LaTeX Class for the *Association for Computing Machinery*[*]

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Abstract

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

Contents

1 Introduction **3**

2 User's guide **3**

2.1 Installation . . . 3
2.2 Invocation and options . . . 6
2.3 Top matter . . . 7
2.4 Algorithms . . . 20
2.5 Figures and tables . . . 20
2.6 Descriptions of images . . . 22
2.7 Theorems . . . 22
2.8 Online-only and offline-only material . . . 22
2.9 Note about anonymous mode . . . 23
2.10 Acknowledgments . . . 23
2.11 Bibliography . . . 24
2.12 Colors . . . 27
2.13 Other notable packages and typographic remarks . . . 28
2.14 Disabled or forbidden commands . . . 28
2.15 Notes for wizards . . . 29
2.16 Currently supported publications . . . 29
2.17 A note about `sigchi-a` format . . . 31

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3 Implementation **33**
3.1 Identification . . . 33
3.2 Preload hook . . . 33
3.3 Options . . . 33
3.4 Setting switches . . . 37
3.5 Loading the base class and package . . . 38
3.6 Citations . . . 39
3.7 Paper size and paragraphing . . . 47
3.8 Fonts . . . 50
3.9 Image descriptions . . . 51
3.10 Floats . . . 52
3.11 Lists . . . 54
3.12 Top-matter data . . . 56
3.13 Concepts system . . . 70
3.14 Copyright system . . . 71
3.15 Maketitle hook . . . 77
3.16 Typesetting top matter . . . 77
3.17 Headers and Footers . . . 93
3.18 Sectioning . . . 99
3.19 TOC lists . . . 102
3.20 Theorems . . . 102
3.21 Balancing columns . . . 105
3.22 Acknowledgments . . . 107
3.23 Conditional typesetting . . . 107
3.24 Additional bibliography commands . . . 107
3.25 End of Class . . . 108

1 Introduction

The Association for Computing Machinery[1] 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 LATEX package.

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, Benjamin Byholm, John Collins, 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://

[1] http://www.acm.org/

github.com/borisveytsman/acmart. At this address you can file a bug report—or even contribute your own enhancement by making a pull request.

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

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

1. Run `latex acmart.ins`. This will produce the file `acmart.cls`
2. Put the files `acmart.cls` and `ACM-Reference-Format.bst` in places where LATEX can find them (see [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
- *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[⟨options⟩]{acmart}
```

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

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

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

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

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

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

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

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

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 2.17).

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 BibTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.11.

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

Value	Meaning
`manuscript`	A manuscript. This is the default.
`acmsmall`	Small single-column format. Used for CIE, CSUR, JACM, JDIQ, JEA, JERIC, JETC, PACMCGIT, PACMHCI, PACMPL, TAAS, TACCESS, 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, TOPS, 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 conference Technical Papers.
`sigconf`	Proceedings format for most ACM conferences (with the exceptions listed below) and all ICPS volumes.
`sigplan`	Proceedings format for SIGPLAN conferences.

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

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

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

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

Table 2: Boolean options

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

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

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

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

```
\acmJournal{TOMS}
```

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

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

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

name: the name of the conference.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

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

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

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

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

\editor In most cases, conference proceedings are edited. You can use the command

`\editor{`⟨*editor*⟩`}` to set the editor of the volume. This command can be repeated, for example,

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

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

`\title[`⟨*ShortTitle*⟩`]{`⟨*FullTitle*⟩`}`

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

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

`\subtitle` Besides title, ACM classes allow a subtitle, set with the `\subtitle{`⟨*subtitle*⟩`}` macro.

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

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

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

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

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

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

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

Similarly you can repeat the `\email` command.

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

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

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

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

However, this format is not generally recommended.

`\additionalaffiliation`

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

```
\author{G. Tobin}
\author{Ben Trovato}
\additionalaffiliation{%
  \institution{The Th{\o}rv{\"a}ld Group}
  \streetaddress{1 Th{\o}rv{\"a}ld Circle}
  \city{Hekla}
  \country{Iceland}}
\affiliation{%
  \institution{Institute for Clarity in Documentation}
  \streetaddress{P.O. Box 1212}
  \city{Dublin}
  \state{Ohio}
```

```
  \postcode{43017-6221}}
```

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

\position
\institution
\department
\streetaddress
\city
\state
\postcode
\country

The `\affiliation` and `\additionalaffiliation` commands are further structured to interact with the metadata extraction tools. Inside these commands you should use the `\position`, `\institution`, `\department`, `\city`, `\streetaddress`, `\state`, `\postcode` 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 and 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 2.10).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Setting this number to zero suppresses the blob.

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

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

`\acmPrice` The macro `\acmPrice{`⟨*price*⟩`}` sets the price for the article, for example,

```
\acmPrice{25.00}
```

Note that you do not need to put the dollar sign here, just the amount. By default the price is $15.00, unless the copyright is set to `usgov`, `rightsretained`, `iw3c2w3`, or `iw3c2w3g`, when it is suppressed. Note that to override the defaults you need to set the

price *after* the `\setcopyright` command. Also, the command `\acmPrice{}` suppresses the printing of the price.

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

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

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

`\acmDOI` The macro `\acmDOI{`⟨*DOI*⟩`}` sets the DOI of the article, for example,

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

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

`\acmBadgeR` `\acmBadgeL` 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 commands to add these badges: `\acmBadgeR[`⟨*url*⟩`]{`⟨*graphics*⟩`}` and `\acmBadgeL[`⟨*url*⟩`]{`⟨*graphics*⟩`}`. The first command puts the badge to the right of the title, and the second one—to the left. The arguments have the following meaning: `[`⟨*url*⟩`]`, if provided, sets the link to the badge authority in the screen version, while `{`⟨*graphics*⟩`}` sets the graphics file with the badge image. The file must be a cropped square, which is scaled to a standard size in the output. For example, if the badge image is `ae-logo.pdf`, the command is

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

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

`\terms` `\keywords` The command `\keywords{`⟨*keyword, keyword,...*⟩`}` sets keywords for the article. They must be separated by commas, for example,

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

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

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

```
\begin{CCSXML}
<ccs2012>
 <concept>
  <concept_id>10010520.10010553.10010562</concept_id>
  <concept_desc>Computer systems organization~Embedded systems</concept_desc>
```

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

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

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

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

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

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

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

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

There is a special case for a personal copy that the authors may be allowed to generate for their use or a posting on a personal site (check the instructions for the specific journal or conference for the details). The document option `authorversion=true` produces

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.

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

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

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

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

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

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

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

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

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

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

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

Table 4: Settings for the `\settopmatter` command

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

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

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

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

2.4 Algorithms

There are now several good packages for typesetting algorithms [3, 4, 5], and the authors are free to choose their favorite one.

2.5 Figures and tables

The new ACM styles use the standard 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` [6] and follow its main principles of typography with respect to tables:

1. Never, ever use vertical rules.

2. Never use double rules.

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

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

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

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

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

2.6 Descriptions of images

\Description

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

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

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

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

2.7 Theorems

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

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

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

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

2.8 Online-only and offline-only material

printonly
screenonly

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

```
\section{Supplementary materials}

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

\begin{screenonly}
```

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

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

2.9 Note about anonymous mode

anonsuppress

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

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

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

2.10 Acknowledgments

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

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

acks

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

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

\grantsponsor
\grantnum

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

\grantsponsor{⟨*sponsorID*⟩}{⟨*name*⟩}{⟨*url*⟩}
\grantnum[⟨*url*⟩]{⟨*sponsorID*⟩}{⟨*number*⟩}.

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

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

Example:

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

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

2.11 Bibliography

The ACM uses the `natbib` package for formatting references and the BibTEX style file `ACM-Reference-Format.bst` for BibTEX processing. You can disable loading of `natbib` using the option `natbib=false` in `\documentclass`. However, it is not recommended, as well as the use of BibTEX styles other than `ACM-Reference-Format.bst`, and may delay the processing of the manuscript.

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

```
\citestyle{acmauthoryear}
```

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

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

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

One of the more common versions is

```
\setcitestyle{nosort}
```

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

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

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

There are several customized BibTeX entry types and fields in the ACM style file `ACM-Reference-Format.bst` that you may want to be aware of.

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

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

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

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

See the examples at 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,

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

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

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

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

There are two ways to enter video or audio sources in the 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,
 author =       "Barack Obama",
 year   =       "2008",
 title  =       "A more perfect union",
 howpublished = "Video",
 day    =       "5",
 url    =       "http://video.google.com/videoplay?docid=6528042696351994555",
 month  =       mar,
 lastaccessed = "March 21, 2008",
}
```

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

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

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

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

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

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

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

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

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

and then encode the author as

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

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

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*.

2.12 Colors

While printed ACM publications are usually black and white, `screen` mode allows the use of colors. The ACM classes pre-define several colors according to [7]: `ACMBlue`, `ACMYellow`, `ACMOrange`, `ACMRed`, `ACMLightBlue`, `ACMGreen`, `ACMPurple` and `ACMDarkBlue`. You can use them in color assignments.

The ACM provides the following recommendation on color use.

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

1. The most common type of inherited Color Vision Deficiency (CVD) is red-green (in which similar-brightness colors that differ only in their amounts of red or green are often confused), and it affects up to 8% of males and 0.5% of females of Northern European descent.

2. The most common type of acquired Color Vision Deficiency (CVD) is blue-yellow (including mild cases for many older adults).

3. Most printing is in black and white.

4. Situational impairments (e.g., bright sunlight shining on a mobile screen) tend to reduce the entire color gamut, reducing color discriminability.

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

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

1. ColourBrewer: http://colorbrewer2.org/

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

2.13 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

The package `subcaption` [8] is recommended for complex figures with several subplots or subfigures that require separate subcaptioning. The packages `nomencl` [9] and `glossaries` [10] can be used for the automatic creation of the lists of symbols and concepts used.

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

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

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

Another problem might be the too strict line breaking rules. Again, a strategically placed `\sloppy` command or putting the problematic paragraph inside `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 [11], so the command `\NoCaseChange` inside the title may help to prevent extraneous uppercasing.

2.14 Disabled or forbidden commands

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

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

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

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

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

2.15 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}}
```

2.16 Currently supported publications

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

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DGOV	Digital Government: Research and Practice
DTRAP	Digital Threats: Research and Practice
HEALTH	ACM Transactions on Computing for Healthcare
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
JDIQ	ACM Journal of Data and Information Quality
JEA	ACM Journal of Experimental Algorithmics
JERIC	ACM Journal of Educational Resources in Computing
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCCH	ACM Journal on Computing and Cultural Heritage
PACMCGIT	Proceedings of the ACM on Computer Graphics and Interactive Techniques
PACMHCI	PACM on Human-Computer Interaction
PACMPL	PACM on Programming Languages
POMACS	PACM on Measurement and Analysis of Computing Systems
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
TALG	ACM Transactions on Algorithms
TALLIP	ACM Transactions on Asian and Low-Resource Language Information Processing
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TDS	ACM/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
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory
TODAES	ACM Transactions on Design Automation of Electronic Systems

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

Abbreviation	Publication
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPS	ACM Transactions on Privacy and Security
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TQC	ACM Transactions on Quantum Computing
TRETS	ACM Transactions on Reconfigurable Technology and Systems
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

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

2.17 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
marginfigure
margintable

This format has large margin uses for special figures and tables. This package provides three environments for this with optional captions:

sidebar: textual information in the margin,

marginfigure: a figure in the margin,

margintable: a table in the margin.

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

The horizontal sizes of figures are:

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

3 Implementation

3.1 Identification

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

```
⟨class⟩\NeedsTeXFormat{LaTeX2e}
⟨*gobble⟩
\ProvidesFile{acmart.dtx}
⟨/gobble⟩
⟨class⟩\ProvidesClass{acmart}
[2021/04/16 v1.77 Typesetting articles for the Association for Computing Machinery]
```

And the driver code:

```
⟨*gobble⟩
\documentclass{ltxdoc}
\usepackage{array,booktabs,amsmath,graphicx,fancyvrb,tabularx, longtable}
\usepackage[tt=false, type1=true]{libertine}
\usepackage[varqu]{zi4}
\usepackage[libertine]{newtxmath}
\usepackage[tableposition=top]{caption}
\usepackage{hypdoc}
\PageIndex
\CodelineIndex
\RecordChanges
\EnableCrossrefs
\begin{document}
  \DocInput{acmart.dtx}
\end{document}
⟨/gobble⟩
⟨*class⟩
\def\@classname{acmart}
```

3.2 Preload hook

We preload `acmart-preload-hook`:

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

3.3 Options

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

```
\RequirePackage{xkeyval}
```

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

```
\RequirePackage{xstring}
```

We need `iftex` to check the engine

```
\RequirePackage{iftex}
```

`format` The possible formats

```
\define@choicekey*+{acmart.cls}{format}[\ACM@format\ACM@format@nr]{%
  manuscript, acmsmall, acmlarge, acmtog, sigconf, siggraph,
  sigplan, sigchi, sigchi-a}[manuscript]{}{%
  \ClassError{\@classname}{The option format must be manuscript,
    acmsmall, acmlarge, acmtog, sigconf, siggraph,
    sigplan, sigchi or sigchi-a}}
\def\@DeclareACMFormat#1{\DeclareOptionX{#1}{\setkeys{acmart.cls}{format=#1}}}
\@DeclareACMFormat{manuscript}
\@DeclareACMFormat{acmsmall}
\@DeclareACMFormat{acmlarge}
\@DeclareACMFormat{acmtog}
\@DeclareACMFormat{sigconf}
\@DeclareACMFormat{siggraph}
\@DeclareACMFormat{sigplan}
\@DeclareACMFormat{sigchi}
\@DeclareACMFormat{sigchi-a}
\ExecuteOptionsX{format}
```

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

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

`\if@ACM@urlbreakonhyphens`

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

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

```
\define@boolkey+{acmart.cls}[@ACM@]{acmthm}[true]{%
  \if@ACM@acmthm
    \PackageInfo{\@classname}{Requiring acmthm}%
  \else
    \PackageInfo{\@classname}{Suppressing acmthm}%
  \fi}{\PackageError{\@classname}{The option acmthm can be either true or
```

```
    false}}
\ExecuteOptionsX{acmthm=true}
```

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

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

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

```
\define@boolkey+{acmart.cls}[@ACM@]{authorversion}[true]{%
  \if@ACM@authorversion
    \PackageInfo{\@classname}{Using authorversion mode}%
  \else
    \PackageInfo{\@classname}{Not using authorversion mode}%
 \fi}{\PackageError{\@classname}{The option authorversion can be either true or
    false}}
\ExecuteOptionsX{authorversion=false}
```

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

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

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

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

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

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

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

\if@ACM@natbib Whether we use natbib mode

```
\define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
  \if@ACM@natbib
    \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
  \else
    \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
  \fi}{\PackageError{\@classname}{The option natbib can be either true or
    false}}
\ExecuteOptionsX{natbib=true}
```

\if@ACM@anonymous Whether we use anonymous mode

```
\define@boolkey+{acmart.cls}[@ACM@]{anonymous}[true]{%
  \if@ACM@anonymous
    \PackageInfo{\@classname}{Using anonymous mode}%
  \else
    \PackageInfo{\@classname}{Not using anonymous mode}%
  \fi}{\PackageError{\@classname}{The option anonymous can be either true or
    false}}
\ExecuteOptionsX{anonymous=false}
```

\if@ACM@timestamp Whether we use timestamp mode

```
\define@boolkey+{acmart.cls}[@ACM@]{timestamp}[true]{%
  \if@ACM@timestamp
    \PackageInfo{\@classname}{Using timestamp mode}%
  \else
    \PackageInfo{\@classname}{Not using timestamp mode}%
  \fi}{\PackageError{\@classname}{The option timestamp can be either true or
    false}}
\ExecuteOptionsX{timestamp=false}
```

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

```
\define@boolkey+{acmart.cls}[@ACM@]{authordraft}[true]{%
  \if@ACM@authordraft
    \PackageInfo{\@classname}{Using authordraft mode}%
    \@ACM@timestamptrue
    \@ACM@reviewtrue
  \else
    \PackageInfo{\@classname}{Not using authordraft mode}%
  \fi}{\PackageError{\@classname}{The option authordraft can be either true or
    false}}
\ExecuteOptionsX{authordraft=false}
```

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

```
\def\ACM@fontsize{}
\DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}
```

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

3.4 Setting switches

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

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

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

```
\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.

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

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

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

Setting up switches

```
\ifnum\ACM@format@nr=5\relax % siggraph
\ClassWarning{\@classname}{%
  The format siggraph is now obsolete.\MessageBreak
  I am switching to sigconf.}
  \setkeys{acmart.cls}{format=sigconf}
\fi
\ifnum\ACM@format@nr=7\relax % sigchi
\ClassWarning{\@classname}{%
  The format sigchi is now obsolete.\MessageBreak
  I am switching to sigconf.}
  \setkeys{acmart.cls}{format=sigconf}
\fi
\ifnum\ACM@format@nr=8\relax % sigchi
\ClassWarning{\@classname}{%
  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
  this template.\MessageBreak
  ACM SIGCHI is directing Conference leaders and\MessageBreak
  authors to publish their articles using the SIGCONF\MessageBreak
  template call.}
\fi
\ifnum\ACM@format@nr=0\relax
  \@ACM@manuscripttrue
```

```
\else
  \@ACM@manuscriptfalse
\fi
\@ACM@sigchiamodefalse
\ifcase\ACM@format@nr
\relax % manuscript
  \@ACM@journaltrue
\or % acmsmall
  \@ACM@journaltrue
\or % acmlarge
  \@ACM@journaltrue
\or % acmtog
  \@ACM@journaltrue
\or % sigconf
  \@ACM@journalfalse
\or % siggraph
  \@ACM@journalfalse
 \or % sigplan
  \@ACM@journalfalse
 \or % sigchi
  \@ACM@journalfalse
\or % sigchi-a
  \@ACM@journalfalse
  \@ACM@sigchiamodetrue
\fi
\if@ACM@journal
 \@ACM@journal@bibstriptrue
\else
 \@ACM@journal@bibstripfalse
\fi
```

3.5 Loading the base class and package

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

```
\ifx\ACM@fontsize\@empty
  \ifcase\ACM@format@nr
  \relax % manuscript
    \def\ACM@fontsize{9pt}%
  \or % acmsmall
    \def\ACM@fontsize{10pt}%
  \or % acmlarge
    \def\ACM@fontsize{10pt}%
  \or % acmtog
    \def\ACM@fontsize{9pt}%
  \or % sigconf
    \def\ACM@fontsize{9pt}%
  \or % siggraph
    \def\ACM@fontsize{9pt}%
   \or % sigplan
```

```
    \def\ACM@fontsize{10pt}%
   \or % sigchi
    \def\ACM@fontsize{9pt}%
  \or % sigchi-a
    \def\ACM@fontsize{10pt}%
  \fi
\fi
\ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
\LoadClass[\ACM@fontsize, reqno]{amsart}
\RequirePackage{microtype}
```

We need `etoolbox` for delayed code

```
\RequirePackage{etoolbox}
```

Booktabs is now the default

```
\RequirePackage{booktabs}
```

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

```
\RequirePackage{refcount}
\RequirePackage{totpages}
```

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

```
\RequirePackage{environ}
```

We use `setspace` for double spacing

```
\if@ACM@manuscript
\RequirePackage{setspace}
\onehalfspacing
\fi
```

We need `textcase` for better upcasing

```
\RequirePackage{textcase}
```

3.6 Citations

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

```
\if@ACM@natbib
  \RequirePackage{natbib}
  \renewcommand{\bibsection}{%
     \section*{\refname}%
     \phantomsection\addcontentsline{toc}{section}{\refname}%
  }
  \renewcommand{\bibfont}{\bibliofont}
  \renewcommand\setcitestyle[1]{
  \@for\@tempa:=#1\do
  {\def\@tempb{round}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{(}\renewcommand\NAT@close{)}\fi
   \def\@tempb{square}\ifx\@tempa\@tempb
```

```
    \renewcommand\NAT@open{[}\renewcommand\NAT@close{]}\fi
  \def\@tempb{angle}\ifx\@tempa\@tempb
    \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
  \def\@tempb{curly}\ifx\@tempa\@tempb
    \renewcommand\NAT@open{\{}\renewcommand\NAT@close{\}}\fi
  \def\@tempb{semicolon}\ifx\@tempa\@tempb
    \renewcommand\NAT@sep{;}\fi
  \def\@tempb{colon}\ifx\@tempa\@tempb
    \renewcommand\NAT@sep{;}\fi
  \def\@tempb{comma}\ifx\@tempa\@tempb
    \renewcommand\NAT@sep{,}\fi
  \def\@tempb{authoryear}\ifx\@tempa\@tempb
    \NAT@numbersfalse\fi
  \def\@tempb{numbers}\ifx\@tempa\@tempb
    \NAT@numberstrue\NAT@superfalse\fi
  \def\@tempb{super}\ifx\@tempa\@tempb
    \NAT@numberstrue\NAT@supertrue\fi
  \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
    \let\bibstyle=\@gobble\fi
  \def\@tempb{bibstyle}\ifx\@tempa\@tempb
    \let\bibstyle=\@citestyle\fi
  \def\@tempb{sort}\ifx\@tempa\@tempb
    \def\NAT@sort{\@ne}\fi
  \def\@tempb{nosort}\ifx\@tempa\@tempb
    \def\NAT@sort{\z@}\fi
  \def\@tempb{compress}\ifx\@tempa\@tempb
    \def\NAT@cmprs{\@ne}\fi
  \def\@tempb{nocompress}\ifx\@tempa\@tempb
    \def\NAT@cmprs{\z@}\fi
  \def\@tempb{sort&compress}\ifx\@tempa\@tempb
    \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
  \def\@tempb{mcite}\ifx\@tempa\@tempb
    \let\NAT@merge\@ne\fi
  \def\@tempb{merge}\ifx\@tempa\@tempb
    \@ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}{}\fi
  \def\@tempb{elide}\ifx\@tempa\@tempb
    \@ifnum{\NAT@merge<\thr@@}{\let\NAT@merge\thr@@}{}\fi
  \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
    \NAT@longnamestrue\fi
  \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
    \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
  \expandafter\NAT@find@eq\@tempa=\relax\@nil
  \if\@tempc\relax\else
    \expandafter\NAT@rem@eq\@tempc
    \def\@tempb{open}\ifx\@tempa\@tempb
     \xdef\NAT@open{\@tempc}\fi
    \def\@tempb{close}\ifx\@tempa\@tempb
     \xdef\NAT@close{\@tempc}\fi
    \def\@tempb{aysep}\ifx\@tempa\@tempb
     \xdef\NAT@aysep{\@tempc}\fi
```

```
    \def\@tempb{yysep}\ifx\@tempa\@tempb
     \xdef\NAT@yrsep{\@tempc}\fi
    \def\@tempb{notesep}\ifx\@tempa\@tempb
     \xdef\NAT@cmt{\@tempc}\fi
    \def\@tempb{citesep}\ifx\@tempa\@tempb
     \xdef\NAT@sep{\@tempc}\fi
  \fi
 }%
 \NAT@@setcites
 }
 \renewcommand\citestyle[1]{%
   \ifcsname bibstyle@#1\endcsname%
   \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
   \else%
   \@latex@error{Undefined `#1' citestyle}%
   \fi
 }%
\fi
```

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

```
\newcommand{\bibstyle@acmauthoryear}{%
 \setcitestyle{%
   authoryear,%
   open={[},close={]},citesep={;},%
   aysep={},yysep={,},%
   notesep={, }}}
```

`\bibstyle@acmnumeric` The default numeric format:

