaceafter` Add space after a sectioning command

```
2692 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

3.18 TOC lists

`\@dotsep` Related to the `\tableofcontents` are all the horizontal fillers. Base L^AT_EX 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.

```
2693 \providecommand*\@dotsep{4.5}
```

3.19 Theorems

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

```
2694 \def\@acmplainbodyfont{\itshape}
```

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

```
2695 \def\@acmplainindent{\parindent}
```

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

```
2696 \def\@acmplainheadfont{\scshape}
```

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

```
2697 \def\@acmplainnotefont{\@empty}
```

Customization of the `acmplain` theorem style:

```

2698 \ifcase\ACM@format@nr
2699 \relax % manuscript
2700 \or % acmsmall
2701 \or % acmlarge
2702 \or % acmtog
2703 \or % sigconf

```

```

2704 \or % siggraph
2705 \or % sigplan
2706 \def\@acmplainbodyfont{\itshape}
2707 \def\@acmplainindent{\z@}
2708 \def\@acmplainheadfont{\bfseries}
2709 \def\@acmplainnotefont{\normalfont}
2710 \or % sigchi
2711 \or % sigchi-a
2712 \fi

```

acmplain The acmplain theorem style

```

2713 \newtheoremstyle{acmplain}%
2714 {.5\baselineskip\@plus.2\baselineskip
2715 \@minus.2\baselineskip}% space above
2716 {.5\baselineskip\@plus.2\baselineskip
2717 \@minus.2\baselineskip}% space below
2718 {\@acmplainbodyfont}% body font
2719 {\@acmplainindent}% indent amount
2720 {\@acmplainheadfont}% head font
2721 {.}% punctuation after head
2722 {.5em}% spacing after head
2723 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont{#3}}}}% head spec

```

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

```
2724 \def\@acmdefinitionbodyfont{\normalfont}
```

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

```
2725 \def\@acmdefinitionindent{\parindent}
```

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

```
2726 \def\@acmdefinitionheadfont{\itshape}
```

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

```
2727 \def\@acmdefinitionnotefont{\@empty}
```

Customization of the acmdefinition theorem style:

```

2728 \ifcase\ACM@format@nr
2729 \relax % manuscript
2730 \or % acmsmall
2731 \or % acmlarge
2732 \or % acmtog
2733 \or % sigconf
2734 \or % siggraph
2735 \or % sigplan
2736 \def\@acmdefinitionbodyfont{\normalfont}
2737 \def\@acmdefinitionindent{\z@}
2738 \def\@acmdefinitionheadfont{\bfseries}
2739 \def\@acmdefinitionnotefont{\normalfont}
2740 \or % sigchi

```

```

2741 \or % sigchi-a
2742 \fi

```

acmdefinition The acmdefinition theorem style

```

2743 \newtheoremstyle{acmdefinition}%
2744   {.5\baselineskip\@plus.2\baselineskip
2745     \@minus.2\baselineskip}% space above
2746   {.5\baselineskip\@plus.2\baselineskip
2747     \@minus.2\baselineskip}% space below
2748   {\@acmdefinitionbodyfont}% body font
2749   {\@acmdefinitionindent}% indent amount
2750   {\@acmdefinitionheadfont}% head font
2751   {.}% punctuation after head
2752   {.5em}% spacing after head
2753   {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont{#3}}}}% head spec

```

Make **acmplain** the default theorem style.

```

2754 \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.

```

2755 \AtEndPreamble{%
2756   \if@ACM@acmthm
2757     \theoremstyle{acmplain}
2758     \@ifundefined{theorem}{%
2759       \newtheorem{theorem}{Theorem}[section]
2760     }{}
2761     \@ifundefined{conjecture}{%
2762       \newtheorem{conjecture}[theorem]{Conjecture}
2763     }{}
2764     \@ifundefined{proposition}{%
2765       \newtheorem{proposition}[theorem]{Proposition}
2766     }{}
2767     \@ifundefined{lemma}{%
2768       \newtheorem{lemma}[theorem]{Lemma}
2769     }{}
2770     \@ifundefined{corollary}{%
2771       \newtheorem{corollary}[theorem]{Corollary}
2772     }{}
2773     \theoremstyle{acmdefinition}
2774     \@ifundefined{example}{%
2775       \newtheorem{example}[theorem]{Example}
2776     }{}

