

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

Boris Veytsman[†]

2018/02/07, v1.50

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	Theorems	22
2.7	Online-only and offline-only material	22
2.8	Note about anonymous mode	22
2.9	Acknowledgments	23
2.10	Bibliography	23
2.11	Colors	26
2.12	Other notable packages and typographic remarks	27
2.13	A note for wizards: <code>acmart-preload-hook.tex</code>	27
3	Implementation	29
3.1	Identification	29
3.2	Preload hook	29
3.3	Options	29
3.4	Setting switches	32

*©2016–2018, Association for Computing Machinery

[†]borisv@lk.net, boris@varphi.com

3.5	Loading the base class and package	33
3.6	Citations	34
3.7	Paper size and paragraphing	40
3.8	Fonts	44
3.9	Floats	45
3.10	Lists	46
3.11	Top-matter data	48
3.12	Concepts system	61
3.13	Copyright system	62
3.14	Typesetting top matter	67
3.15	Headers and Footers	81
3.16	Sectioning	86
3.17	TOC lists	87
3.18	Theorems	88
3.19	Acknowledgments	91
3.20	Conditional typesetting	91
3.21	Additional bibliography commands	92
3.22	End of Class	92

1 Introduction

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

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

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

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

I am grateful to Michael D. Adams, Leif Andersen, Dirk Beyer, Benjamin Byholm, Michael Ekstrand, Matthew Fluet, Paolo G. Giarrusso, Ben Greenman, Jamie Davis, LianTze Lim, Ben Liblit, Kai Mindermann, Frank Mittelbach, Serguei Mokhov, Ross Moore, John Owens, Joel Nider, Tobias Pape, Mathias Rav, Andreas Reichinger, Matteo Riondato, Craig Rodkin, Bernard Rous, David Shamma, Stephen Spencer, Daniel Thomas, Zack Weinberg, John Wickerson and many others for their invaluable help.

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

2 User's guide

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

2.1 Installation

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

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

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.

¹<http://www.acm.org/>

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 \TeX can find them (see [1] or the documentation for your \TeX system).
3. Update the database of file names. Again, see [1] or the documentation for your \TeX system for the system-specific details.
4. The file `acmart.pdf` provides the documentation for the package. (This is probably the file you are reading now.)

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

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

- *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>
- *caption*, <http://www.ctan.org/pkg/caption>
- *comment*, <http://www.ctan.org/pkg/comment>
- *cm-super*, <http://www.ctan.org/pkg/cm-super>
- *cmap*, <http://www.ctan.org/pkg/cmap>
- *draftwatermark*, <http://www.ctan.org/pkg/draftwatermark>
- *environ*, <http://www.ctan.org/pkg/environ>
- *etoolbox*, <http://www.ctan.org/pkg/etoolbox>
- *fancyhdr*, <http://www.ctan.org/pkg/fancyhdr>
- *float*, <http://www.ctan.org/pkg/float>
- *fontaxes*, <http://www.ctan.org/pkg/fontaxes>
- *geometry*, <http://www.ctan.org/pkg/geometry>
- *graphics*, <http://www.ctan.org/pkg/graphics>
- *hyperref*, <http://www.ctan.org/pkg/hyperref>

- *ifluatex*, <http://www.ctan.org/pkg/ifluatex>
- *ifxetex*, <http://www.ctan.org/pkg/ifxetex>
- *inconsolata*, <http://www.ctan.org/pkg/inconsolata>
- *libertine*, <http://www.ctan.org/pkg/libertine>
- *manyfoot*, <http://www.ctan.org/pkg/manyfoot>
- *microtype*, <http://www.ctan.org/pkg/microtype>
- *mmap*, <http://www.ctan.org/pkg/mmap>
- *ms*, <http://www.ctan.org/pkg/ms>
- *mweights*, <http://www.ctan.org/pkg/mweights>
- *natbib*, <http://www.ctan.org/pkg/natbib>
- *nccfoots*, <http://www.ctan.org/pkg/nccfoots>
- *newtx*, <http://www.ctan.org/pkg/newtx>
- *oberdiek*, <http://www.ctan.org/pkg/oberdiek>
- *pdftex-def*, <http://www.ctan.org/pkg/pdftex-def>
- *refcount*, <http://www.ctan.org/pkg/refcount>
- *setspace*, <http://www.ctan.org/pkg/setspace>
- *textcase*, <http://www.ctan.org/pkg/textcase>
- *totpages*, <http://www.ctan.org/pkg/totpages>
- *trimspaces*, <http://www.ctan.org/pkg/trimspaces>
- *upquote*, <http://www.ctan.org/pkg/upquote>
- *url*, <http://www.ctan.org/pkg/url>
- *xcolor*, <http://www.ctan.org/pkg/xcolor>
- *xkeyval*, <http://www.ctan.org/pkg/xkeyval>
- *xstring*, <http://www.ctan.org/pkg/xstring>

2.2 Invocation and options

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

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

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

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

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

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

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

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

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

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

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

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

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

The default for the option `screen` depends on the publication. At present it is `false` for all publications *but* PACM, since PACM is now electronic-only. Thus PACM titles (see Table 3) 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 2.10.

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

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

Table 1: The possible values for the format option

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

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

2.3 Top matter

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

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

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

```
\acmJournal{TOMS}
```

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 2.10)
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)
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 2.6

The currently recognized journals are listed in Table 3. Note that conference proceedings published in *book* form do not set this macro.

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

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

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

name: the name of the conference.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

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

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

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


Table 3: ACM publications and arguments of the \acmJournal command

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DTRAP	Digital Threats: Research and Practice
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
JDIQ	ACM Journal of Data and Information Quality
JEAI	ACM Journal of Experimental Algorithmics
JERIC	ACM Journal of Educational Resources in Computing
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCH	ACM Journal on Computing and Cultural Heritage
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
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
THRI	ACM Transactions on Human-Robot Interaction
TIIS	ACM Transactions on Interactive Intelligent Systems
TISSEC	ACM Transactions on Information and System Security
TIST	ACM Transactions on Intelligent Systems and Technology
TKDD	ACM Transactions on Knowledge Discovery from Data
TMIS	ACM Transactions on Management Information Systems
TOCE	ACM Transactions on Computing Education
TOCHI	ACM Transactions on Computer-Human Interaction
TOCL	ACM Transactions on Computational Logic
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory
TODAES	ACM Transactions on Design Automation of Electronic Systems
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPS	ACM Transactions on Privacy and Security
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TRETS	ACM Transactions on Reconfigurable Technology and Systems
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

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

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

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

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

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

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

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

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

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

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

Do *not* use the \LaTeX `\and` macro! Each author deserves his or her own `\author` command.

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.

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

An example of the author block:

```

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

```

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

Sometimes an author works in several departments within the same 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
Sonnenallee 17
123456, Helm, Germany
```

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

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

will be typeset as

Fluginstitut
Sonentallee 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 2.9).

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

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

You can *suppress* printing authors' addresses by setting them to an empty string:

`\authorsaddresses{}`.

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

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

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

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

```
\author{A. U. Thor}
\authornote{Both authors contributed equally to the paper}
```

```
...
\author{A. N. Other}
\authornotemark[1]
```

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

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

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

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

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.

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

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

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` or `rightsretained`, 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.

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 <code>\acmISBN{}</code> , suppresses printing the ISBN.
<code>\acmDOI</code>	<p>The macro <code>\acmDOI{<DOI>}</code> sets the DOI of the article, for example,</p> <pre>\acmDOI{10.1145/9999997.9999999}</pre>
	It is normally set by the typesetter. Setting it to the empty string, as <code>\acmDOI{}</code> , suppresses the DOI.
<code>\acmBadgeR</code> <code>\acmBadgeL</code>	<p>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: <code>\acmBadgeR[<url>]{<graphics>}</code> and <code>\acmBadgeL[<url>]{<graphics>}</code>. The first command puts the badge to the right of the title, and the second one—to the left. The exception is the <code>sigchi-a</code> mode for SIGCHI extended abstracts, which puts the badges on the left margin. The arguments have the following meaning: <code>[<url>]</code>, if provided, sets the link to the badge authority in the screen version, while <code>{<graphics>}</code> 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 <code>ae-logo.pdf</code>, the command is</p> <pre>\acmBadgeR[http://ctuning.org/ae/ppopp2016.html]{ae-logo}</pre>
<code>\startPage</code>	The macro <code>\startPage{<page>}</code> sets the first page of the article in a journal or book. It is used by the typesetter.
<code>\terms</code> <code>\keywords</code>	<p>The command <code>\keywords{<keyword, keyword,...>}</code> sets keywords for the article. They must be separated by commas, for example,</p> <pre>\keywords{wireless sensor networks, media access control, multi-channel, radio interference, time synchronization}</pre>
<code>CCSXML</code> <code>\ccsdesc</code>	<p>ACM publications are classified according to the ACM Computing Classification Scheme (CCS). CCS codes are used both in the typeset version of the publications <i>and</i> in the metadata in various databases. Therefore you need to provide both \TeX commands and XML metadata with the paper.</p> <p>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:</p> <pre>\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></pre>


```

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

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

```

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

`\setcopyright` There are several possibilities for the copyright of the papers published by the ACM: the authors may transfer the rights to the ACM, license them to the ACM, some or all authors might be employees of the US or Canadian governments, etc. Accordingly the command `\setcopyright{...}` is introduced. Its argument is the copyright status of the paper, for example, `\setcopyright{acmcopyright}`. The possible values for this command are listed in Table 4.

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

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

```

\acmYear{2016}
\copyrightyear{2015}

```

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

`abstract` The environment `abstract` must *precede* the `\maketitle` command. Again, this is different from the standard \LaTeX .

`teaserfigure` A special kind of figure is used for many two-column conference proceedings.

Table 4: 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 the 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 the ACM.
licensedcagov	All the authors are employees of the Canadian government, and the publication rights are licensed to the ACM.
licensedcagovmixed	Some authors are employees of the Canadian government, and the publication rights are licensed to the 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 the ACM.
iw3c2w3	Special statement for conferences organized by IW3C2.
iw3c2w3g	Special statement for conferences organized by IW3C2, when some authors are approved Google employees.

Table 5: Settings for the `\settopmatter` command

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

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 5. For example,

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

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

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

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

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

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

`\maketitle` The macro `\maketitle` must be the last command in the top-matter group. That is

it must follow the commands defined in this section.

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

```

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

```

2.4 Algorithms

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

2.5 Figures and tables

The new ACM styles use the standard \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`.

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

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

It is strongly recommended to use the package `booktabs` [6] and follow its main principles of typography with respect to tables:

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

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

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

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

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

sidebar
marginfigure
margintable

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

sidebar: textual information in the margin

marginfigure: a figure in the margin

margintable: a table in the margin

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

2.6 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.

2.7 Online-only and offline-only material

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

```
\section{Supplementary materials}

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

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

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

2.8 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.

2.9 Acknowledgments

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

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

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

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

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

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

Here `{<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}
```

2.10 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 Bib_T_EX styles other than ACM-Reference-Format.bst, and may delay the processing of the manuscript.

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

```
\citestyle{acmauthoryear}
```

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

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

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

One of the more common versions is

```
\setcitestyle{nosort}
```

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

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

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

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

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

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

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

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

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

There are the special entry types online and game for Web pages and games, for example,

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



```

month =      mar,
lastaccessed = "March 2, 2005",
}

```

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

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

```

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

```

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

```

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

```

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

```

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

```

```

year =      "1996",
}

```

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

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

```

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

```

2.11 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.

2.12 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.

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

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

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

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

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

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

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

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

you will pass dvipsnames to xcolor.

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

3 Implementation

3.1 Identification

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

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class>\ProvidesClass{acmart}
6 [2018/02/07 v1.50 Typesetting articles for the Association for
7 Computing Machinery]
```

And the driver code:

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

3.2 Preload hook

We preload acmart-preload-hook:

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

3.3 Options

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

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

We use xstring to check whether user input is integer

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

format The possible formats

```

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

```

\if@ACM@screen Whether we use screen mode

```

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

```

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

```

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

```

\if@ACM@review Whether we use review mode

```

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

```

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

```

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

```

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

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

```

82 \define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
83   \if@ACM@natbib
84     \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
85   \else
86     \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
87   \fi}{\PackageError{\@classname}{The option natbib can be either true or
88     false}}
89 \ExecuteOptionsX{natbib=true}

```

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

```

90 \define@boolkey+{acmart.cls}[@ACM@]{anonymous}[true]{%
91   \if@ACM@anonymous
92     \PackageInfo{\@classname}{Using anonymous mode}%
93   \else
94     \PackageInfo{\@classname}{Not using anonymous mode}%
95   \fi}{\PackageError{\@classname}{The option anonymous can be either true or
96     false}}
97 \ExecuteOptionsX{anonymous=false}

```

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

```

98 \define@boolkey+{acmart.cls}[@ACM@]{timestamp}[true]{%
99   \if@ACM@timestamp
100     \PackageInfo{\@classname}{Using timestamp mode}%
101   \else
102     \PackageInfo{\@classname}{Not using timestamp mode}%
103   \fi}{\PackageError{\@classname}{The option timestamp can be either true or
104     false}}
105 \ExecuteOptionsX{timestamp=false}

```

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

```

106 \define@boolkey+{acmart.cls}[@ACM@]{authordraft}[true]{%
107   \if@ACM@authordraft
108     \PackageInfo{\@classname}{Using authordraft mode}%
109     \@ACM@timestamptrue
110     \@ACM@reviewtrue
111   \else

```

```

112 \PackageInfo{\@classname}{Not using authordraft mode}%
113 \fi}{\PackageError{\@classname}{The option authordraft can be either true or
114     false}}
115 \ExecuteOptionsX{authordraft=false}

```

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

```

116 \def\ACM@fontsize{
117 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
118 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
119 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
120 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

121 \DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
122 \DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
123 \ProcessOptionsX
124 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}

```

3.4 Setting switches

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

```

125 \newif\if@ACM@manuscript

```

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

```

126 \newif\if@ACM@journal

```

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

```

127 \newif\if@ACM@sigchiamode

```

Setting up switches

```

128 \ifnum\ACM@format@nr=5\relax % siggraph
129 \ClassWarning{\@classname}{The format siggraph is now obsolete.
130     I am switching to sigconf.}
131 \setkeys{acmart.cls}{format=sigconf}
132 \fi
133 \ifnum\ACM@format@nr=0\relax
134 \@ACM@manuscripttrue
135 \else
136 \@ACM@manuscriptfalse
137 \fi
138 \@ACM@sigchiamodefalse
139 \ifcase\ACM@format@nr
140 \relax % manuscript
141 \@ACM@journaltrue
142 \or % acmsmall
143 \@ACM@journaltrue
144 \or % acmlarge
145 \@ACM@journaltrue

```



```

146 \or % acmtog
147   \@ACM@journaltrue
148 \or % sigconf
149   \@ACM@journalfalse
150 \or % siggraph
151   \@ACM@journalfalse
152 \or % sigplan
153   \@ACM@journalfalse
154 \or % sigchi
155   \@ACM@journalfalse
156 \or % sigchi-a
157   \@ACM@journalfalse
158   \@ACM@sigchiamodetrue
159 \fi

```

3.5 Loading the base class and package

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

```

160 \ifx\ACM@fontsize\@empty
161   \ifcase\ACM@format@nr
162     \relax % manuscript
163     \def\ACM@fontsize{9pt}%
164   \or % acmsmall
165     \def\ACM@fontsize{10pt}%
166   \or % acmlarge
167     \def\ACM@fontsize{10pt}%
168   \or % acmtog
169     \def\ACM@fontsize{9pt}%
170   \or % sigconf
171     \def\ACM@fontsize{9pt}%
172   \or % siggraph
173     \def\ACM@fontsize{9pt}%
174   \or % sigplan
175     \def\ACM@fontsize{10pt}%
176   \or % sigchi
177     \def\ACM@fontsize{10pt}%
178   \or % sigchi-a
179     \def\ACM@fontsize{10pt}%
180   \fi
181 \fi
182 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
183 \LoadClass[\ACM@fontsize, reqno]{amsart}
184 \RequirePackage{microtype}

```

We need etoolbox for delayed code

```
185 \RequirePackage{etoolbox}
```

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

```
186 \RequirePackage{refcount}
```

```
187 \RequirePackage{totpages}
```

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

```
188 \RequirePackage{environ}
```

We use `setspace` for double spacing

```
189 \if@ACM@manuscript
```

```
190 \RequirePackage{setspace}
```

```
191 \onehalfspacing
```

```
192 \fi
```

We need `textcase` for better upcasing

```
193 \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.

```
194 \if@ACM@natbib
```

```
195 \RequirePackage{natbib}
```

```
196 \renewcommand{\bibsection}{%
```

```
197 \section*{\refname}%
```

```
198 \phantomsection\addcontentsline{toc}{section}{\refname}%
```

```
199 }
```

```
200 \renewcommand{\bibfont}{\bibliofont}
```

```
201 \renewcommand{\setcitestyle}[1]{
```

```
202 \@for\@tempa:=#1\do
```

```
203 {\def\@tempb{round}\ifx\@tempa\@tempb
```

```
204 \renewcommand\NAT@open{(\renewcommand\NAT@close{)}\fi
```

```
205 \def\@tempb{square}\ifx\@tempa\@tempb
```

```
206 \renewcommand\NAT@open{[\renewcommand\NAT@close{]}\fi
```

```
207 \def\@tempb{angle}\ifx\@tempa\@tempb
```

```
208 \renewcommand\NAT@open{$<\renewcommand\NAT@close{$>}\fi
```

```
209 \def\@tempb{curly}\ifx\@tempa\@tempb
```

```
210 \renewcommand\NAT@open{\{\renewcommand\NAT@close{\}}\fi
```

```
211 \def\@tempb{semicolon}\ifx\@tempa\@tempb
```

```
212 \renewcommand\NAT@sep{;}\fi
```

```
213 \def\@tempb{colon}\ifx\@tempa\@tempb
```

```
214 \renewcommand\NAT@sep{:}\fi
```

```
215 \def\@tempb{comma}\ifx\@tempa\@tempb
```

```
216 \renewcommand\NAT@sep{,}\fi
```

```
217 \def\@tempb{authoryear}\ifx\@tempa\@tempb
```

```
218 \NAT@numbersfalse\fi
```

```
219 \def\@tempb{numbers}\ifx\@tempa\@tempb
```

```
220 \NAT@numberstrue\NAT@superfalse\fi
```

```
221 \def\@tempb{super}\ifx\@tempa\@tempb
```

```
222 \NAT@numberstrue\NAT@supertrue\fi
```

```
223 \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
```

```
224 \let\bibstyle=\@gobble\fi
```

```

225 \def\@tempb{bibstyle}\ifx\@tempa\@tempb
226 \let\bibstyle=\@citestyle\fi
227 \def\@tempb{sort}\ifx\@tempa\@tempb
228 \def\NAT@sort{\@ne}\fi
229 \def\@tempb{nosort}\ifx\@tempa\@tempb
230 \def\NAT@sort{\@z}\fi
231 \def\@tempb{compress}\ifx\@tempa\@tempb
232 \def\NAT@cmprs{\@ne}\fi
233 \def\@tempb{nocompress}\ifx\@tempa\@tempb
234 \def\NAT@cmprs{\@z}\fi
235 \def\@tempb{sort&compress}\ifx\@tempa\@tempb
236 \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
237 \def\@tempb{mcite}\ifx\@tempa\@tempb
238 \let\NAT@merge\@ne\fi
239 \def\@tempb{merge}\ifx\@tempa\@tempb
240 \ifnum\NAT@merge<\tw@\{\let\NAT@merge\tw@\}\fi
241 \def\@tempb{elide}\ifx\@tempa\@tempb
242 \ifnum\NAT@merge<\thr@\{\let\NAT@merge\thr@\}\fi
243 \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
244 \NAT@longnamestrue\fi
245 \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
246 \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
247 \expandafter\NAT@find@eq\@tempa=\relax\@nil
248 \if\@tempc\relax\else
249 \expandafter\NAT@rem@eq\@tempc
250 \def\@tempb{open}\ifx\@tempa\@tempb
251 \xdef\NAT@open{\@tempc}\fi
252 \def\@tempb{close}\ifx\@tempa\@tempb
253 \xdef\NAT@close{\@tempc}\fi
254 \def\@tempb{aysep}\ifx\@tempa\@tempb
255 \xdef\NAT@aysep{\@tempc}\fi
256 \def\@tempb{yysep}\ifx\@tempa\@tempb
257 \xdef\NAT@yrsep{\@tempc}\fi
258 \def\@tempb{notesep}\ifx\@tempa\@tempb
259 \xdef\NAT@cmt{\@tempc}\fi
260 \def\@tempb{citesep}\ifx\@tempa\@tempb
261 \xdef\NAT@sep{\@tempc}\fi
262 \fi
263 }%
264 \NAT@@setcites
265 }
266 \renewcommand\citestyle[1]{%
267 \ifcsname bibstyle@#1\endcsname%
268 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
269 \else%
270 \latexerror{Undefined ‘#1’ citestyle}%
271 \fi
272 }%
273 \fi

```

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

```
274 \newcommand{\bibstyle@acmauthoryear}{%
275   \setcitestyle{%
276     authoryear,%
277     open={},close={},citesep={;},%
278     aysep={},yysep={},,%
279     notesep={, }}}
```

`\bibstyle@acmnumeric` The default numeric format:

```
280 \newcommand{\bibstyle@acmnumeric}{%
281   \setcitestyle{%
282     numbers,sort&compress,%
283     open={},close={},citesep={},,%
284     notesep={, }}}
```

The default is numeric:

```
285 \if@ACM@natbib
286 \citestyle{acmnumeric}
287 \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:

```
288 \def\@startsection#1#2#3#4#5#6{%
289   \if@noskipsec \leavevmode \fi
290   \par
291   \@tempskipa #4\relax
292   \@afterindenttrue
293   \ifdim \@tempskipa <\z@
294     \@tempskipa -\@tempskipa \@afterindentfalse
295   \fi
296   \if@nobreak
297     \everypar{%
298       \else
299         \addpenalty\@secpenalty\addvspace\@tempskipa
300       \fi
301     \@ifstar
302       {\@ssect{#3}{#4}{#5}{#6}}%
303       {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}
304 \def\@sect#1#2#3#4#5#6[#7]#8{%
305   \edef\@toclevel{\ifnum#2=\@m 0\else\number#2\fi}%
306   \ifnum #2>\c@secnumdepth
307     \let\@svsec\@empty
308   \else
309     \refstepcounter{#1}%
310     \protected@edef\@svsec{\@secntformat{#1}\relax}%
311   \fi
312   \@tempskipa #5\relax
313   \ifdim \@tempskipa>\z@
```

```

314 \begingroup
315   #6{%
316     \@hangfrom{\hskip #3\relax\@svsec}%
317     \interlinepenalty \@M #8\@par}%
318 \endgroup
319 \csname #1mark\endcsname{#7}%
320 \ifnum #2>\c@secnumdepth \else
321   \@tochangmeasure{\csname the#1\endcsname}%
322 \fi
323 \addcontentsline{toc}{#1}{%
324   \ifnum #2>\c@secnumdepth \else
325     \protect\numberline{\csname the#1\endcsname}%
326   \fi
327   #7}%
328 \else
329   \def\@svsechd{%
330     #6{\hskip #3\relax
331       \@svsec #8}%
332     \csname #1mark\endcsname{#7}%
333     \ifnum #2>\c@secnumdepth \else
334       \@tochangmeasure{\csname the#1\endcsname\space}%
335     \fi
336     \addcontentsline{toc}{#1}{%
337       \ifnum #2>\c@secnumdepth \else
338         \protect\numberline{\csname the#1\endcsname}%
339       \fi
340       #7}}%
341 \fi
342 \@xsect{#5}}
343 \def\@xsect#1{%
344   \@tempskipa #1\relax
345   \ifdim \@tempskipa>\z@
346     \par \nobreak
347     \vskip \@tempskipa
348     \@afterheading
349   \else
350     \@nobreakfalse
351     \global\@noskipsectrue
352     \everypar{%
353       \if@noskipsec
354         \global\@noskipsecfalse
355         {\setbox\z@\lastbox}%
356         \clubpenalty\@M
357         \begingroup \@svsechd \endgroup
358         \unskip
359         \@tempskipa #1\relax
360         \hskip -\@tempskipa
361       \else
362         \clubpenalty \@clubpenalty
363         \everypar{}%