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

The default is numeric:

```
\if@ACM@natbib
\citestyle{acmnumeric}
\fi
```

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

```
\def\@startsection#1#2#3#4#5#6{%
 \if@noskipsec \leavevmode \fi
 \par
 \@tempskipa #4\relax
 \@afterindenttrue
 \ifdim \@tempskipa <\z@
   \@tempskipa -\@tempskipa \@afterindentfalse
```

```
  \fi
  \if@nobreak
    \everypar{}%
  \else
    \addpenalty\@secpenalty\addvspace\@tempskipa
  \fi
  \@ifstar
    {\@ssect{#3}{#4}{#5}{#6}}%
    {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}}
\def\@sect#1#2#3#4#5#6[#7]#8{%
  \edef\@toclevel{\ifnum#2=\@m 0\else\number#2\fi}%
  \ifnum #2>\c@secnumdepth
    \let\@svsec\@empty
  \else
    \refstepcounter{#1}%
    \protected@edef\@svsec{\@seccntformat{#1}\relax}%
  \fi
  \@tempskipa #5\relax
  \ifdim \@tempskipa>\z@
    \begingroup
      #6{%
        \@hangfrom{\hskip #3\relax\@svsec}%
          \interlinepenalty \@M #8\@@par}%
    \endgroup
    \csname #1mark\endcsname{#7}%
    \ifnum #2>\c@secnumdepth \else
        \@tochangmeasure{\csname the#1\endcsname}%
    \fi
    \addcontentsline{toc}{#1}{%
      \ifnum #2>\c@secnumdepth \else
        \protect\numberline{\csname the#1\endcsname}%
      \fi
      #7}%
  \else
    \def\@svsechd{%
      #6{\hskip #3\relax
      \@svsec #8}%
      \csname #1mark\endcsname{#7}%
      \ifnum #2>\c@secnumdepth \else
        \@tochangmeasure{\csname the#1\endcsname\space}%
      \fi
      \addcontentsline{toc}{#1}{%
        \ifnum #2>\c@secnumdepth \else
          \protect\numberline{\csname the#1\endcsname}%
        \fi
        #7}}%
  \fi
  \@xsect{#5}}
\def\@xsect#1{%
  \@tempskipa #1\relax
```

```
  \ifdim \@tempskipa>\z@
    \par \nobreak
    \vskip \@tempskipa
    \@afterheading
  \else
    \@nobreakfalse
    \global\@noskipsectrue
    \everypar{%
      \if@noskipsec
        \global\@noskipsecfalse
       {\setbox\z@\lastbox}%
        \clubpenalty\@M
        \begingroup \@svsechd \endgroup
        \unskip
        \@tempskipa #1\relax
        \hskip -\@tempskipa
      \else
        \clubpenalty \@clubpenalty
        \everypar{}%
      \fi}%
  \fi
  \ignorespaces}
\def\@seccntformat#1{\csname the#1\endcsname\quad}
\def\@ssect#1#2#3#4#5{%
  \@tempskipa #3\relax
  \ifdim \@tempskipa>\z@
    \begingroup
      #4{%
        \@hangfrom{\hskip #1}%
          \interlinepenalty \@M #5\@@par}%
    \endgroup
  \else
    \def\@svsechd{#4{\hskip #1\relax #5}}%
  \fi
  \@xsect{#3}}
```

\@startsection

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

```
\def\@starttoc#1#2{\begingroup\makeatletter
  \setTrue{#1}%
  \par\removelastskip\vskip\z@skip
  \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
    {.5\linespacing}{\centering\contentsnamefont}{#2}%
  \@input{\jobname.#1}%
  \if@filesw
    \@xp\newwrite\csname tf@#1\endcsname
    \immediate\@xp\openout\csname tf@#1\endcsname \jobname.#1\relax
  \fi
  \global\@nobreakfalse \endgroup
  \addvspace{32\p@\@plus14\p@}%
```

```
}
```

\l@subsection Section spacing is more generous than for amsart

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

\l@subsection The spacing in amsart is too large

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

\l@subsubsection The spacing in amsart is too large

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

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

\@makefntext We do not use indentation for footnotes

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

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

```
\if@ACM@sigchiamode
\long\def\@footnotetext#1{\marginpar{%
    \reset@font\small
    \interlinepenalty\interfootnotelinepenalty
    \protected@edef\@currentlabel{%
       \csname p@footnote\endcsname\@thefnmark
    }%
    \color@begingroup
      \@makefntext{%
        \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
    \color@endgroup}}%
\fi
```

\@mpfootnotetext We want the footnotes in minipages centered:

```
\long\def\@mpfootnotetext#1{%
  \global\setbox\@mpfootins\vbox{%
    \unvbox\@mpfootins
    \reset@font\footnotesize
    \hsize\columnwidth
    \@parboxrestore
    \protected@edef\@currentlabel
         {\csname p@mpfootnote\endcsname\@thefnmark}%
    \color@begingroup\centering
      \@makefntext{%
        \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
    \color@endgroup}}
```

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

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

Adding hyperxmp

```
\RequirePackage{hyperxmp}
```

And now, hyperref

```
\let\@footnotemark@nolink\@footnotemark
\let\@footnotetext@nolink\@footnotetext
\RequirePackage[bookmarksnumbered,unicode]{hyperref}
\pdfstringdefDisableCommands{%
  \def\addtocounter#1#2{}%
  \def\unskip{}%
  \def\textbullet{- }%
  \def\textrightarrow{ -> }%
  \def\footnotemark{}%
}
\urlstyle{rm}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \urlstyle{sf}
\or % sigchi
\or % sigchi-a
  \urlstyle{sf}
\fi
\AtEndPreamble{%
  \if@ACM@urlbreakonhyphens
    \def\do@url@hyp{\do\-}%
  \fi
  \if@ACM@screen
    \hypersetup{colorlinks,
      linkcolor=ACMPurple,
      citecolor=ACMPurple,
      urlcolor=ACMDarkBlue,
      filecolor=ACMDarkBlue}
    \else
    \hypersetup{hidelinks}
  \fi
  \hypersetup{pdflang={en},
    pdfdisplaydoctitle}}
```

Bibliography mangling.

```
\if@ACM@natbib
  \let\citeN\cite
  \let\cite\citep
  \let\citeANP\citeauthor
  \let\citeNN\citeyearpar
  \let\citeyearNP\citeyear
  \let\citeNP\citealt
  \DeclareRobustCommand\citeA
```

```
    {\begingroup\NAT@swafalse
      \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
  \providecommand\newblock{}%
\else
  \AtBeginDocument{%
    \let\shortcite\cite%
    \providecommand\citename[1]{#1}}
\fi
\newcommand\shortcite[2][]{%
  \ifNAT@numbers\cite[#1]{#2}\else\citeyearpar[#1]{#2}\fi}
```

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

```
\def\bibliographystyle#1{%
  \ifx\@begindocumenthook\@undefined\else
    \expandafter\AtBeginDocument
  \fi
    {\if@filesw
       \immediate\write\@auxout{\string\bibstyle{#1}}%
     \fi}}
```

Graphics and color.

```
\RequirePackage{graphicx}
\RequirePackage[prologue]{xcolor}
```

We define ACM colors according to [7]:

```
\definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
\definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
\definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
\definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
\definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
\definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
\definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
\definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}
```

Author-draft mode or sigchi-a mode

```
\if@ACM@authordraft
  \RequirePackage{draftwatermark}
  \SetWatermarkFontSize{0.5in}
  \SetWatermarkColor[gray]{.9}
  \SetWatermarkText{\parbox{12em}{\centering
      Unpublished working draft.\\
      Not for distribution.}}
\else
  \if@ACM@sigchiamode
    \if@ACM@nonacm\else
      \RequirePackage{draftwatermark}
      \SetWatermarkFontSize{0.5in}
      \SetWatermarkColor[gray]{.9}
      \SetWatermarkText{\parbox{12em}{\centering
```

```
          Legacy document. \\
          Not for publication in an ACM venue}}
    \fi
  \fi
\fi
```

3.7 Paper size and paragraphing

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

```
\RequirePackage{geometry}
\ifcase\ACM@format@nr
\relax % manuscript
   \geometry{letterpaper,head=13pt,
   marginparwidth=6pc,heightrounded}%
\or % acmsmall
   \geometry{twoside=true,
     includeheadfoot, head=13pt, foot=2pc,
     paperwidth=6.75in, paperheight=10in,
     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
     marginparwidth=2pc,heightrounded
   }%
\or % acmlarge
   \geometry{twoside=true, head=13pt, foot=2pc,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot,
     top=78pt, bottom=114pt, inner=81pt, outer=81pt,
     marginparwidth=4pc,heightrounded
     }%
\or % acmtog
   \geometry{twoside=true, head=13pt, foot=2pc,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot, columnsep=24pt,
     top=52pt, bottom=75pt, inner=52pt, outer=52pt,
     marginparwidth=2pc,heightrounded
     }%
\or % sigconf
   \geometry{twoside=true, head=13pt,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot, columnsep=2pc,
     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
     marginparwidth=2pc,heightrounded
     }%
\or % siggraph
   \geometry{twoside=true, head=13pt,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot, columnsep=2pc,
     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
```

```
    marginparwidth=2pc,heightrounded
    }%
\or % sigplan
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot=false, columnsep=2pc,
    top=1in, bottom=1in, inner=0.75in, outer=0.75in,
    marginparwidth=2pc,heightrounded
    }%
\or % sigchi
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=2pc,
    top=66pt, bottom=73pt, inner=54pt, outer=54pt,
    marginparwidth=2pc,heightrounded
    }%
\or % sigchi-a
  \geometry{twoside=false, head=13pt,
    paperwidth=11in, paperheight=8.5in,
    includeheadfoot, marginparsep=72pt,
    marginparwidth=170pt, columnsep=20pt,
    top=72pt, bottom=72pt, left=314pt, right=72pt
    }%
    \@mparswitchfalse
    \reversemarginpar
\fi
```

\parindent
\parskip

Paragraphing

```
\setlength\parindent{10\p@}
\setlength\parskip{\z@}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
  \setlength\parindent{9\p@}%
\or % sigconf
\or % siggraph
\or % sigplan
\or % sigchi
\or % sigchi-a
\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.

```
\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.

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

\RequirePackage{manyfoot}
\SelectFootnoteRule[2]{copyrightpermission}
\DeclareNewFootnote{authorsaddresses}
\SelectFootnoteRule[2]{copyrightpermission}
\DeclareNewFootnote{copyrightpermission}
```

`\footnoterule` Tschichold's rules:

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

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

```
\def\endminipage{%
    \par
    \unskip
    \ifvoid\@mpfootins\else
      \vskip\skip\@mpfootins
      \normalcolor
      \unvbox\@mpfootins
    \fi
    \@minipagefalse
  \color@endgroup
  \egroup
  \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}
```

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

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

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
  \flushbottom
\or % sigconf
```

```
  \flushbottom
\or % siggraph
  \flushbottom
\or % sigplan
  \flushbottom
\or % sigchi
  \flushbottom
\or % sigchi-a
\fi
```

3.8 Fonts

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

The code below is by Ross Moore.

```
\ifPDFTeX
\input{glyphtounicode}
\pdfglyphtounicode{f_f}{FB00}
\pdfglyphtounicode{f_f_i}{FB03}
\pdfglyphtounicode{f_f_l}{FB04}
\pdfglyphtounicode{f_i}{FB01}
\pdfglyphtounicode{t_t}{0074 0074}
\pdfglyphtounicode{f_t}{0066 0074}
\pdfglyphtounicode{T_h}{0054 0068}
\pdfgentounicode=1
\RequirePackage{cmap}
\fi
```

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

```
\newif\if@ACM@newfonts
\@ACM@newfontstrue
\IfFileExists{libertine.sty}{}{\ClassWarning{\@classname}{You do not
    have the libertine package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
\IfFileExists{zi4.sty}{}{\ClassWarning{\@classname}{You do not
    have the inconsolata (zi4.sty) package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
\IfFileExists{newtxmath.sty}{}{\ClassWarning{\@classname}{You do not
    have the newtxmath package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
```

We use Libertine throughout.

```
\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
  \ifxetex
```

```
    \RequirePackage[libertine]{newtxmath}
    \RequirePackage[tt=false]{libertine}
    \setmonofont[StylisticSet=3]{inconsolata}
  \else
    \ifluatex
      \RequirePackage[libertine]{newtxmath}
      \RequirePackage[tt=false]{libertine}
      \setmonofont[StylisticSet=3]{inconsolata}
    \else
       \RequirePackage[tt=false, type1=true]{libertine}
       \RequirePackage[varqu]{zi4}
       \RequirePackage[libertine]{newtxmath}
    \fi
  \fi
\fi
```

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

```
\let\liningnums\@undefined
\AtEndPreamble{%
  \DeclareTextFontCommand{\liningnums}{\libertineLF}}
```

The SIGCHI extended abstracts are sans serif:

```
\if@ACM@sigchiamode
  \renewcommand{\familydefault}{\sfdefault}
\fi
```

3.9 Image descriptions

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

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

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

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

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

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

The global warning

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

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

```
\AtBeginEnvironment{figure}{\@Description@presentfalse
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
```

```
\AtBeginEnvironment{figure*}{\@Description@presentfalse
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtEndEnvironment{figure}{\if@Description@present\else
  \global\@undescribed@imagestrue
  \ClassWarning{\@classname}{A possible image without description}\fi}
\AtEndEnvironment{figure*}{\if@Description@present\else
  \global\@undescribed@imagestrue
  \ClassWarning{\@classname}{A possible image without description}\fi}
\AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{table*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}
\AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig}

```

3.10 Floats

We use the caption package

```
\RequirePackage{caption, float}
\captionsetup[table]{position=top}
\if@ACM@journal
  \captionsetup{labelfont={sf, small},
    textfont={sf, small}, margin=\z@}
  \captionsetup[figure]{name={Fig.}}
\else
  \captionsetup{labelfont={bf},
    textfont={bf}, labelsep=colon, margin=\z@}
  \ifcase\ACM@format@nr
  \relax % manuscript
  \or % acmsmall
  \or % acmlarge
  \or % acmtog
  \or % sigconf
```

```
  \or % siggraph
    \captionsetup{textfont={it}}
  \or % sigplan
    \captionsetup{labelfont={bf},
      textfont={normalfont}, labelsep=period, margin=\z@}
  \or % sigchi
    \captionsetup[figure]{labelfont={bf, small},
      textfont={bf, small}}
    \captionsetup[table]{labelfont={bf, small},
      textfont={bf, small}}
  \or % sigchi-a
    \captionsetup[figure]{labelfont={bf, small},
      textfont={bf, small}}
    \captionsetup[table]{labelfont={bf, small},
      textfont={bf, small}}
  \fi
\fi
```

sidebar The sidebar environment:

```
\newfloat{sidebar}{}{sbar}
\floatname{sidebar}{Sidebar}
\renewenvironment{sidebar}{\Collect@Body\@sidebar}{}
```

\@sidebar The processing of the saved text

```
\long\def\@sidebar#1{\bgroup\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig\captionsetup{type=sidebar}%
  \marginpar{\small#1}\egroup}
```

marginfigure The marginfigure environment:

```
\newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}
```

\@marginfigure The processing of the saved text

```
\long\def\@marginfigure#1{\bgroup
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig
  \captionsetup{type=figure}%
  \marginpar{\@Description@presentfalse\centering
    \small#1\if@Description@present\else
      \global\@undescribed@imagestrue
      \ClassWarning{\@classname}{A possible image without description}
      \fi}%
  \egroup}
```

margintable The margintable environment:

```
\newenvironment{margintable}{\Collect@Body\@margintable}{}
```

\@margintable The processing of the saved text

```
\long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
  \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

```
\newdimen\fulltextwidth
\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)

```
\if@ACM@sigchiamode
\def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
  \let\@endfloatbox\@endwidefloatbox
  \def\@fpsadddefault{\def\@fps{tp}}%
  \@float}
\fi
```

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

```
\if@ACM@sigchiamode
\def\end@dblfloat{%
    \end@float\egroup}
\fi
```

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

```
\def\@endwidefloatbox{%
  \par\vskip\z@skip
  \@minipagefalse
  \outer@nobreak
  \egroup
  \color@endbox
  \global\setbox\@currbox=\vbox{\moveleft
    \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
  \wd\@currbox=\textwidth
}
```

3.11 Lists

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
\def\labelenumi{\theenumi.}
\def\labelenumii{\theenumii.}
\def\labelenumiii{\theenumiii.}
\def\labelenumiv{\theenumiv.}
```

```
\or % sigchi
\or % sigchi-a
\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.

```
\newdimen\@ACM@labelwidth
\AtBeginDocument{%
  \setlength\labelsep{4pt}
  \setlength{\@ACM@labelwidth}{6.5pt}

  %% First-level list: when beginning after the first line of an
  %% indented paragraph or ending before an indented paragraph, labels
  %% should not hang to the left of the preceding/following text.
  \setlength\leftmargini{\z@}
  \addtolength\leftmargini{\parindent}
  \addtolength\leftmargini{2\labelsep}
  \addtolength\leftmargini{\@ACM@labelwidth}

  %% Second-level and higher lists.
  \setlength\leftmarginii{\z@}
  \addtolength\leftmarginii{0.5\labelsep}
  \addtolength\leftmarginii{\@ACM@labelwidth}
  \setlength\leftmarginiii{\leftmarginii}
  \setlength\leftmarginiv{\leftmarginiii}
  \setlength\leftmarginv{\leftmarginiv}
  \setlength\leftmarginvi{\leftmarginv}
  \@listi}
\newskip\listisep
\listisep\smallskipamount
\def\@listI{\leftmargin\leftmargini
  \labelwidth\leftmargini \advance\labelwidth-\labelsep
  \listparindent\z@
  \topsep\listisep}
\let\@listi\@listI
\def\@listii{\leftmargin\leftmarginii
  \labelwidth\leftmarginii \advance\labelwidth-\labelsep
  \topsep\z@skip}
\def\@listiii{\leftmargin\leftmarginiii
  \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
\def\@listiv{\leftmargin\leftmarginiv
  \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
\def\@listv{\leftmargin\leftmarginv
  \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
\def\@listvi{\leftmargin\leftmarginvi
  \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
```

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

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

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

```
\renewenvironment{description}{\list{}{%
    \labelwidth\@ACM@labelwidth
    \let\makelabel\descriptionlabel}%
}{
  \endlist
}
\let\enddescription=\endlist % for efficiency
```

3.12 Top-matter data

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

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

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

```
\define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
  CIE,%
  CSUR,%
  DGOV,%
  DTRAP,%
  HEALTH,%
  IMWUT,%
  JACM,%
  JDIQ,%
  JEA,%
  JERIC,%
  JETC,%
  JOCCH,%
  PACMCGIT,%
  PACMHCI,%
  PACMPL,%
  POMACS,%
  TAAS,%
  TACCESS,%
  TACO,%
  TALG,%
  TALLIP,%
  TAP,%
  TCPS,%
  TDS,%
  TEAC,%
  TECS,%
  TELO,%
```

```
  THRI,%
  TIIS,%
  TIOT,%
  TISSEC,%
  TIST,%
  TKDD,%
  TMIS,%
  TOCE,%
  TOCHI,%
  TOCL,%
  TOCS,%
  TOCT,%
  TODAES,%
  TODS,%
  TOG,%
  TOIS,%
  TOIT,%
  TOMACS,%
  TOMM,%
  TOMPECS,%
  TOMS,%
  TOPC,%
  TOPS,%
  TOPLAS,%
  TOS,%
  TOSEM,%
  TOSN,%
  TQC,%
  TRETS,%
  TSAS,%
  TSC,%
  TSLP,%
  TWEB,%
  FACMP%
}{%
\ifcase\@journalCode@nr
\relax % CIE
  \def\@journalName{ACM Computers in Entertainment}%
  \def\@journalNameShort{ACM Comput. Entertain.}%
  \def\@permissionCodeOne{1544-3574}%
\or % CSUR
  \def\@journalName{ACM Computing Surveys}%
  \def\@journalNameShort{ACM Comput. Surv.}%
  \def\@permissionCodeOne{0360-0300}%
\or % DGOV
  \def\@journalName{Digital Government: Research and Practice}%
  \def\@journalNameShort{Digit. Gov. Res. Pract.}%
  \def\@permissionCodeOne{2639-0175}%
\or % DTRAP
  \def\@journalName{Digital Threats: Research and Practice}%
```

```
  \def\@journalNameShort{Digit. Threat. Res. Pract.}%
  \def\@permissionCodeOne{2576-5337}%
\or % HEALTH
  \def\@journalName{ACM Transactions on Computing for Healthcare}%
  \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
  \def\@permissionCodeOne{2637-8051}%
\or % IMWUT
  \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
    Wearable and Ubiquitous Technologies}%
  \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
  \def\@permissionCodeOne{2474-9567}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % JACM
  \def\@journalName{Journal of the ACM}%
  \def\@journalNameShort{J. ACM}%
  \def\@permissionCodeOne{0004-5411}%
\or % JDIQ
  \def\@journalName{ACM Journal of Data and Information Quality}%
  \def\@journalNameShort{ACM J. Data Inform. Quality}%
  \def\@permissionCodeOne{1936-1955}%
\or % JEA
  \def\@journalName{ACM Journal of Experimental Algorithmics}%
  \def\@journalNameShort{ACM J. Exp. Algor.}%
  \def\@permissionCodeOne{1084-6654}%
\or % JERIC
  \def\@journalName{ACM Journal of Educational Resources in Computing}%
  \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
  \def\@permissionCodeOne{1073-0516}%
\or % JETC
  \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
  \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
  \def\@permissionCodeOne{1550-4832}%
\or % JOCCH
  \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
  \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
\or % PACMCGIT
  \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
  \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
  \def\@permissionCodeOne{2577-6193}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % PACMHCI
  \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
  \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
  \def\@permissionCodeOne{2573-0142}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % PACMPL
  \def\@journalName{Proceedings of the ACM on Programming Languages}%
```

```
  \def\@journalNameShort{Proc. ACM Program. Lang.}%
  \def\@permissionCodeOne{2475-1421}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % POMACS
  \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
  \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
  \def\@permissionCodeOne{2476-1249}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % TAAS
  \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
  \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
  \def\@permissionCodeOne{1556-4665}%
\or % TACCESS
  \def\@journalName{ACM Transactions on Accessible Computing}%
  \def\@journalNameShort{ACM Trans. Access. Comput.}%
  \def\@permissionCodeOne{1936-7228}%
\or % TACO
  \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
  \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
\or % TALG
  \def\@journalName{ACM Transactions on Algorithms}%
  \def\@journalNameShort{ACM Trans. Algor.}%
  \def\@permissionCodeOne{1549-6325}%
\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}%
\or % TAP
  \def\@journalName{ACM Transactions on Applied Perception}%
\or % TCPS
  \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
\or % TDS
  \def\@journalName{ACM/IMS Transactions on Data Science}%
  \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
  \def\@permissionCodeOne{2577-3224}%
\or % TEAC
  \def\@journalName{ACM Transactions on Economics and Computation}%
\or % TECS
  \def\@journalName{ACM Transactions on Embedded Computing Systems}%
  \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
  \def\@permissionCodeOne{1539-9087}%
\or % TELO
  \def\@journalName{ACM Transactions on Evolutionary Learning}%
  \def\@journalNameShort{ACM Trans. Evol. Learn.}%
  \def\@permissionCodeOne{2688-3007}%
\or % THRI
  \def\@journalName{ACM Transactions on Human-Robot Interaction}%
  \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
```

```
  \def\@permissionCodeOne{2573-9522}%
\or % TIIS
  \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
  \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
  \def\@permissionCodeOne{2160-6455}%
\or % TIOT
  \def\@journalName{ACM Transactions on Internet of Things}%
  \def\@journalNameShort{ACM Trans. Internet Things}%
  \def\@permissionCodeOne{2577-6207}%
\or % TISSEC
  \def\@journalName{ACM Transactions on Information and System Security}%
  \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
  \def\@permissionCodeOne{1094-9224}%
\or % TIST
  \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
  \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
  \def\@permissionCodeOne{2157-6904}%
\or % TKDD
  \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
  \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
  \def\@permissionCodeOne{1556-4681}%
\or % TMIS
  \def\@journalName{ACM Transactions on Management Information Systems}%
  \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
  \def\@permissionCodeOne{2158-656X}%
\or % TOCE
  \def\@journalName{ACM Transactions on Computing Education}%
  \def\@journalNameShort{ACM Trans. Comput. Educ.}%
  \def\@permissionCodeOne{1946-6226}%
\or % TOCHI
  \def\@journalName{ACM Transactions on Computer-Human Interaction}%
  \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
  \def\@permissionCodeOne{1073-0516}%
\or % TOCL
  \def\@journalName{ACM Transactions on Computational Logic}%
  \def\@journalNameShort{ACM Trans. Comput. Logic}%
  \def\@permissionCodeOne{1529-3785}%
\or % TOCS
  \def\@journalName{ACM Transactions on Computer Systems}%
  \def\@journalNameShort{ACM Trans. Comput. Syst.}%
  \def\@permissionCodeOne{0734-2071}%
\or % TOCT
  \def\@journalName{ACM Transactions on Computation Theory}%
  \def\@journalNameShort{ACM Trans. Comput. Theory}%
  \def\@permissionCodeOne{1942-3454}%
\or % TODAES
  \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
  \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
  \def\@permissionCodeOne{1084-4309}%
\or % TODS
```

```
  \def\@journalName{ACM Transactions on Database Systems}%
  \def\@journalNameShort{ACM Trans. Datab. Syst.}%
  \def\@permissionCodeOne{0362-5915}%
\or % TOG
  \def\@journalName{ACM Transactions on Graphics}%
  \def\@journalNameShort{ACM Trans. Graph.}%
  \def\@permissionCodeOne{0730-0301}
\or % TOIS
  \def\@journalName{ACM Transactions on Information Systems}%
  \def\@permissionCodeOne{1046-8188}%
\or % TOIT
  \def\@journalName{ACM Transactions on Internet Technology}%
  \def\@journalNameShort{ACM Trans. Internet Technol.}%
  \def\@permissionCodeOne{1533-5399}%
\or % TOMACS
  \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
  \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
\or % TOMM
 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
  \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
  \def\@permissionCodeOne{1551-6857}%
  \def\@permissionCodeTwo{0100}%
\or % TOMPECS
 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
  \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
  \def\@permissionCodeOne{2376-3639}%
\or % TOMS
  \def\@journalName{ACM Transactions on Mathematical Software}%
  \def\@journalNameShort{ACM Trans. Math. Softw.}%
  \def\@permissionCodeOne{0098-3500}%
\or % TOPC
  \def\@journalName{ACM Transactions on Parallel Computing}%
  \def\@journalNameShort{ACM Trans. Parallel Comput.}%
  \def\@permissionCodeOne{1539-9087}%
\or % TOPS
  \def\@journalName{ACM Transactions on Privacy and Security}%
  \def\@journalNameShort{ACM Trans. Priv. Sec.}%
  \def\@permissionCodeOne{2471-2566}%
\or % TOPLAS
  \def\@journalName{ACM Transactions on Programming Languages and Systems}%
  \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
  \def\@permissionCodeOne{0164-0925}%
\or % TOS
  \def\@journalName{ACM Transactions on Storage}%
  \def\@journalNameShort{ACM Trans. Storage}%
  \def\@permissionCodeOne{1553-3077}%
\or % TOSEM
 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
  \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
  \def\@permissionCodeOne{1049-331X}%
```

```
\or % TOSN
  \def\@journalName{ACM Transactions on Sensor Networks}%
  \def\@journalNameShort{ACM Trans. Sensor Netw.}%
  \def\@permissionCodeOne{1550-4859}%
\or % TQC
  \def\@journalName{ACM Transactions on Quantum Computing}%
  \def\@journalNameShort{ACM Trans. Quantum Comput.}%
  \def\@permissionCodeOne{2643-6817}%
\or % TRETS
 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
  \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
  \def\@permissionCodeOne{1936-7406}%
\or % TSAS
  \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
  \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
  \def\@permissionCodeOne{2374-0353}%
\or % TSC
  \def\@journalName{ACM Transactions on Social Computing}%
  \def\@journalNameShort{ACM Trans. Soc. Comput.}%
  \def\@permissionCodeOne{2469-7818}%
\or % TSLP
  \def\@journalName{ACM Transactions on Speech and Language Processing}%
  \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
  \def\@permissionCodeOne{1550-4875}%
\or % TWEB
  \def\@journalName{ACM Transactions on the Web}%
  \def\@journalNameShort{ACM Trans. Web}%
  \def\@permissionCodeOne{1559-1131}%
\else % FACMP, a dummy journal
  \def\@journalName{Forthcoming ACM Publication}%
  \def\@journalNameShort{ACM Forthcoming}%
  \def\@permissionCodeOne{XXXX-XXXX}%
\fi
\ClassInfo{\@classname}{Using journal code \@journalCode}%
}{%
  \ClassError{\@classname}{Incorrect journal #1}%
}%
```

