

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

Boris Veytsman[†]

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Abstract

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

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[†]borisv@lk.net, boris@varphi.com

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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, Dirk Beyer, Joachim Breitner, Benjamin Byholm, Nils Anders Danielsson, Michael Ekstrand, Matthew Fluet, Paolo G. Giraruso, Ben Greenman, Jamie Davis, Luis Leiva, Ben Liblit, 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, David Shamma, Gabriel Scherer, Stephen Spencer, 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 customizatop 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 since this package uses a number of relatively recent packages, especially the ones related to fonts.

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

¹<http://www.acm.org/>

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

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

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

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

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

- *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 1. 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 2. The words `=true` can be omitted when setting a Boolean option, so instead of `screen=true` one can write just `screen`, for example,

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

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

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

The option `natbib` is used when the corresponding BibTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.11.

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.

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, DTRAP, JACM, JDIQ, JEA, JERIC, JETC, PACMCGIT, PACMHCI, PACMPL, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TDSCI, TEAC, TECS, THRI, TIIS, TIOT, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPS, TOS, TOSEM, TOSN, TRET, TSAS, TSC, TSLP and TWEB, including special issues.
<code>acmlarge</code>	Large single-column format. Used for 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 `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.

2.3 Top matter

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

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

Table 2: Boolean options

Option	Default	Meaning
review	false	A review version: lines are numbered and hyperlinks are colored
screen	see text	A screen version: hyperlinks are colored
natbib	true	Whether to use the natbib package (see Section 2.11)
anonymous	false	Whether to make author(s) anonymous
authorversion	false	Whether to generate a special version for the authors' personal use or posting (see Section 2.3)
nonacm	false	Use the class typesetting options for a non-ACM document, which will not include the conference/journal header and footers or permission statements
timestamp	false	Whether to put a time stamp in the footer of each page
authordraft	false	Whether author's-draft mode is enabled
acmthm	true	Whether to define theorem-like environments, see Section 2.7
balance	true	Whether to balance the last page in two column mode

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

```
\acmJournal{TOMS}
```

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

It is expected that this command is inserted by the author of the manuscript when she decides to which journal to submit the manuscript.

`\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)}
```

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

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

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

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

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

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

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

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

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

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

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

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

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

```

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

```

Similarly you can repeat the `\email` command.

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

```

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

```

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

```

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

```

However, this format is not generally recommended.

`\additionalaffiliation`

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

```

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

```

```

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

```

Here Trovato and Tobin share their affiliation with the Institute for Clarity in Documentation, but only Ben Trovato is affiliated with The 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 \LaTeX), we allow `\thanks` only *outside* of the commands `\title` and `\author`. This command is obsolete and should *not* be used in most cases. Do not list your acknowledgments or grant sponsors here. Put this information in the `acks` environment (see Section 2.10).

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

```

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

```

You can *suppress* printing authors' addresses by setting them to an empty string: `\authorsaddresses{}`.

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

```

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

```

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

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

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

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

`\acmVolume` The macros `\acmVolume`, `\acmNumber`, `\acmArticle`, `\acmYear` and `\acmMonth` are 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
\acmNumber
\acmArticle
\acmYear
\acmMonth
\acmVolume{9}
\acmNumber{4}
\acmArticle{39}
\acmYear{2010}
\acmMonth{3}
```

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

`\acmArticleSeq` The articles in the same issue of a journal have a *sequence number*. 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 evaluation
`\acmBadgeL` 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 Classification
`\ccsdesc` Scheme (CCS). CCS codes are used both in the typeset version of the publications *and* in the metadata in various databases. Therefore you need to provide both TeX commands and XML metadata with the paper.

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

```
\begin{CCSXML}  
<ccs2012>  
<concept>
```

```

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

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

```

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

`\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 3.

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

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.

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

`\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 \LaTeX .

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

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

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

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

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

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

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.

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

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

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

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

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

2.4 Algorithms

There are now several good packages for typesetting algorithms [3, 4, 5], 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` [6] and follow its main principles of typography with respect to tables:

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

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

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

```

\begin{table}
\caption{Simulation Configuration}
\label{tab:conf}
\begin{minipage}{\columnwidth}
\begin{center}
\begin{tabular}{l}
\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`
`marginfigure`
`margintable`

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

sidebar: textual information in the margin

marginfigure: a figure in the margin

margintable: a table in the margin

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 printed
`screenonly` version. The text inside the environment `screenonly` will be typeset only when the option `screen` (see Section 2.2) is set to true. Conversely, the text inside the environment `printonly` is typeset only when this option is set to false. For example,

```
\section{Supplementary materials}
```

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

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

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

2.9 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” unless the anonymous mode is chosen. Put all thanks inside this environment.

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

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

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

Here $\{\langle sponsorID \rangle\}$ is the unique ID used to match grants to sponsors, $\{\langle name \rangle\}$ is the name of the sponsor, $\{\langle url \rangle\}$ is its URL, and $\{\langle number \rangle\}$ is the grant number. The $\{\langle sponsorID \rangle\}$ of the `\grantnum` command must correspond to the $\{\langle sponsorID \rangle\}$ 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 $\{\langle sponsorID \rangle\}$ 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/hypertex/bibstyles/>.

There are the special entry types `online` and `game` 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",
}
```

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://wvtug.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 [7]: 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` [8] is recommended for complex figures with several subplots or subfigures that require separate subcaptioning. The packages `nomencl` [9] and `glossaries` [10] 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 `sloppy` environment might help—but beware, the results might be, well, sloppy.

Note that the uppercasing in section titles is done using the `textcase` package [11], 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 `xcolor` package. Normally you cannot do this because `acmart` loads this package itself without options.

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

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

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

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

you will pass `dvipsnames` to `xcolor`.

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

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
DTRAP	Digital Threats: Research and Practice
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

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

Abbreviation	Publication
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TDSCI	ACM Transactions on Data Science
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
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
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

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 [2018/12/16 v1.57 Typesetting articles for the Association for
7 Computing Machinery]
```

And the driver code:

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

3.2 Preload hook

We preload acmart-preload-hook:

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

3.3 Options

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

```
30 \RequirePackage{xkeyval}
```

We use xstring to check whether user input is valid

```
31 \RequirePackage{xstring}
```

format The possible formats

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

\if@ACM@screen Whether we use screen mode

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

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

```
57 \define@boolkey+{acmart.cls}[@ACM@]{acmthm}[true]{%
58 \if@ACM@acmthm
59 \PackageInfo{\@classname}{Requiring acmthm}%
60 \else
61 \PackageInfo{\@classname}{Suppressing acmthm}%
62 \fi}{\PackageError{\@classname}{The option acmthm can be either true or
63 false}}
64 \ExecuteOptionsX{acmthm=true}
```

\if@ACM@review Whether we use review mode

```
65 \define@boolkey+{acmart.cls}[@ACM@]{review}[true]{%
66 \if@ACM@review
67 \PackageInfo{\@classname}{Using review mode}%
68 \AtBeginDocument{\@ACM@printfoliostrue}%
69 \else
70 \PackageInfo{\@classname}{Not using review mode}%
71 \fi}{\PackageError{\@classname}{The option review can be either true or
72 false}}
73 \ExecuteOptionsX{review=false}
```

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

```

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

```

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

```

82 \define@boolkey+{acmart.cls}[@ACM@]{nonacm}[true]{%
83   \if@ACM@nonacm
84     \PackageInfo{\@classname}{Using nonacm mode}%
85     \AtBeginDocument{\@ACM@printacmreffalse}%
86     % in 'nonacm' mode we disable the "ACM Reference Format"
87     % printing by default, but this can be re-enabled by the
88     % user using \settopmatter{printacmref=true}
89   \else
90     \PackageInfo{\@classname}{Not using nonacm mode}%
91   \fi}{\PackageError{\@classname}{The option nonacm can be either true or
92     false}}
93 \ExecuteOptionsX{nonacm=false}

```

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

```

94 \define@boolkey+{acmart.cls}[@ACM@]{balance}[true]{}{%
95   \PackageError{\@classname}{The option balance can be either true or
96     false}}
97 \ExecuteOptionsX{balance}

```

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

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

```

98 \define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
99   \if@ACM@natbib
100     \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
101   \else
102     \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
103   \fi}{\PackageError{\@classname}{The option natbib can be either true or
104     false}}
105 \ExecuteOptionsX{natbib=true}

```

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

```

106 \define@boolkey+{acmart.cls}[@ACM@]{anonymous}[true]{%
107   \if@ACM@anonymous
108     \PackageInfo{\@classname}{Using anonymous mode}%
109   \else
110     \PackageInfo{\@classname}{Not using anonymous mode}%
111   \fi}{\PackageError{\@classname}{The option anonymous can be either true or

```



```

112     false}}
113 \ExecuteOptionsX{anonymous=false}

```

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

```

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

```

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

```

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

```

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

```

132 \def\ACM@fontsize{}
133 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
134 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
135 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
136 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

137 \DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
138 \DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
139 \ProcessOptionsX
140 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}

```

3.4 Setting switches

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

```

141 \newif\if@ACM@manuscript

```

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

```

142 \newif\if@ACM@journal

```

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

```

143 \newif\if@ACM@sigchiamode

```

Setting up switches

```
144 \ifnum\ACM@format@nr=5\relax % siggraph
145   \ClassWarning{\@classname}{The format siggraph is now obsolete.
146     I am switching to sigconf.}
147   \setkeys{acmart.cls}{format=sigconf}
148 \fi
149 \ifnum\ACM@format@nr=0\relax
150   \@ACM@manuscripttrue
151 \else
152   \@ACM@manuscriptfalse
153 \fi
154 \@ACM@sigchiamodefalse
155 \ifcase\ACM@format@nr
156 \relax % manuscript
157   \@ACM@journaltrue
158 \or % acmsmall
159   \@ACM@journaltrue
160 \or % acmlarge
161   \@ACM@journaltrue
162 \or % acmtog
163   \@ACM@journaltrue
164 \or % sigconf
165   \@ACM@journalfalse
166 \or % siggraph
167   \@ACM@journalfalse
168 \or % sigplan
169   \@ACM@journalfalse
170 \or % sigchi
171   \@ACM@journalfalse
172 \or % sigchi-a
173   \@ACM@journalfalse
174   \@ACM@sigchiamodetrue
175 \fi
```

3.5 Loading the base class and package

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

```
176 \ifx\ACM@fontsize\@empty
177   \ifcase\ACM@format@nr
178   \relax % manuscript
179     \def\ACM@fontsize{9pt}%
180   \or % acmsmall
181     \def\ACM@fontsize{10pt}%
182   \or % acmlarge
183     \def\ACM@fontsize{10pt}%
184   \or % acmtog
185     \def\ACM@fontsize{9pt}%
186   \or % sigconf
187     \def\ACM@fontsize{9pt}%
```

```

188 \or % siggraph
189   \def\ACM@fontsize{9pt}%
190 \or % sigplan
191   \def\ACM@fontsize{10pt}%
192 \or % sigchi
193   \def\ACM@fontsize{10pt}%
194 \or % sigchi-a
195   \def\ACM@fontsize{10pt}%
196 \fi
197 \fi
198 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
199 \LoadClass[\ACM@fontsize, reqno]{amsart}
200 \RequirePackage{microtype}
    We need etoolbox for delayed code
201 \RequirePackage{etoolbox}
    Booktabs is now the default
202 \RequirePackage{booktabs}
    We need totpages to calculate the number of pages and refcount to use that number
203 \RequirePackage{refcount}
204 \RequirePackage{totpages}
    The \collect@body macro in amsmath is defined using \def. We load environ to
    access the \long version of this command
205 \RequirePackage{environ}
    We use setspace for double spacing
206 \if@ACM@manuscript
207 \RequirePackage{setspace}
208 \onehalfspacing
209 \fi
    We need textcase for better upcasing
210 \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.

```

211 \if@ACM@natbib
212   \RequirePackage{natbib}
213   \renewcommand{\bibsection}{%
214     \section*{\refname}%
215     \phantomsection\addcontentsline{toc}{section}{\refname}%
216   }
217   \renewcommand{\bibfont}{\bibliofont}
218   \renewcommand\setcitestyle[1]{
219     \@for\@tempa:=#1\do

```

```

220 {\def\@tempb{round}\ifx\@tempa\@tempb
221   \renewcommand\NAT@open{()\renewcommand\NAT@close{}}\fi
222 \def\@tempb{square}\ifx\@tempa\@tempb
223   \renewcommand\NAT@open{[]\renewcommand\NAT@close{]}}\fi
224 \def\@tempb{angle}\ifx\@tempa\@tempb
225   \renewcommand\NAT@open{<>\renewcommand\NAT@close{>>}}\fi
226 \def\@tempb{curly}\ifx\@tempa\@tempb
227   \renewcommand\NAT@open{\{\}\renewcommand\NAT@close{\}}\fi
228 \def\@tempb{semicolon}\ifx\@tempa\@tempb
229   \renewcommand\NAT@sep{;}\fi
230 \def\@tempb{colon}\ifx\@tempa\@tempb
231   \renewcommand\NAT@sep{:}\fi
232 \def\@tempb{comma}\ifx\@tempa\@tempb
233   \renewcommand\NAT@sep{,}\fi
234 \def\@tempb{authoryear}\ifx\@tempa\@tempb
235   \NAT@numbersfalse\fi
236 \def\@tempb{numbers}\ifx\@tempa\@tempb
237   \NAT@numberstrue\NAT@superfalse\fi
238 \def\@tempb{super}\ifx\@tempa\@tempb
239   \NAT@numberstrue\NAT@supertrue\fi
240 \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
241   \let\bibstyle=\gobble\fi
242 \def\@tempb{bibstyle}\ifx\@tempa\@tempb
243   \let\bibstyle=\citestyle\fi
244 \def\@tempb{sort}\ifx\@tempa\@tempb
245   \def\NAT@sort{\@ne}\fi
246 \def\@tempb{nosort}\ifx\@tempa\@tempb
247   \def\NAT@sort{\z@}\fi
248 \def\@tempb{compress}\ifx\@tempa\@tempb
249   \def\NAT@cmprs{\@ne}\fi
250 \def\@tempb{nocompress}\ifx\@tempa\@tempb
251   \def\NAT@cmprs{\z@}\fi
252 \def\@tempb{sort&compress}\ifx\@tempa\@tempb
253   \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
254 \def\@tempb{mcite}\ifx\@tempa\@tempb
255   \let\NAT@merge\@ne\fi
256 \def\@tempb{merge}\ifx\@tempa\@tempb
257   \ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}\fi
258 \def\@tempb{elide}\ifx\@tempa\@tempb
259   \ifnum{\NAT@merge<\thr@}{\let\NAT@merge\thr@}\fi
260 \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
261   \NAT@longnamestrue\fi
262 \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
263   \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
264 \expandafter\NAT@find@eq\@tempa=\relax\@nil
265 \if\@tempc\relax\else
266   \expandafter\NAT@rem@eq\@tempc
267   \def\@tempb{open}\ifx\@tempa\@tempb
268     \xdef\NAT@open{\@tempc}\fi
269   \def\@tempb{close}\ifx\@tempa\@tempb