```

```

364     \fi}%
365 \fi
366 \ignorespaces}
367 \def\@seccntformat#1{\csname the#1\endcsname\quad}
368 \def\@ssect#1#2#3#4#5{%
369   \@tempskipa #3\relax
370   \ifdim \@tempskipa>\z@
371     \begingroup
372       #4{%
373         \@hangfrom{\hskip #1}%
374         \interlinepenalty \@M #5\@par}%
375     \endgroup
376   \else
377     \def\@svsechd{#4{\hskip #1\relax #5}}%
378   \fi
379   \@xsect{#3}}

```

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

```

380 \def\@starttoc#1#2{\begingroup\makeatletter
381   \setTrue{#1}%
382   \par\removelastskip\vskip\z@skip
383   \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
384     {.5\linespacing}{centering\contentsnamefont}{#2}%
385   \input{\jobname.#1}%
386   \if@filesn
387     \exp\newwrite\csname tf@#1\endcsname
388     \immediate\exp\openout\csname tf@#1\endcsname \jobname.#1\relax
389   \fi
390   \global\@nbreakfalse \endgroup
391   \addvspace{32\p@\@plus14\p@}%
392 }

```

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

```

393 \def\l@section{\@toctline{1}{0pt}{1pc}{2pc}{}}

```

\l@subsection The spacing in amsart is too large

```

394 \def\l@subsection{\@toctline{2}{0pt}{1pc}{3pc}{}}

```

\l@subsubsection The spacing in amsart is too large

```

395 \def\l@subsubsection{\@toctline{2}{0pt}{1pc}{5pc}{}}

```

And hyperref

```

396 \let\@footnotemark@nolink\@footnotemark
397 \let\@footnotetext@nolink\@footnotetext
398 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
399 \pdfstringdefDisableCommands{%
400   \def\unskip{}%
401   \def\textbullet{- }%

```

```

402 \def\textrightarrow{ -> }%
403 \def\footnotemark{ }%
404 }
405 \urlstyle{rm}
406 \ifcase\ACM@format@nr
407 \relax % manuscript
408 \or % acmsmall
409 \or % acmlarge
410 \or % acmtog
411 \or % sigconf
412 \or % siggraph
413 \or % sigplan
414 \urlstyle{sf}
415 \or % sigchi
416 \or % sigchi-a
417 \urlstyle{sf}
418 \fi
419 \AtEndPreamble{%
420 \if@ACM@screen
421 \hypersetup{colorlinks,
422 linkcolor=ACMRed,
423 citecolor=ACMPurple,
424 urlcolor=ACMDarkBlue,
425 filecolor=ACMDarkBlue}
426 \else
427 \hypersetup{hidelinks}
428 \fi}

Bibliography mangling.
429 \if@ACM@natbib
430 \let\cite\cite
431 \let\cite\citep
432 \let\citeANP\citeauthor
433 \let\citeNN\citeyearpar
434 \let\citeyearNP\citeyear
435 \let\citeNP\citealt
436 \DeclareRobustCommand\citeA
437 {\begingroup\NAT@swafalse
438 \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
439 \providecommand\newblock{}%
440 \else
441 \AtBeginDocument{%
442 \let\shortcite\cite%
443 \providecommand\citename[1]{#1}}
444 \fi
445 \newcommand\shortcite[2][]{%
446 \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:

```

447 \def\bibliographystyle#1{%
448   \ifx\@begindocumenthook\@undefined\else
449     \expandafter\AtBeginDocument
450   \fi
451   {\if@filesw
452     \immediate\write\@auxout{\string\bibstyle{#1}}%
453   \fi}}

```

Graphics and color.

```

454 \RequirePackage{graphicx}
455 \RequirePackage[prologue]{xcolor}

```

We define ACM colors according to [7]:

```

456 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
457 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
458 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
459 \definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
460 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
461 \definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
462 \definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
463 \definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}

```

Author-draft mode

```

464 \if@ACM@authordraft
465   \RequirePackage{draftwatermark}
466   \SetWatermarkFontSize{0.5in}
467   \SetWatermarkColor[gray]{.9}
468   \SetWatermarkText{\parbox{12em}{\centering
469     Unpublished working draft.\
470     Not for distribution.}}
471 \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>.

```

472 \RequirePackage{geometry}
473 \ifcase\ACM@format@nr
474 \relax % manuscript
475   \geometry{letterpaper,head=13pt,
476     marginparwidth=6pc,heightrounded}%
477 \or % acmsmall
478   \geometry{twoside=true,
479     includeheadfoot, head=13pt, foot=2pc,
480     paperwidth=6.75in, paperheight=10in,
481     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
482     marginparwidth=2pc,heightrounded
483   }%
484 \or % acmlarge

```



```

485 \geometry{twoside=true, head=13pt, foot=2pc,
486   paperwidth=8.5in, paperheight=11in,
487   includeheadfoot,
488   top=78pt, bottom=114pt, inner=81pt, outer=81pt,
489   marginparwidth=4pc,heightrounded
490   }%
491 \or % acmtog
492 \geometry{twoside=true, head=13pt, foot=2pc,
493   paperwidth=8.5in, paperheight=11in,
494   includeheadfoot, columnsep=24pt,
495   top=52pt, bottom=75pt, inner=52pt, outer=52pt,
496   marginparwidth=2pc,heightrounded
497   }%
498 \or % sigconf
499 \geometry{twoside=true, head=13pt,
500   paperwidth=8.5in, paperheight=11in,
501   includeheadfoot, columnsep=2pc,
502   top=57pt, bottom=73pt, inner=54pt, outer=54pt,
503   marginparwidth=2pc,heightrounded
504   }%
505 \or % siggraph
506 \geometry{twoside=true, head=13pt,
507   paperwidth=8.5in, paperheight=11in,
508   includeheadfoot, columnsep=2pc,
509   top=57pt, bottom=73pt, inner=54pt, outer=54pt,
510   marginparwidth=2pc,heightrounded
511   }%
512 \or % sigplan
513 \geometry{twoside=true, head=13pt,
514   paperwidth=8.5in, paperheight=11in,
515   includeheadfoot=false, columnsep=2pc,
516   top=1in, bottom=1in, inner=0.75in, outer=0.75in,
517   marginparwidth=2pc,heightrounded
518   }%
519 \or % sigchi
520 \geometry{twoside=true, head=13pt,
521   paperwidth=8.5in, paperheight=11in,
522   includeheadfoot, columnsep=2pc,
523   top=66pt, bottom=73pt, inner=54pt, outer=54pt,
524   marginparwidth=2pc,heightrounded
525   }%
526 \or % sigchi-a
527 \geometry{twoside=false, head=13pt,
528   paperwidth=11in, paperheight=8.5in,
529   includeheadfoot, marginparsep=72pt,
530   marginparwidth=170pt, columnsep=20pt,
531   top=72pt, bottom=72pt, left=314pt, right=72pt
532   }%
533 \@mparswitchfalse
534 \reversemarginpar

```

```

535 \fi

\parindent Paragraphing
\parskip
536 \setlength\parindent{10\p@}
537 \setlength\parskip{\z@}
538 \ifcase\ACM@format@nr
539 \relax % manuscript
540 \or % acmsmall
541 \or % acmlarge
542 \or % acmtog
543 \setlength\parindent{9\p@}%
544 \or % sigconf
545 \or % siggraph
546 \or % sigplan
547 \or % sigchi
548 \or % sigchi-a
549 \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 com-
mand. We set \normalparindent to the value of \parindent as selected by acmart for
consistent paragraph indents.
550 \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.
551 \def\copyrightpermissionfootnoterule{\kern-3\p@
552 \hrule \@width \columnwidth \kern 2.6\p@}

553 \RequirePackage{manyfoot}
554 \SelectFootnoteRule[2]{copyrightpermission}
555 \DeclareNewFootnote{authorsaddresses}
556 \SelectFootnoteRule[2]{copyrightpermission}
557 \DeclareNewFootnote{copyrightpermission}

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

\endminipage We do not use footnote rules in minipages
560 \def\endminipage{%
561 \par

```

```

562 \unskip
563 \ifvoid\@mpfootins\else
564 \vskip\skip\@mpfootins
565 \normalcolor
566 \unvbox\@mpfootins
567 \fi
568 \@minipagefalse
569 \color@endgroup
570 \egroup
571 \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}

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

\@footnotetext In sigchi-a mode our footnotes are in the margin!
573 \if@ACM@sigchiamode
574 \long\def\@footnotetext#1{\marginpar{%
575 \reset@font\small
576 \interlinepenalty\interfootnotelinepenalty
577 \protected@edef\@currentlabel{%
578 \csname p@footnote\endcsname\@thefnmark
579 }%
580 \color@begingroup
581 \@makefnmark{%
582 \rule{z@footnotesep}{\ignorespaces#1}\@finalstrut\strutbox}%
583 \color@endgroup}}%
584 \fi

\@mpfootnotetext We want the footnotes in minipages centered:
585 \long\def\@mpfootnotetext#1{%
586 \global\setbox\@mpfootins\vbox{%
587 \unvbox\@mpfootins
588 \reset@font\footnotesize
589 \hsize\columnwidth
590 \@parboxrestore
591 \protected@edef\@currentlabel
592 {\csname p@mpfootnote\endcsname\@thefnmark}%
593 \color@begingroup\centering
594 \@makefnmark{%
595 \rule{z@footnotesep}{\ignorespaces#1}\@finalstrut\strutbox}%
596 \color@endgroup}}

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

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

```

3.8 Fonts

Somehow PDF_TTeX 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.

```

600 \RequirePackage{iftex}
601 \ifPDFTeX
602 \input{glyphtounicode}
603 \pdfglyphtounicode{f_f}{FB00}
604 \pdfglyphtounicode{f_f_i}{FB03}
605 \pdfglyphtounicode{f_f_l}{FB04}
606 \pdfglyphtounicode{f_i}{FB01}
607 \pdfglyphtounicode{t_t}{00740074}
608 \pdfglyphtounicode{f_t}{00660074}
609 \pdfglyphtounicode{T_h}{00540068}
610 \pdfgentounicode=1
611 \fi
612 \RequirePackage{cmap}

\if@ACM@newfonts Whether we load the new fonts
613 \newif\if@ACM@newfonts
614 \@ACM@newfontstrue
615 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
616   have the libertine package installed. Please upgrade your
617   TeX}\@ACM@newfontsfalse}
618 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
619   have the zi4 package installed. Please upgrade your
620   TeX}\@ACM@newfontsfalse}
621 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
622   have the newtxmath package installed. Please upgrade your
623   TeX}\@ACM@newfontsfalse}

  We use Libertine throughout.
624 \if@ACM@newfonts
625 \RequirePackage[tt=false, type1=true]{libertine}
626 \RequirePackage[varqu]{zi4}
627 \RequirePackage[libertine]{newtxmath}
628 \RequirePackage[T1]{fontenc}
629 \fi

\liningnums Libertine defines \liningnums, which makes fontspec unhappy. While we do not use
fontspec, some users do.
630 \let\liningnums\@undefined
631 \AtEndPreamble{%
632   \DeclareTextFontCommand{\liningnums}{\libertineLF}}

  The SIGCHI extended abstracts are sans serif:
633 \if@ACM@sigchiamode
634   \renewcommand{\familydefault}{\sfdefault}
635 \fi

```

3.9 Floats

We use the caption package

```

636 \RequirePackage{caption, float}
637 \captionsetup[table]{position=top}
638 \if@ACM@journal
639   \captionsetup{labelfont={sf, small},
640     textfont={sf, small}, margin=\z@}
641   \captionsetup[figure]{name={Fig.}}
642 \else
643   \captionsetup{labelfont={bf},
644     textfont={bf}, labelsep=colon, margin=\z@}
645   \ifcase\ACM@format@nr
646     \relax % manuscript
647     \or % acmsmall
648     \or % acmlarge
649     \or % acmtog
650     \or % sigconf
651     \or % siggraph
652     \captionsetup{textfont={it}}
653     \or % sigplan
654     \captionsetup{labelfont={bf},
655       textfont={normalfont}, labelsep=period, margin=\z@}
656     \or % sigchi
657     \captionsetup[figure]{labelfont={bf, small},
658       textfont={bf, small}}
659     \or % sigchi-a
660     \captionsetup[figure]{labelfont={bf, small},
661       textfont={bf, small}}
662   \fi
663 \fi

```

sidebar The sidebar environment:

```

664 \newfloat{sidebar}{}{sbar}
665 \floatname{sidebar}{Sidebar}
666 \renewenvironment{sidebar}{}{\Collect@Body\@sidebar}{}

```

\@sidebar The processing of the saved text

```

667 \long\def\@sidebar#1{\bgroup\captionsetup{type=sidebar}%
668   \marginpar{\small#1}\egroup}

```

marginfigure The marginfigure environment:

```

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

```

\@marginfigure The processing of the saved text

```

670 \long\def\@marginfigure#1{\bgroup\captionsetup{type=figure}%
671   \marginpar{\centering\small#1}\egroup}

```

margintable The margintable environment:

```

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

```

`\@margintable` The processing of the saved text

```
673 \long\def\@margintable#1{\bgroup\captionsetup{type=table}%  
674 \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

```
675 \newdimen\fulltextwidth  
676 \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)

```
677 \if@ACM@sigchiamode  
678 \def\@dblfloat{\bgroup\columnwidth=\fulltextwidth  
679 \let\endfloatbox\endwidefloatbox  
680 \def\@fpsaddddefault{\def\@fps{tp}}%  
681 \@float}  
682 \fi
```

`\enddblfloat` And the end. Just adding a `\bgroup`.

```
683 \if@ACM@sigchiamode  
684 \def\enddblfloat{%  
685 \end@float\egroup}  
686 \fi
```

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

```
687 \def\@endwidefloatbox{%  
688 \par\vskip\z@skip  
689 \@minipagefalse  
690 \outer@nobreak  
691 \egroup  
692 \color@endbox  
693 \global\setbox\@currbox=\vbox{\moveleft  
694 \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%  
695 \wd\@currbox=\textwidth  
696 }
```

3.10 Lists

```
697 \ifcase\ACM@format@nr  
698 \relax % manuscript  
699 \or % acmsmall  
700 \or % acmlarge  
701 \or % acmtog  
702 \or % sigconf  
703 \or % siggraph  
704 \or % sigplan  
705 \def\labelenumi{\theenumi.}
```

```

706 \def\labelenumii{\theenumii.}
707 \def\labelenumiii{\theenumiii.}
708 \def\labelenumiv{\theenumiv.}
709 \or % sigchi
710 \or % sigchi-a
711 \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`.

```

712 \newdimen\@ACM@labelwidth
713 \AtBeginDocument{%
714   \setlength\labelsep{4pt}
715   \setlength{\@ACM@labelwidth}{6.5pt}
716
717   %% First-level list: when beginning after the first line of an
718   %% indented paragraph or ending before an indented paragraph, labels
719   %% should not hang to the left of the preceding/following text.
720   \setlength\leftmargin{\z@}
721   \addtolength\leftmargin{\parindent}
722   \addtolength\leftmargin{2\labelsep}
723   \addtolength\leftmargin{\@ACM@labelwidth}
724
725   %% Second-level and higher lists.
726   \setlength\leftmarginii{\z@}
727   \addtolength\leftmarginii{0.5\labelsep}
728   \addtolength\leftmarginii{\@ACM@labelwidth}
729   \setlength\leftmarginiii{\leftmarginii}
730   \setlength\leftmarginiv{\leftmarginiii}
731   \setlength\leftmarginv{\leftmarginiv}
732   \setlength\leftmarginvi{\leftmarginv}
733   \@listi}
734 \newskip\listisep
735 \listisep\smallskipamount
736 \def\@listI{\leftmargin\leftmargini
737   \labelwidth\leftmargini \advance\labelwidth-\labelsep
738   \listparindent\z@
739   \topsep\listisep}
740 \let\@listi\@listI
741 \def\@listii{\leftmargin\leftmarginii
742   \labelwidth\leftmarginii \advance\labelwidth-\labelsep
743   \topsep\z@skip}
744 \def\@listiii{\leftmargin\leftmarginiii
745   \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
746 \def\@listiv{\leftmargin\leftmarginiv
747   \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
748 \def\@listv{\leftmargin\leftmarginv

```

```

749 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
750 \def\@listvi{\leftmargin\leftmarginvi
751 \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}

\descriptionlabel We do not use a colon by default like amsart does:
752 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}

\description Make the description environment indentation consistent with that of the itemize
and enumerate environments.
753 \renewenvironment{description}{\list{}{\%
754 \labelwidth\@ACM\labelwidth
755 \let\makelabel\descriptionlabel}%
756 }{
757 \endlist
758 }
759 \let\enddescription=\endlist % for efficiency

```

3.11 Top-matter data

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

```

760 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
761 CIE,%
762 CSUR,%
763 DTRAP,%
764 IMWUT,%
765 JACM,%
766 JDIQ,%
767 JEA,%
768 JERIC,%
769 JETC,%
770 JOCCH,%
771 PACMHCI,%
772 PACMPL,%
773 POMACS,%
774 TAAS,%
775 TACCESS,%
776 TACO,%
777 TALG,%
778 TALLIP,%
779 TAP,%
780 TCPS,%
781 TEAC,%
782 TECS,%
783 THRI,%
784 TIIS,%
785 TISSEC,%
786 TIST,%
787 TKDD,%
788 TMIS,%

```



```

789 TOCE,%
790 TOCHI,%
791 TOCL,%
792 TOCS,%
793 TOCT,%
794 TODAES,%
795 TODS,%
796 TOG,%
797 TOIS,%
798 TOIT,%
799 TOMACS,%
800 TOMM,%
801 TOMPECS,%
802 TOMS,%
803 TOPC,%
804 TOPS,%
805 TOPLAS,%
806 TOS,%
807 TOSEM,%
808 TOSN,%
809 TRETs,%
810 TSAS,%
811 TSC,%
812 TSLP,%
813 TWEB%
814 }{%
815 \ifcase\@journalCode@nr
816 \relax % CIE
817 \def\@journalName{ACM Computers in Entertainment}%
818 \def\@journalNameShort{ACM Comput. Entertain.}%
819 \def\@permissionCodeOne{1544-3574}%
820 \or % CSUR
821 \def\@journalName{ACM Computing Surveys}%
822 \def\@journalNameShort{ACM Comput. Surv.}%
823 \def\@permissionCodeOne{0360-0300}%
824 \or % DTRAP
825 \def\@journalName{Digital Threats: Research and Practice}%
826 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
827 \def\@permissionCodeOne{2576-5337}%
828 \or % IMWUT
829 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
830 Wearable and Ubiquitous Technologies}%
831 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
832 \def\@permissionCodeOne{2474-9567}%
833 \@ACM@screentru
834 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
835 \or % JACM
836 \def\@journalName{Journal of the ACM}%
837 \def\@journalNameShort{J. ACM}%
838 \def\@permissionCodeOne{0004-5411}%

```

```

839 \or % JDIQ
840 \def\@journalName{ACM Journal of Data and Information Quality}%
841 \def\@journalNameShort{ACM J. Data Inform. Quality}%
842 \def\@permissionCodeOne{1936-1955}%
843 \or % JEA
844 \def\@journalName{ACM Journal of Experimental Algorithmics}%
845 \def\@journalNameShort{ACM J. Exp. Algor.}%
846 \def\@permissionCodeOne{1084-6654}%
847 \or % JERIC
848 \def\@journalName{ACM Journal of Educational Resources in Computing}%
849 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
850 \def\@permissionCodeOne{1073-0516}%
851 \or % JETC
852 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
853 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
854 \def\@permissionCodeOne{1550-4832}%
855 \or % JOCCH
856 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
857 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
858 \or % PACM HCI
859 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
860 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
861 \def\@permissionCodeOne{2573-0142}%
862 \@ACM@screentru
863 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
864 \or % PACMPL
865 \def\@journalName{Proceedings of the ACM on Programming Languages}%
866 \def\@journalNameShort{Proc. ACM Program. Lang.}%
867 \def\@permissionCodeOne{2475-1421}%
868 \@ACM@screentru
869 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
870 \or % POMACS
871 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
872 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
873 \def\@permissionCodeOne{2476-1249}%
874 \@ACM@screentru
875 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
876 \or % TAAS
877 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
878 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
879 \def\@permissionCodeOne{1556-4665}%
880 \or % TACCESS
881 \def\@journalName{ACM Transactions on Accessible Computing}%
882 \def\@journalNameShort{ACM Trans. Access. Comput.}%
883 \def\@permissionCodeOne{1936-7228}%
884 \or % TACO
885 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
886 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
887 \or % TALG
888 \def\@journalName{ACM Transactions on Algorithms}%

```

```

889 \def\@journalNameShort{ACM Trans. Algor.}%
890 \def\@permissionCodeOne{1549-6325}%
891 \or % TALLIP
892 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
893 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
894 \def\@permissionCodeOne{2375-4699}%
895 \or % TAP
896 \def\@journalName{ACM Transactions on Applied Perception}%
897 \or % TCPS
898 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
899 \or % TEAC
900 \def\@journalName{ACM Transactions on Economics and Computation}%
901 \or % TECS
902 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
903 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
904 \def\@permissionCodeOne{1539-9087}%
905 \or % THRI
906 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
907 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
908 \def\@permissionCodeOne{2573-9522}%
909 \or % TIIS
910 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
911 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
912 \def\@permissionCodeOne{2160-6455}%
913 \or % TISSEC
914 \def\@journalName{ACM Transactions on Information and System Security}%
915 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
916 \def\@permissionCodeOne{1094-9224}%
917 \or % TIST
918 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
919 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
920 \def\@permissionCodeOne{2157-6904}%
921 \or % TKDD
922 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
923 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
924 \def\@permissionCodeOne{1556-4681}%
925 \or % TMIS
926 \def\@journalName{ACM Transactions on Management Information Systems}%
927 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
928 \def\@permissionCodeOne{2158-656X}%
929 \or % TOCE
930 \def\@journalName{ACM Transactions on Computing Education}%
931 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
932 \def\@permissionCodeOne{1946-6226}%
933 \or % TOCHI
934 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
935 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
936 \def\@permissionCodeOne{1073-0516}%
937 \or % TOCL
938 \def\@journalName{ACM Transactions on Computational Logic}%

```