`\acmJournal` And the syntactic sugar around it

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

The defaults:

```
\def\@journalCode@nr{0}
\def\@journalName{}%
\def\@journalNameShort{\@journalName}%
\def\@permissionCodeOne{XXXX-XXXX}%
\def\@permissionCodeTwo{}%
```

\acmConference This is the conference command

```
\newcommand\acmConference[4][]{%
  \gdef\acmConference@shortname{#1}%
  \gdef\acmConference@name{#2}%
  \gdef\acmConference@date{#3}%
  \gdef\acmConference@venue{#4}%
  \ifx\acmConference@shortname\@empty
    \gdef\acmConference@shortname{#2}%
  \fi
  \global\@ACM@journal@bibstripfalse
}
\if@ACM@journal\else
\acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
  DC, USA}%
\fi
```

\acmBooktitle The book title of the conference:
\@acmBooktitle

```
\def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
\acmBooktitle{}
\ifx\acmConference@name\@undefined\else
\acmBooktitle{Proceedings of \acmConference@name
       \ifx\acmConference@name\acmConference@shortname\else
       \ (\acmConference@shortname)\fi}
\fi
```

\@editorsAbbrev How to abbreviate editors

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

\@acmEditors The list of editors

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

\editor Add a new editor to the list

```
\def\editor#1{\ifx\@acmEditors\@empty
    \gdef\@acmEditors{#1}%
  \else
    \gdef\@editorsAbbrev{(Eds.)}%
    \g@addto@macro\@acmEditors{\and#1}%
\fi}
```

\subtitle The subtitle macro

```
\def\subtitle#1{\def\@subtitle{#1}}
\subtitle{}
```

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

```
\newcount\num@authorgroups
\num@authorgroups=0\relax
```

\num@authors The total number of authors

```
\newcount\num@authors
\num@authors=0\relax
```

\if@insideauthorgroup Whether we are continuing an author group

```
\newif\if@insideauthorgroup
\@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.

```
\renewcommand\author[2][]{%
 \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\@classname}{Do not put several
     authors in the same \string\author\space macro!}}{}%
 \global\advance\num@authors by 1\relax
 \if@insideauthorgroup\else
   \global\advance\num@authorgroups by 1\relax
   \global\@insideauthorgrouptrue
 \fi
 \ifx\addresses\@empty
   \if@ACM@anonymous
     \gdef\addresses{\@author{Anonymous Author(s)%
       \ifx\@acmSubmissionID\@empty\else\\Submission Id:
         \@acmSubmissionID\fi}}%
     \gdef\authors{Anonymous Author(s)}%
   \else
     \expandafter\gdef\expandafter\addresses\expandafter{%
       \expandafter\@author\expandafter{%
         \csname typeset@author\the\num@authors\endcsname{#2}}}%
     \gdef\authors{#2}%
   \fi
 \else
   \if@ACM@anonymous\else
   \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
     \expandafter\and\expandafter\@author\expandafter{%
       \csname typeset@author\the\num@authors\endcsname{#2}}}%
     \g@addto@macro\authors{\and#2}%
   \fi
 \fi
 \if@ACM@anonymous
   \ifx\shortauthors\@empty
     \gdef\shortauthors{Anon.
       \ifx\@acmSubmissionID\@empty\else Submission Id:
       \@acmSubmissionID\fi}%
   \fi
 \else
   \def\@tempa{#1}%
   \ifx\@tempa\@empty
     \ifx\shortauthors\@empty
       \gdef\shortauthors{#2}%
```

```
      \else
        \g@addto@macro\shortauthors{\and#2}%
      \fi
    \else
      \ifx\shortauthors\@empty
        \gdef\shortauthors{#1}%
      \else
        \g@addto@macro\shortauthors{\and#1}%
      \fi
    \fi
  \fi}
```

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

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

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

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

\additionalaffiliation Additional affiliations go to footnotes

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

\@additionalaffiliation Process \additionalaffiliation inside \authornote

```
\def\@additionalaffiliation#1{\bgroup
  \def\position##1{\ignorespaces}%
  \def\institution##1{##1\ignorespaces}%
  \def\department{\@ifnextchar[{\@department}{\@department[]}}%
  \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
  \let\streetaddress\position
  \let\city\position
  \let\state\position
  \let\postcode\position
  \let\country\position
  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.

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

\orcid We rededine the command to typeset the current author

```
\def\orcid#1{\unskip\ignorespaces%
  \IfBeginWith{#1}{http}{%
    \expandafter\gdef\csname
        typeset@author\the\num@authors\endcsname##1{%
          \href{#1}{##1}}}{%
    \expandafter\gdef\csname
        typeset@author\the\num@authors\endcsname##1{%
          \href{https://orcid.org/#1}{##1}}}}
```

\authorsaddresses Setting up authors' addresses

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

\@titlenotes The title notes

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

\titlenote Adding a note to the title

```
\def\titlenote#1{%
  \g@addto@macro\@title{\footnotemark}%
  \if@ACM@anonymous
    \g@addto@macro\@titlenotes{%
      \stepcounter{footnote}\footnotetext{Title note}}%
  \else
    \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

\@subtitlenotes The subtitle notes

```
\def\@subtitlenotes{}
```

\subtitlenote Adding a note to the subtitle

```
\def\subtitlenote#1{%
  \g@addto@macro\@subtitle{\footnotemark}%
  \if@ACM@anonymous
    \g@addto@macro\@subtitlenotes{%
      \stepcounter{footnote}\footnotetext{Subtitle note}}%
  \else
    \g@addto@macro\@subtitlenotes{%
      \stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

\@authornotes The author notes

```
\def\@authornotes{}
```

\authornote Adding a note to the author

```
\def\authornote#1{%
  \if@ACM@anonymous\else
    \g@addto@macro\addresses{\@authornotemark}%
```

```
    \g@addto@macro\@authornotes{%
      \stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

`\authornotemark` Adding a footnote mark to the authors

```
\newcommand\authornotemark[1][\relax]{%
  \ifx#1\relax\relax\relax
  \g@addto@macro\addresses{\@authornotemark}%
  \else
  \g@addto@macro\addresses{\@@authornotemark{#1}}%
  \fi}
```

`\acmVolume` The current volume

```
\def\acmVolume#1{\def\@acmVolume{#1}}
\acmVolume{1}
```

`\acmNumber` The current number

```
\def\acmNumber#1{\def\@acmNumber{#1}}
\acmNumber{1}
```

`\acmArticle` The current article

```
\def\acmArticle#1{\def\@acmArticle{#1}}
\acmArticle{}
```

`\acmArticleSeq` The sequence number

```
\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
\acmArticleSeq{\@acmArticle}
```

`\acmYear` The current year

```
\def\acmYear#1{\def\@acmYear{#1}}
\acmYear{\the\year}
```

`\acmMonth` The current month

```
\def\acmMonth#1{\def\@acmMonth{#1}}
\acmMonth{\the\month}
```

`\@acmPubDate` The publication date

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

`\acmPrice` The price

```
\def\acmPrice#1{\def\@acmPrice{#1}}
\acmPrice{15.00}
```

`\acmSubmissionID` The submission ID

```
\def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
\acmSubmissionID{}
```

\acmISBN The book ISBN

```
\def\acmISBN#1{\def\@acmISBN{#1}}
\acmISBN{978-x-xxxx-xxxx-x/YY/MM}
```

\acmDOI The paper DOI

```
\def\acmDOI#1{\def\@acmDOI{#1}}
\acmDOI{10.1145/nnnnnnn.nnnnnnn}
```

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

```
\newif\if@ACM@badge
\@ACM@badgefalse
```

\@ACM@badge@width The width of the badge

```
\newlength\@ACM@badge@width
\setlength\@ACM@badge@width{5pc}
```

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

```
\newlength\@ACM@title@width
```

\@ACM@badge@skip The space between the badge and the title

```
\newlength\@ACM@badge@skip
\setlength\@ACM@badge@skip{1pc}
```

\acmBadgeR Setting the right badge

```
\newcommand\acmBadgeR[2][]{\@ACM@badgetrue
  \def\@acmBadgeR@url{#1}%
  \def\@acmBadgeR@image{#2}}
\def\@acmBadgeR@url{}
\def\@acmBadgeR@image{}
```

\acmBadgeL Setting the left badge

```
\newcommand\acmBadgeL[2][]{\@ACM@badgetrue
  \def\@acmBadgeL@url{#1}%
  \def\@acmBadgeL@image{#2}}
\def\@acmBadgeL@url{}
\def\@acmBadgeL@image{}
```

\startPage The start page of the paper

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

\terms Terms are obsolete. We use CCS now.

```
\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.

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

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

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

\@saveabstract And saving the abstract

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

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

```
\long\def\@lempty{}
```

\if@ACM@printccs Whether to print CCS

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

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

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

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

\if@ACM@printfolios Whether to print folios

```
\define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
  \if@ACM@printfolios
    \ClassInfo{\@classname}{Printing folios}%
  \else
    \ClassInfo{\@classname}{Suppressing folios}%
  \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}
```

\@ACM@authorsperrow The number of authors per row. 0 means use the default algorithm.

```
\define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrow}[0]{%
  \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrow to
      #1}}{\ClassWarning{\@classname}{The parameter authorsperrow must be
      numerical. Ignoring the input #1}\gdef\@ACM@authorsperrow{0}}}
```

\settopmatter The usual syntactic sugar

```
\def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}
```

Now the settings

```
\settopmatter{printccs=true, printacmref=true}
\if@ACM@manuscript
  \settopmatter{printfolios=true}
\else
  \if@ACM@journal
    \settopmatter{printfolios=true}
  \else
    \settopmatter{printfolios=false}
  \fi
\fi
\settopmatter{authorsperrow=0}
```

\@received The container for the paper history

```
\def\@received{}
```

\received The \received command

```
\newcommand\received[2][]{\def\@tempa{#1}%
  \ifx\@tempa\@empty
    \ifx\@received\@empty
      \gdef\@received{Received #2}%
    \else
      \g@addto@macro{\@received}{; revised #2}%
    \fi
  \else
    \ifx\@received\@empty
      \gdef\@received{#1 #2}%
    \else
      \g@addto@macro{\@received}{; #1 #2}%
    \fi
  \fi}
\AtEndDocument{%
  \ifx\@received\@empty\else
    \par\bigskip\noindent\small\normalfont\@received\par
  \fi}
```

3.13 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```
\RequirePackage{comment}
\excludecomment{CCSXML}
```

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

```
\let\@concepts\@empty
\newcounter{@concepts}
```

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

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

```
\def\textrightarrow{$\rightarrow$}
\def\ccsdesc@parse#1~#2~#3~{%
  \stepcounter{@concepts}%
  \expandafter\ifx\csname CCS@General@#2\endcsname\relax
    \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
      \textbf{#2}}%
    \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
    \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
  \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
    \csname CCS@Punctuation@#2\endcsname
    \csname CCS@Specific@#2\endcsname}%
  \fi
  \ifx#3\relax\relax\else
    \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
      \textrightarrow\ }%
   \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
     \addtocounter{@concepts}{-1}%
     \ifnum#1>499\textbf{#3}\else
     \ifnum#1>299\textit{#3}\else
     #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
  \fi
\ccsdesc@parse@finish}

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

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

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

3.14 Copyright system

This is from `acmcopyright.sty`

\if@printcopyright Whether to print a copyright symbol

```
\newif\if@printcopyright
\@printcopyrighttrue
```

\if@printpermission Whether to print the permission block

```
\newif\if@printpermission
\@printpermissiontrue
```

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

```
\newif\if@acmowned
\@acmownedtrue
```

Keys:

```
\define@choicekey*{ACM@}{acmcopyrightmode}[%
  \acm@copyrightinput\acm@copyrightmode]{none,%
    acmcopyright,acmlicensed,rightsretained,%
    usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
    licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
    iw3c2w3,iw3c2w3g}{%
  \@printpermissiontrue
  \@printcopyrighttrue
  \@acmownedtrue
  \ifnum\acm@copyrightmode=0\relax % none
   \@printpermissionfalse
   \@printcopyrightfalse
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=2\relax % acmlicensed
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=3\relax % rightsretained
   \@acmownedfalse
   \AtBeginDocument{\acmPrice{}}%
  \fi
  \ifnum\acm@copyrightmode=4\relax % usgov
   \@printpermissiontrue
   \@printcopyrightfalse
   \@acmownedfalse
   \AtBeginDocument{\acmPrice{}}%
  \fi
  \ifnum\acm@copyrightmode=6\relax % cagov
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=9\relax % licensedcagov
   \@acmownedfalse
  \fi
```

```
\ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=11\relax % othergov
 \@acmownedtrue
\fi
\ifnum\acm@copyrightmode=12\relax % licensedothergov
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=13\relax % iw3c2w3
 \@acmownedfalse
 \AtBeginDocument{\acmPrice{}}%
\fi
\ifnum\acm@copyrightmode=14\relax % iw3c2w3g
 \@acmownedfalse
 \AtBeginDocument{\acmPrice{}}%
\fi}
```

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

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

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

```
\def\@copyrightowner{%
 \ifcase\acm@copyrightmode\relax % none
 \or % acmcopyright
 Association for Computing Machinery.
 \or % acmlicensed
 Copyright held by the owner/author(s). Publication rights licensed to
 ACM\@.
 \or % rightsretained
 Copyright held by the owner/author(s).
 \or % usgov
 \or % usgovmixed
 Association for Computing Machinery.
 \or % cagov
 Crown in Right of Canada.
 \or %cagovmixed
 Association for Computing Machinery.
 \or %licensedusgovmixed
 Copyright held by the owner/author(s). Publication rights licensed to
 ACM\@.
 \or % licensedcagov
 Crown in Right of Canada. Publication rights licensed to
 ACM\@.
 \or %licensedcagovmixed
 Copyright held by the owner/author(s). Publication rights licensed to
 ACM\@.
 \or % othergov
 Association for Computing Machinery.
```

```
  \or % licensedothergov
  Copyright held by the owner/author(s). Publication rights licensed to
  ACM\@.
  \or % ic2w3www
  IW3C2 (International World Wide Web Conference Committee), published
  under Creative Commons CC-BY~4.0 License.
  \or % ic2w3wwwgoogle
  IW3C2 (International World Wide Web Conference Committee), published
  under Creative Commons CC-BY-NC-ND~4.0 License.
  \fi}
```

`\@formatdoi` Print a clickable DOI

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

`\@copyrightpermission` The canned permission block.

```
\def\@copyrightpermission{%
  \ifcase\acm@copyrightmode\relax % none
  \or % acmcopyright
   Permission to make digital or hard copies of all or part of this
   work for personal or classroom use is granted without fee provided
   that copies are not made or distributed for profit or commercial
   advantage and that copies bear this notice and the full citation on
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   honored. For all other uses, contact the
   owner\hspace*{.5pt}/author(s).
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```

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```

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  (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
  disseminate the work on their personal and corporate Web sites with
  the appropriate attribution.
 \fi}
```

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

```
\def\copyrightyear#1{\def\@copyrightyear{#1}}
\copyrightyear{\@acmYear}
```

`\@teaserfigures` The teaser figures container

```
\def\@teaserfigures{}
```

`teaserfigure` The teaser figure

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

\@saveteaser Saving the teaser

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

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

```
\renewcommand{\thanks}[1]{%
  \@ifnotempty{#1}{%
    \if@ACM@anonymous
      \g@addto@macro\thankses{\thanks{A note}}%
   \else
    \g@addto@macro\thankses{\thanks{#1}}%
   \fi}}
```

3.15 Maketitle hook

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

\@beginmaketitlehook The hook

```
\ifx\@beginmaketitlehook\@undefined
  \let\@beginmaketitlehook\@empty
\fi
```

\AtBeginMaketitle Adding to the hook

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

3.16 Typesetting top matter

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

```
\newbox\mktitle@bx
```

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

Another note: there is a subtle difference between author notes, title notes and thanks. The latter two refer to the paper itself and therefore belong to the copyright/permission block. By the way, this was the default behavior of the old ACM classes.

```
\def\maketitle{\@beginmaketitlehook
  \@ACM@maketitle@typesettrue
  \if@ACM@anonymous
    % Anonymize omission of \author-s
    \ifnum\num@authorgroups=0\author{}\fi
  \fi
  \begingroup
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig
  \let\@footnotemark\@footnotemark@nolink
  \let\@footnotetext\@footnotetext@nolink
```

```
\renewcommand\thefootnote{\@fnsymbol\c@footnote}%
\hsize=\textwidth
\def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
\@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
\@printtopmatter
\if@ACM@sigchiamode\@mkauthors\fi
\setcounter{footnote}{0}%
\def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
\@titlenotes
\@subtitlenotes
\@authornotes
\let\@makefnmark\relax
\let\@thefnmark\relax
\let\@makefntext\noindent
\ifx\@empty\thankses\else
  \footnotetextauthorsaddresses{%
    \def\par{\let\par\@par}\parindent\z@\@setthanks}%
\fi
\ifx\@empty\@authorsaddresses\else
   \if@ACM@anonymous\else
     \if@ACM@journal@bibstrip
       \footnotetextauthorsaddresses{%
         \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
     \fi
   \fi
\fi
\if@ACM@nonacm\else\footnotetextcopyrightpermission{%
  \if@ACM@authordraft
      \raisebox{-2ex}[\z@][\z@]{\makebox[0pt][l]{\large\bfseries
          Unpublished working draft. Not for distribution.}}%
     \color[gray]{0.9}%
  \fi
  \parindent\z@\parskip0.1\baselineskip
  \if@ACM@authorversion\else
    \if@printpermission\@copyrightpermission\par\fi
  \fi
  \if@ACM@manuscript\else
     \if@ACM@journal@bibstrip\else % Print the conference information
    {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
     \fi
  \fi
  \if@printcopyright
    \copyright\ \@copyrightyear\ \@copyrightowner\\
  \else
    \@copyrightyear.\
  \fi
  \if@ACM@manuscript
    Manuscript submitted to ACM\\
  \else
    \if@ACM@authorversion
```

```
        This is the author's version of the work. It is posted here for
        your personal use. Not for redistribution. The definitive Version
        of Record was published in
        \if@ACM@journal@bibstrip
          \emph{\@journalName}%
        \else
          \emph{\@acmBooktitle}%
        \fi
        \ifx\@acmDOI\@empty
        .
        \else
          , \@formatdoi{\@acmDOI}.
        \fi\\
      \else
        \if@ACM@nonacm\else
          \if@ACM@journal@bibstrip
            \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle
            \ifx\@acmPrice\@empty\else\ \$\@acmPrice\fi\\
            \@formatdoi{\@acmDOI}%
          \else % Conference
            \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN
            \ifx\@acmPrice\@empty.\else\dots\$\@acmPrice\fi\\\fi
            \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
          \fi
        \fi
      \fi
    \fi}
  \fi
\endgroup
\setcounter{footnote}{0}%
\@mkabstract
\if@ACM@printccs
\ifx\@concepts\@empty\else\bgroup
    {\@specialsection{CCS Concepts}%
       \noindent\@concepts\par}\egroup
   \fi
 \fi
 \ifx\@keywords\@empty\else\bgroup
    {\if@ACM@journal
       \@specialsection{Additional Key Words and Phrases}%
     \else
       \@specialsection{Keywords}%
     \fi
       \noindent\@keywords\par}\egroup
 \fi
\let\metadata@authors=\authors
\nxandlist{, }{, }{, }\metadata@authors
\def\@ACM@checkaffil{}%
\hypersetup{%
  pdfauthor={\metadata@authors},
```

```
    pdftitle={\@title},
    pdfsubject={\@concepts},
    pdfkeywords={\@keywords},
    pdfcreator={LaTeX with acmart
      \csname ver@acmart.cls\endcsname\space
      and hyperref
      \csname ver@hyperref.sty\endcsname}}%
  \andify\authors
  \andify\shortauthors
  \global\let\authors=\authors
  \global\let\shortauthors=\shortauthors
  \if@ACM@printacmref
     \@mkbibcitation
  \fi
  \global\@topnum\z@ % this prevents floats from falling
                     % at the top of page 1
  \global\@botnum\z@ % we do not want them to be on the bottom either
  \@printendtopmatter
  \@afterindentfalse
  \@afterheading
}
```

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

```
\def\@specialsection#1{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \par\medskip\small\noindent#1: %
  \or % acmsmall
    \par\medskip\small\noindent#1: %
  \or % acmlarge
    \par\medskip\small\noindent#1: %
  \or % acmtog
    \par\medskip\small\noindent#1: %
  \or % sigconf
    \section*{#1}%
  \or % siggraph
    \section*{#1}%
  \or % sigplan
     \noindentparagraph*{#1:~}%
  \or % sigchi
    \section*{#1}%
  \or % sigchi-a
    \section*{#1}%
    \fi
}
```

