

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

Boris Veytsman[†]

2018/08/12, v1.55

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	19
2.5	Figures and tables	19
2.6	Theorems	21
2.7	Online-only and offline-only material	21
2.8	Note about anonymous mode	21
2.9	Acknowledgments	22
2.10	Bibliography	22
2.11	Colors	25
2.12	Other notable packages and typographic remarks	26
2.13	A note for wizards: <code>acmart-preload-hook.tex</code>	26
2.14	Currently supported publications	27

*©2016–2018, Association for Computing Machinery

[†]borisv@lk.net, boris@varphi.com

3 Implementation	30
3.1 Identification	30
3.2 Preload hook	30
3.3 Options	30
3.4 Setting switches	33
3.5 Loading the base class and package	34
3.6 Citations	35
3.7 Paper size and paragraphing	42
3.8 Fonts	45
3.9 Floats	46
3.10 Lists	48
3.11 Top-matter data	49
3.12 Concepts system	63
3.13 Copyright system	64
3.14 Typesetting top matter	69
3.15 Headers and Footers	83
3.16 Sectioning	89
3.17 TOC lists	91
3.18 Theorems	92
3.19 Acknowledgments	95
3.20 Conditional typesetting	95
3.21 Additional bibliography commands	96
3.22 End of Class	96

1 Introduction

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

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

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

This package uses only free \TeX packages and fonts included in \TeX Live, Mik \TeX and other popular \TeX distributions. It is intended to be published in these distributions itself, which minimizes users’ efforts in the installation and support of this package.

I am grateful to Michael D. Adams, Leif Andersen, Dirk Beyer, Joachim Breitner, 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, Gabriel Scherer, Stephen Spencer, Daniel Thomas, Zack Weinberg, John Wickerson and many others for their invaluable help.

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

2 User’s guide

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

2.1 Installation

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

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

¹<http://www.acm.org/>

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

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

1. Run `latex acmart.ins`. This will produce the file `acmart.cls`
2. Put the files `acmart.cls` and `ACM-Reference-Format.bst` in places where \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 5) set this option to `true`. In the future this option may involve additional features suitable for on-screen versions of articles.

The option `natbib` is used when the corresponding BibTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.10.

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, PACMCGIT, PACMHCI, PACMPL, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TDSCI, TEAC, TECS, THRI, TIIS, TIOT, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPS, TOS, TOSEM, TOSN, TRETTS, 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,

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)
nonacm	false	Use the class typesetting options for a non-ACM document, which will not include the conference/journal header and footers or permission statements
timestamp	false	Whether to put a time stamp in the footer of each page
authordraft	false	Whether author's-draft mode is enabled
acmthm	true	Whether to define theorem-like environments, see Section 2.6

`\acmJournal{TOMS}`

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

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

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

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

name: the name of the conference.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

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

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


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

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

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

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

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

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

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

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

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

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

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

Do *not* use the \LaTeX `\and` macro! 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.

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

An example of the author block:

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

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

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

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

and

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

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

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

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

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

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

```
\affiliation[obeypunctuation=true]{%
  \institution{Fluginstitut}\\
  \streetaddress{Sonnenallee 17}\\
  \postcode{123456}}
```

```
\city{Helm},
\country{Germany}}
```

will be typeset as

```
Fluginstitut
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.

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

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

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

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

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

Setting this number to zero suppresses the blob.

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

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

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

```
\acmPrice{25.00}
```

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

`\acmISBN` Book-like volumes have ISBN numbers attached to them. The macro `\acmISBN{ISBN}`

sets it. Normally it is set by the typesetter, for example,

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

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

`\acmDOI` The macro `\acmDOI{<DOI>}` sets the DOI of the article, for example,

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

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

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

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

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

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

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

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

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

```
\begin{CCSXML}  
<ccs2012>  
<concept>  
  <concept_id>10010520.10010553.10010562</concept_id>  
  <concept_desc>Computer systems organization~Embedded systems</concept_desc>  
  <concept_significance>500</concept_significance>
```

```

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

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

```

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

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

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

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

```

\acmYear{2016}
\copyrightyear{2015}

```

There is a special case for a personal copy that the authors may be allowed to generate for their use or a posting on a personal site (check the instructions for the specific journal or conference for the details). The document option `authorversion=true` produces a special form of the copyright statement for this case. Note that you still need the `\setcopyright` command and (optionally) `\copyrightyear` command to tell T_EX 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.

Table 3: Parameters for the `\setcopyright` command

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

Table 4: Settings for the `\settopmatter` command

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

<code>abstract</code>	The environment <code>abstract</code> must <i>precede</i> the <code>\maketitle</code> command. Again, this is different from the standard \LaTeX .
<code>teaserfigure</code>	<p>A special kind of figure is used for many two-column conference proceedings. This figure is placed just after the authors but before the main text. The environment <code>teaserfigure</code> is used for these figures. This environment must be used <i>before</i> <code>\maketitle</code>, for example,</p> <pre> \begin{teaserfigure} \includegraphics[width=\textwidth]{sampleteaser} \caption{This is a teaser} \label{fig:teaser} \end{teaserfigure} </pre>
<code>\settopmatter</code>	<p>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 <code>\settopmatter{<settings>}</code>. The settings and their meanings are listed in Table 4. For example,</p> <pre> \settopmatter{printacmref=false, printccs=true, printfolios=true} </pre> <p>The parameter <code>authorsperrow</code> requires some explanation. In conference proceedings authors' information is typeset in boxes, several boxes per row (see <code>sample-sigconf.pdf</code>, <code>sample-sigplan.pdf</code>, 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,</p> <pre> \settopmatter{authorsperrow=4} </pre> <p>However, in most cases you should <i>not</i> do this and should use the default settings. Setting <code>authorsperrow</code> to 0 will revert it to the default settings.</p>
<code>\received</code>	<p>The command <code>\received[<stage>]{<date>}</code> sets the history of the publication. The <code>[<stage>]</code> argument is optional; the default is Received for the first date and revised for the subsequent ones. For example,</p> <pre> \received{February 2007} \received[revised]{March 2009} \received[accepted]{June 2009} </pre>

`\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
sourcernote. This is a table sourcernote. This is a table
sourcernote.

\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 `\citep` and `\citeauthor` are automatically supported. The command `\shortcite` is the same as `\cite` in numerical mode and cites the year in author-date mode.

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

There are several customized 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",
}

```

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

```

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

```

and then encode the author as

```

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

```

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

2.11 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 `sloppy` environment might help—but beware, the results might be, well, sloppy.

Note that the uppercasing in section titles is done using the `textcase` package [11], so the command `\NoCaseChange` inside the title may help to prevent extraneous uppercasing.

2.13 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.

2.14 Currently supported publications

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

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DTRAP	Digital Threats: Research and Practice
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
JDIQ	ACM Journal of Data and Information Quality
JEA	ACM Journal of Experimental Algorithmics
JERIC	ACM Journal of Educational Resources in Computing
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCCH	ACM Journal on Computing and Cultural Heritage
PACMCGIT	Proceedings of the ACM on Computer Graphics and Interactive Techniques
PACMHCI	PACM on Human-Computer Interaction
PACMPL	PACM on Programming Languages

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

Abbreviation	Publication
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
TDSCI	ACM Transactions on Data Science
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
THRI	ACM Transactions on Human-Robot Interaction
TIIS	ACM Transactions on Interactive Intelligent Systems
TIOT	ACM Transactions on Internet of Things
TISSEC	ACM Transactions on Information and System Security
TIST	ACM Transactions on Intelligent Systems and Technology
TKDD	ACM Transactions on Knowledge Discovery from Data
TMIS	ACM Transactions on Management Information Systems
TOCE	ACM Transactions on Computing Education
TOCHI	ACM Transactions on Computer-Human Interaction
TOCL	ACM Transactions on Computational Logic
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory
TODAES	ACM Transactions on Design Automation of Electronic Systems
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPS	ACM Transactions on Privacy and Security
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TRETS	ACM Transactions on Reconfigurable Technology and Systems

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

Abbreviation	Publication
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

3 Implementation

3.1 Identification

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

```
1 <class>\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{acmart.dtx}
4 </gobble>
5 <class>\ProvidesClass{acmart}
6 [2018/08/12 v1.55 Typesetting articles for the Association for
7 Computing Machinery]
```

And the driver code:

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

3.2 Preload hook

We preload acmart-preload-hook:

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

3.3 Options

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

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

We use xstring to check whether user input is 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@nonacm` Special option for non-ACM publications using the ACM typesetting options.

```

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

```

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

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

```

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

```

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

```

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

```

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

```

110 \define@boolkey+{acmart.cls}[@ACM@]{timestamp}[true]{%
111   \if@ACM@timestamp

```



```

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

```

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

```

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

```

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

```

128 \def\ACM@fontsize{}
129 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
130 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
131 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
132 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

133 \DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
134 \DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
135 \ProcessOptionsX
136 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}

```

3.4 Setting switches

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

```

137 \newif\if@ACM@manuscript

```

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

```

138 \newif\if@ACM@journal

```

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

```

139 \newif\if@ACM@sigchiamode

```

Setting up switches

```

140 \ifnum\ACM@format@nr=5\relax % siggraph
141 \ClassWarning{\@classname}{The format siggraph is now obsolete.
142 I am switching to sigconf.}
143 \setkeys{acmart.cls}{format=sigconf}

```

```

144 \fi
145 \ifnum\ACM@format@nr=0\relax
146   \@ACM@manuscripttrue
147 \else
148   \@ACM@manuscriptfalse
149 \fi
150 \@ACM@sigchiamodef=false
151 \ifcase\ACM@format@nr
152 \relax % manuscript
153   \@ACM@journaltrue
154 \or % acmsmall
155   \@ACM@journaltrue
156 \or % acmlarge
157   \@ACM@journaltrue
158 \or % acmtog
159   \@ACM@journaltrue
160 \or % sigconf
161   \@ACM@journalfalse
162 \or % siggraph
163   \@ACM@journalfalse
164 \or % sigplan
165   \@ACM@journalfalse
166 \or % sigchi
167   \@ACM@journalfalse
168 \or % sigchi-a
169   \@ACM@journalfalse
170   \@ACM@sigchiamodetrue
171 \fi