```

939 \def\@journalNameShort{ACM Trans. Comput. Logic}%
940 \def\@permissionCodeOne{1529-3785}%
941 \or % TOCS
942 \def\@journalName{ACM Transactions on Computer Systems}%
943 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
944 \def\@permissionCodeOne{0734-2071}%
945 \or % TOCT
946 \def\@journalName{ACM Transactions on Computation Theory}%
947 \def\@journalNameShort{ACM Trans. Comput. Theory}%
948 \def\@permissionCodeOne{1942-3454}%
949 \or % TODAES
950 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
951 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
952 \def\@permissionCodeOne{1084-4309}%
953 \or % TODS
954 \def\@journalName{ACM Transactions on Database Systems}%
955 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
956 \def\@permissionCodeOne{0362-5915}%
957 \or % TOG
958 \def\@journalName{ACM Transactions on Graphics}%
959 \def\@journalNameShort{ACM Trans. Graph.}%
960 \def\@permissionCodeOne{0730-0301}%
961 \or % TOIS
962 \def\@journalName{ACM Transactions on Information Systems}%
963 \def\@permissionCodeOne{1046-8188}%
964 \or % TOIT
965 \def\@journalName{ACM Transactions on Internet Technology}%
966 \def\@journalNameShort{ACM Trans. Internet Technol.}%
967 \def\@permissionCodeOne{1533-5399}%
968 \or % TOMACS
969 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
970 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
971 \or % TOMM
972 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
973 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
974 \def\@permissionCodeOne{1551-6857}%
975 \def\@permissionCodeTwo{0100}%
976 \or % TOMPECS
977 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
978 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
979 \def\@permissionCodeOne{2376-3639}%
980 \or % TOMS
981 \def\@journalName{ACM Transactions on Mathematical Software}%
982 \def\@journalNameShort{ACM Trans. Math. Softw.}%
983 \def\@permissionCodeOne{0098-3500}%
984 \or % TOPC
985 \def\@journalName{ACM Transactions on Parallel Computing}%
986 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
987 \def\@permissionCodeOne{1539-9087}%
988 \or % TOPS

```

```

989 \def\@journalName{ACM Transactions on Privacy and Security}%
990 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
991 \def\@permissionCodeOne{2471-2566}%
992 \or % TOPLAS
993 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
994 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
995 \def\@permissionCodeOne{0164-0925}%
996 \or % TOS
997 \def\@journalName{ACM Transactions on Storage}%
998 \def\@journalNameShort{ACM Trans. Storage}%
999 \def\@permissionCodeOne{1553-3077}%
1000 \or % TOSEM
1001 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1002 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1003 \def\@permissionCodeOne{1049-331X}%
1004 \or % TOSN
1005 \def\@journalName{ACM Transactions on Sensor Networks}%
1006 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1007 \def\@permissionCodeOne{1550-4859}%
1008 \or % TRET
1009 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1010 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1011 \def\@permissionCodeOne{1936-7406}%
1012 \or % TSAS
1013 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1014 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1015 \def\@permissionCodeOne{2374-0353}%
1016 \or % TSC
1017 \def\@journalName{ACM Transactions on Social Computing}%
1018 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1019 \def\@permissionCodeOne{2469-7818}%
1020 \or % TSLP
1021 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1022 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1023 \def\@permissionCodeOne{1550-4875}%
1024 \or % TWEB
1025 \def\@journalName{ACM Transactions on the Web}%
1026 \def\@journalNameShort{ACM Trans. Web}%
1027 \def\@permissionCodeOne{1559-1131}%
1028 \fi
1029 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1030 }{%
1031 \ClassError{\@classname}{Incorrect journal #1}%
1032 }%

```

\acmJournal And the syntactic sugar around it

```

1033 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}}

```

The defaults:

```

1034 \def\@journalCode@nr{0}

```

```

1035 \def\@journalName{%
1036 \def\@journalNameShort{\@journalName}%
1037 \def\@permissionCodeOne{XXXX-XXXX}%
1038 \def\@permissionCodeTwo{%

\acmConference This is the conference command
1039 \newcommand\acmConference[4][{}%
1040 \gdef\acmConference@shortname{#1}%
1041 \gdef\acmConference@name{#2}%
1042 \gdef\acmConference@date{#3}%
1043 \gdef\acmConference@venue{#4}%
1044 \ifx\acmConference@shortname\empty
1045 \gdef\acmConference@shortname{#2}%
1046 \fi}
1047 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1048 DC, USA}

\acmBooktitle The book title of the conference:
\@acmBooktitle 1049 \def\acmBooktitle#1{\gdef\acmBooktitle{#1}}
1050 \acmBooktitle{Proceedings of \acmConference@name
1051 \ifx\acmConference@name\acmConference@shortname\else
1052 \ (\acmConference@shortname)\fi}

\@editorsAbbrev How to abbreviate editors
1053 \def\@editorsAbbrev{(Ed.)}

\@acmEditors The list of editors
1054 \def\@acmEditors{}

\editor Add a new editor to the list
1055 \def\editor#1{\ifx\@acmEditors\empty
1056 \gdef\@acmEditors{#1}%
1057 \else
1058 \gdef\@editorsAbbrev{(Eds.)}%
1059 \g@addto@macro\@acmEditors{\and#1}%
1060 \fi}

\subtitle The subtitle macro
1061 \def\subtitle#1{\def\@subtitle{#1}}
1062 \subtitle{}

\num@authorgroups The total number of “groups”. Each group is several authors with the same affiliations(s)
1063 \newcount\num@authorgroups
1064 \num@authorgroups=0\relax

\num@authors The total number of authors
1065 \newcount\num@authors
1066 \num@authors=0\relax

```

`\if@insideauthorgroup` Whether we are continuing an author group

```

1067 \newif\if@insideauthorgroup
1068 \@insideauthorgroupfalse

```

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

```

1069 \renewcommand\author[2][{}]{%
1070   \global\advance\num@authors by 1\relax
1071   \if@insideauthorgroup\else
1072     \global\advance\num@authorgroups by 1\relax
1073     \global\@insideauthorgrouptrue
1074   \fi
1075   \ifx\addresses\@empty
1076     \if@ACM@anonymous
1077       \gdef\addresses{\@author{Anonymous Author(s)}}%
1078       \gdef\authors{Anonymous Author(s)}%
1079     \else
1080       \gdef\addresses{\@author{#2}}%
1081       \gdef\authors{#2}%
1082     \fi
1083   \else
1084     \if@ACM@anonymous\else
1085       \g@addto@macro\addresses{\and\@author{#2}}%
1086       \g@addto@macro\authors{\and#2}%
1087     \fi
1088   \fi
1089   \if@ACM@anonymous
1090     \ifx\shortauthors\@empty
1091       \gdef\shortauthors{Anon.}%
1092     \fi
1093   \else
1094     \def\@tempa{#1}%
1095     \ifx\@tempa\@empty
1096       \ifx\shortauthors\@empty
1097         \gdef\shortauthors{#2}%
1098       \else
1099         \g@addto@macro\shortauthors{\and#2}%
1100       \fi
1101     \else
1102       \ifx\shortauthors\@empty
1103         \gdef\shortauthors{#1}%
1104       \else
1105         \g@addto@macro\shortauthors{\and#1}%
1106       \fi
1107     \fi
1108   \fi}

```

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

```

1109 \newcommand{\affiliation}[2][{}]{%

```

```

1110 \global\@insideauthorgroupfalse
1111 \if@ACM@anonymous\else
1112     \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1113 \fi}

@ACM@affiliation@obeypunctuation Whether to use the author's punctuation (false by default, which adds American-style
address punctuation)
1114 \define@boolkey+{@ACM@affiliation@}{@ACM@affiliation@}{obeypunctuation}%
1115 [true]{}{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

\additionalaffiliation Additional affiliations go to footnotes
1116 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

\@additionalaffiliation Process \additionalaffiliation inside \authornote
1117 \def\@additionalaffiliation#1{\bgroup
1118     \def\position##1{\ignorespaces}%
1119     \def\institution##1{##1\ignorespaces}%
1120     \def\department{\ifnextchar[{\@department}]{\@department[]}}%
1121     \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
1122     \let\streetaddress\position
1123     \let\city\position
1124     \let\state\position
1125     \let\postcode\position
1126     \let\country\position
1127     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.
1128 \renewcommand{\email}[2][]{%
1129     \if@ACM@anonymous\else
1130         \g@addto@macro\addresses{\email{#1}{#2}}%
1131     \fi}

\orcid Right now we do not typeset ORCIDs
1132 \def\orcid#1{\unskip\ignorespaces}

\authorsaddresses Setting up authors' addresses
1133 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1134 \authorsaddresses{\mkauthorsaddresses}

\@titlenotes The title notes
1135 \def\@titlenotes{}

\titlenote Adding a note to the title
1136 \def\titlenote#1{%
1137     \g@addto@macro\@title{\footnotemark}%
1138     \if@ACM@anonymous
1139         \g@addto@macro\@titlenotes{%

```



```

1140     \stepcounter{footnote}\footnotetext{Title note}}%
1141   \else
1142     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1143   \fi}

\@subtitlenotes The subtitle notes
1144 \def\@subtitlenotes{}

\subtitlenote Adding a note to the subtitle
1145 \def\subtitlenote#1{%
1146   \g@addto@macro\@subtitle{\footnotemark}%
1147   \if@ACM@anonymous
1148     \g@addto@macro\@subtitlenotes{%
1149       \stepcounter{footnote}\footnotetext{Subtitle note}}%
1150   \else
1151     \g@addto@macro\@subtitlenotes{%
1152       \stepcounter{footnote}\footnotetext{#1}}%
1153   \fi}

\@authornotes The author notes
1154 \def\@authornotes{}

\authornote Adding a note to the author
1155 \def\authornote#1{%
1156   \if@ACM@anonymous\else
1157     \g@addto@macro\addresses{\@authornotemark}%
1158     \g@addto@macro\@authornotes{%
1159       \stepcounter{footnote}\footnotetext{#1}}%
1160   \fi}

\authornotemark Adding a footnote mark to the authors
1161 \newcommand\authornotemark[1][\relax]{%
1162   \ifx#1\relax\relax\relax
1163     \g@addto@macro\addresses{\@authornotemark}%
1164   \else
1165     \g@addto@macro\addresses{\@authornotemark{#1}}%
1166   \fi}

\acmVolume The current volume
1167 \def\acmVolume#1{\def\@acmVolume{#1}}
1168 \acmVolume{1}

\acmNumber The current number
1169 \def\acmNumber#1{\def\@acmNumber{#1}}
1170 \acmNumber{1}

\acmArticle The current article
1171 \def\acmArticle#1{\def\@acmArticle{#1}}
1172 \acmArticle{}

```

<code>\acmArticleSeq</code>	The sequence number 1173 <code>\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}</code> 1174 <code>\acmArticleSeq{\@acmArticle}</code>
<code>\acmYear</code>	The current year 1175 <code>\def\acmYear#1{\def\@acmYear{#1}}</code> 1176 <code>\acmYear{\the\year}</code>
<code>\acmMonth</code>	The current month 1177 <code>\def\acmMonth#1{\def\@acmMonth{#1}}</code> 1178 <code>\acmMonth{\the\month}</code>
<code>\@acmPubDate</code>	The publication date 1179 <code>\def\@acmPubDate{\ifcase\@acmMonth\or</code> 1180 <code>January\or February\or March\or April\or May\or June\or</code> 1181 <code>July\or August\or September\or October\or November\or</code> 1182 <code>December\fi~\@acmYear}</code>
<code>\acmPrice</code>	The price 1183 <code>\def\acmPrice#1{\def\@acmPrice{#1}}</code> 1184 <code>\acmPrice{15.00}</code>
<code>\acmSubmissionID</code>	The submission ID 1185 <code>\def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}</code> 1186 <code>\acmSubmissionID{}</code>
<code>\acmISBN</code>	The book ISBN 1187 <code>\def\acmISBN#1{\def\@acmISBN{#1}}</code> 1188 <code>\acmISBN{978-x-xxxx-xxxx-x/YY/MM}</code>
<code>\acmDOI</code>	The paper DOI 1189 <code>\def\acmDOI#1{\def\@acmDOI{#1}}</code> 1190 <code>\acmDOI{10.1145/nnnnnnn.nnnnnnn}</code>
<code>\if@ACM@badge</code>	Whether to print a badge. Note that either a left or right badge triggers it: 1191 <code>\newif\if@ACM@badge</code> 1192 <code>\@ACM@badgefalse</code>
<code>\@ACM@badge@width</code>	The width of the badge 1193 <code>\newlength\@ACM@badge@width</code> 1194 <code>\setlength\@ACM@badge@width{5pc}</code>
<code>\@ACM@title@width</code>	The width of the badge 1195 <code>\newlength\@ACM@title@width</code>
<code>\@ACM@badge@skip</code>	The space between the badge and the title 1196 <code>\newlength\@ACM@badge@skip</code> 1197 <code>\setlength\@ACM@badge@skip{1pc}</code>

`\acmBadgeR` Setting the right badge

```

1198 \newcommand\acmBadgeR[2][\@ACM@badgetrue
1199   \def\@acmBadgeR@url{#1}%
1200   \def\@acmBadgeR@image{#2}}
1201 \def\@acmBadgeR@url{}
1202 \def\@acmBadgeR@image{}

```

`\acmBadgeL` Setting the left badge

```

1203 \newcommand\acmBadgeL[2][\@ACM@badgetrue
1204   \def\@acmBadgeL@url{#1}%
1205   \def\@acmBadgeL@image{#2}}
1206 \def\@acmBadgeL@url{}
1207 \def\@acmBadgeL@image{}

```

`\startPage` The start page of the paper

```

1208 \def\startPage#1{\def\@startPage{#1}}
1209 \startPage{}

```

`\terms` Terms are obsolete. We use CCS now.

```

1210 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
1211   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.

```

1212 \def\keywords#1{\def\@keywords{#1}}
1213 \keywords{}

```

`abstract` The amsart package puts abstract in a box. Since we do not know whether we will use two-column mode, we prefer to save the text

```

1214 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}

```

`\@saveabstract` And saving the abstract

```

1215 \long\def\@saveabstract#1{\long\gdef\@abstract{#1}}
1216 \@saveabstract{}

```

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

```

1217 \long\def\@empty{}

```

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

```

1218 \define@boolkey+{@ACM@topmatter@}{@ACM@}{printccs}[true]{%
1219   \if@ACM@printccs
1220     \ClassInfo{\@classname}{Printing CCS}%
1221   \else
1222     \ClassInfo{\@classname}{Suppressing CCS}%
1223   \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}

```

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

```

1224 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1225   \if@ACM@printacmref
1226     \ClassInfo{\@classname}{Printing bibformat}%
1227   \else
1228     \ClassInfo{\@classname}{Suppressing bibformat}%
1229 \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}

```

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

```

1230 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1231   \if@ACM@printfolios
1232     \ClassInfo{\@classname}{Printing folios}%
1233   \else
1234     \ClassInfo{\@classname}{Suppressing folios}%
1235 \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}

```

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

```

1236 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsprow}[0]{%
1237   \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsprow to
1238     #1}}{\ClassWarning{\@classname}{The parameter authorsprow must be
1239     numerical. Ignoring the input #1}}\gdef\@ACM@authorsprow{0}}

```

`\settopmatter` The usual syntactic sugar

```

1240 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

```

Now the settings

```

1241 \settopmatter{printccs=true, printacmref=true}
1242 \if@ACM@manuscript
1243   \settopmatter{printfolios=true}
1244 \else
1245   \if@ACM@journal
1246     \settopmatter{printfolios=true}
1247   \else
1248     \settopmatter{printfolios=false}
1249   \fi
1250 \fi
1251 \settopmatter{authorsprow=0}

```

`\@received` The container for the paper history

```

1252 \def\@received{}

```

`\received` The `\received` command

```

1253 \newcommand\received[2][\def\@tempa{#1}%
1254   \ifx\@tempa\empty
1255     \ifx\@received\empty
1256       \gdef\@received{Received #2}%
1257     \else
1258       \g@addto@macro{\@received}{; revised #2}%
1259     \fi

```

```

1260 \else
1261   \ifx\@received\@empty
1262     \gdef\@received{#1 #2}%
1263   \else
1264     \g@addto@macro{\@received}{; #1 #2}%
1265   \fi
1266 \fi}
1267 \AtEndDocument{%
1268   \ifx\@received\@empty\else
1269     \par\bigskip\noindent\small\normalfont\@received\par
1270   \fi}

```

3.12 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```

1271 \RequirePackage{comment}
1272 \excludecomment{CCSXML}

```

\@concepts This is the storage macro for concepts

```
1273 \let\@concepts\@empty
```

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

```

1274 \newcommand\ccsdesc[2][100]{%
1275   \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!

```

1276 \RequirePackage{textcomp}
1277 \def\ccsdesc@parse#1~#2~#3~{%
1278   \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1279     \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1280       \textbf{#2}}%
1281     \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
1282     \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1283     \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
1284       \csname CCS@Punctuation@#2\endcsname
1285       \csname CCS@Specific@#2\endcsname}%
1286   \fi
1287   \ifx#3\relax\relax\else
1288     \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
1289       \textrightarrow\ }%
1290     \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1291       \ifnum#1>499\textbf{#3}; \else
1292       \ifnum#1>299\textit{#3}; \else
1293       #3; \fi\fi}%
1294   \fi
1295 \ccsdesc@parse@finish}

```

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

```
1296 \def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}
```

3.13 Copyright system

This is from acmcopyright.sty

`\if@printcopyright` Whether to print a copyright symbol
1297 `\newif\if@printcopyright`
1298 `\@printcopyrighttrue`

`\if@printpermission` Whether to print the permission block
1299 `\newif\if@printpermission`
1300 `\@printpermissiontrue`

`\if@acmowned` Whether the ACM owns the rights to the paper
1301 `\newif\if@acmowned`
1302 `\@acmownedtrue`

Keys:

```
1303 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1304   \acm@copyrightinput\acm@copyrightmode]{none,%
1305     acmcopyright,acmlicensed,rightsretained,%
1306     usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1307     licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
1308     iw3c2w3,iw3c2w3g}{%
1309   \@printpermissiontrue
1310   \@printcopyrighttrue
1311   \@acmownedtrue
1312   \ifnum\acm@copyrightmode=0\relax % none
1313     \@printpermissionfalse
1314     \@printcopyrightfalse
1315     \@acmownedfalse
1316   \fi
1317   \ifnum\acm@copyrightmode=2\relax % acmlicensed
1318     \@acmownedfalse
1319   \fi
1320   \ifnum\acm@copyrightmode=3\relax % rightsretained
1321     \@acmownedfalse
1322     \acmPrice{}%
1323   \fi
1324   \ifnum\acm@copyrightmode=4\relax % usgov
1325     \@printpermissiontrue
1326     \@printcopyrightfalse
1327     \@acmownedfalse
1328     \acmPrice{}%
1329   \fi
1330   \ifnum\acm@copyrightmode=6\relax % cagov
1331     \@acmownedfalse
1332   \fi
1333   \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1334     \@acmownedfalse
1335   \fi
```

```

1336 \ifnum\acm@copyrightmode=9\relax % licensedcagov
1337 \@acmownedfalse
1338 \fi
1339 \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1340 \@acmownedfalse
1341 \fi
1342 \ifnum\acm@copyrightmode=11\relax % othergov
1343 \@acmownedtrue
1344 \fi
1345 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1346 \@acmownedfalse
1347 \fi
1348 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1349 \@acmownedfalse
1350 \fi
1351 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1352 \@acmownedfalse
1353 \fi}

```

\setcopyright This is the syntactic sugar around setting keys.

```

1354 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1355 \setcopyright{acmcopyright}

```

\@copyrightowner Here is the owner of the copyright

```

1356 \def\@copyrightowner{%
1357 \ifcase\acm@copyrightmode\relax % none
1358 \or % acmcopyright
1359 Association for Computing Machinery.
1360 \or % acmlicensed
1361 Copyright held by the owner/author(s). Publication rights licensed to
1362 the Association for Computing Machinery.
1363 \or % rightsretained
1364 Copyright held by the owner/author(s).
1365 \or % usgov
1366 \or % usgovmixed
1367 Association for Computing Machinery.
1368 \or % cagov
1369 Crown in Right of Canada.
1370 \or %cagovmixed
1371 Association for Computing Machinery.
1372 \or %licensedusgovmixed
1373 Copyright held by the owner/author(s). Publication rights licensed to
1374 the Association for Computing Machinery.
1375 \or % licensedcagov
1376 Crown in Right of Canada. Publication rights licensed to
1377 the Association for Computing Machinery.
1378 \or %licensedcagovmixed
1379 Copyright held by the owner/author(s). Publication rights licensed to
1380 the Association for Computing Machinery.
1381 \or % othergov

```

1382 Association for Computing Machinery.
 1383 \or % licensedothergov
 1384 Copyright held by the owner/author(s). Publication rights licensed to
 1385 the Association for Computing Machinery.
 1386 \or % ic2w3www
 1387 IW3C2 (International World Wide Web Conference Committee), published
 1388 under Creative Commons CC~BY~4.0 License.
 1389 \or % ic2w3wwwgoogle
 1390 IW3C2 (International World Wide Web Conference Committee), published
 1391 under Creative Commons CC~BY-NC-ND~4.0 License.
 1392 \fi}

\@formatdoi Print a clickable DOI

1393 \def\@formatdoi#1{\url{https://doi.org/#1}}

\@copyrightpermission The canned permission block.

1394 \def\@copyrightpermission{%
 1395 \ifcase\acm@copyrightmode\relax % none
 1396 \or % acmcopyright
 1397 Permission to make digital or hard copies of all or part of this
 1398 work for personal or classroom use is granted without fee provided
 1399 that copies are not made or distributed for profit or commercial
 1400 advantage and that copies bear this notice and the full citation on
 1401 the first page. Copyrights for components of this work owned by
 1402 others than ACM must be honored. Abstracting with credit is
 1403 permitted. To copy otherwise, or republish, to post on servers or to
 1404 redistribute to lists, requires prior specific permission
 1405 and\hspace*{.5pt}/or a fee. Request permissions from
 1406 permissions@acm.org.
 1407 \or % acmlicensed
 1408 Permission to make digital or hard copies of all or part of this
 1409 work for personal or classroom use is granted without fee provided
 1410 that copies are not made or distributed for profit or commercial
 1411 advantage and that copies bear this notice and the full citation on
 1412 the first page. Copyrights for components of this work owned by
 1413 others than the author(s) must be honored. Abstracting with credit
 1414 is permitted. To copy otherwise, or republish, to post on servers
 1415 or to redistribute to lists, requires prior specific permission
 1416 and\hspace*{.5pt}/or a fee. Request permissions from
 1417 permissions@acm.org.
 1418 \or % rightsretained
 1419 Permission to make digital or hard copies of part or all of this work
 1420 for personal or classroom use is granted without fee provided that
 1421 copies are not made or distributed for profit or commercial advantage
 1422 and that copies bear this notice and the full citation on the first
 1423 page. Copyrights for third-party components of this work must be
 1424 honored. For all other uses, contact the
 1425 owner\hspace*{.5pt}/author(s).
 1426 \or % usgov
 1427 This paper is authored by an employee(s) of the United States

1428 Government and is in the public domain. Non-exclusive copying or
1429 redistribution is allowed, provided that the article citation is
1430 given and the authors and agency are clearly identified as its
1431 source.

