LATEX Class for the Association for Computing Machinery*

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Abstract

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

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1 Introduction

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

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

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

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

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

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

2 User's guide

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

2.1 Installation

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

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

¹http://www.acm.org/

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

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

- 1. Run latex acmart.ins. This will produce the file acmart.cls
- 2. Put the files acmart.cls, acm-jdslogo.png, and ACM-Reference-Format.bst in places where 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 (TeXLive, MacTeX, MikTeX) 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
- doclicense, http://www.ctan.org/pkg/doclicense
- draftwatermark, http://www.ctan.org/pkg/draftwatermark
- environ, http://www.ctan.org/pkg/environ
- etoolbox, http://www.ctan.org/pkg/etoolbox
- fancyhdr, http://www.ctan.org/pkg/fancyhdr
- float, http://www.ctan.org/pkg/float
- fontaxes, http://www.ctan.org/pkg/fontaxes

- geometry, http://www.ctan.org/pkg/geometry
- graphics, http://www.ctan.org/pkg/graphics
- *hyperref*, http://www.ctan.org/pkg/hyperref
- *hyperxmp*, http://www.ctan.org/pkg/hyperxmp
- *iftex*, http://www.ctan.org/pkg/iftex
- *inconsolata*, http://www.ctan.org/pkg/inconsolata
- *libertine*, http://www.ctan.org/pkg/libertine
- manyfoot, http://www.ctan.org/pkg/manyfoot
- *microtype*, http://www.ctan.org/pkg/microtype
- mmap, http://www.ctan.org/pkg/mmap
- *ms*, http://www.ctan.org/pkg/ms
- *mweights*, http://www.ctan.org/pkg/mweights
- *natbib*, http://www.ctan.org/pkg/natbib
- *nccfoots*, http://www.ctan.org/pkg/nccfoots
- *newtx*, http://www.ctan.org/pkg/newtx
- *oberdiek*, http://www.ctan.org/pkg/oberdiek
- pdftex-def, http://www.ctan.org/pkg/pdftex-def
- refcount, http://www.ctan.org/pkg/refcount
- *setspace*, http://www.ctan.org/pkg/setspace
- *textcase*, http://www.ctan.org/pkg/textcase
- totpages, http://www.ctan.org/pkg/totpages
- trimspaces, http://www.ctan.org/pkg/trimspaces
- *upquote*, http://www.ctan.org/pkg/upquote
- *url*, http://www.ctan.org/pkg/url
- *xcolor*, http://www.ctan.org/pkg/xcolor
- xkeyval, http://www.ctan.org/pkg/xkeyval
- xstring, http://www.ctan.org/pkg/xstring

2.2 Invocation and options

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The option natbib is used when the corresponding $\mbox{BibT}_{\!\! E} \mbox{X}$ style is based on natbib. In most cases you do not need to set it. See Section 2.14.

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

Table 1: The possible values for the format option

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

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

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

The option balance determines whether the last page in the two column mode has balanced columns. By default it is true; however, it may lead to problems for some documents. Set it to false if you encounter compilation errors. Note that for one page documents \balance command might cause problems. An alternative is the (experimental) option pbalance, which uses the new package pbalance for this end.

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

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

2.3 Top matter

A number of commands set up *top matter* or (in computer science jargon) *metadata* for an article. They establish the publication name, article title, authors, DOI and other data. Some of these commands, like \title and \author, should be put by the authors.

Table 2: Boolean options

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

Others, like \acmVolume and \acmDOI—by the editors. Below we describe these commands and mention who should issue them. These macros should be used *before* the \maketitle command. Note that in previous versions of ACM classes some of these commands should be used before \maketitle, and some after it. Now they all must be used before \maketitle.

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

\acmJournal

The macro $\armontomath{\armontenant{armsaction}} \{\armontenant{sets the name of the journal or transaction for journals and transactions. The argument is the short name of the publication in uppercase, for example,$

```
\acmJournal{TOMS}
```

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

\acmConference

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

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

name: the name of the conference.date: the date(s) of the conference.venue: the place of the conference.

Examples:

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

\acmBooktitle

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

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

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

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

\editor

In most cases, conference proceedings are edited. You can use the command $\ensuremath{\mbox{\mbox{\mbox{ommand}}}}$ 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[\langle ShortTitle \rangle] \{\langle FullTitle \rangle \}
```

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{\langle subtitle}} macro.

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

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

\email

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

Do *not* use the Lack 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 emails in one command leads to a warning or an error. This is not a bug, but the expected behavior.

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

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

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

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

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

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{...}
\operatorname{\colong}
\affiliation{...}
\affiliation{...}
\email{...}
```

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

```
\author{...}
\ensuremath{\mbox{\mbox{email}}\{\dots\}}
\author{...}
\ensuremath{\mbox{\mbox{email}}\{\dots\}}
\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 $\{\langle affiliation \rangle\}$ ". You should use this command only as a last resort. An example of usage is:

```
\author{G. Tobin}
\author{Ben Trovato}
\additionalaffiliation{%
  \int Th{ \pi } Th{ \sigma}rv{ \array} d 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 Thørväld Group.

\position \streetaddress

The \affiliation and \additional affiliation commands are further structured \institution to interact with the metadata extraction tools. Inside these commands you should use the \department \position, \institution, \department, \city, \streetaddress, \state, \postcode

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

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

An example of the author block:

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

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

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

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

```
\country{San Serriffe}}
```

and

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

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

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

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

```
Fluginstitut
Sonenallee 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, \afffiliation 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
Sonenallee 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 2.13).

\authorsaddresses

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

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

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

\titlenote

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

\authornotemark

Please never use a \footnote inside an \author or \title command since this confuses the metadata extraction software. (Actually these commands now produce errors.) Sometimes one may need to have the same footnote connected to several authors. The command \authornotemark[$\langle number \rangle$] 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 \acmMonth

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

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

```
\acmMonth{3}
```

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

\acmArticleSeq

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

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{ $\langle price \rangle$ } 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 $\acmission acmission {\it ISBN} \ackside {\it ISBN} \ackside sets it. Normally it is set by the typesetter, for example,$

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

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

\acmD0I

The macro $\acmDOI{\langle DOI \rangle}$ sets the DOI of the article, for example,

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

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

\acmBadge

Some conference articles get special distinctions, for example, the artifact evaluation for PPoPP 2016 (see http://ctuning.org/ae/ppopp2016.html). These articles display special badges supplied by the conference organizers. This class provides command to add these badges: \acmBadge[$\langle url \rangle$]{ $\langle graphics \rangle$ }. The arguments have the following meaning: [$\langle url \rangle$], if provided, sets the link to the badge authority in the screen version, while { $\langle graphics \rangle$ } 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}

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

\startPage

The macro $\startPage{\langle page \rangle}$ sets the first page of the article in a journal or book. It is used by the typesetter.

\terms The command \keywords $\{\langle keyword, keyword, ... \rangle\}$ sets keywords for the article. \keywords They must be separated by commas, for example,

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

CCSXML (env.) ACM publications are classified according to the ACM Computing Classification \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>
</cs2012>
\end{CCSXML}
\ccsdesc[500]{Computer systems organization~Embedded systems}
\ccsdesc[300]{Computer systems organization~Redundancy}
\ccsdesc{Computer systems organization~Robotics}
\ccsdesc[100]{Networks~Network reliability}
```

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

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

 $\scalebox{setcopyright}$

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

Table 3: Parameters for the \setcopyright command

Parameter	Meaning
none	The copyright and permission information is not typeset. (This is the option for some ACM conferences.)
acmcopyright	The authors transfer the copyright to the ACM (the "traditional" choice).
acmlicensed	The authors retain the copyright but license the publication rights to ACM.
rightsretained	The authors retain the copyright and publication rights to themselves or somebody else.
usgov	All the authors are employees of the US government.
usgovmixed	Some authors are employees of the US government.
cagov	All the authors are employees of the Canadian government.
cagovmixed	Some authors are employees of the Canadian government.
licensedusgovmixed	Some authors are employees of the US government, and the publication rights are licensed to ACM.
licensedcagov	All the authors are employees of the Canadian government, and the publication rights are licensed to ACM.
licensedcagovmixed	Some authors are employees of the Canadian government, and the publication rights are licensed to ACM.
othergov	Authors are employees of a government other than the US or Canada.
licensedothergov	Authors are employees of a government other than the US or Canada, and the publication rights are licensed to ACM.
iw3c2w3	Special statement for conferences organized by IW3C2.
iw3c2w3g	Special statement for conferences organized by IW3C2, when some authors are approved Google employees.
cc	Creative Commons license. If this key is set, <i>doclicense</i> images are used to typeset the license. See also \setcctype command. Note that at present this license can be used only for acmengage format or for nonacm publications.

authors might be employees of the US or Canadian governments, etc. Accordingly the command \setcopyright{...} is introduced. Its argument is the copyright status of the paper, for example, \setcopyright{acmcopyright}. The possible values for this command are listed in Table 3. This command must be placed in the preamble, before \begin{document}. Additional information about ACM copyright rules is discussed in Section 2.18.

 $\scalebox{setcctype}$

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

Material published under Creative Commons license should include the corresponding icon. A modern TEX distribution includes these icons in the package *doclicense*. In case your distribution does not have them, ACM provides a file ccicons.zip with these

icons. Just unzip it in the same directory where your document is.

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

\copyrightyear

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

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

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

abstract (env.)

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

teaserfigure (env.)

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

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

\settopmatter

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

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

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

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

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

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

Table 4: Settings for the \settopmatter command

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

\received

The command $\colon (stage) = (\langle stage \rangle)$ sets the history of the publication. The $[\langle stage \rangle]$ argument is optional; the default is Received for the first date and revised for the subsequent ones. For example,

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

\maketitle

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

\shortauthors

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

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

2.4 Top matter of ACM Engage materials

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

\setengagemetadata

These items are set with the command \setengagemetadata $\{\langle name \rangle\}\{\langle value \rangle\}$, for example,

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

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

2.5 ACM cover page

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

There are several top matter commands specific for this format.

\acmArticleType

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

```
\acmArticleType{Review}
```

\acmCodeLink The commands \acmCodeDataLink{ $\langle link \rangle$ } and \acmDataLink{ $\langle link \rangle$ } set the links \acmDataLink to the data and code accompanying the paper, for example,

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

You may repeat these commands if you have several repositories.

 \acmContributions The command $\acmContributions{\langle contributions \rangle}$ sets the contributions of the authors, for example,

```
\label{lem:contributions} $$ AW designed the study, CD performed it, all authors contributed to the writing.$
```

ACM cover page should have the following obligatory sections:

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

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

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

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

Internationalization

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

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

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

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

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

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

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

\translatedtitle

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

```
\title{A note on computational complexity}
\translatedtitle{french}{Remarque sur la complexit\'e de calcul}
while a paper in French should set
 \title{Remarque sur la complexit\'e de calcul}
\translatedtitle{english}{A note on computational complexity}
```

translatedabstract (env.)

Similarly, translatedabstract environment has a mandatory language argument, for example,

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

You can repeat these commands if a paper has more than one secondary language. Use the standard commands (\title, \subtitle, \keywords, abstract) for the main language of the paper.

2.7 Algorithms

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

2.8 Figures and tables

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

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

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

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

teaserfigure: a special figure before \maketitle.

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

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

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

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

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

```
\begin{table}
\caption{Simulation Configuration}
\label{tab:conf}
\begin{minipage}{\columnwidth}
\begin{center}
\begin{tabular}{ll}
 \toprule
 TERRAIN\footnote{This is a table footnote. This is a
   table footnote. This is a table footnote.} &
   (200\,m\ Square \
 Node Number
                & 289\\
 Node Placement & Uniform\\
 Application
                 & Many-to-Many/Gossip CBR Streams\\
 Payload Size
                & 32 bytes\\
```

```
Routing Layer & GF\\
                & CSMA/MMSN\\
 MAC Laver
 Radio Laver
                & RADIO-ACCNOISE\\
 Radio Bandwidth & 250Kbps\\
                & 20m--45m\\
 Radio Range
 \bottomrule
\end{tabular}
\end{center}
\bigskip
\footnotesize\emph{Source:} This is a table
sourcenote. This is a table sourcenote. This is a table
sourcenote.
\emph{Note:} This is a table footnote.
\end{minipage}
\end{table}
```

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

2.9 Descriptions of images

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

The command $\ensuremath{\mbox{\mbox{\mbox{$Nort$}}} (short\ description)} {\langle long\ description \rangle}$ 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, \mbox{\mbox{\mbox{\$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.

2.10 Theorems

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

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

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

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

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

2.11 Online-only and offline-only material

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

```
\section{Supplementary materials}
\begin{printonly}
Supplementary materials are available in the online version of this paper.
\end{printonly}
\begin{screenonly}
(The actual supplementary materials.)
\end{screenonly}
```

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

2.12 Note about anonymous mode

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

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

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

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

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

2.13 Acknowledgments

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

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

acks (env.)

The environment acks starts an unnumbered section "Acknowledgments" unless the anonymous mode is chosen. Put all thanks inside this environment.

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

\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:

```
\proonup \
```

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}
```

Bibliography 2.14

The ACM lets you use either BibTeX or BibLeTeX to process your references: they require slightly different setup of your LTFX file, as detailed in the following subsections.

2.14.1 Processing using BibT_FX

This uses the natbib package for formatting references and the BibTFX style file ACM-Reference-Format.bst for BibTFX 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 $\mbox{Bib}T_{\mbox{E}}X$ entry types and fields in the ACM style file ACM-Reference-Format. bst that you may want to be aware of.

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

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

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

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

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

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

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

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

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

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

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

```
@online{Obama08,
               "Barack Obama",
 author =
               "2008",
year =
title =
               "A more perfect union",
 howpublished = "Video",
               "5".
 dav
      =
               "http://video.google.com/videoplay?docid=6528042696351994555",
 url
 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",
               "Solder man",
 title =
               "ACM SIGGRAPH 2003 Video Review on Animation theater Program",
booktitle =
               "2003",
 year =
 publisher =
               "ACM Press",
 address =
                "New York, NY",
               "4",
 pages =
                "March 21, 2008",
 month =
                "10.9999/woot07-S422",
 doi =
 howpublished = "Video",
```

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

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

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

```
@PREAMBLE{"\providecommand{\noopsort}[1]{}"}
and then encode the author as
author = {Ludwig {\noopsort{Beethoven}}van Beethoven},
```

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

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

2.14.2 Processing using BibLTFX

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

There are a few key differences in how the LTEX sources are set up when using BibLTEX instead of BibTEX, that we summarize briefly here (please refer to the official BibLTEX documentation for more details).

In the preamble of your document you need to load the BibLATEX package and select the approriate bibliography style, as follows

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

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

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

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

Look at the sample-*-biblatex.tex files that can be found in the samples directory after running make for templates showcasing these BibLTFX styles.

2.15 Colors

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

The ACM provides the following recommendation on color use.

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

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

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

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

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

2.15.1 Manual bibliography

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

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

2.16 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

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

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

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

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

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

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

2.17 Counting words

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

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

and uses \begin{math}...\end{math} instead of dollar signs for math. Note that the count is in any case approximate, and the final decision of editors is based on PDF count. The script texcount provides a report of word count in the document.

2.18 Creative Commons licenses for ACM publications

At present ACM does not allow the authors to typeset Creative Commons license for most ACM publications. These licenses can be used under an agreement with the ACM publishing office. In this case they are inserted by ACM itself.

The exceptions are ACM Engage format, which allows Creative Commons license, and conferences organized and copyrighted by IW3C2. In these cases the authors should use correspondingly \setcopyright{cc}, \setcopyright{iw3c2w3}, or \setcopyright{iw3c2w3g} (the latter should be used by Google employees).

Yet another case is the typesetting of non-ACM materials, when the option nonacm is used. This case is somewhat opposite, because for this case *only* Creative Common licenses are supported.

The command \setcopyright(cc) produces an error unless the format is acmengage or nonacm option is selected. On the other hand, if the option nonacm is selected, any argument of \setcopyright other than cc is treated as none.

2.19 Disabled or forbidden commands

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

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

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

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

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

2.20 Notes for wizards

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

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

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

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

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

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

\PassOptionsToPackage{dvipsnames}{xcolor}

you will pass dvipsnames to xcolor.

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

\AtBeginMaketitle

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

\AtBeginMaketitle{\acmPrice{125.00}}

2.21 Currently supported publications

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

Abbreviation	Publication
ACMJCSS	ACM Journal on Computing and Sustainable Societies
CIE	ACM Computers in Entertainment

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

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

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

Abbreviation	Publication
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 Com-
	puting Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPML	ransactions on Probabilistic Machine Learning
TOPS	ACM Transactions on Privacy and Security
TORS	ACM Transactions on Recommender Systems
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TQC	ACM Transactions on Quantum Computing
TRETS	ACM Transactions on Reconfigurable Technology and Systems
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

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

2.22 A note about sigchi-a format

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

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

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

sidebar (env.) margintable (env.)

This format has large margin uses for special figures and tables. This package promarginfigure (env.) vides three environments for this with optional captions:

sidebar: textual information in the margin,

marginfigure: a figure in the margin,

margintable: a table in the margin.

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

The horizontal sizes of figures are:

figure: \columnwidth,

2. marginfigure: \marginparwidth,

3. figure*: \fulltextwidth.

3 Implementation

3.1 Identification

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

```
1 \( class \) \NeedsTeXFormat{LaTeX2e}
2 (*gobble)
3 \ProvidesFile{acmart.dtx}
4 (/gobble)
5 (class)\ProvidesClass{acmart}
_{6} [2023/10/14 v1.92 Typesetting articles for the Association for Computing Machinery]
  And the driver code:
7 (*gobble)
8 \documentclass{ltxdoc}
9 \usepackage{array,booktabs,amsmath,graphicx,fancyvrb,tabularx, longtable}
10 \usepackage[tt=false, type1=true]{libertine}
11 \usepackage[varqu]{zi4}
12 \usepackage[libertine]{newtxmath}
13 \usepackage[tableposition=top]{caption}
14 \usepackage{hypdoc}
15 \PageIndex
16 \CodelineIndex
17 \RecordChanges
18 \EnableCrossrefs
19 \begin{document}
20 \DocInput{acmart.dtx}
21 \end{document}
22 \langle /gobble \rangle
23 (*class)
24 \def\@classname{acmart}
```

3.2 Preload hook

We preload acmart-preload-hook:

3.3 Options

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

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

```
format The possible formats
                            {\tt 32 \setminus define@choicekey*+\{acmart.cls\}\{format\}[\land ACM@format@nr]\{\%\})} \\
                            manuscript, acmsmall, acmlarge, acmtog, sigconf, siggraph,
                               sigplan, sigchi, sigchi-a, acmengage, acmcp}[manuscript]{}{%
                            34
                                \ClassError{\@classname}{The option format must be manuscript,
                            35
                                  acmsmall, acmlarge, acmtog, sigconf, siggraph,
                                  sigplan, sigchi or sigchi-a}}
                            38 \end{area} ACMFormat $$1{\end{area} in $\mathbb{F}^{\end{area} format $$41}} $$
                            39 \@DeclareACMFormat{manuscript}
                            40 \@DeclareACMFormat{acmsmall}
                            41 \@DeclareACMFormat{acmlarge}
                            42 \@DeclareACMFormat{acmtog}
                            43 \@DeclareACMFormat{sigconf}
                            44 \@DeclareACMFormat{siggraph}
                            45 \@DeclareACMFormat{sigplan}
                            46 \@DeclareACMFormat{sigchi}
                            47 \@DeclareACMFormat{sigchi-a}
                            48 \@DeclareACMFormat{acmengage}
                            49 \@DeclareACMFormat{acmcp}
                            50 \ExecuteOptionsX{format}
           \if@ACM@screen Whether we use screen mode
                            51 \define@boolkey+{acmart.cls}[@ACM@]{screen}[true]{%
                            52 \if@ACM@screen
                                  \PackageInfo{\@classname}{Using screen mode}%
                            53
                               \else
                            54
                            55
                                  \PackageInfo{\@classname}{Not using screen mode}%
                               fi}{\PackageError{\Qclassname}} The option screen can be either true or
                            57
                                  false}}
                            58 \ExecuteOptionsX{screen=false}
\if@ACM@urlbreakonhyphens
                            59 \define@boolkey+{acmart.cls}[@ACM@]{urlbreakonhyphens}[true]{%
                            60 \if@ACM@urlbreakonhyphens
                                  \PackageInfo{\@classname}{Using breaking urls on hyphens}%
                            61
                            62
                               \else
                                  \PackageInfo{\@classname}{Not breaking urls on hyphens}%
                            63
                            64 \ fi}{\Lambda extra (Classname)} The option urlbreakonhyphens can be either true or
                            65
                            66 \ExecuteOptionsX{urlbreakonhyphens=true}
           \if@ACM@acmthm Whether we define theorem-like environments.
                            67 \define@boolkey+{acmart.cls}[@ACM@]{acmthm}[true]{%
                               \if@ACM@acmthm
                            68
                                  \PackageInfo{\@classname}{Requiring acmthm}%
                            69
                            70
                                  \PackageInfo{\@classname}{Suppressing acmthm}%
                            71
                                fi}{\PackageError{\Qclassname}}{The option acmthm can be either true or }
                            72
                            73
                            74 \ExecuteOptionsX{acmthm=true}
           \if@ACM@review Whether we use review mode
                            75 \define@boolkey+{acmart.cls}[@ACM@]{review}[true]{%
```

```
\if@ACM@review
                         76
                               \PackageInfo{\@classname}{Using review mode}%
                         77
                               \AtBeginDocument{\@ACM@printfoliostrue}%
                         78
                           \else
                         79
                               \PackageInfo{\@classname}{Not using review mode}%
                         80
                            \fi}{\PackageError{\@classname}{The option review can be either true or
                         81
                         83 \ExecuteOptionsX{review=false}
  \if@ACM@authorversion Whether we use author's-version mode
                         84 \define@boolkey+{acmart.cls}[@ACM@]{authorversion}[true]{%
                           \if@ACM@authorversion
                               \PackageInfo{\@classname}{Using authorversion mode}%
                         86
                         87
                            \else
                         88
                               \PackageInfo{\@classname}{Not using authorversion mode}%
                         89 \fi}{\PackageError{\@classname}{The option authorversion can be either true or
                         90
                         91 \ExecuteOptionsX{authorversion=false}
        \if@ACM@nonacm Special option for non-ACM publications using the ACM typesetting options.
                         92 \define@boolkey+{acmart.cls}[@ACM@]{nonacm}[true]{%
                           \if@ACM@nonacm
                         93
                               \PackageInfo{\@classname}{Using nonacm mode}%
                         94
                               \AtBeginDocument{\@ACM@printacmreffalse}%
                         95
                               % in 'nonacm' mode we disable the "ACM Reference Format"
                         96
                               % printing by default, but this can be re-enabled by the
                               % user using \settopmatter{printacmref=true}
                         98
                         99
                             \else
                               \PackageInfo{\@classname}{Not using nonacm mode}%
                        100
                             fi}{\PackageError{\Qclassname}} The option nonacm can be either true or
                        101
                        102
                               false}}
                        103 \ExecuteOptionsX{nonacm=false}
       \if@ACM@balance Whether to balance the last page
                        104 \define@boolkey+{acmart.cls}[@ACM@]{balance}[true]{}{%
                            \PackageError{\@classname}{The option balance can be either true or
                        105
                               false}}
                        106
                        107 \ExecuteOptionsX{balance}
      \if@ACM@pbalance Whether to balance the last page
                        \PackageError{\@classname}{The option pbalance can be either true or
                        109
                        110
                        111 \ExecuteOptionsX{pbalance=false}
\if@ACM@natbib@override This macro is no longer used.
        \if@ACM@natbib Whether we use natbib mode
                        112 \define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
                        113 \if@ACM@natbib
                               \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
                        114
                        115 \else
                               \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
                        116
                        fi}{\position{Qclassname}{The option natbib can be either true or } \
```