```

3.5 Loading the base class and package

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

```

172 \ifx\ACM@fontsize\empty
173   \ifcase\ACM@format@nr
174   \relax % manuscript
175     \def\ACM@fontsize{9pt}%
176   \or % acmsmall
177     \def\ACM@fontsize{10pt}%
178   \or % acmlarge
179     \def\ACM@fontsize{10pt}%
180   \or % acmtog
181     \def\ACM@fontsize{9pt}%
182   \or % sigconf
183     \def\ACM@fontsize{9pt}%
184   \or % siggraph
185     \def\ACM@fontsize{9pt}%
186   \or % sigplan
187     \def\ACM@fontsize{10pt}%
188   \or % sigchi

```

```

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

```

206 \if@ACM@natbib
207 \RequirePackage{natbib}
208 \renewcommand{\bibsection}{%
209 \section*{\refname}%
210 \phantomsection\addcontentsline{toc}{section}{\refname}%
211 }
212 \renewcommand{\bibfont}{\bibliofont}
213 \renewcommand\setcitestyle[1]{
214 \@for\@tempa:=#1\do
215 {\def\@tempb{round}\ifx\@tempa\@tempb
216 \renewcommand\NAT@open{()\renewcommand\NAT@close{}}\fi
217 \def\@tempb{square}\ifx\@tempa\@tempb
218 \renewcommand\NAT@open{[]\renewcommand\NAT@close{[]}\fi
219 \def\@tempb{angle}\ifx\@tempa\@tempb
220 \renewcommand\NAT@open{<}\renewcommand\NAT@close{>}\fi
221 \def\@tempb{curly}\ifx\@tempa\@tempb
222 \renewcommand\NAT@open{\{\}\renewcommand\NAT@close{\}}\fi

```

```

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

```

```

273     \xdef\NAT@sep{\@tempc}\fi
274   \fi
275 }%
276 \NAT@@setcites
277 }
278 \renewcommand\citestyle[1]{%
279   \ifcsname bibstyle@#1\endcsname%
280   \csname bibstyle@#1\endcsname\let\bibstyle@gobble%
281   \else%
282   \@latex@error{Undefined ‘#1’ citestyle}%
283   \fi
284 }%
285 \fi

```

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

```

286 \newcommand{\bibstyle@acmauthoryear}{%
287   \setcitestyle{%
288     authoryear,%
289     open={[]},close={]},citesep={;},%
290     aysep={},yysep={,},%
291     notesep={, }}

```

`\bibstyle@acmnumeric` The default numeric format:

```

292 \newcommand{\bibstyle@acmnumeric}{%
293   \setcitestyle{%
294     numbers,sort&compress,%
295     open={[]},close={]},citesep={,},%
296     notesep={, }}

```

The default is numeric:

```

297 \if@ACM@natbib
298 \citestyle{acmnumeric}
299 \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:

```

300 \def\@startsection#1#2#3#4#5#6{%
301   \if@noskipsec \leavevmode \fi
302   \par
303   \@tempkipa #4\relax
304   \@afterindenttrue
305   \ifdim \@tempkipa <\z@
306     \@tempkipa -\@tempkipa \@afterindentfalse
307   \fi
308   \if@nobreak
309     \everypar{}%
310   \else
311     \addpenalty\@secpenalty\addvspace\@tempkipa

```

```

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

```

```

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

```

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

```

392 \def\@starttoc#1#2{\begingroup\makeatletter
393   \setTrue{#1}%
394   \par\removelastskip\vskip\z@skip
395   \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
396     {.5\linespacing}{\centering\contentsnamefont}{#2}%
397   \@input{\jobname.#1}%
398   \if@filesW
399     \xp\newwrite\csname tf@#1\endcsname
400     \immediate\xp\openout\csname tf@#1\endcsname \jobname.#1\relax
401   \fi
402   \global\@nobreakfalse \endgroup
403   \addvspace{32\p@\@plus14\p@}%
404 }

```

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

```

405 \def\l@section{\@toCline{1}{0pt}{1pc}{2pc}{}}

```

```

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

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

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

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

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

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

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

And now, hyperref
434 \let\@footnotemark@nolink\@footnotemark
435 \let\@footnotetext@nolink\@footnotetext
436 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
437 \pdfstringdefDisableCommands{%
438   \def\unskip{}}
439 \def\textbullet{- }%

```



```

440 \def\textrightarrow{ -> }%
441 \def\footnotemark{ }%
442 }
443 \urlstyle{rm}
444 \ifcase\ACM@format@nr
445 \relax % manuscript
446 \or % acmsmall
447 \or % acmlarge
448 \or % acmtog
449 \or % sigconf
450 \or % siggraph
451 \or % sigplan
452 \urlstyle{sf}
453 \or % sigchi
454 \or % sigchi-a
455 \urlstyle{sf}
456 \fi
457 \AtEndPreamble{%
458   \if@ACM@screen
459     \hypersetup{colorlinks,
460       linkcolor=ACMRed,
461       citecolor=ACMPurple,
462       urlcolor=ACMDarkBlue,
463       filecolor=ACMDarkBlue}
464   \else
465     \hypersetup{hidelinks}
466   \fi
467   \hypersetup{pdflang={English},
468     pdfdisplaydoctitle}}
  Bibliography mangling.
469 \if@ACM@natbib
470   \let\cite\cite
471   \let\cite\citep
472   \let\citeANP\citeauthor
473   \let\citeNN\citeyearpar
474   \let\citeyearNP\citeyear
475   \let\citeNP\citealt
476   \DeclareRobustCommand\citeA
477     {\begingroup\NAT@swafalse
478       \let\NAT@ctype@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
479   \providecommand\newblock{ }%
480 \else
481   \AtBeginDocument{%
482     \let\shortcite\cite%
483     \providecommand\citename[1]{#1}}
484 \fi
485 \newcommand\shortcite[2][ ]{%
486   \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:

```
487 \def\bibliographystyle#1{%
488   \ifx\@begindocumenthook\@undefined\else
489     \expandafter\AtBeginDocument
490     \fi
491     {\if@filesw
492       \immediate\write\@auxout{\string\bibstyle{#1}}%
493       \fi}}
```

Graphics and color.

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

We define ACM colors according to [7]:

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

Author-draft mode

```
504 \if@ACM@authordraft
505   \RequirePackage{draftwatermark}
506   \SetWatermarkFontSize{0.5in}
507   \SetWatermarkColor[gray]{.9}
508   \SetWatermarkText{\parbox{12em}{\centering
509     Unpublished working draft.\
510     Not for distribution.}}
511 \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>.

```
512 \RequirePackage{geometry}
513 \ifcase\ACM@format@nr
514 \relax % manuscript
515   \geometry{letterpaper,head=13pt,
516     marginparwidth=6pc,heightrounded}%
517 \or % acmsmall
518   \geometry{twoside=true,
519     includeheadfoot, head=13pt, foot=2pc,
520     paperwidth=6.75in, paperheight=10in,
521     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
```

```

522     marginparwidth=2pc,heightrounded
523   }%
524 \or % acmlarge
525   \geometry{twoside=true, head=13pt, foot=2pc,
526     paperwidth=8.5in, paperheight=11in,
527     includeheadfoot,
528     top=78pt, bottom=114pt, inner=81pt, outer=81pt,
529     marginparwidth=4pc,heightrounded
530   }%
531 \or % acmtog
532   \geometry{twoside=true, head=13pt, foot=2pc,
533     paperwidth=8.5in, paperheight=11in,
534     includeheadfoot, columnsep=24pt,
535     top=52pt, bottom=75pt, inner=52pt, outer=52pt,
536     marginparwidth=2pc,heightrounded
537   }%
538 \or % sigconf
539   \geometry{twoside=true, head=13pt,
540     paperwidth=8.5in, paperheight=11in,
541     includeheadfoot, columnsep=2pc,
542     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
543     marginparwidth=2pc,heightrounded
544   }%
545 \or % siggraph
546   \geometry{twoside=true, head=13pt,
547     paperwidth=8.5in, paperheight=11in,
548     includeheadfoot, columnsep=2pc,
549     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
550     marginparwidth=2pc,heightrounded
551   }%
552 \or % sigplan
553   \geometry{twoside=true, head=13pt,
554     paperwidth=8.5in, paperheight=11in,
555     includeheadfoot=false, columnsep=2pc,
556     top=1in, bottom=1in, inner=0.75in, outer=0.75in,
557     marginparwidth=2pc,heightrounded
558   }%
559 \or % sigchi
560   \geometry{twoside=true, head=13pt,
561     paperwidth=8.5in, paperheight=11in,
562     includeheadfoot, columnsep=2pc,
563     top=66pt, bottom=73pt, inner=54pt, outer=54pt,
564     marginparwidth=2pc,heightrounded
565   }%
566 \or % sigchi-a
567   \geometry{twoside=false, head=13pt,
568     paperwidth=11in, paperheight=8.5in,
569     includeheadfoot, marginparsep=72pt,
570     marginparwidth=170pt, columnsep=20pt,
571     top=72pt, bottom=72pt, left=314pt, right=72pt

```

```

572   }%
573   \@mparswitchfalse
574   \reversemarginpar
575 \fi

```

`\parindent` Paragraphing

```

\parskip 576 \setlength\parindent{10\p@}
577 \setlength\parskip{\z@}
578 \ifcase\ACM@format@nr
579 \relax % manuscript
580 \or % acmsmall
581 \or % acmlarge
582 \or % acmtog
583   \setlength\parindent{9\p@}%
584 \or % sigconf
585 \or % siggraph
586 \or % sigplan
587 \or % sigchi
588 \or % sigchi-a
589 \fi

```

`\normalparindent` The `amsart` package defines the `\normalparindent` length and initializes it to 12pt (the value of `\parindent` in `amsart`). It is later used to set the `\listparindent` length in the quotation environment and the `\parindent` length in the `\@footnotetext` command. We set `\normalparindent` to the value of `\parindent` as selected by `acmart` for consistent paragraph indents.

```
590 \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.