1432 \or % usgovmixed
1433 ACM acknowledges that this contribution was authored or co-authored
1434 by an employee, contractor, or affiliate of the United States government. As such,
1435 the United States government retains a nonexclusive, royalty-free right to
1436 publish or reproduce this article, or to allow others to do so, for
1437 government purposes only.

1438 \or % cagov
1439 This article was authored by employees of the Government of Canada.
1440 As such, the Canadian government retains all interest in the
1441 copyright to this work and grants to ACM a nonexclusive,
1442 royalty-free right to publish or reproduce this article, or to allow
1443 others to do so, provided that clear attribution is given both to
1444 the authors and the Canadian government agency employing them.
1445 Permission to make digital or hard copies for personal or classroom
1446 use is granted. Copies must bear this notice and the full citation
1447 on the first page. Copyrights for components of this work owned by
1448 others than the Canadian Government must be honored. To copy
1449 otherwise, distribute, republish, or post, requires prior specific
1450 permission and\hspace*{.5pt}/or a fee. Request permissions from
1451 permissions@acm.org.

1452 \or % cagovmixed
1453 ACM acknowledges that this contribution was co-authored by an
1454 affiliate of the national government of Canada. As such, the Crown
1455 in Right of Canada retains an equal interest in the copyright.
1456 Reprints must include clear attribution to ACM and the author's
1457 government agency affiliation. Permission to make digital or hard
1458 copies for personal or classroom use is granted. Copies must bear
1459 this notice and the full citation on the first page. Copyrights for
1460 components of this work owned by others than ACM must be honored.
1461 To copy otherwise, distribute, republish, or post, requires prior
1462 specific permission and\hspace*{.5pt}/or a fee. Request permissions
1463 from permissions@acm.org.

1464 \or % licensedusgovmixed
1465 Publication rights licensed to ACM\@. ACM acknowledges that this
1466 contribution was authored or co-authored by an employee, contractor
1467 or affiliate of the United States government. As such, the
1468 Government retains a nonexclusive, royalty-free right to publish or
1469 reproduce this article, or to allow others to do so, for Government
1470 purposes only.

1471 \or % licensedcagov
1472 This article was authored by employees of the Government of Canada.
1473 As such, the Canadian government retains all interest in the
1474 copyright to this work and grants to ACM a nonexclusive,
1475 royalty-free right to publish or reproduce this article, or to allow
1476 others to do so, provided that clear attribution is given both to
1477 the authors and the Canadian government agency employing them.

1478 Permission to make digital or hard copies for personal or classroom
1479 use is granted. Copies must bear this notice and the full citation
1480 on the first page. Copyrights for components of this work owned by
1481 others than the Canadian Government must be honored. To copy
1482 otherwise, distribute, republish, or post, requires prior specific
1483 permission and\hspace*{.5pt}/or a fee. Request permissions from
1484 permissions@acm.org.
1485 \or % licensedcagovmixed
1486 Publication rights licensed to ACM\@. ACM acknowledges that this
1487 contribution was authored or co-authored by an employee, contractor
1488 or affiliate of the national government of Canada. As such, the
1489 Government retains a nonexclusive, royalty-free right to publish or
1490 reproduce this article, or to allow others to do so, for Government
1491 purposes only.
1492 \or % othergov
1493 ACM acknowledges that this contribution was authored or co-authored
1494 by an employee, contractor or affiliate of a national government. As
1495 such, the Government retains a nonexclusive, royalty-free right to
1496 publish or reproduce this article, or to allow others to do so, for
1497 Government purposes only.
1498 \or % licensedothergov
1499 Publication rights licensed to ACM\@. ACM acknowledges that this
1500 contribution was authored or co-authored by an employee, contractor
1501 or affiliate of a national government. As such, the Government
1502 retains a nonexclusive, royalty-free right to publish or reproduce
1503 this article, or to allow others to do so, for Government purposes
1504 only.
1505 \or % iw3c2w3
1506 This paper is published under the Creative Commons Attribution~4.0
1507 International (CC~BY~4.0) license. Authors reserve their rights to
1508 disseminate the work on their personal and corporate Web sites with
1509 the appropriate attribution.
1510 \or % iw3c2w3g
1511 This paper is published under the Creative Commons
1512 Attribution-NonCommercial-NoDerivs~4.0 International
1513 (CC~BY-NC-ND~4.0) license. Authors reserve their rights to
1514 disseminate the work on their personal and corporate Web sites with
1515 the appropriate attribution.
1516 \fi}

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

1517 \def\copyrightyear#1{\def\@copyrightyear{#1}}
1518 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container

1519 \def\@teaserfigures{}

teaserfigure The teaser figure

1520 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

```

\@saveteaser Saving the teaser
1521 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

\thanks We redefine amsart \thanks so the anonymous key works
1522 \renewcommand{\thanks}[1]{%
1523   \@ifnotempty{#1}{%
1524     \if@ACM@anonymous
1525       \g@addto@macro\thankses{\thanks{A note}}%
1526     \else
1527       \g@addto@macro\thankses{\thanks{#1}}%
1528     \fi}}

```

3.14 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>*].

```
1529 \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.

```

1530 \def\maketitle{%
1531   \if@ACM@anonymous
1532     % Anonymize omission of \author-s
1533     \ifnum\@authorgroups=0\author{}\fi
1534   \fi
1535   \begin{group}
1536     \let\@footnotemark\@footnotemark@nolink
1537     \let\@footnotetext\@footnotetext@nolink
1538     \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
1539     \global\@topnum\z@ % this prevents floats from falling
1540                       % at the top of page 1
1541     \global\@botnum\z@ % we do not want them to be on the bottom either
1542     \hsize=\textwidth
1543     \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
1544     \mktitle\if@ACM@sigchiamode\else\mkauthors\fi\mkteasers
1545     \printtopmatter
1546     \if@ACM@sigchiamode\mkauthors\fi
1547     \setcounter{footnote}{0}%
1548     \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
1549     \@titlenotes
1550     \@subtitlenotes
1551     \@authornotes
1552     \let\@makefnmark\relax
1553     \let\@thefnmark\relax

```

```

1554 \let\@makefntext\noindent
1555 \ifx\@empty\thankses\else
1556   \footnotetextauthorsaddresses{%
1557     \def\par{\let\par\@par}\parindent\z@\@setthanks}%
1558   \fi
1559 \ifx\@empty\@authorsaddresses\else
1560   \if@ACM@anonymous\else
1561     \if@ACM@journal
1562       \footnotetextauthorsaddresses{%
1563         \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
1564       \fi
1565     \fi
1566   \fi
1567 \footnotetextcopyrightpermission{%
1568   \if@ACM@authordraft
1569     \raisebox{-2ex}{\z@\z@}{\makebox[0pt][l]{\large\bfseries
1570       Unpublished working draft. Not for distribution.}}%
1571     \color[gray]{0.9}%
1572   \fi
1573   \parindent\z@\parskip0.1\baselineskip
1574   \if@ACM@authorversion\else
1575     \if@printpermission\@copyrightpermission\par\fi
1576   \fi
1577   \if@ACM@manuscript\else
1578     \if@ACM@journal\else % Print the conference information
1579       {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
1580     \fi
1581   \fi
1582   \if@printcopyright
1583     \copyright\ \@copyrightyear\ \@copyrightowner\
1584   \else
1585     \@copyrightyear.\
1586   \fi
1587   \if@ACM@manuscript
1588     Manuscript submitted to ACM\
1589   \else
1590     \if@ACM@authorversion
1591       This is the author's version of the work. It is posted here for
1592       your personal use. Not for redistribution. The definitive Version
1593       of Record was published in
1594       \if@ACM@journal
1595         \emph{\@journalName}%
1596       \else
1597         \emph{\@acmBooktitle}%
1598       \fi
1599       \ifx\@acmDOI\@empty
1600         .
1601       \else
1602         , \@formatdoi{\@acmDOI}.
1603       \fi\

```

```

1604         \else
1605             \if@ACM@journal
1606                 \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle
1607                 \ifx\@acmPrice\@empty\else\ $\@acmPrice\fi\
1608                 \@formatdoi{\@acmDOI}%
1609             \else % Conference
1610                 \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN
1611                 \ifx\@acmPrice\@empty.\else\dots\$\@acmPrice\fi\\\fi
1612                 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
1613             \fi
1614         \fi
1615     \fi}
1616 \endgroup
1617 \setcounter{footnote}{0}%
1618 \@mkabstract
1619 \if@ACM@printccs
1620     \ifx\@concepts\@empty\else\bgroup
1621         {\@specialsection{CCS Concepts}%
1622         \@concepts\par}\egroup
1623     \fi
1624 \fi
1625 \ifx\@keywords\@empty\else\bgroup
1626     {\if@ACM@journal
1627         \@specialsection{Additional Key Words and Phrases}%
1628     \else
1629         \@specialsection{Keywords}%
1630     \fi
1631     \@keywords}\par\egroup
1632 \fi
1633 \andify\authors
1634 \andify\shortauthors
1635 \global\let\authors=\authors
1636 \global\let\shortauthors=\shortauthors
1637 \if@ACM@printacmref
1638     \@mkbibcitation
1639 \fi
1640 \hypersetup{%
1641     pdflang={English},
1642     pdfdisplaydoctitle,
1643     pdfauthor={\authors},
1644     pdftitle={\@title},
1645     pdfsubject={\@concepts},
1646     pdfkeywords={\@keywords},
1647     pdfcreator={LaTeX with acmart
1648         \csname ver@acmart.cls\endcsname\space
1649         and hyperref
1650         \csname ver@hyperref.sty\endcsname}}%
1651 \@printendtopmatter
1652 \@afterindentfalse
1653 \@afterheading

```

1654 }

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

```
1655 \def\@specialsection#1{%
1656   \ifcase\ACM@format@nr
1657   \relax % manuscript
1658   \par\medskip\small\noindent#1: %
1659   \or % acmsmall
1660   \par\medskip\small\noindent#1: %
1661   \or % acmlarge
1662   \par\medskip\small\noindent#1: %
1663   \or % acmtog
1664   \par\medskip\small\noindent#1: %
1665   \or % sigconf
1666   \section*{#1}%
1667   \or % siggraph
1668   \section*{#1}%
1669   \or % sigplan
1670   \paragraph*{#1}%
1671   \or % sigchi
1672   \section*{#1}%
1673   \or % sigchi-a
1674   \section*{#1}%
1675   \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.

```
1676 \def\@printtopmatter{%
1677   \ifx\@startPage\@empty
1678     \gdef\@startPage{1}%
1679   \else
1680     \setcounter{page}{\@startPage}%
1681   \fi
1682   \thispagestyle{firstpagestyle}%
1683   \noindent
1684   \ifcase\ACM@format@nr
1685   \relax % manuscript
1686   \box\mktitle@bx\par
1687   \or % acmsmall
1688   \box\mktitle@bx\par
1689   \or % acmlarge
1690   \box\mktitle@bx\par
1691   \or % acmtog
1692   \twocolumn[\box\mktitle@bx]%
1693   \or % sigconf
1694   \twocolumn[\box\mktitle@bx]%
1695   \or % siggraph
1696   \twocolumn[\box\mktitle@bx]%

```

```

1697 \or % sigplan
1698   \twocolumn[\box\mktitle@bx]%
1699 \or % sigchi
1700   \twocolumn[\box\mktitle@bx]%
1701 \or % sigchi-a
1702   \par\box\mktitle@bx\par\bigskip
1703   \if@ACM@badge
1704     \marginpar{\noindent
1705       \ifx\@acmBadgeL@image\empty\else
1706         \href{\@acmBadgeL@url}{%
1707           \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
1708         \hskip\@ACM@badge@skip
1709       \fi
1710       \ifx\@acmBadgeR@image\empty\else
1711         \href{\@acmBadgeR@url}{%
1712           \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
1713       \fi}%
1714   \fi
1715 \fi
1716 }

\@mktitle The title of the article
1717 \def\@mktitle{%
1718   \ifcase\ACM@format@nr
1719   \relax % manuscript
1720   \@mktitle@i
1721   \or % acmsmall
1722   \@mktitle@i
1723   \or % acmlarge
1724   \@mktitle@i
1725   \or % acmtog
1726   \@mktitle@i
1727   \or % sigconf
1728   \@mktitle@iii
1729   \or % siggraph
1730   \@mktitle@iii
1731   \or % sigplan
1732   \@mktitle@iii
1733   \or % sigchi
1734   \@mktitle@iii
1735   \or % sigchi-a
1736   \@mktitle@iv
1737   \fi
1738 }

\@titlefont The font to typeset the title
1739 \def\@titlefont{%
1740   \ifcase\ACM@format@nr
1741   \relax % manuscript
1742   \LARGE\sffamily\bfseries

```

```

1743 \or % acmsmall
1744     \LARGE\sffamily\bfseries
1745 \or % acmlarge
1746     \LARGE\sffamily\bfseries
1747 \or % acmtog
1748     \Huge\sffamily
1749 \or % sigconf
1750     \Huge\sffamily\bfseries
1751 \or % siggraph
1752     \Huge\sffamily\bfseries
1753 \or % sigplan
1754     \Huge\bfseries
1755 \or % sigchi
1756     \Huge\sffamily\bfseries
1757 \or % sigchi-a
1758     \Huge\bfseries
1759 \fi}

```

`\@subtitlefont` The font to typeset the subtitle

```

1760 \def\@subtitlefont{\normalsize
1761   \ifcase\ACM@format@nr
1762   \relax % manuscript
1763   \mdseries
1764   \or % acmsmall
1765   \mdseries
1766   \or % acmlarge
1767   \mdseries
1768   \or % acmtog
1769   \LARGE
1770   \or % sigconf
1771   \LARGE\mdseries
1772   \or % siggraph
1773   \LARGE\mdseries
1774   \or % sigplan
1775   \LARGE\mdseries
1776   \or % sigchi
1777   \LARGE\mdseries
1778   \or % sigchi-a
1779   \mdseries
1780 \fi}

```

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

```

1781 \def\@mktitle@i{\hsize=\textwidth
1782   \@ACM@title@width=\hsize
1783   \ifx\@acmBadgeL@image\@empty\else
1784     \advance\@ACM@title@width by -\@ACM@badge@width
1785     \advance\@ACM@title@width by -\@ACM@badge@skip
1786   \fi
1787   \ifx\@acmBadgeR@image\@empty\else
1788     \advance\@ACM@title@width by -\@ACM@badge@width

```



```

1789 \advance\@ACM@title@width by -\@ACM@badge@skip
1790 \fi
1791 \setbox\mktitle@bx=\vbox{\noindent\@titlefont
1792 \ifx\@acmBadgeL@image\@empty\else
1793 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
1794 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
1795 \hskip\@ACM@badge@skip
1796 \fi
1797 \parbox[t]{\@ACM@title@width}{\raggedright
1798 \@titlefont\noindent
1799 \@title
1800 \ifx\@subtitle\@empty\else
1801 \par\noindent{\@subtitlefont\@subtitle}
1802 \fi}%
1803 \ifx\@acmBadgeR@image\@empty\else
1804 \hskip\@ACM@badge@skip
1805 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
1806 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
1807 \fi
1808 \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.

```

1809 \def\@mktitle@iii{\hsize=\textwidth
1810 \setbox\mktitle@bx=\vbox{\@titlefont\centering
1811 \@ACM@title@width=\hsize
1812 \if@ACM@badge
1813 \advance\@ACM@title@width by -2\@ACM@badge@width
1814 \advance\@ACM@title@width by -2\@ACM@badge@skip
1815 \parbox[b]{\@ACM@badge@width}{\strut
1816 \ifx\@acmBadgeL@image\@empty\else
1817 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
1818 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
1819 \fi}%
1820 \hskip\@ACM@badge@skip
1821 \fi
1822 \parbox[t]{\@ACM@title@width}{\centering\@titlefont
1823 \@title
1824 \ifx\@subtitle\@empty\else
1825 \par\noindent{\@subtitlefont\@subtitle}
1826 \fi
1827 }%
1828 \if@ACM@badge
1829 \hskip\@ACM@badge@skip
1830 \parbox[b]{\@ACM@badge@width}{\strut
1831 \ifx\@acmBadgeR@image\@empty\else
1832 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%

```

```

1833         \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
1834     \fi}%
1835 \fi
1836 \par\bigskip}}%

\@mktitle@iv The version of \@mktitle for sigchi-a
1837 \def\@mktitle@iv{\hsize=\textwidth
1838     \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
1839     \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
1840     \noindent\@title
1841     \ifx\@subtitle\@empty\else
1842     \par\noindent\@subtitlefont\@subtitle
1843     \fi
1844     \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.

1845 \newbox\@ACM@commabox
1846 \def\@ACM@addtoaddress#1{%
1847     \ifvmode\else
1848     \if@ACM@affiliation@obeypunctuation\else
1849     \setbox\@ACM@commabox=\hbox{, }%
1850     \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
1851     \fi\fi
1852     #1}

\institution Theoretically we can define the macros for \affiliation inside the \@mkauthors-style
\position commands. However, this would lead to a strange error if an author uses them outside
\department \affiliation. Of course we can make them produce an error message, but...
\streetaddress 1853 \def\streetaddress#1{\unskip\ignorespaces}
\city 1854 \def\postcode#1{\unskip\ignorespaces}
\state 1855 \if@ACM@journal
\postcode 1856 \def\position#1{\unskip\ignorespaces}
\country 1857 \def\institution#1{\unskip~#1\ignorespaces}
1858 \def\city#1{\unskip\ignorespaces}
1859 \def\state#1{\unskip\ignorespaces}
1860 \newcommand\department[2][0]{\unskip\ignorespaces}
1861 \def\country#1{\if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
1862 \else
1863 \def\position#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
1864 \def\institution#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
1865 \newcommand\department[2][0]{\if@ACM@affiliation@obeypunctuation
1866     #2\else#2\par\fi}%

```

```

1867 % \def\streetaddress#1{\if@ACM@affiliation@obexpunctuation#1\else#1\par\fi}%
1868 \let\city\@ACM@addtoaddress
1869 \let\state\@ACM@addtoaddress
1870 % \def\postcode#1{\if@ACM@affiliation@obexpunctuation#1\else\unskip\space#1\fi}%
1871 \let\country\@ACM@addtoaddress
1872 \fi

```

\@mkauthors Typesetting the authors

```

1873 \def\@mkauthors{\begingroup
1874   \hsize=\textwidth
1875   \ifcase\ACM@format@nr
1876   \relax % manuscript
1877     \@mkauthors@i
1878   \or % acmsmall
1879     \@mkauthors@i
1880   \or % acmlarge
1881     \@mkauthors@i
1882   \or % acmtog
1883     \@mkauthors@i
1884   \or % sigconf
1885     \@mkauthors@iii
1886   \or % siggraph
1887     \@mkauthors@iii
1888   \or % sigplan
1889     \@mkauthors@iii
1890   \or % sigchi
1891     \@mkauthors@iii
1892   \or % sigchi-a
1893     \@mkauthors@iv
1894   \fi
1895 \endgroup
1896 }

```

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

```

1897 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```

1898 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

1899 \ifcase\ACM@format@nr
1900 \relax % manuscript
1901 \or % acmsmall
1902   \def\@authorfont{\large\sffamily}
1903   \def\@affiliationfont{\small\normalfont}
1904 \or % acmlarge
1905 \or % acmtog
1906   \def\@authorfont{\LARGE\sffamily}
1907   \def\@affiliationfont{\large}

```

```

1908 \or % sigconf
1909 \def\@authorfont{\LARGE}
1910 \def\@affiliationfont{\large}
1911 \or % siggraph
1912 \def\@authorfont{\normalsize\normalfont}
1913 \def\@affiliationfont{\normalsize\normalfont}
1914 \or % sigplan
1915 \def\@authorfont{\Large\normalfont}
1916 \def\@affiliationfont{\normalsize\normalfont}
1917 \or % sigchi
1918 \def\@authorfont{\bfseries}
1919 \def\@affiliationfont{\mdseries}
1920 \or % sigchi-a
1921 \def\@authorfont{\bfseries}
1922 \def\@affiliationfont{\mdseries}
1923 \fi

```

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

```

1924 \def\@typeset@author@line{%
1925 \andify\@currentauthors\par\noindent
1926 \@currentauthors\def\@currentauthors{}%
1927 \ifx\@currentaffiliations\@empty\else
1928 \andify\@currentaffiliations
1929 \unskip, {\@currentaffiliations}\par
1930 \fi
1931 \def\@currentaffiliations{}}

```

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

```

1932 \def\@mkauthors@i{%
1933 \def\@currentauthors{}%
1934 \def\@currentaffiliations{}%
1935 \global\let\and\@typeset@author@line
1936 \def\@author##1{%
1937 \ifx\@currentauthors\@empty
1938 \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
1939 \else
1940 \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
1941 \fi
1942 \gdef\and{}}%
1943 \def\email##1##2{%
1944 \def\affiliation##1##2{%
1945 \def\@tempa{##2}\ifx\@tempa\@empty\else
1946 \ifx\@currentaffiliations\@empty
1947 \gdef\@currentaffiliations{%
1948 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
1949 \setkeys{@ACM@affiliation@}{##1}%
1950 \@affiliationfont##2}%

```

```

1951     \else
1952         \g@addto@macro{\@currentaffiliations}{\and
1953             \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
1954             \setkeys{@ACM@affiliation@}{##1}##2}%
1955     \fi
1956 \fi
1957 \global\let\and\@typeset@author@line}%
1958 \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par\medskip
1959     \noindent\addresses\@typeset@author@line
1960 \par\medskip}%
1961 }

```

`\@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

```

1962 \newbox\author@bx

```

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

```

1963 \newdimen\author@bx@wd

```

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

```

1964 \newskip\author@bx@sep
1965 \author@bx@sep=1pc\relax

```

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

```

1966 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd\def\and{\par}%
1967     \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
1968         \@authorfont\@currentauthors\par\@affiliationfont
1969         \@currentaffiliation}\egroup
1970     \box\author@bx\hspace{\author@bx@sep}%
1971     \gdef\@currentauthors{}}%
1972     \gdef\@currentaffiliation{}}

```

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

```

1973 \def\@mkauthors@iii{%

```

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

```

1974     \author@bx@wd=\textwidth\relax
1975     \advance\author@bx@wd by -\author@bx@sep\relax
1976     \ifnum\@ACM@authorsperrrow>0\relax
1977         \divide\author@bx@wd by \@ACM@authorsperrrow\relax
1978     \else
1979         \ifcase\num@authorgroups
1980             \relax % 0?
1981             \or % 1=one author per row

```

```

1982 \or % 2=two authors per row
1983 \divide\author@bx@wd by \num@authorgroups\relax
1984 \or % 3=three authors per row
1985 \divide\author@bx@wd by \num@authorgroups\relax
1986 \or % 4=two authors per row (!)
1987 \divide\author@bx@wd by 2\relax
1988 \else % three authors per row
1989 \divide\author@bx@wd by 3\relax
1990 \fi
1991 \fi
1992 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

1993 \gdef\@currentauthors{}%
1994 \gdef\@currentaffiliation{}%
1995 \def\@author##1{\ifx\@currentauthors\@empty
1996 \gdef\@currentauthors{\par##1}%
1997 \else
1998 \g@addto@macro\@currentauthors{\par##1}%
1999 \fi
2000 \gdef\and{}}%
2001 \def\email##1##2{\ifx\@currentaffiliation\@empty
2002 \gdef\@currentaffiliation{\nolinkurl{##2}}%
2003 \else
2004 \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2005 \fi}%
2006 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2007 \gdef\@currentaffiliation{%
2008 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2009 \setkeys{@ACM@affiliation@}{##1}##2}%
2010 \else
2011 \g@addto@macro\@currentaffiliation{\par
2012 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2013 \setkeys{@ACM@affiliation@}{##1}##2}%
2014 \fi
2015 \global\let\and\@typeset@author@bx
2016 }%

```

Actual typesetting is done by the \and macro:

```

2017 \hspace=\textwidth
2018 \global\setbox\mktitle@bx=\vbox{\noindent
2019 \box\mktitle@bx\par\medskip\leavevmode
2020 \lineskip=1pc\relax\centering\hspace*{-1em}%
2021 \addresses\let\and\@typeset@author@bx\and\par\bigskip}}

```

\@mkauthors@iv The sigchi-a version. We put authors in the main text with no more than 2 authors per line, unless overridden.