```

```

270 \xdef\NAT@close{\@tempc}\fi
271 \def\@tempb{aysep}\ifx\@tempa\@tempb
272 \xdef\NAT@aysep{\@tempc}\fi
273 \def\@tempb{yysep}\ifx\@tempa\@tempb
274 \xdef\NAT@yrsep{\@tempc}\fi
275 \def\@tempb{notesep}\ifx\@tempa\@tempb
276 \xdef\NAT@cmt{\@tempc}\fi
277 \def\@tempb{citesep}\ifx\@tempa\@tempb
278 \xdef\NAT@sep{\@tempc}\fi
279 \fi
280 }%
281 \NAT@@setcites
282 }
283 \renewcommand\citestyle[1]{%
284 \ifcsname bibstyle@#1\endcsname%
285 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
286 \else%
287 \@latex@error{Undefined ‘#1’ citestyle}%
288 \fi
289 }%
290 \fi

```

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

```

291 \newcommand{\bibstyle@acmauthoryear}{%
292 \setcitestyle{%
293 authoryear,%
294 open={[]},close={}],citesep={;},%
295 aysep={},yysep={,},%
296 notesep={, }}}

```

`\bibstyle@acmnumeric` The default numeric format:

```

297 \newcommand{\bibstyle@acmnumeric}{%
298 \setcitestyle{%
299 numbers,sort&compress,%
300 open={[]},close={}],citesep={,},%
301 notesep={, }}}

```

The default is numeric:

```

302 \if@ACM@natbib
303 \citestyle{acmnumeric}
304 \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:

```

305 \def\@startsection#1#2#3#4#5#6{%
306 \if@noskipsec \leavevmode \fi
307 \par
308 \@tempskipa #4\relax

```

```

309 \@afterindenttrue
310 \ifdim \@tempskipa <\z@
311   \@tempskipa -\@tempskipa \@afterindentfalse
312 \fi
313 \if@nobreak
314   \everypar{}%
315 \else
316   \addpenalty\@secpenalty\advspace\@tempskipa
317 \fi
318 \ifstar
319   {\@essect{#3}{#4}{#5}{#6}}%
320   {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}
321 \def\@sect#1#2#3#4#5#6[#7]#8{%
322   \edef\@toclevel{\ifnum#2=\@m 0\else\@number#2\fi}%
323   \ifnum #2>\c@secnumdepth
324     \let\@svsec\@empty
325   \else
326     \refstepcounter{#1}%
327     \protected@edef\@svsec{\@secntformat{#1}\relax}%
328   \fi
329   \@tempskipa #5\relax
330   \ifdim \@tempskipa>\z@
331     \begingroup
332       #6{%
333         \@hangfrom{\hskip #3\relax\@svsec}%
334         \interlinepenalty \@M #8\@epar}%
335     \endgroup
336     \csname #1mark\endcsname{#7}%
337     \ifnum #2>\c@secnumdepth \else
338       \@tochangmeasure{\csname the#1\endcsname}%
339     \fi
340     \addcontentsline{toc}{#1}{%
341       \ifnum #2>\c@secnumdepth \else
342         \protect\numberline{\csname the#1\endcsname}%
343       \fi
344       #7}%
345   \else
346     \def\@svsechd{%
347       #6{\hskip #3\relax
348         \@svsec #8}%
349       \csname #1mark\endcsname{#7}%
350       \ifnum #2>\c@secnumdepth \else
351         \@tochangmeasure{\csname the#1\endcsname\space}%
352       \fi
353       \addcontentsline{toc}{#1}{%
354         \ifnum #2>\c@secnumdepth \else
355           \protect\numberline{\csname the#1\endcsname}%
356         \fi
357         #7}}%
358   \fi

```

```

359 \@xsect{#5}}
360 \def\@xsect#1{%
361   \@tempskipa #1\relax
362   \ifdim \@tempskipa>\z@
363     \par \nobreak
364     \vskip \@tempskipa
365     \@afterheading
366   \else
367     \@nobreakfalse
368     \global\@noskipsectrue
369     \everypar{%
370       \if@noskipsec
371         \global\@noskipsecfalse
372         {\setbox\z@\lastbox}%
373         \clubpenalty\@M
374         \begingroup \@svsechd \endgroup
375         \unskip
376         \@tempskipa #1\relax
377         \hskip -\@tempskipa
378       \else
379         \clubpenalty \@clubpenalty
380         \everypar{}}%
381     \fi}%
382 \fi
383 \ignorespaces}
384 \def\@seccontformat#1{\csname the#1\endcsname\quad}
385 \def\@ssect#1#2#3#4#5{%
386   \@tempskipa #3\relax
387   \ifdim \@tempskipa>\z@
388     \begingroup
389       #4{%
390         \@hangfrom{\hskip #1}%
391         \interlinepenalty \@M #5\@@par}%
392     \endgroup
393   \else
394     \def\@svsechd{#4{\hskip #1\relax #5}}%
395   \fi
396   \@xsect{#3}}

```

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

```

397 \def\@starttoc#1#2{\begingroup\makeatletter
398   \setTrue{#1}%
399   \par\removelastskip\vskip\z@skip
400   \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
401     {.5\linespacing}{\centering\contentsnamefont}{#2}%
402   \input{\jobname.#1}%
403   \if@filesw
404     \exp\newwrite\csname tf@#1\endcsname
405     \immediate\exp\openout\csname tf@#1\endcsname \jobname.#1\relax

```

```

406 \fi
407 \global\@nobreakfalse \endgroup
408 \addvspace{32\p@\@plus14\p@}%
409 }

\l@section Section spacing is more generous than for amsart
410 \def\l@section{\@tocline{1}{0pt}{1pc}{2pc}{}}

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

\l@subsubsection The spacing in amsart is too large
412 \def\l@subsubsection{\@tocline{2}{0pt}{1pc}{5pc}{}}

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

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

\@footnotetext In sigchi-a mode our footnotes are in the margin!
414 \if@ACM@sigchiamode
415 \long\def\@footnotetext#1{\marginpar{%
416 \reset@font\small
417 \interlinepenalty\interfootnotelinepenalty
418 \protected@edef\@currentlabel{%
419 \csname p@footnote\endcsname\@thefnmark
420 }%
421 \color@begingroup
422 \@makefnmark{%
423 \rule{z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
424 \color@endgroup}}%
425 \fi

\@mpfootnotetext We want the footnotes in minipages centered:
426 \long\def\@mpfootnotetext#1{%
427 \global\setbox\@mpfootins\vbox{%
428 \unvbox\@mpfootins
429 \reset@font\footnotesize
430 \hsize\columnwidth
431 \@parboxrestore
432 \protected@edef\@currentlabel
433 {\csname p@mpfootnote\endcsname\@thefnmark}%
434 \color@begingroup\centering
435 \@makefnmark{%
436 \rule{z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
437 \color@endgroup}}

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

```


And now, hyperref

```
439 \let\@footnotemark@nolink\@footnotemark
440 \let\@footnotetext@nolink\@footnotetext
441 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
442 \pdfstringdefDisableCommands{%
443   \def\unskip{ }%
444   \def\textbullet{- }%
445   \def\textrightarrow{-> }%
446   \def\footnotemark{ }%
447 }
448 \urlstyle{rm}
449 \ifcase\ACM@format@nr
450 \relax % manuscript
451 \or % acmsmall
452 \or % acmlarge
453 \or % acmtog
454 \or % sigconf
455 \or % siggraph
456 \or % sigplan
457   \urlstyle{sf}
458 \or % sigchi
459 \or % sigchi-a
460   \urlstyle{sf}
461 \fi
462 \AtEndPreamble{%
463   \if@ACM@screen
464     \hypersetup{colorlinks,
465       linkcolor=ACMPurple,
466       citecolor=ACMPurple,
467       urlcolor=ACMDarkBlue,
468       filecolor=ACMDarkBlue}
469   \else
470     \hypersetup{hidelinks}
471   \fi
472   \hypersetup{pdflang={en},
473     pdfdisplaydoctitle}}
474 \if@ACM@natbib
475   \let\cite\cite
476   \let\cite\citep
477   \let\cite\citeauthor
478   \let\cite\citeyearpar
479   \let\cite\citeyearNP\citeyear
480   \let\cite\citealt
481   \DeclareRobustCommand\citeA
482     {\begingroup\NAT@swafalse
483       \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
484   \providecommand\newblock{ }%
485 \else
```

```

486 \AtBeginDocument{%
487   \let\shortcite\cite%
488   \providecommand\citename[1]{#1}}
489 \fi
490 \newcommand\shortcite[2][{}]{%
491   \ifNAT@numbers\cite[#1]{#2}\else\citeyearpar[#1]{#2}\fi}

```

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

```

492 \def\bibliographystyle#1{%
493   \ifx\@begindocumenthook\@undefined\else
494     \expandafter\AtBeginDocument
495     \fi
496     {\if@filesw
497       \immediate\write\@auxout{\string\bibstyle{#1}}%
498       \fi}}

```

Graphics and color.

```

499 \RequirePackage{graphicx}
500 \RequirePackage[prologue]{xcolor}

```

We define ACM colors according to [7]:

```

501 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
502 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
503 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
504 \definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
505 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
506 \definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
507 \definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
508 \definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}

```

Author-draft mode

```

509 \if@ACM@authordraft
510   \RequirePackage{draftwatermark}
511   \SetWatermarkFontSize{0.5in}
512   \SetWatermarkColor[gray]{.9}
513   \SetWatermarkText{\parbox{12em}{\centering
514     Unpublished working draft.\
515     Not for distribution.}}
516 \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>.

```

517 \RequirePackage{geometry}
518 \ifcase\ACM@format@nr
519 \relax % manuscript
520   \geometry{letterpaper,head=13pt,

```

```

521 marginparwidth=6pc,heightrounded}%
522 \or % acmsmall
523 \geometry{twoside=true,
524 includeheadfoot, head=13pt, foot=2pc,
525 paperwidth=6.75in, paperheight=10in,
526 top=58pt, bottom=44pt, inner=46pt, outer=46pt,
527 marginparwidth=2pc,heightrounded
528 }%
529 \or % acmlarge
530 \geometry{twoside=true, head=13pt, foot=2pc,
531 paperwidth=8.5in, paperheight=11in,
532 includeheadfoot,
533 top=78pt, bottom=114pt, inner=81pt, outer=81pt,
534 marginparwidth=4pc,heightrounded
535 }%
536 \or % acmtog
537 \geometry{twoside=true, head=13pt, foot=2pc,
538 paperwidth=8.5in, paperheight=11in,
539 includeheadfoot, columnsep=24pt,
540 top=52pt, bottom=75pt, inner=52pt, outer=52pt,
541 marginparwidth=2pc,heightrounded
542 }%
543 \or % sigconf
544 \geometry{twoside=true, head=13pt,
545 paperwidth=8.5in, paperheight=11in,
546 includeheadfoot, columnsep=2pc,
547 top=57pt, bottom=73pt, inner=54pt, outer=54pt,
548 marginparwidth=2pc,heightrounded
549 }%
550 \or % siggraph
551 \geometry{twoside=true, head=13pt,
552 paperwidth=8.5in, paperheight=11in,
553 includeheadfoot, columnsep=2pc,
554 top=57pt, bottom=73pt, inner=54pt, outer=54pt,
555 marginparwidth=2pc,heightrounded
556 }%
557 \or % sigplan
558 \geometry{twoside=true, head=13pt,
559 paperwidth=8.5in, paperheight=11in,
560 includeheadfoot=false, columnsep=2pc,
561 top=1in, bottom=1in, inner=0.75in, outer=0.75in,
562 marginparwidth=2pc,heightrounded
563 }%
564 \or % sigchi
565 \geometry{twoside=true, head=13pt,
566 paperwidth=8.5in, paperheight=11in,
567 includeheadfoot, columnsep=2pc,
568 top=66pt, bottom=73pt, inner=54pt, outer=54pt,
569 marginparwidth=2pc,heightrounded
570 }%

```

```

571 \or % sigchi-a
572   \geometry{twoside=false, head=13pt,
573     paperwidth=11in, paperheight=8.5in,
574     includeheadfoot, marginparsep=72pt,
575     marginparwidth=170pt, columnsep=20pt,
576     top=72pt, bottom=72pt, left=314pt, right=72pt
577   }%
578   \@parswitchfalse
579   \reversemarginpar
580 \fi

```

`\parindent` Paragraphing

```

\parskip 581 \setlength\parindent{10\p@}
582 \setlength\parskip{\z@}
583 \ifcase\ACM@format@nr
584 \relax % manuscript
585 \or % acmsmall
586 \or % acmlarge
587 \or % acmtog
588   \setlength\parindent{9\p@}%
589 \or % sigconf
590 \or % siggraph
591 \or % sigplan
592 \or % sigchi
593 \or % sigchi-a
594 \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.

```
595 \setlength\normalparindent{\parindent}
```

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

We use `manyfoot` for layered footnotes instead.

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

```

596 \def\copyrightpermissionfootnoterule{\kern-3\p@
597   \hrule \@width \columnwidth \kern 2.6\p@}

598 \RequirePackage{manyfoot}
599 \SelectFootnoteRule[2]{copyrightpermission}
600 \DeclareNewFootnote{authorsaddresses}
601 \SelectFootnoteRule[2]{copyrightpermission}
602 \DeclareNewFootnote{copyrightpermission}

```

```

\footnoterule Tschichold's rules:
603 \def\footnoterule{\kern-3\p@
604 \hrule \@width 4pc \kern 2.6\p@}

\endminipage We do not use footnote rules in minipages
605 \def\endminipage{%
606 \par
607 \unskip
608 \ifvoid\@mpfootins\else
609 \vskip\skip\@mpfootins
610 \normalcolor
611 \unvbox\@mpfootins
612 \fi
613 \@minipagefalse
614 \color@endgroup
615 \egroup
616 \expandafter\@iiparbox\@mpargs{\unvbox\@tempboxa}}

\@textbottom Add some stretch according to David Carlisle's advice at http://tex.stackexchange.com/a/62318/5522
617 \def\@textbottom{\vskip \z@ \@plus 1pt}
618 \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.

```

619 \ifcase\ACM@format@nr
620 \relax % manuscript
621 \or % acmsmall
622 \or % acmlarge
623 \or % acmtog
624 \flushbottom
625 \or % sigconf
626 \flushbottom
627 \or % siggraph
628 \flushbottom
629 \or % sigplan
630 \flushbottom
631 \or % sigchi
632 \flushbottom
633 \or % sigchi-a
634 \fi

```

3.8 Fonts

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

The code below is by Ross Moore.

```

635 \RequirePackage{iftex}

```

```

636 \ifPDFTeX
637 \input{glyphtounicode}
638 \pdfglyphtounicode{f_f}{FB00}
639 \pdfglyphtounicode{f_f_i}{FB03}
640 \pdfglyphtounicode{f_f_l}{FB04}
641 \pdfglyphtounicode{f_i}{FB01}
642 \pdfglyphtounicode{t_t}{0074 0074}
643 \pdfglyphtounicode{f_t}{0066 0074}
644 \pdfglyphtounicode{T_h}{0054 0068}
645 \pdfgentounicode=1
646 \fi
647 \RequirePackage{cmap}