```

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

593 \RequirePackage{manyfoot}
594 \SelectFootnoteRule[2]{copyrightpermission}
595 \DeclareNewFootnote{authorsaddresses}
596 \SelectFootnoteRule[2]{copyrightpermission}
597 \DeclareNewFootnote{copyrightpermission}

```

`\footnoterule` Tschichold’s rules:

```

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

```

```

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

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

```

3.8 Fonts

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

The code below is by Ross Moore.

```

614 \RequirePackage{iftex}
615 \ifPDFTeX
616 \input{glyphtounicode}
617 \pdfglyphtounicode{f_f}{FB00}
618 \pdfglyphtounicode{f_f_i}{FB03}
619 \pdfglyphtounicode{f_f_l}{FB04}
620 \pdfglyphtounicode{f_i}{FB01}
621 \pdfglyphtounicode{t_t}{0074 0074}
622 \pdfglyphtounicode{f_t}{0066 0074}
623 \pdfglyphtounicode{T_h}{0054 0068}
624 \pdfgentounicode=1
625 \fi
626 \RequirePackage{cmap}

\if@ACM@newfonts Whether we load the new fonts
627 \newif\if@ACM@newfonts
628 \@ACM@newfontstrue
629 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
630   have the libertine package installed. Please upgrade your
631   TeX}\@ACM@newfontsfalse}
632 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
633   have the zi4 package installed. Please upgrade your
634   TeX}\@ACM@newfontsfalse}
635 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
636   have the newtxmath package installed. Please upgrade your

```

```
637 TeX}\@ACM@newfontsfalse}
```

We use Libertine throughout.

```
638 \if@ACM@newfonts
639 \RequirePackage[T1]{fontenc}
640 \ifxetex
641 \RequirePackage[tt=false]{libertine}
642 \else
643 \RequirePackage[tt=false, type1=true]{libertine}
644 \fi
645 \RequirePackage[varqu]{zi4}
646 \RequirePackage[libertine]{newtxmath}
647 \fi
```

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

```
648 \let\liningnums\undefined
649 \AtEndPreamble{%
650 \DeclareTextFontCommand{\liningnums}{\libertineLF}}
```

The SIGCHI extended abstracts are sans serif:

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

3.9 Floats

We use the caption package

```
654 \RequirePackage{caption, float}
655 \captionsetup[table]{position=top}
656 \if@ACM@journal
657 \captionsetup{labelfont={sf, small},
658 textfont={sf, small}, margin=\z@}
659 \captionsetup[figure]{name={Fig.}}
660 \else
661 \captionsetup{labelfont={bf},
662 textfont={bf}, labelsep=colon, margin=\z@}
663 \ifcase\ACM@format@nr
664 \relax % manuscript
665 \or % acmsmall
666 \or % acmlarge
667 \or % acmtog
668 \or % sigconf
669 \or % siggraph
670 \captionsetup{textfont={it}}
671 \or % sigplan
672 \captionsetup{labelfont={bf},
673 textfont={normalfont}, labelsep=period, margin=\z@}
674 \or % sigchi
```

```

675 \captionsetup[figure]{labelfont={bf, small},
676 textfont={bf, small}}
677 \or % sigchi-a
678 \captionsetup[figure]{labelfont={bf, small},
679 textfont={bf, small}}
680 \fi
681 \fi

sidebar The sidebar environment:
682 \newfloat{sidebar}{}{sbar}
683 \floatname{sidebar}{Sidebar}
684 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}

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

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

\@marginfigure The processing of the saved text
688 \long\def\@marginfigure#1{\bgroup\captionsetup{type=figure}%
689 \marginpar{\centering\small#1}\egroup}

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

\@margintable The processing of the saved text
691 \long\def\@margintable#1{\bgroup\captionsetup{type=table}%
692 \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
693 \newdimen\fulltextwidth
694 \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)
695 \if@ACM@sigchiamode
696 \def\@dblfloat{\bgroup\columnwidth=\fulltextwidth
697 \let\endfloatbox\endwidefloatbox
698 \def\@fpsadddfault{\def\@fps{tp}}%
699 \@float}
700 \fi

```

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

```
701 \if@ACM@sigchiamode
702 \def\end@dblfloat{%
703   \end@float\egroup}
704 \fi
```

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

```
705 \def\@endwidefloatbox{%
706   \par\vskip\z@skip
707   \@minipagefalse
708   \outer@nobreak
709   \egroup
710   \color@endbox
711   \global\setbox\@currbox=\vbox{\moveleft
712     \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
713   \wd\@currbox=\textwidth
714 }
```

3.10 Lists

```
715 \ifcase\ACM@format@nr
716 \relax % manuscript
717 \or % acmsmall
718 \or % acmlarge
719 \or % acmtog
720 \or % sigconf
721 \or % siggraph
722 \or % sigplan
723 \def\labelenumi{\theenumi.}
724 \def\labelenumii{\theenumii.}
725 \def\labelenumiii{\theenumiii.}
726 \def\labelenumiv{\theenumiv.}
727 \or % sigchi
728 \or % sigchi-a
729 \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`.

```
730 \newdimen\@ACM@labelwidth
731 \AtBeginDocument{%
732   \setlength\labelsep{4pt}
733   \setlength{\@ACM@labelwidth}{6.5pt}
734
735   %% First-level list: when beginning after the first line of an
736   %% indented paragraph or ending before an indented paragraph, labels
```



```

737 %% should not hang to the left of the preceding/following text.
738 \setlength\leftmargini{\z@}
739 \addtolength\leftmargini{\parindent}
740 \addtolength\leftmargini{2\labelsep}
741 \addtolength\leftmargini{\@ACM@labelwidth}
742
743 %% Second-level and higher lists.
744 \setlength\leftmarginii{\z@}
745 \addtolength\leftmarginii{0.5\labelsep}
746 \addtolength\leftmarginii{\@ACM@labelwidth}
747 \setlength\leftmarginiii{\leftmarginii}
748 \setlength\leftmarginiv{\leftmarginiii}
749 \setlength\leftmarginv{\leftmarginiv}
750 \setlength\leftmarginvi{\leftmarginv}
751 \@listi}
752 \newskip\listisep
753 \listisep\smallskipamount
754 \def\@listI{\leftmargin\leftmargini
755 \labelwidth\leftmargini \advance\labelwidth-\labelsep
756 \listparindent\z@
757 \topsep\listisep}
758 \let\@listi\@listI
759 \def\@listii{\leftmargin\leftmarginii
760 \labelwidth\leftmarginii \advance\labelwidth-\labelsep
761 \topsep\z@skip}
762 \def\@listiii{\leftmargin\leftmarginiii
763 \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
764 \def\@listiv{\leftmargin\leftmarginiv
765 \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
766 \def\@listv{\leftmargin\leftmarginv
767 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
768 \def\@listvi{\leftmargin\leftmarginvi
769 \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
\descriptionlabel We do not use a colon by default like amsart does:
770 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}

\description Make the description environment indentation consistent with that of the itemize
and enumerate environments.
771 \renewenvironment{description}{\list{}{%
772 \labelwidth\@ACM@labelwidth
773 \let\makelabel\descriptionlabel}%
774 }{
775 \endlist
776 }
777 \let\enddescription=\endlist % for efficiency

```

3.11 Top-matter data

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

```

778 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
779 CIE,%
780 CSUR,%
781 DTRAP,%
782 IMWUT,%
783 JACM,%
784 JDIQ,%
785 JEA,%
786 JERIC,%
787 JETC,%
788 JOCCH,%
789 PACMCGIT,%
790 PACMHCI,%
791 PACMPL,%
792 POMACS,%
793 TAAS,%
794 TACCESS,%
795 TACO,%
796 TALG,%
797 TALLIP,%
798 TAP,%
799 TCPS,%
800 TDSCI,%
801 TEAC,%
802 TECS,%
803 THRI,%
804 TIIS,%
805 TIOT,%
806 TISSEC,%
807 TIST,%
808 TKDD,%
809 TMIS,%
810 TOCE,%
811 TOCHI,%
812 TOCL,%
813 TOCS,%
814 TOCT,%
815 TODAES,%
816 TODS,%
817 TOG,%
818 TOIS,%
819 TOIT,%
820 TOMACS,%
821 TOMM,%
822 TOMPECS,%
823 TOMS,%
824 TOPC,%
825 TOPS,%
826 TOPLAS,%
827 TOS,%

```

```

828 TOSEM,%
829 TOSN,%
830 TRET$,%
831 TSAS,%
832 TSC,%
833 TSLP,%
834 TWEB%
835 }{%
836 \ifcase\@journalCode@nr
837 \relax % CIE
838 \def\@journalName{ACM Computers in Entertainment}%
839 \def\@journalNameShort{ACM Comput. Entertain.}%
840 \def\@permissionCodeOne{1544-3574}%
841 \or % CSUR
842 \def\@journalName{ACM Computing Surveys}%
843 \def\@journalNameShort{ACM Comput. Surv.}%
844 \def\@permissionCodeOne{0360-0300}%
845 \or % DTRAP
846 \def\@journalName{Digital Threats: Research and Practice}%
847 \def\@journalNameShort{Digit. Threat. Res. Pract.}%
848 \def\@permissionCodeOne{2576-5337}%
849 \or % IMWUT
850 \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
851 Wearable and Ubiquitous Technologies}%
852 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
853 \def\@permissionCodeOne{2474-9567}%
854 \@ACM@screentrue
855 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
856 \or % JACM
857 \def\@journalName{Journal of the ACM}%
858 \def\@journalNameShort{J. ACM}%
859 \def\@permissionCodeOne{0004-5411}%
860 \or % JDIQ
861 \def\@journalName{ACM Journal of Data and Information Quality}%
862 \def\@journalNameShort{ACM J. Data Inform. Quality}%
863 \def\@permissionCodeOne{1936-1955}%
864 \or % JEA
865 \def\@journalName{ACM Journal of Experimental Algorithmics}%
866 \def\@journalNameShort{ACM J. Exp. Algor.}%
867 \def\@permissionCodeOne{1084-6654}%
868 \or % JERIC
869 \def\@journalName{ACM Journal of Educational Resources in Computing}%
870 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
871 \def\@permissionCodeOne{1073-0516}%
872 \or % JETC
873 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
874 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
875 \def\@permissionCodeOne{1550-4832}%
876 \or % JOCCH
877 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%