```

2022 \def\@mkauthors@iv{%

```

First, we need to determine the design of the author strip. The boxes are separated by \author@bx@sep plus two \author@bx@sep margins. This means that each box must

be of width $(\text{textwidth} - \text{author@bx@sep})/N - \text{author@bx@sep}$, where N is the number of boxes per row.

```

2023 \author@bx@wd=\columnwidth\relax
2024 \advance\author@bx@wd by -\author@bx@sep\relax
2025 \ifnum\@ACM@authorsperrow>0\relax
2026   \divide\author@bx@wd by \@ACM@authorsperrow\relax
2027 \else
2028   \ifcase\num@authorgroups
2029     \relax % 0?
2030     \or % 1=one author per row
2031     \else % 2=two authors per row
2032       \divide\author@bx@wd by 2\relax
2033   \fi
2034 \fi
2035 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2036 \gdef\@currentauthors{}%
2037 \gdef\@currentaffiliation{}%
2038 \def\@author##1{\ifx\@currentauthors\@empty
2039   \gdef\@currentauthors{\par##1}%
2040 \else
2041   \g@addto@macro\@currentauthors{\par##1}%
2042 \fi
2043 \gdef\and{}}%
2044 \def\email##1##2{\ifx\@currentaffiliation\@empty
2045   \gdef\@currentaffiliation{\nolinkurl{##2}}%
2046 \else
2047   \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2048 \fi}%
2049 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2050   \gdef\@currentaffiliation{%
2051     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2052     \setkeys{@ACM@affiliation@}{##1}##2}%
2053 \else
2054   \g@addto@macro\@currentaffiliation{\par
2055     \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2056     \setkeys{@ACM@affiliation@}{##1}##2}%
2057 \fi
2058 \global\let\and\@typeset@author@bx}%
2059 %

```

Actual typesetting is done by the \and macro

```

2060 \bgroup\hsize=\columnwidth
2061 \par\raggedright\leftskip=\z@
2062 \lineskip=1pc\noindent
2063 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

\@mkauthorsaddresses Typesetting authors' addresses in the footnote style

```

2064 \def\@mkauthorsaddresses{%

```

```

2065 \ifnum\num@authors>1\relax
2066 Authors' \else Author's \fi
2067 \ifnum\num@authorgroups>1\relax
2068 addresses: \else address: \fi
2069 \bgroup
2070 \def\streetaddress##1{\unskip\@addpunct, ##1}%
2071 \def\postcode##1{\unskip\@addpunct, ##1}%
2072 \def\position##1{\unskip\ignorespaces}%
2073 \def\institution##1{\unskip\@addpunct, ##1}%
2074 \def\city##1{\unskip\@addpunct, ##1}%
2075 \def\state##1{\unskip\@addpunct, ##1}%
2076 \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2077 \def\country##1{\unskip\@addpunct, ##1}%
2078 \def\and{\unskip\@addpunct; }%
2079 \def\author##1{##1}%
2080 \def\email##1##2{\unskip\@addpunct, \nolinkurl{##2}}%
2081 \addresses
2082 \egroup}

\@setaddresses This is an amsart macro that we do not need.
2083 \def\@setaddresses{}

\@authornotemark Adding a footnote mark to authors. This version adds a “normal” footnote mark.
2084 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}

\@@authornotemark Adding a footnote mark to authors with a given number
2085 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}

\@mkteasers Typesetting the teasers
2086 \def\@mkteasers{%
2087   \ifx\@teaserfigures\@empty\else
2088     \def\@teaser##1{\par\bigskip\bgroup
2089       \captionsetup{type=figure}##1\egroup\par}
2090     \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par
2091       \noindent\@teaserfigures\par\medskip}%
2092   \fi}

\@mkabstract Typesetting the abstract
2093 \def\@mkabstract{\bgroup
2094   \ifx\@abstract\@empty\else
2095     {\phantomsection\addcontentsline{toc}{section}{Abstract}%
2096     \if@ACM@journal
2097       \everypar{\setbox\z@\lastbox\everypar{}}\small
2098     \else
2099       \section*{Abstract}%
2100     \fi
2101     \ignorespaces\@abstract\par}%
2102   \fi\egroup}

```


`\mkbibcitation` Print the bibcitation format

```
2103 \def\mkbibcitation{\bgroup
2104 \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2105 \def\footnotemark{}}%
2106 \def\{\unskip\} \ignorespaces}%
2107 \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2108     inside a \string\title{ } or \string\author{ } command! Use
2109     \string\titlenote{ } or \string\authornote{ } instead!}}%
2110 \def\@article@string{\ifx\@acmArticle\@empty{\ } \else,
2111     Article~\@acmArticle\ } \fi}%
2112 \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2113 \noindent\authors. \@acmYear. \@title
2114 \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2115 \if@ACM@journal
2116     \textit{\@journalNameShort}
2117     \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2118     \ref{TotPages}~\@pages@word.
2119 \else
2120     In \textit{\@acmBooktitle}%
2121     \ifx\@acmEditors\@empty\textit{.} \else
2122         \andify\@acmEditors\textit{, } \@acmEditors~\@editorsAbbrev.%
2123     \fi\
2124     ACM, New York, NY, USA%
2125     \@article@string\unskip, \ref{TotPages}~\@pages@word.
2126 \fi
2127 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2128 \par\egroup}
```

`\@printendtopmatter` End the top matter

```
2129 \def\@printendtopmatter{\par\bigskip}
```

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

```
2130 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}
```

`\@setauthorsaddresses`

```
2131 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}
```

3.15 Headers and Footers

We use `fancyhdr` for our headers and footers:

```
2132 \RequirePackage{fancyhdr}
```

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

```
2133 \if@ACM@review
2134     \newsavebox{\ACM@linecount@bx}
2135     \newlength\ACM@linecount@bxht
2136     \newcount\ACM@linecount
2137     \ACM@linecount\@ne\relax
2138     \def\ACM@mk@linecount{%
```

```

2139 \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{%
2140 \setlength{\ACM@linecount@bxht}{0pt}%
2141 \loop{\color{red}\scriptsize\the\ACM@linecount}\
2142 \global\advance\ACM@linecount by \@ne
2143 \addtolength{\ACM@linecount@bxht}{\baselineskip}%
2144 \ifdim\ACM@linecount@bxht<\textheight\repeat
2145 {\color{red}\scriptsize\the\ACM@linecount}\hfill
2146 \global\advance\ACM@linecount by \@ne}}
2147 \fi

\ACM@linecountL How to display the box on the left
2148 \def\ACM@linecountL{%
2149 \if@ACM@review
2150 \ACM@mk@linecount
2151 \begin{picture}(0,0)%
2152 \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2153 \end{picture}%
2154 \fi}

\ACM@linecountR How to display the box on the right
2155 \def\ACM@linecountR{%
2156 \if@ACM@review
2157 \ACM@mk@linecount
2158 \begin{picture}(0,0)%
2159 \put(20,-22){\usebox{\ACM@linecount@bx}}%
2160 \end{picture}%
2161 \fi}

\ACM@timestamp The timestamp system
2162 \if@ACM@timestamp
2163 % Subtracting 30 from \time gives us the effect of rounding down despite
2164 % \numexpr rounding to nearest
2165 \newcounter{ACM@time@hours}
2166 \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
2167 \newcounter{ACM@time@minutes}
2168 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
2169 \newcommand\ACM@timestamp{%
2170 \footnotesize%
2171 \ifx\@acmSubmissionID\@empty\relax\else
2172 Submission ID: \@acmSubmissionID.{ }%
2173 \fi
2174 \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
2175 \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
2176 Page \thepage\ of \@startPage--\pageref*{TotPages}.%
2177 }
2178 \fi

\@shortauthors Even if the author redefined \shortauthors, we do not print it in the headers when in
anonymous mode:
2179 \def\@shortauthors{\if@ACM@anonymous Anon.\else\shortauthors\fi}

```

\@headfootfont The font to typeset header and footer text.
2180 \def\@headfootfont{\sffamily}

standardpagestyle The page style for all pages but the first one

```

2181 \fancypagestyle{standardpagestyle}{%
2182   \fancyhf{}%
2183   \renewcommand{\headrulewidth}{\z@}%
2184   \renewcommand{\footrulewidth}{\z@}%
2185   \ifcase\ACM@format@nr
2186   \relax % manuscript
2187     \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
2188     \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
2189     \fancyhead[RE]{\@shortauthors}%
2190     \fancyhead[LO]{\ACM@linecountL\shorttitle}%
2191     \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}%
2192   \or % acmsmall
2193     \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
2194     \fancyhead[RO]{\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
2195     \fancyhead[RE]{\@headfootfont\@shortauthors}%
2196     \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2197     \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
2198       \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2199   \or % acmlarge
2200     \fancyhead[LE]{\ACM@linecountL\@headfootfont
2201       \@acmArticle\if@ACM@printfolios:\thepage\fi\quad\textbullet\quad\@shortauthors}%
2202     \fancyhead[LO]{\ACM@linecountL}%
2203     \fancyhead[RO]{\@headfootfont
2204       \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi}%
2205     \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
2206       \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2207   \or % acmtog
2208     \fancyhead[LE]{\ACM@linecountL\@headfootfont
2209       \@acmArticle\if@ACM@printfolios:\thepage\fi\quad\textbullet\quad\@shortauthors}%
2210     \fancyhead[LO]{\ACM@linecountL}%
2211     \fancyhead[RE]{\ACM@linecountR}%
2212     \fancyhead[RO]{\@headfootfont
2213       \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi\ACM@linecountR}%
2214     \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
2215       \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2216   \else % Proceedings
2217     \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2218     \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2219     \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
2220     \fancyhead[LE]{\ACM@linecountL\@headfootfont\acmConference@shortname,
2221       \acmConference@date, \acmConference@venue}%
2222     \fancyhead[RO]{\@headfootfont\acmConference@shortname,
2223       \acmConference@date, \acmConference@venue\ACM@linecountR}%
2224   \fi
2225   \if@ACM@sigchiamode
2226     \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%

```

```

2227 \fi
2228 \if@ACM@timestamp
2229 \fancyfoot[LO,RE]{\ACM@timestamp}
2230 \fi
2231 }
2232 \pagestyle{standardpagestyle}

\@folio@wd Folio blob width, height, offsets and max number
\@folio@ht
\@folio@voffset
\@folio@max
2233 \newdimen\@folio@wd
2234 \@folio@wd=\z@
2235 \newdimen\@folio@ht
2236 \@folio@ht=\z@
2237 \newdimen\@folio@voffset
2238 \@folio@voffset=\z@
2239 \def\@folio@max{1}
2240 \ifcase\ACM@format@nr
2241 \relax % manuscript
2242 \or % acmsmall
2243 \@folio@wd=45.75pt\relax
2244 \@folio@ht=1.25in\relax
2245 \@folio@voffset=.2in\relax
2246 \def\@folio@max{8}
2247 \or % acmlarge
2248 \@folio@wd=43.25pt\relax
2249 \@folio@ht=79pt\relax
2250 \@folio@voffset=.55in\relax
2251 \def\@folio@max{10}
2252 \fi

\@folioblob The macro to typeset the folio blob.
2253 \def\@folioblob{\@tempcnta=0\@acmArticleSeq\relax
2254 \ifnum\@tempcnta=0\relax\else
First, we calculate \@acmArticleSeq modulo \@folio@max
2255 \loop
2256 \ifnum\@tempcnta>\@folio@max\relax
2257 \advance\@tempcnta by - \@folio@max
2258 \repeat
2259 \advance\@tempcnta by -1\relax
2260 \@tempdima=\@folio@ht\relax
2261 \multiply\@tempdima by \the\@tempcnta\relax
2262 \advance\@tempdima by -\@folio@voffset\relax
2263 \begin{picture}(0,0)
2264 \makebox[\z@]{\raisebox{-\@tempdima}{%
2265 \rlap{%
2266 \raisebox{-0.45\@folio@ht}{\z@}{\z@}{%
2267 \rule{\@folio@wd}{\@folio@ht}}}%
2268 \parbox{\@folio@wd}{%
2269 \centering
2270 \textcolor{white}{\LARGE\sffamily\bfseries\@acmArticle}}}}

```

```

2271 \end{picture}\fi}
2272

```

firstpagestyle The page style for the first page only.

```

2273 \fancypagestyle{firstpagestyle}{%
2274   \fancyhf{}%
2275   \renewcommand{\headrulewidth}{\z@}%
2276   \renewcommand{\footrulewidth}{\z@}%
2277   \ifcase\ACM@format@nr
2278   \relax % manuscript
2279     \fancyhead[L]{\ACM@linecountL}%
2280     \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
2281     \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
2282   \or % acmsmall
2283     \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
2284     \@acmNumber, Article \@acmArticle. Publication date:
2285     \@acmPubDate.}%
2286     \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2287     \fancyhead[LO]{\ACM@linecountL}%
2288     \fancyhead[RO]{\@folioblob}%
2289     \fancyheadoffset[RO,LE]{0.6\@folio@wd}%
2290   \or % acmlarge
2291     \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
2292     \@acmNumber, Article \@acmArticle. Publication date:
2293     \@acmPubDate.}%
2294     \fancyhead[RO]{\@folioblob}%
2295     \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2296     \fancyhead[LO]{\ACM@linecountL}%
2297     \fancyheadoffset[RO,LE]{1.4\@folio@wd}%
2298   \or % acmtog
2299     \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
2300     \@acmNumber, Article \@acmArticle. Publication date:
2301     \@acmPubDate.}%
2302     \fancyhead[L]{\ACM@linecountL}%
2303     \fancyhead[R]{\ACM@linecountR}%
2304   \else % Conference proceedings
2305     \fancyhead[L]{\ACM@linecountL}%
2306     \fancyhead[R]{\ACM@linecountR}%
2307     \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2308   \fi
2309   \if@ACM@timestamp
2310     \ifnum\ACM@format@nr=0\relax % Manuscript
2311     \fancyfoot[LO,RE]{\ACM@timestamp\quad
2312     \footnotesize Manuscript submitted to ACM}
2313   \else
2314     \fancyfoot[LO,RE]{\ACM@timestamp}
2315   \fi
2316 \fi
2317 }

```

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

```

2318 \let\ACM@ps@plain\ps@plain
2319 \let\ACM@ps@myheadings\ps@myheadings
2320 \let\ACM@ps@headings\ps@headings
2321 \def\ACM@restore@pagestyle{%
2322   \let\ps@plain\ACM@ps@plain
2323   \let\ps@myheadings\ACM@ps@myheadings
2324   \let\ps@headings\ACM@ps@headings}
2325 \AtBeginDocument{\ACM@restore@pagestyle}

```

3.16 Sectioning

Sectioning is different for different levels

```

2326 \renewcommand\section{\@startsection{section}{1}{\z@}%
2327   {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2328   {.25\baselineskip}%
2329   {\@secfont}}
2330 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
2331   {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2332   {.25\baselineskip}%
2333   {\@subsecfont}}
2334 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{10pt}%
2335   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2336   {-3.5\p@}%
2337   {\@subsubsecfont\@adddotafter}}
2338 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
2339   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2340   {-3.5\p@}%
2341   {\@parfont\@adddotafter}}
2342 \renewcommand\part{\@startsection{part}{9}{\z@}%
2343   {-10\p@ \@plus -4\p@ \@minus -2\p@}%
2344   {4\p@}%
2345   {\@parfont}}

```

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

```

2346 \def\section@raggedright{\@rightskip\@flushglue
2347   \rightskip\@rightskip
2348   \leftskip\z@skip
2349   \parindent\z@}

```

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

```

\@subsecfont 2350 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
\@subsubsecfont 2351 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 2352 \def\@subsubsecfont{\sffamily\itshape}
2353 \def\@parfont{\itshape}
2354 \setcounter{secnumdepth}{3}
2355 \ifcase\ACM@format@nr
2356 \relax % manuscript
2357 \or % acmsmall

```

```

2358 \or % acmlarge
2359 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
2360 \def\@subsecfont{\sffamily\large\section@raggedright}
2361 \or % acmtog
2362 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
2363 \def\@subsecfont{\sffamily\large\section@raggedright}
2364 \or % sigconf
2365 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
2366 \def\@subsecfont{\bfseries\Large\section@raggedright}
2367 \or % siggraph
2368 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
2369 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
2370 \or % sigplan
2371 \def\@secfont{\bfseries\Large\section@raggedright}
2372 \def\@subsecfont{\bfseries\section@raggedright}
2373 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
2374   {-0.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2375   {.25\baselineskip}%
2376   {\@subsubsecfont}}
2377 \def\@subsubsecfont{\bfseries\section@raggedright}
2378 \renewcommand\paragraph{\@startsection{paragraph}{4}{\z@}%
2379   {-0.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2380   {-3.5\p@}%
2381   {\@parfont\@addspaceafter}}
2382 \def\@parfont{\bfseries\itshape}
2383 \renewcommand\subparagraph{\@startsection{subparagraph}{5}{\z@}%
2384   {-0.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2385   {-3.5\p@}%
2386   {\@subparfont\@addspaceafter}}
2387 \def\@subparfont{\itshape}
2388 \or % sigchi
2389 \setcounter{secnumdepth}{1}
2390 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
2391 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
2392 \or % sigchi-a
2393 \setcounter{secnumdepth}{0}
2394 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
2395 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
2396 \fi

```

\@adddotafter Add punctuation after a sectioning command

```
2397 \def\@adddotafter#1{#1\@addpunct{.}}
```

\@addspaceafter Add space after a sectioning command

```
2398 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

3.17 TOC lists

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

```
2399 \providecommand*\dotsep{4.5}
```

3.18 Theorems

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

```
2400 \def\acmplainbodyfont{\itshape}
```

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

```
2401 \def\acmplainindent{\parindent}
```

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

```
2402 \def\acmplainheadfont{\scshape}
```

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

```
2403 \def\acmplainnotefont{\@empty}
```

Customization of the `acmplain` theorem style:

```
2404 \ifcase\ACM@format@nr
2405 \relax % manuscript
2406 \or % acmsmall
2407 \or % acmlarge
2408 \or % acmtog
2409 \or % sigconf
2410 \or % siggraph
2411 \or % sigplan
2412 \def\acmplainbodyfont{\itshape}
2413 \def\acmplainindent{\z@}
2414 \def\acmplainheadfont{\bfseries}
2415 \def\acmplainnotefont{\normalfont}
2416 \or % sigchi
2417 \or % sigchi-a
2418 \fi
```

`acmplain` The `acmplain` theorem style

```
2419 \newtheoremstyle{acmplain}%
2420 { .5\baselineskip \@plus .2\baselineskip
2421   \@minus .2\baselineskip }% space above
2422 { .5\baselineskip \@plus .2\baselineskip
2423   \@minus .2\baselineskip }% space below
2424 {\acmplainbodyfont}% body font
2425 {\acmplainindent}% indent amount
2426 {\acmplainheadfont}% head font
2427 { .}% punctuation after head
2428 { .5em}% spacing after head
2429 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\acmplainnotefont{#3}}}}% head spec
```


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

```
2430 \def\@acmdefinitionbodyfont{\normalfont}
```

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

```
2431 \def\@acmdefinitionindent{\parindent}
```

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

```
2432 \def\@acmdefinitionheadfont{\itshape}
```

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

```
2433 \def\@acmdefinitionnotefont{\@empty}
```

Customization of the acmdefinition theorem style:

```
2434 \ifcase\ACM@format@nr
```

```
2435 \relax % manuscript
```

```
2436 \or % acmsmall
```

```
2437 \or % acmlarge
```

```
2438 \or % acmtog
```

```
2439 \or % sigconf
```

```
2440 \or % siggraph
```

```
2441 \or % sigplan
```

```
2442 \def\@acmdefinitionbodyfont{\normalfont}
```

```
2443 \def\@acmdefinitionindent{\z@}
```

```
2444 \def\@acmdefinitionheadfont{\bfseries}
```

```
2445 \def\@acmdefinitionnotefont{\normalfont}
```

```
2446 \or % sigchi
```

```
2447 \or % sigchi-a
```

```
2448 \fi
```

`acmdefinition` The acmdefinition theorem style

```
2449 \newtheoremstyle{acmdefinition}%
```

```
2450 { .5\baselineskip \@plus.2\baselineskip
```

```
2451 \@minus.2\baselineskip}% space above
```

```
2452 { .5\baselineskip \@plus.2\baselineskip
```

```
2453 \@minus.2\baselineskip}% space below
```

```
2454 {\@acmdefinitionbodyfont}% body font
```

```
2455 {\@acmdefinitionindent}% indent amount
```

```
2456 {\@acmdefinitionheadfont}% head font
```

```
2457 { .}% punctuation after head
```

```
2458 { .5em}% spacing after head
```

```
2459 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec
```

Make acmplain the default theorem style.