```

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

```

648 \newif\if@ACM@newfonts
649 \@ACM@newfontstrue
650 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
651   have the libertine package installed. Please upgrade your
652   TeX}\@ACM@newfontsfalse}
653 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
654   have the zi4 package installed. Please upgrade your
655   TeX}\@ACM@newfontsfalse}
656 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
657   have the newtxmath package installed. Please upgrade your
658   TeX}\@ACM@newfontsfalse}

```

We use Libertine throughout.

```

659 \if@ACM@newfonts
660 \RequirePackage[T1]{fontenc}
661 \ifxetex
662 \RequirePackage[tt=false]{libertine}
663 \setmonofont{inconsolata}
664 \else
665 \RequirePackage[tt=false, type1=true]{libertine}
666 \fi
667 \RequirePackage[varqu]{zi4}
668 \RequirePackage[libertine]{newtxmath}
669 \fi

```

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

```

670 \let\liningnums\@undefined
671 \AtEndPreamble{%
672 \DeclareTextFontCommand{\liningnums}{\libertineLF}}

```

The SIGCHI extended abstracts are sans serif:

```

673 \if@ACM@sigchiamode
674 \renewcommand{\familydefault}{\sfdefault}
675 \fi

```

3.9 Image descriptions

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

```
676 \newif\if@Description@present
677 \@Description@presenttrue
```

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

```
678 \newif\if@undescribed@images
679 \@undescribed@imagesfalse
```

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

```
680 \newcommand\Description[2][\global\@Description@presenttrue]

    The global warning
681 \AtEndDocument{\if@undescribed@images
682   \ClassWarningNoLine{\@classname}{Some images may lack descriptions}\fi}

    Hooks for figures
683 \AtBeginEnvironment{figure}{\@Description@presentfalse}
684 \AtBeginEnvironment{figure*}{\@Description@presentfalse}
685 \AtEndEnvironment{figure}{\if@Description@present\else
686   \global\@undescribed@imagestrue
687   \ClassWarning{\@classname}{A possible image without description}\fi}
688 \AtEndEnvironment{figure*}{\if@Description@present\else
689   \global\@undescribed@imagestrue
690   \ClassWarning{\@classname}{A possible image without description}\fi}
```

3.10 Floats

We use the `caption` package

```
691 \RequirePackage{caption, float}
692 \captionsetup[table]{position=top}
693 \if@ACM@journal
694   \captionsetup{labelfont={sf, small},
695     textfont={sf, small}, margin=\z@}
696   \captionsetup[figure]{name={Fig.}}
697 \else
698   \captionsetup{labelfont={bf},
699     textfont={bf}, labelsep=colon, margin=\z@}
700 \ifcase\ACM@format@nr
701   \relax % manuscript
702   \or % acsmall
703   \or % acmlarge
704   \or % acmtog
705   \or % sigconf
706   \or % siggraph
707     \captionsetup{textfont={it}}
708   \or % sigplan
709     \captionsetup{labelfont={bf},
```

```

710     textfont={normalfont}, labelsep=period, margin=\z@
711 \or % sigchi
712   \captionsetup[figure]{labelfont={bf, small},
713     textfont={bf, small}}
714   \captionsetup[table]{labelfont={bf, small},
715     textfont={bf, small}}
716 \or % sigchi-a
717   \captionsetup[figure]{labelfont={bf, small},
718     textfont={bf, small}}
719   \captionsetup[table]{labelfont={bf, small},
720     textfont={bf, small}}
721 \fi
722 \fi

sidebar The sidebar environment:
723 \newfloat{sidebar}{}{sbar}
724 \floatname{sidebar}{Sidebar}
725 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}

\@sidebar The processing of the saved text
726 \long\def\@sidebar#1{\bgroup\captionsetup{type=sidebar}%
727   \marginpar{\small#1}\egroup}

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

\@marginfigure The processing of the saved text
729 \long\def\@marginfigure#1{\bgroup
730   \captionsetup{type=figure}%
731   \marginpar{\@Description@presentfalse\centering
732     \small#1\if@Description@present\else
733       \global\@undescribed@imagestrue
734       \ClassWarning{\@classname}{A possible image without description}
735       \fi}%
736   \egroup}

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

\@margintable The processing of the saved text
738 \long\def\@margintable#1{\bgroup\captionsetup{type=table}%
739   \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
740 \newdimen\fulltextwidth
741 \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)

```
742 \if@ACM@sigchiamode
743 \def\@dblfloat{\bgroup\columnwidth=\fulltextwidth
744 \let\@endfloatbox\@endwidefloatbox
745 \def\@fpsaddefault{\def\@fps{tp}}%
746 \@float}
747 \fi
```

`\end@dblfloat` And the end. Just adding a `\bgroup`.

```
748 \if@ACM@sigchiamode
749 \def\end@dblfloat{%
750 \end@float\egroup}
751 \fi
```

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

```
752 \def\@endwidefloatbox{%
753 \par\vskip\z@skip
754 \@minipagefalse
755 \outer@nobreak
756 \egroup
757 \color@endbox
758 \global\setbox\@currbox=\vbox{\moveleft
759 \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
760 \wd\@currbox=\textwidth
761 }
```

3.11 Lists

```
762 \ifcase\ACM@format@nr
763 \relax % manuscript
764 \or % acmsmall
765 \or % acmlarge
766 \or % acmtog
767 \or % sigconf
768 \or % siggraph
769 \or % sigplan
770 \def\labelenumi{\theenumi.}
771 \def\labelenumii{\theenumii.}
772 \def\labelenumiii{\theenumiii.}
773 \def\labelenumiv{\theenumiv.}
774 \or % sigchi
775 \or % sigchi-a
776 \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 (effec-

tively) irrelevant; nonetheless, we follow amsart and set `\labelwidth` to `\leftmargin` minus `\labelsep`.

```

777 \newdimen\@ACM@labelwidth
778 \AtBeginDocument{%
779   \setlength\labelsep{4pt}
780   \setlength{\@ACM@labelwidth}{6.5pt}
781
782   %% First-level list: when beginning after the first line of an
783   %% indented paragraph or ending before an indented paragraph, labels
784   %% should not hang to the left of the preceding/following text.
785   \setlength\leftmargini{\z@}
786   \addtolength\leftmargini{\parindent}
787   \addtolength\leftmargini{2\labelsep}
788   \addtolength\leftmargini{\@ACM@labelwidth}
789
790   %% Second-level and higher lists.
791   \setlength\leftmarginii{\z@}
792   \addtolength\leftmarginii{0.5\labelsep}
793   \addtolength\leftmarginii{\@ACM@labelwidth}
794   \setlength\leftmarginiii{\leftmarginii}
795   \setlength\leftmarginiv{\leftmarginiii}
796   \setlength\leftmarginv{\leftmarginiv}
797   \setlength\leftmarginvi{\leftmarginv}
798   \@listi}
799 \newskip\listisep
800 \listisep\smallskipamount
801 \def\@listI{\leftmargin\leftmargini
802   \labelwidth\leftmargini \advance\labelwidth-\labelsep
803   \listparindent\z@
804   \topsep\listisep}
805 \let\@listi\@listI
806 \def\@listii{\leftmargin\leftmarginii
807   \labelwidth\leftmarginii \advance\labelwidth-\labelsep
808   \topsep\z@skip}
809 \def\@listiii{\leftmargin\leftmarginiii
810   \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
811 \def\@listiv{\leftmargin\leftmarginiv
812   \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
813 \def\@listv{\leftmargin\leftmarginv
814   \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
815 \def\@listvi{\leftmargin\leftmarginvi
816   \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}

```

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

```
817 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}
```

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

```
818 \renewenvironment{description}{\list{}}{%
819   \labelwidth\@ACM@labelwidth
```

```

820 \let\makelabel\descriptionlabel}%
821 }{
822 \endlist
823 }
824 \let\enddescription=\endlist % for efficiency

```

3.12 Top-matter data

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

```

825 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
826 CIE,%
827 CSUR,%
828 DTRAP,%
829 IMWUT,%
830 JACM,%
831 JDIQ,%
832 JEA,%
833 JERIC,%
834 JETC,%
835 JOCCH,%
836 PACMCGIT,%
837 PACMHCI,%
838 PACMPL,%
839 POMACS,%
840 TAAS,%
841 TACCESS,%
842 TACO,%
843 TALG,%
844 TALLIP,%
845 TAP,%
846 TCPS,%
847 TDSCI,%
848 TEAC,%
849 TECS,%
850 THRI,%
851 TIIS,%
852 TIOT,%
853 TISSEC,%
854 TIST,%
855 TKDD,%
856 TMIS,%
857 TOCE,%
858 TOCHI,%
859 TOCL,%
860 TOCS,%
861 TOCT,%
862 TODAES,%
863 TODS,%
864 TOG,%

```

```

865 TOIS,%
866 TOIT,%
867 TOMACS,%
868 TOMM,%
869 TOMPECS,%
870 TOMS,%
871 TOPC,%
872 TOPS,%
873 TOPLAS,%
874 TOS,%
875 TOSEM,%
876 TOSN,%
877 TRETs,%
878 TSAS,%
879 TSC,%
880 TSLP,%
881 TWEB%
882 }{%
883 \ifcase\@journalCode@nr
884 \relax % CIE
885 \def\@journalName{ACM Computers in Entertainment}%
886 \def\@journalNameShort{ACM Comput. Entertain.}%
887 \def\@permissionCodeOne{1544-3574}%
888 \or % CSUR
889 \def\@journalName{ACM Computing Surveys}%
890 \def\@journalNameShort{ACM Comput. Surv.}%
891 \def\@permissionCodeOne{0360-0300}%
892 \or % DTRAP
893 \def\@journalName{Digital Threats: Research and Practice}%
894 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
895 \def\@permissionCodeOne{2576-5337}%
896 \or % IMWUT
897 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
898 Wearable and Ubiquitous Technologies}%
899 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
900 \def\@permissionCodeOne{2474-9567}%
901 \@ACM@screentru
902 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
903 \or % JACM
904 \def\@journalName{Journal of the ACM}%
905 \def\@journalNameShort{J. ACM}%
906 \def\@permissionCodeOne{0004-5411}%
907 \or % JDIQ
908 \def\@journalName{ACM Journal of Data and Information Quality}%
909 \def\@journalNameShort{ACM J. Data Inform. Quality}%
910 \def\@permissionCodeOne{1936-1955}%
911 \or % JEA
912 \def\@journalName{ACM Journal of Experimental Algorithmics}%
913 \def\@journalNameShort{ACM J. Exp. Algor.}%
914 \def\@permissionCodeOne{1084-6654}%

```

```

915 \or % JERIC
916 \def\@journalName{ACM Journal of Educational Resources in Computing}%
917 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
918 \def\@permissionCodeOne{1073-0516}%
919 \or % JETC
920 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
921 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
922 \def\@permissionCodeOne{1550-4832}%
923 \or % JOCC
924 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
925 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
926 \or % PACMCGIT
927 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
928 \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
929 \def\@permissionCodeOne{2577-6193}%
930 \@ACM@screentrue
931 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
932 \or % PACMHCI
933 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
934 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
935 \def\@permissionCodeOne{2573-0142}%
936 \@ACM@screentrue
937 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
938 \or % PACMPL
939 \def\@journalName{Proceedings of the ACM on Programming Languages}%
940 \def\@journalNameShort{Proc. ACM Program. Lang.}%
941 \def\@permissionCodeOne{2475-1421}%
942 \@ACM@screentrue
943 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
944 \or % POMACS
945 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
946 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
947 \def\@permissionCodeOne{2476-1249}%
948 \@ACM@screentrue
949 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
950 \or % TAAS
951 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
952 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
953 \def\@permissionCodeOne{1556-4665}%
954 \or % TACCESS
955 \def\@journalName{ACM Transactions on Accessible Computing}%
956 \def\@journalNameShort{ACM Trans. Access. Comput.}%
957 \def\@permissionCodeOne{1936-7228}%
958 \or % TACO
959 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
960 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
961 \or % TALG
962 \def\@journalName{ACM Transactions on Algorithms}%
963 \def\@journalNameShort{ACM Trans. Algor.}%
964 \def\@permissionCodeOne{1549-6325}%

```

```

965 \or % TALLIP
966 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
967 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
968 \def\@permissionCodeOne{2375-4699}%
969 \or % TAP
970 \def\@journalName{ACM Transactions on Applied Perception}%
971 \or % TCPS
972 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
973 \or % TDSCI
974 \def\@journalName{ACM Transactions on Data Science}%
975 \def\@journalNameShort{ACM Trans. Data Sci.}%
976 \def\@permissionCodeOne{2577-3224}%
977 \or % TEAC
978 \def\@journalName{ACM Transactions on Economics and Computation}%
979 \or % TECS
980 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
981 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
982 \def\@permissionCodeOne{1539-9087}%
983 \or % THRI
984 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
985 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
986 \def\@permissionCodeOne{2573-9522}%
987 \or % TIIS
988 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
989 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
990 \def\@permissionCodeOne{2160-6455}%
991 \or % TIOT
992 \def\@journalName{ACM Transactions on Internet of Things}%
993 \def\@journalNameShort{ACM Trans. Internet Things}%
994 \def\@permissionCodeOne{2577-6207}%
995 \or % TISSEC
996 \def\@journalName{ACM Transactions on Information and System Security}%
997 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
998 \def\@permissionCodeOne{1094-9224}%
999 \or % TIST
1000 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1001 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1002 \def\@permissionCodeOne{2157-6904}%
1003 \or % TKDD
1004 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
1005 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1006 \def\@permissionCodeOne{1556-4681}%
1007 \or % TMIS
1008 \def\@journalName{ACM Transactions on Management Information Systems}%
1009 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1010 \def\@permissionCodeOne{2158-656X}%
1011 \or % TOCE
1012 \def\@journalName{ACM Transactions on Computing Education}%
1013 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
1014 \def\@permissionCodeOne{1946-6226}%

```

```

1015 \or % TOCHI
1016 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1017 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1018 \def\@permissionCodeOne{1073-0516}%
1019 \or % TOCL
1020 \def\@journalName{ACM Transactions on Computational Logic}%
1021 \def\@journalNameShort{ACM Trans. Comput. Logic}%
1022 \def\@permissionCodeOne{1529-3785}%
1023 \or % TOCS
1024 \def\@journalName{ACM Transactions on Computer Systems}%
1025 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1026 \def\@permissionCodeOne{0734-2071}%
1027 \or % TOCT
1028 \def\@journalName{ACM Transactions on Computation Theory}%
1029 \def\@journalNameShort{ACM Trans. Comput. Theory}%
1030 \def\@permissionCodeOne{1942-3454}%
1031 \or % TODAES
1032 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1033 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1034 \def\@permissionCodeOne{1084-4309}%
1035 \or % TODS
1036 \def\@journalName{ACM Transactions on Database Systems}%
1037 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
1038 \def\@permissionCodeOne{0362-5915}%
1039 \or % TOG
1040 \def\@journalName{ACM Transactions on Graphics}%
1041 \def\@journalNameShort{ACM Trans. Graph.}%
1042 \def\@permissionCodeOne{0730-0301}%
1043 \or % TOIS
1044 \def\@journalName{ACM Transactions on Information Systems}%
1045 \def\@permissionCodeOne{1046-8188}%
1046 \or % TOIT
1047 \def\@journalName{ACM Transactions on Internet Technology}%
1048 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1049 \def\@permissionCodeOne{1533-5399}%
1050 \or % TOMACS
1051 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1052 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1053 \or % TOMM
1054 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
1055 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1056 \def\@permissionCodeOne{1551-6857}%
1057 \def\@permissionCodeTwo{0100}%
1058 \or % TOMPECS
1059 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1060 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1061 \def\@permissionCodeOne{2376-3639}%
1062 \or % TOMS
1063 \def\@journalName{ACM Transactions on Mathematical Software}%
1064 \def\@journalNameShort{ACM Trans. Math. Softw.}%