```
118
                                                       false}}
                                          119 \ExecuteOptionsX{natbib=true}
    \if@ACM@anonymous Whether we use anonymous mode
                                          120 \define@boolkey+{acmart.cls}[@ACM@]{anonymous}[true]{%
                                                   \if@ACM@anonvmous
                                                        \PackageInfo{\@classname}{Using anonymous mode}%
                                          122
                                          123
                                                   \else
                                                        \PackageInfo{\@classname}{Not using anonymous mode}%
                                          124
                                                   fi}{\position{0.5cm} \position{Moral Market Marke
                                          125
                                          126
                                          127 \ExecuteOptionsX{anonymous=false}
    \if@ACM@timestamp Whether we use timestamp mode
                                          {\tt 128 \setminus define@boolkey+\{acmart.cls\}[@ACM@]\{timestamp\}[true]\{\%\}} \\
                                                   \if@ACM@timestamp
                                          129
                                                        \PackageInfo{\@classname}{Using timestamp mode}%
                                          130
                                          131
                                                        \PackageInfo{\@classname}{Not using timestamp mode}%
                                          132
                                                   \fi}{\PackageError{\@classname}{The option timestamp can be either true or
                                          133
                                          135 \ExecuteOptionsX{timestamp=false}
\if@ACM@authordraft Whether we use author-draft mode
                                          136 \define@boolkey+{acmart.cls}[@ACM@]{authordraft}[true]{%
                                          137
                                                   \if@ACM@authordraft
                                          138
                                                        \PackageInfo{\@classname}{Using authordraft mode}%
                                          139
                                                        \@ACM@timestamptrue
                                          140
                                                       \@ACM@reviewtrue
                                          141
                                                   \else
                                                        \PackageInfo{\@classname}{Not using authordraft mode}%
                                          142
                                                  fi}{\PackageError{\Qclassname}} The option authordraft can be either true or
                                          143
                                                       false}}
                                          144
                                          145 \ExecuteOptionsX{authordraft=false}
            \ACM@fontsize The font size to pass to the base class
                                          146% \changes{v1.87}{2022/08/27}{Added fontsize 8pt}
                                          147 \def\ACM@fontsize{}
                                          149 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
                                          150 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
                                          151 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
                                          152 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}
          \ACM@languages The languages of the document
                                          153 \def\ACM@languages{}
                                          154 \DeclareOptionX{language}{%
                                                  \ifx\ACM@languages\@empty
                                                   \gdef\ACM@languages{english}\fi
                                          156
                                                   \g@addto@macro\ACM@languages{, #1}}
                                          {\tt 158 \setminus DeclareOptionX\{draft\}\{\setminus PassOptionsToClass\{\setminus CurrentOption\}\{amsart\}\}}
                                          {\tt 159 \setminus DeclareOptionX\{*\}{\setminus PassOptionsToClass\{\setminus CurrentOption\}\{amsart\}\}}}
                                          160 \ProcessOptionsX
                                          161 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}
```

3.4 Setting switches

197 \else

```
\if@ACM@manuscript Whether we use manuscript mode
                          162 \newif\if@ACM@manuscript
         \if@ACM@journal There are two kinds of publications: journals and books
                          163 \newif\if@ACM@journal
\if@ACM@journal@bibstrip Sometimes ACM wants a journal-like publication to have conference information in the
                         bibstrip and vice versa, so we have an additional switch.
                          164 \newif\if@ACM@journal@bibstrip
     \if@ACM@sigchiamode The formatting of SIGCHI extended abstracts is quite unusual. We have a special switch
                         for them.
                          165 \newif\if@ACM@sigchiamode
          \if@ACM@engage ACM Engage course materials have special formatting
                          166 \newif\if@ACM@engage
                          167 \@ACM@engagefalse
           \if@ACM@acmcp ACM cover page formatting
                          168 \newif\if@ACM@acmcp
                          169 \@ACM@acmcpfalse
                             Setting up switches
                          170 \ifnum\ACM@format@nr=5\relax % siggraph
                          171 \ClassWarning{\@classname}{%
                              The format siggraph is now obsolete.\MessageBreak
                               I am switching to sigconf.}
                          173
                               \setkeys{acmart.cls}{format=sigconf}
                          174
                          175 \fi
                          176 \ifnum\ACM@format@nr=7\relax % sigchi
                          177 \ClassWarning{\@classname}{%
                          178 The format sigchi is now obsolete.\MessageBreak
                              I am switching to sigconf.}
                             \setkeys{acmart.cls}{format=sigconf}
                          181 \fi
                          182 \ifnum\ACM@format@nr=8\relax % sigchi
                          183 \ClassWarning{\@classname}{%
                          184 ACM SIGCHI has retired the SIGCHI-A template\MessageBreak
                          effective immediately. ACM is keeping this template\MessageBreak
                          option available to authors who are working on legacy\MessageBreak
                          documents only. ACM will not, under any circumstances,\MessageBreak
                          accept documents in this format for publication and\MessageBreak
                              will not offer technical support to the authors who use\MessageBreak
                          189
                              this template.\MessageBreak
                          190
                              ACM SIGCHI is directing Conference leaders and\MessageBreak
                              authors to publish their articles using the SIGCONF\MessageBreak
                          193 template call.}
                          194 \fi
                          195 \ifnum\ACM@format@nr=0\relax
                          196 \@ACM@manuscripttrue
```

```
\@ACM@manuscriptfalse
199\fi
200 \@ACM@sigchiamodefalse
201 \ifcase\ACM@format@nr
202 \relax % manuscript
203 \@ACM@journaltrue
204 \or % acmsmall
205 \@ACM@journaltrue
206 \or % acmlarge
207 \@ACM@journaltrue
208 \or % acmtog
209 \@ACM@journaltrue
210 \or % sigconf
211 \@ACM@journalfalse
212 \or % siggraph
213 \@ACM@journalfalse
214 \or % sigplan
215 \@ACM@journalfalse
216 \or % sigchi
217 \@ACM@journalfalse
218 \or % sigchi-a
219 \@ACM@journalfalse
220 \@ACM@sigchiamodetrue
221 \or % acmengage
222 \@ACM@journalfalse
223 \@ACM@engagetrue
224 \or % acmcp
225 \@ACM@journaltrue
   \@ACM@acmcptrue
227 \AtBeginDocument{\@ACM@printacmreffalse}%
228\fi
229 \if@ACM@journal
230 \@ACM@journal@bibstriptrue
231 \else
232 \@ACM@journal@bibstripfalse
233 \fi
```

3.5 Loading the base class and package

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

```
234 \ifx\ACM@fontsize\@empty
235 \ifcase\ACM@format@nr
236 \relax % manuscript
      \def\ACM@fontsize{9pt}%
237
   \or % acmsmall
238
      \def\ACM@fontsize{10pt}%
239
   \or % acmlarge
      \def\ACM@fontsize{10pt}%
242 \or % acmtog
     \def\ACM@fontsize{9pt}%
243
244 \or % sigconf
     \def\ACM@fontsize{9pt}%
245
   \or % siggraph
246
      \def\ACM@fontsize{9pt}%
247
```

```
\or % sigplan
                   248
                          \def\ACM@fontsize{10pt}%
                   249
                         \or % sigchi
                   250
                          \def\ACM@fontsize{9pt}%
                   251
                        \or % sigchi-a
                   252
                          \def\ACM@fontsize{10pt}%
                   253
                   254
                        \or % acmengage
                          \def\ACM@fontsize{10pt}%
                   256
                        \or % acmcp
                          \def\ACM@fontsize{9pt}%
                   257
                        \fi
                   258
                   259 \fi
                   260 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
                   261 \LoadClass[\ACM@fontsize, reqno]{amsart}
                   262 \RequirePackage{microtype}
                      We need etoolbox for delayed code
                   263 \RequirePackage{etoolbox}
                      Booktabs is now the default
                   264 \RequirePackage{booktabs}
                      We need totpages to calculate the number of pages and refcount to use that num-
                   ber
                   265 \RequirePackage{refcount}
                   266 \RequirePackage{totpages}
                      The \collect@body macro in amsmath is defined using \def. We load environ to
                   access the \long version of this command
                   267 \RequirePackage{environ}
                      We use setspace for double spacing
                   268 \if@ACM@manuscript
                   269 \RequirePackage{setspace}
                   270 \onehalfspacing
                   271 \fi
                      We need textcase for better upcasing
                   272 \RequirePackage{textcase}
                   273 \if@ACM@acmcp
                   274 \RequirePackage{framed}
                   275 \RequirePackage{zref-savepos, zref-user}
\@ACM@acmcp@delta We need to store the dimen to store the insert length of amcp box
                   277 \newdimen\@ACM@acmcp@delta
                   278 \@ACM@acmcp@delta=0pt\relax
```

3.6 Citations

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

```
279 \if@ACM@natbib
280 \RequirePackage{natbib}
281 \renewcommand{\bibsection}{%
```

```
\section*{\refname}%
282
               \phantomsection\addcontentsline{toc}{section}{\refname}%
283
         }
284
         \renewcommand{\bibfont}{\bibliofont}
285
         \renewcommand\setcitestyle[1]{
286
         \ensuremath{\texttt{Qfor}\ensurema:=\#1\do}
287
         288
               \renewcommand\NAT@open{(}\renewcommand\NAT@close{)}\fi
289
290
           \def\@tempb{square}\ifx\@tempa\@tempb
               \renewcommand\NAT@open{[}\renewcommand\NAT@close{]}\fi
291
292
           \def\@tempb{angle}\ifx\@tempa\@tempb
               \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
293
           \def\@tempb{curly}\ifx\@tempa\@tempb
294
               \renewcommand\NAT@open{\{}\renewcommand\NAT@close{\}}\fi
295
           \def\@tempb{semicolon}\ifx\@tempa\@tempb
296
               \renewcommand\NAT@sep{;}\fi
297
           \def\@tempb{colon}\ifx\@tempa\@tempb
298
               \renewcommand\NAT@sep{;}\fi
           \def\@tempb{comma}\ifx\@tempa\@tempb
300
               \renewcommand\NAT@sep{,}\fi
301
302
           \def\@tempb{authoryear}\ifx\@tempa\@tempb
               \NAT@numbersfalse\fi
303
           \def\@tempb{numbers}\ifx\@tempa\@tempb
304
               \NAT@numberstrue\NAT@superfalse\fi
305
           \def\@tempb{super}\ifx\@tempa\@tempb
306
307
               \NAT@numberstrue\NAT@supertrue\fi
308
           \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
               \let\bibstyle=\@gobble\fi
309
           \def\@tempb{bibstyle}\ifx\@tempa\@tempb
310
311
               \let\bibstyle=\@citestyle\fi
312
           \def\@tempb{sort}\ifx\@tempa\@tempb
313
               \def\NAT@sort{\@ne}\fi
314
           \def\@tempb{nosort}\ifx\@tempa\@tempb
               \def\NAT@sort{\z@}\fi
315
           \def\@tempb{compress}\ifx\@tempa\@tempb
316
               \def\NAT@cmprs{\@ne}\fi
317
           \def\@tempb{nocompress}\ifx\@tempa\@tempb
318
319
               \def\NAT@cmprs{\z@}\fi
320
           \def\@tempb{sort&compress}\ifx\@tempa\@tempb
321
               \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
322
           \def\@tempb{mcite}\ifx\@tempa\@tempb
323
               \let\NAT@merge\@ne\fi
324
           \def\@tempb{merge}\ifx\@tempa\@tempb
               325
           \label{lide} $$ \end{engg} if $x \otimes e^{\theta} \end{engg} $$ \
326
               \@ifnum{\NAT@merge<\thr@@}{\let\NAT@merge\thr@@}{}\fi
327
328
           \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
329
               \NAT@longnamestrue\fi
           \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
330
331
               \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
332
           \expandafter\NAT@find@eq\@tempa=\relax\@nil
333
           \if\@tempc\relax\else
334
               \expandafter\NAT@rem@eq\@tempc
               \def\@tempb{open}\ifx\@tempa\@tempb
335
```

```
\xdef\NAT@open{\@tempc}\fi
                          336
                                  \def\@tempb{close}\ifx\@tempa\@tempb
                          337
                                   \xdef\NAT@close{\@tempc}\fi
                          338
                                  \def\@tempb{aysep}\ifx\@tempa\@tempb
                          339
                                   \xdef\NAT@aysep{\@tempc}\fi
                          340
                                  \def\@tempb{yysep}\ifx\@tempa\@tempb
                          341
                                   \xdef\NAT@yrsep{\@tempc}\fi
                          342
                          343
                                  \def\@tempb{notesep}\ifx\@tempa\@tempb
                          344
                                   \xdef\NAT@cmt{\@tempc}\fi
                                  \def\@tempb{citesep}\ifx\@tempa\@tempb
                          345
                                   \xdef\NAT@sep{\@tempc}\fi
                          346
                                \fi
                          347
                               }%
                          348
                               \NAT@@setcites
                          349
                          350
                               \renewcommand\citestyle[1]{%
                          351
                                 \ifcsname bibstyle@#1\endcsname%
                          352
                          353
                                 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
                          354
                                 \@latex@error{Undefined '#1' citestyle}%
                          355
                                 \fi
                          356
                              }%
                          357
                          358 \fi
\bibstyle@acmauthoryear The default author-year format:
                          {\tt 359 \ le@acmauthoryear} \{ \texttt{\%} \\
                              \setcitestyle{%
                          360
                                 authoryear,%
                          361
                          362
                                 open={[},close={]},citesep={;},%
                                 aysep={},yysep={,},%
                          363
                                 notesep={, }}}
                          364
   \bibstyle@acmnumeric The default numeric format:
                          365 \newcommand{\bibstyle@acmnumeric}{%
                              \setcitestyle{%
                          366
                                 numbers, sort&compress,%
                          367
                                 open={[},close={]},citesep={,},%
                          368
                                 notesep={, }}}
                          369
                             The default is numeric:
                          370 \if@ACM@natbib
                          371 \citestyle{acmnumeric}
                          372\fi
                               Internationalization
                         3.7
                          373 \if@ACM@journal
                          374 \renewcommand\keywordsname{Additional Key Words and Phrases}%
                          375 \else
                          376 \renewcommand\keywordsname{Keywords}%
                          377 \fi
                          378 \if@ACM@engage
                               \renewcommand\abstractname{Synopsis}%
                          379
                          380\fi
```

```
382 \else
                      \RequirePackage[\ACM@languages]{babel}%
                 383
                      \addto\captionsenglish{%
                 384
                           \if@ACM@journal
                 385
                             \renewcommand\keywordsname{Additional Key Words and Phrases}%
                 386
                           \else
                 387
                             \renewcommand\keywordsname{Keywords}%
                 388
                 389
                           \renewcommand\acksname{Acknowledgements}%
                 390
                           \if@ACM@engage
                 391
                              \renewcommand\abstractname{Synopsis}%
                 392
                           \fi
                 393
                      }%
                 394
                      \addto\captionsfrench{%
                 395
                           \if@ACM@journal
                 396
                             \renewcommand\keywordsname{Mots Clés et Phrases Supplémentaires}%
                 397
                           \else
                             \renewcommand\keywordsname{Mots clés}%
                 399
                           \fi
                 400
                           \renewcommand\acksname{Remerciements}%
                 401
                      }%
                 402
                      \addto\captionsgerman{%
                 403
                           \if@ACM@journal
                 404
                             \renewcommand\keywordsname{Zusätzliche Schlagwörter und Phrasen}%
                 405
                 406
                             \renewcommand\keywordsname{Schlagwörter}%
                 407
                 408
                           \renewcommand\acksname{Danksagungen}%
                  409
                 410
                      }%
                      \addto\captionsspanish{%
                 411
                           \if@ACM@journal
                 412
                             \renewcommand\keywordsname{Palabras y Frases Claves Adicionales}%
                 413
                           \else
                 414
                             \renewcommand\keywordsname{Palabras claves}%
                 415
                 416
                           \renewcommand\acksname{Expresiones de gratitud}%
                 417
                 418
                      }%
                 419\fi
\ACM@lang@check Some commands should not be used if the document is monlingual
                 420 \newcommand\ACM@lang@check[1]{%
                      \ifx\ACM@languages\@empty\relax
                 421
                      \ClassError{\@classname}{%
                 422
                        Command \string#1 \MessageBreak is used in monlingual document}{%
                 423
                        You used a command (\string#1) \MessageBreak
                  424
                        that does not have a meaning \MessageBreak
                  425
                        unless are languages are defined. \MessageBreak
                 426
                        Please choose the languages in \string\documentclass
                 427
                        \MessageBreak
                 428
                        (e.g. \string\documentclass[languages={french, english}]{acmart}),
                 429
                        \MessageBreak
                 430
                        or delete the command.}%
                 431
                 432
                      \fi}
```

381 \ifx\ACM@languages\@empty

```
\@translatedtitle
                                                                                  433 \def\@translatedtitle{}
                         \translatedtitle The title of the paper in a different language
                                                                                  434 \newcommand\translatedtitle[2]{\ACM@lang@check{\translatedtitle}%
                                                                                  435 \g@addto@macro\\@translatedtitle{\par\foreignlanguage{#1}{#2}}}
             \@translatedsubtitle
                                                                                  436 \def\@translatedsubtitle{}
                \translatedsubtitle The subtitle of the paper in a different language
                                                                                  {\tt 437 \ lecommand \ translated subtitle [2] \{\ ACM@ lang@ check \{\ translated subtitle \}\% \}} \\
                                                                                  438 \ensuremath{\mbox{\sc 4}38} \ensuremath{\mbox{\sc 4}
             \@translatedkeywords
                                                                                  439 \def\@translatedkeywords{}
                \translatedkeywords Add keywords to the paper in the language specified
                                                                                  440 \newcommand\translatedkeywords[2]{\ACM@lang@check{\translatedkeywords}%
                                                                                  441 \ensuremath{\mbox{\mbox{$1$}}} 441 \ensuremath{\mbox{\mbox{\mbox{$4$}}}} 1341 \ensuremath{\mbox{\mbox{$4$}}} 1341 \ensuremath{\mbox{$4$}} 1341 \ensuremath{
          \@translatedabstracts The container for translated abstracts.
                                                                                  442 \def\@translatedabstracts{}
                   translatedabstract We save translated abstracts into \@translatedabstracts
                                                                                  443 \newenvironment{translatedabstract}[1]{\Collect@Body
                                                                                  444 \@savetranslatedabstract\@mktranslatedabstract{#1}}{}
\@savetranslatedabstract And saving the abstract
                                                                                  445 \long\def\@savetranslatedabstract#1{\if@ACM@maketitle@typeset
                                                                                                \ClassError{\@classname}{Abstract must be defined before maketitle
                                                                                                      command. Please move it!}\fi
                                                                                  447
                                                                                              \ACM@lang@check{translatedabstract}%
                                                                                  448
                                                                                               \g@addto@macro\@translatedabstracts{\bgroup#1\egroup}}
                                                                                                  Sectioning
                                                                                3.8
                                \@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:
                                                                                  450 \def\@startsection#1#2#3#4#5#6{%
                                                                                  451 \if@noskipsec \leavevmode \fi
                                                                                  452 \par
                                                                                  453 \@tempskipa #4\relax
                                                                                               \@afterindenttrue
                                                                                  454
                                                                                               \ifdim \@tempskipa <\z@
                                                                                  455
                                                                                                      \@tempskipa -\@tempskipa \@afterindentfalse
                                                                                  456
                                                                                                \fi
                                                                                  457
                                                                                               \if@nobreak
                                                                                  458
                                                                                  459
                                                                                                      \everypar{}%
                                                                                  460
                                                                                                      \addpenalty\@secpenalty\addvspace\@tempskipa
```

```
\fi
462
            \@ifstar
463
                 {\@ssect{#3}{#4}{#5}{#6}}%
464
                 {\d}^{\d}_{\d}^{\#3}^{\#4}^{\#5}^{\#6}}}
465
466 \def\@sect#1#2#3#4#5#6[#7]#8{%
            \edsen \edse \ed
467
            \ifnum #2>\c@secnumdepth
468
                 \let\@svsec\@empty
469
470
            \else
                 \refstepcounter{#1}%
471
                 472
            \fi
473
            \@tempskipa #5\relax
474
            \ifdim \@tempskipa>\z@
475
                 \begingroup
476
                       #6{%
477
                             \@hangfrom{\hskip #3\relax\@svsec}%
478
                                 \interlinepenalty \@M #8\@@par}%
480
                 \endgroup
481
                 \csname #1mark\endcsname{#7}%
                 \ifnum #2>\c@secnumdepth \else
482
                            \verb|\dotangmeasure{\csname the #1\ends name}| % \\
483
                 \fi
484
                 \verb|\addcontentsline{toc}{#1}{%}|
485
                       \ifnum #2>\c@secnumdepth \else
486
                            \protect\numberline{\csname the#1\endcsname}%
487
                       \fi
488
                       #7}%
489
            \else
490
                 \def\ensuremath{\sc 0}
491
                       #6{\hskip #3\relax
492
                       \@svsec #8}%
493
                       \csname #1mark\endcsname{#7}%
494
                       \ifnum #2>\c@secnumdepth \else
495
                            \@tochangmeasure{\csname the#1\endcsname\space}%
496
497
                       \addcontentsline{toc}{#1}{%
498
499
                             \ifnum #2>\c@secnumdepth \else
500
                                 \protect\numberline{\csname the#1\endcsname}%
                            \fi
501
                            #7}}%
502
503
            \fi
            \@xsect{#5}}
504
         def\@xsect#1{%
505
            \@tempskipa #1\relax
506
            \ifdim \@tempskipa>\z@
507
                  \par \nobreak
508
                 \vskip \@tempskipa
509
                 \@afterheading
510
511
            \else
512
                 \@nobreakfalse
513
                 \global\@noskipsectrue
514
                 \everypar{%
                       \if@noskipsec
515
```

```
\global\@noskipsecfalse
                            {\setbox\z@\lastbox}%
                  517
                             \clubpenalty\@M
                  518
                             \begingroup \@svsechd \endgroup
                  519
                             \unskip
                  520
                             \@tempskipa #1\relax
                  521
                             \hskip -\@tempskipa
                  522
                           \else
                  523
                             \clubpenalty \@clubpenalty
                  524
                             \everypar{}%
                  525
                           \fi}%
                  526
                       \fi
                  527
                       \ignorespaces}
                  528
                  529 \def\@seccntformat#1{\csname the#1\endcsname\quad}
                  530 \def\@ssect#1#2#3#4#5{%
                       \@tempskipa #3\relax
                  531
                       \ifdim \@tempskipa>\z@
                  532
                         \begingroup
                  533
                  534
                           #4{%
                             \@hangfrom{\hskip #1}%
                  535
                               \interlinepenalty \@M \#5\@par}%
                  536
                         \endgroup
                  537
                       \else
                  538
                         \def\@svsechd{#4{\hskip #1\relax #5}}%
                  539
                       \fi
                  540
                       \@xsect{#3}}
                  541
  \@startsection The amsart package redefines \startsection. Here we redefine it again to make the
                 table of contents work.
                  543
                      \setTrue{#1}%
                       \par\removelastskip\vskip\z@skip
                  544
                       \label{linespacing} $$ \operatorname{section}\em \z @{\linespacing}_{\mbox{$\mathbb{Z}$}} $$
                  545
                         {.5\linespacing}{\centering\contentsnamefont}{#2}%
                  546
                       \@input{\jobname.#1}%
                  547
                       \if@filesw
                  548
                         \@xp\newwrite\csname tf@#1\endcsname
                  549
                         \immediate\@xp\openout\csname tf@#1\endcsname \jobname.#1\relax
                  550
                  551
                      \global\@nobreakfalse \endgroup
                  553
                      \addvspace{32\p@\@plus14\p@}%
                  554 }
   \l@subsection Section spacing is more generous than for amsart
                  555 \left( \frac{1}{2pc} \right)
   \l@subsection The spacing in amsart is too large
                  \label{lem:condition} $$56 \det \ell^2_{0pt}_{1pc}_{3pc}_{}$
\l@subsubsection The spacing in amsart is too large
                  557 \def\l@subsubsection{\@tocline{3}{0pt}{1pc}{5pc}{}}
```

516

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

```
\@makefntext We do not use indentation for footnotes
                  558 \def\@makefntext{\noindent\@makefnmark}
  \@footnotetext In sigchi-a mode our footnotes are in the margin!
                  559 \if@ACM@sigchiamode
                  560 \long\def\@footnotetext#1{\marginpar{%
                         \reset@font\small
                         \interlinepenalty\interfootnotelinepenalty
                  562
                         \protected@edef\@currentlabel{%
                  563
                            \csname p@footnote\endcsname\@thefnmark
                  564
                         }%
                  565
                         \color@begingroup
                  566
                  567
                           \@makefntext{%
                             \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
                         \color@endgroup}}%
                  570\fi
\@mpfootnotetext We want the footnotes in minipages centered:
                  571 \long\def\@mpfootnotetext#1{%
                       \global\setbox\@mpfootins\vbox{%
                  573
                         \unvbox\@mpfootins
                  574
                         \reset@font\footnotesize
                  575
                         \hsize\columnwidth
                  576
                         \@parboxrestore
                         \protected@edef\@currentlabel
                  577
                              {\csname p@mpfootnote\endcsname\@thefnmark}%
                  578
                         \color@begingroup\centering
                  579
                           \@makefntext{%
                  580
                             \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
                  581
                         \color@endgroup}}
                  582
    \@makefnmark AMS classes use a buggy definition of \makefnmark. We revert to the standard one.
                  583 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}
```

3.9 Hyperxmp and hyperref