```

```

878 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
879 \or % PACMCGIT
880 \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
881 \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
882 \def\@permissionCodeOne{2577-6193}%
883 \@ACM@screentruer
884 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
885 \or % PACMHCI
886 \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
887 \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
888 \def\@permissionCodeOne{2573-0142}%
889 \@ACM@screentruer
890 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
891 \or % PACMPL
892 \def\@journalName{Proceedings of the ACM on Programming Languages}%
893 \def\@journalNameShort{Proc. ACM Program. Lang.}%
894 \def\@permissionCodeOne{2475-1421}%
895 \@ACM@screentruer
896 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
897 \or % POMACS
898 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
899 \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
900 \def\@permissionCodeOne{2476-1249}%
901 \@ACM@screentruer
902 \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
903 \or % TAAS
904 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
905 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
906 \def\@permissionCodeOne{1556-4665}%
907 \or % TACCESS
908 \def\@journalName{ACM Transactions on Accessible Computing}%
909 \def\@journalNameShort{ACM Trans. Access. Comput.}%
910 \def\@permissionCodeOne{1936-7228}%
911 \or % TACO
912 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
913 \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
914 \or % TALG
915 \def\@journalName{ACM Transactions on Algorithms}%
916 \def\@journalNameShort{ACM Trans. Algor.}%
917 \def\@permissionCodeOne{1549-6325}%
918 \or % TALLIP
919 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
920 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
921 \def\@permissionCodeOne{2375-4699}%
922 \or % TAP
923 \def\@journalName{ACM Transactions on Applied Perception}%
924 \or % TCPS
925 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
926 \or % TDSCI
927 \def\@journalName{ACM Transactions on Data Science}%

```

928 \def\@journalNameShort{ACM Trans. Data Sci.}%
 929 \def\@permissionCodeOne{2577-3224}%
 930 \or % TEAC
 931 \def\@journalName{ACM Transactions on Economics and Computation}%
 932 \or % TECS
 933 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
 934 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
 935 \def\@permissionCodeOne{1539-9087}%
 936 \or % THRI
 937 \def\@journalName{ACM Transactions on Human-Robot Interaction}%
 938 \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
 939 \def\@permissionCodeOne{2573-9522}%
 940 \or % TIIS
 941 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
 942 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
 943 \def\@permissionCodeOne{2160-6455}%
 944 \or % TIOT
 945 \def\@journalName{ACM Transactions on Internet of Things}%
 946 \def\@journalNameShort{ACM Trans. Internet Things}%
 947 \def\@permissionCodeOne{2577-6207}%
 948 \or % TISSEC
 949 \def\@journalName{ACM Transactions on Information and System Security}%
 950 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
 951 \def\@permissionCodeOne{1094-9224}%
 952 \or % TIST
 953 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
 954 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
 955 \def\@permissionCodeOne{2157-6904}%
 956 \or % TKDD
 957 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
 958 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
 959 \def\@permissionCodeOne{1556-4681}%
 960 \or % TMIS
 961 \def\@journalName{ACM Transactions on Management Information Systems}%
 962 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
 963 \def\@permissionCodeOne{2158-656X}%
 964 \or % TOCE
 965 \def\@journalName{ACM Transactions on Computing Education}%
 966 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
 967 \def\@permissionCodeOne{1946-6226}%
 968 \or % TOCHI
 969 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
 970 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
 971 \def\@permissionCodeOne{1073-0516}%
 972 \or % TOCL
 973 \def\@journalName{ACM Transactions on Computational Logic}%
 974 \def\@journalNameShort{ACM Trans. Comput. Logic}%
 975 \def\@permissionCodeOne{1529-3785}%
 976 \or % TOCS
 977 \def\@journalName{ACM Transactions on Computer Systems}%

```

978 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
979 \def\@permissionCodeOne{0734-2071}%
980 \or % TOCT
981 \def\@journalName{ACM Transactions on Computation Theory}%
982 \def\@journalNameShort{ACM Trans. Comput. Theory}%
983 \def\@permissionCodeOne{1942-3454}%
984 \or % TODAES
985 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
986 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
987 \def\@permissionCodeOne{1084-4309}%
988 \or % TODS
989 \def\@journalName{ACM Transactions on Database Systems}%
990 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
991 \def\@permissionCodeOne{0362-5915}%
992 \or % TOG
993 \def\@journalName{ACM Transactions on Graphics}%
994 \def\@journalNameShort{ACM Trans. Graph.}%
995 \def\@permissionCodeOne{0730-0301}%
996 \or % TOIS
997 \def\@journalName{ACM Transactions on Information Systems}%
998 \def\@permissionCodeOne{1046-8188}%
999 \or % TOIT
1000 \def\@journalName{ACM Transactions on Internet Technology}%
1001 \def\@journalNameShort{ACM Trans. Internet Technol.}%
1002 \def\@permissionCodeOne{1533-5399}%
1003 \or % TOMACS
1004 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1005 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1006 \or % TOMM
1007 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
1008 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
1009 \def\@permissionCodeOne{1551-6857}%
1010 \def\@permissionCodeTwo{0100}%
1011 \or % TOMPECS
1012 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1013 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1014 \def\@permissionCodeOne{2376-3639}%
1015 \or % TOMS
1016 \def\@journalName{ACM Transactions on Mathematical Software}%
1017 \def\@journalNameShort{ACM Trans. Math. Softw.}%
1018 \def\@permissionCodeOne{0098-3500}%
1019 \or % TOPC
1020 \def\@journalName{ACM Transactions on Parallel Computing}%
1021 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1022 \def\@permissionCodeOne{1539-9087}%
1023 \or % TOPS
1024 \def\@journalName{ACM Transactions on Privacy and Security}%
1025 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1026 \def\@permissionCodeOne{2471-2566}%
1027 \or % TOPLAS

```

```

1028 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
1029 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
1030 \def\@permissionCodeOne{0164-0925}%
1031 \or % TOS
1032 \def\@journalName{ACM Transactions on Storage}%
1033 \def\@journalNameShort{ACM Trans. Storage}%
1034 \def\@permissionCodeOne{1553-3077}%
1035 \or % TOSEM
1036 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1037 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1038 \def\@permissionCodeOne{1049-331X}%
1039 \or % TOSN
1040 \def\@journalName{ACM Transactions on Sensor Networks}%
1041 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
1042 \def\@permissionCodeOne{1550-4859}%
1043 \or % TRETTS
1044 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
1045 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1046 \def\@permissionCodeOne{1936-7406}%
1047 \or % TSAS
1048 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
1049 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
1050 \def\@permissionCodeOne{2374-0353}%
1051 \or % TSC
1052 \def\@journalName{ACM Transactions on Social Computing}%
1053 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1054 \def\@permissionCodeOne{2469-7818}%
1055 \or % TSLP
1056 \def\@journalName{ACM Transactions on Speech and Language Processing}%
1057 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1058 \def\@permissionCodeOne{1550-4875}%
1059 \or % TWEB
1060 \def\@journalName{ACM Transactions on the Web}%
1061 \def\@journalNameShort{ACM Trans. Web}%
1062 \def\@permissionCodeOne{1559-1131}%
1063 \fi
1064 \ClassInfo{\@classname}{Using journal code \@journalCode}%
1065 }{%
1066 \ClassError{\@classname}{Incorrect journal #1}%
1067 }%

```

\acmJournal And the syntactic sugar around it

```

1068 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}}

```

The defaults:

```

1069 \def\@journalCode{nr{0}}
1070 \def\@journalName{}%
1071 \def\@journalNameShort{\@journalName}%
1072 \def\@permissionCodeOne{XXXX-XXXX}%
1073 \def\@permissionCodeTwo{}%

```

`\acmConference` This is the conference command

```

1074 \newcommand\acmConference[4][]{%
1075   \gdef\acmConference@shortname{#1}%
1076   \gdef\acmConference@name{#2}%
1077   \gdef\acmConference@date{#3}%
1078   \gdef\acmConference@venue{#4}%
1079   \ifx\acmConference@shortname\@empty
1080     \gdef\acmConference@shortname{#2}%
1081   \fi}
1082 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
1083   DC, USA}

```

`\acmBooktitle` The book title of the conference:

`\@acmBooktitle`

```

1084 \def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
1085 \acmBooktitle{Proceedings of \acmConference@name
1086   \ifx\acmConference@name\acmConference@shortname\else
1087     \ (\acmConference@shortname)\fi}

```

`\@editorsAbbrev` How to abbreviate editors

```

1088 \def\@editorsAbbrev{(Ed.)}

```

`\@acmEditors` The list of editors

```

1089 \def\@acmEditors{}

```

`\editor` Add a new editor to the list

```

1090 \def\editor#1{\ifx\@acmEditors\@empty
1091   \gdef\@acmEditors{#1}%
1092   \else
1093     \gdef\@editorsAbbrev{(Eds.)}%
1094     \g@addto@macro\@acmEditors{\and#1}%
1095 \fi}

```

`\subtitle` The subtitle macro

```

1096 \def\subtitle#1{\def\@subtitle{#1}}
1097 \subtitle{}

```

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

```

1098 \newcount\num@authorgroups
1099 \num@authorgroups=0\relax

```

`\num@author`s The total number of authors

```

1100 \newcount\num@author
1101 \num@author=0\relax

```

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

```

1102 \newif\if@insideauthorgroup
1103 \@insideauthorgroupfalse

```


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

```
1104 \renewcommand\author[2][{}%
1105 \global\advance\num@authors by 1\relax
1106 \if@insideauthorgroup\else
1107 \global\advance\num@authorgroups by 1\relax
1108 \global\@insideauthorgrouptrue
1109 \fi
1110 \ifx\addresses\@empty
1111 \if@ACM@anonymous
1112 \gdef\addresses{\@author{Anonymous Author(s)}%
1113 \ifx\@acmSubmissionID\@empty\else\Submission Id:
1114 \@acmSubmissionID\fi}%
1115 \gdef\authors{Anonymous Author(s)}%
1116 \else
1117 \gdef\addresses{\@author{#2}}%
1118 \gdef\authors{#2}%
1119 \fi
1120 \else
1121 \if@ACM@anonymous\else
1122 \g@addto@macro\addresses{\and\@author{#2}}%
1123 \g@addto@macro\authors{\and#2}%
1124 \fi
1125 \fi
1126 \if@ACM@anonymous
1127 \ifx\shortauthors\@empty
1128 \gdef\shortauthors{Anon.
1129 \ifx\@acmSubmissionID\@empty\else Submission Id:
1130 \@acmSubmissionID\fi}%
1131 \fi
1132 \else
1133 \def\@tempa{#1}%
1134 \ifx\@tempa\@empty
1135 \ifx\shortauthors\@empty
1136 \gdef\shortauthors{#2}%
1137 \else
1138 \g@addto@macro\shortauthors{\and#2}%
1139 \fi
1140 \else
1141 \ifx\shortauthors\@empty
1142 \gdef\shortauthors{#1}%
1143 \else
1144 \g@addto@macro\shortauthors{\and#1}%
1145 \fi
1146 \fi
1147 \fi}
```