```

```

1065 \def\@permissionCodeOne{0098-3500}%
1066 \or % TOPC
1067 \def\@journalName{ACM Transactions on Parallel Computing}%
1068 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1069 \def\@permissionCodeOne{1539-9087}%
1070 \or % TOPS
1071 \def\@journalName{ACM Transactions on Privacy and Security}%
1072 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1073 \def\@permissionCodeOne{2471-2566}%
1074 \or % TOPLAS
1075 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1076 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1077 \def\@permissionCodeOne{0164-0925}%
1078 \or % TOS
1079 \def\@journalName{ACM Transactions on Storage}%
1080 \def\@journalNameShort{ACM Trans. Storage}%
1081 \def\@permissionCodeOne{1553-3077}%
1082 \or % TOSEM
1083 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1084 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1085 \def\@permissionCodeOne{1049-331X}%
1086 \or % TOSN
1087 \def\@journalName{ACM Transactions on Sensor Networks}%
1088 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1089 \def\@permissionCodeOne{1550-4859}%
1090 \or % TRET
1091 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1092 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1093 \def\@permissionCodeOne{1936-7406}%
1094 \or % TSAS
1095 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1096 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1097 \def\@permissionCodeOne{2374-0353}%
1098 \or % TSC
1099 \def\@journalName{ACM Transactions on Social Computing}%
1100 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1101 \def\@permissionCodeOne{2469-7818}%
1102 \or % TSLP
1103 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1104 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1105 \def\@permissionCodeOne{1550-4875}%
1106 \or % TWEB
1107 \def\@journalName{ACM Transactions on the Web}%
1108 \def\@journalNameShort{ACM Trans. Web}%
1109 \def\@permissionCodeOne{1559-1131}%
1110 \fi
1111 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1112 }{%
1113 \ClassError{\@classname}{Incorrect journal #1}%
1114 }%

```



```

\acmJournal And the syntactic sugar around it
1115 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}}

    The defaults:
1116 \def\@journalCode@nr{0}
1117 \def\@journalName{}%
1118 \def\@journalNameShort{\@journalName}%
1119 \def\@permissionCodeOne{XXXX-XXXX}%
1120 \def\@permissionCodeTwo{}%

\acmConference This is the conference command
1121 \newcommand\acmConference[4][{}]{%
1122   \gdef\acmConference@shortname{#1}%
1123   \gdef\acmConference@name{#2}%
1124   \gdef\acmConference@date{#3}%
1125   \gdef\acmConference@venue{#4}%
1126   \ifx\acmConference@shortname\@empty
1127     \gdef\acmConference@shortname{#2}%
1128   \fi}
1129 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1130   DC, USA}

\acmBooktitle The book title of the conference:
\@acmBooktitle 1131 \def\acmBooktitle#1{\gdef\acmBooktitle{#1}}
1132 \acmBooktitle{Proceedings of \acmConference@name
1133   \ifx\acmConference@name\acmConference@shortname\else
1134     \ (\acmConference@shortname)\fi}

\@editorsAbbrev How to abbreviate editors
1135 \def\@editorsAbbrev{(Ed.)}

\@acmEditors The list of editors
1136 \def\@acmEditors{}

  \editor Add a new editor to the list
1137 \def\editor#1{\ifx\@acmEditors\@empty
1138   \gdef\@acmEditors{#1}%
1139   \else
1140     \gdef\@editorsAbbrev{(Eds.)}%
1141     \g@addto@macro\@acmEditors{\and#1}%
1142   \fi}

\subtitle The subtitle macro
1143 \def\subtitle#1{\def\@subtitle{#1}}
1144 \subtitle{}

\num@authorgroups The total number of “groups”. Each group is several authors with the same affiliations(s)
1145 \newcount\num@authorgroups
1146 \num@authorgroups=0\relax

```

```

\num@authors The total number of authors
1147 \newcount\num@authors
1148 \num@authors=0\relax

\if@insideauthorgroup Whether we are continuing an author group
1149 \newif\if@insideauthorgroup
1150 \@insideauthorgroupfalse

\author Adding an author to the list of authors and addresses
1151 \renewcommand\author[2][{}%
1152 \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1153 authors in the same \string\author\space macro!}}}%
1154 \global\advance\num@authors by 1\relax
1155 \if@insideauthorgroup\else
1156 \global\advance\num@authorgroups by 1\relax
1157 \global\@insideauthorgrouptrue
1158 \fi
1159 \ifx\addresses\@empty
1160 \if@ACM@anonymous
1161 \gdef\addresses{\@author{Anonymous Author(s)}%
1162 \ifx\@acmSubmissionID\@empty\else\Submission Id:
1163 \@acmSubmissionID\fi}%
1164 \gdef\authors{Anonymous Author(s)}%
1165 \else
1166 \gdef\addresses{\@author{#2}}%
1167 \gdef\authors{#2}%
1168 \fi
1169 \else
1170 \if@ACM@anonymous\else
1171 \g@addto@macro\addresses{\and\@author{#2}}%
1172 \g@addto@macro\authors{\and#2}%
1173 \fi
1174 \fi
1175 \if@ACM@anonymous
1176 \ifx\shortauthors\@empty
1177 \gdef\shortauthors{Anon.
1178 \ifx\@acmSubmissionID\@empty\else Submission Id:
1179 \@acmSubmissionID\fi}%
1180 \fi
1181 \else
1182 \def\@tempa{#1}%
1183 \ifx\@tempa\@empty
1184 \ifx\shortauthors\@empty
1185 \gdef\shortauthors{#2}%
1186 \else
1187 \g@addto@macro\shortauthors{\and#2}%
1188 \fi
1189 \else
1190 \ifx\shortauthors\@empty

```

```

1191     \gdef\shortauthors{#1}%
1192     \else
1193     \g@addto@macro\shortauthors{\and#1}%
1194     \fi
1195     \fi
1196     \fi}

```

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

```

1197 \newcommand{\affiliation}[2][{}]{%
1198   \global\@insideauthorgroupfalse
1199   \if@ACM@anonymous\else
1200     \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1201     \fi}

```

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

```

1202 \define@boolkey+{@ACM@affiliation@}{@ACM@affiliation@}{obeypunctuation}%
1203 [true]{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

```

`\additionalaffiliation` Additional affiliations go to footnotes

```

1204 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

```

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

```

1205 \def\@additionalaffiliation#1{\bgroup
1206   \def\position##1{\ignorespaces}%
1207   \def\institution##1{##1\ignorespaces}%
1208   \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1209   \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
1210   \let\streetaddress\position
1211   \let\city\position
1212   \let\state\position
1213   \let\postcode\position
1214   \let\country\position
1215   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.

```

1216 \renewcommand{\email}[2][{}]{%
1217   \IfSubStr{#2}{,}{\ClassWarning{\@classname}{Do not put several
1218     addresses in the same \string\email\space macro!}}{}%
1219   \if@ACM@anonymous\else
1220     \g@addto@macro\addresses{\email{#1}{#2}}%
1221     \fi}

```

`\orcid` Right now we do not typeset ORCIDs

```

1222 \def\orcid#1{\unskip\ignorespaces}

```

```

\authorsaddresses Setting up authors' addresses
1223 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1224 \authorsaddresses{\mkauthorsaddresses}

\@titlenotes The title notes
1225 \def\@titlenotes{}

\titlenote Adding a note to the title
1226 \def\titlenote#1{%
1227   \g@addto@macro\@title{\footnotemark}%
1228   \if@ACM@anonymous
1229     \g@addto@macro\@titlenotes{%
1230       \stepcounter{footnote}\footnotetext{Title note}}%
1231   \else
1232     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1233   \fi}

\@subtitlenotes The subtitle notes
1234 \def\@subtitlenotes{}

\subtitlenote Adding a note to the subtitle
1235 \def\subtitlenote#1{%
1236   \g@addto@macro\@subtitle{\footnotemark}%
1237   \if@ACM@anonymous
1238     \g@addto@macro\@subtitlenotes{%
1239       \stepcounter{footnote}\footnotetext{Subtitle note}}%
1240   \else
1241     \g@addto@macro\@subtitlenotes{%
1242       \stepcounter{footnote}\footnotetext{#1}}%
1243   \fi}

\@authornotes The author notes
1244 \def\@authornotes{}

\authornote Adding a note to the author
1245 \def\authornote#1{%
1246   \if@ACM@anonymous\else
1247     \g@addto@macro\addresses{\@authornotemark}%
1248     \g@addto@macro\@authornotes{%
1249       \stepcounter{footnote}\footnotetext{#1}}%
1250   \fi}

\authornotemark Adding a footnote mark to the authors
1251 \newcommand\authornotemark[1][\relax]{%
1252   \ifx#1\relax\relax\relax
1253   \g@addto@macro\addresses{\@authornotemark}%
1254   \else
1255   \g@addto@macro\addresses{\@authornotemark{#1}}%
1256   \fi}

```

`\acmVolume` The current volume
1257 `\def\acmVolume#1{\def\@acmVolume{#1}}`
1258 `\acmVolume{1}`

`\acmNumber` The current number
1259 `\def\acmNumber#1{\def\@acmNumber{#1}}`
1260 `\acmNumber{1}`

`\acmArticle` The current article
1261 `\def\acmArticle#1{\def\@acmArticle{#1}}`
1262 `\acmArticle{}`

`\acmArticleSeq` The sequence number
1263 `\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}`
1264 `\acmArticleSeq{\@acmArticle}`

`\acmYear` The current year
1265 `\def\acmYear#1{\def\@acmYear{#1}}`
1266 `\acmYear{\the\year}`

`\acmMonth` The current month
1267 `\def\acmMonth#1{\def\@acmMonth{#1}}`
1268 `\acmMonth{\the\month}`

`\@acmPubDate` The publication date
1269 `\def\@acmPubDate{\ifcase\@acmMonth\or`
1270 `January\or February\or March\or April\or May\or June\or`
1271 `July\or August\or September\or October\or November\or`
1272 `December\fi~\@acmYear}`

`\acmPrice` The price
1273 `\def\acmPrice#1{\def\@acmPrice{#1}}`
1274 `\acmPrice{15.00}`

`\acmSubmissionID` The submission ID
1275 `\def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}`
1276 `\acmSubmissionID{}`

`\acmISBN` The book ISBN
1277 `\def\acmISBN#1{\def\@acmISBN{#1}}`
1278 `\acmISBN{978-x-xxxx-xxxx-x/YY/MM}`

`\acmDOI` The paper DOI
1279 `\def\acmDOI#1{\def\@acmDOI{#1}}`
1280 `\acmDOI{10.1145/nnnnnnn.nnnnnnn}`

`\if@ACM@badge` Whether to print a badge. Note that either a left or right badge triggers it:
1281 `\newif\if@ACM@badge`
1282 `\@ACM@badgefalse`

`\@ACM@badge@width` The width of the badge
1283 `\newlength\@ACM@badge@width`
1284 `\setlength\@ACM@badge@width{5pc}`

`\@ACM@title@width` The width of the badge
1285 `\newlength\@ACM@title@width`

`\@ACM@badge@skip` The space between the badge and the title
1286 `\newlength\@ACM@badge@skip`
1287 `\setlength\@ACM@badge@skip{1pc}`

`\acmBadgeR` Setting the right badge
1288 `\newcommand\acmBadgeR[2][\@ACM@badgetrue`
1289 `\def\@acmBadgeR@url{#1}%`
1290 `\def\@acmBadgeR@image{#2}}`
1291 `\def\@acmBadgeR@url{}`
1292 `\def\@acmBadgeR@image{}`

`\acmBadgeL` Setting the left badge
1293 `\newcommand\acmBadgeL[2][\@ACM@badgetrue`
1294 `\def\@acmBadgeL@url{#1}%`
1295 `\def\@acmBadgeL@image{#2}}`
1296 `\def\@acmBadgeL@url{}`
1297 `\def\@acmBadgeL@image{}`

`\startPage` The start page of the paper
1298 `\def\startPage#1{\def\@startPage{#1}}`
1299 `\startPage{}`

`\terms` Terms are obsolete. We use CCS now.
1300 `\def\terms#1{\ClassWarning{\@classname}{The command \string\terms} is`
1301 `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.
1302 `\def\keywords#1{\def\@keywords{#1}}`
1303 `\keywords{}`

`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
1304 `\renewenvironment{abstract}{\Collect@Body\@saveabstract}{}`

`\@saveabstract` And saving the abstract
1305 `\long\def\@saveabstract#1{\long\gdef\@abstract{#1}}`
1306 `\@saveabstract{}`

`\@empty` The long version of `\@empty` (to compare with `\@abstract`)
1307 `\long\def\@empty{}`

```

\if@ACM@printccs Whether to print CCS
1308 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
1309 \if@ACM@printccs
1310 \ClassInfo{\@classname}{Printing CCS}%
1311 \else
1312 \ClassInfo{\@classname}{Suppressing CCS}%
1313 \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}

\if@ACM@printacmref Whether to print the ACM bibstrip
1314 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1315 \if@ACM@printacmref
1316 \ClassInfo{\@classname}{Printing bibformat}%
1317 \else
1318 \ClassInfo{\@classname}{Suppressing bibformat}%
1319 \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}

\if@ACM@printfolios Whether to print folios
1320 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1321 \if@ACM@printfolios
1322 \ClassInfo{\@classname}{Printing folios}%
1323 \else
1324 \ClassInfo{\@classname}{Suppressing folios}%
1325 \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}

\@ACM@authorsperrow The number of authors per row. 0 means use the default algorithm.
1326 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrow}[0]{%
1327 \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrow to
1328 #1}}{\ClassWarning{\@classname}{The parameter authorsperrow must be
1329 numerical. Ignoring the input #1}\gdef\@ACM@authorsperrow{0}}}}

\settopmatter The usual syntactic sugar
1330 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

Now the settings
1331 \settopmatter{printccs=true, printacmref=true}
1332 \if@ACM@manuscript
1333 \settopmatter{printfolios=true}
1334 \else
1335 \if@ACM@journal
1336 \settopmatter{printfolios=true}
1337 \else
1338 \settopmatter{printfolios=false}
1339 \fi
1340 \fi
1341 \settopmatter{authorsperrow=0}

\@received The container for the paper history
1342 \def\@received{}

```

`\received` The `\received` command

```

1343 \newcommand\received[2][\def\tempa{#1}%
1344 \ifx\tempa\empty
1345 \ifx\@received\@empty
1346 \gdef\@received{Received #2}%
1347 \else
1348 \g@addto@macro{\@received}{; revised #2}%
1349 \fi
1350 \else
1351 \ifx\@received\@empty
1352 \gdef\@received{#1 #2}%
1353 \else
1354 \g@addto@macro{\@received}{; #1 #2}%
1355 \fi
1356 \fi}
1357 \AtEndDocument{%
1358 \ifx\@received\@empty\else
1359 \par\bigskip\noindent\small\normalfont\@received\par
1360 \fi}

```

3.13 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```

1361 \RequirePackage{comment}
1362 \excludecomment{CCSXML}

```

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

```

1363 \let\@concepts\@empty
1364 \newcounter{@concepts}

```

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

```

1365 \newcommand\ccsdesc[2][100]{%
1366 \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!