```
2460 \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.

```

2461 \AtEndPreamble{%
2462   \if@ACM@acmthm
2463   \theoremstyle{acmplain}
2464   \@ifundefined{theorem}{%
2465     \newtheorem{theorem}{Theorem}[section]
2466   }{}
2467   \@ifundefined{conjecture}{%
2468     \newtheorem{conjecture}[theorem]{Conjecture}
2469   }{}
2470   \@ifundefined{proposition}{%
2471     \newtheorem{proposition}[theorem]{Proposition}
2472   }{}
2473   \@ifundefined{lemma}{%
2474     \newtheorem{lemma}[theorem]{Lemma}
2475   }{}
2476   \@ifundefined{corollary}{%
2477     \newtheorem{corollary}[theorem]{Corollary}
2478   }{}
2479   \theoremstyle{acmdefinition}
2480   \@ifundefined{example}{%
2481     \newtheorem{example}[theorem]{Example}
2482   }{}
2483   \@ifundefined{definition}{%
2484     \newtheorem{definition}[theorem]{Definition}
2485   }{}
2486   \fi
2487   \theoremstyle{acmplain}
2488 }
```

\@proofnamefont The font to typeset the proof name.

```

2489 \def\@proofnamefont{\scshape}
```

\@proofindent Whether or not to indent proofs.

```

2490 \def\@proofindent{\indent}
```

Customization of the proof environment.

```

2491 \ifcase\ACM@format@nr
2492 \relax % manuscript
2493 \or % acmsmall
2494 \or % acmlarge
2495 \or % acmtog
2496 \or % sigconf
2497 \or % siggraph
2498 \or % sigplan
2499 \def\@proofnamefont{\itshape}
```

```

2500 \def\@proofindent{\noindent}
2501 \or % sigchi
2502 \or % sigchi-a
2503 \fi

```

proof We want some customization of the proof environment.

```

2504 \renewenvironment{proof}[1][\proofname]{\par
2505 \pushQED{\qed}%
2506 \normalfont \topsep6\p@\@plus6\p@\relax
2507 \trivlist
2508 \item[\@proofindent\hskip\labelsep
2509 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
2510 }{%
2511 \popQED\endtrivlist\@endpfalse
2512 }

```

3.19 Acknowledgments

\acks This is a comment-like structure

```

2513 \specialcomment{acks}{%
2514 \begingroup
2515 \section*{Acknowledgments}
2516 \phantomsection\addcontentsline{toc}{section}{Acknowledgments}
2517 }{%
2518 \endgroup
2519 }

```

\grantsponsor We just typeset the name of the sponsor

```

2520 \def\grantsponsor#1#2#3{#2}

```

\grantnum

```

2521 \newcommand\grantnum[3][{}]{#3%
2522 \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}

```

3.20 Conditional typesetting

We use the comment package for conditional typesetting:

```

2523 \AtEndPreamble{%
2524 \if@ACM@screen
2525 \includecomment{screenonly}
2526 \excludecomment{printonly}
2527 \else
2528 \excludecomment{screenonly}
2529 \includecomment{printonly}
2530 \fi
2531 \if@ACM@anonymous
2532 \excludecomment{anonsuppress}
2533 \excludecomment{acks}

```

```

2534 \else
2535   \includecomment{anonsuppress}
2536 \fi}

```

3.21 Additional bibliography commands

`\showeprint` The command `\showeprint` has two arguments: the (optional) prefix and the eprint number. Right now the only prefix we understand is the (lowercase) word ‘arxiv’ (see <http://arxiv.org/hypertex/bibstyles/>).

```

2537 \newcommand\showeprint[2][arxiv]{%
2538   \def\@tempa{#1}%
2539   \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
2540   \def\@tempb{arxiv}%
2541   \ifx\@tempa\@tempb
2542     arXiv:\href{http://arxiv.org/abs/#2}{#2}\else arXiv:#2%
2543   \fi}

```

3.22 End of Class

```

2544 \normalsize\normalfont\frenchspacing
2545 </class>

```

References

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

Change History

1.48	General: Added prologue option to xcolor 40 Bib code cleanup (Zack Weinberg) 29 Documentation update (siggraph) . 29	v1.04	\acmArticleSeq: Name change by Matthew Fluet 58 \acmDOI: Name change by Matthew Fluet 58 \acmISBN: Name change by Matthew Fluet 58 General: Updated bibliography for siggraph 29
1.49	General: New journal: DTRAP 29	v1.05	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib 29 Patched \setcitestyle command; closes https: //github.com/borisveytsman/ acmart/issues/1) 29 Defined ACM colors 29 Explicitly put draft option (closes https: //github.com/borisveytsman/ acmart/issues/4) 32 Set headheight to 1pc for all formats (closes https: //github.com/borisveytsman/ acmart/issues/5) 29
v1.00	General: First released version 29	v1.06	\@ACM@badge@skip: Added macro . . 58 \@ACM@badge@width: Added macro . 58 \@ACM@title@width: Added macro . 58 \@mktitle@i: Added processing badges 72 Made generic 72 \@mktitle@ii: Now this macro is obsolete 73 \@mktitle@iii: Added processing badges 73 Made more generic 73 \@mktitle@iv: Made more generic . 74 \@printtopmatter: Added processing badges 70 \@subtitlefont: Added macro 72 \@titlefont: Added macro 71 \acmBadgeL: Added macro 59 \acmBadgeR: Added macro 59 \if@ACM@badge: Added macro 58
v1.01	General: Changed hyperref colors in screen mode (closes https: //github.com/borisveytsman/ acmart/issues/1) 29 Defined ACM colors 29 Explicitly put draft option (closes https: //github.com/borisveytsman/ acmart/issues/4) 32 Set headheight to 1pc for all formats (closes https: //github.com/borisveytsman/ acmart/issues/5) 29	v1.07	\maketitle: Corrected a bug with abstract footnotes 67 Corrected a bug with permssion and footnotes order 67
v1.02	General: Added TOPS and TSC (closes https: //github.com/borisveytsman/ acmart/issues/12) 29 Documentation changes (closes https: //github.com/borisveytsman/ acmart/issues/13) 29	v1.08	General: SIGPLAN reformatting by Matthew Fluet 29 Typos corrected (Tobias Pape) . . . 29
v1.03	\@formatdoi: Added macro 64 \if@ACM@authorversion: Added macro 31 \maketitle: Added special case of authorversion 67 General: Added anonsuppress environment 29 Added authorversion option (closes https: //github.com/borisveytsman/ acmart/issues/9) 29		

v1.09	General: Revert SIGPLAN caption rules	29	Increased font size for ACM Large	33
			Print bibliographic information by default for the proceedings	60
v1.10	\maketitle: Corrected a bug with doi in manuscript and author version, https://github.com/borisveytsman/acmart/issues/36	67	standardpagestyle: Added headers for sigs	83
	General: Changes of ‘licensedothergov’ wording	62	Expanded headers for sigchi-a	83
	standardpagestyle: Reversed folios location	83	Suppressed folios if sig	83
v1.11	General: Customization of ACM theorem styles and proof environment by Matthew Fluet	29	v1.14	\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use
				35
			\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use	36
			General: \citestyle updates (Matthew Fluet)	29
			Patched \citestyle	34
v1.12	\@marginfigure: Now centering by default	45	v1.15	\@ACM@addtoaddress: Added macro
	\@margintable: Now centering by default	46		74
	\@parfont: Moved to \section@raggedright	86	\@mkauthors@iii: New authors system	77
	\copyrightpermissionfootnoterule: Added macro	42	\@shortauthors: Introduced macro	82
	\descriptionlabel: Redefined	48	\@typeset@author@bx: Moved to separate macro	77
	\footnoterule: Made shorter	42	\acks: Added macro	91
	\if@ACM@natbib@override: Added macro	31	\affiliation: Added code for author groups	55
	\if@ACM@newfonts: Added macro	44	\author: Added code for author groups	55
	\maketitle: Moved thankses to copyrightpermission box	67	\city: Added macro	74
	\section@raggedright: Introduced macro	86	\country: Added macro	74
	General: Added graceful behavior when libertine fonts are absent	44	\department: Added macro	74
	Documentation updates	29	\grantnum: Added macro	91
			\grantsponsor: Added macro	91
v1.13	\@mpfootnotetext: Made minipage footnotes centered	43	\if@insideauthorgroup: Introduced macro	55
	\bibliographystyle: Redefined macro	39	\institution: Added macro	74
	\bibstyle@acmauthoryear: Added macro	35	\num@authorgroups: Renamed	54
	\bibstyle@acmnumeric: Added macro	36	\orcid: Introduced macro	56
	\if@ACM@printfolios: Added macro	60	\position: Added macro	74
	General: Font adjustments for acmsmall	75	\postcode: Added macro	74
			\state: Added macro	74
			\streetaddress: Added macro	74
			standardpagestyle: Better handling of anonymous mode	83
			v1.16	\@headfootfont: Added macro
				83
			General: Formatting header/footer (Matthew Fluet)	29
			standardpagestyle: Customize header/footer text font	83

v1.17		v1.22	
\@makefnmark: Redefined	43	General: More bibliography changes for Aptara	29
\@mkauthors: TOG now uses the same authors block as other journals . .	75	v1.23	
\@mkauthors@ii: Deleted	77	General: Add PACMPL journal option . .	29
\@mkbibcitation: Added \nobreak	81	v1.24	
Changed format for sigs	81	General: Add IMWUT journal option . .	48
\acmArticle: The default is now numerical	57	v1.25	
\acmMonth: The default must be numerical. Closes #50.	58	General: Updated PACMPL	48
\acmNumber: The default is now numerical	57	v1.26	
\acmVolume: The default is now numerical	57	General: Corrected \shortcite bug . .	29
\acmYear: The default is now numerical	58	Documentation typos fixed (thanks to Stephen Spencer)	29
\description: Decreased indent . .	48	v1.27	
\grantnum: Added url	91	\if@ACM@printccs: Typo corrected . .	59
\grantsponsor: Renamed	91	v1.28	
\if@ACM@printacmref: Renamed from \if@ACM@printbib	60	\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato)	61
General: Slightly decreased margins for sigs	40	General: Corrected option natbib behavior	36
standardpagestyle: Added paper title to sigs	83	Got rid of warnings in pdf keywords . .	38
v1.18		v1.29	
\@mkauthors@i: Now we andify affiliations	76	\@mkabstract: Removed spurious indentation (John Wickerson) . . .	80
\@typeset@author@line: Added macro	76	\ccsdesc@parse: Add spacing after bullet and around rightrightarrow; semicolon separators no longer in bold/italic (John Wickerson)	61
General: Natbib is now the default for all formats	29	General: Increased head to 13pt	40
v1.19		standardpagestyle: Corrected printfolios (Matthew Fluet)	83
\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet) . .	80	v1.30	
\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet) . .	91	\department: Added optional parameter	74
General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	29	General: Added \frenchspacing	92
Include 'References' in PDF bookmarks (Matthew Fluet)	34	Bibtex style now recognizes https:// in doi	29
v1.20		Switched to T1: looks like libertine has problems with \l in OT1	44
\@mkabstract: Deleted spurious space	80	Updated IMWUT and PACMPL	48
General: Bug fixes for bst	29	v1.31	
v1.21		\@additionalaffiliation: Added macro	56
\showeprint: Added macro	92	\@mkbibcitation: Disabled linebreak . .	81
		\@startsection: Added \tochangmeasure	36
		Rededined macro	38
		\@textbottom: Redefined	43

\acmMonth: The default now is the current month (Matteo Riondato) . . .	58	\position: Added obeypunctuation code	74
\acmYear: The default now is the current year (Matteo Riondato) . . .	58	\postcode: Added obeypunctuation code	74
\additionalaffiliation: Added macro	56	\state: Added obeypunctuation code	74
\l@section: Redefined macro . . .	38	\streetaddress: Added obeypunctuation code	74
\l@subsection: Redefined macro	38	General: Added acmart-preload-hook	29
General: Documentation changes . . .	29	Added cmap and glyptounicode . . .	44
v1.32		BibTeX comma before articleno bug corrected	29
\@formatdoi: New doi format	64	BibTeX crossref bug corrected . . .	29
General: Added POMACS journal option	29	BibTeX numpages bug corrected . . .	29
Format siggraph is now obsolete . . .	29	Documentation updates	29
v1.33		Moved \citename definition for non-natbib bibliography, so a package may redefine it	39
\@ACM@addtoaddress: Added obeypunctuation code	74	Switched to Type 1 fonts for libertine even if OTF-capable engine is used (Kai Mindermann) . . .	44
\@mkauthors@i: Added obeypunctuation code	76	firstpagestyle: Added right linecount for two-column formats	85
\@mkauthors@iii: Added obeypunctuation code	77	Added timestamp (Michael D. Adams)	85
\@mkauthors@iv: Added obeypunctuation code	78	standardpagestyle: Added right linecount for two-column formats	83
\@subtitlefont: Added \normalsize	72	Added timestamp (Michael D. Adams)	83
\ACM@linecountL: Renamed macro . . .	82	v1.34	
\ACM@linecountR: Added macro . . .	82	\@mkbibcitation: Deleted DOI from doi numbers	81
\ACM@timestamp: Added current page number	82	\ACM@linecount@bx: Rulers now are continuous	81
Added macro (Michael D. Adams) . . .	82	\ACM@linecountL: Rulers now are continuous	82
Added submission id	82	\ACM@linecountR: Rulers now are continuous	82
\acmSubmissionID: Added macro . . .	58	\maketitle: Added date to the bibstrip in conf proceedings	67
\city: Added obeypunctuation code	74	Deleted 'DOI' from doi numbers . . .	67
\country: Added obeypunctuation code	74	Rearranged bibstrip	67
\department: Added obeypunctuation code	74	The \terms command is now obsolete	67
\if@ACM@affiliation@obeypunctuation: Added macro	56	\terms: The \terms command now just produces a warning	59
\if@ACM@authordraft: Added macro	31	v1.35	
\if@ACM@natbib@override: Deleted macro	31	\bibstyle@acmauthoryear: Square brackets for author-year style . . .	35
\if@ACM@timestamp: Added macro (Michael D. Adams)	31	General: BibTeX bug fixed: et al. . . .	29
\institution: Added obeypunctuation code	74		
\maketitle: Fixed the bug with figures on top and bottom of the title page, thanks to David Epstein	67		

If the copyright is set to usgov or rightsretained, the price is suppressed	62	\country: Fixed bugs with extra spaces	74
v1.36		\l@section: Redefined macro . .	38
\@ACM@authorsparrow: Added macro	60	\postcode: We now do not print this even in SIG	74
\@mkauthors@iii: Added authorsparrow override	77	\state: We now do not print this even in SIG	74
\@mkauthors@iv: Added authorsparrow override	78	\streetaddress: We now do not print this even in SIG	74
\if@ACM@authordraft: Corrected typo, thanks to bargteil	31	General: Added 'textcase' package . .	34
General: Added PACMHCI journal options	48	Added heightrounded to geometry	40
Added the possibility to adjust number of author boxes per row in conference formats	29	Added new copyright version: licensedcagov	29
v1.37		Added package cleveref	29
\description: Reduce list indentation (Matthew Fluet)	48	Added Ross Moore code for glyptounicode	44
\descriptionlabel: Reduce list indentation (Matthew Fluet)	48	Bibliography changes	29
\normalparindent: Set \normalparindent (Matthew Fluet)	42	v1.41	
General: Reduce list indentation (Matthew Fluet)	47	General: Added new badges	29
Set \normalparindent; Reduce list indentation (Matthew Fluet)	29	v1.42	
v1.38		General: Deleted ACM badges	29
General: Increase default font size for SIGPLAN	29, 33	v1.43	
v1.39		\@startsection: Added \makeatletter	38
\@authornotemark: Added macro . .	80	\country: Added comma before country for journals	74
\authornotemark: Added macro . . .	57	v1.44	
v1.40		\@acmBooktitle: Added macro	54
\@copyrightowner: Added new copyright version: licensedcagov .	63	\@acmEditors: Added macro	54
\@copyrightpermission: Added new copyright version: licensedcagov .	64	\@editorsAbbrev: Added macro . . .	54
\@mkauthors@i: Switched to MakeTextUppercase	76	\@folioblob: Suppress the blob if acmArticleSeq is empty	84
\@parfont: Switched to MakeTextUppercase	86	\@mkbibcitation: If the paper has just one page, use 'page' instead of 'pages'	81
\ACM@linecount@bx: Work around a bug in xcolor: looks like cmyk colors in boxes do not work	81	\ACM@restore@pagestyle: Added macro	85
\ccdesc@parse@finish: Added macro	61	\acmArticle: The default is now empty	57
\city: We now do not print this even in SIG	74	\acmArticleSeq: Now acmArticle might be empty	58
		\acmBooktitle: Added macro	54
		\editor: Added macro	54
		\if@ACM@acmthm: Added macro	30
		\maketitle: Empty DOI or ISBN are not printed (by Michael Ekstrand)	67
		General: Added package refcount . . .	29
		Deleted package cleveref	29
		Put theorem defs in a separate style	29

v1.45	Bst file bug fixes: label width is calculated correctly	29
\@folioblob: Switched \bfeseries\sffamily to \sffamily\bfseries	Delayed hypersetup since journal options may change screen mode	38
\@parfont: Switched \bfeseries\sffamily to \sffamily\bfseries	PACM now set screen to true	48
\@titlefont: Switched \bfeseries\sffamily to \sffamily\bfseries	Restore theorem defs to class file . .	29
v1.46	v1.47 General: New journal: THRI	29
\@mkauthorsaddresses: Introduced macro	v1.48 \@headfootfont: Deleted unnecessary switch (Michael D. Adams)	83
\@mkbibcitation: Added subtitle . .	\@mkabstract: Removed spurious indentation if abstract is followed by an empty line	80
\@printendtopmatter: Made it \par\bigskip uniformly	\ACM@timestamp: Formatting change (Michael D. Adams)	82
\@printtopmatter: Deleted rule . .	\if@ACM@review: Review mode now switches on folios	30
\@setauthorsaddresses: Introduced macro	\maketitle: Added acmart and version info to pdfcreator tag . . .	67
\ACM@linecount@bx: Rearranged the code to get rid of spurious underfull messages (Benjamin Byholm)	Added language and doctitle attributes to PDF (Andreas Reichinger)	67
\author: Started counting authors . .	Suppressed empty DOI (Serguei Mokhov)	67
\authorsaddresses: Introduced macro	General: \citeyear no longer behaves like \citeyearpar	39
\country: Corrected spacing for institution	Code prettying (Michael D. Adams)	29
\if@ACM@acmthm: Modified description	Initial support for Biblatex (Daniel Thomas)	29
\liningnums: Workaround for compatibility with fontspec	Misc entries in the bibliography no longer produce a separate date . .	29
\maketitle: Added authors' addresses Thankses go before authors' addresses	Typos fixed (Jamie Davis)	29
\num@authors: Introduced macro . .	v1.50 \@copyrightpermission: New copyright statements for iw3c2w3[g]	64
General: Added etoolbox		

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		
\\$	1607, 1611	\@ACM@title@width 2215, 2285, 2293, 2301
\@	1465, 1486, 1499	\@acmSubmissionID 1185, 2171, 2172
\@authornotemark	1165, 2085	\@acmVolume 1167, 2117, 2197, 2205, 2214, 2283, 2291, 2299
\@par	317, 374	\@acmYear 1175, 1182, 1518, 1606, 2113
\@ACM@addtoaddress	1845, 1868, 1869, 1871	\@acmdefinitionbodyfont 2430, 2442, 2454
\@ACM@authorsperrrow	1236, 1976, 1977, 2025, 2026	\@acmdefinitionheadfont 2432, 2444, 2456
\@ACM@badge@skip	1196, 1708, 1785, 1789, 1795, 1804, 1814, 1820, 1829	\@acmdefinitionindent 2431, 2443, 2455
\@ACM@badge@width	1193, 1707, 1712, 1784, 1788, 1794, 1806, 1813, 1815, 1818, 1830, 1833	\@acmdefinitionnotefont 2433, 2445, 2459
\@ACM@badgefalse	1192	\@acmownedfalse 1315, 1318, 1321, 1327, 1331, 1334, 1337, 1340, 1346, 1349, 1352
\@ACM@badgetrue	1198, 1203	\@acmownedtrue 1302, 1311, 1343
\@ACM@commabox	1845, 1849, 1850	\@acmplainbodyfont 2400, 2412, 2424
\@ACM@journalfalse	149, 151, 153, 155, 157	\@acmplainheadfont 2402, 2414, 2426
\@ACM@journaltrue	141, 143, 145, 147	\@acmplainindent 2401, 2413, 2425
\@ACM@labelwidth	712, 715, 723, 728, 754	\@acmplainnotefont 2403, 2415, 2429
\@ACM@manuscriptfalse	136	\@adddotafter 2337, 2341, 2397
\@ACM@manuscripttrue	134	\@additionalaffiliation 1116, 1117
\@ACM@newfontsfalse	617, 620, 623	\@addpunct 2070, 2071, 2073, 2074, 2075, 2076, 2077, 2078, 2080, 2130, 2131, 2397, 2398, 2509
\@ACM@newfontstrue	614	\@addspaceafter 2381, 2386, 2398
\@ACM@printfoliostrue	68	\@affiliationfont 1898, 1903, 1907,
\@ACM@reviewtrue	110	
\@ACM@screentrue	833, 862, 868, 874	
\@ACM@sigchiamodefalse	138	
\@ACM@sigchiamodetrue	158	
\@ACM@timestamptrue	109	
\@ACM@title@width	1195, 1782, 1784, 1785, 1788, 1789, 1797, 1811, 1813, 1814, 1822	
\@M	317, 356, 374, 383	
\@abstract	1215, 2094, 2101	
\@acmArticle	1171, 1174, 1606, 2110, 2111, 2193, 2194, 2198, 2201, 2204, 2206, 2209, 2213, 2215, 2270, 2284, 2292, 2300	
\@acmArticleSeq	1173, 2253	
\@acmBadgeL@image	1205, 1207, 1705, 1707, 1783, 1792, 1794, 1816, 1818	
\@acmBadgeL@url	1204, 1206, 1706, 1793, 1817	
\@acmBadgeR@image	1200, 1202, 1710, 1712, 1787, 1803, 1806, 1831, 1833	
\@acmBadgeR@url	1199, 1201, 1711, 1805, 1832	
\@acmBooktitle	1049, 1597, 2120	
\@acmDOI	1189, 1599, 1602, 1608, 1612, 2127	
\@acmEditors	1054, 1055, 1056, 1059, 2121, 2122	
\@acmISBN	1187, 1610	
\@acmMonth	1177, 1179, 1606	
\@acmNumber	1169, 2117, 2198, 2206, 2215, 2284, 2292, 2300	
\@acmPrice	1183, 1607, 1611	
\@acmPubDate	1179, 2117, 2198, 2206,	