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

```
\def\@printtopmatter{%
  \ifx\@startPage\@empty
     \gdef\@startPage{1}%
  \else
     \setcounter{page}{\@startPage}%
  \fi
  \thispagestyle{firstpagestyle}%
  \noindent
  \ifcase\ACM@format@nr
  \relax % manuscript
    \box\mktitle@bx\par
  \or % acmsmall
    \box\mktitle@bx\par
  \or % acmlarge
    \box\mktitle@bx\par
  \or % acmtog
    \twocolumn[\box\mktitle@bx]%
  \or % sigconf
    \twocolumn[\box\mktitle@bx]%
  \or % siggraph
    \twocolumn[\box\mktitle@bx]%
  \or % sigplan
    \twocolumn[\box\mktitle@bx]%
  \or % sigchi
    \twocolumn[\box\mktitle@bx]%
  \or % sigchi-a
    \par\box\mktitle@bx\par\bigskip
    \if@ACM@badge
       \marginpar{\noindent
         \ifx\@acmBadgeL@image\@empty\else
           \href{\@acmBadgeL@url}{%
             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
            \hskip\@ACM@badge@skip
          \fi
         \ifx\@acmBadgeR@image\@empty\else
           \href{\@acmBadgeR@url}{%
             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
          \fi}%
    \fi
  \fi
}
```

`\@mktitle` The title of the article

```
\def\@mktitle{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \@mktitle@i
  \or % acmsmall
    \@mktitle@i
  \or % acmlarge
```

```
    \@mktitle@i
  \or % acmtog
    \@mktitle@i
  \or % sigconf
    \@mktitle@iii
  \or % siggraph
    \@mktitle@iii
  \or % sigplan
    \@mktitle@iii
  \or % sigchi
    \@mktitle@iii
  \or % sigchi-a
    \@mktitle@iv
  \fi
}
```

`\@titlefont` The font to typeset the title

```
\def\@titlefont{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \LARGE\sffamily\bfseries
  \or % acmsmall
    \LARGE\sffamily\bfseries
  \or % acmlarge
    \LARGE\sffamily\bfseries
  \or % acmtog
    \Huge\sffamily
  \or % sigconf
    \Huge\sffamily\bfseries
  \or % siggraph
    \Huge\sffamily\bfseries
  \or % sigplan
    \Huge\bfseries
  \or % sigchi
    \Huge\sffamily\bfseries
  \or % sigchi-a
     \Huge\bfseries
  \fi}
```

`\@subtitlefont` The font to typeset the subtitle

```
\def\@subtitlefont{\normalsize
  \ifcase\ACM@format@nr
  \relax % manuscript
    \mdseries
  \or % acmsmall
    \mdseries
  \or % acmlarge
    \mdseries
  \or % acmtog
     \LARGE
```

```
  \or % sigconf
     \LARGE\mdseries
  \or % siggraph
     \LARGE\mdseries
  \or % sigplan
     \LARGE\mdseries
  \or % sigchi
     \LARGE\mdseries
  \or % sigchi-a
     \mdseries
  \fi}
```

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

```
\def\@mktitle@i{\hsize=\textwidth
  \@ACM@title@width=\hsize
  \ifx\@acmBadgeL@image\@empty\else
    \advance\@ACM@title@width by -\@ACM@badge@width
    \advance\@ACM@title@width by -\@ACM@badge@skip
  \fi
  \ifx\@acmBadgeR@image\@empty\else
    \advance\@ACM@title@width by -\@ACM@badge@width
    \advance\@ACM@title@width by -\@ACM@badge@skip
  \fi
  \setbox\mktitle@bx=\vbox{\noindent\@titlefont
    \ifx\@acmBadgeL@image\@empty\else
      \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
          \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
      \hskip\@ACM@badge@skip
    \fi
    \parbox[t]{\@ACM@title@width}{\raggedright
      \@titlefont\noindent
      \@title
  \ifx\@subtitle\@empty\else
    \par\noindent{\@subtitlefont\@subtitle}
  \fi}%
  \ifx\@acmBadgeR@image\@empty\else
    \hskip\@ACM@badge@skip
    \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
        \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
  \fi
  \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. Note that since the title is centered, we leave space for the left badge even if only the right badge is defined.

```
\def\@mktitle@iii{\hsize=\textwidth
    \setbox\mktitle@bx=\vbox{\@titlefont\centering
      \@ACM@title@width=\hsize
```

```
      \if@ACM@badge
        \advance\@ACM@title@width by -2\@ACM@badge@width
        \advance\@ACM@title@width by -2\@ACM@badge@skip
        \parbox[b]{\@ACM@badge@width}{\strut
          \ifx\@acmBadgeL@image\@empty\else
            \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
          \fi}%
        \hskip\@ACM@badge@skip
      \fi
      \parbox[t]{\@ACM@title@width}{\centering\@titlefont
        \@title
        \ifx\@subtitle\@empty\else
          \par\noindent{\@subtitlefont\@subtitle}
        \fi
      }%
      \if@ACM@badge
        \hskip\@ACM@badge@skip
        \parbox[b]{\@ACM@badge@width}{\strut
          \ifx\@acmBadgeR@image\@empty\else
            \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
          \fi}%
      \fi
      \par\bigskip}}%
```

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

```
\def\@mktitle@iv{\hsize=\textwidth
    \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
      \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
      \noindent\@title
     \ifx\@subtitle\@empty\else
       \par\noindent\@subtitlefont\@subtitle
     \fi
     \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.

```
\newbox\@ACM@commabox
\def\@ACM@addtoaddress#1{%
  \ifvmode\else
    \if@ACM@affiliation@obeypunctuation\else
    \setbox\@ACM@commabox=\hbox{, }%
    \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
```

```
  \fi\fi
  #1}
```

\institution
\position
\department
\streetaddress
\city
\state
\postcode
\country

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

```
\def\streetaddress#1{\unskip\ignorespaces}
\def\postcode#1{\unskip\ignorespaces}
\if@ACM@journal
  \def\position#1{\unskip\ignorespaces}
  \def\institution#1{\global\@ACM@instpresenttrue
    \unskip~#1\ignorespaces}
  \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
  \def\state#1{\unskip\ignorespaces}
  \newcommand\department[2][0]{\unskip\ignorespaces}
  \def\country#1{\global\@ACM@countrypresenttrue
    \if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
\else
  \def\position#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
  \def\institution#1{\global\@ACM@instpresenttrue
    \if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
  \newcommand\department[2][0]{\if@ACM@affiliation@obeypunctuation
    #2\else#2\par\fi}%
% \def\streetaddress#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
  \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
  \let\state\@ACM@addtoaddress
% \def\postcode#1{\if@ACM@affiliation@obeypunctuation#1\else\unskip\space#1\fi}%
  \def\country#1{\global\@ACM@countrypresenttrue\@ACM@addtoaddress{#1}}%
\fi
```

\@mkauthors

Typesetting the authors

```
\def\@mkauthors{\begingroup
  \hsize=\textwidth
  \ifcase\ACM@format@nr
  \relax % manuscript
    \@mkauthors@i
  \or % acmsmall
    \@mkauthors@i
  \or % acmlarge
    \@mkauthors@i
  \or % acmtog
    \@mkauthors@i
  \or % sigconf
    \@mkauthors@iii
  \or % siggraph
    \@mkauthors@iii
  \or % sigplan
    \@mkauthors@iii
  \or % sigchi
```

```
    \@mkauthors@iii
  \or % sigchi-a
    \@mkauthors@iv
  \fi
  \endgroup
}
```

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

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

`\@affiliationfont` Font for affiliations

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

Adjusting fonts for different formats

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
  \def\@authorfont{\large\sffamily}
  \def\@affiliationfont{\small\normalfont}
\or % acmlarge
\or % acmtog
  \def\@authorfont{\LARGE\sffamily}
  \def\@affiliationfont{\large}
\or % sigconf
  \def\@authorfont{\LARGE}
  \def\@affiliationfont{\large}
\or % siggraph
  \def\@authorfont{\normalsize\normalfont}
  \def\@affiliationfont{\normalsize\normalfont}
\or % sigplan
  \def\@authorfont{\Large\normalfont}
  \def\@affiliationfont{\normalsize\normalfont}
\or % sigchi
  \def\@authorfont{\bfseries}
  \def\@affiliationfont{\mdseries}
\or % sigchi-a
  \def\@authorfont{\bfseries}
  \def\@affiliationfont{\mdseries}
\fi
```

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

```
\def\@typeset@author@line{%
  \andify\@currentauthors\par\noindent
  \@currentauthors\def\@currentauthors{}%
  \ifx\@currentaffiliations\@empty\else
    \andify\@currentaffiliations
      \unskip, {\@currentaffiliations}\par
  \fi
  \def\@currentaffiliations{}}
```

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

```
\newif\if@ACM@instpresent
\@ACM@instpresenttrue
```

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

```
\newif\if@ACM@citypresent
\@ACM@citypresenttrue
```

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

```
\newif\if@ACM@countrypresent
\@ACM@countrypresenttrue
```

\@ACM@resetaffil Reset affiliation flags

```
\def\@ACM@resetaffil{%
  \global\@ACM@instpresentfalse
  \global\@ACM@citypresentfalse
  \global\@ACM@countrypresentfalse
}
```

\@ACM@checkaffil Check affiliation flags

```
\def\@ACM@checkaffil{%
  \if@ACM@instpresent\else
  \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
  \fi
  \if@ACM@citypresent\else
  \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
  \fi
  \if@ACM@countrypresent\else
  \ClassError{\@classname}{No country present for an affiliation}{ACM
    requires each author to indicate their country using country macro.}%
  \fi
}
```

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

```
\def\@mkauthors@i{%
  \def\@currentauthors{}%
  \def\@currentaffiliations{}%
  \global\let\and\@typeset@author@line
  \def\@author##1{%
    \ifx\@currentauthors\@empty
      \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
    \else
       \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
    \fi
    \gdef\and{}}%
  \def\email##1##2{}%
  \def\affiliation##1##2{%
    \def\@tempa{##2}\ifx\@tempa\@empty\else
```

```
      \ifx\@currentaffiliations\@empty
         \gdef\@currentaffiliations{%
           \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
           \setkeys{@ACM@affiliation@}{##1}%
           \@ACM@resetaffil
           \@affiliationfont##2\@ACM@checkaffil}%
      \else
        \g@addto@macro{\@currentaffiliations}{\and
          \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
          \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
          ##2\@ACM@checkaffil}%
      \fi
    \fi
     \global\let\and\@typeset@author@line}%
  \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par\medskip
    \noindent\addresses\@typeset@author@line
   \par\medskip}%
}
```

`\@mkauthors@ii` The `\@mkauthors@ii` command was the version used in `acmtog`. It is no longer necessary.

`\author@bx` The box to put an individual author in

```
\newbox\author@bx
```

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

```
\newdimen\author@bx@wd
```

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

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

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

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

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

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

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

```
  \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
  \else
    \ifcase\num@authorgroups
    \relax % 0?
    \or  % 1=one author per row
    \or  % 2=two authors per row
       \divide\author@bx@wd by \num@authorgroups\relax
    \or  % 3=three authors per row
       \divide\author@bx@wd by \num@authorgroups\relax
    \or  % 4=two authors per row (!)
       \divide\author@bx@wd by 2\relax
    \else % three authors per row
       \divide\author@bx@wd by 3\relax
    \fi
  \fi
  \advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of \addresses:

```
  \gdef\@currentauthors{}%
  \gdef\@currentaffiliation{}%
  \def\@author##1{\ifx\@currentauthors\@empty
    \gdef\@currentauthors{\par##1}%
  \else
    \g@addto@macro\@currentauthors{\par##1}%
  \fi
  \gdef\and{}}%
  \def\email##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{\bgroup
      \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
  \else
    \g@addto@macro\@currentaffiliation{\par\bgroup
      \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
  \fi}%
  \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{%
      \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
      \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
      ##2\@ACM@checkaffil}%
  \else
    \g@addto@macro\@currentaffiliation{\par
      \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
      \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
      ##2\@ACM@checkaffil}%
  \fi
  \global\let\and\@typeset@author@bx
}%
```

Actual typesetting is done by the \and macro:

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

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

```
\author@bx@wd=\columnwidth\relax
\advance\author@bx@wd by -\author@bx@sep\relax
\ifnum\@ACM@authorsperrow>0\relax
  \divide\author@bx@wd by \@ACM@authorsperrow\relax
\else
  \ifcase\num@authorgroups
  \relax % 0?
  \or  % 1=one author per row
  \else  % 2=two authors per row
     \divide\author@bx@wd by 2\relax
  \fi
\fi
\advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of \addresses:

```
\gdef\@currentauthors{}%
\gdef\@currentaffiliation{}%
\def\@author##1{\ifx\@currentauthors\@empty
  \gdef\@currentauthors{\par##1}%
\else
  \g@addto@macro\@currentauthors{\par##1}%
\fi
\gdef\and{}}%
\def\email##1##2{\ifx\@currentaffiliation\@empty
  \gdef\@currentaffiliation{\nolinkurl{##2}}%
\else
  \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
\fi}%
\def\affiliation##1##2{\ifx\@currentaffiliation\@empty
  \gdef\@currentaffiliation{%
    \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
    \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
    ##2\@ACM@checkaffil}%
\else
  \g@addto@macro\@currentaffiliation{\par
```

```
      \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
      \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
      ##2\@ACM@checkaffil}%
  \fi
  \global\let\and\@typeset@author@bx}%
%
```

Actual typesetting is done by the \and macro

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

\@mkauthorsaddresses Typesetting authors' addresses in the footnote style

```
\def\@mkauthorsaddresses{%
  \ifnum\num@authors>1\relax
  Authors' \else Author's \fi
  \ifnum\num@authorgroups>1\relax
  addresses: \else address: \fi
  \bgroup
  \def\streetaddress##1{\unskip, ##1}%
  \def\postcode##1{\unskip, ##1}%
  \def\position##1{\unskip\ignorespaces}%
  \gdef\@ACM@institution@separator{, }%
 \def\institution##1{\unskip\@ACM@institution@separator ##1\gdef\@ACM@institution@separator{ and }}%
  \def\city##1{\unskip, ##1}%
  \def\state##1{\unskip, ##1}%
  \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
  \def\country##1{\unskip, ##1}%
  \def\and{\unskip; \gdef\@ACM@institution@separator{, }}%
  \def\@author##1{##1}%
  \def\email##1##2{\unskip, \nolinkurl{##2}}%
  \addresses
  \egroup}

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

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

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

\@authornotemark Adding a footnote mark to authors. This version adds a "normal" footnote mark.

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

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

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

\@mkteasers Typesetting the teasers

```
\def\@mkteasers{%
  \ifx\@teaserfigures\@empty\else
    \def\@teaser##1{\par\bigskip\bgroup
      \captionsetup{type=figure}##1\egroup\par}
    \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par
      \noindent\@Description@presentfalse
      \@teaserfigures\par\if@Description@present\else
         \global\@undescribed@imagestrue
         \ClassWarning{\@classname}{A possible image without
           description}\fi
    \medskip}%
  \fi}
```

\@mkabstract Typesetting the abstract

```
\def\@mkabstract{\bgroup
  \ifx\@abstract\@lempty\else
  {\phantomsection\addcontentsline{toc}{section}{Abstract}%
    \if@ACM@journal
       \everypar{\setbox\z@\lastbox\everypar{}}\small
    \else
      \section*{\abstractname}%
    \fi
   \ignorespaces\@abstract\par}%
  \fi\egroup}
```

\@mkbibcitation Print the bibcitation format

```
\def\@mkbibcitation{\bgroup
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig
 \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
  \def\footnotemark{}%
  \def\\{\unskip{} \ignorespaces}%
  \def\footnote{\ClassError{\@classname}{Please do not use footnotes
      inside a \string\title{} or \string\author{} command! Use
      \string\titlenote{} or \string\authornote{} instead!}}%
  \def\@article@string{\ifx\@acmArticle\@empty{\ }\else,
    Article~\@acmArticle\ \fi}%
  \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
  \noindent\bgroup
    \def\\{\unskip{}, \ignorespaces}\authors\egroup. \@acmYear. \@title
  \ifx\@subtitle\@empty. \else: \@subtitle. \fi
  \if@ACM@nonacm\else
    % The 'nonacm' option disables 'printacmref' by default,
    % and the present \@mkbibcitation definition is never used
    % in this case. The conditional remains useful if the user
    % explicitly sets \settopmatter{printacmref=true}.
    \if@ACM@journal@bibstrip
       \textit{\@journalNameShort}
```

```
      \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
      \ref{TotPages}~\@pages@word.
    \else
      In \textit{\@acmBooktitle}%
      \ifx\@acmEditors\@empty\textit{.}\else
        \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
      \fi\
      ACM, New York, NY, USA%
        \@article@string\unskip, \ref{TotPages}~\@pages@word.
    \fi
  \fi
  \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
\par\egroup}
```

`\@printendtopmatter` End the top matter

```
\def\@printendtopmatter{%
  \let\@vspace\@vspace@orig
  \let\@vspacer\@vspacer@orig
  \par\bigskip
  \let\@vspace\@vspace@acm
  \let\@vspacer\@vspacer@acm
  }
```

`\@setthanks` We redefine `\setthanks` using `\long`

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

`\@setauthorsaddresses`

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

3.17 Headers and Footers

We use `fancyhdr` for our headers and footers:

```
\RequirePackage{fancyhdr}
```

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

```
\let\ACM@ps@plain\ps@plain
\let\ACM@ps@myheadings\ps@myheadings
\let\ACM@ps@headings\ps@headings
\def\ACM@restore@pagestyle{%
  \let\ps@plain\ACM@ps@plain
  \let\ps@myheadings\ACM@ps@myheadings
  \let\ps@headings\ACM@ps@headings}
\AtBeginDocument{\ACM@restore@pagestyle}
```

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

```
\if@ACM@review
  \newsavebox{\ACM@linecount@bx}
  \newlength\ACM@linecount@bxht
  \newcount\ACM@linecount
```

```
  \ACM@linecount\@ne\relax
  \def\ACM@mk@linecount{%
    \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{\normalfont
        \normalsize
        \setlength{\ACM@linecount@bxht}{0pt}%
        \loop{\color{red}\scriptsize\the\ACM@linecount}\\
        \global\advance\ACM@linecount by \@ne
        \addtolength{\ACM@linecount@bxht}{\baselineskip}%
        \ifdim\ACM@linecount@bxht<\textheight\repeat
        {\color{red}\scriptsize\the\ACM@linecount}\hfill
        \global\advance\ACM@linecount by \@ne}}}
\fi
```

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

```
\def\ACM@linecountL{%
  \if@ACM@review
  \ACM@mk@linecount
  \begin{picture}(0,0)%
    \put(-26,-22){\usebox{\ACM@linecount@bx}}%
  \end{picture}%
  \fi}
```

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

```
\def\ACM@linecountR{%
  \if@ACM@review
    \ifcase\ACM@format@nr
    \relax % manuscript
         \relax
       \or % acmsmall
         \relax
       \or % acmlarge
         \relax
       \or % acmtog
          \ACM@mk@linecount
       \or % sigconf
          \ACM@mk@linecount
       \or % siggraph
          \ACM@mk@linecount
       \or % sigplan
          \ACM@mk@linecount
       \or % sigchi
          \ACM@mk@linecount
       \or % sigchi-a
          \ACM@mk@linecount
    \fi
    \begin{picture}(0,0)%
      \put(20,-22){\usebox{\ACM@linecount@bx}}%
     \end{picture}%
  \fi}
```

\ACM@timestamp The timestamp system

```
\if@ACM@timestamp
  % Subtracting 30 from \time gives us the effect of rounding down despite
  % \numexpr rounding to nearest
  \newcounter{ACM@time@hours}
  \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
  \newcounter{ACM@time@minutes}
 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
  \newcommand\ACM@timestamp{%
    \footnotesize%
    \ifx\@acmSubmissionID\@empty\relax\else
    Submission ID: \@acmSubmissionID.{ }%
    \fi
    \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
    \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
    Page \thepage\ of \@startPage--\pageref*{TotPages}.%
  }
\fi
```

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

```
\def\@shortauthors{%
  \if@ACM@anonymous
    Anon.
    \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
  \else\shortauthors\fi}
```

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

```
\def\@headfootfont{\sffamily\footnotesize}
```

standardpagestyle The page style for all pages but the first one The page style for all pages but the first one

```
\AtBeginDocument{%
\fancypagestyle{standardpagestyle}{%
  \fancyhf{}%
  \renewcommand{\headrulewidth}{\z@}%
  \renewcommand{\footrulewidth}{\z@}%
  \def\@acmArticlePage{%
    \ifx\@acmArticle\empty%
      \if@ACM@printfolios\thepage\fi%
    \else%
      \@acmArticle\if@ACM@printfolios:\thepage\fi%
    \fi%
  }%
  \if@ACM@journal@bibstrip
    \ifcase\ACM@format@nr
    \relax % manuscript
      \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
      \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
```

```
    \fancyhead[RE]{\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL\shorttitle}%
    \if@ACM@nonacm\else%
      \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
    \fi%
  \or % acmsmall
    \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
    \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
    \fancyhead[RE]{\@headfootfont\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
    \if@ACM@nonacm\else%
   \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
      \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
    \fi
  \or % acmlarge
    \fancyhead[LE]{\ACM@linecountL\@headfootfont
    \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL}%
    \fancyhead[RO]{\@headfootfont
      \shorttitle\quad\textbullet\quad\@acmArticlePage}%
    \if@ACM@nonacm\else%
   \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
      \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
    \fi
  \or % acmtog
    \fancyhead[LE]{\ACM@linecountL\@headfootfont
      \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL}%
    \fancyhead[RE]{\ACM@linecountR}%
    \fancyhead[RO]{\@headfootfont
      \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
    \if@ACM@nonacm\else%
   \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
      \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
    \fi
  \else % Proceedings
    \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
    \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
    \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
    \if@ACM@nonacm
      \fancyhead[LE]{\ACM@linecountL}%
      \fancyhead[RO]{\ACM@linecountR}%
    \else%
      \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
        \acmConference@shortname,
        \acmConference@date, \acmConference@venue}%
      \fancyhead[RO]{\@headfootfont
        \acmConference@shortname,
        \acmConference@date, \acmConference@venue\ACM@linecountR}%
    \fi
```

```
    \fi
  \else % Proceedings
    \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
    \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
    \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
    \if@ACM@nonacm
      \fancyhead[LE]{\ACM@linecountL}%
      \fancyhead[RO]{\ACM@linecountR}%
    \else%
      \fancyhead[LE]{\ACM@linecountL\@headfootfont
        \acmConference@shortname,
        \acmConference@date, \acmConference@venue}%
      \fancyhead[RO]{\@headfootfont
        \acmConference@shortname,
        \acmConference@date, \acmConference@venue\ACM@linecountR}%
    \fi
  \fi
  \if@ACM@sigchiamode
     \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
  \fi
  \if@ACM@timestamp
     \fancyfoot[LO,RE]{\ACM@timestamp}
  \fi
}%
\pagestyle{standardpagestyle}
}
```

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

```
\newdimen\@folio@wd
\@folio@wd=\z@
\newdimen\@folio@ht
\@folio@ht=\z@
\newdimen\@folio@voffset
\@folio@voffset=\z@
\def\@folio@max{1}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
  \@folio@wd=45.75pt\relax
  \@folio@ht=1.25in\relax
  \@folio@voffset=.2in\relax
  \def\@folio@max{8}
\or % acmlarge
  \@folio@wd=43.25pt\relax
  \@folio@ht=79pt\relax
  \@folio@voffset=.55in\relax
  \def\@folio@max{10}
\fi
```

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

```
\def\@folioblob{\@tempcnta=0\@acmArticleSeq\relax
  \ifnum\@tempcnta=0\relax\else
```

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

```
  \loop
     \ifnum\@tempcnta>\@folio@max\relax
      \advance\@tempcnta by - \@folio@max
   \repeat
```

```
    \advance\@tempcnta by -1\relax
    \@tempdima=\@folio@ht\relax
    \multiply\@tempdima by \the\@tempcnta\relax
    \advance\@tempdima by -\@folio@voffset\relax
    \begin{picture}(0,0)
    \makebox[\z@]{\raisebox{-\@tempdima}{%
        \rlap{%
          \raisebox{-0.45\@folio@ht}[\z@][\z@]{%
            \rule{\@folio@wd}{\@folio@ht}}}%
        \parbox{\@folio@wd}{%
          \centering
          \textcolor{white}{\LARGE\sffamily\bfseries\@acmArticle}}}}
  \end{picture}\fi}