```

```

2777 \@ifundefined{definition}{%
2778 \newtheorem{definition}[theorem]{Definition}
2779 }{}
2780 \fi
2781 \theoremstyle{acmplain}
2782 }

\@proofnamefont The font to typeset the proof name.
2783 \def\@proofnamefont{\scshape}

\@proofindent Whether or not to indent proofs.
2784 \def\@proofindent{\indent}

Customization of the proof environment.
2785 \ifcase\ACM@format@nr
2786 \relax % manuscript
2787 \or % acmsmall
2788 \or % acmlarge
2789 \or % acmtog
2790 \or % sigconf
2791 \or % siggraph
2792 \or % sigplan
2793 \def\@proofnamefont{\itshape}
2794 \def\@proofindent{\noindent}
2795 \or % sigchi
2796 \or % sigchi-a
2797 \fi

proof We want some customization of the proof environment.
2798 \renewenvironment{proof}[1][\proofname]{\par
2799 \pushQED{\qed}%
2800 \normalfont \topsep6\p@\@plus6\p@\relax
2801 \trivlist
2802 \item[\@proofindent\hskip\labelsep
2803 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
2804 }{%
2805 \popQED\endtrivlist\@endpfalse
2806 }

```

3.20 Balancing columns

We need balancing only if the user did not disable it, and we use a two column format

```

2807 \AtEndPreamble{%
2808 \if@ACM@balance
2809 \ifcase\ACM@format@nr
2810 \relax % manuscript
2811 \global\@ACM@balancefalse
2812 \or % acmsmall

```

```

2813         \global\@ACM@balancefalse
2814     \or % acmlarge
2815         \global\@ACM@balancefalse
2816     \or % acmtog
2817         \RequirePackage{balance}%
2818     \or % sigconf
2819         \RequirePackage{balance}%
2820     \or % siggraph
2821         \RequirePackage{balance}%
2822     \or % sigplan
2823         \RequirePackage{balance}%
2824     \or % sigchi
2825         \RequirePackage{balance}%
2826     \or % sigchi-a
2827         \global\@ACM@balancefalse
2828 \fi
2829 \fi
2830 }
2831 \AtEndDocument{%
2832 \if@ACM@balance
2833 \if@twocolumn
2834 \balance
2835 \fi\fi}

```

3.21 Acknowledgments

`\acksname`

```
2836 \newcommand\acksname{Acknowledgments}
```

`\acks` This is a comment-like structure

```

2837 \specialcomment{acks}{%
2838 \begingroup
2839 \section*{\acksname}
2840 \phantomsection\addcontentsline{toc}{section}{\acksname}
2841 }{%
2842 \endgroup
2843 }

```

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

```
2844 \def\grantsponsor#1#2#3{#2}
```

`\grantnum`

```

2845 \newcommand\grantnum[3][ ]{#3%
2846 \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}

```

3.22 Conditional typesetting

We use the `comment` package for conditional typesetting:

```

2847 \AtEndPreamble{%
2848 \if@ACM@screen
2849   \includecomment{screenonly}
2850   \excludecomment{printonly}
2851 \else
2852   \excludecomment{screenonly}
2853   \includecomment{printonly}
2854 \fi
2855 \if@ACM@anonymous
2856   \excludecomment{anonsuppress}
2857   \excludecomment{acks}
2858 \else
2859   \includecomment{anonsuppress}
2860 \fi}

```

3.23 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’ (see <http://arxiv.org/hypertex/bibstyles/>).

```

2861 \newcommand\showeprint[2][arxiv]{%
2862   \def\@tempa{#1}%
2863   \ifx\@tempa\empty\def\@tempa{arxiv}\fi
2864   \def\@tempb{arxiv}%
2865   \ifx\@tempa\@tempb
2866     arXiv:\href{http://arxiv.org/abs/#2}{#2}\else arXiv:#2%
2867   \fi}

```

3.24 End of Class

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

```

2868 \let\@vspace@orig=\@vspace
2869 \let\@vspacer@orig=\@vspacer
2870 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
2871   only be used to provide space above/below surrounding
2872   objects}}{\fi}
2873 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
2874   only be used to provide space above/below surrounding
2875   objects}}{\fi}

```

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

```

2876 \let\ACM@origbaselinestretch\baselinestretch
2877 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
2878   \ClassError{\@classname}{An attempt to redefine
2879     \string\baselinestretch\space detected. Please do not do this for
2880     ACM submissions!}\fi}

2881 \normalsize\normalfont\frenchspacing
2882 \</class>

```