```

1367 \RequirePackage{textcomp}
1368 \def\ccsdesc@parse#1~#2~#3~{%
1369 \stepcounter{@concepts}%
1370 \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1371 \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1372 \textbf{#2}}%
1373 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
1374 \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1375 \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
1376 \csname CCS@Punctuation@#2\endcsname
1377 \csname CCS@Specific@#2\endcsname}%
1378 \fi
1379 \ifx#3\relax\relax\else

```



```

1380 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
1381 \textrightarrow\ }%
1382 \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1383 \addtocounter{@concepts}{-1}%
1384 \ifnum#1>499\textbf{#3}\else
1385 \ifnum#1>299\textit{#3}\else
1386 #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
1387 \fi
1388 \ccsdesc@parse@finish}

```

```

\ccdesc@parse@finish Gobble everything to \ccsdesc@parse@end
1389 \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
1390 \newif\if@printcopyright
1391 \@printcopyrighttrue

```

```

\if@printpermission Whether to print the permission block
1392 \newif\if@printpermission
1393 \@printpermissiontrue

```

```

\if@acmowned Whether the ACM owns the rights to the paper
1394 \newif\if@acmowned
1395 \@acmownedtrue

```

Keys:

```

1396 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1397 \acm@copyrightinput\acm@copyrightmode]{none,%
1398 acmcopyright,acmlicensed,rightsretained,%
1399 usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1400 licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
1401 iw3c2w3,iw3c2w3g}{%
1402 \@printpermissiontrue
1403 \@printcopyrighttrue
1404 \@acmownedtrue
1405 \ifnum\acm@copyrightmode=0\relax % none
1406 \@printpermissionfalse
1407 \@printcopyrightfalse
1408 \@acmownedfalse
1409 \fi
1410 \ifnum\acm@copyrightmode=2\relax % acmlicensed
1411 \@acmownedfalse
1412 \fi
1413 \ifnum\acm@copyrightmode=3\relax % rightsretained
1414 \@acmownedfalse

```

```

1415 \AtBeginDocument{\acmPrice{}}%
1416 \fi
1417 \ifnum\acm@copyrightmode=4\relax % usgov
1418 \printpermissiontrue
1419 \printcopyrightfalse
1420 \acmownedfalse
1421 \AtBeginDocument{\acmPrice{}}%
1422 \fi
1423 \ifnum\acm@copyrightmode=6\relax % cagov
1424 \acmownedfalse
1425 \fi
1426 \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1427 \acmownedfalse
1428 \fi
1429 \ifnum\acm@copyrightmode=9\relax % licensedcagov
1430 \acmownedfalse
1431 \fi
1432 \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1433 \acmownedfalse
1434 \fi
1435 \ifnum\acm@copyrightmode=11\relax % othergov
1436 \acmownedtrue
1437 \fi
1438 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1439 \acmownedfalse
1440 \fi
1441 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1442 \acmownedfalse
1443 \AtBeginDocument{\acmPrice{}}%
1444 \fi
1445 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1446 \acmownedfalse
1447 \AtBeginDocument{\acmPrice{}}%
1448 \fi}

```

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

```

1449 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1450 \setcopyright{acmcopyright}

```

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

```

1451 \def\@copyrightowner{%
1452 \ifcase\acm@copyrightmode\relax % none
1453 \or % acmcopyright
1454 Association for Computing Machinery.
1455 \or % acmlicensed
1456 Copyright held by the owner/author(s). Publication rights licensed to
1457 ACM\@.
1458 \or % rightsretained
1459 Copyright held by the owner/author(s).
1460 \or % usgov

```

1461 \or % usgovmixed
 1462 Association for Computing Machinery.
 1463 \or % cagov
 1464 Crown in Right of Canada.
 1465 \or %cagovmixed
 1466 Association for Computing Machinery.
 1467 \or %licensedusgovmixed
 1468 Copyright held by the owner/author(s). Publication rights licensed to
 1469 ACM\@.
 1470 \or % licensedcagov
 1471 Crown in Right of Canada. Publication rights licensed to
 1472 ACM\@.
 1473 \or %licensedcagovmixed
 1474 Copyright held by the owner/author(s). Publication rights licensed to
 1475 ACM\@.
 1476 \or % othergov
 1477 Association for Computing Machinery.
 1478 \or % licensedothergov
 1479 Copyright held by the owner/author(s). Publication rights licensed to
 1480 ACM\@.
 1481 \or % ic2w3www
 1482 IW3C2 (International World Wide Web Conference Committee), published
 1483 under Creative Commons CC-BY~4.0 License.
 1484 \or % ic2w3wwwgoogle
 1485 IW3C2 (International World Wide Web Conference Committee), published
 1486 under Creative Commons CC-BY-NC-ND~4.0 License.
 1487 \fi}

\@formatdoi Print a clickable DOI

1488 \def\@formatdoi#1{\url{https://doi.org/#1}}

\@copyrightpermission The canned permission block.

1489 \def\@copyrightpermission{%
 1490 \ifcase\acm@copyrightmode\relax % none
 1491 \or % acmcopyright
 1492 Permission to make digital or hard copies of all or part of this
 1493 work for personal or classroom use is granted without fee provided
 1494 that copies are not made or distributed for profit or commercial
 1495 advantage and that copies bear this notice and the full citation on
 1496 the first page. Copyrights for components of this work owned by
 1497 others than ACM must be honored. Abstracting with credit is
 1498 permitted. To copy otherwise, or republish, to post on servers or to
 1499 redistribute to lists, requires prior specific permission
 1500 and\hspace*{.5pt}/or a fee. Request permissions from
 1501 permissions@acm.org.
 1502 \or % acmlicensed
 1503 Permission to make digital or hard copies of all or part of this
 1504 work for personal or classroom use is granted without fee provided
 1505 that copies are not made or distributed for profit or commercial
 1506 advantage and that copies bear this notice and the full citation on

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1511 and\hspace*.5pt}/or a fee. Request permissions from
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1517 and that copies bear this notice and the full citation on the first
1518 page. Copyrights for third-party components of this work must be
1519 honored. For all other uses, contact the
1520 owner\hspace*.5pt}/author(s).

1521 \or % usgov

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1525 given and the authors and agency are clearly identified as its
1526 source.

1527 \or % usgovmixed

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1533 \or % cagov

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1574 use is granted. Copies must bear this notice and the full citation
1575 on the first page. Copyrights for components of this work owned by
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1579 permissions@acm.org.

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1599 only.

1600 \or % iw3c2w3

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1602 International (CC-BY~4.0) license. Authors reserve their rights to
1603 disseminate the work on their personal and corporate Web sites with
1604 the appropriate attribution.

1605 \or % iw3c2w3g

1606 This paper is published under the Creative Commons

```

1607 Attribution-NonCommercial-NoDerivs~4.0 International
1608 (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
1609 disseminate the work on their personal and corporate Web sites with
1610 the appropriate attribution.
1611 \fi}

```

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

```

1612 \def\copyrightyear#1{\def\copyrightyear{#1}}
1613 \copyrightyear{\@acmYear}

```

`\@teaserfigures` The teaser figures container

```

1614 \def\@teaserfigures{}

```

`teaserfigure` The teaser figure

```

1615 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

```

`\@saveteaser` Saving the teaser

```

1616 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

```

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

```

1617 \renewcommand{\thanks}[1]{%
1618   \@ifnotempty{#1}{%
1619     \if@ACM@anonymous
1620       \g@addto@macro\thankses{\thanks{A note}}%
1621     \else
1622       \g@addto@macro\thankses{\thanks{#1}}%
1623     \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>]`.

```

1624 \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.

```

1625 \def\maketitle{%
1626   \if@ACM@anonymous
1627     % Anonymize omission of \author-s
1628     \ifnum\@authorgroups=0\author{}\fi
1629   \fi
1630   \begingroup
1631   \let\@footnotemark\@footnotemark@nolink
1632   \let\@footnotetext\@footnotetext@nolink

```

```

1633 \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
1634 \hsize=\textwidth
1635 \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
1636 \@mktitle\if@ACM@sigchiamode\else\mkauthors\fi\@mkteasers
1637 \@printtopmatter
1638 \if@ACM@sigchiamode\mkauthors\fi
1639 \setcounter{footnote}{0}%
1640 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
1641 \@titlenotes
1642 \@subtitlenotes
1643 \@authornotes
1644 \let\@makefnmark\relax
1645 \let\@thefnmark\relax
1646 \let\@makefntext\noindent
1647 \ifx\@empty\thankses\else
1648   \footnotetextauthorsaddresses{%
1649     \def\par{\let\par\@par}\parindent\z@\@setthanks}%
1650 \fi
1651 \ifx\@empty\@authorsaddresses\else
1652   \if@ACM@anonymous\else
1653     \if@ACM@journal
1654       \footnotetextauthorsaddresses{%
1655         \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
1656       \fi
1657     \fi
1658   \fi
1659 \if@ACM@nonacm\else\footnotetextcopyrightpermission{%
1660   \if@ACM@authordraft
1661     \raisebox{-2ex}[\z@][\z@]{\makebox[0pt][l]{\large\bfseries
1662       Unpublished working draft. Not for distribution.}}%
1663     \color[gray]{0.9}%
1664   \fi
1665   \parindent\z@\parskip0.1\baselineskip
1666   \if@ACM@authorversion\else
1667     \if@printpermission\@copyrightpermission\par\fi
1668   \fi
1669   \if@ACM@manuscript\else
1670     \if@ACM@journal\else % Print the conference information
1671     {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
1672     \fi
1673   \fi
1674   \if@printcopyright
1675     \copyright\ \@copyrightyear\ \@copyrightowner\
1676   \else
1677     \@copyrightyear.\
1678   \fi
1679   \if@ACM@manuscript
1680     Manuscript submitted to ACM\
1681   \else
1682     \if@ACM@authorversion

```

```

1683         This is the author's version of the work. It is posted here for
1684         your personal use. Not for redistribution. The definitive Version
1685         of Record was published in
1686         \if@ACM@journal
1687             \emph{\@journalName}%
1688         \else
1689             \emph{\@acmBooktitle}%
1690         \fi
1691         \ifx\@acmDOI\@empty
1692             .
1693         \else
1694             , \@formatdoi{\@acmDOI}.
1695         \fi\
1696     \else
1697         \if@ACM@nonacm\else
1698             \if@ACM@journal
1699                 \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle
1700                 \ifx\@acmPrice\@empty\else\ $\@acmPrice\fi\
1701                 \@formatdoi{\@acmDOI}%
1702             \else % Conference
1703                 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN
1704                 \ifx\@acmPrice\@empty.\else\dots\$\@acmPrice\fi\
1705                 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
1706             \fi
1707         \fi
1708     \fi
1709 \fi}
1710 \fi
1711 \endgroup
1712 \setcounter{footnote}{0}%
1713 \mkabstract
1714 \if@ACM@printccs
1715     \ifx\@concepts\@empty\else\bgroup
1716         {\@specialsection{CCS Concepts}%
1717         \@concepts\par}\egroup
1718     \fi
1719 \fi
1720 \ifx\@keywords\@empty\else\bgroup
1721     {\if@ACM@journal
1722         \@specialsection{Additional Key Words and Phrases}%
1723     \else
1724         \@specialsection{Keywords}%
1725     \fi
1726     \@keywords}\par\egroup
1727 \fi
1728 \andify\authors
1729 \andify\shortauthors
1730 \global\let\authors=\authors
1731 \global\let\shortauthors=\shortauthors
1732 \if@ACM@printacmref

```



```

1733     \@mkbibcitation
1734 \fi
1735 \hypersetup{%
1736   pdfauthor={\authors},
1737   pdftitle={\@title},
1738   pdfsubject={\@concepts},
1739   pdfkeywords={\@keywords},
1740   pdfcreator={LaTeX with acmart
1741     \csname ver@acmart.cls\endcsname\space
1742     and hyperref
1743     \csname ver@hyperref.sty\endcsname}}%
1744 \global\@topnum\z@ % this prevents floats from falling
1745                   % at the top of page 1
1746 \global\@botnum\z@ % we do not want them to be on the bottom either
1747 \@printtopmatter
1748 \@afterindentfalse
1749 \@afterheading
1750 }

```

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

```

1751 \def\@specialsection#1{%
1752   \ifcase\ACM@format@nr
1753   \relax % manuscript
1754   \par\medskip\small\noindent#1: %
1755   \or % acmsmall
1756   \par\medskip\small\noindent#1: %
1757   \or % acmlarge
1758   \par\medskip\small\noindent#1: %
1759   \or % acmtog
1760   \par\medskip\small\noindent#1: %
1761   \or % sigconf
1762   \section*{#1}%
1763   \or % siggraph
1764   \section*{#1}%
1765   \or % sigplan
1766   \paragraph*{#1}%
1767   \or % sigchi
1768   \section*{#1}%
1769   \or % sigchi-a
1770   \section*{#1}%
1771   \fi}

```

`\@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 `\mkttitle` since we want them in the margins.