```
Adding hyperref
```

```
584 \let\@footnotemark@nolink\@footnotemark
585 \let\@footnotetext@nolink\@footnotetext
586 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
587 \RequirePackage{hyperxmp}
588 \pdfstringdefDisableCommands{%
589 \def\addtocounter#1#2{}%
590 \def\unskip{}%
    \def\textbullet{- }%
591
    \def\textrightarrow{ -> }%
592
593
    \def\footnotemark{}%
594 }
595 \urlstyle{rm}
596 \ifcase\ACM@format@nr
597 \relax % manuscript
598 \or % acmsmall
599 \or % acmlarge
```

```
601 \or % sigconf
                      602 \or % siggraph
                      603 \or % sigplan
                           \urlstyle{sf}
                      605 \or % sigchi
                      606 \or % sigchi-a
                           \urlstyle{sf}
                      608 \or % acmengage
                      609 \or % acmcp
                      610 \fi
                      611 \AtEndPreamble{%
                           \if@ACM@urlbreakonhyphens
                      612
                             \def\do@url@hyp{\do\-}%
                      613
                      614
                           \if@ACM@screen
                      615
                             \hypersetup{colorlinks,
                      616
                                linkcolor=ACMPurple,
                      617
                                citecolor=ACMPurple,
                      618
                                urlcolor=ACMDarkBlue,
                      619
                                filecolor=ACMDarkBlue}
                      620
                             \else
                      621
                             \hypersetup{hidelinks}
                      622
                           \fi
                      623
                           \hypersetup{pdflang={en},
                      624
                             pdfdisplaydoctitle}}
                      625
                         Bibliography mangling.
                      626 \if@ACM@natbib
                           \let\citeN\cite
                      627
                           \let\cite\citep
                      628
                           \let\citeANP\citeauthor
                      629
                           \let\citeNN\citeyearpar
                      630
                           \let\citeyearNP\citeyear
                      631
                           \let\citeNP\citealt
                      632
                      633
                           \DeclareRobustCommand\citeA
                      634
                               {\begingroup\NAT@swafalse
                                 \verb|\label{lem:lem:lem:nate}| $$ \operatorname{NAT}\operatorname{ene}\operatorname{NAT}\operatorname{ene}\operatorname{NAT}\operatorname{ene}\.
                      635
                           \providecommand\newblock{}%
                      636
                      637 \else
                           \AtBeginDocument{%
                      638
                             \let\shortcite\cite%
                      639
                              \providecommand\citename[1]{#1}}
                      640
                      641\fi
                      642 \newcommand\shortcite[2][]{%
                           \ifNAT@numbers\cite[#1]{#2}\else\citeyearpar[#1]{#2}\fi}
\bibliographystyle The amsart package redefines \bibliographystyle since it prefers the AMS bibliogra-
                     phy style. We turn it back to the LATEX definition:
                      644 \def\bibliographystyle#1{%
                           \ifx\@begindocumenthook\@undefined\else
                      645
                              \expandafter\AtBeginDocument
                      646
                           \fi
                      647
                             {\if@filesw
                      648
```

600 \or % acmtog

```
649 \immediate\write\@auxout{\string\bibstyle{#1}}%
650 \fi}}
```

3.10 Other packages

```
Graphics and color.
 651 \RequirePackage{graphicx}
 652 \RequirePackage[prologue]{xcolor}
         We define ACM colors according to [8]:
 653 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
 654 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
 655 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
 \label{localize} $$ $ \end{area} {\end} {\end} {\end} {\end{area} $\end{area} $$ $\end{area} $$ $$ $\end{area} $$\end{area} $$\end{area
 657 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
 \label{lem:color_named} $$ \definecolor[named]_{ACMGreen}_{cmyk}_{0.20,0,1,0.19}$$
 {\tt 659 \setminus definecolor[named]{ACMPurple}{cmyk}{\{0.55,1,0,0.15\}}}
 660 \ensuremath{\mbox{ hefinecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}}
         Author-draft mode or sigchi-a mode
 661 \if@ACM@authordraft
               \RequirePackage{draftwatermark}
 662
               \SetWatermarkFontSize{0.5in}
 663
               \SetWatermarkColor[gray]{.9}
 664
               \SetWatermarkText{\parbox{12em}{\centering}
 665
                           Unpublished working draft.\\
 666
                           Not for distribution.}}
 667
 668 \else
 669
               \if@ACM@sigchiamode
 670
                     \if@ACM@nonacm\else
 671
                            \RequirePackage{draftwatermark}
                            \SetWatermarkFontSize{0.5in}
 672
                            \SetWatermarkColor[gray]{.9}
 673
                            \SetWatermarkText{\parbox{12em}{\centering
 674
                                       Legacy document. \\
 675
                                       Not for publication in an ACM venue}}
 676
                     \fi
 677
              \fi
 678
```

3.11 Paper size and paragraphing

679\fi

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.

```
680 \RequirePackage{geometry}
681 \ifcase\ACM@format@nr
682 \relax % manuscript
683 \geometry{letterpaper,head=13pt,
684 marginparwidth=6pc,heightrounded}%
685 \or % acmsmall
686 \geometry{twoside=true,
687 includeheadfoot, head=13pt, foot=2pc,
688 paperwidth=6.75in, paperheight=10in,
```

```
top=58pt, bottom=44pt, inner=46pt, outer=46pt,
689
        marginparwidth=2pc,heightrounded
690
     }%
691
692 \or % acmlarge
      \geometry{twoside=true, head=13pt, foot=2pc,
693
        paperwidth=8.5in, paperheight=11in,
694
        includeheadfoot,
695
        top=78pt, bottom=114pt, inner=81pt, outer=81pt,
696
        marginparwidth=4pc, heightrounded
697
698
        }%
699 \or % acmtog
      \geometry{twoside=true, head=13pt, foot=2pc,
700
        paperwidth=8.5in, paperheight=11in,
701
        includeheadfoot, columnsep=24pt,
702
        top=52pt, bottom=75pt, inner=52pt, outer=52pt,
703
        marginparwidth=2pc,heightrounded
704
705
        }%
706 \or % sigconf
      \geometry{twoside=true, head=13pt,
707
708
        paperwidth=8.5in, paperheight=11in,
        includeheadfoot, columnsep=2pc,
709
        top=57pt, bottom=73pt, inner=54pt, outer=54pt,
710
        marginparwidth=2pc,heightrounded
711
       }%
712
713 \or % siggraph
      \geometry{twoside=true, head=13pt,
714
        paperwidth=8.5in, paperheight=11in,
715
        includeheadfoot, columnsep=2pc,
716
        top=57pt, bottom=73pt, inner=54pt, outer=54pt,
717
        marginparwidth=2pc,heightrounded
718
719
        }%
720 \or % sigplan
      \geometry{twoside=true, head=13pt,
721
        paperwidth=8.5in, paperheight=11in,
722
        includeheadfoot=false, columnsep=2pc,
723
        top=1in, bottom=1in, inner=0.75in, outer=0.75in,
724
        marginparwidth=2pc, heightrounded
725
726
        }%
727 \or % sigchi
      \geometry{twoside=true, head=13pt,
728
729
        paperwidth=8.5in, paperheight=11in,
        includeheadfoot, columnsep=2pc,
730
        top=66pt, bottom=73pt, inner=54pt, outer=54pt,
731
        marginparwidth=2pc,heightrounded
732
       }%
733
734 \or % sigchi-a
      \geometry{twoside=false, head=13pt,
735
        paperwidth=11in, paperheight=8.5in,
736
        includeheadfoot, marginparsep=72pt,
737
738
        marginparwidth=170pt, columnsep=20pt,
739
        top=72pt, bottom=72pt, left=314pt, right=72pt
740
        }%
        \@mparswitchfalse
741
        \reversemarginpar
742
```

```
743 \or % acmengage
                  \geometry{twoside=true, head=13pt,
            744
                    paperwidth=8.5in, paperheight=11in,
            745
                    includeheadfoot, columnsep=2pc,
            746
                    top=57pt, bottom=73pt, inner=54pt, outer=54pt,
            747
                    marginparwidth=2pc,heightrounded
            748
                    }%
            749
            750 \or % acmcp
                  \geometry{twoside=true,
            751
                    includeheadfoot, head=13pt, foot=2pc,
            752
                    paperwidth=6.75in, paperheight=10in,
            753
                    top=58pt, bottom=44pt, inner=46pt, outer=46pt,
            754
                    marginparwidth=2pc,heightrounded
            755
            756
                  }%
            757 \fi
\parindent Paragraphing
 \parskip
            758 \setlength\parindent{10\p@}
            759 \setlength\parskip{\z@}
            760 \ifcase\ACM@format@nr
            761 \relax % manuscript
            762 \or % acmsmall
            763 \or % acmlarge
            764 \or % acmtog
            765 \setlength\parindent{9\p@}%
            766 \or % sigconf
            767 \or % siggraph
            768 \or % sigplan
            769∖or % sigchi
            770 \or % sigchi-a
            771 \or % acmengage
            772 \or % acmcp
            773 \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.

774 \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.

```
775 \def\copyrightpermissionfootnoterule{\kern-3\p@
776 \hrule \@width \columnwidth \kern 2.6\p@}
777 \RequirePackage{manyfoot}
```

```
778 \SelectFootnoteRule[2]{copyrightpermission}
                779 \DeclareNewFootnote{authorsaddresses}
                780 \SelectFootnoteRule[2]{copyrightpermission}
                781 \DeclareNewFootnote{copyrightpermission}
\footnoterule Tschichold's rules:
                782 \def\footnoterule{\kern-3\p@}
                783 \hrule \@width 4pc \kern 2.6\p@}
 \endminipage We do not use footnote rules in minipages
                784 \def\endminipage{%
                785
                       \par
                786
                       \unskip
                       \ifvoid\ensuremath{\mbox{\@mpfootins\else}}
                787
                         \vskip\skip\@mpfootins
                788
                         \normalcolor
                789
                         \unvbox\@mpfootins
                790
                       \fi
                791
                       \@minipagefalse
                792
                    \color@endgroup
                793
                794
                     \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}
 \@textbottom Add some stretch according to David Carlisle's advice at http://tex.stackexchange.
               com/a/62318/5522
                796 \def\@textbottom{\vskip \z@ \@plus 1pt}
                797 \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.
                798 \ifcase\ACM@format@nr
                799 \relax % manuscript
                800 \or % acmsmall
                801 \or % acmlarge
                802 \or % acmtog
                803 \flushbottom
                804 \or % sigconf
                805 \flushbottom
                806 \or % siggraph
                807 \flushbottom
                808 \or % sigplan
                809 \flushbottom
                810 \or % sigchi
                811 \flushbottom
                812 \or % sigchi-a
                813 \or % acmengage
                814 \flushbottom
                815 \ \text{or} \ \text{\%} \ \text{acmcp}
                816 \flushbottom
                817 \fi
```

3.12 Fonts

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

```
The code below is by Ross Moore.
                                              818 \ifPDFTeX
                                              819 \input{glyphtounicode}
                                              820 \pdfglyphtounicode\{f_f\}\{FB00\}
                                              821 \pdfglyphtounicode{f_f_i}{FB03}
                                              822 \neq f_1{FB04}
                                              823 \pdfglyphtounicode{f_i}{FB01}
                                              824 \neq t_t  0074 0074}
                                              825 \pdfglyphtounicode{f_t}{0066 0074}
                                              826 \pdfglyphtounicode{T_h}{0054 0068}
                                              827 \pdfgentounicode=1
                                              828 \RequirePackage{cmap}
                                              829\fi
\if@ACM@newfonts Whether we load the new fonts
                                              830 \newif\if@ACM@newfonts
                                              831 \@ACM@newfontstrue
                                              832 \fi = xists{libertine.sty}{}{\classWarning{\classname}{\coloredge do not } }
                                                              have the libertine package installed. Please upgrade your
                                              833
                                                              TeX}\@ACM@newfontsfalse}
                                              834
                                              835 \footnote{1}{1}  \ClassWarning{\@classname}{You do not
                                                              have the inconsolata (zi4.sty) package installed. Please upgrade your
                                              836
                                                              TeX}\@ACM@newfontsfalse}
                                              837
                                              838 \footnote{Months} {\classWarning(\classname){You do not }} {\classwarnin
                                                              have the newtxmath package installed. Please upgrade your
                                                              TeX}\@ACM@newfontsfalse}
                                                     We use Libertine throughout.
                                              841 \if@ACM@newfonts
                                                          \RequirePackage[T1]{fontenc}
                                                         % Note that the order in which packages are loaded matters,
                                                         % and the correct order depends on the LaTeX engine used.
                                                         % See https://github.com/borisveytsman/acmart/issues/402
                                                         % and https://github.com/borisveytsman/acmart/issues/410
                                              847
                                                          \ifxetex
                                              848
```

```
\RequirePackage[libertine]{newtxmath}
       \RequirePackage[tt=false]{libertine}
849
      \setmonofont[StylisticSet=3]{inconsolata}
850
     \else
851
       \ifluatex
852
         \RequirePackage[libertine]{newtxmath}
853
         \RequirePackage[tt=false]{libertine}
854
855
         \setmonofont[StylisticSet=3]{inconsolata}
       \else
856
          \RequirePackage[tt=false, type1=true]{libertine}
857
          \RequirePackage[varqu]{zi4}
858
          \RequirePackage[libertine]{newtxmath}
859
      \fi
860
    \fi
861
862\fi
```

```
\liningnums Libertine defines \liningnums, which makes fontspec unhappy. While we do not use
                                                 fontspec, some users do.
                                                   863 \let\liningnums\@undefined
                                                   864 \AtEndPreamble{%
                                                   865 \DeclareTextFontCommand{\liningnums}{\libertineLF}}
                                                        The SIGCHI extended abstracts are sans serif:
                                                   866 \if@ACM@sigchiamode
                                                   867 \renewcommand{\familydefault}{\sfdefault}
                                                   868 \fi
                                                  3.13 Image descriptions
\if@Description@present A local switch: whether there is a description in the given figure
                                                   869 \newif\if@Description@present
                                                   870 \@Description@presenttrue
  \if@undescribed@images A global switch whether some images were not described
                                                   871 \newif\if@undescribed@images
                                                   872 \@undescribed@imagesfalse
                      \Description The Description macro right now just sets switches
                                                   873 \newcommand\Description[2][]{\global\@Description@presenttrue\ignorespaces}
                                                        The global warning
                                                   874 \AtEndDocument{\if@undescribed@images
                                                   875 \ClassWarningNoLine{\@classname}{Some images may lack descriptions}\fi}
                                                        Hooks for figures and tables. We also patch algorithm and algorithm* in case
                                                  somebody uses them.
                                                   {\tt 876 \ AtBeginEnvironment\{figure\}\{\ QDescription\ Qpresentfalse\}} \\
                                                           \let\@vspace\@vspace@orig
                                                           \let\@vspacer\@vspacer@orig}
                                                   878
                                                   \let\@vspace\@vspace@orig
                                                   880
                                                           \let\@vspacer\@vspacer@orig}
                                                   881
                                                   882 \AtEndEnvironment{figure}{\if@Description@present\else
                                                           \global\@undescribed@imagestrue
                                                   \ensuremath{\tt NS4} \ensuremath
                                                   885 \AtEndEnvironment{figure*}{\if@Description@present\else
                                                   886 \global\@undescribed@imagestrue
                                                   \ensuremath{\tt NST} \classWarning{\classname}{A possible image without description}\fi}
                                                   888 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
                                                   889 \let\@vspacer\@vspacer@orig}
                                                   891 \let\@vspacer\@vspacer@orig}
                                                   892 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
                                                   893 \let\@vspacer\@vspacer@orig}
                                                   894 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
                                                           \let\@vspacer\@vspacer@orig}
                                                   896 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
                                                           \let\@vspacer\@vspacer@orig}
```

898 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig

```
899 \let\@vspacer\@vspacer@orig}
900 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig}
901 \let\@vspacer\@vspacer@orig}
902 \AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig}
903 \let\@vspacer\@vspacer@orig}
904 \AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig}
905 \let\@vspacer\@vspacer@orig}
906 \AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig}
907 \let\@vspacer\@vspacer@orig}
908
```

3.14 Floats

We use the caption package

```
909 \RequirePackage{caption, float}
         910 \captionsetup[table]{position=top}
         911 \if@ACM@journal
             \captionsetup{labelfont={sf, small},
         912
                textfont={sf, small}, margin=\z@}
         913
              \captionsetup[figure]{name={Fig.}}
         914
         915 \else
              \captionsetup{labelfont={bf},
         916
                textfont={bf}, labelsep=colon, margin=\z@}
         917
              \ifcase\ACM@format@nr
         918
              \relax % manuscript
         919
              \or % acmsmall
         920
              \or % acmlarge
         921
             \or % acmtog
         922
         923
              \or % sigconf
         924
              \or % siggraph
                \captionsetup{textfont={it}}
         925
         926
              \or % sigplan
                \captionsetup{labelfont={bf},
         927
                  textfont={normalfont}, labelsep=period, margin=\z0}
         928
              \or % sigchi
         929
                \captionsetup[figure]{labelfont={bf, small},
         930
                  textfont={bf, small}}
         931
                \captionsetup[table]{labelfont={bf, small},
         932
                  textfont={bf, small}}
         933
         934
              \or % sigchi-a
                \captionsetup[figure]{labelfont={bf, small},
         935
                  textfont={bf, small}}
         936
                \captionsetup[table]{labelfont={bf, small},
         937
                  textfont={bf, small}}
         938
              \or % acmengage
         939
             \or % acmcp
         940
         941 \fi
         942\fi
sidebar The sidebar environment:
         943 \newfloat{sidebar}{}{sbar}
         944 \floatname{sidebar}{Sidebar}
         945 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}
```

```
\@sidebar The processing of the saved text
                946 \long\def\@sidebar#1{\bgroup\let\@vspace\@vspace@orig
                    \let\@vspacer\@vspacer@orig\captionsetup{type=sidebar}%
                948 \marginpar{\small#1}\egroup}
  marginfigure The marginfigure environment:
                949 \newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}
\@marginfigure The processing of the saved text
                950 \long\def\@marginfigure#1{\bgroup
                951 \let\@vspace\@vspace@orig
                952 \let\@vspacer\@vspacer@orig
                953 \captionsetup{type=figure}%
                954 \marginpar{\@Description@presentfalse\centering
                       \small#1\if@Description@present\else
                955
                         \global\@undescribed@imagestrue
                956
                         \ClassWarning{\@classname}{A possible image without description}
                957
                         \fi}%
                958
                959
                    \egroup}
   margintable The margintable environment:
                960 \newenvironment{margintable}{\Collect@Body\@margintable}{}
 \@margintable The processing of the saved text
                961 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
                962 \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
                963 \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
                964 \newdimen\fulltextwidth
                965 \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)
                966 \if@ACM@sigchiamode
                967 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
                968 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
                969 \let\@endfloatbox\@endwidefloatbox
                970 \def\@fpsadddefault{\def\@fps{tp}}%
                971 \@float}
                972∖fi
 \end@dblfloat And the end. Just adding a \bgroup.
                973 \if@ACM@sigchiamode
                974 \def\end@dblfloat{%
                       \end@float\egroup}
                975
                976\fi
```

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

```
977 \def\@endwidefloatbox{%
    \par\vskip\z@skip
978
     \@minipagefalse
979
    \outer@nobreak
980
981
    \egroup
982
     \color@endbox
     \global\setbox\@currbox=\vbox{\moveleft
984
      \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
985
    \wd\@currbox=\textwidth
986 }
```

3.15 Lists

```
987 \ifcase\ACM@format@nr
988 \relax % manuscript
989 \or % acmsmall
990 \or % acmlarge
991 \or % acmtog
992 \or % sigconf
993 \or % siggraph
994 \or % sigplan
995 \def\labelenumi{\theenumi.}
996 \def\labelenumii{\theenumii.}
997 \def\labelenumiii{\theenumiii.}
998 \def\labelenumiv{\theenumiv.}
999 \or % sigchi
1000 \or % sigchi-a
1001 \or % acmengage
1002 \or % acmcp
1003 \fi
```

The AMS uses generous margins for lists. Note that amsart defines \leftmargin values for list levels at the beginning of the document, so we must redefine them in the same manner. Also, note that amsart redefines the enumerate and itemize environments with a \makelabel command that uses \llap, so the \labelwidth value is (effectively) irrelevant; nonetheless, we follow amsart and set \labelwidth to \leftmargin minus \labelsep.

```
1004 \newdimen\@ACM@labelwidth
1005 \AtBeginDocument{%
     \setlength\labelsep{4pt}
1006
     \setlength{\@ACM@labelwidth}{6.5pt}
1007
1008
     %% First-level list: when beginning after the first line of an
1009
     %% indented paragraph or ending before an indented paragraph, labels
     %% should not hang to the left of the preceding/following text.
1011
     \setlength\leftmargini{\z@}
1012
     \addtolength\leftmargini{\parindent}
1013
     \addtolength\leftmargini{2\labelsep}
1014
     \addtolength\leftmargini{\@ACM@labelwidth}
1015
1016
1017
     %% Second-level and higher lists.
     \setlength\leftmarginii{\z@}
1018
     \addtolength\leftmarginii{0.5\labelsep}
```

```
\addtolength\leftmarginii{\@ACM@labelwidth}
                  1020
                        \setlength\leftmarginiii{\leftmarginii}
                  1021
                        \setlength\leftmarginiv{\leftmarginiii}
                  1022
                        \setlength\leftmarginv{\leftmarginiv}
                  1023
                        \setlength\leftmarginvi{\leftmarginv}
                  1024
                        \@listi}
                  1026 \newskip\listisep
                  1027 \listisep\smallskipamount
                  1028 \def\@listI{\leftmargin\leftmargini
                        \labelwidth\leftmargini \advance\labelwidth-\labelsep
                        \listparindent\z@
                        \topsep\listisep}
                  1031
                  1032 \let\@listi\@listI
                  1033 \def\@listii{\leftmargin\leftmarginii
                        \labelwidth\leftmarginii \advance\labelwidth-\labelsep
                        \topsep\z@skip}
                  1035
                  1036 \def\@listiii{\leftmargin\leftmarginiii
                        \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
                  1038 \def\@listiv{\leftmargin\leftmarginiv
                        \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
                  1040 \def\@listv{\leftmargin\leftmarginv
                  1041 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
                  1042 \def\@listvi{\leftmargin\leftmarginvi
                       \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
\descriptionlabel We do not use a colon by default like amsart does:
                  1044 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}
     \description Make the description environment indentation consistent with that of the itemize
                  and enumerate environments.
                  1045 \renewenvironment{description}{\list{}{%
                          \labelwidth\@ACM@labelwidth
                  1046
                          \let\makelabel\descriptionlabel}%
                  1047
                  1048 }{
                        \endlist
                  1049
                  1050 }
                  1051 \let\enddescription=\endlist % for efficiency
                          Top-matter data
```

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

```
1052 \newif\if@ACM@maketitle@typeset
1053 \@ACM@maketitle@typesetfalse
```

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

```
1054 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
1055 ACMJCSS,%
1056 CIE,%
1057 CSUR,%
1058 DGOV,%
1059 DLT,%
1060 DTRAP.%
1061 FAC,%
```