```

`firstpagestyle` The page style for the first page only.

```
\AtBeginDocument{%
\fancypagestyle{firstpagestyle}{%
  \fancyhf{}%
  \renewcommand{\headrulewidth}{\z@}%
  \renewcommand{\footrulewidth}{\z@}%
  \if@ACM@journal@bibstrip
    \ifcase\ACM@format@nr
    \relax % manuscript
      \fancyhead[L]{\ACM@linecountL}%
      \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
      \if@ACM@nonacm\else%
        \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
      \fi%
    \or % acmsmall
      \if@ACM@nonacm\else%
     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
        \@acmNumber, Article \@acmArticle.  Publication date:
        \@acmPubDate.}%
      \fi%
      \fancyhead[LE]{\ACM@linecountL\@folioblob}%
      \fancyhead[LO]{\ACM@linecountL}%
      \fancyhead[RO]{\@folioblob}%
      \fancyheadoffset[RO,LE]{0.6\@folio@wd}%
    \or % acmlarge
      \if@ACM@nonacm\else%
     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
```

```
        \@acmNumber, Article \@acmArticle.  Publication date:
        \@acmPubDate.}%
      \fi%
      \fancyhead[RO]{\@folioblob}%
      \fancyhead[LE]{\ACM@linecountL\@folioblob}%
      \fancyhead[LO]{\ACM@linecountL}%
      \fancyheadoffset[RO,LE]{1.4\@folio@wd}%
    \or % acmtog
      \if@ACM@nonacm\else%
     \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
        \@acmNumber, Article \@acmArticle.  Publication date:
        \@acmPubDate.}%
      \fi%
      \fancyhead[L]{\ACM@linecountL}%
      \fancyhead[R]{\ACM@linecountR}%
    \else % Conference proceedings
      \fancyhead[L]{\ACM@linecountL}%
      \fancyhead[R]{\ACM@linecountR}%
      \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
    \fi
  \else
    \fancyhead[L]{\ACM@linecountL}%
    \fancyhead[R]{\ACM@linecountR}%
    \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
  \fi
  \if@ACM@timestamp
    \ifnum\ACM@format@nr=0\relax % Manuscript
    \fancyfoot[LO,RE]{\ACM@timestamp\quad
      \if@ACM@nonacm\else
        \footnotesize Manuscript submitted to ACM
      \fi}
    \else
    \fancyfoot[LO,RE]{\ACM@timestamp}
    \fi
  \fi
}}
```

3.18 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.

```
\def\ACM@NRadjust#1{%
 \begingroup
  \expandafter\ifx\csname Sectionformat\endcsname\relax
  % do nothing when  \Sectionformat  is unknown
   \def\next{\endgroup #1}%
 \else
  \def\next{\endgroup
   \let\realSectionformat\Sectionformat
   \def\ACM@sect@format@{#1}%
   \let\Sectionformat\ACM@NR@adjustedSectionformat
 %%  next lines added 2018-06-17 to ensure section number is styled
   \let\real@adddotafter\@adddotafter
   \let\@adddotafter\ACM@adddotafter
   #1{}% imposes the styles, but nullifies  \MakeUppercase
   \let\@adddotafter\real@adddotafter
  }%
 \fi \next
}
```

\ACM@NR@adjustedSectionformat

```
\def\ACM@NR@adjustedSectionformat#1#2{%
 \realSectionformat{\ACM@sect@format{#1}}{#2}%
 \let\Sectionformat\realSectionformat}
\DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
\def\ACM@sect@format@null#1{#1}
\let\ACM@sect@format@\ACM@sect@format@null
\AtBeginDocument{%
 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
  \let\LTX@adddotafter\@adddotafter
 \fi
}
```

\ACM@adddotafter

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

Sectioning is different for different levels

```
\renewcommand\section{\@startsection{section}{1}{\z@}%
  {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
```

```
  {.25\baselineskip}%
  {\ACM@NRadjust\@secfont}}
\renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
  {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {.25\baselineskip}%
  {\ACM@NRadjust\@subsecfont}}
\renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}
\renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\ACM@NRadjust{\@parfont\@adddotafter}}}
\newcommand\noindentparagraph{\@startsection{paragraph}{4}{\z@}%
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\ACM@NRadjust{\@parfont}}}

\renewcommand\part{\@startsection{part}{9}{\z@}%
  {-10\p@ \@plus -4\p@ \@minus -2\p@}%
  {4\p@}%
  {\ACM@NRadjust\@parfont}}
```

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

```
\def\section@raggedright{\@rightskip\@flushglue
  \rightskip\@rightskip
  \leftskip\z@skip
  \parindent\z@}
```

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

```
\def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
\def\@subsecfont{\sffamily\bfseries\section@raggedright}
\def\@subsubsecfont{\sffamily\itshape}
\def\@parfont{\itshape}
\setcounter{secnumdepth}{3}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\sffamily\large\section@raggedright}
\or % acmtog
 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\sffamily\large\section@raggedright}
\or % sigconf
 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\bfseries\Large\section@raggedright}
\or % siggraph
 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
```

```
 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
\or % sigplan
 \def\@secfont{\bfseries\Large\section@raggedright}
 \def\@subsecfont{\bfseries\section@raggedright}
 \def\@subsubsecfont{\bfseries\section@raggedright}
 \def\@parfont{\bfseries\itshape}
 \def\@subparfont{\itshape}
\or % sigchi
 \setcounter{secnumdepth}{1}
 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\or % sigchi-a
 \setcounter{secnumdepth}{0}
 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\fi
```

`\@adddotafter` Add punctuation after a sectioning command

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

`\@addspaceafter` Add space after a sectioning command

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

3.19 TOC lists

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

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

3.20 Theorems

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

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

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

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

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

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

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

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

Customization of the `acmplain` theorem style:

```
\ifcase\ACM@format@nr
\relax % manuscript
```

```
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@acmplainbodyfont{\itshape}
  \def\@acmplainindent{\z@}
  \def\@acmplainheadfont{\bfseries}
  \def\@acmplainnotefont{\normalfont}
\or % sigchi
\or % sigchi-a
\fi
```

acmplain The acmplain theorem style

```
\newtheoremstyle{acmplain}%
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space above
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space below
  {\@acmplainbodyfont}% body font
  {\@acmplainindent}% indent amount
  {\@acmplainheadfont}% head font
  {.}% punctuation after head
  {.5em}% spacing after head
  {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec
```

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

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

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

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

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

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

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

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

Customization of the acmdefinition theorem style:

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@acmdefinitionbodyfont{\normalfont}
```

```
  \def\@acmdefinitionindent{\z@}
  \def\@acmdefinitionheadfont{\bfseries}
  \def\@acmdefinitionnotefont{\normalfont}
\or % sigchi
\or % sigchi-a
\fi
```

acmdefinition The acmdefinition theorem style

```
\newtheoremstyle{acmdefinition}%
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space above
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space below
  {\@acmdefinitionbodyfont}% body font
  {\@acmdefinitionindent}% indent amount
  {\@acmdefinitionheadfont}% head font
  {.}% punctuation after head
  {.5em}% spacing after head
 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec
```

Make acmplain the default theorem style.

```
\theoremstyle{acmplain}
```

Delay defining the theorem environments until after other packages have been loaded. In particular, the cleveref package must be loaded before the theorem environments are defined in order to show the correct environment name (see https://github.com/borisveytsman/acmart/issues/138). The acmthm option is used to suppress the definition of any theorem environments. Also, to avoid obscure errors arising from these environment definitions conflicting with environments defined by the user or by user-loaded packages, we only define environments that have not yet been defined.

```
\AtEndPreamble{%
  \if@ACM@acmthm
  \theoremstyle{acmplain}
  \@ifundefined{theorem}{%
  \newtheorem{theorem}{Theorem}[section]
  }{}
  \@ifundefined{conjecture}{%
  \newtheorem{conjecture}[theorem]{Conjecture}
  }{}
  \@ifundefined{proposition}{%
  \newtheorem{proposition}[theorem]{Proposition}
  }{}
  \@ifundefined{lemma}{%
  \newtheorem{lemma}[theorem]{Lemma}
  }{}
  \@ifundefined{corollary}{%
  \newtheorem{corollary}[theorem]{Corollary}
  }{}
```

```
  \theoremstyle{acmdefinition}
  \@ifundefined{example}{%
  \newtheorem{example}[theorem]{Example}
  }{}
  \@ifundefined{definition}{%
  \newtheorem{definition}[theorem]{Definition}
  }{}
  \fi
  \theoremstyle{acmplain}
}
```

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

```
\def\@proofnamefont{\scshape}
```

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

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

Customization of the proof environment.

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@proofnamefont{\itshape}
  \def\@proofindent{\noindent}
\or % sigchi
\or % sigchi-a
\fi
```

`proof` We want some customization of the proof environment.

```
\renewenvironment{proof}[1][\proofname]{\par
  \pushQED{\qed}%
  \normalfont \topsep6\p@\@plus6\p@\relax
  \trivlist
  \item[\@proofindent\hskip\labelsep
        {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
}{%
  \popQED\endtrivlist\@endpefalse
}
```

3.21 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.

```
\AtEndPreamble{%
  \if@ACM@pbalance
```

```
    \global\@ACM@balancefalse
    \ifcase\ACM@format@nr
    \relax % manuscript
       \or % acmsmall
       \or % acmlarge
       \or % acmtog
          \RequirePackage{pbalance}%
       \or % sigconf
          \RequirePackage{pbalance}%
       \or % siggraph
          \RequirePackage{pbalance}%
       \or % sigplan
          \RequirePackage{pbalance}%
       \or % sigchi
          \RequirePackage{pbalance}%
       \or % sigchi-a
    \fi
  \fi
  \if@ACM@balance
    \ifcase\ACM@format@nr
    \relax % manuscript
         \global\@ACM@balancefalse
       \or % acmsmall
         \global\@ACM@balancefalse
       \or % acmlarge
         \global\@ACM@balancefalse
       \or % acmtog
          \RequirePackage{balance}%
       \or % sigconf
          \RequirePackage{balance}%
       \or % siggraph
          \RequirePackage{balance}%
       \or % sigplan
          \RequirePackage{balance}%
       \or % sigchi
          \RequirePackage{balance}%
       \or % sigchi-a
          \global\@ACM@balancefalse
    \fi
  \fi
}
\AtEndDocument{%
  \if@ACM@balance
  \if@twocolumn
  \balance
  \fi\fi}
```

3.22 Acknowledgments

\acksname

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

\acks This is a comment-like structure

```
\specialcomment{acks}{%
  \begingroup
  \section*{\acksname}
  \phantomsection\addcontentsline{toc}{section}{\acksname}
}{%
  \endgroup
}
```

\grantsponsor We just typeset the name of the sponsor

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

\grantnum

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

3.23 Conditional typesetting

We use the comment package for conditional typesetting:

```
\AtEndPreamble{%
\if@ACM@screen
  \includecomment{screenonly}
  \excludecomment{printonly}
\else
  \excludecomment{screenonly}
  \includecomment{printonly}
\fi
\if@ACM@anonymous
  \excludecomment{anonsuppress}
  \excludecomment{acks}
\else
  \includecomment{anonsuppress}
\fi}
```

3.24 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’.

```
\newcommand\showeprint[2][arxiv]{%
  \def\@tempa{#1}%
  \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
  \def\@tempb{arxiv}%
  \ifx\@tempa\@tempb\relax
```

```
    arXiv:\href{https://arxiv.org/abs/#2}{#2}%
  \else
    \def\@tempb{arXiv}%
    \ifx\@tempa\@tempb\relax
      arXiv:\href{https://arxiv.org/abs/#2}{#2}%
    \else
      arXiv:#2%
    \fi
  \fi}
```

3.25 End of Class

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

```
\let\@vspace@orig=\@vspace
\let\@vspacer@orig=\@vspacer
\apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
    only be used to provide space above/below surrounding
    objects}}{}{}
\apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
    only be used to provide space above/below surrounding
    objects}}{}{}
\let\@vspace@acm=\@vspace
\let\@vspacer@acm=\@vspacer
```