```

1772 \def\@printtopmatter{%
1773   \ifx\@startPage\@empty
1774     \gdef\@startPage{1}%
1775   \else

```

```

1776     \setcounter{page}{\@startPage}%
1777     \fi
1778     \thispagestyle{firstpagestyle}%
1779     \noindent
1780     \ifcase\ACM@format@nr
1781     \relax % manuscript
1782     \box\mktitle@bx\par
1783     \or % acmsmall
1784     \box\mktitle@bx\par
1785     \or % acmlarge
1786     \box\mktitle@bx\par
1787     \or % acmtog
1788     \twocolumn[\box\mktitle@bx]%
1789     \or % sigconf
1790     \twocolumn[\box\mktitle@bx]%
1791     \or % siggraph
1792     \twocolumn[\box\mktitle@bx]%
1793     \or % sigplan
1794     \twocolumn[\box\mktitle@bx]%
1795     \or % sigchi
1796     \twocolumn[\box\mktitle@bx]%
1797     \or % sigchi-a
1798     \par\box\mktitle@bx\par\bigskip
1799     \ifACM@badge
1800         \marginpar{\noindent
1801             \ifx\@acmBadgeL@image\empty\else
1802                 \href{\@acmBadgeL@url}{%
1803                     \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
1804                 \hskip\@ACM@badge@skip
1805             \fi
1806             \ifx\@acmBadgeR@image\empty\else
1807                 \href{\@acmBadgeR@url}{%
1808                     \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
1809             \fi}%
1810     \fi
1811     \fi
1812 }

```

`\@mktitle` The title of the article

```

1813 \def\@mktitle{%
1814     \ifcase\ACM@format@nr
1815     \relax % manuscript
1816     \@mktitle@i
1817     \or % acmsmall
1818     \@mktitle@i
1819     \or % acmlarge
1820     \@mktitle@i
1821     \or % acmtog
1822     \@mktitle@i
1823     \or % sigconf

```

```

1824 \mktitle@iii
1825 \or % siggraph
1826 \mktitle@iii
1827 \or % sigplan
1828 \mktitle@iii
1829 \or % sigchi
1830 \mktitle@iii
1831 \or % sigchi-a
1832 \mktitle@iv
1833 \fi
1834 }

```

\@titlefont The font to typeset the title

```

1835 \def\@titlefont{%
1836 \ifcase\ACM@format@nr
1837 \relax % manuscript
1838 \LARGE\sffamily\bfseries
1839 \or % acmsmall
1840 \LARGE\sffamily\bfseries
1841 \or % acmlarge
1842 \LARGE\sffamily\bfseries
1843 \or % acmtog
1844 \Huge\sffamily
1845 \or % sigconf
1846 \Huge\sffamily\bfseries
1847 \or % siggraph
1848 \Huge\sffamily\bfseries
1849 \or % sigplan
1850 \Huge\bfseries
1851 \or % sigchi
1852 \Huge\sffamily\bfseries
1853 \or % sigchi-a
1854 \Huge\bfseries
1855 \fi}

```

\@subtitlefont The font to typeset the subtitle

```

1856 \def\@subtitlefont{\normalsize
1857 \ifcase\ACM@format@nr
1858 \relax % manuscript
1859 \mdseries
1860 \or % acmsmall
1861 \mdseries
1862 \or % acmlarge
1863 \mdseries
1864 \or % acmtog
1865 \LARGE
1866 \or % sigconf
1867 \LARGE\mdseries
1868 \or % siggraph
1869 \LARGE\mdseries

```

```

1870 \or % sigplan
1871     \LARGE\mdseries
1872 \or % sigchi
1873     \LARGE\mdseries
1874 \or % sigchi-a
1875     \mdseries
1876 \fi}

```

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

```

1877 \def\@mkttitle@i{\hsize=\textwidth
1878   \@ACM@title@width=\hsize
1879   \ifx\@acmBadgeL@image\@empty\else
1880     \advance\@ACM@title@width by -\@ACM@badge@width
1881     \advance\@ACM@title@width by -\@ACM@badge@skip
1882   \fi
1883   \ifx\@acmBadgeR@image\@empty\else
1884     \advance\@ACM@title@width by -\@ACM@badge@width
1885     \advance\@ACM@title@width by -\@ACM@badge@skip
1886   \fi
1887   \setbox\mkttitle@bx=\vbox{\noindent\@titlefont
1888     \ifx\@acmBadgeL@image\@empty\else
1889       \raisebox{- .5\baselineskip}{\z@\z@}{\href{\@acmBadgeL@url}{%
1890         \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
1891       \hskip\@ACM@badge@skip
1892     \fi
1893     \parbox[t]{\@ACM@title@width}{\raggedright
1894       \@titlefont\noindent
1895       \@title
1896     \ifx\@subtitle\@empty\else
1897       \par\noindent{\@subtitlefont\@subtitle}
1898     \fi}%
1899     \ifx\@acmBadgeR@image\@empty\else
1900       \hskip\@ACM@badge@skip
1901       \raisebox{- .5\baselineskip}{\z@\z@}{\href{\@acmBadgeR@url}{%
1902         \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
1903     \fi
1904     \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 centered, we leave space for the left badge even if only the right badge is defined.

```

1905 \def\@mkttitle@iii{\hsize=\textwidth
1906   \setbox\mkttitle@bx=\vbox{\@titlefont\centering
1907     \@ACM@title@width=\hsize
1908     \if@ACM@badge
1909       \advance\@ACM@title@width by -2\@ACM@badge@width
1910       \advance\@ACM@title@width by -2\@ACM@badge@skip
1911     \parbox[b]{\@ACM@badge@width}{\strut

```

```

1912         \ifx\@acmBadgeL@image\@empty\else
1913             \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
1914                 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
1915         \fi}%
1916     \hskip\@ACM@badge@skip
1917 \fi
1918 \parbox[t]{\@ACM@title@width}{\centering\@titlefont
1919     \@title
1920     \ifx\@subtitle\@empty\else
1921         \par\noindent{\@subtitlefont\@subtitle}
1922     \fi
1923 }%
1924 \if@ACM@badge
1925     \hskip\@ACM@badge@skip
1926     \parbox[b]{\@ACM@badge@width}{\strut
1927         \ifx\@acmBadgeR@image\@empty\else
1928             \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
1929                 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
1930         \fi}%
1931 \fi
1932 \par\bigskip}}%

```

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

```

1933 \def\@mktitle@iv{\hspace=\textwidth
1934     \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
1935         \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
1936         \noindent\@title
1937         \ifx\@subtitle\@empty\else
1938             \par\noindent\@subtitlefont\@subtitle
1939         \fi
1940     \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.

```

1941 \newbox\@ACM@commabox
1942 \def\@ACM@addtoaddress#1{%
1943     \ifvmode\else
1944         \if@ACM@affiliation@obeypunctuation\else
1945             \setbox\@ACM@commabox=\hbox{, }%
1946             \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
1947         \fi\fi
1948     #1}

```

```

\institution Theoretically we can define the macros for \affiliation inside the \@mkauthors-style
\position commands. However, this would lead to a strange error if an author uses them outside
\department \affiliation. Of course we can make them produce an error message, but...
\streetaddress 1949 \def\streetaddress#1{\unskip\ignorespaces}
\city 1950 \def\postcode#1{\unskip\ignorespaces}
\state 1951 \if@ACM@journal
\postcode 1952 \def\position#1{\unskip\ignorespaces}
\country 1953 \def\institution#1{\unskip~#1\ignorespaces}
1954 \def\city#1{\unskip\ignorespaces}
1955 \def\state#1{\unskip\ignorespaces}
1956 \newcommand\department[2][0]{\unskip\ignorespaces}
1957 \def\country#1{\if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
1958 \else
1959 \def\position#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
1960 \def\institution#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
1961 \newcommand\department[2][0]{\if@ACM@affiliation@obeypunctuation
1962 #2\else#2\par\fi}%
1963 % \def\streetaddress#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
1964 \let\city\@ACM@addtoaddress
1965 \let\state\@ACM@addtoaddress
1966 % \def\postcode#1{\if@ACM@affiliation@obeypunctuation#1\else\unskip\space#1\fi}%
1967 \let\country\@ACM@addtoaddress
1968 \fi

\@mkauthors Typesetting the authors
1969 \def\@mkauthors{\begingroup
1970 \hsize=\textwidth
1971 \ifcase\ACM@format@nr
1972 \relax % manuscript
1973 \@mkauthors@i
1974 \or % acsmall
1975 \@mkauthors@i
1976 \or % acmlarge
1977 \@mkauthors@i
1978 \or % acmtog
1979 \@mkauthors@i
1980 \or % sigconf
1981 \@mkauthors@iii
1982 \or % siggraph
1983 \@mkauthors@iii
1984 \or % sigplan
1985 \@mkauthors@iii
1986 \or % sigchi
1987 \@mkauthors@iii
1988 \or % sigchi-a
1989 \@mkauthors@iv
1990 \fi
1991 \endgroup
1992 }

```

`\@authorfont` Somehow different conferences use different fonts for author names. Why?
1993 `\def\@authorfont{\Large\sffamily}`

`\@affiliationfont` Font for affiliations
1994 `\def\@affiliationfont{\normalsize\normalfont}`

Adjusting fonts for different formats

```
1995 \ifcase\ACM@format@nr
1996 \relax % manuscript
1997 \or % acsmall
1998 \def\@authorfont{\large\sffamily}
1999 \def\@affiliationfont{\small\normalfont}
2000 \or % acmlarge
2001 \or % acmtog
2002 \def\@authorfont{\LARGE\sffamily}
2003 \def\@affiliationfont{\large}
2004 \or % sigconf
2005 \def\@authorfont{\LARGE}
2006 \def\@affiliationfont{\large}
2007 \or % siggraph
2008 \def\@authorfont{\normalsize\normalfont}
2009 \def\@affiliationfont{\normalsize\normalfont}
2010 \or % sigplan
2011 \def\@authorfont{\Large\normalfont}
2012 \def\@affiliationfont{\normalsize\normalfont}
2013 \or % sigchi
2014 \def\@authorfont{\bfseries}
2015 \def\@affiliationfont{\mdseries}
2016 \or % sigchi-a
2017 \def\@authorfont{\bfseries}
2018 \def\@affiliationfont{\mdseries}
2019 \fi
```

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

```
2020 \def\@typeset@author@line{%
2021 \andify\@currentauthors\par\noindent
2022 \@currentauthors\def\@currentauthors{}%
2023 \ifx\@currentaffiliations\@empty\else
2024 \andify\@currentaffiliations
2025 \unskip, {\@currentaffiliations}\par
2026 \fi
2027 \def\@currentaffiliations{}}
```

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

```
2028 \def\@mkauthors@i{%
2029 \def\@currentauthors{}%
2030 \def\@currentaffiliations{}}
```

```

2031 \global\let\and\@typeset@author@line
2032 \def\@author##1{%
2033   \ifx\@currentauthors\@empty
2034     \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
2035   \else
2036     \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
2037   \fi
2038   \gdef\and{}}%
2039 \def\email##1##2{%
2040 \def\affiliation##1##2{%
2041   \def\@tempa{##2}\ifx\@tempa\@empty\else
2042     \ifx\@currentaffiliations\@empty
2043       \gdef\@currentaffiliations{%
2044         \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2045         \setkeys{@ACM@affiliation@}{##1}%
2046         \@affiliationfont##2}%
2047     \else
2048       \g@addto@macro{\@currentaffiliations}{\and
2049         \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2050         \setkeys{@ACM@affiliation@}{##1}##2}%
2051     \fi
2052   \fi
2053   \global\let\and\@typeset@author@line}%
2054 \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par\medskip
2055 \noindent\addresses\@typeset@author@line
2056 \par\medskip}%
2057 }

```

`\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
2058 `\newbox\author@bx`

`\author@bx@wd` The width of the author box
2059 `\newdimen\author@bx@wd`

`\author@bx@sep` The separation between author boxes
2060 `\newskip\author@bx@sep`
2061 `\author@bx@sep=1pc\relax`

`\@typeset@author@bx` Typesetting the box with authors. Note that in `sigchi-a` the box is not centered.
2062 `\def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd\def\and{\par}%`
2063 `\global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi`
2064 `\@authorfont\@currentauthors\par\@affiliationfont`
2065 `\@currentaffiliation}\egroup`
2066 `\box\author@bx\hspace{\author@bx@sep}%`
2067 `\gdef\@currentauthors{}}%`
2068 `\gdef\@currentaffiliation{}}`

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

```
2069 \def\@mkauthors@iii{%
```

First, we need to determine the design of the author strip. The boxes are separated by \author@bx@sep plus two \author@bx@sep margins. This means that each box must be of width $(\text{textwidth} - \text{author@bx@sep})/N - \text{author@bx@sep}$, where N is the number of boxes per row.

```
2070 \author@bx@wd=\textwidth\relax
2071 \advance\author@bx@wd by -\author@bx@sep\relax
2072 \ifnum\@ACM@authorsperrow>0\relax
2073   \divide\author@bx@wd by \@ACM@authorsperrow\relax
2074 \else
2075   \ifcase\num@authorgroups
2076   \relax % 0?
2077   \or % 1=one author per row
2078   \or % 2=two authors per row
2079     \divide\author@bx@wd by \num@authorgroups\relax
2080   \or % 3=three authors per row
2081     \divide\author@bx@wd by \num@authorgroups\relax
2082   \or % 4=two authors per row (!)
2083     \divide\author@bx@wd by 2\relax
2084   \else % three authors per row
2085     \divide\author@bx@wd by 3\relax
2086   \fi
2087 \fi
2088 \advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of \addresses:

```
2089 \gdef\@currentauthors{}%
2090 \gdef\@currentaffiliation{}%
2091 \def\@author##1{\ifx\@currentauthors\@empty
2092   \gdef\@currentauthors{\par##1}%
2093 \else
2094   \g@addto@macro\@currentauthors{\par##1}%
2095 \fi
2096 \gdef\@and{}}%
2097 \def\@email##1##2{\ifx\@currentaffiliation\@empty
2098   \gdef\@currentaffiliation{\bgroup
2099     \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2100 \else
2101   \g@addto@macro\@currentaffiliation{\par\bgroup
2102     \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2103 \fi}%
2104 \def\@affiliation##1##2{\ifx\@currentaffiliation\@empty
2105   \gdef\@currentaffiliation{%
2106     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2107     \setkeys{@ACM@affiliation@}{##1}##2}%
2108 \else
2109   \g@addto@macro\@currentaffiliation{\par
2110     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
```

```

2111     \setkeys{@ACM@affiliation@}{##1}##2}%
2112   \fi
2113   \global\let\and\@typeset@author@bx
2114 }%

```

Actual typesetting is done by the `\and` macro:

```

2115   \hsize=\textwidth
2116   \global\setbox\mktitle@bx=\vbox{\noindent
2117     \box\mktitle@bx\par\medskip\leavevmode
2118     \lineskip=1pc\relax\centering\hspace*{-1em}%
2119     \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.