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

```
1148 \newcommand{\affiliation}[2][{}%
```

```

1149 \global\@insideauthorgroupfalse
1150 \if@ACM@anonymous\else
1151   \g@addto@macro\addresses{\affiliation{#1}{#2}}%
1152   \fi}

@ACM@affiliation@obeypunctuation Whether to use the author's punctuation (false by default, which adds American-style
address punctuation)
1153 \define@boolkey+{@ACM@affiliation@}{@ACM@affiliation@}{obeypunctuation}%
1154 [true]{}{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}

\additionalaffiliation Additional affiliations go to footnotes
1155 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}

@additionalaffiliation Process \additionalaffiliation inside \authornote
1156 \def\@additionalaffiliation#1{\bgroup
1157   \def\position##1{\ignorespaces}%
1158   \def\institution##1{##1\ignorespaces}%
1159   \def\department{\@ifnextchar[{\@department}{\@department[]}}%
1160   \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
1161   \let\streetaddress\position
1162   \let\city\position
1163   \let\state\position
1164   \let\postcode\position
1165   \let\country\position
1166   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.
1167 \renewcommand{\email}[2][{}]{%
1168   \if@ACM@anonymous\else
1169     \g@addto@macro\addresses{\email{#1}{#2}}%
1170     \fi}

\orcid Right now we do not typeset ORCIDs
1171 \def\orcid#1{\unskip\ignorespaces}

\authorsaddresses Setting up authors' addresses
1172 \def\authorsaddresses#1{\def\@authorsaddresses{#1}}
1173 \authorsaddresses{\mkauthorsaddresses}

@titlenotes The title notes
1174 \def\@titlenotes{}

\titlenote Adding a note to the title
1175 \def\titlenote#1{%
1176   \g@addto@macro\@title{\footnotemark}%
1177   \if@ACM@anonymous
1178     \g@addto@macro\@titlenotes{%

```

```

1179     \stepcounter{footnote}\footnotetext{Title note}}%
1180 \else
1181     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
1182 \fi}

\@subtitlenotes The subtitle notes
1183 \def\@subtitlenotes{}

\subtitlenote Adding a note to the subtitle
1184 \def\subtitlenote#1{%
1185     \g@addto@macro\@subtitle{\footnotemark}%
1186     \if@ACM@anonymous
1187         \g@addto@macro\@subtitlenotes{%
1188             \stepcounter{footnote}\footnotetext{Subtitle note}}%
1189     \else
1190         \g@addto@macro\@subtitlenotes{%
1191             \stepcounter{footnote}\footnotetext{#1}}%
1192 \fi}

\@authornotes The author notes
1193 \def\@authornotes{}

\authornote Adding a note to the author
1194 \def\authornote#1{%
1195     \if@ACM@anonymous\else
1196         \g@addto@macro\addresses{\@authornotemark}%
1197         \g@addto@macro\@authornotes{%
1198             \stepcounter{footnote}\footnotetext{#1}}%
1199     \fi}

\authornotemark Adding a footnote mark to the authors
1200 \newcommand\authornotemark[1][\relax]{%
1201     \ifx#1\relax\relax\relax
1202     \g@addto@macro\addresses{\@authornotemark}%
1203     \else
1204     \g@addto@macro\addresses{\@@authornotemark{#1}}%
1205     \fi}

\acmVolume The current volume
1206 \def\acmVolume#1{\def\@acmVolume{#1}}
1207 \acmVolume{1}

\acmNumber The current number
1208 \def\acmNumber#1{\def\@acmNumber{#1}}
1209 \acmNumber{1}

\acmArticle The current article
1210 \def\acmArticle#1{\def\@acmArticle{#1}}
1211 \acmArticle{}

```

`\acmArticleSeq` The sequence number
1212 `\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}`
1213 `\acmArticleSeq{\@acmArticle}`

`\acmYear` The current year
1214 `\def\acmYear#1{\def\@acmYear{#1}}`
1215 `\acmYear{\the\year}`

`\acmMonth` The current month
1216 `\def\acmMonth#1{\def\@acmMonth{#1}}`
1217 `\acmMonth{\the\month}`

`\@acmPubDate` The publication date
1218 `\def\@acmPubDate{\ifcase\@acmMonth\or`
1219 `January\or February\or March\or April\or May\or June\or`
1220 `July\or August\or September\or October\or November\or`
1221 `December\fi~\@acmYear}`

`\acmPrice` The price
1222 `\def\acmPrice#1{\def\@acmPrice{#1}}`
1223 `\acmPrice{15.00}`

`\acmSubmissionID` The submission ID
1224 `\def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}`
1225 `\acmSubmissionID{}`

`\acmISBN` The book ISBN
1226 `\def\acmISBN#1{\def\@acmISBN{#1}}`
1227 `\acmISBN{978-x-xxxx-xxxx-x/YY/MM}`

`\acmDOI` The paper DOI
1228 `\def\acmDOI#1{\def\@acmDOI{#1}}`
1229 `\acmDOI{10.1145/nnnnnnn.nnnnnnn}`

`\if@ACM@badge` Whether to print a badge. Note that either a left or right badge triggers it:
1230 `\newif\if@ACM@badge`
1231 `\@ACM@badgefalse`

`\@ACM@badge@width` The width of the badge
1232 `\newlength\@ACM@badge@width`
1233 `\setlength\@ACM@badge@width{5pc}`

`\@ACM@title@width` The width of the badge
1234 `\newlength\@ACM@title@width`

`\@ACM@badge@skip` The space between the badge and the title
1235 `\newlength\@ACM@badge@skip`
1236 `\setlength\@ACM@badge@skip{1pc}`

`\acmBadgeR` Setting the right badge

```

1237 \newcommand\acmBadgeR[2][\@ACM@badgetrue
1238   \def\@acmBadgeR@url{#1}%
1239   \def\@acmBadgeR@image{#2}}
1240 \def\@acmBadgeR@url{}
1241 \def\@acmBadgeR@image{}

```

`\acmBadgeL` Setting the left badge

```

1242 \newcommand\acmBadgeL[2][\@ACM@badgetrue
1243   \def\@acmBadgeL@url{#1}%
1244   \def\@acmBadgeL@image{#2}}
1245 \def\@acmBadgeL@url{}
1246 \def\@acmBadgeL@image{}

```

`\startPage` The start page of the paper

```

1247 \def\startPage#1{\def\@startPage{#1}}
1248 \startPage{}

```

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

```

1249 \def\terms#1{\ClassWarning{\@classname}{The command \string\terms} is
1250   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.

```

1251 \def\keywords#1{\def\@keywords{#1}}
1252 \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

```

1253 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}

```

`\@saveabstract` And saving the abstract

```

1254 \long\def\@saveabstract#1{\long\gdef\@abstract{#1}}
1255 \@saveabstract{}

```

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

```

1256 \long\def\@empty{}

```

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

```

1257 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
1258   \if@ACM@printccs
1259     \ClassInfo{\@classname}{Printing CCS}%
1260   \else
1261     \ClassInfo{\@classname}{Suppressing CCS}%
1262   \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}

```

```

\if@ACM@printacmref Whether to print the ACM bibstrip
1263 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1264   \if@ACM@printacmref
1265     \ClassInfo{\@classname}{Printing bibformat}%
1266   \else
1267     \ClassInfo{\@classname}{Suppressing bibformat}%
1268 \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}

\if@ACM@printfolios Whether to print folios
1269 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1270   \if@ACM@printfolios
1271     \ClassInfo{\@classname}{Printing folios}%
1272   \else
1273     \ClassInfo{\@classname}{Suppressing folios}%
1274 \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.
1275 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsprow}[0]{%
1276   \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsprow to
1277     #1}}{\ClassWarning{\@classname}{The parameter authorsprow must be
1278     numerical. Ignoring the input #1}}\gdef\@ACM@authorsprow{0}}

\settopmatter The usual syntactic sugar
1279 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

    Now the settings
1280 \settopmatter{printccs=true, printacmref=true}
1281 \if@ACM@manuscript
1282   \settopmatter{printfolios=true}
1283 \else
1284   \if@ACM@journal
1285     \settopmatter{printfolios=true}
1286   \else
1287     \settopmatter{printfolios=false}
1288   \fi
1289 \fi
1290 \settopmatter{authorsprow=0}

\@received The container for the paper history
1291 \def\@received{}

\received The \received command
1292 \newcommand\received[2][\def\@tempa{#1}%
1293   \ifx\@tempa\@empty
1294     \ifx\@received\@empty
1295       \gdef\@received{Received #2}%
1296     \else
1297       \g@addto@macro{\@received}{; revised #2}%
1298     \fi

```

```

1299 \else
1300 \ifx\@received\@empty
1301 \gdef\@received{#1 #2}%
1302 \else
1303 \g@addto@macro{\@received}{; #1 #2}%
1304 \fi
1305 \fi}
1306 \AtEndDocument{%
1307 \ifx\@received\@empty\else
1308 \par\bigskip\noindent\small\normalfont\@received\par
1309 \fi}

```

3.12 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```

1310 \RequirePackage{comment}
1311 \excludecomment{CCSXML}

```

\@concepts This is the storage macro for concepts

```

1312 \let\@concepts\@empty

```

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