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

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

\normalsize\normalfont\frenchspacing
⟨/class⟩
```

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Change History

1.48
General: Added prologue option to xcolor 46
Bib code cleanup (Zack Weinberg) 33
Documentation update (siggraph) . 33
1.49
General: New journal: DTRAP 33
1.53
General: New journals: PACMCGIT, TIOT, TDSCI 33
Rearranged docs 33
1.54
General: Moved footnote stuff before hyperref call (Ross Moore) 33
1.56
General: Documented \Description 33
1.57
General: Booktabs package is now the default 33
1.58
General: Changes in samples (Enrico Gregorio) 33
New journal: HEALTH. TDS is renamed to TDSCI 33
1.60
\if@ACM@urlbreakonhyphens: introduced macro 34
General: New option: urlbreakonhyphens 33
1.62
General: New journal: TELO 33
1.63
General: New journal: FACMP 33
New journal: TQUANT 33
1.63a
General: Move: TQUANT to TQC . . 33
1.64
General: Putting abstract after \maketitle now causes an error . 33
1.65
General: New journal: DGOV 33
1.66
\@mkauthorsaddresses: Added warning for missing addresses . . 91
\ccsdesc@parse: Added warning for missing concepts 71
\if@ACM@printacmref: Added warning for longer papers 69
\keywords: Added warning for missing keywords 69
General: ACM reference format is now mandatory for papers over one page; CCS concepts and keywords are now mandatory for papers over two pages 33
Authors' addresses are mandatory for journal articles 33
1.69
\vspace: Added the changed command to avoid grouping . . . 108
1.70
General: Name change for TDS 56
1.71
General: Bibliography change: volume for @inproceedings is now in brackets together with series . . . 33
LuaTeX now uses the OTF versions of fonts 33
Retired sigchi and sigchi-a 33
1.75
General: Documentation update . . . 33

v1.00
General: First released version 33
v1.01
General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/acmart/issues/1) 33
Defined ACM colors 33
Explicitly put draft option (closes https://github.com/borisveytsman/acmart/issues/4) 37
Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/acmart/issues/5) 33
v1.02
General: Added TOPS and TSC (closes https://github.com/borisveytsman/acmart/issues/12) 33

Documentation changes (closes https://github.com/borisveytsman/acmart/issues/13) 33
v1.03
\@formatdoi: Added macro 74
\if@ACM@authorversion: Added macro 35
\maketitle: Added special case of authorversion 77
General: Added anonsuppress environment 33
Added authorversion option (closes https://github.com/borisveytsman/acmart/issues/9) 33
v1.04
\acmArticleSeq: Name change by Matthew Fluet 67
\acmDOI: Name change by Matthew Fluet 68
\acmISBN: Name change by Matthew Fluet 68
General: Updated bibliography for siggraph 33
v1.05
General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib 33
Patched \setcitestyle command; closes https://github.com/borisveytsman/acmart/issues/19 33
v1.06
\@ACM@badge@skip: Added macro . . 68
\@ACM@badge@width: Added macro . 68
\@ACM@title@width: Added macro . 68
\@mktitle@i: Added processing badges 83
Made generic 83
\@mktitle@ii: Now this macro is obsolete 83
\@mktitle@iii: Added processing badges 83
Made more generic 83
\@mktitle@iv: Made more generic . 84
\@printtopmatter: Added processing badges 80
\@subtitlefont: Added macro 82
\@titlefont: Added macro 82
\acmBadgeL: Added macro 68
\acmBadgeR: Added macro 68
\if@ACM@badge: Added macro 68
v1.07
\maketitle: Corrected a bug with abstract footnotes 77
Corrected a bug with permssion and footnotes order 77
v1.08
General: SIGPLAN reformatting by Matthew Fluet 33
Typos corrected (Tobias Pape) . . . 33
v1.09
General: Revert SIGPLAN caption rules 33
v1.10
\maketitle: Corrected a bug with doi in manuscript and author vertsion, https://github.com/borisveytsman/acmart/issues/36 77
General: Changes of 'licensedothergov' wording 72
standardpagestyle: Reversed folios location 95
v1.11
General: Customization of ACM theorem styles and proof environment by Matthew Fluet . . 33
v1.12
\@marginfigure: Now centering by default 53
\@margintable: Now centering by default 53
\@parfont: Moved to \section@raggedright 101
\copyrightpermissionfootnoterule: Added macro 49
\descriptionlabel: Redefined 56
\footnoterule: Made shorter 49
\if@ACM@natbib@override: Added macro 36
\if@ACM@newfonts: Added macro . . 50
\maketitle: Moved thankses to copyrightpermission box 77
\section@raggedright: Introduced macro 101
General: Added graceful behavior when libertine fonts are absent . . 50
Documentation updates 33

v1.13
\@mpfootnotetext: Made minipage footnotes centered . . . 44
\bibliographystyle: Redefined macro . . . 46
\bibstyle@acmauthoryear: Added macro . . . 41
\bibstyle@acmnumeric: Added macro . . . 41
\if@ACM@printfolios: Added macro 69
General: Font adjustments for acmsmall . . . 86
Increased font size for ACM Large 38
Print bibliographic information by default for the proceedings . . . 70
standardpagestyle: Added headers for sigs . . . 95
Expanded headers for sigchi-a . . . 95
Suppressed folios if sig . . . 95
v1.14
\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use . . . 41
\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use . . 41
General: \citestyle updates (Matthew Fluet) . . . 33
Patched \citestyle . . . 39
v1.15
\@ACM@addtoaddress: Added macro 84
\@mkauthors@iii: New authors system . . . 88
\@shortauthors: Introduced macro . 95
\@typeset@author@bx: Moved to separate macro . . . 88
\acks: Added macro . . . 107
\affiliation: Added code for author groups . . . 65
\author: Added code for author groups . . . 64
\city: Added macro . . . 85
\country: Added macro . . . 85
\department: Added macro . . . 85
\grantnum: Added macro . . . 107
\grantsponsor: Added macro . . . 107
\if@insideauthorgroup: Introduced macro . . . 64
\institution: Added macro . . . 85
\num@authorgroups: Renamed . . . 63
\orcid: Introduced macro . . . 66
\position: Added macro . . . 85
\postcode: Added macro . . . 85
\state: Added macro . . . 85
\streetaddress: Added macro . . . 85
standardpagestyle: Better handling of anonymous mode . . . 95
v1.16
\@headfootfont: Added macro . . . 95
General: Formatting header/footer (Matthew Fluet) . . . 33
standardpagestyle: Customize header/footer text font . . . 95
v1.17
\@makefnmark: Redefined . . . 44
\@mkauthors: TOG now uses the same authors block as other journals . . 85
\@mkauthors@ii: Deleted . . . 88
\@mkbibcitation: Added \nobreak 92
Changed format for sigs . . . 92
\acmArticle: The default is now numerical . . . 67
\acmMonth: The default must be numerical. Closes #50. . . . 67
\acmNumber: The default is now numerical . . . 67
\acmVolume: The default is now numerical . . . 67
\acmYear: The default is now numerical . . . 67
\description: Decreased indent . . . 56
\grantnum: Added url . . . 107
\grantsponsor: Renamed . . . 107
\if@ACM@printacmref: Renamed from \if@ACM@printbib . . . 69
General: Slightly decreased margins for sigs . . . 47
standardpagestyle: Added paper title to sigs . . . 95
v1.18
\@mkauthors@i: Now we andify affiliations . . . 87
\@typeset@author@line: Added macro . . . 86
General: Natbib is now the default for all formats . . . 33
v1.19
\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet) . 92
\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet) 107

General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet) . . . 33
Include 'References' in PDF bookmarks (Matthew Fluet) 39
v1.20
\@mkabstract: Deleted spurious space 92
General: Bug fixes for bst 33
v1.21
\showeprint: Added macro 107
v1.22
General: More bibliography changes for Aptara 33
v1.23
General: Add PACMPL journal option 33
v1.24
General: Add IMWUT journal option 56
v1.25
General: Updated PACMPL 56
v1.26
General: Corrected \shortcite bug . 33
Documentation typos fixed (thanks to Stephen Spencer) 33
v1.27
\if@ACM@printccs: Typo corrected . 69
v1.28
\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato) 71
General: Corrected option natbib behavior 41
Got rid of warnings in pdf keywords 45
v1.29
\@mkabstract: Removed spurious indentation (John Wickerson) . . . 92
\ccsdesc@parse: Add spacing after bullet and around rightarrow; semicolon separators no longer in bold/italic (John Wickerson) 71
General: Increased head to 13pt 47
standardpagestyle: Corrected printfolios (Matthew Fluet) 95
v1.30
\department: Added optional parameter 85
General: Added \frenchspacing . . . 108
Bibtex style now recognizes https:// in doi 33
Switched to T1: looks like libertine has problems with \l in OT1 . . . 50
Updated IMWUT and PACMPL . . 56
v1.31
\@additionalaffiliation: Added macro 65
\@mkbibcitation: Disabled linebreak 92
\@startsection: Added \tochangmeasure 41
Rededined macro 43
\@textbottom: Redefined 49
\acmMonth: The default now is the current month (Matteo Riondato) 67
\acmYear: The default now is the current year (Matteo Riondato) . . 67
\additionalaffiliation: Added macro 65
\l@subsection: Redefined macro . . 44
\l@subsubsection: Redefined macro 44
General: Documentation changes . . . 33
v1.32
\@formatdoi: New doi format 74
General: Added POMACS journal option 33
Format siggraph is now obsolete . 33
v1.33
\@ACM@addtoaddress: Added obeypunctuation code 84
\@mkauthors@i: Added obeypunctuation code 87
\@mkauthors@iii: Added obeypunctuation code 88
\@mkauthors@iv: Added obeypunctuation code 90
\@subtitlefont: Added \normalsize 82
\ACM@linecountL: Renamed macro . 94
\ACM@linecountR: Added macro . . . 94
\ACM@timestamp: Added current page number 95
Added macro (Michael D. Adams) . 95
Added submission id 95
\acmSubmissionID: Added macro . . 67
\city: Added obeypunctuation code 85
\country: Added obeypunctuation code 85
\department: Added obeypunctuation code 85
\if@ACM@affiliation@obeypunctuation: Added macro 65

\if@ACM@authordraft: Added macro 36
\if@ACM@natbib@override: Deleted macro 36
\if@ACM@timestamp: Added macro (Michael D. Adams) 36
\institution: Added obeypunctuation code 85
\maketitle: Fixed the bug with figures on top and bottom of the title page, thanks to David Epstein 77
\position: Added obeypunctuation code 85
\postcode: Added obeypunctuation code 85
\state: Added obeypunctuation code 85
\streetaddress: Added obeypunctuation code 85
General: Added acmart-preload-hook 33
Added cmap and glyphtounicode . 50
BibTeX comma before articleno bug corrected 33
BibTeX crossref bug corrected . . . 33
BibTeX numpages bug corrected . 33
Documentation updates 33
Moved \citename definition for non-natbib bibliography, so a package may redefine it 45
Switched to Type 1 fonts for libertine even if OTF-capable engine is used (Kai Mindermann) . 50
firstpagestyle: Added right linecount for two-column formats 98
Added timestamp (Michael D. Adams) 98
standardpagestyle: Added right linecount for two-column formats 95
Added timestamp (Michael D. Adams) 95
v1.34
\@mkbibcitation: Deleted DOI from doi numbers 92
\ACM@linecount@bx: Rulers now are continuous 93
\ACM@linecountL: Rulers now are continuous 94
\ACM@linecountR: Rulers now are continuous 94
\maketitle: Added date to the bibstrip in conf proceedings 77
Deleted 'DOI' from doi numbers . 77
Rearranged bibstrip 77
The \terms command is now obsolete 77
\terms: The \terms command now just produces a warning 68
v1.35
\bibstyle@acmauthoryear: Square brackets for author-year style . . . 41
General: BibTeX bug fixed: et al. . . . 33
If the copyright is set to usgov or rigtsretained, the price is suppressed 72
v1.36
\@ACM@authorsperrow: Added macro 70
\@mkauthors@iii: Added authorsperrow overrride 88
\@mkauthors@iv: Added authorsperrow overrride 90
\if@ACM@authordraft: Corrected typo, thanks to bargteil 36
General: Added PACMHCI journal options 56
Added the possibility to adjust number of author boxes per row in conference formats 33
v1.37
\description: Reduce list indentation (Matthew Fluet) 56
\descriptionlabel: Reduce list indentation (Matthew Fluet) 56
\normalparindent: Set \normalparindent (Matthew Fluet) 48
General: Reduce list indentation (Matthew Fluet) 55
Set \normalparindent; Reduce list indentation (Matthew Fluet) 33
v1.38
General: Increase default font size for SIGPLAN 33, 38
v1.39
\@@authornotemark: Added macro . 91
\authornotemark: Added macro . . . 67
v1.40
\@copyrightowner: Added new copyright version: licensedcagov . 73
\@copyrightpermission: Added new copyright version: licensedcagov . 74
\@mkauthors@i: Switched to MakeTextUppercase 87

\@parfont: Switched to MakeTextUppercase 101
\ACM@linecount@bx: Work around a bug in xcolor: looks like cmyk colors in boxes do not work 93
\ccdesc@parse@finish: Added macro 71
\city: We now do not print this even in SIG 85
\country: Fixed bugs with extra spaces 85
\l@subsection: Redefined macro . . 44
\postcode: We now do not print this even in SIG 85
\state: We now do not print this even in SIG 85
\streetaddress: We now do not print this even in SIG 85
General: Added 'textcase' package . . 39
Added heightrounded to geometry 47
Added new copyright version: licensedcagov 33
Added package cleveref 33
Added Ross Moore code for glyphtounicode 50
Bibliography changes 33
v1.41
General: Added new badges 33
v1.42
General: Deleted ACM badges 33
v1.43
\@startsection: Added \makeatletter 43
\country: Added comma before country for journals 85
v1.44
\@acmBooktitle: Added macro 63
\@acmEditors: Added macro 63
\@editorsAbbrev: Added macro . . . 63
\@folioblob: Suppress the blob if acmArticleSeq is empty 97
\@mkbibcitation: If the paper has just one page, use 'page' instead of 'pages' 92
\ACM@restore@pagestyle: Added macro 93
\acmArticle: The default is now empty 67
\acmArticleSeq: Now acmArticle might be empty 67
\acmBooktitle: Added macro 63
\editor: Added macro 63
\if@ACM@acmthm: Added macro 34
\maketitle: Empty DOI or ISBN are not printed (by Michael Ekstrand) 77
General: Added package refcount . . . 33
Deleted package cleveref 33
Put theorem defs in a separate style 33
v1.45
\@folioblob: Switched \bfseries\sffamily to \sffamily\bfseries 97
\@parfont: Switched \bfseries\sffamily to \sffamily\bfseries 101
\@titlefont: Switched \bfseries\sffamily to \sffamily\bfseries 82
v1.46
\@mkauthorsaddresses: Introduced macro 91
\@mkbibcitation: Added subtitle . . 92
\@printendtopmatter: Made it \par\bigskip uniformly 93
\@printtopmatter: Deleted rule . . . 80
\@setauthorsaddresses: Introduced macro 93
\ACM@linecount@bx: Rearranged the code to get rid of spurious underfull messages (Benjamin Byholm) 93
\author: Started counting authors . . 64
\authorsaddresses: Introduced macro 66
\country: Corrected spacing for institution 85
\if@ACM@acmthm: Modified description 34
\liningnums: Workaround for compatibility with fontspec 51
\maketitle: Added authors' addresses 77
Thankses go before authors' addresses 77
\num@authors: Introduced macro . . 63
General: Added etoolbox 33
Bst file bug fixes: label width is calculated correctly 33
Delayed hypersetup since journal options may change screen mode 45
PACM now set screen to true 56

Restore theorem defs to class file . 33
v1.47
General: New journal: THRI 33
v1.48
\@headfootfont: Deleted unnecessary switch (Michael D. Adams) 95
\@mkabstract: Removed spurious indentation if abstract is followed by an empty line 92
\ACM@timestamp: Fromatting change (Michael D. Adams) 95
\if@ACM@review: Review mode now switches on folios 35
\maketitle: Added acmart and version info to pdfcreator tag . . . 77
Added language and doctitle attributes to PDF (Andreas Reichinger) 77
Suppressed empty DOI (Serguei Mokhov) 77
General: \citeyear no longer behaves like \citeyearpar 45
Code prettying (Michael D. Adams) 33
Initial support for Biblatex (Daniel Thomas) 33
Misc entries in the bibliography no longer produce a separate date . . 33
Typos fixed (Jamie Davis) 33
v1.50
\@copyrightpermission: New copyright statements for iw3c2w3[g] 74
v1.51
General: Corrected the bug with price suppression 72
Suppress price if the copyright is set to iw3c2w3 or iw3c2w3g 72
XeTeX now uses OTF fonts (Joachim Breitner) 50
firstpagestyle: We now use journal abbreviation for footers 98
standardpagestyle: We now use journal abbreviation for footers . . 95
v1.52
\@copyrightowner: Rewording of licenses 73
\@copyrightpermission: Another rewording of copyright statements for iw3c2w3[g] 74
v1.53
General: Added PACMCGIT, TIOT, TDSCI 56
v1.54
\@mkbibcitation: Bug corrected (Ross Moore) 92
\@shortauthors: Added submission id in anonymous mode 95
\ACM@NR@adjustedSectionformat: Added macro 100
\ACM@NRadjust: Added macro 99
\ACM@adddotafter: Added macro . . 100
\author: Added submission id in anonymous mode 64
\if@ACM@nonacm: Added macro 35
General: Added Ross's patch for sectioning 100
Deleted indent for subsubsection . 100
XeTeX now uses T1 encoding . . . 50
v1.55
\@mkbibcitation: Bug corrected . . . 92
\maketitle: Fixes topnum 77
General: Now we use purple color for links 45
Table captions for SIGCHI now use the same font size as figure captions (Luis Leiva) 52
Typo corrected (Zack Weinberg) . 39
v1.56
\@marginfigure: Added checking for description 53
\@mkteasers: Added check for description 92
\Description: Added macro 51
\acksname: Added macro (Philip Quinn) 107
\ccsdesc@parse: End the concepts list with a period (Philip Quinn) . 71
\if@Description@present: Added macro 51
\if@undescribed@images: Added macro 51
General: Looks like XeTeX requires explicit monotype font declaration 50
Make two-column layouts flush (Philip Quinn) 47
v1.57
\ACM@origbaselinestretch: Added check whether the user changed \baselinestretch 108

\author: Added warning if \author has comma 64
\email: Added warning if \author has comma 65
\if@ACM@balance: Added macro . . . 35
\vspace: Added warning 108
v1.58
\@dblfloat: Deleted spurious \vspace warning 54
\@marginfigure: Deleted spurious \vspace warning 53
\@margintable: Deleted spurious \vspace warning 53
\@mkbibcitation: Deleted spurious \vspace warning 92
\@printendtopmatter: Deleted spurious \vspace warning 93
\@sidebar: Deleted spurious \vspace warning 53
\maketitle: Original \vspace inside \maketitle 77
\vspace: Preserved old versions as \@vspace@orig and \@vspace@orig 108
General: Added HEALTH. TDSCI is renamed to TDS 56
Suppressed \addtocounter in pdf subject 45
v1.59
\acmConference: Setting \@ACM@journal@bibstrip 62
\acmJournal: Setting \@ACM@journal@bibstrip 62
\if@ACM@journal@bibstrip: Introduced macro 37
firstpagestyle: Added logic for conference papers using journal format 98
Moved page styles to \AtBeginDocument 98
standardpagestyle: Added logic for conference papers using journal format 95
Moved page styles to \AtBeginDocument 95
v1.60
\@headfootfont: Moved to footnotesize 95
v1.61
\@typeset@author@bx: Added \normalbaselines 88
v1.64
\ACM@linecount@bx: Bug fix: made the spacing on the left and the right size equal 93
\if@ACM@maketitle@typeset: Introduced macro 56
\maketitle: Added a switch setting to show that \maketitle is typeset . 77
v1.65
\@mkauthorsaddresses: Deleted cs@addpunct 91
v1.66
\@specialsection: Suppress warnings about \vspace 80
General: Patching algorithm and algorithm* to prevent spurious space warnings 51
v1.67
\@parfont: Deleted redefinitions of sections 101
\@specialsection: Paragraph inside group does not print its argument. Added a bugfix 80
General: Patching lstlisting and lstlisting* to prevent spurious space warnings 51
v1.68
\@specialsection: Deleted grouping altogether 80
General: New command for unindent paras 100
v1.69
\@printendtopmatter: Deleted grouping 93
\@specialsection: Changed dot to colon for sigplan 80
\ACM@linecountR: Do not increase numbers in one column format . . 94
\ccsdesc@parse: Use math right arrow in text 71
General: No dots for unindented paragraphs 100
v1.71
\l@subsubsection: Bug fixed (thanks to Andrew Black) 44

v1.72
\author: Added \detokenize (Kuldeep S. Meel) 64
\maketitle: Do not andify authors for pdf metadata (Scott Pakin) . . . 77
General: Added hyperxmp 44
v1.73
\@ACM@checkaffil: Added macro . . 87
\@ACM@resetaffil: Added macro . . 87
\@mkauthors@i: Check the presence of required elements for affiliations 87
\@mkauthors@iii: Check the presence of required elements for affiliations 88
\@mkauthors@iv: Check the presence of required elements for affiliations 90
\city: Check the presence in affil . . 85
\country: Check the presence in affil 85
\if@ACM@citypresent: Added macro 87
\if@ACM@countrypresent: Added macro 87
\if@ACM@instpresent: Added macro 87
\institution: Check the presence in affil 85
\maketitle: Do not check again the presense of address fields 77
General: Patching minted and minted* to prevent spurious space warnings 51
v1.74
General: Changed the order of font loading 50
v1.75
\@ACM@checkaffil: Changed warning to error for country 87
\@beginmaketitlehook: Introduced macro 77
\AtBeginMaketitle: Introduced macro 77
\maketitle: Added \@beginmaketitlehook 77
v1.76
\author: Added code for orcid links . 64
\if@ACM@pbalance: Added macro . . 35
\maketitle: Put \par inside group for keywords 77
\orcid: Added code for orcid links . . 66
General: Moved before hyperref, see https://github.com/borisveytsman/acmart/issues/425 44
standardpagestyle: Fixed bug with no line numbers for nonacm 95
v1.77
\@mkauthorsaddresses: New separator of institutions 91

Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

Symbols

\$ 1865, 1869
\- 504
\@ 1615, 1627, 1630, 1633, 1638, 1718, 1739, 1752
\@@authornotemark 1395, 2391
\@@par 372, 429
\@ACM@addtoaddress . 2110, 2136, 2137, 2139
\@ACM@authorsperrow 1479, 2270, 2271, 2323, 2324