1910, 1913, 1916, 1919, 1922, 1950, 1968	\@currentaffiliation 1969, 1972, 1994, 2001, 2002, 2004, 2006, 2007, 2011, 2037, 2044, 2045, 2047, 2049, 2050, 2054	\@folio@ht 2233, 2260, 2266, 2267
\@afterheading . 348, 1653		\@folio@max 2233, 2256, 2257
\@afterindentfalse 294, 1652		\@folio@voffset 2233, 2262
\@afterindenttrue .. 292		\@folio@wd 2233, 2267, 2268, 2289, 2297
\@article@string 2110, 2117, 2125	\@currentaffiliations 1927, 1928, 1929, 1931, 1934, 1946, 1947, 1952	\@folioblob 2253, 2286, 2288, 2294, 2295
\@author 1077, 1080, 1085, 1936, 1995, 2038, 2079	\@currentauthors 1925, 1926, 1933, 1937, 1938, 1940, 1968, 1971, 1993, 1995, 1996, 1998, 2036, 2038, 2039, 2041, 2084, 2085	\@footnotemark . 396, 1536
\@authorfont 1897, 1902, 1906, 1909, 1912, 1915, 1918, 1921, 1938, 1968		\@footnotemark@nolink 396, 1536
\@authornotemark 1157, 1163, 2084		\@footnotetext 397, 573, 1537
\@authornotes 1154, 1158, 1551	\@currentlabel . 577, 591	\@footnotetext@nolink 397, 1537
\@authorsaddresses 1133, 1559, 2131	\@dblarg 303	\@for 202
\@auxout 452	\@dblfloat 677	\@formatdoi 1393, 1602, 1608, 1612, 2127
\@begindocumenthook 448	\@department .. 1120, 1121	\@fps 680
\@botnum 1541	\@dotsep 2399	\@fpsadddefault 680
\@citestyle 226	\@editorsAbbrev 1053, 1058, 2122	\@gobble 224, 268
\@classname 25, 27, 35, 51, 53, 54, 59, 61, 62, 67, 70, 71, 76, 78, 79, 84, 86, 87, 92, 94, 95, 100, 102, 103, 108, 112, 113, 124, 129, 182, 615, 618, 621, 834, 863, 869, 875, 1029, 1031, 1115, 1210, 1220, 1222, 1223, 1226, 1228, 1229, 1232, 1234, 1235, 1237, 1238, 2107	\@empty 160, 307, 1044, 1055, 1075, 1090, 1095, 1096, 1102, 1254, 1255, 1261, 1268, 1273, 1555, 1559, 1599, 1607, 1610, 1611, 1612, 1620, 1625, 1677, 1705, 1710, 1783, 1787, 1792, 1800, 1803, 1816, 1824, 1831, 1841, 1927, 1937, 1945, 1946, 1995, 2001, 2006, 2038, 2044, 2049, 2087, 2110, 2114, 2121, 2127, 2171, 2403, 2433, 2522, 2539	\@hangfrom 316, 373
\@clubpenalty 362	\@endfloatbox 679	\@headfootfont 2180, 2193, 2194, 2195, 2196, 2200, 2203, 2208, 2212, 2218, 2219, 2220, 2222
\@concepts 1273, 1283, 1620, 1622, 1645	\@endpfalse 2511	\@ifnextchar 1120
\@copyrightowner 1356, 1583	\@endwdefloatbox 679, 687	\@ifnotempty 1523
\@copyrightpermission 1394, 1575	\@finalstrut ... 582, 595	\@ifnum 240, 242
\@copyrightyear 1517, 1583, 1585	\@float 681	\@ifstar 301
\@currbox ... 693, 694, 695	\@flushglue 2346	\@ifundefined 2464, 2467, 2470, 2473, 2476, 2480, 2483
	\@fnsymbol 1538	\@iiiparbox 571
		\@input 385
		\@insideauthorgroupfalse 1068, 1110
		\@insideauthorgrouptrue 1073
		\@journalCode .. 760, 834, 863, 869, 875, 1029
		\@journalCode@nr 760, 815, 1034
		\@journalName 817, 821, 825, 829, 836, 840, 844, 848, 852, 856, 859, 865, 871, 877, 881, 885, 888, 892, 896, 898, 900, 902,

906, 910, 914, 918,	\@mkauthors 1544, 1546, 1873	\@plus .. 383, 391, 598,
922, 926, 930, 934,	\@mkauthors@i .. 1877,	2327, 2331, 2335,
938, 942, 946, 950,	1879, 1881, 1883, 1932	2339, 2343, 2374,
954, 958, 962, 965,	\@mkauthors@ii 1962	2379, 2384, 2420,
969, 972, 977, 981,	\@mkauthors@iii . 1885,	2422, 2450, 2452, 2506
985, 989, 993, 997,	1887, 1889, 1891, 1973	\@printcopyrightfalse
1001, 1005, 1009,	\@mkauthors@iv 1893, 2022	..... 1314, 1326
1013, 1017, 1021,	\@mkauthorsaddresses	\@printcopyrighttrue
1025, 1035, 1036,	..... 1134, 2064	..... 1298, 1310
1595, 2197, 2205,	\@mkbibcitation 1638, 2103	\@printendtopmatter
2214, 2283, 2291, 2299	\@mkteasers ... 1544, 2086	..... 1651, 2129
\@journalNameShort .	\@mktitle 1544, 1717	\@printpermissionfalse
..... 818,	\@mktitle@i 1720,	..... 1313
822, 826, 831, 837,	1722, 1724, 1726, 1781	\@printpermissiontrue
841, 845, 849, 853,	\@mktitle@ii 1809	... 1300, 1309, 1325
857, 860, 866, 872,	\@mktitle@iii .. 1728,	\@printtopmatter ...
878, 882, 886, 889,	1730, 1732, 1734, 1809	..... 1545, 1676
893, 903, 907, 911,	\@mktitle@iv .. 1736, 1837	\@proofindent
915, 919, 923, 927,	\@mpargs 571	... 2490, 2500, 2508
931, 935, 939, 943,	\@mparswitchfalse .. 533	\@proofnamefont
947, 951, 955, 959,	\@mpfootins .....	... 2489, 2499, 2509
966, 970, 973, 978,	563, 564, 566, 586, 587	\@received . 1252, 1255,
982, 986, 990, 994,	\@mpfootnotetext ... 585	1256, 1258, 1261,
998, 1002, 1006,	\@ene . 228, 232, 236, 238,	1262, 1264, 1268, 1269
1010, 1014, 1018,	438, 2137, 2142, 2146	\@rightskip ... 2346, 2347
1022, 1026, 1036, 2116	\@enil 247	\@saveabstract 1214, 1215
\@keywords	\@nobreakfalse . 350, 390	\@saveteaser .. 1520, 1521
1212, 1625, 1631, 1646	\@noskipsecfalse ... 354	\@seccntformat . 310, 367
\@latex@error 270	\@noskipsectrue 351	\@secfont 2329, 2350
\@lempy 1217, 2094	\@pages@word	\@secpenalty 299
\@listI 736, 740	... 2104, 2118, 2125	\@sect 303, 304
\@listi 733, 740	\@par 1557, 1563	\@setaddresses 2083
\@listii 741	\@parboxrestore 590	\@setauthorsaddresses
\@listiii 744	\@parfont . 2341, 2345, 2350	..... 1563, 2131
\@listiv 746	\@permissionCodeOne	\@setthanks ... 1557, 2130
\@listv 748	... 819, 823, 827,	\@shortauthors
\@listvi 750	832, 838, 842, 846,	.... 2179, 2189,
\@m 305	850, 854, 861, 867,	2195, 2201, 2209, 2219
\@makefnmark ... 572,	873, 879, 883, 890,	\@sidebar 666, 667
597, 1543, 1548, 1552	894, 904, 908, 912,	\@specialsection ...
\@makefnmtxt	916, 920, 924, 928,	1621, 1627, 1629, 1655
.. 572, 581, 594, 1554	932, 936, 940, 944,	\@essect 302, 368
\@marginfigure . 669, 670	948, 952, 956, 960,	\@startPage 1208,
\@margintable .. 672, 673	963, 967, 974, 979,	1677, 1678, 1680, 2176
\@minipagefalse . 568, 689	983, 987, 991, 995,	\@startsection
\@minus ... 2327, 2331,	999, 1003, 1007,	.. 288, 380, 2326,
2335, 2339, 2343,	1011, 1015, 1019,	2330, 2334, 2338,
2374, 2379, 2384,	1023, 1027, 1037, 1606	2342, 2373, 2378, 2383
2421, 2423, 2451, 2453	\@permissionCodeTwo	\@starttoc 380
\@mkabstract .. 1618, 2093	..... 975, 1038	\@subparfont .. 2386, 2387

\@subsecfont .. 2333, 2350	\@title ... 1137, 1644,	697, 1656, 1684,
\@subsubsecfont 2337, 2350	1799, 1823, 1840, 2113	1718, 1740, 1761,
\@subtitle . 1061, 1146,	\@titlefont 1739, 1791,	1875, 1899, 2185,
1800, 1801, 1824,	1798, 1810, 1822, 1838	2240, 2277, 2310,
1825, 1841, 1842, 2114	\@titlenotes	2355, 2404, 2434, 2491
\@subtitlefont	1135, 1139, 1142, 1549	\ACM@linecount
1760, 1801, 1825, 1842	\@tochangmeasure 321, 334	.... 2136, 2137,
\@subtitlenotes	\@toclevel 305	2141, 2142, 2145, 2146
1144, 1148, 1151, 1550	\@tocline ... 393, 394, 395	\ACM@linecount@bx ..
\@svsec . 307, 310, 316, 331	\@topnum 1539	... 2133, 2152, 2159
\@svsechd ... 329, 357, 377	\@typeset@author@bx	\ACM@linecount@bxht
\@teaser 1521, 2088	..... 1966,	2135, 2140, 2143, 2144
\@teaserfigures	2015, 2021, 2058, 2063	\ACM@linecountL
1519, 1521, 2087, 2091	\@typeset@author@line	.... 2148, 2187,
\@tempa 202,	1924, 1935, 1957, 1959	2190, 2193, 2196,
203, 205, 207, 209,	\@undefined 448, 630	2200, 2202, 2208,
211, 213, 215, 217,	\@width 552, 559	2210, 2218, 2220,
219, 221, 223, 225,	\@exp 387, 388	2279, 2286, 2287,
227, 229, 231, 233,	\@xsect 342, 343, 379	2295, 2296, 2302, 2305
235, 237, 239, 241,	\@z 234	\ACM@linecountR
243, 245, 247, 250,	\@ 469, 1583, 1588, 1603,	2155, 2211, 2213,
252, 254, 256, 258,	1607, 1611, 2106, 2141	2219, 2223, 2303, 2306
260, 1094, 1095,	\{ 210	\ACM@mk@linecount ..
1253, 1254, 1945,	\} 210	... 2138, 2150, 2157
2522, 2538, 2539, 2541		\ACM@ps@headings ...
\@tempb 203, 205,		..... 2320, 2324
207, 209, 211, 213,	_ ... 1052, 1279, 1289,	\ACM@ps@myheadings .
215, 217, 219, 221,	1583, 1585, 1607,	..... 2319, 2323
223, 225, 227, 229,	2110, 2111, 2123, 2176	\ACM@ps@plain . 2318, 2322
231, 233, 235, 237,		\ACM@restore@pagestyle
239, 241, 243, 245,		..... 2318
250, 252, 254, 256,		\ACM@timestamp
258, 260, 2540, 2541		2162, 2229, 2311, 2314
\@tempboxa 571	\abstract 1214	\acmArticle 15, 1171
\@tempc . 248, 249, 251,	abstract (environment) 17	\acmArticleSeq . 15, 1173
253, 255, 257, 259, 261	\acks 2513	\acmBadgeL 16, 1203
\@tempcnta . 2253, 2254,	acks (environment) 23	\acmBadgeR 16, 1198
2256, 2257, 2259, 2261	\acm@copyrightinput 1304	\acmBooktitle ... 8, 1049
\@tempdima 1304, 1312,	\acm@copyrightmode .	\acmConference .. 8, 1039
1317, 1320, 1324,	.... 1304, 1312,	\acmConference@date
2260, 2261, 2262, 2264	1317, 1320, 1324,	1042, 1579, 2221, 2223
\@tempskipa 1330, 1333, 1336,	1339, 1342, 1345,	\acmConference@name
291, 293, 294, 299,	1348, 1351, 1357, 1395	... 1041, 1050, 1051
312, 313, 344, 345,	\ACM@fontsize 116, 160, 163, 165,	\acmConference@shortname
347, 359, 360, 369, 370	167, 169, 171, 173,	..... 1040,
\@textbottom 598	175, 177, 179, 182, 183	1044, 1045, 1051,
\@textsuperscript ..	\ACM@format 32, 124	1052, 1579, 2220, 2222
.... 597, 1543, 1548	\ACM@format@nr 32, 124,	\acmConference@venue
\@texttop 599	128, 133, 139, 161,	1043, 1579, 2221, 2223
\@thefnmark . 578, 592,	406, 473, 538, 645,	\acmdefinition 2449
597, 1543, 1548, 1553		

<code>\ClassError</code>	<code>\def</code> . . . 25, 38, 116, 163,	979, 981, 982, 983,
. . 35, 1031, 1115,	165, 167, 169, 171,	985, 986, 987, 989,
1223, 1229, 1235, 2107	173, 175, 177, 179,	990, 991, 993, 994,
<code>\ClassInfo</code>	203, 205, 207, 209,	995, 997, 998, 999,
. . 124, 182, 1029,	211, 213, 215, 217,	1001, 1002, 1003,
1220, 1222, 1226,	219, 221, 223, 225,	1005, 1006, 1007,
1228, 1232, 1234, 1237	227, 228, 229, 230,	1009, 1010, 1011,
<code>\ClassWarning</code>	231, 232, 233, 234,	1013, 1014, 1015,
. . . 27, 129, 615,	235, 236, 237, 239,	1017, 1018, 1019,
618, 621, 1210, 1238	241, 243, 245, 246,	1021, 1022, 1023,
<code>\cleaders</code> 1850	250, 252, 254, 256,	1025, 1026, 1027,
<code>\clubpenalty</code> . . . 356, 362	258, 260, 288, 304,	1033, 1034, 1035,
<code>\CodelineIndex</code> 17	329, 343, 367, 368,	1036, 1037, 1038,
<code>\Collect@Body</code> . . 666,	377, 380, 393, 394,	1049, 1053, 1054,
669, 672, 1214, 1520	395, 400, 401, 402,	1055, 1061, 1094,
<code>\color</code> . . . 1571, 2141, 2145	403, 447, 551, 558,	1116, 1117, 1118,
<code>\color@begingroup</code> 580, 593	560, 572, 574, 585,	1119, 1120, 1121,
<code>\color@endbox</code> 692	597, 598, 667, 670,	1132, 1133, 1135,
<code>\color@endgroup</code>	673, 678, 680, 684,	1136, 1144, 1145,
. 569, 583, 596	687, 705, 706, 707,	1154, 1155, 1167,
<code>\columnwidth</code> . . . 552,	708, 736, 741, 744,	1169, 1171, 1173,
589, 678, 2023, 2060	746, 748, 750, 817,	1175, 1177, 1179,
<code>\contentsnamefont</code> . . 384	818, 819, 821, 822,	1183, 1185, 1187,
<code>\copy</code> 1850	823, 825, 826, 827,	1189, 1199, 1200,
<code>\copyright</code> 1583	829, 831, 832, 836,	1201, 1202, 1204,
<code>\copyrightpermissionfootnoterule</code>	837, 838, 840, 841,	1205, 1206, 1207,
. 551	842, 844, 845, 846,	1208, 1210, 1212,
<code>\copyrightyear</code> . . 17, 1517	848, 849, 850, 852,	1215, 1217, 1240,
<code>\country</code> 12, 1126, 1853, 2077	853, 854, 856, 857,	1252, 1253, 1277,
<code>\csname</code> 268, 319,	859, 860, 861, 865,	1296, 1354, 1356,
321, 325, 332, 334,	866, 867, 871, 872,	1393, 1394, 1517,
338, 367, 387, 388,	873, 877, 878, 879,	1519, 1521, 1530,
578, 592, 1278,	881, 882, 883, 885,	1543, 1548, 1557,
1279, 1281, 1282,	886, 888, 889, 890,	1563, 1655, 1676,
1283, 1284, 1285,	892, 893, 894, 896,	1717, 1739, 1760,
1288, 1290, 1648, 1650	898, 900, 902, 903,	1781, 1809, 1837,
<code>\CurrentOption</code> . 117,	904, 906, 907, 908,	1846, 1853, 1854,
118, 119, 120, 121, 122	910, 911, 912, 914,	1856, 1857, 1858,
	915, 916, 918, 919,	1859, 1861, 1863,
	920, 922, 923, 924,	1864, 1867, 1870,
D	926, 927, 928, 930,	1873, 1897, 1898,
<code>\day</code> 2174	931, 932, 934, 935,	1902, 1903, 1906,
<code>\DeclareNewFootnote</code>	936, 938, 939, 940,	1907, 1909, 1910,
. 555, 557	942, 943, 944, 946,	1912, 1913, 1915,
<code>\DeclareOptionX</code>	947, 948, 950, 951,	1916, 1918, 1919,
. 38, 117,	952, 954, 955, 956,	1921, 1922, 1924,
118, 119, 120, 121, 122	958, 959, 960, 962,	1926, 1931, 1932,
<code>\DeclareRobustCommand</code> 436	963, 965, 966, 967,	1933, 1934, 1936,
<code>\DeclareTextFontCommand</code>	969, 970, 972, 973,	1943, 1944, 1945,
. 632	974, 975, 977, 978,	1966, 1973, 1995,

2001, 2006, 2022, 2038, 2044, 2049, 2064, 2070, 2071, 2072, 2073, 2074, 2075, 2077, 2078, 2079, 2080, 2083, 2084, 2085, 2086, 2088, 2093, 2103, 2104, 2105, 2106, 2107, 2110, 2129, 2130, 2131, 2138, 2148, 2155, 2179, 2180, 2239, 2246, 2251, 2253, 2321, 2346, 2350, 2351, 2352, 2353, 2359, 2360, 2362, 2363, 2365, 2366, 2368, 2369, 2371, 2372, 2377, 2382, 2387, 2390, 2391, 2394, 2395, 2397, 2398, 2400, 2401, 2402, 2403, 2412, 2413, 2414, 2415, 2430, 2431, 2432, 2433, 2442, 2443, 2444, 2445, 2489, 2490, 2499, 2500, 2520, 2522, 2538, 2539, 2540	\dots 1611	2254, 2304, 2313, 2522, 2527, 2534, 2542
	E	\email 10, 1128, 1943, 2001, 2044, 2080
\edef 117, 118, 119, 120, 305	\editor 10, 1055	\emph 1595, 1597
\egroup 570, 668, 671, 674, 685, 691, 1127, 1622, 1631, 1969, 2063, 2082, 2089, 2102, 2128	\else . . . 52, 60, 69, 77, 85, 93, 101, 111, 135, 248, 269, 298, 305, 308, 320, 324, 328, 333, 337, 349, 361, 376, 426, 440, 446, 448, 563, 642, 1051, 1057, 1071, 1079, 1083, 1084, 1093, 1098, 1101, 1104, 1111, 1129, 1141, 1150, 1156, 1164, 1221, 1227, 1233, 1244, 1247, 1257, 1260, 1263, 1268, 1287, 1291, 1292, 1526, 1544, 1555, 1559, 1560, 1574, 1577, 1578, 1584, 1589, 1596, 1601, 1604, 1607, 1609, 1610, 1611, 1612, 1620, 1625, 1628, 1679, 1705, 1710, 1783, 1787, 1792, 1800, 1803, 1816, 1824, 1831, 1841, 1847, 1848, 1861, 1862, 1863, 1864, 1866, 1867, 1870, 1927, 1939, 1945, 1951, 1967, 1978, 1988, 1997, 2003, 2010, 2027, 2031, 2040, 2046, 2053, 2066, 2068, 2087, 2094, 2098, 2104, 2110, 2114, 2119, 2121, 2127, 2171, 2179, 2216,	\EnableCrossrefs 19 \end . . . 22, 2153, 2160, 2271 \end@dblfloat 683 \end@float 685 \endcsname 267, 268, 319, 321, 325, 332, 334, 338, 367, 387, 388, 578, 592, 1278, 1279, 1281, 1282, 1283, 1284, 1285, 1288, 1290, 1648, 1650 \enddescription 759 \endgroup 318, 357, 375, 390, 1616, 1895, 2518 \endlist 757, 759 \endminipage 560 \endtrivlist 2511 \enspace 2398 environments: abstract 17 acks 23 anonsuppress 22 CCSXML 16 marginfigure 21 marginable 21 prntonly 22 screenonly 22 sidebar 21 teaserfigure 17 \everypar 297, 352, 363, 2097 \excludecomment . 1272, 2526, 2528, 2532, 2533 \ExecuteOptionsX 48, 56, 64, 73, 81, 89, 97, 105, 115 \expandafter 247, 249, 449, 571, 1278, 1279, 1281, 1282, 1288, 1290
		F
		\familydefault 634
		\fancyfoot 2191, 2197, 2205, 2214, 2217, 2229, 2280,
\define@boolkey 49, 57, 65, 74, 82, 90, 98, 106, 1114, 1218, 1224, 1230		
\define@choicekey 32, 760, 1303		
\define@cmdkey 1236		
\definecolor 456, 457, 458, 459, 460, 461, 462, 463		
\department 12, 1120, 1853, 2076		
\description 753		
\descriptionlabel 752, 755		
\dimexpr . . 676, 694, 2226		
\divide 1977, 1983, 1985, 1987, 1989, 2026, 2032		
\do 202		
\DocInput 21		
\documentclass 9		

2281, 2283, 2291,	1392, 1516, 1528,	2217, 2281, 2283,
2299, 2307, 2311, 2314	1533, 1534, 1544,	2291, 2299, 2307, 2312
\fancyhead . 2187, 2188,	1546, 1558, 1564,	\footnotetext .. 1140,
2189, 2190, 2193,	1565, 1566, 1572,	1142, 1149, 1152, 1159
2194, 2195, 2196,	1575, 1576, 1580,	\footnotetextauthorsaddresses
2200, 2202, 2203,	1581, 1586, 1598,	..... 1556, 1562
2208, 2210, 2211,	1603, 1607, 1611,	\footnotetextcopyrightpermission
2212, 2218, 2219,	1612, 1613, 1614,	..... 1567
2220, 2222, 2279,	1615, 1623, 1624,	\footrulewidth 2184, 2276
2286, 2287, 2288,	1630, 1632, 1639,	\format 32
2294, 2295, 2296,	1675, 1681, 1709,	\frenchspacing 2544
2302, 2303, 2305, 2306	1713, 1714, 1715,	\fulltextwidth
\fancyheadoffset ...	1737, 1759, 1780,	..... 675, 678, 694
... 2226, 2289, 2297	1786, 1790, 1796,	
\fancyhf 2182, 2274	1802, 1807, 1819,	G
\fancypagestyle 2181, 2273	1821, 1826, 1834,	\g@addto@macro
\fi 54, 62, 71, 79, 87, 95,	1835, 1843, 1851,	1059, 1085, 1086,
103, 113, 132, 137,	1861, 1863, 1864,	1099, 1105, 1112,
159, 180, 181, 192,	1866, 1867, 1870,	1130, 1137, 1139,
204, 206, 208, 210,	1872, 1894, 1923,	1142, 1146, 1148,
212, 214, 216, 218,	1930, 1941, 1955,	1151, 1157, 1158,
220, 222, 224, 226,	1956, 1967, 1990,	1163, 1165, 1258,
228, 230, 232, 234,	1991, 1999, 2005,	1264, 1283, 1290,
236, 238, 240, 242,	2014, 2033, 2034,	1521, 1525, 1527,
244, 246, 251, 253,	2042, 2048, 2057,	1940, 1952, 1998,
255, 257, 259, 261,	2066, 2068, 2092,	2004, 2011, 2041,
262, 271, 273, 287,	2100, 2102, 2104,	2047, 2054, 2084, 2085
289, 295, 300, 305,	2111, 2114, 2123,	\gdef 1040,
311, 322, 326, 335,	2126, 2127, 2147,	1041, 1042, 1043,
339, 341, 364, 365,	2154, 2161, 2173,	1045, 1049, 1056,
378, 389, 418, 428,	2178, 2179, 2187,	1058, 1077, 1078,
444, 446, 450, 453,	2188, 2193, 2194,	1080, 1081, 1091,
471, 535, 549, 567,	2201, 2204, 2209,	1097, 1103, 1215,
584, 611, 629, 635,	2213, 2217, 2224,	1239, 1256, 1262,
662, 663, 682, 686,	2227, 2230, 2252,	1279, 1281, 1282,
711, 1028, 1046,	2271, 2280, 2307,	1288, 1678, 1938,
1052, 1060, 1074,	2308, 2315, 2316,	1942, 1947, 1971,
1082, 1087, 1088,	2396, 2418, 2448,	1972, 1993, 1994,
1092, 1100, 1106,	2486, 2503, 2522,	1996, 2000, 2002,
1107, 1108, 1113,	2530, 2536, 2539, 2543	2007, 2036, 2037,
1131, 1143, 1153,	\firstpagestyle 2273	2039, 2043, 2045, 2050
1160, 1166, 1182,	\floatname 665	\geometry 475, 478, 485, 492,
1223, 1229, 1235,	\footnote 2107	499, 506, 513, 520, 527
1249, 1250, 1259,	\footnotemark 403, 1137,	\getrefnumber 2104
1265, 1266, 1270,	1146, 2084, 2085, 2105	\global 351, 354, 390, 586,
1286, 1293, 1294,	\footnoterule 558	693, 1070, 1072,
1316, 1319, 1323,	\footnotesep ... 582, 595	1073, 1110, 1539,
1329, 1332, 1335,	\footnotesize 1541, 1635, 1636,	
1338, 1341, 1344,	. 588, 2170, 2191,	
1347, 1350, 1353,	2197, 2205, 2214,	