- GAMES,% 1062
- HEALTH,% 1063
- IMWUT,% 1064
- JACM,% 1065
- JATS,% 1066
- 1067 JDIQ,%
- 1068 JDS,%
- JEA,% 1069
- JERIC,% 1070
- 1071 JETC,%
- JOCCH,% 1072
- JRC,% 1073
- PACMCGIT,% 1074
- 1075 PACMHCI,%
- 1076 PACMMOD,%
- 1077 PACMNET,% 1078 PACMPL,%
- POMACS,%
- 1079
- TAAS,% 1080
- TACCESS,% 1081
- TACO,% 1082
- TALG,% 1083
- TALLIP,% 1084
- TAP,% 1085
- TCPS,% 1086
- 1087 TDS,%
- TEAC,% 1088
- TECS,% 1089
- TELO,% 1090
- THRI,% 1091
- TIIS,% 1092
- TIOT,% 1093
- TISSEC,% 1094
- TIST,% 1095
- 1096 TKDD,% 1097 TMIS,%
- 1098 TOCE,%
- TOCHI,% 1099
- TOCL,% 1100
- TOCS,%
- 1101 TOCT,% 1102
- TODAES,% 1103
- TODS,% 1104
- TOG,% 1105
- TOIS,% 1106
- TOIT,% 1107
- TOMACS,% 1108 1109 TOMM,%
- 1110 TOMPECS,%
- 1111 TOMS,%
- TOPC,% 1112
- TOPS,% 1113
- TOPLAS,% 1114
- TOPML,% 1115

```
TORS.%
1116
     TOS,%
1117
    TOSEM,%
1118
    TOSN,%
1119
    TQC,%
1120
    TRETS,%
1121
1122 TSAS,%
1123 TSC,%
    TSLP,%
1124
    TWEB,%
1125
    FACMP%
1126
1127 }{%
1128 \ifcase\@journalCode@nr
1129 \relax % ACMJCSS
     \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
1130
     \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%
1131
     \def\@permissionCodeOne{2834-5533}%
1132
1133 \or % CIE
1134
     \def\@journalName{ACM Computers in Entertainment}%
     \def\@journalNameShort{ACM Comput. Entertain.}%
1135
     \def\@permissionCodeOne{1544-3574}%
1136
1137 \or % CSUR
     \def\@journalName{ACM Computing Surveys}%
1138
     \def\@journalNameShort{ACM Comput. Surv.}%
1139
     \def\@permissionCodeOne{0360-0300}%
1140
1141 \or % DGOV
     \def\@journalName{Digital Government: Research and Practice}%
     \def\@journalNameShort{Digit. Gov. Res. Pract.}%
     \def\@permissionCodeOne{2639-0175}%
1145 \or % DLT
     \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
1146
     \def\@journalNameShort{Distrib. Ledger Technol.}%
1147
     \def\@permissionCodeOne{2769-6472}%
1148
1149 \or % DTRAP
     \def\@journalName{Digital Threats: Research and Practice}%
1150
     \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1151
     \def\@permissionCodeOne{2576-5337}%
1152
1153 \or % FAC
     \def\@journalName{Formal Aspects of Computing}%
1155
     \def\@journalNameShort{Form. Asp. Comput.}%
     \def\@permissionCodeOne{0934-5043}%
1156
1157
     \def\@permissionCodeTwo{1433-299X}%
1158 \or % GAMES
     \def\@journalName{ACM Games: Research and Practice}%
1159
     \def\@journalNameShort{ACM Games}%
1160
     \def\@permissionCodeOne{2832-5516}%
1161
1162 \or % HEALTH
     \def\@journalName{ACM Transactions on Computing for Healthcare}%
1163
     \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1164
     \def\@permissionCodeOne{2637-8051}%
1166 \or % IMWUT
     \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1167
       Wearable and Ubiquitous Technologies}%
1168
    \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
```

```
\def\@permissionCodeOne{2474-9567}%
1170
     \@ACM@screentrue
1171
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1172
1173 \or % JACM
     \def\@journalName{Journal of the ACM}%
1174
     \def\@journalNameShort{J. ACM}%
    \def\@permissionCodeOne{0004-5411}%
1177 \or % JATS
     \def\@journalName{Journal on Autonomous Transportation Systems}%
1178
     1179
1180
     \def\@permissionCodeOne{2833-0528}%
1181 \or % JDTO
     \def\@journalName{ACM Journal of Data and Information Quality}%
1182
     \def\@journalNameShort{ACM J. Data Inform. Quality}%
1183
     \def\@permissionCodeOne{1936-1955}%
1184
1185 \or % JDS
     \def\@journalName{ACM/JMS Journal of Data Science}%
1186
     \def\@journalNameShort{ACM/IMS J. Data Sci.}%
     \def\@permissionCodeOne{2831-3194}%
1188
     \def\@permissionCodeTwo{2831-3194}%
1189
1190 \or % JEA
     \def\@journalName{ACM Journal of Experimental Algorithmics}%
1191
     \def\@journalNameShort{ACM J. Exp. Algor.}%
1192
     \def\@permissionCodeOne{1084-6654}%
1193
1194 \or % JERIC
     \def\@journalName{ACM Journal of Educational Resources in Computing}%
1195
     \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
     \def\@permissionCodeOne{1073-0516}%
1198 \or % JETC
    \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
     \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1200
     \def\@permissionCodeOne{1550-4832}%
1201
1202 \or % JOCCH
     \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1203
     \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1204
     \def\@permissionCodeOne{1556-4673}%
1205
     \def\@permissionCodeTwo{1556-4711}%
1206
     \def\@journalName{ACM Journal on Responsible Computing}%
     \def\@journalNameShort{ACM J. Responsib. Comput.}%
1209
     \def\@permissionCodeOne{2832-0565}%
1210
1211 \or % PACMCGIT
    \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1212
     \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1213
     \def\@permissionCodeOne{2577-6193}%
1214
     \@ACM@screentrue
1215
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1216
1217 \or % PACMHCI
     \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
     \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
1220
     \def\@permissionCodeOne{2573-0142}%
1221
     \@ACM@screentrue
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1222
```

1223 \or % PACMMOD

```
\def\@journalName{Proceedings of the ACM on Management of Data}%
1224
     \def\@journalNameShort{Proc. ACM Manag. Data}%
1225
     \def\@permissionCodeOne{2836-6573}%
1226
1227 \or % PACMNET
     \def\@journalName{Proceedings of the ACM on Networkng}%
1228
     \def\@journalNameShort{Proc. ACM Netw.}%
     \def\@permissionCodeOne{2834-5509}%
1231 \or % PACMPL
     \def\@journalName{Proceedings of the ACM on Programming Languages}%
1232
     \def\@journalNameShort{Proc. ACM Program. Lang.}%
1233
1234
     \def\@permissionCodeOne{2475-1421}%
     \@ACM@screentrue
1235
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1236
1237 \or % POMACS
    \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1238
     \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1239
     \def\@permissionCodeOne{2476-1249}%
     \@ACM@screentrue
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1242
1243 \or % TAAS
     \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
1244
     \def\@iournalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
1245
     \def\@permissionCodeOne{1556-4665}%
1246
1247 \or % TACCESS
     \def\@journalName{ACM Transactions on Accessible Computing}%
1248
     \def\@journalNameShort{ACM Trans. Access. Comput.}%
1249
     \def\@permissionCodeOne{1936-7228}%
1251 \or % TACO
     \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
     \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1253
     \def\@permissionCodeOne{1544-3566}%
1254
     \def\@permissionCodeTwo{1544-3973}%
1255
1256 \or % TALG
     \def\@journalName{ACM Transactions on Algorithms}%
1257
1258
     \def\@journalNameShort{ACM Trans. Algor.}%
     \def\@permissionCodeOne{1549-6325}%
1259
1260 \or % TALLIP
    \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
     \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
     \def\@permissionCodeOne{2375-4699}%
1263
1264 \or % TAP
     \def\@journalName{ACM Transactions on Applied Perception}%
1265
     \def\@journalNameShort{ACM Trans. Appl. Percept.}%
1266
     \def\@permissionCodeOne{1544-3558}%
1267
1268 \or % TCPS
     \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1269
     \def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%
1270
     \def\@permissionCodeOne{2378-962X}%
1272 \or % TDS
     \def\@journalName{ACM/IMS Transactions on Data Science}%
1274
     \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
1275
     \def\@permissionCodeOne{2577-3224}%
1276 \or % TEAC
```

\def\@journalName{ACM Transactions on Economics and Computation}%

```
\def\@iournalNameShort{ACM Trans. Econ. Comput.}%
1278
     \def\@permissionCodeOne{2167-8375}%
1279
1280 \or % TECS
     \def\@journalName{ACM Transactions on Embedded Computing Systems}%
1281
     \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1282
     \def\@permissionCodeOne{1539-9087}%
     \def\@journalName{ACM Transactions on Evolutionary Learning}%
     \def\@journalNameShort{ACM Trans. Evol. Learn.}%
1286
     \def\@permissionCodeOne{2688-3007}%
1287
1288 \or % THRI
     \def\@iournalName{ACM Transactions on Human-Robot Interaction}%
1289
     \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1290
     \def\@permissionCodeOne{2573-9522}%
1291
1292 \or % TIIS
     \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
     \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
     \def\@permissionCodeOne{2160-6455}%
1296 \or % TIOT
     \def\@journalName{ACM Transactions on Internet of Things}%
1297
1298
     \def\@journalNameShort{ACM Trans. Internet Things}%
     \def\@permissionCodeOne{2577-6207}%
1299
1300 \or % TISSEC
     \def\@journalName{ACM Transactions on Information and System Security}%
1301
     \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1302
     \def\@permissionCodeOne{1094-9224}%
1303
     \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
     \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
     \def\@permissionCodeOne{2157-6904}%
1307
1308 \or % TKDD
     \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
     \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1310
     \def\@permissionCodeOne{1556-4681}%
1311
1312 \or % TMIS
     \def\@journalName{ACM Transactions on Management Information Systems}%
     \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1314
     \def\@permissionCodeOne{2158-656X}%
1316 \or % TOCE
     \def\@journalName{ACM Transactions on Computing Education}%
1317
     \def\@journalNameShort{ACM Trans. Comput. Educ.}%
1318
     \def\@permissionCodeOne{1946-6226}%
1319
1320 \or % TOCHT
     \def\@journalName{ACM Transactions on Computer-Human Interaction}%
1321
     \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1322
     \def\@permissionCodeOne{1073-0516}%
1323
1324 \or % TOCL
     \def\@journalName{ACM Transactions on Computational Logic}%
     \def\@journalNameShort{ACM Trans. Comput. Logic}%
     \def\@permissionCodeOne{1529-3785}%
1328 \or % TOCS
     \def\@journalName{ACM Transactions on Computer Systems}%
1329
     \def\@journalNameShort{ACM Trans. Comput. Syst.}%
1330
```

\def\@permissionCodeOne{0734-2071}%

```
1332 \or % TOCT
     \def\@journalName{ACM Transactions on Computation Theory}%
     \def\@journalNameShort{ACM Trans. Comput. Theory}%
1334
     \def\@permissionCodeOne{1942-3454}%
1335
1336 \or % TODAES
    \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
     \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
     \def\@permissionCodeOne{1084-4309}%
1340 \or % TODS
1341
     \def\@journalName{ACM Transactions on Database Systems}%
1342
     \def\@journalNameShort{ACM Trans. Datab. Syst.}%
     \def\@permissionCodeOne{0362-5915}%
1343
1344 \or % TOG
     \def\@journalName{ACM Transactions on Graphics}%
1345
     \def\@journalNameShort{ACM Trans. Graph.}%
1346
     \def\@permissionCodeOne{0730-0301}
1347
     \def\@journalName{ACM Transactions on Information Systems}%
     \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1350
     \def\@permissionCodeOne{1046-8188}%
1351
1352 \or % TOIT
     \def\@journalName{ACM Transactions on Internet Technology}%
1353
     \def\@journalNameShort{ACM Trans. Internet Technol.}%
1354
     \def\@permissionCodeOne{1533-5399}%
1355
1356 \or % TOMACS
     \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1357
     \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1358
     \def\@permissionCodeOne{1049-3301}%
     \def\@permissionCodeTwo{1558-1195}%
1361 \or % TOMM
    \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
1362
     \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1363
     \def\@permissionCodeOne{1551-6857}%
1364
     \def\@permissionCodeTwo{1551-6865}%
1365
1366 \or % TOMPECS
    \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
     \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1368
     \def\@permissionCodeOne{2376-3639}%
1370 \or % TOMS
     \def\@journalName{ACM Transactions on Mathematical Software}%
1371
     \def\@journalNameShort{ACM Trans. Math. Softw.}%
1372
     \def\@permissionCodeOne{0098-3500}%
1373
1374\or % TOPC
     \def\@journalName{ACM Transactions on Parallel Computing}%
1375
     \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1376
     \def\@permissionCodeOne{2329-4949}%
1377
     \def\@permissionCodeTwo{2329-4957}%
1378
     \def\@journalName{ACM Transactions on Privacy and Security}%
     \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1382
     \def\@permissionCodeOne{2471-2566}%
1383 \or % TOPLAS
     \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1384
```

\def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%

```
\def\@permissionCodeOne{0164-0925}%
1386
1387 \or % TOPML
     \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
1388
     \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
1389
     \def\@permissionCodeOne{2836-8924}%
1390
1391 \or % TORS
     \def\@journalName{ACM Transactions on Recommender Systems}%
1392
     \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
     \def\@permissionCodeOne{2770-6699}%
1394
1395 \or % TOS
     \def\@journalName{ACM Transactions on Storage}%
1396
     \def\@journalNameShort{ACM Trans. Storage}%
1397
     \def\@permissionCodeOne{1553-3077}%
1398
1399 \or % TOSEM
    \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1400
     \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1401
     \def\@permissionCodeOne{1049-331X}%
1403 \or % TOSN
     \def\@journalName{ACM Transactions on Sensor Networks}%
1404
     \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1405
     \label{lem:codeOne} $$ \ensuremath{\tt 0-4859}\% $$ \ensuremath{\tt 0-4859}\% $$
1406
1407 \or % TQC
     \def\@journalName{ACM Transactions on Quantum Computing}%
1408
     \def\@journalNameShort{ACM Trans. Quantum Comput.}%
1409
     \def\@permissionCodeOne{2643-6817}%
1410
1411 \or % TRETS
    \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
     \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
     \def\@permissionCodeOne{1936-7406}%
1415 \or % TSAS
     \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1416
     1417
     \def\@permissionCodeOne{2374-0353}%
1418
1419 \or % TSC
     \def\@journalName{ACM Transactions on Social Computing}%
1420
     \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1421
     \def\@permissionCodeOne{2469-7818}%
1422
1423 \or % TSLP
     \def\@journalName{ACM Transactions on Speech and Language Processing}%
     \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1425
     \def\@permissionCodeOne{1550-4875}%
1426
1427 \or % TWEB
     \def\@journalName{ACM Transactions on the Web}%
1428
     \def\@journalNameShort{ACM Trans. Web}%
1429
     \def\@permissionCodeOne{1559-1131}%
1430
1431 \else % FACMP, a dummy journal
     \def\@journalName{ACM Just Accepted}%
1432
     \def\@journalNameShort{ACM Accepted}%
     \def\@permissionCodeOne{XXXX-XXXX}%
1435 \fi
1436 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1437 }{%
     \ClassError{\@classname}{Incorrect journal #1}%
1438
1439 }%
```

```
\acmJournal And the syntactic sugar around it
                1440 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
                     \global\@ACM@journal@bibstriptrue}
                   The defaults:
                1442 \def\@journalCode@nr{0}
                1443 \def\@journalName{}%
                1444 \def\@journalNameShort{\@journalName}%
                1445 \def\@permissionCodeOne{XXXX-XXXX}%
                1446 \def\@permissionCodeTwo{}%
 \acmConference This is the conference command
                1447 \newcommand\acmConference[4][]{%
                     \gdef\acmConference@shortname{#1}%
                1448
                     \gdef\acmConference@name{#2}%
                1449
                     \gdef\acmConference@date{#3}%
                1450
                     \gdef\acmConference@venue{#4}%
                1451
                     \ifx\acmConference@shortname\@empty
                1452
                1453
                       \gdef\acmConference@shortname{#2}%
                1454
                1455
                     \global\@ACM@journal@bibstripfalse
                1456 }
                1457 \if@ACM@journal\else
                1458 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
                1459 DC, USA}%
                1460 \fi
  \acmBooktitle The book title of the conference:
 1462 \acmBooktitle{}
                1463 \ifx\acmConference@name\@undefined\else
                1464 \acmBooktitle{Proceedings of \acmConference@name
                          \ifx\acmConference@name\acmConference@shortname\else
                1465
                          \ (\acmConference@shortname)\fi}
                1466
                1467 \fi
\@editorsAbbrev How to abbreviate editors
                1468 \def\@editorsAbbrev{(Ed.)}
   \@acmEditors The list of editors
                1469 \def\@acmEditors{}
       \editor Add a new editor to the list
                1470 \def\editor#1{\ifx\@acmEditors\@empty
                1471
                       \gdef\@acmEditors{#1}%
                1472
                     \else
                       \gdef\@editorsAbbrev{(Eds.)}%
                1473
                       \g@addto@macro\@acmEditors{\and#1}%
                1475 \fi}
      \subtitle The subtitle macro
                1476 \def\subtitle#1{\def\@subtitle{#1}}
                1477 \subtitle{}
```

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

1478 \newcount\num@authorgroups
1479 \num@authorgroups=0\relax

\num@authors The total number of authors
1480 \newcount\num@authors
1481 \num@authors=0\relax

\if@insideauthorgroup Whether we are continuing an author group
1482 \newif\if@insideauthorgroup
1483 \@insideauthorgroupfalse
```

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

Note that we want to typeset the link to the author's orcid if known. The problem is, we know the orcid only after the author is entered. The trick is based on the idea that \csname...\endcsname is \relax unless defined. Therefore we typeset authors by the special macro \csname typeset@author\the\num@authors\endcsname, which is defined by \orcid command.

```
1484 \renewcommand\author[2][]{%
1485
    authors in the same \string\author\space macro!}}{}%
1486
     \global\advance\num@authors by 1\relax
1487
     \if@insideauthorgroup\else
1488
       \global\advance\num@authorgroups by 1\relax
1489
      \global\@insideauthorgrouptrue
1490
1491
     \ifx\addresses\@empty
1492
      \if@ACM@anonymous
1493
1494
         \gdef\addresses{\@author{Anonymous Author(s)%
1495
          \ifx\@acmSubmissionID\@empty\else\\Submission Id:
            \@acmSubmissionID\fi}}%
1496
         \gdef\authors{Anonymous Author(s)}%
1497
      \else
1498
         \expandafter\gdef\expandafter\addresses\expandafter{%
1499
          \expandafter\@author\expandafter{%
1500
            \csname typeset@author\the\num@authors\endcsname{#2}}}%
1501
         \gdef\authors{#2}%
1502
      \fi
1503
1504
     \else
1505
      \if@ACM@anonymous\else
      1506
         \expandafter\and\expandafter\@author\expandafter{%
1507
          \csname typeset@author\the\num@authors\endcsname{#2}}}%
1508
         \g@addto@macro\authors{\and#2}%
1509
      \fi
1510
1511
     \fi
     \if@ACM@anonymous
1512
      \ifx\shortauthors\@empty
1513
         \gdef\shortauthors{Anon.
1514
1515
          \ifx\@acmSubmissionID\@empty\else Submission Id:
1516
          \@acmSubmissionID\fi}%
      \fi
1517
    \else
1518
```

```
\def\ensuremath{\def}\
                               1519
                                       \ifx\@tempa\@empty
                               1520
                                         \ifx\shortauthors\@empty
                               1521
                                           \gdef\shortauthors{#2}%
                               1522
                                1523
                                           \g@addto@macro\shortauthors{\and#2}%
                                1524
                                         \fi
                                1525
                                       \else
                                1526
                                         \ifx\shortauthors\@empty
                                1527
                                           \gdef\shortauthors{#1}%
                                1528
                                         \else
                                1529
                                           \g@addto@macro\shortauthors{\and#1}%
                                1530
                                         \fi
                                1531
                                       \fi
                                1532
                                     \fi}
                                1533
                  \affiliation The macro \affiliation mimics \address from amsart. Note that it has an optional
                                argument, which we use differently from amsart.
                                1534 \newcommand{\affiliation}[2][]{%
                                     \global\@insideauthorgroupfalse
                                1536
                                     \if@ACM@anonymous\else
                                       \g@add to @macro \addresses {\affiliation {\#1}{\#2}} \%
                               1537
ACM@affiliation@obeypunctuation Whether to use the author's punctuation (false by default, which adds American-style
                                address punctuation)
                                1539 \define@boolkey+{@ACM@affiliation@}[@ACM@affiliation@]{obeypunctuation}%
                                1540 [true]{}{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}
         \additionalaffiliation Additional affiliations go to footnotes
                                1541 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}
        \@additionalaffiliation Process \additionalaffiliation inside \authornote
                                1542 \def\@additionalaffiliation#1{\bgroup
                                     \def\position##1{\ignorespaces}%
                                     \def\institution##1{##1\ignorespaces}%
                               1544
                                     1545
                                     \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
                                1546
                                    \let\streetaddress\position
                               1547
                               1548 \let\city\position
                               1549 \let\state\position
                                    \let\postcode\position
                                1550
                                    \let\country\position
                                1551
                                    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.
                                1553 \renewcommand{\email}[2][]{%
                                     1554
                                         addresses in the same \string\email\space macro!}}{}%
                               1555
                                     \if@ACM@anonymous\else
                               1556
                                       \g@addto@macro\addresses{\email{#1}{\#2}}\%
                               1557
                                    \fi}
                                1558
```

```
\orcid We redefine the command to typeset the current author
                       1559 \def\orcid#1{\unskip\ignorespaces%
                            \IfBeginWith{#1}{http}{%
                       1560
                              \expandafter\gdef\csname
                       1561
                                   typeset@author\the\num@authors\endcsname##1{%
                       1562
                       1563
                                     \href{#1}{##1}}}{%
                       1564
                              \expandafter\gdef\csname
                                   typeset@author\the\num@authors\endcsname\#1\{\%\}
                                     \href{https://orcid.org/#1}{##1}}}
                       1566
     \authorsaddresses Setting up authors' addresses
                       1568 \authorsaddresses{\@mkauthorsaddresses}
\@mktranslatedkeywords We have two argument: the language to typeset keywords and the keywords.
                       1569 \newcommand\@mktranslatedkeywords[2]{\bgroup
                            \selectlanguage{#1}%
                            {\@specialsection{\keywordsname}%
                              \noindent#2\par}\egroup}
          \@titlenotes The title notes
                       1573 \def\@titlenotes{}
            \titlenote Adding a note to the title
                       1574 \def\titlenote#1{%
                            \g@addto@macro\@title{\footnotemark}%
                       1575
                            \if@ACM@anonymous
                       1576
                               \g@addto@macro\@titlenotes{%
                       1577
                                 \stepcounter{footnote}\footnotetext{Title note}}%
                       1578
                       1579
                       1580
                              \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
                       1581
                            \fi}
       \@subtitlenotes The subtitle notes
                       1582 \def\@subtitlenotes{}
         \subtitlenote Adding a note to the subtitle
                       1583 \def\subtitlenote#1{%
                            \g@addto@macro\@subtitle{\footnotemark}%
                       1584
                       1585
                            \if@ACM@anonymous
                              \g@addto@macro\@subtitlenotes{%
                       1586
                                 \stepcounter{footnote}\footnotetext{Subtitle note}}%
                       1587
                       1588
                               \g@addto@macro\@subtitlenotes{%
                       1589
                       1590
                                 \stepcounter{footnote}\footnotetext{#1}}%
                       1591
                            \fi}
         \@authornotes The author notes
                       1592 \def\@authornotes{}
           \authornote Adding a note to the author
                       1593 \def\authornote#1{%
                       1594 \if@ACM@anonymous\else
```

```
\g@addto@macro\addresses{\@authornotemark}%
                  1595
                          \g@addto@macro\@authornotes{%
                  1596
                            \stepcounter{footnote}\footnotetext{#1}}%
                  1597
                       \fi}
                  1598
 \authornotemark Adding a footnote mark to the authors
                  1599 \newcommand\authornotemark[1][\relax]{%
                       \ifx#1\relax\relax\relax
                       \g@add to @macro \addresses {\@authornotemark}\%
                  1602
                       \else
                       \g@addto@macro\addresses{\@@authornotemark{#1}}%
                  1603
                       \fi}
                  1604
      \acmVolume The current volume
                  1605 \def\acmVolume#1{\def\@acmVolume{#1}}
                  1606 \acmVolume{1}
      \acmNumber The current number
                  1607 \def\acmNumber#1{\def\@acmNumber{#1}}
                  1608 \acmNumber{1}
     \acmArticle The current article
                  1609 \def\acmArticle#1{\def\@acmArticle{#1}}
                  1610 \acmArticle{}
  \acmArticleSeq The sequence number
                  1611 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
                  1612 \acmArticleSeq{\@acmArticle}
        \acmYear The current year
                  1613 \def\acmYear#1{\def\@acmYear{#1}}
                  1614 \acmYear{\the\year}
       \acmMonth The current month
                  1615 \def\acmMonth#1{\def\@acmMonth{#1}}
                  1616 \acmMonth{\the\month}
    \ensuremath{\texttt{QacmPubDate}} The publication date
                  1617 \def\@acmPubDate{\ifcase\@acmMonth\or
                  1618 January\or February\or March\or April\or May\or June\or
                       July\or August\or September\or October\or November\or
                  1620
                      December\fi~\@acmYear}
       \acmPrice The price
                  1621 \def\acmPrice#1{\def\@acmPrice{#1}}
                  1622 \acmPrice{15.00}
\acmSubmissionID The submission ID
                  1623 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
                  1624 \acmSubmissionID{}
        \acmisbn The book ISBN
                  1625 \def\acmISBN#1{\def\@acmISBN{#1}}
                  1626 \acmISBN{978-x-xxxx-xxxx-x/YY/MM}
```