\@ACM@badge@skip 1426, 1973, 2050, 2054, 2060, 2069, 2079, 2085, 2094
\@ACM@badge@width 1423, 1972, 1977, 2049, 2053, 2059, 2071, 2078, 2080, 2083, 2095, 2098
\@ACM@badgefalse . . . 1422
\@ACM@badgetrue 1428, 1433
\@ACM@balancefalse 2946, 2967, 2969, 2971, 2983
\@ACM@checkaffil 1895, 2211, 2242, 2247, 2306, 2311, 2351, 2356
\@ACM@citypresentfalse 2208
\@ACM@citypresenttrue . . . 2124, 2136, 2203
\@ACM@commabox 2110, 2114, 2115
\@ACM@countrypresentfalse 2209
\@ACM@countrypresenttrue . . . 2127, 2139, 2205
\@ACM@institution@separator . . . 2373, 2374, 2379
\@ACM@instpresentfalse 2207
\@ACM@instpresenttrue . . . 2122, 2131, 2201
\@ACM@journal@bibstripfalse 212, 1251
\@ACM@journal@bibstriptrue 210, 1237
\@ACM@journalfalse . 198, 200, 202, 204, 206
\@ACM@journaltrue 190, 192, 194, 196
\@ACM@labelwidth . . . 871, 874, 882, 887, 913
\@ACM@maketitle@typesetfalse 920
\@ACM@maketitle@typesettrue 1788
\@ACM@manuscriptfalse 185
\@ACM@manuscripttrue 183
\@ACM@newfontsfalse 705, 708, 711
\@ACM@newfontstrue . 702
\@ACM@printacmreffalse 93
\@ACM@printfoliostrue 76
\@ACM@resetaffil . . . 2206, 2241, 2246, 2305, 2310, 2350, 2355
\@ACM@reviewtrue . . . 138
\@ACM@screentrue 1010, 1039, 1045, 1051, 1057
\@ACM@sigchiamodefalse 187
\@ACM@sigchiamodetrue 207
\@ACM@timestamptrue 137
\@ACM@title@width 1425, 2047, 2049, 2050, 2053, 2054, 2062, 2076, 2078, 2079, 2087
\@DeclareACMFormat . . . 38, 39, 40, 41, 42, 43, 44, 45, 46, 47
\@Description@presentfalse . . 747, 750, 823, 2397
\@Description@presenttrue 741, 744
\@M 372, 411, 429, 438
\@abstract 1453, 2405, 2412
\@acmArticle . . . 1401, 1404, 1864, 2423, 2424, 2545, 2548, 2568, 2578, 2589, 2669, 2688, 2698, 2708
\@acmArticlePage . . . 2544, 2562, 2563, 2572, 2575, 2582, 2586
\@acmArticleSeq 1403, 2652
\@acmBadgeL@image 1435, 1437, 1970, 1972, 2048, 2057, 2059, 2081, 2083
\@acmBadgeL@url . 1434, 1436, 1971, 2058, 2082
\@acmBadgeR@image 1430, 1432, 1975, 1977, 2052, 2068, 2071, 2096, 2098
\@acmBadgeR@url . 1429, 1431, 1976, 2070, 2097
\@acmBooktitle 1257, 1854, 2439
\@acmDOI . . 1419, 1856, 1859, 1866, 1870, 2447
\@acmEditors 1265, 1266, 1267, 1270, 2440, 2441
\@acmISBN 1417, 1868
\@acmMonth 1407, 1409, 1864
\@acmNumber 1399, 2436, 2568, 2578, 2589, 2688, 2698, 2708
\@acmPrice 1413, 1865, 1869
\@acmPubDate . . . 1409, 2436, 2568, 2578, 2589, 2689, 2699, 2709

\@acmSubmissionID 1291, 1292, 1311, 1312, 1415, 2525, 2526, 2536
\@acmVolume 1397, 2436, 2567, 2577, 2588, 2687, 2697, 2707
\@acmYear 1405, 1412, 1771, 1864, 2427
\@acmdefinitionbodyfont . . . 2861, 2873, 2885
\@acmdefinitionheadfont . . . 2863, 2875, 2887
\@acmdefinitionindent . . . 2862, 2874, 2886
\@acmdefinitionnotefont . . . 2864, 2876, 2890
\@acmownedfalse . 1566, 1569, 1572, 1578, 1582, 1585, 1588, 1591, 1597, 1600, 1604
\@acmownedtrue 1553, 1562, 1594
\@acmplainbodyfont . . . 2831, 2843, 2855
\@acmplainheadfont . . . 2833, 2845, 2857
\@acmplainindent 2832, 2844, 2856
\@acmplainnotefont . . . 2834, 2846, 2860
\@adddotafter 2745, 2746, 2748, 2760, 2775, 2779, 2828
\@additionalaffiliation 1337, 1338
\@addpunct . 2377, 2456, 2457, 2828, 2829, 2940
\@addspaceafter 2829
\@affiliationfont . . 2166, 2171, 2175, 2178, 2181, 2184, 2187, 2190, 2242, 2262
\@afterheading . 403, 1917
\@afterindentfalse 349, 1916
\@afterindenttrue . . 347
\@article@string 2423, 2436, 2444
\@author 1290, 1296, 1303, 2227, 2289, 2336, 2380
\@authorfont 2165, 2170, 2174, 2177, 2180, 2183, 2186, 2189, 2229, 2262
\@authornotemark 1387, 1393, 2390
\@authornotes 1384, 1388, 1808
\@authorsaddresses . 1363, 1816, 2385, 2457
\@auxout 540
\@begindocumenthook 536
\@beginmaketitlehook . . . 1782, 1785, 1787
\@botnum 1914
\@citestyle 281
\@classname 24, 26, 35, 51, 53, 54, 59, 61, 62, 67, 69, 70, 75, 78, 79, 84, 86, 87, 92, 98, 99, 103, 107, 112, 114, 115, 120, 122, 123, 128, 130, 131, 136, 140, 141, 152, 158, 164, 170, 236, 703, 706, 709, 746, 755, 758, 826, 1011, 1040, 1046, 1052, 1058, 1232, 1234, 1281, 1336, 1350, 1440, 1446, 1451, 1458, 1460, 1461, 1464, 1466, 1467, 1470, 1475, 1477, 1478, 1480, 1481, 1544, 2213, 2216, 2219, 2386, 2400, 2420, 3033, 3036, 3043
\@clubpenalty 417
\@concepts . 1516, 1528, 1542, 1880, 1882, 1899
\@copyrightowner 1609, 1840
\@copyrightpermission 1647, 1832
\@copyrightyear 1770, 1840, 1842
\@currbox . . . 852, 853, 854
\@currentaffiliation 2263, 2266, 2288, 2295, 2296, 2299, 2302, 2303, 2308, 2335, 2342, 2343, 2345, 2347, 2348, 2353
\@currentaffiliations 2195, 2196, 2197, 2199, 2225, 2237, 2238, 2244
\@currentauthors 2193, 2194, 2224, 2228, 2229, 2231, 2262, 2265, 2287, 2289, 2290, 2292, 2334, 2336, 2337, 2339, 2390, 2391
\@currentlabel . 456, 470
\@dblarg 358
\@dblfloat 835
\@department . . 1341, 1342
\@dotsep 2830
\@editorsAbbrev 1264, 1269, 2441
\@empty 214, 362, 1248, 1266, 1288, 1291, 1309, 1311, 1316, 1317, 1323, 1443, 1444, 1497, 1498, 1504, 1511, 1516, 1542, 1783, 1812, 1816, 1856, 1865, 1868, 1869, 1870, 1880, 1885, 1942, 1970, 1975, 2048, 2052, 2057, 2065, 2068, 2081, 2089, 2096, 2106, 2195, 2228, 2236, 2237, 2289, 2295, 2302, 2336, 2342, 2347, 2385, 2393, 2423, 2428, 2440, 2447, 2525, 2536, 2834, 2864, 3002, 3019
\@endfloatbox 838
\@endpefalse 2942

\@endwidefloatbox 838, 846
\@finalstrut ... 461, 474
\@float 840
\@flushglue 2789
\@fnsymbol 1798
\@folio@ht .....
2632, 2659, 2665, 2666
\@folio@max 2632, 2655, 2656
\@folio@voffset 2632, 2661
\@folio@wd 2632,
2666, 2667, 2694, 2704
\@folioblob 2652,
2691, 2693, 2701, 2702
\@footnotemark . 478, 1796
\@footnotemark@nolink
..... 478, 1796
\@footnotetext ....
..... 452, 479, 1797
\@footnotetext@nolink
..... 479, 1797
\@for 257
\@formatdoi 1646,
1859, 1866, 1870, 2447
\@fps 839
\@fpsadddefault 839
\@gobble 279, 323
\@hangfrom 371, 428
\@headfootfont . 2538,
2562, 2563, 2564,
2565, 2571, 2574,
2581, 2585, 2593,
2594, 2599, 2602,
2609, 2610, 2615, 2618
\@ifnextchar 1341
\@ifnotempty 1776
\@ifnum 295, 297
\@ifstar 356
\@ifundefined .....
2895, 2898, 2901,
2904, 2907, 2911, 2914
\@iiiparbox 670
\@input 440
\@insideauthorgroupfalse
..... 1279, 1331
\@insideauthorgrouptrue
..... 1286
\@journalCode .....
. 921, 1011, 1040,
1046, 1052, 1058, 1232
\@journalCode@nr ...
..... 921, 984, 1238
\@journalName .....
... 986, 990, 994,
998, 1002, 1006,
1013, 1017, 1021,
1025, 1029, 1033,
1036, 1042, 1048,
1054, 1060, 1064,
1068, 1071, 1075,
1079, 1081, 1083,
1087, 1089, 1093,
1097, 1101, 1105,
1109, 1113, 1117,
1121, 1125, 1129,
1133, 1137, 1141,
1145, 1149, 1153,
1157, 1160, 1164,
1167, 1172, 1176,
1180, 1184, 1188,
1192, 1196, 1200,
1204, 1208, 1212,
1216, 1220, 1224,
1228, 1239, 1240, 1852
\@journalNameShort .
987, 991, 995, 999,
1003, 1008, 1014,
1018, 1022, 1026,
1030, 1034, 1037,
1043, 1049, 1055,
1061, 1065, 1069,
1072, 1076, 1084,
1090, 1094, 1098,
1102, 1106, 1110,
1114, 1118, 1122,
1126, 1130, 1134,
1138, 1142, 1146,
1150, 1154, 1161,
1165, 1168, 1173,
1177, 1181, 1185,
1189, 1193, 1197,
1201, 1205, 1209,
1213, 1217, 1221,
1225, 1229, 1240,
2435, 2567, 2577,
2588, 2687, 2697, 2707
\@keywords . 1442, 1443,
1444, 1885, 1891, 1900
\@latex@error 325
\@lempty 1455, 2405
\@listI 895, 899
\@listi 892, 899
\@listii 900
\@listiii 903
\@listiv 905
\@listv 907
\@listvi 909
\@m 360
\@makefnmark ... 451,
476, 1800, 1805, 1809
\@makefntext .....
.. 451, 460, 473, 1811
\@marginfigure . 818, 819
\@margintable .. 829, 830
\@minipagefalse . 667, 848
\@minus 2765, 2769, 2773,
2777, 2781, 2786,
2852, 2854, 2882, 2884
\@mkabstract .. 1878, 2404
\@mkauthors 1801, 1803, 2141
\@mkauthors@i .. 2145,
2147, 2149, 2151, 2223
\@mkauthors@ii 2255
\@mkauthors@iii . 2153,
2155, 2157, 2159, 2267
\@mkauthors@iv 2161, 2320
\@mkauthorsaddresses
..... 1364, 2364
\@mkbibcitation 1910, 2414
\@mkteasers ... 1801, 2392
\@mktitle 1801, 1982
\@mktitle@i 1985,
1987, 1989, 1991, 2046
\@mktitle@ii 2074
\@mktitle@iii .. 1993,
1995, 1997, 1999, 2074
\@mktitle@iv .. 2001, 2102
\@mpargs 670
\@mparswitchfalse .. 632
\@mpfootins .....
465, 466, 662, 663, 665
\@mpfootnotetext ... 464
\@ne . 283, 287, 291, 293,
526, 2471, 2477, 2481
\@nil 302
\@nobreakfalse . 405, 445
\@noskipsecfalse ... 409
\@noskipsectrue 406
\@pages@word .....
... 2417, 2437, 2444

\@par 1814, 1820
\@parboxrestore 469
\@parfont 2779, 2783, 2788, 2793
\@permissionCodeOne 988, 992, 996, 1000, 1004, 1009, 1015, 1019, 1023, 1027, 1031, 1038, 1044, 1050, 1056, 1062, 1066, 1073, 1077, 1085, 1091, 1095, 1099, 1103, 1107, 1111, 1115, 1119, 1123, 1127, 1131, 1135, 1139, 1143, 1147, 1151, 1155, 1158, 1162, 1169, 1174, 1178, 1182, 1186, 1190, 1194, 1198, 1202, 1206, 1210, 1214, 1218, 1222, 1226, 1230, 1241, 1864
\@permissionCodeTwo 1170, 1242
\@plus 438, 446, 671, 2765, 2769, 2773, 2777, 2781, 2786, 2851, 2853, 2881, 2883, 2937
\@printcopyrightfalse 1565, 1577
\@printcopyrighttrue 1549, 1561
\@printendtopmatter 1915, 2449
\@printpermissionfalse 1564
\@printpermissiontrue . . . 1551, 1560, 1576
\@printtopmatter 1802, 1941
\@proofindent 2921, 2931, 2939
\@proofnamefont 2920, 2930, 2940
\@received . 1495, 1498, 1499, 1501, 1504, 1505, 1507, 1511, 1512
\@rightskip . . . 2789, 2790
\@saveabstract 1449, 1450
\@saveteaser . . 1773, 1774
\@seccntformat . 365, 422
\@secfont 2767, 2793
\@secpenalty 354
\@sect 358, 359
\@setaddresses 2389
\@setauthorsaddresses 1820, 2457
\@setthanks . . . 1814, 2456
\@shortauthors 2533, 2556, 2564, 2572, 2582, 2594, 2610
\@sidebar 814, 815
\@specialsection . . . 1881, 1887, 1889, 1919
\@ssect 357, 423
\@startPage 1438, 1942, 1943, 1945, 2530
\@startsection . 343, 435, 2764, 2768, 2772, 2776, 2780, 2785
\@starttoc 435
\@subparfont 2818
\@subsecfont . . 2771, 2793
\@subsubsecfont 2775, 2793
\@subtitle . 1272, 1376, 2065, 2066, 2089, 2090, 2106, 2107, 2428
\@subtitlefont 2025, 2066, 2090, 2107
\@subtitlenotes 1374, 1378, 1381, 1807
\@svsec . 362, 365, 371, 386
\@svsechd . . . 384, 412, 432
\@teaser 1774, 2394
\@teaserfigures 1772, 1774, 2393, 2398
\@tempa 257, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 305, 307, 309, 311, 313, 315, 1315, 1316, 1496, 1497, 2236, 3002, 3018, 3019, 3021, 3025
\@tempb 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 305, 307, 309, 311, 313, 315, 3020, 3021, 3024, 3025
\@tempboxa 670
\@tempc . 303, 304, 306, 308, 310, 312, 314, 316
\@tempcnta . 2652, 2653, 2655, 2656, 2658, 2660
\@tempdima 2659, 2660, 2661, 2663
\@tempskipa 346, 348, 349, 354, 367, 368, 399, 400, 402, 414, 415, 424, 425
\@textbottom 671
\@textsuperscript 476, 1800, 1805
\@texttop 672
\@thefnmark . 457, 471, 476, 1800, 1805, 1810
\@title . . . 1367, 1898, 2064, 2088, 2105, 2427
\@titlefont 2004, 2056, 2063, 2075, 2087, 2103
\@titlenotes 1365, 1369, 1372, 1806
\@tochangmeasure 376, 389
\@toclevel 360
\@tocline . . . 448, 449, 450
\@topnum 1912
\@typeset@author@bx 2259, 2313, 2319, 2358, 2363
\@typeset@author@line 2192, 2226, 2250, 2252
\@undefined 536, 734, 1259, 1782
\@undescribed@imagesfalse 743
\@undescribed@imagestrue . . 754, 757, 825, 2399
\@vspace 748, 751, 759, 761, 763, 765, 767, 769,

771, 773, 775, 777, 815, 820, 830, 836, 1794, 2415, 2450, 2453, 3031, 3033, 3039
\@vspace@acm . . 2453, 3039
\@vspace@orig 748, 751, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 815, 820, 830, 836, 1794, 2415, 2450, 3031
\@vspacer 749, 752, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 816, 821, 831, 837, 1795, 2416, 2451, 2454, 3032, 3036, 3040
\@vspacer@acm . 2454, 3040
\@vspacer@orig 749, 752, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 816, 821, 831, 837, 1795, 2416, 2451, 3032
\@width 651, 658
\@xp 442, 443
\@xsect 397, 398, 434
\\ 557, 566, 1291, 1840, 1845, 1860, 1865, 1869, 2419, 2427, 2476
\{ 265
\} 265

\␣ . . . 1262, 1524, 1534, 1840, 1842, 1865, 2423, 2424, 2442, 2530

A

\abstract 1449
abstract (environment) *19*
\abstractname 2410
\acks 2993
acks (environment) *23*
\acksname . 2992, 2995, 2996
\ACM@adddotafter 2746, 2763
\acm@copyrightinput 1555
\acm@copyrightmode 1555, 1563, 1568, 1571, 1575, 1581, 1584, 1587, 1590, 1593, 1596, 1599, 1603, 1610, 1648
\ACM@fontsize 144, 214, 217, 219, 221, 223, 225, 227, 229, 231, 233, 236, 237
\ACM@format 32, 152
\ACM@format@nr . . 32, 152, 157, 163, 169, 182, 188, 215, 489, 572, 637, 673, 789, 856, 1920, 1949, 1983, 2005, 2026, 2143, 2167, 2492, 2552, 2639, 2678, 2724, 2798, 2835, 2865, 2922, 2947, 2965
\ACM@linecount 2470, 2471, 2476, 2477, 2480, 2481
\ACM@linecount@bx 2467, 2487, 2513
\ACM@linecount@bxht 2469, 2475, 2478, 2479
\ACM@linecountL . 2483, 2554, 2557, 2562, 2565, 2571, 2573, 2581, 2583, 2593, 2596, 2599, 2609, 2612, 2615, 2680, 2691, 2692, 2702, 2703, 2711, 2714, 2719
\ACM@linecountR 2490, 2584, 2586, 2594, 2597, 2604, 2610, 2613, 2620, 2712, 2715, 2720
\ACM@mk@linecount 2472, 2485, 2500, 2502, 2504, 2506, 2508, 2510
\ACM@NR@adjustedSectionformat 2743, 2752
\ACM@NRadjust 2734, 2767, 2771, 2775, 2779, 2783, 2788
\ACM@origbaselinestretch 3041
\ACM@ps@headings 2461, 2465
\ACM@ps@myheadings 2460, 2464
\ACM@ps@plain . 2459, 2463
\ACM@restore@pagestyle 2459
\ACM@sect@format 2753, 2755
\ACM@sect@format@ 2742, 2755, 2757
\ACM@sect@format@null 2756, 2757
\ACM@timestamp 2516, 2627, 2725, 2730
\acmArticle *15*, 1401
\acmArticleSeq . *15*, 1403
\acmBadgeL *16*, 1433
\acmBadgeR *16*, 1428
\acmBooktitle . . . *9*, 1257
\acmConference . . *9*, 1243
\acmConference@date 1246, 1836, 2601, 2604, 2617, 2620
\acmConference@name 1245, 1259, 1260, 1261
\acmConference@shortname 1244, 1248, 1249, 1261, 1262, 1836, 2600, 2603, 2616, 2619
\acmConference@venue 1247, 1836, 2601, 2604, 2617, 2620
\acmdefinition 2880
\acmDOI *16*, 1419
\acmISBN *16*, 1417
\acmJournal *9*, 1236
\acmMonth *15*, 1407
\acmNumber *15*, 1399
\acmplain 2850
\acmPrice . . . *15*, 1413, 1573, 1579, 1601, 1605
\acmSubmissionID *15*, 1415
\acmVolume *15*, 1397
\acmYear *15*, 1405
\addcontentsline 253, 378, 391, 2406, 2996

\additionalaffiliation *11*, 1337
\addpenalty 354
\addresses 1288, 1290, 1295, 1302, 1333, 1353, 1387, 1393, 1395, 2252, 2319, 2363, 2382
\addtocounter . . 482, 1536
\addtolength . . . 880, 881, 882, 886, 887, 2478
\addvspace 354, 446
\advance 896, 901, 904, 906, 908, 910, 1283, 1285, 2049, 2050, 2053, 2054, 2078, 2079, 2269, 2286, 2322, 2333, 2477, 2481, 2656, 2658, 2661
\affiliation *10*, 1330, 2235, 2302, 2347
\and 1270, 1303, 1305, 1320, 1326, 2226, 2231, 2233, 2244, 2250, 2260, 2294, 2313, 2319, 2341, 2358, 2363, 2379
\andify 1905, 1906, 2193, 2196, 2441
anonsuppress (environment) *23*
\apptocmd 3033, 3036
\AtBeginDocument 76, 93, 529, 537, 872, 1573, 1579, 1601, 1605, 2466, 2539, 2672, 2758
\AtBeginEnvironment . . . 747, 750, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777
\AtBeginMaketitle *29*, 1785
\AtEndDocument . 745, 1444, 1468, 1510, 1542, 2384, 2987, 3042
\AtEndEnvironment 753, 756
\AtEndPreamble . 502, 735, 2892, 2944, 3003
\author *10*, 1280, 1790, 1791, 2421
\author@bx 2255, 2261, 2264
\author@bx@sep 2257, 2264, 2269, 2286, 2322, 2333
\author@bx@wd 2256, 2259, 2268, 2269, 2271, 2277, 2279, 2281, 2283, 2286, 2321, 2322, 2324, 2330, 2333
\authornote *14*, 1337, 1385, 2422
\authornotemark . *15*, 1391
\authors 1293, 1298, 1305, 1893, 1905, 1907, 2427
\authorsaddresses *14*, 1363

B

\balance 2990
\baselineskip 1830, 2058, 2070, 2082, 2097, 2478, 2765, 2766, 2769, 2770, 2773, 2777, 2781, 2851, 2852, 2853, 2854, 2881, 2882, 2883, 2884
\baselinestretch 3041, 3042, 3044
\begin . 19, 2486, 2512, 2662
\begingroup 369, 412, 426, 435, 525, 1793, 2141, 2735, 2994
\bfseries . . 911, 1826, 2007, 2009, 2011, 2015, 2017, 2019, 2021, 2023, 2186, 2189, 2425, 2669, 2793, 2794, 2808, 2809, 2811, 2812, 2814, 2815, 2816, 2817, 2821, 2822, 2825, 2826, 2845, 2875
\bgroup . 815, 819, 830, 836, 1338, 1880, 1885, 2259, 2296, 2299, 2360, 2369, 2394, 2404, 2414, 2426
\bibfont 255
\bibliofont 255
\bibliographystyle . 535
\bibsection 251
\bibstyle 279, 281, 323, 540
\bibstyle@acmauthoryear 329
\bibstyle@acmnumeric 335
\bigskip . . 1512, 1967, 2073, 2101, 2109, 2319, 2363, 2394, 2452
\box 853, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 2251, 2264, 2317, 2396

C

\c@footnote 1798
\c@secnumdepth 361, 375, 379, 388, 392
\captionsetup . . 781, 783, 785, 787, 796, 798, 801, 803, 806, 808, 816, 822, 831, 2395
\ccdesc@parse@finish 1547
\ccsdesc *16*, 1518
\ccsdesc@parse 1519, 1520
\ccsdesc@parse@end 1519, 1547
\ccsdesc@parse@finish 1541, 1547
CCSXML (environment) . . *16*
\centering 439, 472, 556, 565, 823, 832, 2075, 2087, 2261, 2318, 2668
\cite . . . 518, 519, 530, 534
\citeA 524
\citealt 523
\citeANP 520
\citeauthor 520
\citeN 518
\citename 531
\citeNN 521
\citeNP 523
\citep 519
\citestyle . . . *24*, 321, 341
\citeyear 522

\citeyearNP 522
\citeyearpar . . . 521, 534
\city . . *12*, 1344, 2118, 2375
\ClassError 35, 1234, 1336, 1451, 1461, 1467, 1478, 2219, 2420, 3043
\ClassInfo 152, 236, 1232, 1458, 1460, 1464, 1466, 1475, 1477, 1480
\ClassWarning 26, 158, 164, 170, 703, 706, 709, 755, 758, 826, 1281, 1350, 1440, 1481, 2400, 3033, 3036
\ClassWarningNoLine . 746, 1446, 1470, 1544, 2213, 2216, 2386
\cleaders 2115
\clubpenalty . . . 411, 417
\CodelineIndex 16
\Collect@Body . . 814, 818, 829, 1449, 1773
\color . . . 1828, 2476, 2480
\color@begingroup 459, 472
\color@endbox 851
\color@endgroup 462, 475, 668
\columnwidth . . . 468, 651, 837, 2321, 2360
\contentsnamefont . . 439
\copy 2115
\copyright 1840
\copyrightpermissionfootnoterule 650
\copyrightyear . *17*, 1770
\country *12*, 1347, 2118, 2378
\csname 323, 374, 376, 380, 387, 389, 393, 422, 442, 443, 457, 471, 1297, 1304, 1357, 1360, 1523, 1524, 1526, 1527, 1528, 1529, 1530, 1533, 1535, 1902, 1904, 2736, 2759
\CurrentOption . 145, 146, 147, 148, 149, 150

D

\day 2528
\DeclareNewFootnote 654, 656
\DeclareOptionX 38, 145, 146, 147, 148, 149, 150
\DeclareRobustCommand 524, 2755
\DeclareTextFontCommand 736
\def 24, 38, 144, 217, 219, 221, 223, 225, 227, 229, 231, 233, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 294, 296, 298, 300, 301, 305, 307, 309, 311, 313, 315, 343, 359, 384, 398, 422, 423, 432, 435, 448, 449, 450, 451, 453, 464, 476, 482, 483, 484, 485, 486, 504, 535, 650, 657, 659, 671, 815, 819, 830, 836, 839, 843, 846, 864, 865, 866, 867, 895, 900, 903, 905, 907, 909, 986, 987, 988, 990, 991, 992, 994, 995, 996, 998, 999, 1000, 1002, 1003, 1004, 1006, 1008, 1009, 1013, 1014, 1015, 1017, 1018, 1019, 1021, 1022, 1023, 1025, 1026, 1027, 1029, 1030, 1031, 1033, 1034, 1036, 1037, 1038, 1042, 1043, 1044, 1048, 1049, 1050, 1054, 1055, 1056, 1060, 1061, 1062, 1064, 1065, 1066, 1068, 1069, 1071, 1072, 1073, 1075, 1076, 1077, 1079, 1081, 1083, 1084, 1085, 1087, 1089, 1090, 1091, 1093, 1094, 1095, 1097, 1098, 1099, 1101, 1102, 1103, 1105, 1106, 1107, 1109, 1110, 1111, 1113, 1114, 1115, 1117, 1118, 1119, 1121, 1122, 1123, 1125, 1126, 1127, 1129, 1130, 1131, 1133, 1134, 1135, 1137, 1138, 1139, 1141, 1142, 1143, 1145, 1146, 1147, 1149, 1150, 1151, 1153, 1154, 1155, 1157, 1158, 1160, 1161, 1162, 1164, 1165, 1167, 1168, 1169, 1170, 1172, 1173, 1174, 1176, 1177, 1178, 1180, 1181, 1182, 1184, 1185, 1186, 1188, 1189, 1190, 1192, 1193, 1194, 1196, 1197, 1198, 1200, 1201, 1202, 1204, 1205, 1206, 1208, 1209, 1210, 1212, 1213, 1214, 1216, 1217, 1218, 1220, 1221, 1222, 1224, 1225, 1226, 1228, 1229, 1230, 1236, 1238, 1239, 1240, 1241, 1242, 1257, 1264, 1265, 1266, 1272, 1315, 1337, 1338, 1339, 1340, 1341, 1342, 1355, 1363, 1365, 1366, 1374, 1375, 1384, 1385, 1397,

1399, 1401, 1403, 1405, 1407, 1409, 1413, 1415, 1417, 1419, 1429, 1430, 1431, 1432, 1434, 1435, 1436, 1437, 1438, 1440, 1442, 1450, 1455, 1483, 1495, 1496, 1520, 1521, 1547, 1607, 1609, 1646, 1647, 1770, 1772, 1774, 1785, 1787, 1800, 1805, 1814, 1820, 1895, 1919, 1941, 1982, 2004, 2025, 2046, 2074, 2102, 2111, 2118, 2119, 2121, 2122, 2124, 2125, 2127, 2130, 2131, 2135, 2136, 2138, 2139, 2141, 2165, 2166, 2170, 2171, 2174, 2175, 2177, 2178, 2180, 2181, 2183, 2184, 2186, 2187, 2189, 2190, 2192, 2194, 2199, 2206, 2211, 2223, 2224, 2225, 2227, 2234, 2235, 2236, 2259, 2260, 2267, 2289, 2295, 2302, 2320, 2336, 2342, 2347, 2364, 2370, 2371, 2372, 2374, 2375, 2376, 2378, 2379, 2380, 2381, 2389, 2390, 2391, 2392, 2394, 2404, 2414, 2417, 2418, 2419, 2420, 2423, 2427, 2449, 2456, 2457, 2462, 2472, 2483, 2490, 2533, 2538, 2544, 2638, 2645, 2650, 2652, 2734, 2738, 2740, 2742, 2752, 2756, 2763, 2789, 2793, 2794, 2795, 2796, 2802, 2803, 2805, 2806, 2808, 2809, 2811, 2812, 2814, 2815, 2816, 2817, 2818, 2821, 2822, 2825, 2826, 2828, 2829, 2831, 2832, 2833, 2834, 2843, 2844, 2845, 2846, 2861, 2862, 2863, 2864, 2873, 2874, 2875, 2876, 2920, 2921, 2930, 2931, 3000, 3002, 3018, 3019, 3020, 3024

\define@boolkey 49, 57, 65, 73, 82, 90, 102, 106, 110, 118, 126, 134, 1335, 1456, 1462, 1473

\define@choicekey 32, 921, 1554

\define@cmdkey 1479

\definecolor 544, 545, 546, 547, 548, 549, 550, 551

\department *12*, 1341, 2118, 2377

\Description *22*, 744

\description 912

\descriptionlabel 911, 914

\detokenize 1281

\dimexpr . . 834, 853, 2624

\divide 2271, 2277, 2279, 2281, 2283, 2324, 2330

\do 257, 504

\do@url@hyp 504

\DocInput 20

\documentclass 8

\dots 1869

E

\edef 145, 146, 147, 148, 360

\editor *9*, 1266

\egroup 669, 817, 828, 832, 844, 850, 1348, 1882, 1891, 2263, 2297, 2300, 2363, 2383, 2395, 2413, 2427, 2448