```

1313 \newcommand\ccsdesc[2][100]{%
1314 \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!

```

1315 \RequirePackage{textcomp}
1316 \def\ccsdesc@parse#1~#2~#3~{%
1317 \expandafter\ifx\csname CCS@General@#2\endcsname\relax
1318 \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
1319 \textbf{#2}}%
1320 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
1321 \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
1322 \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
1323 \csname CCS@Punctuation@#2\endcsname
1324 \csname CCS@Specific@#2\endcsname}%
1325 \fi
1326 \ifx#3\relax\relax\else
1327 \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
1328 \textrightarrow\ }%
1329 \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
1330 \ifnum#1>499\textbf{#3}; \else
1331 \ifnum#1>299\textit{#3}; \else
1332 #3; \fi\fi}%
1333 \fi
1334 \ccsdesc@parse@finish}

```

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

```

1335 \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
1336 `\newif\if@printcopyright`
1337 `\@printcopyrighttrue`

`\if@printpermission` Whether to print the permission block
1338 `\newif\if@printpermission`
1339 `\@printpermissiontrue`

`\if@acmowned` Whether the ACM owns the rights to the paper
1340 `\newif\if@acmowned`
1341 `\@acmownedtrue`

Keys:

```
1342 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1343   \acm@copyrightinput\acm@copyrightmode]{none,%
1344     acmcopyright,acmlicensed,rightsretained,%
1345     usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
1346     licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
1347     iw3c2w3,iw3c2w3g}{%
1348   \@printpermissiontrue
1349   \@printcopyrighttrue
1350   \@acmownedtrue
1351   \ifnum\acm@copyrightmode=0\relax % none
1352     \@printpermissionfalse
1353     \@printcopyrightfalse
1354     \@acmownedfalse
1355   \fi
1356   \ifnum\acm@copyrightmode=2\relax % acmlicensed
1357     \@acmownedfalse
1358   \fi
1359   \ifnum\acm@copyrightmode=3\relax % rightsretained
1360     \@acmownedfalse
1361   \AtBeginDocument{\acmPrice{}}%
1362   \fi
1363   \ifnum\acm@copyrightmode=4\relax % usgov
1364     \@printpermissiontrue
1365     \@printcopyrightfalse
1366     \@acmownedfalse
1367   \AtBeginDocument{\acmPrice{}}%
1368   \fi
1369   \ifnum\acm@copyrightmode=6\relax % cagov
1370     \@acmownedfalse
1371   \fi
1372   \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1373     \@acmownedfalse
1374   \fi
```



```

1375 \ifnum\acm@copyrightmode=9\relax % licensedcagov
1376 \@acmownedfalse
1377 \fi
1378 \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
1379 \@acmownedfalse
1380 \fi
1381 \ifnum\acm@copyrightmode=11\relax % othergov
1382 \@acmownedtrue
1383 \fi
1384 \ifnum\acm@copyrightmode=12\relax % licensedothergov
1385 \@acmownedfalse
1386 \fi
1387 \ifnum\acm@copyrightmode=13\relax % iw3c2w3
1388 \@acmownedfalse
1389 \AtBeginDocument{\acmPrice{}}%
1390 \fi
1391 \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
1392 \@acmownedfalse
1393 \AtBeginDocument{\acmPrice{}}%
1394 \fi}

```

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

```

1395 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1396 \setcopyright{acmcopyright}

```

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

```

1397 \def\@copyrightowner{%
1398 \ifcase\acm@copyrightmode\relax % none
1399 \or % acmcopyright
1400 Association for Computing Machinery.
1401 \or % acmlicensed
1402 Copyright held by the owner/author(s). Publication rights licensed to
1403 ACM\@.
1404 \or % rightsretained
1405 Copyright held by the owner/author(s).
1406 \or % usgov
1407 \or % usgovmixed
1408 Association for Computing Machinery.
1409 \or % cagov
1410 Crown in Right of Canada.
1411 \or %cagovmixed
1412 Association for Computing Machinery.
1413 \or %licensedusgovmixed
1414 Copyright held by the owner/author(s). Publication rights licensed to
1415 ACM\@.
1416 \or % licensedcagov
1417 Crown in Right of Canada. Publication rights licensed to
1418 ACM\@.
1419 \or %licensedcagovmixed
1420 Copyright held by the owner/author(s). Publication rights licensed to

```

1421 ACM\@.
 1422 \or % othergov
 1423 Association for Computing Machinery.
 1424 \or % licensedothergov
 1425 Copyright held by the owner/author(s). Publication rights licensed to
 1426 ACM\@.
 1427 \or % ic2w3www
 1428 IW3C2 (International World Wide Web Conference Committee), published
 1429 under Creative Commons CC-BY~4.0 License.
 1430 \or % ic2w3wwwgoogle
 1431 IW3C2 (International World Wide Web Conference Committee), published
 1432 under Creative Commons CC-BY-NC-ND~4.0 License.
 1433 \fi}

\@formatdoi Print a clickable DOI

1434 \def\@formatdoi#1{\url{https://doi.org/#1}}

\@copyrightpermission The canned permission block.

1435 \def\@copyrightpermission{%
 1436 \ifcase\acm@copyrightmode\relax % none
 1437 \or % acmcopyright
 1438 Permission to make digital or hard copies of all or part of this
 1439 work for personal or classroom use is granted without fee provided
 1440 that copies are not made or distributed for profit or commercial
 1441 advantage and that copies bear this notice and the full citation on
 1442 the first page. Copyrights for components of this work owned by
 1443 others than ACM must be honored. Abstracting with credit is
 1444 permitted. To copy otherwise, or republish, to post on servers or to
 1445 redistribute to lists, requires prior specific permission
 1446 and\hspace*{.5pt}/or a fee. Request permissions from
 1447 permissions@acm.org.
 1448 \or % acmlicensed
 1449 Permission to make digital or hard copies of all or part of this
 1450 work for personal or classroom use is granted without fee provided
 1451 that copies are not made or distributed for profit or commercial
 1452 advantage and that copies bear this notice and the full citation on
 1453 the first page. Copyrights for components of this work owned by
 1454 others than the author(s) must be honored. Abstracting with credit
 1455 is permitted. To copy otherwise, or republish, to post on servers
 1456 or to redistribute to lists, requires prior specific permission
 1457 and\hspace*{.5pt}/or a fee. Request permissions from
 1458 permissions@acm.org.
 1459 \or % rightsretained
 1460 Permission to make digital or hard copies of part or all of this work
 1461 for personal or classroom use is granted without fee provided that
 1462 copies are not made or distributed for profit or commercial advantage
 1463 and that copies bear this notice and the full citation on the first
 1464 page. Copyrights for third-party components of this work must be
 1465 honored. For all other uses, contact the
 1466 owner\hspace*{.5pt}/author(s).

1467 \or % usgov
1468 This paper is authored by an employee(s) of the United States
1469 Government and is in the public domain. Non-exclusive copying or
1470 redistribution is allowed, provided that the article citation is
1471 given and the authors and agency are clearly identified as its
1472 source.

1473 \or % usgovmixed
1474 ACM acknowledges that this contribution was authored or co-authored
1475 by an employee, contractor, or affiliate of the United States government. As such,
1476 the United States government retains a nonexclusive, royalty-free right to
1477 publish or reproduce this article, or to allow others to do so, for
1478 government purposes only.

1479 \or % cagov
1480 This article was authored by employees of the Government of Canada.
1481 As such, the Canadian government retains all interest in the
1482 copyright to this work and grants to ACM a nonexclusive,
1483 royalty-free right to publish or reproduce this article, or to allow
1484 others to do so, provided that clear attribution is given both to
1485 the authors and the Canadian government agency employing them.
1486 Permission to make digital or hard copies for personal or classroom
1487 use is granted. Copies must bear this notice and the full citation
1488 on the first page. Copyrights for components of this work owned by
1489 others than the Canadian Government must be honored. To copy
1490 otherwise, distribute, republish, or post, requires prior specific
1491 permission and\hspace*{.5pt}/or a fee. Request permissions from
1492 permissions@acm.org.

1493 \or % cagovmixed
1494 ACM acknowledges that this contribution was co-authored by an
1495 affiliate of the national government of Canada. As such, the Crown
1496 in Right of Canada retains an equal interest in the copyright.
1497 Reprints must include clear attribution to ACM and the author's
1498 government agency affiliation. Permission to make digital or hard
1499 copies for personal or classroom use is granted. Copies must bear
1500 this notice and the full citation on the first page. Copyrights for
1501 components of this work owned by others than ACM must be honored.
1502 To copy otherwise, distribute, republish, or post, requires prior
1503 specific permission and\hspace*{.5pt}/or a fee. Request permissions
1504 from permissions@acm.org.

1505 \or % licensedusgovmixed
1506 Publication rights licensed to ACM\@. ACM acknowledges that this
1507 contribution was authored or co-authored by an employee, contractor
1508 or affiliate of the United States government. As such, the
1509 Government retains a nonexclusive, royalty-free right to publish or
1510 reproduce this article, or to allow others to do so, for Government
1511 purposes only.

1512 \or % licensedcagov
1513 This article was authored by employees of the Government of Canada.
1514 As such, the Canadian government retains all interest in the
1515 copyright to this work and grants to ACM a nonexclusive,
1516 royalty-free right to publish or reproduce this article, or to allow

1517 others to do so, provided that clear attribution is given both to
1518 the authors and the Canadian government agency employing them.
1519 Permission to make digital or hard copies for personal or classroom
1520 use is granted. Copies must bear this notice and the full citation
1521 on the first page. Copyrights for components of this work owned by
1522 others than the Canadian Government must be honored. To copy
1523 otherwise, distribute, republish, or post, requires prior specific
1524 permission and\hspace*{.5pt}/or a fee. Request permissions from
1525 permissions@acm.org.
1526 \or % licensedcagovmixed
1527 Publication rights licensed to ACM\@. ACM acknowledges that this
1528 contribution was authored or co-authored by an employee, contractor
1529 or affiliate of the national government of Canada. As such, the
1530 Government retains a nonexclusive, royalty-free right to publish or
1531 reproduce this article, or to allow others to do so, for Government
1532 purposes only.
1533 \or % othergov
1534 ACM acknowledges that this contribution was authored or co-authored
1535 by an employee, contractor or affiliate of a national government. As
1536 such, the Government retains a nonexclusive, royalty-free right to
1537 publish or reproduce this article, or to allow others to do so, for
1538 Government purposes only.
1539 \or % licensedothergov
1540 Publication rights licensed to ACM\@. ACM acknowledges that this
1541 contribution was authored or co-authored by an employee, contractor
1542 or affiliate of a national government. As such, the Government
1543 retains a nonexclusive, royalty-free right to publish or reproduce
1544 this article, or to allow others to do so, for Government purposes
1545 only.
1546 \or % iw3c2w3
1547 This paper is published under the Creative Commons Attribution~4.0
1548 International (CC-BY~4.0) license. Authors reserve their rights to
1549 disseminate the work on their personal and corporate Web sites with
1550 the appropriate attribution.
1551 \or % iw3c2w3g
1552 This paper is published under the Creative Commons
1553 Attribution-NonCommercial-NoDerivs~4.0 International
1554 (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
1555 disseminate the work on their personal and corporate Web sites with
1556 the appropriate attribution.
1557 \fi}

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

1558 \def\copyrightyear#1{\def\@copyrightyear{#1}}
1559 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container

1560 \def\@teaserfigures{}

teaserfigure The teaser figure