```
\acmDOI The paper DOI
                                             1627 \def\acmDOI#1{\def\@acmDOI{#1}}
                                             1628 \acmDOI{10.1145/nnnnnn.nnnnnnn}
         \if@ACM@badge
\@ACM@badge@width The width of the badge
                                             1629 \newlength\@ACM@badge@width
                                             1630 \setlength\@ACM@badge@width{3pc}
\@ACM@title@width The width of the title
                                             1631 \newlength\@ACM@title@width
  \@ACM@badge@skip The spacing between badges
                                             1632 \newlength\@ACM@badge@skip
                                             1633 \setlength\@ACM@badge@skip{1pt}
              \@acmBadgeR
                                             1634 \def\@acmBadgeR{}
              \@acmBadgeL
                                             1635 \def\@acmBadgeL{}
                 \acmBadgeR Setting the right badge
                                             1636 \newcommand\acmBadgeR[2][]{%
                                                          \ifx\@acmBadgeR\@empty
                                             1637
                                                                \gdef\@acmBadgeR{%
                                             1638
                                                                     \smash{%
                                             1639
                                                                          \arrowvert \arrowver
                                             1640
                                                                               1641
                                                           \else
                                             1642
                                                               \g@addto@macro{\@acmBadgeR}{%
                                             1643
                                                                     \hspace{\@ACM@badge@skip}%
                                             1644
                                                                     \smash{%
                                             1645
                                                                          \raisebox{0.5\height}{%
                                             1646
                                                                               1647
                                             1648
                                                         \fi}
                 \acmBadgeL Setting the left badge
                                             1649 \newcommand\acmBadgeL[2][]{%
                                                           \ifx\@acmBadgeL\@empty
                                             1650
                                                                \gdef\@acmBadgeL{%
                                             1651
                                                                     \smash{%
                                             1652
                                                                          \raisebox{0.5\height}{%
                                             1653
                                                                               \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}%
                                             1654
                                             1655
                                                           \else
                                             1656
                                                                \g@addto@macro{\@acmBadgeL}{%
                                                                     \hspace{\@ACM@badge@skip}%
                                             1657
                                                                     \smash{%
                                             1658
                                                                          \raisebox{0.5\height}{%
                                             1659
                                                                               1660
                                                          \fi}
                                             1661
```

```
\acmBadge Just a syntax sugar for \acmBadgeR
                    1662 \let\acmBadge=\acmBadgeR
         \startPage The start page of the paper
                    1663 \def\startPage#1{\def\@startPage{#1}}
                     1664 \startPage{}
             \terms Terms are obsolete. We use CCS now.
                     1665 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
                            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.
                     1667 \def\keywords#1{\def\@keywords{#1}}
                    1668 \let\@keywords\@empty
                    1669 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty
                         \ifnum\getrefnumber{TotPages}>2\relax
                          \ClassWarningNoLine{\@classname}{ACM keywords are mandatory
                    1671
                    1672
                            for papers over two pages}%
                    1673
                         \fi\fi\fi}
           abstract The amsart package puts abstract in a box. Since we do not know whether we will
                    use two-column mode, we prefer to save the text
                    1674 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}
     \@saveabstract And saving the abstract
                    1675 \long\def\@saveabstract#1{\if@ACM@maketitle@typeset
                          \ClassError{\@classname}{Abstract must be defined before maketitle
                            command. Please move it!}\fi
                     1678 \long\gdef\@abstract{#1}}
                     1679 \@saveabstract{}
           \@lempty The long version of \@empty (to compare with \@abstract)
                    1680 \long\def\@lempty{}
   \if@ACM@printccs Whether to print CCS
                    1681 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
                    1682 \if@ACM@printccs
                            \ClassInfo{\@classname}{Printing CCS}%
                    1683
                    1684 \else
                            \ClassInfo{\@classname}{Suppressing CCS}%
                    1685
                     1686 \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}
\if@ACM@printacmref Whether to print the ACM bibstrip
                    1687 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
                         \if@ACM@printacmref
                    1688
                            \ClassInfo{\@classname}{Printing bibformat}%
                    1689
                    1690 \else
                            \ClassInfo{\@classname}{Suppressing bibformat}%
                    1691
                     1692 \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}
```

```
1693 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
                          \ifnum\getrefnumber{TotPages}>1\relax
                    1694
                          \ClassWarningNoLine{\@classname}{%
                    1695
                            ACM reference format is mandatory \MessageBreak
                    1696
                            for papers over one page. \MessageBreak
                    1697
                            Please add printacmref=true to the \MessageBreak
                    1698
                            \string\settopmatter\space command.}%
                    1699
                         \fi\fi\fi}
                    1700
\if@ACM@printfolios Whether to print folios
                    1701 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
                          \if@ACM@printfolios
                            \ClassInfo{\@classname}{Printing folios}%
                    1704
                            \ClassInfo{\@classname}{Suppressing folios}%
                    1705
                         \fij{\ClassError{\@classname}{The option printfolios can be either true or false}}
                    1706
\@ACM@authorsperrow The number of authors per row. 0 means use the default algorithm.
                    1707 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrow}[0]{%
                          \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrow to
                              #1}}{\ClassWarning{\@classname}{The parameter authorsperrow must be
                    1709
                              numerical. Ignoring the input #1}\gdef\@ACM@authorsperrow{0}}}
                    1710
      \settopmatter The usual syntactic sugar
                    1711 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}
                        Now the settings
                    1712 \settopmatter{printccs=true, printacmref=true}
                    1713 \if@ACM@manuscript
                    1714 \settopmatter{printfolios=true}
                    1715 \else
                         \if@ACM@journal
                    1716
                            \settopmatter{printfolios=true}
                    1717
                         \else
                    1718
                            \settopmatter{printfolios=false}
                    1719
                         \fi
                    1720
                    1721 \fi
                    1722 \settopmatter{authorsperrow=0}
         \@received The container for the paper history
                    1723 \def\@received{}
          \received The \received command
                    \ifx\@tempa\@empty
                    1725
                            \ifx\@received\@empty
                    1726
                              \gdef\@received{Received #2}%
                    1727
                    1728
                            \else
                              \g@addto@macro{\@received}{; revised #2}%
                    1729
                            \fi
                    1730
                    1731
                         \else
                    1732
                            \ifx\@received\@empty
                              \gdef\@received{#1 #2}%
                    1733
```

```
\else
                   1734
                              \g@addto@macro{\@received}{; #1 #2}%
                   1735
                           \fi
                   1736
                        \fi}
                   1737
                   1738 \AtEndDocument{%
                         \ifx\@received\@empty\else
                           \par\bigskip\noindent\small\normalfont\@received\par
                   1740
                         \fi}
                   1741
  \acmArticleType Article type. We set up the color.
                   1742 \define@choicekey+{ACM}{articletype}[\ACM@ArticleType\ACM@ArticleType@nr]{%
                         Research, Review, Discussion, Invited, Position \[Review] \{\%
                   1743
                         \ifcase\ACM@ArticleType@nr
                         \relax % Research
                   1745
                            \colorlet{@ACM@Article@color}{ACMBlue}%
                   1746
                   1747
                         \or % Review
                   1748
                            \colorlet{@ACM@Article@color}{ACMOrange}%
                   1749
                         \or % Discussion
                            \colorlet{@ACM@Article@color}{ACMGreen}%
                   1750
                   1751
                         \or % Invited
                            \colorlet{@ACM@Article@color}{ACMPurple}%
                   1752
                         \or % Position
                   1753
                            \colorlet{@ACM@Article@color}{ACMRed}%
                   1754
                         \fi
                   1755
                   1756 }{%
                   1757 \ClassError{\@classname}{Article Type must be Research, Review,\MessageBreak
                          Discussion, Invited, or Position}}
                   {\tt 1759 \setminus def \setminus acmArticleType\#1{\setminus setkeys\{ACM\}\{articletype=\#1\}\}}}
                   1760 \if@ACM@acmcp
                   1761 \acmArticleType{Research}%
                   1762 \fi
                   1763
\@ACM@color@frame The colored frame for the acmcp
                   1764 \newenvironment{@ACM@color@frame}{%
                         \def\FrameCommand{\hspace*{-6.5pc}%
                   1765
                           \colorbox{@ACM@Article@color!10!white}}%
                   1766
                         \MakeFramed {\advance\hsize
                   1767
                           -6.5pc\relax\FrameRestore}}{\zsaveposy{@ACM@acmcpframe@y}%
                   1768
                         \endMakeFramed}
                   1769
\acmCodeDataLink The code link
                   1770 \def\acmCodeLink#1{%
                         \ifx\@acmCodeDataLink\@empty
                   1771
                            \gdef\@acmCodeDataLink{\url{#1}}%
                   1772
                         \else
                   1773
                            \g@addto@macro{\@acmCodeDataLink}{\\ \url{#1}}%
                   1774
                         \fi}
                   1775
                   1776 \def\@acmCodeDataLink{}
\acmContributions The authors' contrubution statement
                   1777 \def\acmContributions#1{\gdef\@acmContributions{#1}}
                   1778 \acmContributions{}
```

```
\acmDataLink The code link
```

1779 \let\acmDataLink\acmCodeLink

3.17 Concepts system

```
We exclude CCSXML stuff generated by the ACM system:
                                              1780 \RequirePackage{comment}
                                              1781 \excludecomment{CCSXML}
                      \@concepts This is the storage macro and counter for concepts
                                              1782 \let\@concepts\@empty
                                              1783 \newcounter{@concepts}
                          \ccsdesc The first argument is the significance, the second is the concept(s)
                                              1784 \newcommand\ccsdesc[2][100]{%
                                              1785 \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!
                                              1786 \def\textrightarrow{\rightarrow\}
                                              1787 \def\ccsdesc@parse#1~#2~#3~{%
                                                         \stepcounter{@concepts}%
                                                          \expandafter\ifx\csname CCS@General@#2\endcsname\relax
                                              1789
                                              1790
                                                              \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
                                              1791
                                                                   \textbf{#2}}%
                                                              \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
                                              1792
                                                              \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
                                              1793
                                                          \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
                                              1794
                                                              \csname CCS@Punctuation@#2\endcsname
                                              1795
                                                              \csname CCS@Specific@#2\endcsname}%
                                              1796
                                              1797
                                                          \ifx#3\relax\relax\else
                                              1798
                                                              \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
                                                                   \textrightarrow\ }%
                                              1800
                                                           \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
                                              1801
                                                                 \addtocounter{@concepts}{-1}%
                                              1802
                                                                 1803
                                                                \ifnum#1>299\textit{#3}\else
                                              1804
                                                                #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
                                              1805
                                                         \fi
                                              1806
                                              1807 \ccsdesc@parse@finish}
                                              {\tt 1808 \ AtEndDocument \{ if @ACM@nonacm \ else \ if x \ @concepts \ @empty \ relax \ else \ and \ else \ else \ and \ else \ else \ and \ else \ else \ else \ else \ and \ else \ else
                                                         \ifnum\getrefnumber{TotPages}>2\relax
                                                         \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
                                              1810
                                                              for papers over two pages}%
                                              1811
                                                        \fi\fi\fi}
                                              1812
\ccdesc@parse@finish Gobble everything to \ccsdesc@parse@end
                                              1813 \def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}
```

3.18 Copyright system

This is from acmcopyright.sty

```
\if@printcopyright Whether to print a copyright symbol
                     1814 \newif\if@printcopyright
                     1815 \@printcopyrighttrue
\if@printpermission Whether to print the permission block
                     1816 \newif\if@printpermission
                     1817 \@printpermissiontrue
       \if@acmowned Whether the ACM owns the rights to the paper
                     1818 \newif\if@acmowned
                     1819 \@acmownedtrue
                         Keys:
                     1820 \define@choicekey*{ACM@}{acmcopyrightmode}[%
                           \acm@copyrightinput\acm@copyrightmode]{none,%
                     1821
                             acmcopyright,acmlicensed,rightsretained,%
                     1822
                             usgov, usgovmixed, cagov, cagovmixed, licensedusgovmixed, %
                     1823
                             licensedcagov, licensedcagovmixed, othergov, licensedothergov, %
                     1824
                             iw3c2w3,iw3c2w3g,cc}{%
                     1825
                     1826
                           \@printpermissiontrue
                     1827
                           \@printcopyrighttrue
                     1828
                           \@acmownedtrue
                           \ifnum\acm@copyrightmode=0\relax % none
                     1829
                            \@printpermissionfalse
                     1830
                            \@printcopyrightfalse
                     1831
                            \@acmownedfalse
                     1832
                     1833
                           \ifnum\acm@copyrightmode=2\relax % acmlicensed
                     1834
                            \@acmownedfalse
                     1835
                           \fi
                     1836
                           \ifnum\acm@copyrightmode=3\relax % rightsretained
                     1837
                            \@acmownedfalse
                     1838
                            \AtBeginDocument{\acmPrice{}}%
                     1839
                           \fi
                     1840
                           \ifnum\acm@copyrightmode=4\relax % usgov
                     1841
                            \@printpermissiontrue
                     1842
                            \@printcopyrightfalse
                     1843
                            \@acmownedfalse
                     1844
                            \AtBeginDocument{\acmPrice{}}%
                     1845
                     1846
                           \ifnum\acm@copyrightmode=6\relax % cagov
                     1847
                            \@acmownedfalse
                     1848
                     1849
                           \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
                     1850
                            \@acmownedfalse
                     1851
                     1852
                           \ifnum\acm@copvrightmode=9\relax % licensedcagov
                     1853
                            \@acmownedfalse
                     1854
```

1855

\ifnum\acm@copyrightmode=10\relax % licensedcagovmixed

```
\@acmownedfalse
                  1857
                  1858
                       \ifnum\acm@copyrightmode=11\relax % othergov
                  1859
                        \@acmownedtrue
                  1860
                  1861
                       \ifnum\acm@copyrightmode=12\relax % licensedothergov
                  1862
                        \@acmownedfalse
                  1863
                       \fi
                  1864
                       \ifnum\acm@copyrightmode=13\relax % iw3c2w3
                  1865
                        \@acmownedfalse
                  1866
                        \AtBeginDocument{\acmPrice{}}%
                  1867
                       \fi
                  1868
                       \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
                  1869
                        \@acmownedfalse
                  1870
                        \AtBeginDocument{\acmPrice{}}%
                  1871
                  1872
                       \ifnum\acm@copyrightmode=15\relax % cc
                  1873
                  1874
                        \@acmownedfalse
                        \AtBeginDocument{\acmPrice{}}%
                  1875
                       \fi}
                  1876
   \setcopyright This is the syntactic sugar around setting keys.
                  1877 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
                  1878 \setcopyright{acmcopyright}
      \setcctype The type of Creative Commons license used
                  1879 \newcommand\setcctype[2][4.0]{%
                       \def\ACM@cc@version{#1}%
                       \def\ACM@cc@type{#2}}
                  1882 \setcctype{by}
\@copyrightowner Here is the owner of the copyright
                  1883 \def\@copyrightowner{%
                       \ifcase\acm@copyrightmode\relax % none
                       \or % acmcopyright
                  1885
                       Association for Computing Machinery.
                  1887
                       \or % acmlicensed
                       Copyright held by the owner/author(s). Publication rights licensed to
                  1888
                       ACM\@.
                  1889
                       \or % rightsretained
                  1890
                       Copyright held by the owner/author(s).
                  1891
                       \or % usgov
                  1892
                       \or % usgovmixed
                  1893
                       Association for Computing Machinery.
                  1894
                  1895
                       \or % cagov
                       Crown in Right of Canada.
                  1896
                       \or %cagovmixed
                  1897
                       Association for Computing Machinery.
                  1898
                       \or %licensedusgovmixed
                  1899
                  1900 Copyright held by the owner/author(s). Publication rights licensed to
                      ACM\@.
                  1901
                       \or % licensedcagov
                  1902
                      Crown in Right of Canada. Publication rights licensed to
                  1903
                  1904
                      ACM\@.
```

```
\or %licensedcagovmixed
                          1905
                                Copyright held by the owner/author(s). Publication rights licensed to
                          1906
                               ACM\@.
                          1907
                                \or % othergov
                          1908
                                Association for Computing Machinery.
                          1909
                                \or % licensedothergov
                                Copyright held by the owner/author(s). Publication rights licensed to
                               ACM\@.
                          1912
                                \or % ic2w3www
                          1913
                               IW3C2 (International World Wide Web Conference Committee), published
                          1914
                                under Creative Commons CC-BY~4.0 License.
                          1915
                                \or % ic2w3wwwgoogle
                          1916
                                IW3C2 (International World Wide Web Conference Committee), published
                          1917
                                under Creative Commons CC-BY-NC-ND~4.0 License.
                          1918
                                \or % cc
                          1919
                                Copyright held by the owner/author(s).
                          1920
                                \fi}
             \@formatdoi Print a clickable DOI
                          1922 \def\@formatdoi#1{\url{https://doi.org/#1}}
\@ACM@copyright@check@cc At present cC licenses can be used only for acmengage format or for non-acm stuff. This
                          macro checks whether the CC license is applicable and generates an error if not.
                          1923 \def\@ACM@copyright@check@cc{%
                                \if@ACM@nonacm
                          1924
                                   \ClassInfo{\@classname}{Using CC license with a non-acm
                          1925
                                     material}%
                          1926
                                \else
                          1927
                                   \if@ACM@engage
                          1928
                                      \ClassInfo{\@classname}{Using CC license with ACM Enage
                          1929
                                        material}%
                          1930
                          1931
                                    \else
                                    \ClassError{\@classname}{%
                          1932
                                      Sorry, Creative Commons licenses are\MessageBreak
                          1933
                                      currently not used with ACM publications\MessageBreak
                          1934
                                      typeset by the authors}{Please use nonacm
                          1935
                                         option or ACM Engage class to enable CC licenses}%
                          1936
                                    \fi
                          1937
                                \fi}
                          1938
   \@copyrightpermission The canned permission block.
                          1939 \def\@copvrightpermission{%
                                \ifcase\acm@copyrightmode\relax % none
                          1940
                                \or % acmcopyright
                          1941
                                 Permission to make digital or hard copies of all or part of this
                          1942
                                 work for personal or classroom use is granted without fee provided
                          1943
                                 that copies are not made or distributed for profit or commercial
                          1944
                                 advantage and that copies bear this notice and the full citation on
                          1945
                          1946
                                 the first page. Copyrights for components of this work owned by
                                 others than ACM must be honored. Abstracting with credit is
                          1947
                                 permitted. To copy otherwise, or republish, to post on servers or to
                          1948
                                 redistribute to lists, requires prior specific permission
                          1949
                                 and\hspace*{.5pt}/or a fee. Request permissions from
                          1950
```

1951

permissions@acm.org.

```
\or % acmlicensed
1952
      Permission to make digital or hard copies of all or part of this
1953
      work for personal or classroom use is granted without fee provided
1954
      that copies are not made or distributed for profit or commercial
1955
      advantage and that copies bear this notice and the full citation on
1956
      the first page. Copyrights for components of this work owned by
1957
      others than the author(s) must be honored. Abstracting with credit
1958
      is permitted. To copy otherwise, or republish, to post on servers
1959
      or to redistribute to lists, requires prior specific permission
1960
      and\hspace*{.5pt}/or a fee. Request permissions from
1961
      permissions@acm.org.
1962
     \or % rightsretained
1963
      Permission to make digital or hard copies of part or all of this work
1964
      for personal or classroom use is granted without fee provided that
1965
      copies are not made or distributed for profit or commercial advantage
1966
      and that copies bear this notice and the full citation on the first
1967
      page. Copyrights for third-party components of this work must be
      honored. For all other uses, contact the
1970
      owner\hspace*{.5pt}/author(s).
1971
     \or % usgov
      This paper is authored by an employee(s) of the United States
1972
      Government and is in the public domain. Non-exclusive copying or
1973
      redistribution is allowed, provided that the article citation is
1974
      given and the authors and agency are clearly identified as its
1975
1976
      source.
1977
     \or % usgovmixed
      ACM acknowledges that this contribution was authored or co-authored
1978
      by an employee, contractor, or affiliate of the United States
1979
      government. As such, the United States government retains a
1980
1981
      nonexclusive, royalty-free right to publish or reproduce this
      article, or to allow others to do so, for government purposes only.
1982
1983
     \or % cagov
      This article was authored by employees of the Government of Canada.
1984
      As such, the Canadian government retains all interest in the
1985
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- 2053 disseminate the work on their personal and corporate Web sites with
- ${\small 2054} \qquad \text{the appropriate attribution.} \\$
- 2055 \or % iw3c2w3g
- 2056 This paper is published under the Creative Commons
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- 2058 (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
- 2059 disseminate the work on their personal and corporate Web sites with

```
the appropriate attribution.
                2060
                     \or % CC
                2061
                       \@ACM@copyright@check@cc
                2062
                       \IfEq{\ACM@cc@type}{zero}{%
                2063
                        \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0/legalcode}}{%
                2064
                      \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version/legalcode}}%
                2065
                      \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\\
                2066
                       \href{\ACM@CC@Url}{%
                2067
                       This work is licensed under a Creative Commons
                2068
                       \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}{%
                2069
                         \IfEq{\ACM@cc@type}{by}{Attribution}{}%
                2070
                         \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}{}%
                2071
                         \IfEq{\ACM@cc@type}{by-nd}{Attribution-NoDerivatives}{}%
                2072
                         \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}{}%
                2073
                         \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{}%
                2074
                        \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{}%
                2075
                           \IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}%
                 2076
                       License.}%
                2078
                2079 \fi}
 \copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
                 2080 \def\copyrightyear#1{\def\@copyrightyear{#1}}
                2081 \copyrightyear{\@acmYear}
\@teaserfigures The teaser figures container
                2082 \def\@teaserfigures{}
   teaserfigure The teaser figure
                2083 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}
   \@saveteaser Saving the teaser
                2084 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}
        \thanks We redefine amsart \thanks so the anonymous key works
                2085 \renewcommand{\thanks}[1]{%
                      \@ifnotempty{#1}{%
                2086
                        \if@ACM@anonymous
                2087
                           \g@addto@macro\thankses{\thanks{A note}}%
                2088
                2089
                        \g@addto@macro\thankses{\thanks{\#1}}\%
                2090
                2091
                       \fi}}
          \anon We provide \anon command, which obscures parts of the text if the package option
                 anonymous is set
                2092 \newcommand{\anon}[2][ANONYMIZED]{%
                2093
                      \if@ACM@anonymous%
                        {\color{ACMOrange}#1}%
                2094
                      \else%
                2095
                        #2%
                2096
                      \fi}
                2097
```

3.19 Maketitle hook

The current Lagar provides a nice 1thooks mechanism. However, since it is relatively new, we will use oldfashioned approach—at least for now.

```
\@beginmaketitlehook The hook
```

```
2098 \ifx\@beginmaketitlehook\@undefined
2099 \let\@beginmaketitlehook\@empty
2100 \fi
```

\AtBeginMaketitle Adding to the hook

2101 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}

3.20 ACM Engage top matter

\@acmengagemetadata The special metadata for ACM engage course materials

2102 \def\@acmengagemetadata{}

\setengagemetadata Adding topic to engage metadata

```
2103 \def\setengagemetadata#1#2{%
2104 \g@addto@macro{\@acmengagemetadata}{%
2105 \@setengagemetadata{#1}{#2}}}
```

3.21 Typesetting top matter

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

2106 \newbox\mktitle@bx

\maketitle The (in)famous \maketitle. Note that in sigchi-a mode, authors are *not* in the title

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.

```
2107 \def\maketitle{\@beginmaketitlehook
     \@ACM@maketitle@typesettrue
     \if@ACM@anonymous
       % Anonymize omission of \author-s
2110
2111
       \ifnum\num@authorgroups=0\author{}\fi
2112
     \fi
2113
     \begingroup
     \let\@vspace\@vspace@orig
2114
     \let\@vspacer\@vspacer@orig
2115
    \let\@footnotemark\@footnotemark@nolink
2116
    \let\@footnotetext\@footnotetext@nolink
2117
    \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
2118
2120 \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
2121 \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
2122 \@printtopmatter
```