```
2120 \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.

```

2121   \author@bx@wd=\columnwidth\relax
2122   \advance\author@bx@wd by -\author@bx@sep\relax
2123   \ifnum\@ACM@author@sprow>0\relax
2124     \divide\author@bx@wd by \@ACM@author@sprow\relax
2125   \else
2126     \ifcase\@num@author@groups
2127     \relax % 0?
2128     \or % 1=one author per row
2129     \else % 2=two authors per row
2130       \divide\author@bx@wd by 2\relax
2131     \fi
2132   \fi
2133   \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of `\addresses`:

```

2134   \gdef\@currentauthors{}%
2135   \gdef\@currentaffiliation{}%
2136   \def\@author##1{\ifx\@currentauthors\@empty
2137     \gdef\@currentauthors{\par##1}%
2138   \else
2139     \g@addto@macro\@currentauthors{\par##1}%
2140   \fi
2141   \gdef\and{}}%
2142   \def\email##1##2{\ifx\@currentaffiliation\@empty
2143     \gdef\@currentaffiliation{\nolinkurl{##2}}%
2144   \else
2145     \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2146   \fi}%
2147   \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2148     \gdef\@currentaffiliation{%

```

```

2149     \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2150     \setkeys{@ACM@affiliation@}{##1}##2}%
2151 \else
2152   \g@addto@macro\@currentaffiliation{\par
2153     \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2154     \setkeys{@ACM@affiliation@}{##1}##2}%
2155   \fi
2156   \global\let\and\@typeset@author@bx}%
2157 %

```

Actual typesetting is done by the `\and` macro

```

2158   \bgroup\hsize=\columnwidth
2159   \par\raggedright\leftskip=\z@
2160   \lineskip=1pc\noindent
2161   \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

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

```

2162 \def\@mkauthorsaddresses{%
2163   \ifnum\num@authors>1\relax
2164   Authors' \else Author's \fi
2165   \ifnum\num@authorgroups>1\relax
2166   addresses: \else address: \fi
2167   \bgroup
2168   \def\streetaddress##1{\unskip\@addpunct, ##1}%
2169   \def\postcode##1{\unskip\@addpunct, ##1}%
2170   \def\position##1{\unskip\ignorespaces}%
2171   \def\institution##1{\unskip\@addpunct, ##1}%
2172   \def\city##1{\unskip\@addpunct, ##1}%
2173   \def\state##1{\unskip\@addpunct, ##1}%
2174   \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2175   \def\country##1{\unskip\@addpunct, ##1}%
2176   \def\and{\unskip\@addpunct; }%
2177   \def\@author##1{##1}%
2178   \def\email##1##2{\unskip\@addpunct, \nolinkurl{##2}}%
2179   \addresses
2180   \egroup}

```

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

```

2181 \def\@setaddresses{}

```

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

```

2182 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}

```

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

```

2183 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}

```

`\@mkteasers` Typesetting the teasers

```

2184 \def\@mkteasers{%
2185   \ifx\@teaserfigures\@empty\else

```

```

2186 \def\@teaser##1{\par\bigskip\bgroup
2187   \captionsetup{type=figure}##1\egroup\par}
2188 \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par
2189   \noindent\@Description@presentfalse
2190   \@teaserfigures\par\if@Description@present\else
2191     \global\@undescrbed@imagestrue
2192     \ClassWarning{\@classname}{A possible image without
2193       description}\fi
2194   \medskip}%
2195 \fi}

\@mkabstract Typesetting the abstract
2196 \def\@mkabstract{\bgroup
2197   \ifx\@abstract\@empty\else
2198     {\phantomsection\addcontentsline{toc}{section}{Abstract}%
2199     \if@ACM@journal
2200       \everypar{\setbox\z@\lastbox\everypar{}}\small
2201     \else
2202       \section*\@abstractname}%
2203     \fi
2204     \ignorespaces\@abstract\par}%
2205 \fi\egroup}

\@mkbibcitation Print the bibcitation format
2206 \def\@mkbibcitation{\bgroup
2207   \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2208   \def\footnotemark{}%
2209   \def\{\unskip}\ \ignorespaces}%
2210   \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2211     inside a \string\title{} or \string\author{} command! Use
2212     \string\titlenote{} or \string\authornote{} instead!}}%
2213   \def\@article@string{\ifx\@acmArticle\@empty{\ }else,
2214     Article~\@acmArticle\ \fi}%
2215   \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2216   \noindent\bgroup
2217     \def\{\unskip}, \ignorespaces\authors\egroup. \@acmYear. \@title
2218     \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2219     \if@ACM@nonacm\else
2220       % The 'nonacm' option disables 'printacmref' by default,
2221       % and the present \@mkbibcitation definition is never used
2222       % in this case. The conditional remains useful if the user
2223       % explicitly sets \settopmatter{printacmref=true}.
2224       \if@ACM@journal
2225         \textit{\@journalNameShort}
2226         \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2227         \ref{TotPages}~\@pages@word.
2228       \else
2229         In \textit{\@acmBooktitle}%
2230         \ifx\@acmEditors\@empty\textit{.}\else
2231           \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%

```

```

2232     \fi\
2233     ACM, New York, NY, USA%
2234     \@article@string\unskip, \ref{TotPages}~\@pages@word.
2235     \fi
2236     \fi
2237     \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2238 \par\egroup}

```

```

\@printendtopmatter End the top matter
2239 \def\@printendtopmatter{\par\bigskip}

```

```

\@setthanks We redefine \setthanks using \long
2240 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}

```

```

\@setauthorsaddresses
2241 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}

```

3.16 Headers and Footers

We use fancyhdr for our headers and footers:

```

2242 \RequirePackage{fancyhdr}

```

```

\ACM@linecount@bx This is the box displayed in review mode
2243 \if@ACM@review
2244   \newsavebox{\ACM@linecount@bx}
2245   \newlength\ACM@linecount@bxht
2246   \newcount\ACM@linecount
2247   \ACM@linecount\@ne\relax
2248   \def\ACM@mk@linecount{%
2249     \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{%
2250       \setlength{\ACM@linecount@bxht}{0pt}%
2251       \loop{\color{red}\scriptsize\the\ACM@linecount}\@
2252       \global\advance\ACM@linecount by \@ne
2253       \addtolength{\ACM@linecount@bxht}{\baselineskip}%
2254       \ifdim\ACM@linecount@bxht<\textheight\repeat
2255       {\color{red}\scriptsize\the\ACM@linecount}\hfill
2256       \global\advance\ACM@linecount by \@ne}}
2257   \fi

```

```

\ACM@linecountL How to display the box on the left
2258 \def\ACM@linecountL{%
2259   \if@ACM@review
2260     \ACM@mk@linecount
2261     \begin{picture}(0,0)%
2262       \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2263     \end{picture}%
2264   \fi}

```

```

\ACM@linecountR How to display the box on the right
2265 \def\ACM@linecountR{%
2266   \if@ACM@review
2267   \ACM@mk@linecount
2268   \begin{picture}(0,0)%
2269     \put(20,-22){\usebox{\ACM@linecount@bx}}%
2270   \end{picture}%
2271   \fi}

\ACM@timestamp The timestamp system
2272 \if@ACM@timestamp
2273   % Subtracting 30 from \time gives us the effect of rounding down despite
2274   % \numexpr rounding to nearest
2275   \newcounter{ACM@time@hours}
2276   \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
2277   \newcounter{ACM@time@minutes}
2278   \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
2279   \newcommand\ACM@timestamp{%
2280     \footnotesize%
2281     \ifx\@acmSubmissionID\@empty\relax\else
2282     Submission ID: \@acmSubmissionID.{ }%
2283     \fi
2284     \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
2285     \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
2286     Page \thepage\ of \@startPage--\pageref*{TotPages}.%
2287   }
2288 \fi

\@shortauthors Even if the author redefined \shortauthors, we do not print it in the headers when in
anonymous mode:
2289 \def\@shortauthors{%
2290   \if@ACM@anonymous
2291     Anon.
2292     \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
2293   \else\shortauthors\fi}

\@headfootfont The font to typeset header and footer text.
2294 \def\@headfootfont{\sffamily}

standardpagestyle The page style for all pages but the first one The page style for all pages but the first one
2295 \fancypagestyle{standardpagestyle}{%
2296   \fancyhf{}%
2297   \renewcommand{\headrulewidth}{\z@}%
2298   \renewcommand{\footrulewidth}{\z@}%
2299   \def\@acmArticlePage{%
2300     \ifx\@acmArticle\empty%
2301       \if@ACM@printfolios\thepage\fi%
2302     \else%
2303       \@acmArticle\if@ACM@printfolios:\thepage\fi%

```

```

2304 \fi%
2305 }
2306 \ifcase\ACM@format@nr
2307 \relax % manuscript
2308 \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
2309 \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
2310 \fancyhead[RE]{\@shortauthors}%
2311 \fancyhead[LO]{\ACM@linecountL\shorttitle}%
2312 \if@ACM@nonacm\else%
2313 \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
2314 \fi%
2315 \or % acsmall
2316 \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
2317 \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
2318 \fancyhead[RE]{\@headfootfont\@shortauthors}%
2319 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2320 \if@ACM@nonacm\else%
2321 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2322 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2323 \fi%
2324 \or % acmlarge
2325 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2326 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2327 \fancyhead[LO]{\ACM@linecountL}%
2328 \fancyhead[RO]{\@headfootfont
2329 \shorttitle\quad\textbullet\quad\@acmArticlePage}%
2330 \if@ACM@nonacm\else%
2331 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2332 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2333 \fi%
2334 \or % acmtog
2335 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2336 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2337 \fancyhead[LO]{\ACM@linecountL}%
2338 \fancyhead[RE]{\ACM@linecountR}%
2339 \fancyhead[RO]{\@headfootfont
2340 \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
2341 \if@ACM@nonacm\else%
2342 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2343 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2344 \fi%
2345 \else % Proceedings
2346 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2347 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2348 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
2349 \if@ACM@nonacm\else%
2350 \fancyhead[LE]{\ACM@linecountL\@headfootfont\acmConference@shortname,
2351 \acmConference@date, \acmConference@venue}%
2352 \fancyhead[RO]{\@headfootfont\acmConference@shortname,
2353 \acmConference@date, \acmConference@venue\ACM@linecountR}%

```

```

2354 \fi%
2355 \fi
2356 \if@ACM@sigchiamode
2357 \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
2358 \fi
2359 \if@ACM@timestamp
2360 \fancyfoot[LO,RE]{\ACM@timestamp}
2361 \fi
2362 }
2363 \pagestyle{standardpagestyle}

\@folio@wd Folio blob width, height, offsets and max number
\@folio@ht
\@folio@voffset
\@folio@max
2364 \newdimen\@folio@wd
2365 \@folio@wd=\z@
2366 \newdimen\@folio@ht
2367 \@folio@ht=\z@
2368 \newdimen\@folio@voffset
2369 \@folio@voffset=\z@
2370 \def\@folio@max{1}
2371 \ifcase\ACM@format@nr
2372 \relax % manuscript
2373 \or % acmsmall
2374 \@folio@wd=45.75pt\relax
2375 \@folio@ht=1.25in\relax
2376 \@folio@voffset=.2in\relax
2377 \def\@folio@max{8}
2378 \or % acmlarge
2379 \@folio@wd=43.25pt\relax
2380 \@folio@ht=79pt\relax
2381 \@folio@voffset=.55in\relax
2382 \def\@folio@max{10}
2383 \fi

\@folioblob The macro to typeset the folio blob.
2384 \def\@folioblob{\@tempcnta=0\@acmArticleSeq\relax
2385 \ifnum\@tempcnta=0\relax\else
First, we calculate \@acmArticleSeq modulo \@folio@max
2386 \loop
2387 \ifnum\@tempcnta>\@folio@max\relax
2388 \advance\@tempcnta by - \@folio@max
2389 \repeat
2390 \advance\@tempcnta by -1\relax
2391 \@tempdima=\@folio@ht\relax
2392 \multiply\@tempdima by \the\@tempcnta\relax
2393 \advance\@tempdima by -\@folio@voffset\relax
2394 \begin{picture}(0,0)
2395 \makebox[\z@]{\raisebox{-\@tempdima}{%
2396 \rlap{%
2397 \raisebox{-0.45\@folio@ht}{\z@}[\z@]{%

```



```

2398         \rule{\@folio@wd}{\@folio@ht}}%
2399     \parbox{\@folio@wd}{%
2400         \centering
2401         \textcolor{white}{\LARGE\sfseries\bfseries\@acmArticle}}}}
2402 \end{picture}\fi}
2403

```

firstpagestyle The page style for the first page only.

```

2404 \fancypagestyle{firstpagestyle}{%
2405     \fancyhf{}%
2406     \renewcommand{\headrulewidth}{\z@}%
2407     \renewcommand{\footrulewidth}{\z@}%
2408     \ifcase\ACM@format@nr
2409     \relax % manuscript
2410     \fancyhead[L]{\ACM@linecountL}%
2411     \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
2412     \if@ACM@nonacm\else%
2413         \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
2414     \fi%
2415     \or % acsmall
2416     \if@ACM@nonacm\else%
2417         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2418             \@acmNumber, Article \@acmArticle. Publication date:
2419             \@acmPubDate.}%
2420     \fi%
2421     \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2422     \fancyhead[LO]{\ACM@linecountL}%
2423     \fancyhead[RO]{\@folioblob}%
2424     \fancyheadoffset[RO,LE]{0.6\@folio@wd}%
2425     \or % acmlarge
2426     \if@ACM@nonacm\else%
2427         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2428             \@acmNumber, Article \@acmArticle. Publication date:
2429             \@acmPubDate.}%
2430     \fi%
2431     \fancyhead[RO]{\@folioblob}%
2432     \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2433     \fancyhead[LO]{\ACM@linecountL}%
2434     \fancyheadoffset[RO,LE]{1.4\@folio@wd}%
2435     \or % acmtog
2436     \if@ACM@nonacm\else%
2437         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2438             \@acmNumber, Article \@acmArticle. Publication date:
2439             \@acmPubDate.}%
2440     \fi%
2441     \fancyhead[L]{\ACM@linecountL}%
2442     \fancyhead[R]{\ACM@linecountR}%
2443     \else % Conference proceedings
2444     \fancyhead[L]{\ACM@linecountL}%
2445     \fancyhead[R]{\ACM@linecountR}%

```

```

2446 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2447 \fi
2448 \if@ACM@timestamp
2449 \ifnum\ACM@format@nr=0\relax % Manuscript
2450 \fancyfoot[LO,RE]{\ACM@timestamp\quad
2451 \if@ACM@nonacm\else
2452 \footnotesize Manuscript submitted to ACM
2453 \fi}
2454 \else
2455 \fancyfoot[LO,RE]{\ACM@timestamp}
2456 \fi
2457 \fi
2458 }

```

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

```

2459 \let\ACM@ps@plain\ps@plain
2460 \let\ACM@ps@myheadings\ps@myheadings
2461 \let\ACM@ps@headings\ps@headings
2462 \def\ACM@restore@pagestyle{%
2463 \let\ps@plain\ACM@ps@plain
2464 \let\ps@myheadings\ACM@ps@myheadings
2465 \let\ps@headings\ACM@ps@headings}
2466 \AtBeginDocument{\ACM@restore@pagestyle}

```

3.17 Sectioning

`\ACM@NRadjust` Ross Moore's macro.