```

1561 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}
\@saveteaser Saving the teaser
1562 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

\thanks We redefine amsart \thanks so the anonymous key works
1563 \renewcommand{\thanks}[1]{%
1564   \ifnotempty{#1}{%
1565     \if@ACM@anonymous
1566       \g@addto@macro\thankses{\thanks{A note}}%
1567     \else
1568       \g@addto@macro\thankses{\thanks{#1}}%
1569     \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]`.

```
1570 \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.

```

1571 \def\maketitle{%
1572   \if@ACM@anonymous
1573     % Anonymize omission of \author-s
1574     \ifnum\@authorgroups=0\author{}\fi
1575   \fi
1576   \begingroup
1577   \let\@footnotemark\@footnotemark@nolink
1578   \let\@footnotetext\@footnotetext@nolink
1579   \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
1580   \global\@topnum\z@ % this prevents floats from falling
1581                     % at the top of page 1
1582   \global\@botnum\z@ % we do not want them to be on the bottom either
1583   \hsize=\textwidth
1584   \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
1585   \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
1586   \@printtopmatter
1587   \if@ACM@sigchiamode\@mkauthors\fi
1588   \setcounter{footnote}{0}%
1589   \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
1590   \@titlenotes
1591   \@subtitlenotes
1592   \@authornotes

```

```

1593 \let\makefnmark\relax
1594 \let\thefnmark\relax
1595 \let\makefnmark\noindent
1596 \ifx\@empty\thankses\else
1597   \footnotetextauthorsaddresses{%
1598     \def\par{\let\par\@par}\parindent\z@\setthanks}%
1599   \fi
1600 \ifx\@empty\@authorsaddresses\else
1601   \if@ACM@anonymous\else
1602     \if@ACM@journal
1603       \footnotetextauthorsaddresses{%
1604         \def\par{\let\par\@par}\parindent\z@\setauthorsaddresses}%
1605       \fi
1606     \fi
1607   \fi
1608 \if@ACM@nonacm\else\footnotetextcopyrightpermission{%
1609   \if@ACM@authordraft
1610     \raisebox{-2ex}[\z@][\z@]{\makebox[0pt][l]{\large\bfseries
1611       Unpublished working draft. Not for distribution.}}%
1612     \color[gray]{0.9}%
1613   \fi
1614   \parindent\z@\parskip0.1\baselineskip
1615   \if@ACM@authorversion\else
1616     \if@printpermission\@copyrightpermission\par\fi
1617   \fi
1618   \if@ACM@manuscript\else
1619     \if@ACM@journal\else % Print the conference information
1620     {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
1621     \fi
1622   \fi
1623   \if@printcopyright
1624     \copyright\ \@copyrightyear\ \@copyrightowner\
1625   \else
1626     \@copyrightyear.\
1627   \fi
1628   \if@ACM@manuscript
1629     Manuscript submitted to ACM\
1630   \else
1631     \if@ACM@authorversion
1632       This is the author's version of the work. It is posted here for
1633       your personal use. Not for redistribution. The definitive Version
1634       of Record was published in
1635       \if@ACM@journal
1636         \emph{\@journalName}%
1637       \else
1638         \emph{\@acmBooktitle}%
1639       \fi
1640       \ifx\@acmDOI\@empty
1641         .
1642       \else

```

```

1643         , \@formatdoi{\@acmDOI}.
1644     \fi\\
1645 \else
1646     \if@ACM@nonacm\else
1647         \if@ACM@journal
1648             \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle
1649             \ifx\@acmPrice\@empty\else\ $\@acmPrice\fi\\
1650             \@formatdoi{\@acmDOI}%
1651         \else % Conference
1652             \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN
1653             \ifx\@acmPrice\@empty.\else\dots\$\@acmPrice\fi\\fi
1654             \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
1655         \fi
1656     \fi
1657 \fi
1658 \fi}
1659 \fi
1660 \endgroup
1661 \setcounter{footnote}{0}%
1662 \@mkabstract
1663 \if@ACM@printccs
1664     \ifx\@concepts\@empty\else\bgroup
1665         {\@specialsection{CCS Concepts}%
1666         \@concepts\par}\egroup
1667     \fi
1668 \fi
1669 \ifx\@keywords\@empty\else\bgroup
1670     {\if@ACM@journal
1671         \@specialsection{Additional Key Words and Phrases}%
1672     \else
1673         \@specialsection{Keywords}%
1674     \fi
1675     \@keywords}\par\egroup
1676 \fi
1677 \andify\authors
1678 \andify\shortauthors
1679 \global\let\authors=\authors
1680 \global\let\shortauthors=\shortauthors
1681 \if@ACM@printacmref
1682     \@mkbibcitation
1683 \fi
1684 \hypersetup{%
1685     pdfauthor={\authors},
1686     pdftitle={\@title},
1687     pdfsubject={\@concepts},
1688     pdfkeywords={\@keywords},
1689     pdfcreator={LaTeX with acmart
1690     \csname ver@acmart.cls\endcsname\space
1691     and hyperref
1692     \csname ver@hyperref.sty\endcsname}}%

```

```

1693 \@printendtopmatter
1694 \@afterindentfalse
1695 \@afterheading
1696 }

```

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

```

1697 \def\@specialsection#1{%
1698   \ifcase\ACM@format@nr
1699   \relax % manuscript
1700   \par\medskip\small\noindent#1: %
1701   \or % acsmall
1702   \par\medskip\small\noindent#1: %
1703   \or % acmlarge
1704   \par\medskip\small\noindent#1: %
1705   \or % acmtog
1706   \par\medskip\small\noindent#1: %
1707   \or % sigconf
1708   \section*{#1}%
1709   \or % siggraph
1710   \section*{#1}%
1711   \or % sigplan
1712   \paragraph*{#1}%
1713   \or % sigchi
1714   \section*{#1}%
1715   \or % sigchi-a
1716   \section*{#1}%
1717   \fi}

```

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

```

1718 \def\@printtopmatter{%
1719   \ifx\@startPage\@empty
1720     \gdef\@startPage{1}%
1721   \else
1722     \setcounter{page}{\@startPage}%
1723   \fi
1724   \thispagestyle{firstpagestyle}%
1725   \noindent
1726   \ifcase\ACM@format@nr
1727   \relax % manuscript
1728   \box\mkttitle@bx\par
1729   \or % acsmall
1730   \box\mkttitle@bx\par
1731   \or % acmlarge
1732   \box\mkttitle@bx\par
1733   \or % acmtog
1734   \twocolumn[\box\mkttitle@bx]%
1735   \or % sigconf

```



```

1736   \twocolumn[\box\mktitle@bx]%
1737   \or % siggraph
1738   \twocolumn[\box\mktitle@bx]%
1739   \or % sigplan
1740   \twocolumn[\box\mktitle@bx]%
1741   \or % sigchi
1742   \twocolumn[\box\mktitle@bx]%
1743   \or % sigchi-a
1744   \par\box\mktitle@bx\par\bigskip
1745   \if@ACM@badge
1746     \marginpar{\noindent
1747       \ifx\@acmBadgeL@image\empty\else
1748         \href{\@acmBadgeL@url}{%
1749           \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
1750         \hskip\@ACM@badge@skip
1751       \fi
1752       \ifx\@acmBadgeR@image\empty\else
1753         \href{\@acmBadgeR@url}{%
1754           \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
1755         \fi}%
1756   \fi
1757   \fi
1758 }

```

`\@mktitle` The title of the article

```

1759 \def\@mktitle{%
1760   \ifcase\ACM@format@nr
1761     \relax % manuscript
1762     \@mktitle@i
1763   \or % acsmall
1764     \@mktitle@i
1765   \or % acmlarge
1766     \@mktitle@i
1767   \or % acmtog
1768     \@mktitle@i
1769   \or % sigconf
1770     \@mktitle@iii
1771   \or % siggraph
1772     \@mktitle@iii
1773   \or % sigplan
1774     \@mktitle@iii
1775   \or % sigchi
1776     \@mktitle@iii
1777   \or % sigchi-a
1778     \@mktitle@iv
1779   \fi
1780 }

```

`\@titlefont` The font to typeset the title

```

1781 \def\@titlefont{%
1782   \ifcase\ACM@format@nr
1783   \relax % manuscript
1784   \LARGE\sffamily\bfseries
1785   \or % acmsmall
1786   \LARGE\sffamily\bfseries
1787   \or % acmlarge
1788   \LARGE\sffamily\bfseries
1789   \or % acmtog
1790   \Huge\sffamily
1791   \or % sigconf
1792   \Huge\sffamily\bfseries
1793   \or % siggraph
1794   \Huge\sffamily\bfseries
1795   \or % sigplan
1796   \Huge\bfseries
1797   \or % sigchi
1798   \Huge\sffamily\bfseries
1799   \or % sigchi-a
1800   \Huge\bfseries
1801   \fi}

```

\@subtitlefont The font to typeset the subtitle