\if@ACM@sigchiamode\@mkauthors\fi

```
\setcounter{footnote}{0}%
2124
    2125
    \@titlenotes
2126
    \@subtitlenotes
2127
    \@authornotes
2128
    \let\@makefnmark\relax
    \let\@thefnmark\relax
2130
    \let\@makefntext\noindent
2131
2132
    \ifx\@empty\thankses\else
      \footnotetextauthorsaddresses{%
2133
        \def\par{\let\par\@par}\parindent\z@\@setthanks}%
2134
    \fi
2135
    \if@ACM@acmcp\else
2136
      \ifx\@empty\@authorsaddresses\else
2137
         \if@ACM@anonymous\else
2138
           \if@ACM@journal@bibstrip
2139
            \footnotetextauthorsaddresses{%
2140
               \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2141
          \fi
2142
         \fi
2143
      \fi
2144
    \fi
2145
    \if@ACM@nonacm
2146
      \ifnum\acm@copyrightmode=15\relax % cc
2147
         \footnotetextcopyrightpermission{\@copyrightpermission}%
2148
      \fi
2149
    \else
2150
      \if@ACM@acmcp\else
2151
      \footnotetextcopyrightpermission{%
2152
2153
      \if@ACM@authordraft
          2154
             Unpublished working draft. Not for distribution.}}%
2155
2156
         \color[gray]{0.9}%
      \fi
2157
      \parindent\z@\parskip0.1\baselineskip
2158
      \if@ACM@authorversion\else
2159
        \if@printpermission\@copyrightpermission\par\fi
2160
2161
2162
      \if@ACM@manuscript\else
         2163
2164
           \if@ACM@engage
2165
             {\itshape \@acmBooktitle, \@acmYear.}\par
2166
          \else
        2167
          \fi
2168
         \fi
2169
      \fi
2170
      \if@printcopyright
2171
        \copyright\ \@copyrightyear\ \@copyrightowner\\
2172
2173
      \else
2174
        \@copyrightyear.\
      \fi
2175
      \if@ACM@manuscript
2176
        Manuscript submitted to ACM\
2177
```

```
\else
2178
          \if@ACM@authorversion
2179
              This is the author's version of the work. It is posted here for
2180
              your personal use. Not for redistribution. The definitive Version
2181
              of Record was published in
2182
              \if@ACM@journal@bibstrip
2183
                \emph{\@journalName}%
2184
              \else
2185
                \emph{\@acmBooktitle}%
2186
              \fi
2187
              \ifx\@acmDOI\@empty
2188
2189
              \else
2190
                , \@formatdoi{\@acmDOI}.
2191
              \fi\\
2192
            \else
2193
              \if@ACM@nonacm\else
2194
                \if@ACM@journal@bibstrip
                  \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle
2196
2197
                  \ifx\@acmPrice\@empty\else\ \$\@acmPrice\fi\\
                  \@formatdoi{\@acmDOI}%
2198
                \else % Conference
2199
                  \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN
2200
                  \ifx\@acmPrice\@empty.\else\dots\$\@acmPrice\fi\\\fi
2201
                  2202
                \fi
2203
              \fi
2204
            \fi
2205
          \fi}%
2206
       \fi
2207
2208
       \fi
     \endgroup
2209
     \if @ACM@engage \end{array} engagemetadata \fi
2210
     \setcounter{footnote}{0}%
2211
     \@mkabstract
2212
     \ifx\@translatedabstracts\@empty\else
2213
     \@translatedabstracts\fi
2214
2215
     \if@ACM@printccs
2216
     \ifx\@concepts\@empty\else\bgroup
2217
          {\@specialsection{CCS Concepts}%
2218
             \noindent\@concepts\par}\egroup
2219
        \fi
      \fi
2220
      \if@ACM@acmcp\else
2221
         \ifx\@keywords\@empty\else\bgroup
2222
            {\@specialsection{\keywordsname}%
2223
               \noindent\@keywords\par}\egroup
2224
2225
       \ifx\@translatedkeywords\@empty\else
2226
2227
           \@translatedkeywords
2228
       \fi
2229
     \fi
     \let\metadata@authors=\authors
2230
     \mbox{\nxandlist{, }{, }{, }\mbox{\mbox{\nxandlist{}}{, }{, }{, }}
2231
```

```
\def\@ACM@checkaffil{}%
                  2232
                        \hypersetup{%
                  2233
                         pdfauthor={\metadata@authors},
                  2234
                         pdftitle={\@title},
                  2235
                         pdfsubject={\@concepts},
                  2236
                         pdfkeywords={\@keywords},
                  2237
                         pdfcreator={LaTeX with acmart
                  2238
                            \csname ver@acmart.cls\endcsname\space
                  2239
                  2240
                            and hyperref
                            \csname ver@hyperref.sty\endcsname}}%
                  2241
                        \andify\authors
                  2242
                        \andify\shortauthors
                  2243
                        \global\let\authors=\authors
                  2244
                        \global\let\shortauthors=\shortauthors
                  2245
                        \if@ACM@printacmref
                  2246
                           \@mkbibcitation
                  2247
                        \fi
                  2248
                        \global\@topnum\z@ % this prevents floats from falling
                  2249
                  2250
                                           % at the top of page 1
                        \global\@botnum\z@ % we do not want them to be on the bottom either
                  2251
                  2252
                        \@printendtopmatter
                        \@afterindentfalse
                  2253
                        \@afterheading
                  2254
                        \if@ACM@acmcp
                  2255
                          \set@ACM@acmcpbox
                  2256
                          \AtEndDocument{\end@ACM@color@frame}%
                  2257
                          \@ACM@color@frame
                  2258
                       \fi
                  2259
                  2260 }
\set@ACM@acmcpbox Setting infobox for acmcp
                  2261 \newbox\@ACM@acmcpbox
                  2262 \def\set@ACM@acmcpbox{%
                       \bgroup
                  2263
                       \hsize=5pc
                  2264
                        \global\setbox\@ACM@acmcpbox=\vbox{%
                  2265
                          \sting th{\pi(\ze{0})}
                  2266
                         {\clude graphics[width=\hsize]{acm-jdslogo}\par}\%
                  2267
                          \scriptsize
                  2268
                         \ifnum\getrefnumber{TotPages}>1\else
                  2269
                            \zrefused{@ACM@acmcpbox@y}%
                  2270
                            \zrefused{@ACM@acmcpframe@y}%
                  2271
                  2272
                            \@tempdima=\dimexpr\zposy{@ACM@acmcpbox@y}sp -
                            \zposy{@ACM@acmcpframe@y}sp+0.3\FrameSep+
                  2273
                            \@ACM@acmcp@delta\relax
                  2274
                            \ifdim\@tempdima>0pt\relax
                  2276
                               \vspace*{\@tempdima}%
                  2277
                               \protected@write\@auxout{}%
                               2278
                            \fi
                  2279
                         \fi
                  2280
                         \ifx\@acmCodeDataLink\@empty\else\bigskip
                  2281
                         Code and data links:\\ \@acmCodeDataLink\par\bigskip
                  2282
                         \fi
                  2283
```

```
\ifx\@keywords\@empty\else\bigskip
                  2284
                            Keywords: \@keywords\par
                  2285
                  2286
                          \ifx\@acmContributions\@empty\else\bigskip
                  2287
                            \@acmContributions\par
                  2288
                  2289
                          \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
                  2290
                          \zsaveposy{@ACM@acmcpbox@y}%
                  2291
                  2292
                       }
                  2293 \egroup}
\@specialsection This macro starts sections for proceedings and uses \small for journals
                  2294 \def\@specialsection#1{%
                  2295
                        \let\@vspace\@vspace@orig
                  2296
                        \let\@vspacer\@vspacer@orig
                        \ifcase\ACM@format@nr
                  2297
                  2298
                        \relax % manuscript
                          \par\medskip\small\noindent#1: %
                  2299
                  2300
                        \or % acmsmall
                          \par\medskip\small\noindent#1: %
                  2301
                  2302
                        \or % acmlarge
                          \par\medskip\small\noindent#1: %
                  2304
                        \or % acmtog
                  2305
                          \par\medskip\small\noindent#1: %
                        \or % sigconf
                  2306
                          \section*{#1}%
                  2307
                        \or % siggraph
                  2308
                  2309
                          \section*{#1}%
                  2310
                        \or % sigplan
                           \noindentparagraph*{#1:~}%
                  2311
                  2312
                       \or % sigchi
                  2313
                          \section*{#1}%
                  2314
                       \or % sigchi-a
                  2315
                          \section*{#1}%
                  2316
                       \or % acmengage
                          \section*{#1}%
                  2317
                       \or % acmcp
                  2318
                          \section*{#1}%
                  2319
                  2320
                  2321
                        \let\@vspace\@vspace@acm
                  2322
                        \let\@vspacer\@vspacer@acm
                  2323 }
```

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

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

```
2324 \def\@printtopmatter{%
2325 \ifx\@startPage\@empty
2326 \gdef\@startPage{1}%
2327 \else
2328 \setcounter{page}{\@startPage}%
2329 \fi
2330 \@tempdima=\ht\mktitle@bx
```

```
\ifdim\@tempdima>0.9\textheight
           2332
           2333
                     \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
           2334
                     \thispagestyle{firstpagestyle}%
           2335
                     \noindent\unvbox\@tempboxa
           2336
           2337
                     \clearpage
                     \ensuremath{\tt 0}tempdima=\ht\mbox{\tt mktitle@bx}
           2338
                     \advance\@tempdima by \dp\mktitle@bx
           2339
                   \ifdim\@tempdima>0.9\textheight\repeat
           2340
                \fi
           2341
                 \thispagestyle{firstpagestyle}%
           2342
                 \noindent
           2343
                 \ifcase\ACM@format@nr
           2344
                 \relax % manuscript
           2345
                   \box\mktitle@bx\par
           2346
                 \or % acmsmall
           2347
                   \box\mktitle@bx\par
           2349
                 \or % acmlarge
                   \box\mktitle@bx\par
           2350
           2351
                 \or % acmtog
                   \twocolumn[\box\mktitle@bx]%
           2352
                 \or % sigconf
           2353
                   \twocolumn[\box\mktitle@bx]%
           2354
                 \or % siggraph
           2355
                   \twocolumn[\box\mktitle@bx]%
           2356
                \or % sigplan
           2357
                   \twocolumn[\box\mktitle@bx]%
           2358
           2359
                \or % sigchi
                   \twocolumn[\box\mktitle@bx]%
           2360
                \or % sigchi-a
           2361
                   \par\box\mktitle@bx\par\bigskip
           2362
           2363
                \or % acmengage
                   \twocolumn[\box\mktitle@bx]%
           2364
                 \or % acmcp
           2365
                    \box\mktitle@bx\par
           2366
           2367
                \fi
           2368 }
\@mktitle The title of the article
           2369 \def\@mktitle{%
                \ifcase\ACM@format@nr
           2370
                \relax % manuscript
           2371
                   \@mktitle@i
           2372
                \or % acmsmall
           2373
                   \@mktitle@i
           2374
           2375
                \or % acmlarge
           2376
                  \@mktitle@i
           2377
                \or % acmtog
                   \@mktitle@i
           2378
                \or % sigconf
           2379
                   \@mktitle@iii
           2380
                \or % siggraph
           2381
                   \@mktitle@iii
           2382
```

\advance\@tempdima by \dp\mktitle@bx

```
\or % sigplan
                        \@mktitle@iii
                2384
                     \or % sigchi
                2385
                        \@mktitle@iii
                2386
                     \or % sigchi-a
                2387
                2388
                        \@mktitle@iv
                2389
                     \or % acmengage
                2390
                        \@mktitle@iii
                2391
                     \or % acmcp
                        \@mktitle@i
                2392
                     \fi
                2393
                2394 }
   \@titlefont The font to typeset the title
                2395 \def\@titlefont{%
                     \ifcase\ACM@format@nr
                2397
                     \relax % manuscript
                2398
                        \LARGE\sffamily\bfseries
                     \or % acmsmall
                2399
                        \LARGE\sffamily\bfseries
                2400
                      \or % acmlarge
                2401
                2402
                        \LARGE\sffamily\bfseries
                2403
                      \or % acmtog
                2404
                        \Huge\sffamily
                2405
                      \or % sigconf
                       \Huge\sffamily\bfseries
                2406
                2407
                      \or % siggraph
                       \Huge\sffamily\bfseries
                2408
                     \or % sigplan
                2409
                        \Huge\bfseries
                2410
                     \or % sigchi
                2411
                        \Huge\sffamily\bfseries
                2412
                     \or % sigchi-a
                2413
                         \Huge\bfseries
                2414
                     \or % acmengage
                2415
                        \Huge\sffamily\bfseries
                2417
                     \or % acmcp
                        \LARGE\sffamily\bfseries
                2418
                     \fi}
                2419
\@subtitlefont The font to typeset the subtitle
                2420 \def\@subtitlefont{\normalsize
                     \ifcase\ACM@format@nr
                2422 \relax % manuscript
                        \mdseries
                2423
                     \or % acmsmall
                2424
                       \mdseries
                2425
                     \or % acmlarge
                2426
                       \mdseries
                2427
                     \or % acmtog
                2428
                         \LARGE
                2429
                     \or % sigconf
                2430
                        \LARGE\mdseries
                2432 \or % siggraph
```

```
\LARGE\mdseries
              2433
                    \or % sigplan
              2434
                       \LARGE\mdseries
              2435
                    \or % sigchi
              2436
                       \LARGE\mdseries
              2437
                    \or % sigchi-a
              2438
                       \mdseries
              2439
                    \or % acmengage
              2440
              2441
                       \LARGE\mdseries
              2442
                    \or % acmcp
                      \mdseries
              2443
                    \fi}
              2444
  \@mktitle@i The version of \mktitle for most journals
              2445 \def\@mktitle@i{\hsize=\textwidth}
              2446
                    \if@ACM@acmcp
              2447
                      \advance\hsize by -6pc%
              2448
                    \fi
                    \@ACM@title@width=\hsize
              2449
                    \setbox\mktitle@bx=\vbox{\noindent\@titlefont
              2450
                      \parbox[t]{\@ACM@title@width}{\raggedright
              2451
                        \@titlefont\noindent
              2452
                        \@title\@translatedtitle%
              2453
                    \ifx\@subtitle\@empty\else
              2454
                      \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
                    \fi}%
              2456
              2457
                    \par\bigskip}}%
 \@mktitle@ii The version of \mktitle for TOG. Since v1.06, this is subsumed by the \mktitle@i
              macro
\@mktitle@iii The version of \@mktitle for SIG proceedings.
              2458 \def\@mktitle@iii{\hsize=\textwidth
                      \setbox\mktitle@bx=\vbox{\@titlefont\centering
              2459
              2460
                        \@ACM@title@width=\hsize
                        \parbox[t]{\@ACM@title@width}{\centering\@titlefont
              2461
                          \@title\@translatedtitle%
              2462
                          \ifx\@subtitle\@empty\else
              2463
                            \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
              2464
                          \fi
              2465
                        }%
              2466
                        \par\bigskip}}%
 \@mktitle@iv The version of \@mktitle for sigchi-a
              \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
              2469
                        \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
              2470
                        \noindent\@title\@translatedtitle%
              2471
                       \ifx\@subtitle\@empty\else
              2472
                         \par\noindent\@subtitlefont\@subtitle\@translatedsubtitle%
              2473
              2474
                       \fi
              2475
                       \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.

```
2476 \newbox\@ACM@commabox
             2477 \def\@ACM@addtoaddress#1{%
                  \ifvmode\else
             2478
                    \if@ACM@affiliation@obeypunctuation\else
             2479
                    \setbox\@ACM@commabox=\hbox{, }%
             2480
                    \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
             2481
             2482
                  \fi\fi
             2483
                  #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...
\verb|\streetaddress|| 2484 \verb|\def\streetaddress|| 1{\unskip\ignorespaces}|
       \city 2485 \def\postcode#1{\unskip\ignorespaces}
       \state 2486 \if@ACM@journal
    \postcode 2487
                  \def\position#1{\unskip\ignorespaces}
     \country ^{2488}
                  \def\institution#1{\global\@ACM@instpresenttrue
                    \unskip~#1\ignorespaces}
             2489
                  \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
             2490
                  \def\state#1{\unskip\ignorespaces}
             2491
                  \newcommand\department[2][0]{\unskip\ignorespaces}
             2492
                  \def\country#1{\StrDel{#1}{ }[\@tempa]%
             2493
                    \ifx\@tempa\@empty\else
             2494
             2495
                    \global\@ACM@countrypresenttrue\fi
                    2496
             2497 \else
                  2498
             2499
                  \def\institution#1{\global\@ACM@instpresenttrue
                    \if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
             2500
                  2501
                    #2\else#2\par\fi}%
             2502
             2503\% \def\streetaddress#1{if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
                  \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
             2504
                  \let\state\@ACM@addtoaddress
             2506% \def\postcode#1{\if@ACM@affiliation@obeypunctuation#1\else\unskip\space#1\fi}%
                  2508 \fi
  \@mkauthors Typesetting the authors
             2509 \def\@mkauthors{\begingroup
             2510 \hsize=\textwidth
                 \ifcase\ACM@format@nr
             2512 \relax % manuscript
             2513
                    \@mkauthors@i
             2514
                 \or % acmsmall
                   \@mkauthors@i
             2515
             2516 \or % acmlarge
```

```
\or % acmtog
                  2518
                          \@mkauthors@i
                  2519
                        \or % sigconf
                  2520
                          \@mkauthors@iii
                  2521
                        \or % siggraph
                  2522
                          \@mkauthors@iii
                  2523
                        \or % sigplan
                  2524
                          \@mkauthors@iii
                  2525
                  2526
                        \or % sigchi
                          \@mkauthors@iii
                  2527
                        \or % sigchi-a
                  2528
                          \@mkauthors@iv
                  2529
                        \or % acmengage
                  2530
                          \@mkauthors@iii
                  2531
                        \or % acmcp
                  2532
                          \@mkauthors@i
                  2533
                  2534
                        \fi
                  2535
                        \endgroup
                  2536 }
     \@authorfont Somehow different conferences use different fonts for author names. Why?
                  2537 \def\@authorfont{\Large\sffamily}
\@affiliationfont Font for affiliations
                  2538 \def\@affiliationfont{\normalsize\normalfont}
                      Adjusting fonts for different formats
                  2539 \ifcase\ACM@format@nr
                  2540 \relax % manuscript
                  2541 \or % acmsmall
                  2542 \def\@authorfont{\large\sffamily}
                  2543 \def\@affiliationfont{\small\normalfont}
                  2544 \or % acmlarge
                  2545 \or % acmtog
                  2546 \def\@authorfont{\LARGE\sffamily}
                  2547 \def\@affiliationfont{\large}
                  2548 \or % sigconf
                  2549 \def\@authorfont{\LARGE}
                  2550 \def\@affiliationfont{\large}
                  2551 \or % siggraph
                  2552 \def\@authorfont{\normalsize\normalfont}
                  2553 \def\@affiliationfont{\normalsize\normalfont}
                  2554 \or % sigplan
                  2555 \def\@authorfont{\Large\normalfont}
                  2556 \def\@affiliationfont{\normalsize\normalfont}
                  2557 \or % sigchi
                  2558 \def\@authorfont{\bfseries}
                  2559 \def\@affiliationfont{\mdseries}
                  2560 \or % sigchi-a
                  2561 \def\@authorfont{\bfseries}
                  2562 \def\@affiliationfont{\mdseries}
                  2563 \or % acmengage
                  2564 \def\@authorfont{\LARGE}
```

\@mkauthors@i

```
\def\@affiliationfont{\large}
                                                   2566 \or % acmcp
                                                              \def\@authorfont{\large\sffamily}
                                                   2567
                                                   2568 \def\@affiliationfont{\small\normalfont}
                                                   2569 \fi
  \@typeset@author@line At this point we have \@currentauthors and \@currentaffiliations. We typeset
                                                   them in the journal style
                                                   2570 \def\@typeset@author@line{%
                                                              \andify\@currentauthors\par\noindent
                                                               \@currentauthors\def\@currentauthors{}%
                                                   2572
                                                               \ifx\@currentaffiliations\@empty\else
                                                   2573
                                                                    \andify\@currentaffiliations
                                                   2574
                                                                         \unskip, {\@currentaffiliations}\par
                                                   2575
                                                   2576
                                                               \def\@currentaffiliations{}}
                                                   2577
      \if@ACM@instpresent Whether the given affiliation has institution
                                                   2578 \newif\if@ACM@instpresent
                                                   2579 \@ACM@instpresenttrue
      \if@ACM@citypresent Whether the given affiliation has city
                                                   2580 \newif\if@ACM@citypresent
                                                   2581 \@ACM@citypresenttrue
\if@ACM@countrypresent Whether the given affiliation has country
                                                   2582 \newif\if@ACM@countrypresent
                                                   2583 \@ACM@countrypresenttrue
             \@ACM@resetaffil Reset affiliation flags
                                                   2584 \def\@ACM@resetaffil{%
                                                              \global\@ACM@instpresentfalse
                                                   2585
                                                               \global\@ACM@citypresentfalse
                                                   2586
                                                               \global\@ACM@countrypresentfalse
                                                   2587
                                                   2588 }
             \@ACM@checkaffil Check affiliation flags
                                                   2589 \def\@ACM@checkaffil{%
                                                              \if@ACM@instpresent\else
                                                   2590
                                                              \verb|\ClassWarningNoLine{\end{Qclassname}}| No institution present for an affiliation}| % | ClassWarningNoLine{\end{Qclassname}}| % | ClassWarningNoLine{\end
                                                   2591
                                                   2592
                                                   2593
                                                               \if@ACM@citypresent\else
                                                               \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
                                                   2594
                                                   2595
                                                               \if@ACM@countrypresent\else
                                                               \verb|\ClassError{\end{ACM}} In a ffiliation $$ ACM $$
                                                   2597
                                                                   requires each author to indicate their country using country macro.}%
                                                   2598
                                                   2599
                                                   2600 }
                   \@mkauthors@i This version is used in most journal formats. Note that \and between authors with the
                                                   same affiliation becomes _and_:
                                                   2601 \def\@mkauthors@i{%
```

```
\def\@currentaffiliations{}%
                    2603
                          \global\let\and\@typeset@author@line
                    2604
                          \def\@author##1{%
                    2605
                            \ifx\@currentauthors\@empty
                    2606
                              \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
                    2607
                            \else
                    2608
                               \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
                    2609
                            \fi
                    2610
                            \gdef\and{}}%
                    2611
                          \def\email##1##2{}%
                    2612
                          \def\affiliation##1##2{%
                    2613
                            \def\@tempa{\#2}\ifx\@tempa\@empty\else
                    2614
                               \ifx\@currentaffiliations\@empty
                    2615
                                  \gdef\@currentaffiliations{%
                    2616
                                    \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                    2617
                                    \setkeys{@ACM@affiliation@}{##1}%
                    2618
                                    \@ACM@resetaffil
                                    \@affiliationfont##2\@ACM@checkaffil}%
                    2620
                    2621
                               \else
                                 \g@addto@macro{\@currentaffiliations}{\and
                    2622
                                   \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                    2623
                                   \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
                    2624
                                   ##2\@ACM@checkaffil}%
                    2625
                              \fi
                    2626
                    2627
                             \global\let\and\@typeset@author@line}%
                    2628
                          \if@ACM@acmcp
                    2629
                            \advance\hsize by -6pc%
                    2630
                    2631
                          \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
                    2632
                            \noindent\addresses\@typeset@author@line
                    2633
                    2634
                           \par\medskip}%
                    2635 }
     \@mkauthors@ii The \@mkauthors@ii command was the version used in acmtog. It is no longer neces-
         \author@bx The box to put an individual author in
                    2636 \newbox\author@bx
      \author@bx@wd The width of the author box
                    2637 \newdimen\author@bx@wd
     \author@bx@sep The separation between author boxes
                    2638 \newskip\author@bx@sep
                    2639 \author@bx@sep=1pc\relax
\@typeset@author@bx Typesetting the box with authors. Note that in sigchi-a the box is not centered.
                    \def\and{\par}\normalbaselines
                    2641
                          \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
                    2642
                            \@authorfont\@currentauthors\par\@affiliationfont
                    2643
                            \@currentaffiliation}\egroup
                    2644
```

\def\@currentauthors{}%

```
2645 \box\author@bx\hspace{\author@bx@sep}%
2646 \gdef\@currentauthors{}%
2647 \gdef\@currentaffiliation{}}
```

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

```
2648 \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 ($\author@bx@sep$)/N - $\author@bx@sep$, where N is the number of boxes per row.

```
2649
     \author@bx@wd=\textwidth\relax
     \advance\author@bx@wd by -\author@bx@sep\relax
     \ifnum\@ACM@authorsperrow>0\relax
       \divide\author@bx@wd by \@ACM@authorsperrow\relax
2652
     \else
2653
       \ifcase\num@authorgroups
2654
       \relax % 0?
2655
       \or % 1=one author per row
2656
       \or % 2=two authors per row
2657
2658
          \divide\author@bx@wd by \num@authorgroups\relax
2659
       \or % 3=three authors per row
          \divide\author@bx@wd by \num@authorgroups\relax
2660
       \or % 4=two authors per row (!)
2661
          \divide\author@bx@wd by 2\relax
2662
       \else % three authors per row
2663
          \divide\author@bx@wd by 3\relax
2664
       \fi
2665
     \fi
2666
     \advance\author@bx@wd by -\author@bx@sep\relax
2667
Now, parsing of \addresses:
     \gdef\@currentauthors{}%
2668
     \gdef\@currentaffiliation{}%
2669
     \def\@author##1{\ifx\@currentauthors\@empty
2670
       \gdef\@currentauthors{\par##1}%
2671
     \else
2672
       \g@addto@macro\@currentauthors{\par##1}%
2673
     \fi
2674
     2675
     \def\email##1##2{\ifx\@currentaffiliation\@empty
2676
       \gdef\@currentaffiliation{\bgroup
2677
          \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2678
2679
       \g@addto@macro\@currentaffiliation{\par\bgroup
2680
          \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2681
2682
     \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2683
       \gdef\@currentaffiliation{%
2684
          \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2685
          \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2686
         ##2\@ACM@checkaffil}%
2687
     \else
2688
       \g@addto@macro\@currentaffiliation{\par
2689
          \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2690
```

```
\setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2691
          ##2\@ACM@checkaffil}%
2692
     \fi
2693
     \global\let\and\@typeset@author@bx
2694
2695 }%
Actual typesetting is done by the \and macro:
     \hsize=\textwidth
2696
     \global\setbox\mktitle@bx=\vbox{\noindent
2697
2698
       \unvbox\mktitle@bx\par\medskip\leavevmode
       \lineskip=1pc\relax\centering\hspace*{-1em}%
2699
       \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 overriden.