\else 52, 60, 68, 77, 85, 97, 113, 121, 129, 139, 184, 211, 303, 324, 353, 360, 363, 375, 379, 383, 388, 392, 404, 416, 431, 512, 528, 534, 536, 559, 561, 662, 722, 727, 753, 756, 786, 824, 1227, 1253, 1259, 1261, 1268, 1284, 1291, 1294, 1300, 1301, 1311, 1314, 1319, 1322, 1325, 1332, 1352, 1371, 1380, 1386, 1394, 1444, 1459, 1465, 1468, 1476, 1487, 1490, 1500, 1503, 1506, 1511, 1532, 1537, 1538, 1539, 1542, 1779, 1801, 1812, 1816, 1817, 1824, 1831, 1834, 1835, 1841, 1846, 1853, 1858, 1861, 1862, 1865, 1867, 1868, 1869, 1870, 1880, 1885, 1888, 1944, 1970, 1975, 2048, 2052, 2057, 2065, 2068, 2081, 2089, 2096, 2106, 2112, 2113, 2128, 2129, 2130, 2132, 2134, 2135, 2138, 2195, 2212, 2215, 2218, 2230, 2236, 2243, 2261, 2272, 2282, 2291, 2298, 2307, 2325, 2329, 2338, 2344, 2352, 2366, 2368, 2384, 2393, 2398, 2405, 2409, 2417, 2423, 2428, 2429, 2438, 2440, 2447, 2525, 2536, 2537, 2547,

2558, 2566, 2576, 2587, 2591, 2598, 2607, 2614, 2653, 2682, 2686, 2696, 2706, 2713, 2718, 2726, 2729, 2739, 2763, 3002, 3007, 3014, 3023, 3027, 3042
\email 10, 1349, 2234, 2295, 2342, 2381
\emph 1852, 1854
\empty 2545
\EnableCrossrefs 18
\end ... 21, 2488, 2514, 2670
\end@dblfloat 842
\end@float 844
\endcsname 322, 323, 374, 376, 380, 387, 389, 393, 422, 442, 443, 457, 471, 1297, 1304, 1358, 1361, 1523, 1524, 1526, 1527, 1528, 1529, 1530, 1533, 1535, 1902, 1904, 2736, 2759
\enddescription 918
\endgroup ... 373, 412, 430, 445, 1876, 2163, 2738, 2740, 2998
\endlist 916, 918
\endminipage 659
\endtrivlist 2942
\enspace 2829
environments:
abstract 19
acks 23
anonsuppress 23
CCSXML 16
marginfigure 31
margintable 31
printonly 22
screenonly 22
sidebar 31
teaserfigure 19
\everypar 352, 407, 418, 2408
\excludecomment . 1515, 3006, 3008, 3012, 3013
\ExecuteOptionsX 48, 56, 64, 72, 81, 89, 101, 105, 109, 117, 125, 133, 143
\expandafter 302, 304, 537, 670, 1295, 1296, 1302, 1303, 1357, 1360, 1523, 1524, 1526, 1527, 1533, 1535, 2736, 2759

F

\familydefault 738
\fancyfoot 2559, 2567, 2577, 2588, 2592, 2608, 2627, 2681, 2683, 2687, 2697, 2707, 2716, 2721, 2725, 2730
\fancyhead 2554, 2555, 2556, 2557, 2562, 2563, 2564, 2565, 2571, 2573, 2574, 2581, 2583, 2584, 2585, 2593, 2594, 2596, 2597, 2599, 2602, 2609, 2610, 2612, 2613, 2615, 2618, 2680, 2691, 2692, 2693, 2701, 2702, 2703, 2711, 2712, 2714, 2715, 2719, 2720
\fancyheadoffset 2624, 2694, 2704
\fancyhf 2541, 2674
\fancypagestyle 2540, 2673
\fi 54, 62, 70, 79, 87, 99, 115, 123, 131, 141, 162, 168, 181, 186, 208, 213, 234, 235, 247, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 306, 308, 310, 312, 314, 316, 317, 326, 328, 342, 344, 350, 355, 360, 366, 377, 381, 390, 394, 396, 419, 420, 433, 444, 463, 501, 505, 514, 532, 534, 538, 541, 568, 569, 570, 634, 648, 666, 688, 700, 731, 732, 733, 739, 746, 755, 758, 810, 811, 827, 841, 845, 870, 1231, 1250, 1256, 1262, 1263, 1271, 1287, 1292, 1299, 1306, 1307, 1312, 1313, 1321, 1327, 1328, 1329, 1334, 1354, 1373, 1383, 1390, 1396, 1412, 1448, 1452, 1461, 1467, 1472, 1478, 1492, 1493, 1502, 1508, 1509, 1513, 1531, 1539, 1540, 1546, 1567, 1570, 1574, 1580, 1583, 1586, 1589, 1592, 1595, 1598, 1602, 1606, 1645, 1769, 1781, 1784, 1791, 1792, 1801, 1803, 1815, 1821, 1822, 1823, 1829, 1832, 1833, 1837, 1838, 1843, 1855, 1860, 1865, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1883, 1884, 1890, 1892, 1911, 1939, 1946, 1974, 1978, 1979, 1980, 2002, 2024, 2045, 2051, 2055, 2061, 2067, 2072, 2084, 2086, 2091, 2099, 2100, 2108, 2116, 2128, 2130, 2132, 2134, 2135, 2138, 2140, 2162, 2191, 2198, 2214, 2217, 2221, 2232, 2248, 2249, 2261, 2284,

2285, 2293, 2301, 2312, 2331, 2332, 2340, 2346, 2357, 2366, 2368, 2388, 2401, 2403, 2411, 2413, 2417, 2424, 2428, 2442, 2445, 2446, 2447, 2482, 2489, 2511, 2515, 2527, 2532, 2536, 2537, 2546, 2548, 2549, 2554, 2555, 2560, 2569, 2579, 2590, 2592, 2605, 2606, 2608, 2621, 2622, 2625, 2628, 2651, 2670, 2681, 2684, 2690, 2700, 2710, 2716, 2717, 2721, 2722, 2728, 2731, 2732, 2750, 2761, 2763, 2827, 2849, 2879, 2917, 2934, 2962, 2963, 2984, 2985, 2991, 3002, 3010, 3016, 3019, 3029, 3030, 3045
\firstpagestyle 2672
\floatname 813
\flushbottom 678, 680, 682, 684, 686
\footnote 2420
\footnotemark 486, 1367, 1376, 2390, 2391, 2418
\footnoterule 657
\footnotesep . . . 461, 474
\footnotesize . . 467, 2524, 2538, 2559, 2567, 2577, 2588, 2592, 2599, 2608, 2683, 2687, 2697, 2707, 2716, 2721, 2727
\footnotetext . . 1370, 1372, 1379, 1382, 1389
\footnotetextauthorsaddresses 1813, 1819
\footnotetextcopyrightpermission 1824
\footrulewidth 2543, 2676
\format 32
\frenchspacing 3046
\fulltextwidth 833, 837, 853

G

\g@addto@macro . 1270, 1302, 1305, 1320, 1326, 1333, 1353, 1367, 1369, 1372, 1376, 1378, 1381, 1387, 1388, 1393, 1395, 1501, 1507, 1528, 1535, 1774, 1778, 1780, 1785, 2231, 2244, 2292, 2299, 2308, 2339, 2345, 2353, 2390, 2391
\gdef . 1244, 1245, 1246, 1247, 1249, 1257, 1267, 1269, 1290, 1293, 1295, 1298, 1310, 1318, 1324, 1357, 1360, 1453, 1482, 1499, 1505, 1524, 1526, 1527, 1533, 1943, 2229, 2233, 2238, 2265, 2266, 2287, 2288, 2290, 2294, 2296, 2303, 2334, 2335, 2337, 2341, 2343, 2348, 2373, 2374, 2379
\geometry 574, 577, 584, 591, 598, 605, 612, 619, 626
\getrefnumber 1445, 1469, 1543, 2417
\global . 406, 409, 445, 465, 744, 754, 757, 825, 852, 1237, 1251, 1283, 1285, 1286, 1331, 1907, 1908, 1912, 1914, 2122, 2124, 2127, 2131, 2136, 2139, 2207, 2208, 2209, 2226, 2250, 2251, 2261, 2313, 2316, 2358, 2396, 2399, 2477, 2481, 2946, 2967, 2969, 2971, 2983
\grantnum *23*, 3001
\grantsponsor . . *23*, 3000

H

\hbox . 476, 1800, 1805, 2114
\headrulewidth 2542, 2675
\hfill 2104, 2480
\href . 1359, 1362, 1971, 1976, 2058, 2070, 2082, 2097, 3022, 3026
\hrule 651, 658, 2104
\hsize 468, 1799, 2046, 2047, 2074, 2076, 2102, 2142, 2259, 2315, 2360
\hskip 371, 385, 415, 428, 432, 1973, 2060, 2069, 2085, 2094, 2115, 2939
\hspace 1658, 1669, 1678, 1703, 1715, 1736, 2264, 2318
\Huge 2013, 2015, 2017, 2019, 2021, 2023
\hypersetup 507, 513, 515, 1896

I

\if 303
\if@ACM@acmthm . 65, 2893
\if@ACM@affiliation@obeypunctuation 1335, 2113, 2128, 2130, 2132, 2133, 2135, 2138
\if@ACM@anonymous 118, 1289, 1301, 1308, 1332, 1352, 1368, 1377, 1386, 1777, 1789, 1817, 2534, 3011
\if@ACM@authordraft 134, 552, 1825
\if@ACM@authorversion 82, 1831, 1847
\if@ACM@badge 1421, 1968, 2077, 2093
\if@ACM@balance 102, 2964, 2988
\if@ACM@citypresent 2202, 2215

\if@ACM@countrypresent 2204, 2218
\if@ACM@instpresent 2200, 2212
\if@ACM@journal 154, 209, 782, 1253, 1488, 1886, 2120, 2384, 2407
\if@ACM@journal@bibstrip 155, 1818, 1835, 1851, 1863, 2434, 2551, 2677
\if@ACM@maketitle@typeset 919, 1450
\if@ACM@manuscript 153, 244, 1485, 1834, 1844
\if@ACM@natbib 110, 249, 340, 517
\if@ACM@natbib@override 110
\if@ACM@newfonts 701, 712
\if@ACM@nonacm . . 90, 561, 1444, 1468, 1542, 1824, 1862, 2384, 2429, 2558, 2566, 2576, 2587, 2595, 2611, 2682, 2686, 2696, 2706, 2726
\if@ACM@pbalance 106, 2945
\if@ACM@printacmref 1462, 1909
\if@ACM@printccs 1456, 1879
\if@ACM@printfolios 1473, 2546, 2548, 2554, 2555, 2592, 2608, 2681, 2716, 2721
\if@ACM@review 73, 2467, 2484, 2491
\if@ACM@screen 49, 506, 3004
\if@ACM@sigchiamode 156, 452, 560, 737, 835, 842, 1801, 1803, 2261, 2623
\if@ACM@timestamp . . 126, 2516, 2626, 2723
\if@ACM@urlbreakonhyphens 57, 503
\if@acmowned 1552
\if@Description@present 740, 753, 756, 824, 2398
\if@filesw 441, 539
\if@insideauthorgroup 1278, 1284
\if@nobreak 351
\if@noskipsec . . 344, 408
\if@printcopyright 1548, 1839
\if@printpermission 1550, 1832
\if@twocolumn 2989
\if@undescribed@images 742, 745
\IfBeginWith 1356
\ifcase 188, 215, 489, 572, 637, 673, 789, 856, 984, 1409, 1610, 1648, 1920, 1949, 1983, 2005, 2026, 2143, 2167, 2273, 2326, 2492, 2552, 2639, 2678, 2798, 2835, 2865, 2922, 2947, 2965
\ifcsname 322
\ifdim 348, 368, 400, 425, 2479
\IfFileExists 703, 706, 709
\IfInteger 1480
\ifluatex 723
\ifNAT@numbers 534
\ifnum 157, 163, 169, 182, 360, 361, 375, 379, 388, 392, 1445, 1469, 1537, 1538, 1539, 1543, 1563, 1568, 1571, 1575, 1581, 1584, 1587, 1590, 1593, 1596, 1599, 1603, 1791, 2270, 2323, 2365, 2367, 2417, 2653, 2655, 2724
\ifPDFTeX 689
\IfSubStr 1281, 1350
\ifvmode 2112
\ifvoid 662
\ifx 214, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 305, 307, 309, 311, 313, 315, 536, 1248, 1259, 1261, 1266, 1288, 1291, 1309, 1311, 1316, 1317, 1323, 1392, 1444, 1497, 1498, 1504, 1511, 1523, 1532, 1542, 1782, 1812, 1816, 1856, 1865, 1868, 1869, 1870, 1880, 1885, 1942, 1970, 1975, 2048, 2052, 2057, 2065, 2068, 2081, 2089, 2096, 2106, 2195, 2228, 2236, 2237, 2289, 2295, 2302, 2336, 2342, 2347, 2385, 2393, 2405, 2423, 2428, 2440, 2447, 2525, 2536, 2545, 2736, 2759, 2763, 3002, 3019, 3021, 3025, 3042
\ifxetex 718
\ignorespaces 421, 461, 474, 744, 1339, 1340, 1342, 1355, 2118, 2119, 2121, 2123, 2124, 2125, 2126, 2128, 2372, 2412, 2419, 2427, 2940
\immediate 443, 540
\includecomment 3005, 3009, 3015
\includegraphics 1972, 1977, 2059, 2071, 2083, 2098
\indent 2921
\input 690
\InputIfFileExists . . 25
\institution *12*, 1340, 2118, 2374
\interfootnotelinepenalty 455

\interlinepenalty 372, 429, 455
\item 2939
\itshape . . 1836, 2795, 2796, 2817, 2818, 2831, 2843, 2863, 2930

J

\jobname 440, 443

K

\kern 650, 651, 657, 658, 2104
\keywords *16*, 1442

L

\l@section 448
\l@subsection . . 448, 449
\l@subsubsection . . . 450
\labelenumi 864
\labelenumii 865
\labelenumiii 866
\labelenumiv 867
\labelsep 873, 881, 886, 896, 901, 904, 906, 908, 910, 2939
\labelwidth . 896, 901, 904, 906, 908, 910, 913
\LARGE 2007, 2009, 2011, 2034, 2036, 2038, 2040, 2042, 2174, 2177, 2669
\Large 2165, 2183, 2808, 2809, 2811, 2812, 2814
\large 1826, 2170, 2175, 2178, 2802, 2803, 2805, 2806
\lastbox 410, 2408
\leaders 2104
\leavevmode 344, 2104, 2317
\leftmargin 895, 900, 903, 905, 907, 909
\leftmargini . . . 879, 880, 881, 882, 895, 896
\leftmarginii . . 885, 886, 887, 888, 900, 901
\leftmarginiii 888, 889, 903, 904
\leftmarginiv 889, 890, 905, 906
\leftmarginv 890, 891, 907, 908
\leftmarginvi 891, 909, 910
\leftskip . 2103, 2361, 2791
\let 279, 281, 293, 295, 297, 323, 362, 478, 479, 518, 519, 520, 521, 522, 523, 526, 530, 672, 734, 748, 749, 751, 752, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 815, 816, 820, 821, 830, 831, 836, 837, 838, 899, 914, 918, 1343, 1344, 1345, 1346, 1347, 1443, 1516, 1783, 1794, 1795, 1796, 1797, 1809, 1810, 1811, 1814, 1820, 1893, 1907, 1908, 2137, 2226, 2250, 2313, 2319, 2358, 2363, 2415, 2416, 2450, 2451, 2453, 2454, 2459, 2460, 2461, 2463, 2464, 2465, 2741, 2743, 2745, 2746, 2748, 2754, 2757, 2760, 3031, 3032, 3039, 3040, 3041
\libertineLF 736
\lineskip 2318, 2362
\linespacing . . . 438, 439
\liningnums 734
\list 912
\listisep . . . 893, 894, 898
\listparindent 897
\LoadClass 237
\long . . . 453, 464, 815, 819, 830, 1450, 1453, 1455, 1774, 2456
\loop 2476, 2654
\LTX@adddotafter 2760, 2763

M

\makeatletter 435
\makebox 1826, 2663
\makelabel 914
\MakeTextUppercase 2229, 2231, 2793, 2802, 2805, 2808, 2811, 2821, 2825
\maketitle *20*, 1787
\MakeUppercase 2747
\marginfigure 818
marginfigure (environment) *31*
\marginpar 453, 817, 823, 832, 1969
\marginparsep . . 834, 2624
\marginparwidth . 834, 2624
\margintable 829
margintable (environment) *31*
\mathchardef . . 2297, 2300
\mbox 301
\mdseries 2028, 2030, 2032, 2036, 2038, 2040, 2042, 2044, 2187, 2190
\medskip . . 1922, 1924, 1926, 1928, 2251, 2253, 2317, 2402, 2425
\MessageBreak 159, 165, 171, 172, 173, 174, 175, 176, 177, 178, 179
\metadata@authors . . . 1893, 1894, 1897
\mktitle@bx 1786, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 2056, 2075, 2103, 2251, 2316, 2317, 2396
\month 1408, 2528
\moveleft 852
\multiply 2660

N

\NAT@@setcites 319
\NAT@aysep 310
\NAT@citetp 526
\NAT@close 259, 261, 263, 265, 308

\NAT@cmprs . . 287, 289, 291
\NAT@cmt 314
\NAT@ctype 526
\NAT@find@eq 302
\NAT@fullfalse 526
\NAT@longnamestrue . 299
\NAT@merge . . 293, 295, 297
\NAT@nmfmt 301
\NAT@numbersfalse . . 273
\NAT@numberstrue 275, 277
\NAT@open 259, 261, 263, 265, 306, 526
\NAT@partrue 526
\NAT@rem@eq 304
\NAT@sep 267, 269, 271, 316
\NAT@sort . . . 283, 285, 291
\NAT@superfalse 275
\NAT@supertrue 277
\NAT@swafalse 525
\NAT@up 301
\NAT@yrsep 312
\NeedsTeXFormat 1
\newblock 527
\newbox . . 1786, 2110, 2255
\newcommand . 329, 335, 533, 744, 1243, 1330, 1391, 1428, 1433, 1496, 1518, 2126, 2133, 2523, 2780, 2992, 3001, 3017
\newcount . 1274, 1276, 2470
\newcounter 1517, 2519, 2521
\newdimen . . . 833, 871, 2256, 2632, 2634, 2636
\newenvironment 818, 829, 1773
\newfloat 812
\newif 153, 154, 155, 156, 701, 740, 742, 919, 1278, 1421, 1548, 1550, 1552, 2200, 2202, 2204
\newlength 1423, 1425, 1426, 2469
\newsavebox 2468
\newskip 893, 2257
\newtheorem 2896, 2899, 2902, 2905, 2908, 2912, 2915
\newtheoremstyle 2850, 2880
\newwrite 442
\next 2738, 2740, 2750
\nobreak 401, 2425
\noindent 451, 1512, 1811, 1882, 1891, 1922, 1924, 1926, 1928, 1948, 1969, 2056, 2063, 2066, 2090, 2104, 2105, 2107, 2193, 2251, 2252, 2316, 2362, 2396, 2397, 2425, 2426, 2931
\noindentparagraph 1934, 2780
\nolinkurl 2297, 2300, 2343, 2345, 2381
\normalbaselines . . . 2260
\normalcolor 664
\normalfont 476, 1512, 1805, 2166, 2171, 2180, 2181, 2183, 2184, 2473, 2846, 2861, 2873, 2876, 2937, 3046
\normalparindent . . . 649
\normalsize 2025, 2166, 2180, 2181, 2184, 2474, 3046
\num@authorgroups 1274, 1285, 1791, 2273, 2277, 2279, 2326, 2367
\num@authors 1276, 1283, 1297, 1304, 1358, 1361, 2365
\number 360
\numberline 380, 393
\numexpr . 2518, 2520, 2522
\nxandlist 1894

O

\onehalfspacing 246
\openout 443
\or 191, 193, 195, 197, 199, 201, 203, 205, 218, 220, 222, 224, 226, 228, 230, 232, 491, 492, 493, 494, 495, 496, 498, 499, 576, 583, 590, 597, 604, 611, 618, 625, 639, 640, 641, 643, 644, 645, 646, 647, 675, 676, 677, 679, 681, 683, 685, 687, 791, 792, 793, 794, 795, 797, 800, 805, 858, 859, 860, 861, 862, 863, 868, 869, 989, 993, 997, 1001, 1005, 1012, 1016, 1020, 1024, 1028, 1032, 1035, 1041, 1047, 1053, 1059, 1063, 1067, 1070, 1074, 1078, 1080, 1082, 1086, 1088, 1092, 1096, 1100, 1104, 1108, 1112, 1116, 1120, 1124, 1128, 1132, 1136, 1140, 1144, 1148, 1152, 1156, 1159, 1163, 1166, 1171, 1175, 1179, 1183, 1187, 1191, 1195, 1199, 1203, 1207, 1211, 1215, 1219, 1223, 1409, 1410, 1411, 1611, 1613, 1616, 1618, 1619, 1621, 1623, 1625, 1628, 1631, 1634, 1636, 1639, 1642, 1649, 1660, 1671, 1679, 1685, 1691, 1705, 1717, 1724, 1738, 1745, 1751, 1758, 1763, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1952, 1954, 1956, 1958, 1960, 1962, 1964, 1966, 1986, 1988, 1990, 1992, 1994, 1996,

1998, 2000, 2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2146, 2148, 2150, 2152, 2154, 2156, 2158, 2160, 2169, 2172, 2173, 2176, 2179, 2182, 2185, 2188, 2275, 2276, 2278, 2280, 2328, 2495, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2561, 2570, 2580, 2641, 2646, 2685, 2695, 2705, 2800, 2801, 2804, 2807, 2810, 2813, 2819, 2823, 2837, 2838, 2839, 2840, 2841, 2842, 2847, 2848, 2867, 2868, 2869, 2870, 2871, 2872, 2877, 2878, 2924, 2925, 2926, 2927, 2928, 2929, 2932, 2933, 2949, 2950, 2951, 2953, 2955, 2957, 2959, 2961, 2968, 2970, 2972, 2974, 2976, 2978, 2980, 2982

\orcid *10*, 1355

\outer@nobreak 849

P

\p@ 446, 635, 642, 650, 651, 657, 658, 2765, 2769, 2773, 2774, 2777, 2778, 2781, 2782, 2786, 2787, 2937

\PackageError . 54, 62, 70, 79, 87, 99, 103, 107, 115, 123, 131, 141

\PackageInfo 51, 53, 59, 61, 67, 69, 75, 78, 84, 86, 92, 98, 112, 114, 120, 122, 128, 130, 136, 140, 1011, 1040, 1046, 1052, 1058

\PageIndex 15

\pageref 2530

\pagestyle 2630

\par . 345, 401, 437, 660, 847, 1512, 1814, 1820, 1832, 1836, 1882, 1891, 1922, 1924, 1926, 1928, 1951, 1953, 1955, 1967, 2066, 2073, 2090, 2101, 2104, 2107, 2109, 2130, 2132, 2134, 2135, 2193, 2197, 2251, 2253, 2260, 2262, 2290, 2292, 2299, 2308, 2317, 2319, 2337, 2339, 2345, 2353, 2361, 2363, 2394, 2395, 2396, 2398, 2412, 2425, 2448, 2452, 2456, 2935

\paragraph 2776

\parbox 556, 565, 2062, 2080, 2087, 2095, 2473, 2667

\parindent 635, 649, 880, 1814, 1820, 1830, 2776, 2792, 2832, 2862

\parskip 635, 1830

\part 2785

\PassOptionsToClass 149, 150

\pdfgentounicode . . . 698

\pdfglyphtounicode 691, 692, 693, 694, 695, 696, 697

\pdfstringdefDisableCommands 481

\phantomsection 253, 2406, 2996

\popQED 2942

\position . . . *12*, 1339, 1343, 1344, 1345, 1346, 1347, 2118, 2372

\postcode *12*, 1346, 2118, 2371

printonly (environment) *22*

\ProcessOptionsX . . . 151

\proof 2935

\proofname 2935

\protect 380, 393

\protected@edef 365, 456, 470

\providecommand 527, 531, 2830

\ProvidesClass 5

\ProvidesFile 3

\ps@headings . . 2461, 2465

\ps@myheadings 2460, 2464

\ps@plain 2459, 2463

\pushQED 2936

\put 2487, 2513

Q

\qed 2936

\quad 422, 2572, 2575, 2582, 2586, 2725

R

\raggedright 2062, 2103, 2361

\raisebox 1826, 2058, 2070, 2082, 2097, 2663, 2665

\real@adddotafter 2745, 2748

\realSectionformat . . . 2741, 2753, 2754

\received *19*, 1496

\RecordChanges 17

\ref 2437, 2444

\refname 252, 253

\refstepcounter 364

\relax 157, 163, 169, 182, 189, 216, 302, 303, 346, 365, 367, 371, 385, 399, 414, 424, 432, 443, 490, 573, 638, 672, 674, 790, 857, 985, 1275, 1277, 1283, 1285, 1391, 1392, 1445, 1469, 1523, 1532, 1542, 1543, 1563,

1568, 1571, 1575, 1581, 1584, 1587, 1590, 1593, 1596, 1599, 1603, 1610, 1648, 1809, 1810, 1921, 1950, 1984, 2006, 2027, 2144, 2168, 2258, 2268, 2269, 2270, 2271, 2274, 2277, 2279, 2281, 2283, 2286, 2318, 2321, 2322, 2323, 2324, 2327, 2330, 2333, 2365, 2367, 2390, 2417, 2471, 2493, 2494, 2496, 2498, 2520, 2522, 2525, 2553, 2640, 2642, 2643, 2644, 2647, 2648, 2649, 2652, 2653, 2655, 2658, 2659, 2660, 2661, 2679, 2724, 2736, 2759, 2763, 2799, 2836, 2866, 2923, 2937, 2948, 2966, 3021, 3025
\removelastskip 437
\renewcommand . . 251, 255, 256, 259, 261, 263, 265, 267, 269, 271, 321, 738, 911, 1280, 1349, 1775, 1798, 2377, 2542, 2543, 2675, 2676, 2764, 2768, 2772, 2776, 2785
\renewenvironment . . . 814, 912, 1449, 2935
\repeat 2479, 2657
\RequirePackage . . 29, 30, 31, 238, 239, 240, 241, 242, 243, 245, 248, 250, 477, 480, 542, 543, 553, 562, 571, 652, 699, 713, 719, 720, 724, 725, 728, 729, 730, 780, 1514, 2458, 2952, 2954, 2956, 2958, 2960, 2973, 2975, 2977, 2979, 2981
\reset@font 454, 467
\reversemarginpar . . 633
\rightarrow 1520
\rightskip 2790
\rlap 2664
\rule 461, 474, 2666

S

\savebox 2473
screenonly (environment) 22
\scriptsize . . . 2476, 2480
\scshape 2833, 2920
\section 252, 1930, 1932, 1936, 1938, 2410, 2764, 2995
\section@raggedright 2789, 2793, 2794, 2802, 2803, 2805, 2806, 2808, 2809, 2811, 2812, 2814, 2815, 2816, 2821, 2822, 2825, 2826
\Sectionformat 2737, 2741, 2743, 2754
\SelectFootnoteRule 653, 655
\setbox 410, 465, 852, 2056, 2075, 2103, 2114, 2251, 2261, 2316, 2396, 2408
\setcitestyle 24, 256, 330, 336
\setcopyright . . 17, 1607
\setcounter 1804, 1877, 1945, 2520, 2522, 2797, 2820, 2824
\setkeys 38, 161, 167, 1236, 1483, 1607, 2239, 2240, 2245, 2246, 2304, 2305, 2309, 2310, 2349, 2350, 2354, 2355
\setlength 635, 636, 642, 649, 873, 874, 879, 885, 888, 889, 890, 891, 1424, 1427, 2475
\setmonofont . . . 721, 726
\settopmatter . 19, 96, 1483, 1484, 1486, 1489, 1491, 1494, 2433
\setTrue 436
\SetWatermarkColor 555, 564
\SetWatermarkFontSize 554, 563
\SetWatermarkText 556, 565
\sfdefault 738
\sffamily 2007, 2009, 2011, 2013, 2015, 2017, 2021, 2165, 2170, 2174, 2538, 2669, 2793, 2794, 2795, 2802, 2803, 2805, 2806, 2811, 2812, 2821, 2822, 2825, 2826
\shortauthors 20, 1309, 1310, 1317, 1318, 1320, 1323, 1324, 1326, 1906, 1908, 2537
\shortcite 530, 533
\shorttitle 2557, 2565, 2575, 2586, 2593, 2609
\showeprint 3017
\sidebar 812
sidebar (environment) . 31
\skip 663
\small . . 454, 817, 824, 832, 1512, 1922, 1924, 1926, 1928, 2171, 2408, 2425, 2681
\smallskipamount . . . 894
\space 389, 1282, 1351, 1902, 2138, 3002, 3033, 3036, 3044
\specialcomment 2993
\standardpagestyle . 2539
\startPage 16, 1438
\state . 12, 1345, 2118, 2376
\stepcounter 1370, 1372, 1379, 1382, 1389, 1522
\streetaddress 12, 1343, 2118, 2370
\string . . . 540, 1282, 1351, 1440, 2421, 2422, 3033, 3036, 3044
\strut 2080, 2095

\strutbox 461, 474
\subsection 2768
\subsubsection 2772
\subtitle *10*, 1272
\subtitlenote . . *14*, 1375

T

\teaserfigure 1773
teaserfigure (environment) *19*
\terms *16*, 1440
\textbf 1525, 1537
\textbullet 484, 1524, 2572, 2575, 2582, 2586
\textcolor 2669
\textheight 2479
\textit 1538, 2435, 2439, 2440, 2441
\textrightarrow 485, 1520, 1534
\textwidth 834, 853, 854, 1799, 2046, 2074, 2102, 2142, 2268, 2315
\thanks *14*, 1775, 2456
\thankses 1778, 1780, 1812, 2456
\the . . 1297, 1304, 1358, 1361, 1406, 1408, 2476, 2480, 2528, 2660
\theACM@time@hours 2522, 2529
\theACM@time@minutes 2529
\theenumi 864
\theenumii 865
\theenumiii 866
\theenumiv 867
\thefootnote 1798
\theoremstyle 2891, 2894, 2910, 2918
\thepage 2530, 2546, 2548, 2554, 2555, 2592, 2608, 2681, 2716, 2721
\thispagestyle 1947
\thmname 2860, 2890
\thmnote 2860, 2890
\thmnumber 2860, 2890
\thr@@ 297
\time 2517, 2520, 2522
\title *10*, 2421
\titlenote . . *14*, 1366, 2422
\topsep . . . 898, 902, 2937
\trivlist 2938
\tw@ 295
\two@digits . . . 2528, 2529
\twocolumn 1957, 1959, 1961, 1963, 1965

U

\unskip 413, 483, 661, 1342, 1348, 1355, 2115, 2118, 2119, 2121, 2123, 2124, 2125, 2126, 2138, 2197, 2370, 2371, 2372, 2374, 2375, 2376, 2377, 2378, 2379, 2381, 2419, 2427, 2444, 2457
\unvbox 466, 665, 670
\upshape 911
\url 1646, 3002
\UrlBreakPenalty 2297, 2300
\urlstyle . . . 488, 497, 500
\usebox 2487, 2513
\usepackage 9, 10, 11, 12, 13, 14

V

\value 1539
\vbox 465, 852, 2056, 2075, 2103, 2251, 2316, 2396
\vskip 402, 437, 663, 671, 847
\vspace 3031
\vtop 2261

W

\wd 854, 2115
\write 540

X

\xdef 306, 308, 310, 312, 314, 316

Y

\year 1406, 2528

Z

\z@ . . 285, 289, 348, 368, 400, 410, 425, 438, 461, 474, 636, 671, 784, 788, 799, 879, 885, 897, 1814, 1820, 1826, 1830, 1912, 1914, 2058, 2070, 2082, 2097, 2361, 2408, 2542, 2543, 2633, 2635, 2637, 2663, 2665, 2675, 2676, 2764, 2768, 2772, 2780, 2785, 2792, 2844, 2874
\z@skip 437, 847, 902, 2791