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

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

```

2467 \def\ACM@NRadjust#1{%

```

```

2468 \begingroup
2469 \expandafter\ifx\csname Sectionformat\endcsname\relax
2470 % do nothing when \Sectionformat is unknown
2471 \def\next{\endgroup #1}%
2472 \else
2473 \def\next{\endgroup
2474 \let\realSectionformat\Sectionformat
2475 \def\ACM@sect@format@{#1}%
2476 \let\Sectionformat\ACM@NR@adjustedSectionformat
2477 %% next lines added 2018-06-17 to ensure section number is styled
2478 \let\real@adddotafter\@adddotafter
2479 \let\@adddotafter\ACM@adddotafter
2480 #1{ }% imposes the styles, but nullifies \MakeUppercase
2481 \let\@adddotafter\real@adddotafter
2482 }%
2483 \fi \next
2484 }

```

\ACM@NR@adjustedSectionformat

```

2485 \def\ACM@NR@adjustedSectionformat#1#2{%
2486 \realSectionformat{\ACM@sect@format@{#1}}{#2}%
2487 \let\Sectionformat\realSectionformat}
2488 \DeclareRobustCommand{\ACM@sect@format@}{\ACM@sect@format@}
2489 \def\ACM@sect@format@null#1{#1}
2490 \let\ACM@sect@format@\ACM@sect@format@null
2491 \AtBeginDocument{%
2492 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
2493 \let\LTX@adddotafter\@adddotafter
2494 \fi
2495 }

```

\ACM@adddotafter

```

2496 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}

```

Sectioning is different for different levels

```

2497 \renewcommand\section{\@startsection{section}{1}{\z@}%
2498 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2499 {.25\baselineskip}%
2500 {\ACM@NRadjust\@secfont}}
2501 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
2502 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2503 {.25\baselineskip}%
2504 {\ACM@NRadjust\@subsecfont}}
2505 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
2506 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2507 {-3.5\p@}%
2508 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}}
2509 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
2510 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%

```

```

2511 {-3.5\p@}%
2512 {\ACM@NRadjust{\@parfont\@adddotafter}}
2513 \renewcommand\part{\@startsection{part}{9}{\z@}%
2514 {-1\p@ \@plus -4\p@ \@minus -2\p@}%
2515 {4\p@}%
2516 {\ACM@NRadjust\@parfont}}

\section@raggedright Special version of \raggedright compatible with \MakeUppercase
2517 \def\section@raggedright{\@rightskip\@flushglue
2518 \rightskip\@rightskip
2519 \leftskip\z@skip
2520 \parindent\z@}

\@secfont Fonts for sections etc. are different for different formats.
\@subsecfont
\@subsubsecfont
\@parfont
2521 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
2522 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
2523 \def\@subsubsecfont{\sffamily\itshape}
2524 \def\@parfont{\itshape}
2525 \setcounter{secnumdepth}{3}
2526 \ifcase\ACM@format@nr
2527 \relax % manuscript
2528 \or % acmsmall
2529 \or % acmlarge
2530 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
2531 \def\@subsecfont{\sffamily\large\section@raggedright}
2532 \or % acmtog
2533 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
2534 \def\@subsecfont{\sffamily\large\section@raggedright}
2535 \or % sigconf
2536 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
2537 \def\@subsecfont{\bfseries\Large\section@raggedright}
2538 \or % siggraph
2539 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
2540 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
2541 \or % sigplan
2542 \def\@secfont{\bfseries\Large\section@raggedright}
2543 \def\@subsecfont{\bfseries\section@raggedright}
2544 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
2545 {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2546 {.25\baselineskip}%
2547 {\@subsubsecfont}}
2548 \def\@subsubsecfont{\bfseries\section@raggedright}
2549 \renewcommand\paragraph{\@startsection{paragraph}{4}{\z@}%
2550 {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2551 {-3.5\p@}%
2552 {\@parfont\@addspaceafter}}
2553 \def\@parfont{\bfseries\itshape}
2554 \renewcommand\subparagraph{\@startsection{subparagraph}{5}{\z@}%
2555 {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2556 {-3.5\p@}%

```

```

2557   {\@subparfont\@addspaceafter}}
2558   \def\@subparfont{\itshape}
2559   \or % sigchi
2560   \setcounter{secnumdepth}{1}
2561   \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
2562   \def\@subsecfont{\sffamily\bfseries\section@raggedright}
2563   \or % sigchi-a
2564   \setcounter{secnumdepth}{0}
2565   \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
2566   \def\@subsecfont{\sffamily\bfseries\section@raggedright}
2567   \fi

```

\@adddotafter Add punctuation after a sectioning command

```
2568 \def\@adddotafter#1{#1\@addpunct{.}}
```

\@addspaceafter Add space after a sectioning command

```
2569 \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.

```
2570 \providecommand*\@dotsep{4.5}
```

3.19 Theorems

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

```
2571 \def\@acmplainbodyfont{\itshape}
```

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

```
2572 \def\@acmplainindent{\parindent}
```

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

```
2573 \def\@acmplainheadfont{\scshape}
```

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

```
2574 \def\@acmplainnotefont{\@empty}
```

Customization of the acmplain theorem style:

```
2575 \ifcase\ACM@format@nr
```

```
2576 \relax % manuscript
```

```
2577 \or % acmsmall
```

```
2578 \or % acmlarge
```

```
2579 \or % acmtog
```

```
2580 \or % sigconf
```

```
2581 \or % siggraph
```

```

2582 \or % sigplan
2583 \def\acmplainbodyfont{\itshape}
2584 \def\acmplainindent{\z@}
2585 \def\acmplainheadfont{\bfseries}
2586 \def\acmplainnotefont{\normalfont}
2587 \or % sigchi
2588 \or % sigchi-a
2589 \fi

```

acmplain The acmplain theorem style

```

2590 \newtheoremstyle{acmplain}%
2591 { .5\baselineskip\@plus.2\baselineskip
2592 \@minus.2\baselineskip}% space above
2593 { .5\baselineskip\@plus.2\baselineskip
2594 \@minus.2\baselineskip}% space below
2595 {\@acmplainbodyfont}% body font
2596 {\@acmplainindent}% indent amount
2597 {\@acmplainheadfont}% head font
2598 { .}% punctuation after head
2599 { .5em}% spacing after head
2600 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec

```

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

```
2601 \def\@acmdefinitionbodyfont{\normalfont}
```

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

```
2602 \def\@acmdefinitionindent{\parindent}
```

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

```
2603 \def\@acmdefinitionheadfont{\itshape}
```

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

```
2604 \def\@acmdefinitionnotefont{\@empty}
```

Customization of the acmdefinition theorem style:

```

2605 \ifcase\ACM@format@nr
2606 \relax % manuscript
2607 \or % acmsmall
2608 \or % acmlarge
2609 \or % acmtog
2610 \or % sigconf
2611 \or % siggraph
2612 \or % sigplan
2613 \def\@acmdefinitionbodyfont{\normalfont}
2614 \def\@acmdefinitionindent{\z@}
2615 \def\@acmdefinitionheadfont{\bfseries}
2616 \def\@acmdefinitionnotefont{\normalfont}
2617 \or % sigchi
2618 \or % sigchi-a
2619 \fi

```

acmdefinition The acmdefinition theorem style

```
2620 \newtheoremstyle{acmdefinition}%
2621   {.5\baselineskip\@plus.2\baselineskip
2622     \@minus.2\baselineskip}% space above
2623   {.5\baselineskip\@plus.2\baselineskip
2624     \@minus.2\baselineskip}% space below
2625   {\@acmdefinitionbodyfont}% body font
2626   {\@acmdefinitionindent}% indent amount
2627   {\@acmdefinitionheadfont}% head font
2628   {.}% punctuation after head
2629   {.5em}% spacing after head
2630   {\thmname{#1}\thmnumber{ #2}\thmnote{ \@acmdefinitionnotefont{#3}}}% head spec
```

Make acmplain the default theorem style.

```
2631 \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.

```
2632 \AtEndPreamble{%
2633   \if@ACM@acmthm
2634     \theoremstyle{acmplain}
2635     \@ifundefined{theorem}{%
2636       \newtheorem{theorem}{Theorem}[section]
2637     }{}
2638     \@ifundefined{conjecture}{%
2639       \newtheorem{conjecture}[theorem]{Conjecture}
2640     }{}
2641     \@ifundefined{proposition}{%
2642       \newtheorem{proposition}[theorem]{Proposition}
2643     }{}
2644     \@ifundefined{lemma}{%
2645       \newtheorem{lemma}[theorem]{Lemma}
2646     }{}
2647     \@ifundefined{corollary}{%
2648       \newtheorem{corollary}[theorem]{Corollary}
2649     }{}
2650     \theoremstyle{acmdefinition}
2651     \@ifundefined{example}{%
2652       \newtheorem{example}[theorem]{Example}
2653     }{}
2654     \@ifundefined{definition}{%
2655       \newtheorem{definition}[theorem]{Definition}
2656     }{}
}
```

```

2657 \fi
2658 \theoremstyle{acmplain}
2659 }

\@proofnamefont The font to typeset the proof name.
2660 \def\@proofnamefont{\scshape}

\@proofindent Whether or not to indent proofs.
2661 \def\@proofindent{\indent}

Customization of the proof environment.
2662 \ifcase\ACM@format@nr
2663 \relax % manuscript
2664 \or % acsmall
2665 \or % acmlarge
2666 \or % acmtog
2667 \or % sigconf
2668 \or % siggraph
2669 \or % sigplan
2670 \def\@proofnamefont{\itshape}
2671 \def\@proofindent{\noindent}
2672 \or % sigchi
2673 \or % sigchi-a
2674 \fi

proof We want some customization of the proof environment.
2675 \renewenvironment{proof}[1][\proofname]{\par
2676 \pushQED{\qed}%
2677 \normalfont \topsep6\p@\@plus6\p@\relax
2678 \trivlist
2679 \item[\@proofindent\hskip\labelsep
2680 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
2681 }{%
2682 \popQED\endtrivlist\@endpefalse
2683 }

```

3.20 Balancing columns

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

```

2684 \AtEndPreamble{%
2685 \if@ACM@balance
2686 \ifcase\ACM@format@nr
2687 \relax % manuscript
2688 \global\@ACM@balancefalse
2689 \or % acsmall
2690 \global\@ACM@balancefalse
2691 \or % acmlarge
2692 \global\@ACM@balancefalse
2693 \or % acmtog

```



```

2694         \RequirePackage{balance}%
2695     \or % sigconf
2696         \RequirePackage{balance}%
2697     \or % siggraph
2698         \RequirePackage{balance}%
2699     \or % sigplan
2700         \RequirePackage{balance}%
2701     \or % sigchi
2702         \RequirePackage{balance}%
2703     \or % sigchi-a
2704         \global\@ACM@balancefalse
2705     \fi
2706 \fi
2707 }
2708 \AtEndDocument{%
2709     \if@ACM@balance
2710     \if@twocolumn
2711     \balance
2712     \fi\fi}

```

3.21 Acknowledgments

`\acksname`

```
2713 \newcommand\acksname{Acknowledgments}
```

`\acks` This is a comment-like structure

```

2714 \specialcomment{acks}{%
2715     \begingroup
2716     \section*{\acksname}
2717     \phantomsection\addcontentsline{toc}{section}{\acksname}
2718 }{%
2719     \endgroup
2720 }

```

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

```
2721 \def\grantsponsor#1#2#3{#2}
```

`\grantnum`

```

2722 \newcommand\grantnum[3][]{#3%
2723     \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}

```

3.22 Conditional typesetting

We use the comment package for conditional typesetting:

```

2724 \AtEndPreamble{%
2725     \if@ACM@screen
2726     \includecomment{screenonly}
2727     \excludecomment{printonly}

```

```

2728 \else
2729   \excludecomment{screenonly}
2730   \excludecomment{printonly}
2731 \fi
2732 \if@ACM@anonymous
2733   \excludecomment{anonsuppress}
2734   \excludecomment{acks}
2735 \else
2736   \includecomment{anonsuppress}
2737 \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/>).

```

2738 \newcommand\showeprint[2][arxiv]{%
2739   \def\@tempa{#1}%
2740   \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
2741   \def\@tempb{arxiv}%
2742   \ifx\@tempa\@tempb
2743     arXiv:\href{http://arxiv.org/abs/#2}{#2}\else arXiv:#2%
2744   \fi}

```

3.24 End of Class

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

```

2745 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
2746   only be used to provide space above/below surrounding
2747   objects}}{}{}
2748 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
2749   only be used to provide space above/below surrounding
2750   objects}}{}{}

```

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

```

2751 \let\ACM@origbaselinestretch\baselinestretch
2752 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
2753   \ClassError{\@classname}{An attempt to redefine
2754     \string\baselinestretch\space detected. Please do not do this for
2755     ACM submissions!}\fi}

2756 \normalsize\normalfont\frenchspacing
2757 </class>

```

References

- [1] UK T_EX Users Group. UK list of T_EX frequently asked questions. <http://www.tex.ac.uk>, 2016.
- [2] Michael Downes and Barbara Beeton. *The amsart, amsproc, and amsbook document classes*. American Mathematical Society, August 2004. <http://www.ctan.org/pkg/amslatex>.
- [3] Christophe Fiorio. *algorithm2e.sty—package for algorithms*, October 2015. <http://www.ctan.org/pkg/algorithm2e>.
- [4] Rogério Brito. *The algorithms bundle*, August 2009. <http://www.ctan.org/pkg/algorithms>.
- [5] Carsten Heinz, Brooks Moses, and Jobst Hoffmann. *The Listings Package*, June 2015. <http://www.ctan.org/pkg/listings>.
- [6] Simon Fear. *Publication quality tables in L^AT_EX*, April 2005. <http://www.ctan.org/pkg/booktabs>.
- [7] Association for Computing Machinery. *ACM Visual Identity Standards*, 2007. <http://identitystandards.acm.org>.
- [8] Axel Sommerfeldt. *The subcaption package*, April 2013. <http://www.ctan.org/pkg/subcaption>.
- [9] Boris Veytsman, Bern Schandl, Lee Netherton, and C. V. Radhakrishnan. *A package to create a nomenclature*, September 2005. <http://www.ctan.org/pkg/nomencl>.
- [10] Nicola L. C. Talbot. *User Manual for glossaries.sty v4.25*, June 2016. <http://www.ctan.org/pkg/subcaption>.
- [11] David Carlisle. *The textcase package*, October 2004. <http://www.ctan.org/pkg/textcase>.

Change History

1.48	General: Added prologue option to xcolor	42	\if@ACM@authorversion: Added macro	32
	Bib code cleanup (Zack Weinberg)	30	\maketitle: Added special case of authorversion	70
	Documentation update (siggraph)	30	General: Added anonsuppress environment	30
1.49	General: New journal: DTRAP	30	Added authorversion option (closes https://github.com/borisveytsman/acmart/issues/9)	30
1.53	General: New journals: PACMCGIT, TIOT, TDSCI	30	v1.04	
	Rearranged docs	30	\acmArticleSeq: Name change by Matthew Fluet	61
1.54	General: Moved footnote stuff before hyperref call (Ross Moore)	30	\acmDOI: Name change by Matthew Fluet	61
1.56	General: Documented \Description	30	\acmISBN: Name change by Matthew Fluet	61
1.57	General: Booktabs package is now the default	30	General: Updated bibliography for siggraph	30
v1.00	General: First released version	30	v1.05	
v1.01	General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/acmart/issues/1)	30	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	30
	Defined ACM colors	30	Patched \setcitestyle command; closes https://github.com/borisveytsman/acmart/issues/19	30
	Explicitly put draft option (closes https://github.com/borisveytsman/acmart/issues/4)	33	v1.06	
	Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/acmart/issues/5)	30	\@ACM@badge@skip: Added macro	62
v1.02	General: Added TOPS and TSC (closes https://github.com/borisveytsman/acmart/issues/12)	30	\@ACM@badge@width: Added macro	62
	Documentation changes (closes https://github.com/borisveytsman/acmart/issues/13)	30	\@ACM@title@width: Added macro	62
v1.03	\@formatdoi: Added macro	67	\@mktitle@i: Added processing badges	76
			Made generic	76
			\@mktitle@ii: Now this macro is obsolete	76
			\@mktitle@iii: Added processing badges	76
			Made more generic	76
			\@mktitle@iv: Made more generic	77
			\@printtopmatter: Added processing badges	73
			\@subtitlefont: Added macro	75
			\@titlefont: Added macro	75
			\acmBadgeL: Added macro	62
			\acmBadgeR: Added macro	62
			\if@ACM@badge: Added macro	61

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