```
2701 \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 ($\author@bx@sep$)/N - $\author@bx@sep$, where N is the number of boxes per row.

```
\author@bx@wd=\columnwidth\relax
2702
      \advance\author@bx@wd by -\author@bx@sep\relax
2703
     \ifnum\@ACM@authorsperrow>0\relax
2704
       \divide\author@bx@wd by \@ACM@authorsperrow\relax
2705
     \else
2706
       \ifcase\num@authorgroups
2707
        \relax % 0?
2708
        \or % 1=one author per row
2709
        \else % 2=two authors per row
2710
           \divide\author@bx@wd by 2\relax
2712
       \fi
     \fi
2713
     \advance\author@bx@wd by -\author@bx@sep\relax
2714
Now, parsing of \addresses:
     \gdef\@currentauthors{}%
      \gdef\@currentaffiliation{}%
2716
      \def\@author##1{\ifx\@currentauthors\@empty
2717
       \gdef\@currentauthors{\par##1}%
2718
      \else
2719
        \g@addto@macro\@currentauthors{\par##1}%
2720
     \fi
2721
      \gdef\and{}}%
2722
      \def\email##1##2{\ifx\@currentaffiliation\@empty
2723
        \gdef\@currentaffiliation{\nolinkurl{##2}}%
2724
2725
        \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2726
2727
     \fi}%
     \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2728
        \gdef\@currentaffiliation{%
2729
          \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2730
          \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2731
          ##2\@ACM@checkaffil}%
2732
     \else
2733
```

```
\g@addto@macro\@currentaffiliation{\par
                                           2734
                                                              \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                                           2735
                                                              \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
                                           2736
                                                              ##2\@ACM@checkaffil}%
                                           2737
                                           2738
                                                     \global\let\and\@typeset@author@bx}%
                                           2739
                                           2740 %
                                           Actual typesetting is done by the \and macro
                                                          \bgroup\hsize=\columnwidth
                                           2741
                                                          \par\raggedright\leftskip=\z@
                                           2742
                                                          \lineskip=1pc\noindent
                                           2743
                                                         \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}
                                           2744
\@mkauthorsaddresses Typesetting authors' addresses in the footnote style
                                           2745 \def\@mkauthorsaddresses{%
                                                     \ifnum\num@authors>1\relax
                                           2746
                                           2747
                                                     Authors' \else Author's \fi
                                                     \ifnum\num@authorgroups>1\relax
                                           2748
                                                     addresses: \else address: \fi
                                           2750
                                                     \def\streetaddress##1{\unskip, ##1}%
                                           2751
                                                     \def\postcode##1{\unskip, ##1}%
                                           2752
                                                     \def\position##1{\unskip\ignorespaces}%
                                           2753
                                                     \gdef\@ACM@institution@separator{, }%
                                           2754
                                                    2755
                                                     \def\city##1{\unskip, ##1}%
                                           2756
                                                     \def\state##1{\unskip, ##1}%
                                           2757
                                                     \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
                                           2758
                                                     \def\country##1{\unskip, ##1}%
                                           2759
                                                     \def\and{\unskip; \gdef\@ACM@institution@separator{, }}%
                                                     \def\@author##1{##1}%
                                                     \def\email##1##2{\unskip, \nolinkurl{##2}}%
                                           2762
                                           2763
                                                     \addresses
                                           2764
                                                     \egroup}
                                           2765 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
                                                     \ifx\@authorsaddresses\@empty
                                           2766
                                                     \ClassWarningNoLine{\@classname}{Authors'
                                           2767
                                                          addresses are mandatory for ACM journals}%
                                                     \fi\fi\fi}
                                           2769
            \@setaddresses This is an amsart macro that we do not need.
                                           2770 \def\@setaddresses{}
        \@authornotemark Adding a footnote mark to authors. This version adds a "normal" footnote mark.
                                           2771 \end{footnote} ark \end{f
      \@@authornotemark Adding a footnote mark to authors with a given number
                                           2772 \det @authornotemark#1{\g@addto@macro\ecurrentauthors{\footnotemark[#1]}}
                  \@mkteasers Typesetting the teasers
                                           2773 \def\@mkteasers{%
                                          2774 \ifx\@teaserfigures\@empty\else
```

```
\def\@teaser##1{\par\bigskip\bgroup
                                                  2775
                                                                        \captionsetup{type=figure}##1\egroup\par}
                                                  2776
                                                                   \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
                                                  2777
                                                                        \noindent\@Description@presentfalse
                                                  2778
                                                                        \@teaserfigures\par\if@Description@present\else
                                                  2779
                                                                              \global\@undescribed@imagestrue
                                                  2780
                                                                              \ClassWarning{\@classname}{A possible image without
                                                  2781
                                                                                  description}\fi
                                                  2782
                                                                   \medskip}%
                                                  2783
                                                             \fi}
                                                  2784
                     \@mkabstract Typesetting the abstract
                                                  2785 \def\@mkabstract{\bgroup
                                                              \ifx\@abstract\@lempty\else
                                                  2787
                                                              {\normalcontentsline\{toc\}\{section\}\{\normalcontentsline\}} % \normalcontentsline\{toc\}\{section\}\{\normalcontentsline\}\} % \normalconten
                                                  2788
                                                                   \if@ACM@journal
                                                                         \everypar{\setbox\z@\lastbox\everypar{}}\small
                                                  2789
                                                  2790
                                                                   \else
                                                                        \section*{\abstractname}%
                                                  2791
                                                  2792
                                                  2793
                                                                 \ignorespaces\@abstract\par}%
                                                              \fi\egroup}
\@mktranslatedabstract Typesetting a translated abstract
                                                  {\tt 2795 \setminus def \backslash @mktranslatedabstract \#1{\backslash select language \{\#1\}\%}}
                                                                  \if@ACM@journal
                                                  2796
                                                                          \everypar{\setbox\z@\lastbox\everypar{}}\small
                                                  2797
                                                  2798
                                                                          \section*{\abstractname}%
                                                                  \fi
                                                  2801
                                                                \ignorespaces}
               \@mkbibcitation Print the bibcitation format
                                                   2802 \def\@mkbibcitation{\bgroup
                                                              \let\@vspace\@vspace@orig
                                                              \let\@vspacer\@vspacer@orig
                                                             \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
                                                  2805
                                                  2806
                                                              \def\footnotemark{}%
                                                              \def\\{\unskip{} \ignorespaces}%
                                                  2807
                                                              \def\footnote{\ClassError{\@classname}{Please do not use footnotes
                                                  2808
                                                                        inside a \string\title{} or \string\author{} command! Use
                                                  2809
                                                                        \string\titlenote{} or \string\authornote{} instead!}}%
                                                  2810
                                                               \def\@article@string{\ifx\@acmArticle\@empty{\ }\else,
                                                  2811
                                                                  Article \@acmArticle \ \fi}%
                                                  2812
                                                               \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
                                                  2813
                                                  2814
                                                              \noindent\bgroup
                                                                   \def\\{\unskip{}, \ignorespaces}\authors\egroup. \@acmYear. \@title
                                                  2815
                                                              \ifx\@subtitle\@empty. \else: \@subtitle. \fi
                                                  2816
                                                  2817
                                                              \if@ACM@nonacm\else
                                                                  % The 'nonacm' option disables 'printacmref' by default,
                                                  2818
                                                                  % and the present \@mkbibcitation definition is never used
                                                  2819
                                                                  % in this case. The conditional remains useful if the user
                                                  2820
                                                                  % explicitly sets \settopmatter{printacmref=true}.
                                                  2821
                                                  2822
                                                                  \if@ACM@journal@bibstrip
```

```
\textit{\@journalNameShort}
                                                      2823
                                                                             \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
                                                      2824
                                                                             \ref{TotPages}~\@pages@word.
                                                      2825
                                                                      \else
                                                      2826
                                                                             In \textit{\@acmBooktitle}%
                                                      2827
                                                                             \ifx\@acmEditors\@empty\textit{.}\else
                                                      2828
                                                                                 \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
                                                      2829
                                                                             \fi\
                                                      2830
                                                                             ACM, New York, NY, USA%
                                                      2831
                                                                                 \@article@string\unskip, \ref{TotPages}~\@pages@word.
                                                      2832
                                                                      \fi
                                                      2833
                                                                 \fi
                                                      2834
                                                                  \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
                                                      2835
                                                      2836 \par\egroup}
        \@printendtopmatter End the top matter
                                                      2837 \def\@printendtopmatter{%
                                                                 \let\@vspace\@vspace@orig
                                                      2838
                                                                 \let\@vspacer\@vspacer@orig
                                                      2839
                                                                 \par\bigskip
                                                      2840
                                                                 \let\@vspace\@vspace@acm
                                                      2841
                                                                 \let\@vspacer\@vspacer@acm
                                                      2842
                          \@setthanks We redefine \setthanks using \long
                                                      2844 \end{area} $$2844 \end{
    \@setauthorsaddresses
                                                      2845 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}
\@typesetengagemetadata Typesetting special metadata for ACM Engage
                                                      2846 \def\@typesetengagemetadata{%
                                                                  \def\@setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
                                                                 \@acmengagemetadata}
                                                      3.22 Headers and Footers
                                                      We use fancyhdr for our headers and footers:
                                                      2849 \RequirePackage{fancyhdr}
  \ACM@restore@pagestyle The following code by Ross Moore protects against changes by the totpages package:
                                                      2850 \let\ACM@ps@plain\ps@plain
                                                      2851 \let\ACM@ps@myheadings\ps@myheadings
                                                      2852 \let\ACM@ps@headings\ps@headings
                                                      2853 \def\ACM@restore@pagestyle{%
                                                                \let\ps@plain\ACM@ps@plain
                                                      2855
                                                                 \let\ps@myheadings\ACM@ps@myheadings
                                                                 \let\ps@headings\ACM@ps@headings}
                                                      2857 \AtBeginDocument{\ACM@restore@pagestyle}
             \ACM@linecount@bx This is the box displayed in review mode
                                                      2858 \if@ACM@review
                                                      2859 \newsavebox{\ACM@linecount@bx}
```

```
\newlength\ACM@linecount@bxht
                 2860
                       \newcount\ACM@linecount
                 2861
                       \ACM@linecount\@ne\relax
                 2862
                       \def\ACM@mk@linecount{%
                 2863
                         \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
                 2864
                             \normalsize
                 2865
                             \setlength{\ACM@linecount@bxht}{0pt}%
                 2866
                 2867
                             \loop{\color{red}\scriptsize\the\ACM@linecount}\\
                             \global\advance\ACM@linecount by \@ne
                 2868
                             \addtolength{\ACM@linecount@bxht}{\baselineskip}%
                 2869
                             \verb|\dimACM@linecount@bxht<| textheight| repeat|
                 2870
                             {\color{red}\scriptsize\the\ACM@linecount}\hfill
                 2871
                             \global\advance\ACM@linecount by \@ne}}}
                 2872
                 2873 \fi
\ACM@linecountL How to display the box on the left
                 2874 \def\ACM@linecountL{%
                 2875
                      \if@ACM@review
                 2876
                       \ACM@mk@linecount
                       \begin{picture}(0,0)%
                 2877
                         \t(-26, -22){\t(-26, -22)}(\t(-26, -22))
                 2878
                       \end{picture}%
                 2879
\ACM@linecountR How to display the box on the right. In one column formats we do not step the numbers.
                 2881 \def\ACM@linecountR{%
                      \if@ACM@review
                 2882
                         \ifcase\ACM@format@nr
                 2883
                         \relax % manuscript
                 2884
                              \relax
                 2885
                            \or % acmsmall
                 2886
                              \relax
                 2888
                            \or % acmlarge
                 2889
                              \relax
                 2890
                            \or % acmtog
                               \ACM@mk@linecount
                 2891
                            \or % sigconf
                 2892
                               \ACM@mk@linecount
                 2893
                            \or % siggraph
                 2894
                               \ACM@mk@linecount
                 2895
                            \or % sigplan
                 2896
                               \ACM@mk@linecount
                 2897
                            \or % sigchi
                 2898
                 2899
                               \ACM@mk@linecount
                 2900
                            \or % sigchi-a
                               \ACM@mk@linecount
                 2901
                            \or % acmengage
                 2902
                               \ACM@mk@linecount
                 2903
                            \or % acmcp
                 2904
                 2905
                              \relax
                 2906
                         \begin{picture}(0,0)%
                 2907
                           \put(20,-22){\usebox{\ACM@linecount@bx}}%
```

2909

\end{picture}%

```
2910 \fi}
      \ACM@timestamp The timestamp system
                                       2911 \if@ACM@timestamp
                                                  \% Subtracting 30 from \time gives us the effect of rounding down despite
                                       2912
                                       2913
                                                   % \numexpr rounding to nearest
                                       2914
                                                   \newcounter{ACM@time@hours}
                                                   \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
                                       2915
                                                   \newcounter{ACM@time@minutes}
                                       2916
                                                  \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
                                       2917
                                                   \newcommand\ACM@timestamp{%
                                       2918
                                                        \footnotesize%
                                       2919
                                       2920
                                                       \ifx\@acmSubmissionID\@empty\relax\else
                                                       Submission ID: \@acmSubmissionID.{ }%
                                       2921
                                       2922
                                       2923
                                                       \t \ \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
                                       2924
                                                       \label{two@digits{theACM@time@hours}:\two@digits{theACM@time@minutes}{.} \end{time} % The action of the action o
                                       2925
                                                       Page \thepage\ of \@startPage--\pageref*{TotPages}.%
                                       2926
                                       2927 \fi
      \@shortauthors Even if the author redefined \shortauthors, we do not print it in the headers when in
                                       anonymous mode:
                                       2928 \def\@shortauthors{%
                                                  \if@ACM@anonymous
                                       2930
                                       2931
                                                       \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
                                       2932
                                                  \else\shortauthors\fi}
      \@headfootfont The font to typeset header and footer text.
                                       2933 \def\@headfootfont{\sffamily\footnotesize}
standardpagestyle The page style for all pages but the first one The page style for all pages but the first
                                        2934 \AtBeginDocument{%
                                       2935 \fancypagestyle{standardpagestyle}{%
                                       2936
                                                   \fancyhf{}%
                                                   \renewcommand{\headrulewidth}{\z@}%
                                       2937
                                                   \renewcommand{\footrulewidth}{\z@}%
                                       2938
                                                   \def\@acmArticlePage{%
                                       2939
                                                       \ifx\@acmArticle\empty%
                                       2940
                                                            \if@ACM@printfolios\thepage\fi%
                                       2941
                                       2942
                                                            \@acmArticle\if@ACM@printfolios:\thepage\fi%
                                       2943
                                                       \fi%
                                       2944
                                       2945
                                                   }%
                                       2946
                                                   \if@ACM@journal@bibstrip
                                       2947
                                                       \ifcase\ACM@format@nr
                                       2948
                                                       \relax % manuscript
                                                            \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
                                       2949
                                                            \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
                                       2950
                                                            \fancyhead[RE]{\@shortauthors}%
                                       2951
```

\fancyhead[LO]{\ACM@linecountL\shorttitle}%

```
\if@ACM@nonacm\else%
2953
           \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
2954
         \fi%
2955
       \or % acmsmall
2956
         \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
2957
         \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
2958
         \fancyhead[RE]{\@headfootfont\@shortauthors}%
2959
         \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2960
         \if@ACM@nonacm\else%
2961
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2962
          \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2963
         \fi
2964
       \or % acmlarge
2965
         \fancyhead[LE]{\ACM@linecountL\@headfootfont
2966
         \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2967
         \fancyhead[LO]{\ACM@linecountL}%
2968
         \fancyhead[RO]{\@headfootfont
           \shorttitle\quad\textbullet\quad\@acmArticlePage}%
2971
         \if@ACM@nonacm\else%
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2972
          \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2973
         \fi
2974
       \or % acmtog
2975
         \fancyhead[LE]{\ACM@linecountL\@headfootfont
2976
           \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2977
         \fancyhead[LO]{\ACM@linecountL}%
2978
         \fancyhead[RE]{\ACM@linecountR}%
2979
         \fancyhead[RO]{\@headfootfont
2980
           \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
2981
2982
         \if@ACM@nonacm\else%
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2983
          \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2984
2985
       \else % Proceedings
2986
         \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2987
         \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2988
         \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
2989
         \if@ACM@nonacm
           \fancyhead[LE]{\ACM@linecountL}%
           \fancyhead[RO]{\ACM@linecountR}%
2992
2993
         \else%
2994
           \if@ACM@engage
             \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
2995
               2996
             \footnotemark
2997
               EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2998
2999
               \ACM@linecountR}%
           \else
3000
             \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3001
3002
               \acmConference@shortname,
3003
               \acmConference@date, \acmConference@venue}%
3004
             \footnotemark
               \acmConference@shortname,
3005
               \acmConference@date, \acmConference@venue\ACM@linecountR}%
3006
```

```
\fi
                                                                           \fi
                                                    3009
                                                                      \else % Proceedings
                                                    3010
                                                                            \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
                                                    3011
                                                                            \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
                                                    3012
                                                                            3013
                                                                            \if@ACM@nonacm
                                                    3014
                                                                                   \fancyhead[LE]{\ACM@linecountL}%
                                                    3015
                                                                                   \fancyhead[RO]{\ACM@linecountR}%
                                                    3016
                                                    3017
                                                                            \else%
                                                                                   \if@ACM@engage
                                                    3018
                                                                                         \fancyhead[LE]{\ACM@linecountL\@headfootfont
                                                    3019
                                                                                               EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
                                                    3020
                                                                                         \fancyhead[RO]{\@headfootfont
                                                    3021
                                                                                               EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
                                                    3022
                                                                                                \ACM@linecountR}%
                                                    3023
                                                                                   \else
                                                                                         \fancyhead[LE]{\ACM@linecountL\@headfootfont
                                                    3025
                                                                                               \acmConference@shortname,
                                                                                               \acmConference@date, \acmConference@venue}%
                                                    3027
                                                                                         \footnotemark
                                                    3028
                                                                                               \acmConference@shortname,
                                                    3029
                                                                                               \acmConference@date, \acmConference@venue\ACM@linecountR}%
                                                    3030
                                                                                     \fi
                                                    3031
                                                                           \fi
                                                    3032
                                                                     \fi
                                                    3033
                                                                      \if@ACM@sigchiamode
                                                    3034
                                                                               \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
                                                    3035
                                                    3036
                                                                     \if@ACM@timestamp
                                                    3037
                                                                               \fancyfoot[LO,RE]{\ACM@timestamp}
                                                    3038
                                                    3039
                                                                     \if@ACM@acmcp
                                                    3040
                                                                      \renewcommand{\footrulewidth}{0.1\p@}%
                                                    3041
                                                                      \fancyheadoffset[L]{46pt}%
                                                    3042
                                                                      \fancyhead[L]{\makebox[\z@][1]{%
                                                    3043
                                                    3044
                                                                                   \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
                                                    3045
                                                                                   \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
                                                    3046
                                                                                               \strut\ACM@ArticleType~Article}}}%
                                                    3047
                                                                            \ACM@linecountL}%
                                                    3048
                                                                     \fancyfoot[L,C]{}%
                                                    3049
                                                                     \fancyfoot[R]{\footnotesize
                                                    3050
                                                                            \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
                                                    3051
                                                                            \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
                                                    3052
                                                    3053
                                                                            (\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\en
                                                                    \fi
                                                    3054
                                                    3055 }%
                                                    3056 \pagestyle{standardpagestyle}
                                                    3057 }
                \@folio@wd Folio blob width, height, offsets and max number
                \ensuremath{$\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{}\ensuremath{$}\ensuremath{$}\ensuremath{$}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{}\ensuremath{
\@folio@voffset
             \@folio@max
                                                                                                                                                                               104
```

\fi

3007

```
3059 \@folio@wd=\z@
                3060 \newdimen\@folio@ht
                3061 \@folio@ht=\z@
                3062 \newdimen\@folio@voffset
                3063 \@folio@voffset=\z@
                3064 \def\@folio@max{1}
                3065 \ifcase\ACM@format@nr
                3066 \relax % manuscript
                3067 \or % acmsmall
                     \@folio@wd=45.75pt\relax
                3068
                     \@folio@ht=1.25in\relax
                3069
                     \@folio@voffset=.2in\relax
                3070
                     \def\@folio@max{8}
                3071
                3072 \or % acmlarge
                     \@folio@wd=43.25pt\relax
                3073
                     \@folio@ht=79pt\relax
                3074
                     \@folio@voffset=.55in\relax
                     \def\@folio@max{10}
                3076
                3077 \fi
   \@folioblob The macro to typeset the folio blob.
                3078 \def\@folioblob{\@tempcnta=0\@acmArticleSeq\relax
                     \ifnum\@tempcnta=0\relax\else
                First, we calculate \@acmArticleSeg modulo \@folio@max
                     \100p
                3080
                         \ifnum\@tempcnta>\@folio@max\relax
                3081
                3082
                          \advance\ensuremath{\ensuremath{\mbox{\scriptsize 0}}} defolio@max
                3083
                        \advance\@tempcnta by -1\relax
                3084
                        \@tempdima=\@folio@ht\relax
                3085
                        \mathbf b \
                3086
                        \advance\@tempdima by -\@folio@voffset\relax
                3087
                        \begin{picture}(0,0)
                3088
                        \makebox[\z@]{\raisebox{-\@tempdima}{%
                3089
                3090
                              \arrowvert = \frac{-0.45}{0folio@ht}[\z@][\z@]{\%}
                3091
                                \rule{\@folio@wd}{\@folio@ht}}}%
                3092
                            \parbox{\@folio@wd}{%
                3093
                3094
                              \centering
                              \textcolor{white}{\LARGE\sffamily\bfseries\@acmArticle}}}}
                3095
                     \end{picture}\fi}
                3096
                3097
firstpagestyle The page style for the first page only.
                3098 \AtBeginDocument{%
                3099 \fancypagestyle{firstpagestyle}{%
                3100 \fancyhf{}%
                     \renewcommand{\headrulewidth}{\z@}%
                3101
                     \renewcommand{\footrulewidth}{\z@}%
                3102
                     \if@ACM@journal@bibstrip
                3103
                       \ifcase\ACM@format@nr
                3104
                       \relax % manuscript
                3105
                          \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
                3106
```

```
\fancyhead[R]{\@acmBadgeR}%
3107
         \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
3108
         \if@ACM@nonacm\else%
3109
           \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
3110
         \fi%
3111
       \or % acmsmall
3112
         \if@ACM@nonacm\else%
3113
        3114
           \@acmNumber, Article \@acmArticle. Publication date:
3115
           \@acmPubDate.}%
3116
         \fi%
3117
         \fancyhead[LE]{\ACM@linecountL\@folioblob\@acmBadgeL}%
3118
         \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
3119
         \fancyhead[RO]{\@acmBadgeR\@folioblob}%
3120
         \fancyhead[RE]{\@acmBadgeR}%
3121
         \fancyheadoffset[RO,LE]{0.6\@folio@wd}%
3122
       \or % acmlarge
3123
         \if@ACM@nonacm\else%
3124
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3125
           \@acmNumber, Article \@acmArticle. Publication date:
3126
           \@acmPubDate.}%
3127
         \fi%
3128
         \fancyhead[RO]{\@acmBadgeR\@folioblob}%
3129
         \fancyhead[RE]{\@acmBadgeR}%
3130
         \fancyhead[LE]{\ACM@linecountL\@folioblob\@acmBadgeL}%
3131
3132
         \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
         \fancyheadoffset[RO,LE]{1.4\@folio@wd}%
3133
       \or % acmtog
3134
         \if@ACM@nonacm\else%
3135
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
3136
           \@acmNumber, Article \@acmArticle. Publication date:
3137
           \@acmPubDate.}%
3138
         \fi%
3139
         \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3140
         \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3141
       \else % Conference proceedings
3142
         \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3143
3144
         \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
         \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
       \fi
3146
3147
     \else
3148
       \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
       \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3149
       3150
     \fi
3151
     \if@ACM@timestamp
3152
       \ifnum\ACM@format@nr=0\relax % Manuscript
3153
       \foot[LO,RE]{\ACM@timestamp\quad}
3154
         \if@ACM@nonacm\else
3155
3156
           \footnotesize Manuscript submitted to ACM
3157
         \fi}
3158
       \else
       \fancyfoot[LO,RE]{\ACM@timestamp}
3159
       \fi
3160
```

```
\fi
3161
    \if@ACM@acmcp
3162
    \renewcommand{\footrulewidth}{0.1\p@}%
3163
    \fancyheadoffset[L]{46pt}%
3164
    \frac{L}{\makebox[\z@][1]{\%}}
3165
        \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3166
        \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3167
           \strut\ACM@ArticleType~Article}}}%
3168
      \ACM@linecountL\@acmBadgeL}%
3169
    3170
    \fancyfoot[L,C]{}%
3171
    \fancyfoot[R]{\footnotesize
3172
      \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3173
      \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3174
      3175
    \fi
3176
3177 }}
```

3.23 Sectioning

\ACM@NRadjust Ross Moore's macro.