1935, 1957, 1958, 1967, 2015, 2018, 2058, 2090, 2142, 2146	\grantnum 23, 2521	\ifACM@manuscript 125, 189, 1242, 1577, 1587	\ifnum 128, 133, 305, 306, 320, 324, 333, 337, 1291, 1292, 1312, 1317, 1320, 1324, 1330, 1333, 1336, 1339, 1342, 1345, 1348, 1351, 1533, 1976, 2025, 2065, 2067, 2104, 2254, 2256, 2310
\grantsponsor . . . 23, 2520		\ifACM@natbib 82, 194, 285, 429	\ifPDFTeX 601
		\ifACM@natbib@override 82	\ifvmode 1847
H		\ifACM@newfonts 613, 624	\ifvoid 563
\hbox . 597, 1543, 1548, 1849		\ifACM@printacmref 1224, 1637	\ifx . 160, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 250, 252, 254, 256, 258, 260, 448, 1044, 1051, 1055, 1075, 1090, 1095, 1096, 1102, 1162, 1254, 1255, 1261, 1268, 1278, 1287, 1555, 1559, 1599, 1607, 1610, 1611, 1612, 1620, 1625, 1677, 1705, 1710, 1783, 1787, 1792, 1800, 1803, 1816, 1824, 1831, 1841, 1927, 1937, 1945, 1946, 1995, 2001, 2006, 2038, 2044, 2049, 2087, 2094, 2110, 2114, 2121, 2127, 2171, 2522, 2539, 2541
\headrulewidth 2183, 2275		\ifACM@printccs 1218, 1619	\ignorespaces 366, 582, 595, 1118, 1119, 1121, 1132, 1853, 1854, 1856, 1857, 1858, 1859, 1860, 1861, 2072, 2101, 2106, 2509
\hfill 1839, 2145		\ifACM@review 65, 2133, 2149, 2156	\immediate 388, 452
\href . 1706, 1711, 1793, 1805, 1817, 1832, 2542		\ifACM@screen 49, 420, 2524	\includecomment 2525, 2529, 2535
\hrule 552, 559, 1839		\ifACM@sigchiamode 127, 573, 633, 677, 683, 1544, 1546, 1967, 2225	\includegraphics . . .
\hsize 589, 1542, 1781, 1782, 1809, 1811, 1837, 1874, 1966, 2017, 2060		\ifACM@timestamp 98, 2162, 2228, 2309	
\hskip 316, 330, 360, 373, 377, 1708, 1795, 1804, 1820, 1829, 1850, 2508		\ifacmowned 1301	
\hspace 1405, 1416, 1425, 1450, 1462, 1483, 1970, 2020		\if@filesw 386, 451	
\Huge 1748, 1750, 1752, 1754, 1756, 1758		\if@insideauthorgroup 1067, 1071	
\hypersetup 421, 427, 1640		\if@nobreak 296	
I		\if@printcopyright 1297, 1582	
\if 248		\if@printpermission 1299, 1575	
\ifACM@acmthm . 57, 2462		\ifcase 139, 161, 406, 473, 538, 645, 697, 815, 1179, 1357, 1395, 1656, 1684, 1718, 1740, 1761, 1875, 1899, 1979, 2028, 2185, 2240, 2277, 2355, 2404, 2434, 2491	
\ifACM@affiliation@obeyrules 1114, 1848, 1861, 1863, 1864, 1865, 1867, 1870		\ifcsname 267	
\ifACM@anonymous 90, 1076, 1084, 1089, 1111, 1129, 1138, 1147, 1156, 1524, 1531, 1560, 2179, 2531		\ifdim 293, 313, 345, 370, 2144	
\ifACM@authordraft 106, 464, 1568		\IfFileExists 615, 618, 621	
\ifACM@authorversion 74, 1574, 1590		\IfInteger 1237	
\ifACM@badge 1191, 1703, 1812, 1828		\ifNAT@numbers 446	
\ifACM@journal . 126, 638, 1245, 1561, 1578, 1594, 1605, 1626, 1855, 2096, 2115			

..... 1707, 1712, 1794, 1806, 1818, 1833	\leftmargini ... 720, 721, 722, 723, 736, 737	\marginfigure 669
\indent 2490	\leftmarginii .. 726, 727, 728, 729, 741, 742	marginfigure (environ- ment) 21
\input 602	\leftmarginiii 729, 730, 744, 745	\marginpar 574, 668, 671, 674, 1704
\InputIfFileExists .. 26	\leftmarginiv 730, 731, 746, 747	\marginparsep .. 676, 2226
\institution 12, 1119, 1853, 2073	\leftmarginv 731, 732, 748, 749	\marginparwidth . 676, 2226
\interfootnotelinepenalty 576	\leftmarginvi 732, 750, 751	\margintable 672
\interlinepenalty 317, 374, 576	\leftskip . 1838, 2061, 2348	marginable (environ- ment) 21
\item 2508	\let 224, 226, 238, 240, 242, 268, 307, 396, 397, 430, 431, 432, 433, 434, 435, 438, 442, 599, 630, 679, 740, 755, 759, 1122, 1123, 1124, 1125, 1126, 1273, 1536, 1537, 1552, 1553, 1554, 1557, 1563, 1635, 1636, 1868, 1869, 1871, 1935, 1957, 2015, 2021, 2058, 2063, 2318, 2319, 2320, 2322, 2323, 2324	\mbox 246
\itshape .. 1579, 2352, 2353, 2382, 2387, 2400, 2412, 2432, 2499	\mdseries 1763, 1765, 1767, 1771, 1773, 1775, 1777, 1779, 1919, 1922	\medskip .. 1658, 1660, 1662, 1664, 1958, 1960, 2019, 2091, 2112
J		\mktitle@bx 1529, 1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1791, 1810, 1838, 1958, 2018, 2019, 2090
\jobname 385, 388		\month 1178, 2174
K		\moveleft 693
\kern 551, 552, 558, 559, 1839		\multiply 2261
\keywords 16, 1212		
L		N
\l@section 393	\libertineLF 632	\NAT@@setcites 264
\l@subsection .. 393, 394	\lineskip 2020, 2062	\NAT@aysep 255
\l@subsubsection ... 395	\linespacing ... 383, 384	\NAT@citetp 438
\labelenumi 705	\liningnums 630	\NAT@close 204, 206, 208, 210, 253
\labelenumii 706	\list 753	\NAT@cmprs .. 232, 234, 236
\labelenumiii 707	\listisep ... 734, 735, 739	\NAT@cmt 259
\labelenumiv 708	\listparindent 738	\NAT@ctype 438
\labelsep 714, 722, 727, 737, 742, 745, 747, 749, 751, 2508	\LoadClass 183	\NAT@find@eq 247
\labelwidth . 737, 742, 745, 747, 749, 751, 754	\long 574, 585, 667, 670, 673, 1215, 1217, 1521, 2130	\NAT@fullfalse 438
\LARGE 1742, 1744, 1746, 1769, 1771, 1773, 1775, 1777, 1906, 1909, 2270	\loop 2141, 2255	\NAT@longnamestrue . 244
\Large 1897, 1915, 2365, 2366, 2368, 2369, 2371		\NAT@merge .. 238, 240, 242
\large 1569, 1902, 1907, 1910, 2359, 2360, 2362, 2363	M	\NAT@nmfmt 246
\lastbox 355, 2097	\makeatletter 380	\NAT@numbersfalse .. 218
\leaders 1839	\makebox 1569, 2264	\NAT@numberstrue 220, 222
\leavevmode 289, 1839, 2019	\makelabel 755	\NAT@open 204, 206, 208, 210, 251, 438
\leftmargin 736, 741, 744, 746, 748, 750	\MakeTextUppercase 1938, 1940, 2350, 2359, 2362, 2365, 2368, 2390, 2394	\NAT@partrue 438
	\maketitle 19, 1530	\NAT@rem@eq 249
		\NAT@sep 212, 214, 216, 261
		\NAT@sort ... 228, 230, 236

<code>\NAT@superfalse</code>	220	1916, 2415, 2430,	1375, 1378, 1381,
<code>\NAT@supertrue</code>	222	2442, 2445, 2506, 2544	1383, 1386, 1389,
<code>\NAT@swafalse</code>	437	<code>\normalparindent</code> . . .	<u>550</u>
<code>\NAT@up</code>	246	<code>\normalsize</code> 1760, 1898,	1396, 1407, 1418,
<code>\NAT@yrsep</code>	257	1912, 1913, 1916, 2544	1426, 1432, 1438,
<code>\NeedsTeXFormat</code>	1	<code>\num@authorgroups</code> . .	1452, 1464, 1471,
<code>\newblock</code>	439	. . . . .	<u>1063</u> ,
<code>\newbox</code> . .	1529, 1845, 1962	1072, 1533, 1979,	1485, 1492, 1498,
<code>\newcommand</code> .	274, 280,	1983, 1985, 2028, 2067	1505, 1510, 1659,
	445, 1039, 1109,	<code>\num@author</code>	1661, 1663, 1665,
	1161, 1198, 1203,	. . .	1667, 1669, 1671,
	1253, 1274, 1860,	<u>1065</u> , 1070, 2065	1673, 1687, 1689,
	1865, 2169, 2521, 2537	<code>\number</code>	1691, 1693, 1695,
<code>\newcount</code> .	1063, 1065, 2136	<code>\numberline</code>	1697, 1699, 1701,
<code>\newcounter</code> . . .	2165, 2167	. . .	1721, 1723, 1725,
<code>\newdimen</code> . . .	675, 712,	<code>\numexpr</code> .	1727, 1729, 1731,
	1963, 2233, 2235, 2237		1733, 1735, 1743,
<code>\newenvironment</code>		O	1745, 1747, 1749,
	. . . . .	<code>\onehalfspacing</code> . . . .	1751, 1753, 1755,
	669, 672, 1520	<code>\openout</code>	1757, 1764, 1766,
<code>\newfloat</code>	664	<code>\or</code>	1768, 1770, 1772,
<code>\newif</code>	125, 126,		1774, 1776, 1778,
	127, 613, 1067,	144, 146, 148, 150,	1878, 1880, 1882,
	1191, 1297, 1299, 1301	152, 154, 156, 164,	1884, 1886, 1888,
<code>\newlength</code>		166, 168, 170, 172,	1890, 1892, 1901,
	1193, 1195, 1196, 2135	174, 176, 178, 408,	1904, 1905, 1908,
<code>\newsavebox</code>	2134	409, 410, 411, 412,	1911, 1914, 1917,
<code>\newskip</code>	734, 1964	413, 415, 416, 477,	1920, 1981, 1982,
<code>\newtheorem</code>		484, 491, 498, 505,	1984, 1986, 2030,
	2465, 2468, 2471,	512, 519, 526, 540,	2192, 2199, 2207,
	2474, 2477, 2481, 2484	541, 542, 544, 545,	2242, 2247, 2282,
<code>\newtheoremstyle</code> . . .		546, 547, 548, 647,	2290, 2298, 2357,
	. . . . .	648, 649, 650, 651,	2358, 2361, 2364,
	2419, 2449	653, 656, 659, 699,	2367, 2370, 2388,
<code>\newwrite</code>	387	700, 701, 702, 703,	2392, 2406, 2407,
<code>\nobreak</code>	346, 2112	704, 709, 710, 820,	2408, 2409, 2410,
<code>\noindent</code>	572,	824, 828, 835, 839,	2411, 2416, 2417,
	1269, 1554, 1658,	843, 847, 851, 855,	2436, 2437, 2438,
	1660, 1662, 1664,	858, 864, 870, 876,	2439, 2440, 2441,
	1683, 1704, 1791,	880, 884, 887, 891,	2446, 2447, 2493,
	1798, 1801, 1825,	895, 897, 899, 901,	2494, 2495, 2496,
	1839, 1840, 1842,	905, 909, 913, 917,	2497, 2498, 2501, 2502
	1925, 1958, 1959,	921, 925, 929, 933,	<code>\orcid</code>
	2018, 2062, 2090,	937, 941, 945, 949,	<u>10</u> , <u>1132</u>
	2091, 2112, 2113, 2500	953, 957, 961, 964,	<code>\outer@nobreak</code>
<code>\nolinkurl</code>	2002,	968, 971, 976, 980,	690
	2004, 2045, 2047, 2080	984, 988, 992, 996,	
<code>\normalcolor</code>	565	1000, 1004, 1008,	P
<code>\normalfont</code> 597, 1269,		1012, 1016, 1020,	<code>\p@</code>
1548, 1898, 1903,		1024, 1179, 1180,	391,
1912, 1913, 1915,		1181, 1358, 1360,	536, 543, 551, 552,
		1363, 1365, 1366,	558, 559, 2327,
		1368, 1370, 1372,	2331, 2335, 2336,
			2339, 2340, 2343,
			2344, 2374, 2379,

2380, 2384, 2385, 2506	\position . . . 12, 1118,	1342, 1345, 1348,
\PackageError . 54, 62,	1122, 1123, 1124,	1351, 1357, 1395,
71, 79, 87, 95, 103, 113	1125, 1126, 1853, 2072	1552, 1553, 1657,
\PackageInfo 51,	\postcode	1685, 1719, 1741,
53, 59, 61, 67, 70,	. 12, 1125, 1853, 2071	1762, 1876, 1900,
76, 78, 84, 86, 92,	printonly (environment) 22	1965, 1974, 1975,
94, 100, 102, 108,	\ProcessOptionsX . . . 123	1976, 1977, 1980,
112, 834, 863, 869, 875	\proof 2504	1983, 1985, 1987,
\PageIndex 16	\proofname 2504	1989, 1992, 2020,
\pageref 2176	\protect 325, 338	2023, 2024, 2025,
\pagestyle 2232	\protected@edef	2026, 2029, 2032,
\par . 290, 346, 382, 561,	. . . . . 310, 577, 591	2035, 2065, 2067,
688, 1269, 1557,	\providecommand	2084, 2104, 2137,
1563, 1575, 1579,	. . . . . 439, 443, 2399	2166, 2168, 2171,
1622, 1631, 1658,	\ProvidesClass 5	2186, 2241, 2243,
1660, 1662, 1664,	\ProvidesFile 3	2244, 2245, 2248,
1686, 1688, 1690,	\ps@headings . . 2320, 2324	2249, 2250, 2253,
1702, 1801, 1808,	\ps@myheadings 2319, 2323	2254, 2256, 2259,
1825, 1836, 1839,	\ps@plain 2318, 2322	2260, 2261, 2262,
1842, 1844, 1863,	\pushQED 2505	2278, 2310, 2356,
1864, 1866, 1867,	\put 2152, 2159	2405, 2435, 2492, 2506
1925, 1929, 1958,		\removelastskip 382
1960, 1966, 1968,	Q	\renewcommand . . 196,
1996, 1998, 2004,	\qed 2505	200, 201, 204, 206,
2011, 2019, 2021,	\quad 367, 2201,	208, 210, 212,
2039, 2041, 2047,	2204, 2209, 2213, 2311	214, 216, 266,
2054, 2061, 2063,		634, 752, 1069,
2088, 2089, 2090,	R	1128, 1522, 1538,
2091, 2101, 2112,	\raggedright	2076, 2183, 2184,
2128, 2129, 2130, 2504	. . . 1797, 1838, 2061	2275, 2276, 2326,
\paragraph 1670, 2338, 2378	\raisebox	2330, 2334, 2338,
\parbox 468, 1797, 1815,	1569, 1793, 1805,	2342, 2373, 2378, 2383
1822, 1830, 2139, 2268	1817, 1832, 2264, 2266	\renewenvironment . .
\parindent 536, 550, 721,	\received 19, 1253	. 666, 753, 1214, 2504
1557, 1563, 1573,	\RecordChanges 18	\repeat 2144, 2258
2338, 2349, 2401, 2431	\ref 2118, 2125	\RequirePackage 30, 31,
\parskip 536, 1573	\refname 197, 198	184, 185, 186, 187,
\part 2342	\refstepcounter 309	188, 190, 193, 195,
\PassOptionsToClass	\relax 128,	398, 454, 455, 465,
. 121, 122	133, 140, 162, 247,	472, 553, 600, 612,
\pdfgentounicode . . . 610	248, 291, 310, 312,	625, 626, 627, 628,
\pdfglyptounicode .	316, 330, 344, 359,	636, 1271, 1276, 2132
. 603, 604,	369, 377, 388, 407,	\reset@font 575, 588
605, 606, 607, 608, 609	474, 539, 599, 646,	\reversemarginpar . . 534
\pdfstringdefDisableCommands	698, 816, 1064,	\rightskip 2347
. 399	1066, 1070, 1072,	\rlap 2265
\phantomsection	1161, 1162, 1278,	\rule 582, 595, 2267
. . . . 198, 2095, 2516	1287, 1312, 1317,	
\popQED 2511	1320, 1324, 1330,	S
	1333, 1336, 1339,	\savebox 2139

screenonly (environ- ment)	22	2359, 2360, 2362, 2363, 2368, 2369, 2390, 2391, 2394, 2395	\textwidth 676, 694, 695, 1542, 1781, 1809, 1837, 1874, 1974, 2017
\scriptsize	2141, 2145		\thanks 14, 1522, 2130
\scshape	2402, 2489	\shortauthors 20, 1090, 1091, 1096, 1097, 1099, 1102, 1103, 1105, 1634, 1636, 2179	\thankses 1525, 1527, 1555, 2130
\section	197, 1666, 1668, 1672, 1674, 2099, 2326, 2515	\shortcite 442, 445	\the 1176, 1178, 2141, 2145, 2174, 2261
\section@raggedright	2346, 2350, 2351, 2359, 2360, 2362, 2363, 2365, 2366, 2368, 2369, 2371, 2372, 2377, 2390, 2391, 2394, 2395	\shorttitle 2190, 2196, 2204, 2213, 2218	\theACM@time@hours 2168, 2175
\SelectFootnoteRule	554, 556	\showeprint 2537	\theACM@time@minutes 2175
\setbox	355, 586, 693, 1791, 1810, 1838, 1849, 1958, 1967, 2018, 2090, 2097	\sidebar 664	\theenumi 705
\setcitestyle	24, 201, 275, 281	sidebar (environment) . 21	\theenumii 706
\setcopyright	17, 1354	\skip 564	\theenumiii 707
\setcounter	1547, 1617, 1680, 2166, 2168, 2354, 2389, 2393	\small 575, 668, 671, 674, 1269, 1658, 1660, 1662, 1664, 1903, 2097, 2112, 2280	\theenumiv 708
\setkeys	38, 131, 1033, 1240, 1354, 1948, 1949, 1953, 1954, 2008, 2009, 2012, 2013, 2051, 2052, 2055, 2056	\smallskipamount . . . 735	\thefootnote 1538
\setlength 536, 537, 543, 550, 714, 715, 720, 726, 729, 730, 731, 732, 1194, 1197, 2140		\space 334, 1648, 1870, 2522	\theoremstyle 2460, 2463, 2479, 2487
\settopmatter	19, 1240, 1241, 1243, 1246, 1248, 1251	\specialcomment 2513	\thepage 2176, 2187, 2188, 2193, 2194, 2201, 2204, 2209, 2213, 2217, 2280, 2307
\setTrue	381	\standardpagestyle . 2181	\thispagestyle 1682
\SetWatermarkColor . 467		\startPage 16, 1208	\thmname 2429, 2459
\SetWatermarkFontSize 466		\state . 12, 1124, 1853, 2075	\thmnote 2429, 2459
\SetWatermarkText . . 468		\stepcounter 1140, 1142, 1149, 1152, 1159	\thmnumber 2429, 2459
\sfdefault	634	\streetaddress 12, 1122, 1853, 2070	\thr@ 242
\sffamily	1742, 1744, 1746, 1748, 1750, 1752, 1756, 1897, 1902, 1906, 2180, 2270, 2350, 2351, 2352,	\string 452, 1210, 2108, 2109	\time 2163, 2166, 2168
		\strut 1815, 1830	\title 10, 2108
		\strutbox 582, 595	\titlenote 14, 1136, 2109
		\subparagraph 2383	\topsep 739, 743, 2506
		\subsection 2330	\trivlist 2507
		\subsubsection 2334, 2373	\tw@ 240
		\subtitle 10, 1061	\two@digits 2174, 2175
		\subtitlenote 14, 1145	\twocolumn 1692, 1694, 1696, 1698, 1700
T			
\teaserfigure	1520	U	
teaserfigure (environ- ment)	17	\unskip 358, 400, 562, 1121, 1127, 1132, 1850, 1853, 1854, 1856, 1857, 1858, 1859, 1860, 1870, 1929, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2080, 2106, 2125, 2131	
\terms	16, 1210	\unvbox 566, 571, 587	
\textbf	1280, 1291	\upshape 752	
\textbullet 401, 1279, 2201, 2204, 2209, 2213			
\textcolor	2270		
\textheight	2144		
\textit	1292, 2116, 2120, 2121, 2122		
\textrightarrow . 402, 1289			

<code>\url</code>	1393, 2522	W	582, 595, 598, 640,
<code>\urlstyle</code> . . .	405, 414, 417	<code>\wd</code>	644, 655, 720, 726,
<code>\usebox</code>	2152, 2159	<code>\write</code>	738, 1539, 1541,
<code>\usepackage</code>		X	1557, 1563, 1569,
. 10, 11, 12, 13, 14, 15		<code>\xdef</code>	1573, 1793, 1805,
			1817, 1832, 2061,
V			2097, 2183, 2184,
<code>\vbox</code>	586,	Y	2234, 2236, 2238,
693, 1791, 1810,		<code>\year</code>	2264, 2266, 2275,
1838, 1958, 2018, 2090			2276, 2326, 2330,
<code>\vskip</code> 347, 382, 564, 598, 688		Z	2342, 2349, 2373,
<code>\vtop</code>	1967	<code>\z@</code>	2378, 2383, 2413, 2443
			<code>\z@skip</code> 382, 688, 743, 2348