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

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

```
3178 \def\ACM@NRadjust#1{%
    \begingroup
3179
     \expandafter\ifx\csname Sectionformat\endcsname\relax
3180
     % do nothing when \Sectionformat is unknown
3181
      \def\next{\endgroup #1}%
3182
3183 \else
3184
     \def\next{\endgroup
      \let\realSectionformat\Sectionformat
3185
      \def\ACM@sect@format@{#1}%
3186
      \let\Sectionformat\ACM@NR@adjustedSectionformat
3188 %% next lines added 2018-06-17 to ensure section number is styled
      \let\real@adddotafter\@adddotafter
3189
```

```
#1{}% imposes the styles, but nullifies \MakeUppercase
                                                            3191
                                                                        \let\@adddotafter\real@adddotafter
                                                            3192
                                                            3193 }%
                                                            3194 \fi \next
                                                            3195 }
\ACM@NR@adjustedSectionformat
                                                            3196 \def\ACM@NR@adjustedSectionformat#1#2{%
                                                            3197 \realSectionformat{\ACM@sect@format{#1}}{#2}%
                                                            3198 \let\Sectionformat\realSectionformat}
                                                            3199 \DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
                                                            3200 \def\ACM@sect@format@null#1{#1}
                                                            3202 \AtBeginDocument{%
                                                            3203 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
                                                                      \let\LTX@adddotafter\@adddotafter
                                                            3204
                                                            3205 \fi
                                                            3206 }
                         \ACM@adddotafter
                                                            Sectioning is different for different levels
                                                            3208 \renewcommand \section{\@startsection{section}{1}{\z@}%
                                                            3209 \quad \{-.75\baselineskip \eqlus -2\p@ \eminus -.2\p@}%
                                                                      {.25\baselineskip}%
                                                            3210
                                                            3211 {\ACM@NRadjust\@secfont}}
                                                            3212 \mbox{ renewcommand \subsection}{2}{\z@}%
                                                                      \{-.75\baselineskip \eqrup -2\p@ \eqrup -.2\p@}%
                                                                       {.25\baselineskip}%
                                                            3214
                                                                       {\ACM@NRadjust\@subsecfont}}
                                                            3216 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
                                                            3217
                                                                     \{-.5\baselineskip \eqrup -2\p@ \eqrup -.2\p@}%
                                                            3218
                                                                      \{-3.5\p@\}\%
                                                            3219 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}
                                                            3220 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
                                                            \{-.5\baselineskip \eqrup -2\p@ \eqrup -.2\p@}
                                                            3222 {-3.5\p@}%
                                                            3223 {\ACM@NRadjust{\@parfont\@adddotafter}}}
                                                            3224 \newcommand\noindentparagraph{\@startsection{paragraph}{4}{\z@}%
                                                                     {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
                                                                     \{-3.5\p0\}\%
                                                            3226
                                                            3227
                                                                     {\ACM@NRadjust{\@parfont}}}
                                                            3228
                                                            3229 \renewcommand\part{\@startsection{part}{9}{\z@}%
                                                            3230 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
                                                                      {4\p@}%
                                                            3231
                                                            3232
                                                                     {\ACM@NRadjust\@parfont}}
                 \verb|\sction@raggedright| Special version of \verb|\sction@raggedright| such \verb|\sction@raggedright| Special version of \verb|\sction@raggedright| such as the s
                                                            3233 \def\section@raggedright{\@rightskip\@flushglue
                                                            3234 \rightskip\@rightskip
                                                            3235 \leftskip\z@skip
```

\let\@adddotafter\ACM@adddotafter

```
\parindent\z@}
                                3236
            \@secfont Fonts for sections etc. are different for different formats.
      \verb|\@subsecfont| 3237 \verb|\def| @secfont{\sffamily bfseries} section @ragged right \verb|\MakeTextUppercase|| and the property of t
\verb|\descrip| 3238 \verb|\def| @ subsection {\sffamily bfseries } section @ ragged right }|
            \@parfont 3239 \def\@subsubsecfont{\sffamily\itshape}
                                3240 \def\@parfont{\itshape}
                               3241 \setcounter{secnumdepth}{3}
                               3242 \ifcase\ACM@format@nr
                               3243 \relax % manuscript
                               3244 \or % acmsmall
                                3245 \or % acmlarge
                                3246 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
                                3247 \def\@subsecfont{\sffamily\large\section@raggedright}
                                3248 \or % acmtog
                                3249 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
                                3250 \def\@subsecfont{\sffamily\large\section@raggedright}
                                3251 \or % sigconf
                               3252 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
                               {\tt 3253} $$ \end{\bf \SLarge\end{\bf Section@raggedright}}
                                3254 \or % siggraph
                                3255 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
                                3256 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
                                3257 \or % sigplan
                                3258 \def\@secfont{\bfseries\Large\section@raggedright}
                                3259 \def\@subsecfont{\bfseries\section@raggedright}
                                3260 \def\@subsubsecfont{\bfseries\section@raggedright}
                                3261 \def\@parfont{\bfseries\itshape}
                                3262 \def\@subparfont{\itshape}
                                3263 \or % sigchi
                                3264 \setcounter{secnumdepth}{1}
                               3265 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
                                3266 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
                                3267 \or % sigchi-a
                               3268 \setcounter{secnumdepth}{0}
                                {\tt 3269} $$ \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase} 
                                3270 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
                                3271 \or % acmengage
                               3272 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
                                3273 \def\@subsecfont{\bfseries\Large\section@raggedright}
                               3274\or %acmcp
                               3275 \fi
    \@adddotafter Add punctuation after a sectioning command
                                3276 \def\@adddotafter#1{#1\@addpunct{.}}
\@addspaceafter Add space after a sectioning command
                                3277 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
                                3278 \if@ACM@acmcp
                                           \setcounter{secnumdepth}{-1}%
                                3279
                                3280 \fi
```

3.24 TOC lists

\@dotsep Related to the \tableofcontents are all the horizontal fillers. Base LTEX 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.

3281 \providecommand*\@dotsep{4.5}

3.25 Theorems

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

3282 \def\@acmplainbodyfont{\itshape}

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

3283 \def\@acmplainindent{\parindent}

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

3284 \def\@acmplainheadfont{\scshape}
```

 $\verb|\@acmplainnotefont| The font to type set the note of the acmplain theorem style.$

3285 \def\@acmplainnotefont{\@empty}

Customization of the acmplain theorem style:

```
3286 \ifcase\ACM@format@nr
3287 \relax % manuscript
3288 \or % acmsmall
3289 \or % acmlarge
3290 \or % acmtog
3291 \or % sigconf
3292 \or % siggraph
3293 \or % sigplan
3294 \def\@acmplainbodyfont{\itshape}
     \def\@acmplainindent{\z@}
3295
     \def\@acmplainheadfont{\bfseries}
3296
3297 \def\@acmplainnotefont{\normalfont}
3298 \or % sigchi
3299 \or % sigchi-a
3300 \or % acmengage
3301 \or % acmcp
3302 \fi
```

acmplain The acmplain theorem style

```
3303 \newtheoremstyle{acmplain}%
3304 {.5\baselineskip\@plus.2\baselineskip
3305 \@minus.2\baselineskip}% space above
3306 {.5\baselineskip\@plus.2\baselineskip
3307 \@minus.2\baselineskip}% space below
3308 {\@acmplainbodyfont}% body font
3309 {\@acmplainindent}% indent amount
3310 {\@acmplainheadfont}% head font
3311 {.}% punctuation after head
3312 {.5em}% spacing after head
3313 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec
```

```
\@acmdefinitionbodyfont The font to typeset the body of the acmdefinition theorem style.
                         3314 \def\@acmdefinitionbodyfont{\normalfont}
  \@acmdefinitionindent The amount to indent the acmdefinition theorem style.
                         3315 \def\@acmdefinitionindent{\parindent}
\@acmdefinitionheadfont The font to typeset the head of the acmdefinition theorem style.
                         3316 \def\@acmdefinitionheadfont{\itshape}
\@acmdefinitionnotefont The font to typeset the note of the acmdefinition theorem style.
                         3317 \def\@acmdefinitionnotefont{\@empty}
                            Customization of the acmdefinition theorem style:
                         3318 \ifcase\ACM@format@nr
                         3319 \relax % manuscript
                         3320 \or % acmsmall
                         3321 \or % acmlarge
                        3322 \or % acmtog
                        3323 \or % sigconf
                         3324 \or % siggraph
                        3325 \or % sigplan
                        3326 \def\@acmdefinitionbodyfont{\normalfont}
                             \def\@acmdefinitionindent{\z@}
                        3327
                        3328 \def\@acmdefinitionheadfont{\bfseries}
                         3329 \def\@acmdefinitionnotefont{\normalfont}
                        3330 \or % sigchi
                        3331 \or % sigchi-a
                         3332 \or % acmengage
                         3333 \or % acmcp
                        3334\fi
          acmdefinition The acmdefinition theorem style
                        3335 \newtheoremstyle{acmdefinition}%
                        3336 {.5\baselineskip\@plus.2\baselineskip
                                \@minus.2\baselineskip}% space above
                         3338
                             {.5\baselineskip\@plus.2\baselineskip
                         3339
                                \@minus.2\baselineskip}% space below
                         3340~ {\@acmdefinitionbodyfont}% body font
                             {\@acmdefinitionindent}% indent amount
                         3341
                         3342 {\@acmdefinitionheadfont}% head font
                             {.}% punctuation after head
                         3343
                         3344
                              {.5em}% spacing after head
                         3345 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec
                            Make acmplain the default theorem style.
                        3346 \theoremstyle{acmplain}
                            Delay defining the theorem environments until after other packages have been
```

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.

```
\if@ACM@acmthm
                 3348
                      \theoremstyle{acmplain}
                 3349
                      \@ifundefined{theorem}{%
                 3350
                      \newtheorem{theorem}{Theorem}[section]
                 3351
                 3352
                       \@ifundefined{conjecture}{%
                 3353
                 3354
                      \newtheorem{conjecture}[theorem]{Conjecture}
                       \@ifundefined{proposition}{%
                 3356
                       \newtheorem{proposition}[theorem]{Proposition}
                 3357
                 3358
                       \@ifundefined{lemma}{%
                 3359
                      \newtheorem{lemma}[theorem]{Lemma}
                 3360
                 3361
                      \@ifundefined{corollary}{%
                 3362
                      \newtheorem{corollary}[theorem]{Corollary}
                 3363
                 3364
                      \theoremstyle{acmdefinition}
                 3365
                      \@ifundefined{example}{%
                 3366
                 3367
                      \newtheorem{example}[theorem]{Example}
                 3368
                      \@ifundefined{definition}{%
                 3369
                      \newtheorem{definition}[theorem]{Definition}
                 3370
                 3371
                      }{}
                 3372
                       \fi
                      \theoremstyle{acmplain}
                 3373
                 3374 }
\@proofnamefont The font to typeset the proof name.
                 3375 \def\@proofnamefont{\scshape}
  \@proofindent Whether or not to indent proofs.
                 3376 \def\@proofindent{\indent}
                    Customization of the proof environment.
                 3377 \ifcase\ACM@format@nr
                 3378 \relax % manuscript
                 3379 \or % acmsmall
                 3380 \or % acmlarge
                 3381 \or % acmtog
                 3382 \or % sigconf
                 3383 \or % siggraph
                 3384 \or % sigplan
                 3385 \def\@proofnamefont{\itshape}
                     \def\@proofindent{\noindent}
                 3387 \or % sigchi
                 3388 \or % sigchi-a
                 3389 \or % acmengage
                 3390 \or % acmcp
                 3391\fi
```

3347 \AtEndPreamble{%

proof We want some customization of the proof environment.

```
3392 \renewenvironment{proof}[1][\proofname]{\par
3393 \pushQED{\qed}%
3394 \normalfont \topsep6\p@\@plus6\p@\relax
3395 \trivlist
3396 \item[\@proofindent\hskip\labelsep
3397 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
3398 }{%
3399 \popQED\endtrivlist\@endpefalse
3400 }
```

3.26 Balancing columns

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

```
3401 \AtEndPreamble{%
     \if@ACM@pbalance
3402
        \global\@ACM@balancefalse
3403
        \ifcase\ACM@format@nr
3404
        \relax % manuscript
3405
           \or % acmsmall
3406
3407
           \or % acmlarge
3408
           \or % acmtog
              \RequirePackage{pbalance}%
3409
           \or % sigconf
3410
              \RequirePackage{pbalance}%
3411
           \or % siggraph
3412
              \RequirePackage{pbalance}%
3413
           \or % sigplan
3414
3415
              \RequirePackage{pbalance}%
3416
           \or % sigchi
3417
              \RequirePackage{pbalance}%
           \or % sigchi−a
3419
           \or % acmengage
              \RequirePackage{pbalance}%
3420
           \or % acmcp
3421
       \fi
3422
     \fi
3423
      \if@ACM@balance
3424
        \ifcase\ACM@format@nr
3425
        \relax % manuscript
3426
             \global\@ACM@balancefalse
3427
3428
           \or % acmsmall
3429
             \global\@ACM@balancefalse
3430
           \or % acmlarge
             \global\@ACM@balancefalse
3431
           \or % acmtog
3432
              \RequirePackage{balance}%
3433
           \or % sigconf
3434
              \RequirePackage{balance}%
3435
           \or % siggraph
3436
              \RequirePackage{balance}%
           \or % sigplan
```

```
\RequirePackage{balance}%
3439
           \or % sigchi
3440
              \RequirePackage{balance}%
3441
           \or % sigchi-a
3442
              \global\@ACM@balancefalse
3443
           \or % acmengage
3444
              \RequirePackage{balance}%
3445
           \or % acmcp
             \global\@ACM@balancefalse
3447
        \fi
3448
     \fi
3449
3450 }
3451 \AtEndDocument{%
     \if@ACM@balance
3452
     \if@twocolumn
3453
     \balance
3454
     \fi\fi}
```

3.27 Acknowledgments

```
\acksname
```

```
3456 \newcommand\acksname{Acknowledgments}
```

```
\acks This is a comment-like structure
```

```
3457\specialcomment{acks}{%
3458 \begingroup
3459 \section*{\acksname}
3460 \phantomsection\addcontentsline{toc}{section}{\acksname}
3461 }{%
3462 \endgroup
3463 }
```

\grantsponsor We just typeset the name of the sponsor

```
3464 \def\grantsponsor#1#2#3{#2}
```

\grantnum

```
$3465 \end{\command\grantnum[3][]}$ $$3466 \end{\command\grantnum[3][]}$ $$3466 \end{\command\grantnum[3][]}$ $$1660 \end{\command\grantnum[3][]}$ $$1600 \en
```

3.28 Conditional typesetting

We use the comment package for conditional typesetting:

```
3467 \AtEndPreamble{%
3468 \if@ACM@screen
3469 \includecomment{screenonly}
3470 \excludecomment{printonly}
3471 \else
3472 \excludecomment{screenonly}
3473 \includecomment{printonly}
3474 \fi
3475 \if@ACM@anonymous
3476 \excludecomment{anonsuppress}
3477 \excludecomment{acks}
```

```
3478 \else
3479 \includecomment{anonsuppress}
3480 \fi}
```

3.29 Additional bibliography commands

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

```
3481 \newcommand\showeprint[2][arxiv]{%
     \def\@tempa{#1}%
     \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
3483
     \def\@tempb{arxiv}%
3484
     \ifx\@tempa\@tempb\relax
3485
        arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3486
     \else
3487
         \def\@tempb{arXiv}%
3488
         \ifx\@tempa\@tempb\relax
3489
3490
          arXiv:\href{https://arxiv.org/abs/#2}{#2}%
        \else
          #1:#2%
3493
       \fi
3494
     \fi}
```

3.30 Index

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

```
3495 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
3496 \columnseprule\z@ \columnsep 35\p@
3497 \@indextitlestyle
3498 \let\item\@idxitem
3499 \parindent\z@ \parskip\z@\@plus.3\p@\relax
3500 \raggedright
3501 \hyphenpenalty\@M
3502 \footnotesize}
```

3.31 End of Class

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

```
3503 \let\@vspace@orig=\@vspace
3504 \let\@vspacer@orig=\@vspacer
3505 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
3506 only be used to provide space above/below surrounding
3507 objects}}{}{}
3508 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
3509 only be used to provide space above/below surrounding
3510 objects}}{}{}
3511 \let\@vspace@acm=\@vspace
3512 \let\@vspacer@acm=\@vspacer
```

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

 ${\tt 3513} \verb|\letACM@origbaselinestretch| baselinestretch| \\$

```
3514 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
3515 \ClassError{\@classname}{An attempt to redefine
3516 \string\baselinestretch\space detected. Please do not do this for
3517 ACM submissions!}\fi}
3518 \normalsize\normalfont\frenchspacing
3519 \( /class \)
```

References

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Change History

1.48	\ccsdesc@parse: Added warning for
General: Added prologue option to	missing concepts 77
xcolor	
Bib code cleanup (Zack Weinberg) 36	warning for longer papers 75
Documentation update (siggraph) . 36	\keywords: Added warning for
1.49	missing keywords 74
General: New journal: DTRAP 36	1.69
1.53	\vspace: Added the changed
General: New journals: PACMCGIT,	command to avoid grouping 115
TIOT, TDSCI 36	1.70
Rearranged docs	General: Name change for TDS 60
1.54	1.71
General: Moved footnote stuff before	General: Bibliography change: volume
hyperref call (Ross Moore) 36	for @inproceedings is now in
1.56	brackets together with series 36
General: Documented \Description 36	
1.57	of fonts
General: Booktabs package is now the	Retired sigchi and sigchi-a 36
default	
1.58	General: Documentation update 36
General: Changes in samples (Enrico	1.78
Gregorio)	General: Documentation update: Word
New journal: HEALTH. TDS is	count
renamed to TDSCI 36	1.79
1.60	General: Updated indormation for
General: New option:	TAP, TCPS, TEAC 60
urlbreakonhyphens	
\if@ACM@urlbreakonhyphens:	General: Added DLT and FAC 60
introduced macro 37	1.82
1.62	General: Updated abbreviations and
General: New journal: TELO 36	
1.63	1.84
General: New journal: FACMP 36	General: New journals: JDS,
New journal: TQUANT	GAMES
1.63a	1.85
General: Move: TQUANT to TQC 36	General: Added CC licenses 36
1.64	Added: acmengage 49
General: Putting abstract after	New journal: JRC 60
\maketitle now causes an error . 36	
1.65	\@mktitle: Added: acmengage 89
General: New journal: DGOV 36	0.0
1.66	\@printtopmatter: Added:
General: ACM reference format is now	acmengage 88
mandatory for papers over one	\@specialsection: Added:
page; CCS concepts and keywords	acmengage 88
are now mandatory for papers	\@subtitlefont: Added: acmengage 90
over two pages	8 8
Authors' addresses are mandatory	\ACM@linecountR: Added:
for journal articles	
\@mkauthorsaddresses: Added	format: New format: acmengage 37
warning for missing addresses 98	0 0

1.87	//github.com/borisveytsman/
General: New journals: ACMJCSS,	acmart/issues/9) 36
JATS, TORS 60	\@formatdoi: Added macro 80
format: New format: acmcp 37	\if@ACM@authorversion: Added
1.88	macro
General: Added ISSN for ACMJCSS . 60	
Added ISSN for GAMES 60	authorversion 84
Added PACMNET 60	v1.04
1.89	General: Updated bibliography for
General: Added PACMMOD 60	33834511
Added TOPML 60	(domin orozood, rame change b)
\@printtopmatter: Moved badges to	Matthew Fluet
top header	\acmDOI: Name change by Matthew
1.90	Fluet
General: Added TOPML eISSN 60	\acmISBN: Name change by Matthew
1.90a	Fluet
General: Changes in the sample	v1.05
keywords and concepts 36	
1.92	numbers for acmsiggraph and doi
General: Documentation update: use	numbers for sigproc.bib 36
of 'anonymous' throughout 36	rateriou (octorroct) re communa,
Moved hyperxmp again due to	closes https:
kernel update 49	//githab.com/borisveytoman/
v1.00	acmart/issues/19 36
General: First released version 36	v1.06
v1.01	\@ACM@badge@skip: Added macro 73
General: Changed hyperref colors in	\@ACM@badge@width: Added macro . 73
screen mode (closes https:	\@ACM@title@width: Added macro . 73
//github.com/borisveytsman/	\@mktitle@i: Added processing
acmart/issues/1) 36	badges91
Defined ACM colors	Made generic 91
Explicitly put draft option (closes	\@mktitle@ii: Now this macro is
https:	obsolete
//github.com/borisveytsman/	\@mktitle@iii: Added processing badges
acmart/issues/4) 39	8
Set headheight to 1pc for all	8
formats (closes https:	\@mktitle@iv: Made more generic . 91 \@printtopmatter: Added processing
//github.com/borisveytsman/	hd
acmart/issues/5) 36	\@subtitlefont: Added macro 90
v1.02	\@titlefont: Added macro 90
General: Added TOPS and TSC (closes	\acmBadgeL: Added macro 73
https:	\acmBadgeR: Added macro 73
//github.com/borisveytsman/	\ : CO \ CNOL \ \ \ \ \ \ \ \ \ \ \ \ \ \
acmart/issues/12) 36	v1.07
Documentation changes (closes	\maketitle: Corrected a bug with
https:	abstract footnotes
//github.com/borisveytsman/	
acmart/issues/13) 36	and footnotes order
v1.03 General: Added anonsuppress	v1.08
environment 36	
Added authorversion option (closes	Matthew Fluet
https:	Typos corrected (Tobias Pape) 36

v1.09	standardpagestyle: Added headers
General: Revert SIGPLAN caption	for sigs
rules	Expanded headers for sigchi-a 102
v1.10	Suppressed folios if sig 102
General: Changes of	v1.14
'licensedothergov' wording 78	General: \citestyle updates
\maketitle: Corrected a bug with doi	(Matthew Fluet)
in manuscript and author vertsion,	Patched \citestyle 42
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