```

1802 \def\@subtitlefont{\normalsize
1803   \ifcase\ACM@format@nr
1804   \relax % manuscript
1805   \mdseries
1806   \or % acmsmall
1807   \mdseries
1808   \or % acmlarge
1809   \mdseries
1810   \or % acmtog
1811   \LARGE
1812   \or % sigconf
1813   \LARGE\mdseries
1814   \or % siggraph
1815   \LARGE\mdseries
1816   \or % sigplan
1817   \LARGE\mdseries
1818   \or % sigchi
1819   \LARGE\mdseries
1820   \or % sigchi-a
1821   \mdseries
1822   \fi}

```

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

```

1823 \def\@mktitle@i{\hsize=\textwidth
1824   \@ACM@title@width=\hsize
1825   \ifx\@acmBadgeL@image\@empty\else
1826     \advance\@ACM@title@width by -\@ACM@badge@width

```

```

1827 \advance\@ACM@title@width by -\@ACM@badge@skip
1828 \fi
1829 \ifx\@acmBadgeR@image\@empty\else
1830 \advance\@ACM@title@width by -\@ACM@badge@width
1831 \advance\@ACM@title@width by -\@ACM@badge@skip
1832 \fi
1833 \setbox\mkttitle@bx=\vbox{\noindent\@titlefont
1834 \ifx\@acmBadgeL@image\@empty\else
1835 \raisebox{- .5\baselineskip}{\z@\z@\href{\@acmBadgeL@url}{%
1836 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
1837 \hskip\@ACM@badge@skip
1838 \fi
1839 \parbox[t]{\@ACM@title@width}{\raggedright
1840 \@titlefont\noindent
1841 \@title
1842 \ifx\@subtitle\@empty\else
1843 \par\noindent{\@subtitlefont\@subtitle}
1844 \fi}%
1845 \ifx\@acmBadgeR@image\@empty\else
1846 \hskip\@ACM@badge@skip
1847 \raisebox{- .5\baselineskip}{\z@\z@\href{\@acmBadgeR@url}{%
1848 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
1849 \fi
1850 \par\bigskip}}%

```

`\@mkttitle@ii` The version of `\mkttitle` for TOG. Since v1.06, this is subsumed by the `\mkttitle@i` macro

`\@mkttitle@iii` The version of `\@mkttitle` for SIG proceedings. Note that since the title is centered, we leave space for the left badge even if only the right badge is defined.

```

1851 \def\@mkttitle@iii{\hsize=\textwidth
1852 \setbox\mkttitle@bx=\vbox{\@titlefont\centering
1853 \@ACM@title@width=\hsize
1854 \if@ACM@badge
1855 \advance\@ACM@title@width by -2\@ACM@badge@width
1856 \advance\@ACM@title@width by -2\@ACM@badge@skip
1857 \parbox[b]{\@ACM@badge@width}{\strut
1858 \ifx\@acmBadgeL@image\@empty\else
1859 \raisebox{- .5\baselineskip}{\z@\z@\href{\@acmBadgeL@url}{%
1860 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
1861 \fi}%
1862 \hskip\@ACM@badge@skip
1863 \fi
1864 \parbox[t]{\@ACM@title@width}{\centering\@titlefont
1865 \@title
1866 \ifx\@subtitle\@empty\else
1867 \par\noindent{\@subtitlefont\@subtitle}
1868 \fi
1869 }%
1870 \if@ACM@badge

```

```

1871 \hskip\@ACM@badge@skip
1872 \parbox[b]{\@ACM@badge@width}{\strut
1873 \ifx\@acmBadgeR@image\@empty\else
1874 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
1875 \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
1876 \fi}%
1877 \fi
1878 \par\bigskip}}%

```

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

```

1879 \def\@mktitle@iv{\hspace=\textwidth
1880 \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
1881 \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
1882 \noindent\@title
1883 \ifx\@subtitle\@empty\else
1884 \par\noindent\@subtitlefont\@subtitle
1885 \fi
1886 \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.

```

1887 \newbox\@ACM@commabox
1888 \def\@ACM@addtoaddress#1{%
1889 \ifvmode\else
1890 \if@ACM@affiliation@obeypunctuation\else
1891 \setbox\@ACM@commabox=\hbox{, }%
1892 \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
1893 \fi\fi
1894 #1}

```

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

```

\streetaddress 1895 \def\streetaddress#1{\unskip\ignorespaces}
\city           1896 \def\postcode#1{\unskip\ignorespaces}
\state         1897 \if@ACM@journal
\postcode      1898 \def\position#1{\unskip\ignorespaces}
\country       1899 \def\institution#1{\unskip~#1\ignorespaces}
               1900 \def\city#1{\unskip\ignorespaces}
               1901 \def\state#1{\unskip\ignorespaces}
               1902 \newcommand\department[2][0]{\unskip\ignorespaces}
               1903 \def\country#1{\if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
               1904 \else

```

```

1905 \def\position#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
1906 \def\institution#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
1907 \newcommand\department[2][0]{\if@ACM@affiliation@obeypunctuation
1908   #2\else#2\par\fi}%
1909 % \def\streetaddress#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
1910 \let\city\@ACM@addtoaddress
1911 \let\state\@ACM@addtoaddress
1912 % \def\postcode#1{\if@ACM@affiliation@obeypunctuation#1\else\unskip\space#1\fi}%
1913 \let\country\@ACM@addtoaddress
1914 \fi

```

\@mkauthors Typesetting the authors

```

1915 \def\@mkauthors{\begingroup
1916   \hsize=\textwidth
1917   \ifcase\ACM@format@nr
1918     \relax % manuscript
1919     \@mkauthors@i
1920   \or % acsmall
1921     \@mkauthors@i
1922   \or % acmlarge
1923     \@mkauthors@i
1924   \or % acmtog
1925     \@mkauthors@i
1926   \or % sigconf
1927     \@mkauthors@iii
1928   \or % siggraph
1929     \@mkauthors@iii
1930   \or % sigplan
1931     \@mkauthors@iii
1932   \or % sigchi
1933     \@mkauthors@iii
1934   \or % sigchi-a
1935     \@mkauthors@iv
1936   \fi
1937 \endgroup
1938 }

```

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

```

1939 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```

1940 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

1941 \ifcase\ACM@format@nr
1942 \relax % manuscript
1943 \or % acsmall
1944   \def\@authorfont{\Large\sffamily}
1945   \def\@affiliationfont{\small\normalfont}

```

```

1946 \or % acmlarge
1947 \or % acmtog
1948 \def\@authorfont{\LARGE\sffamily}
1949 \def\@affiliationfont{\large}
1950 \or % sigconf
1951 \def\@authorfont{\LARGE}
1952 \def\@affiliationfont{\large}
1953 \or % siggraph
1954 \def\@authorfont{\normalsize\normalfont}
1955 \def\@affiliationfont{\normalsize\normalfont}
1956 \or % sigplan
1957 \def\@authorfont{\Large\normalfont}
1958 \def\@affiliationfont{\normalsize\normalfont}
1959 \or % sigchi
1960 \def\@authorfont{\bfseries}
1961 \def\@affiliationfont{\mdseries}
1962 \or % sigchi-a
1963 \def\@authorfont{\bfseries}
1964 \def\@affiliationfont{\mdseries}
1965 \fi

```

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

```

1966 \def\@typeset@author@line{%
1967 \andify\@currentauthors\par\noindent
1968 \@currentauthors\def\@currentauthors{}%
1969 \ifx\@currentaffiliations\@empty\else
1970 \andify\@currentaffiliations
1971 \unskip, {\@currentaffiliations}\par
1972 \fi
1973 \def\@currentaffiliations{}}

```

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

```

1974 \def\@mkauthors@i{%
1975 \def\@currentauthors{}%
1976 \def\@currentaffiliations{}%
1977 \global\let\and\@typeset@author@line
1978 \def\@author##1{%
1979 \ifx\@currentauthors\@empty
1980 \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
1981 \else
1982 \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
1983 \fi
1984 \gdef\and{}}%
1985 \def\email##1##2{%
1986 \def\@tempa{##2}\ifx\@tempa\@empty\else
1987 \ifx\@currentaffiliations\@empty

```

```

1989     \gdef\@currentaffiliations{%
1990         \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
1991         \setkeys{@ACM@affiliation@}{##1}%
1992         \@affiliationfont##2}%
1993     \else
1994         \g@addto@macro{\@currentaffiliations}{\and
1995             \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
1996             \setkeys{@ACM@affiliation@}{##1}##2}%
1997     \fi
1998 \fi
1999 \global\let\and\@typeset@author@line}%
2000 \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par\medskip
2001 \noindent\addresses\@typeset@author@line
2002 \par\medskip}%
2003 }

```

`\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
2004 `\newbox\author@bx`

`\author@bx@wd` The width of the author box
2005 `\newdimen\author@bx@wd`

`\author@bx@sep` The separation between author boxes
2006 `\newskip\author@bx@sep`
2007 `\author@bx@sep=1pc\relax`

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

```

2008 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd\def\and{\par}%
2009 \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2010 \@authorfont\@currentauthors\par\@affiliationfont
2011 \@currentaffiliation}\egroup
2012 \box\author@bx\hspace{\author@bx@sep}%
2013 \gdef\@currentauthors{}}%
2014 \gdef\@currentaffiliation{}}

```

`\mkauthors@iii` The `sigconf` version. Here we use a centered design with each author in a separate box.
2015 `\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.

```

2016 \author@bx@wd=\textwidth\relax
2017 \advance\author@bx@wd by -\author@bx@sep\relax
2018 \ifnum\@ACM@authorsperrow>0\relax
2019 \divide\author@bx@wd by \@ACM@authorsperrow\relax

```

```

2020 \else
2021   \ifcase\num@authorgroups
2022   \relax % 0?
2023   \or % 1=one author per row
2024   \or % 2=two authors per row
2025     \divide\author@bx@wd by \num@authorgroups\relax
2026   \or % 3=three authors per row
2027     \divide\author@bx@wd by \num@authorgroups\relax
2028   \or % 4=two authors per row (!)
2029     \divide\author@bx@wd by 2\relax
2030   \else % three authors per row
2031     \divide\author@bx@wd by 3\relax
2032   \fi
2033 \fi
2034 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

2035 \gdef\@currentauthors{ }%
2036 \gdef\@currentaffiliation{ }%
2037 \def\@author##1{\ifx\@currentauthors\@empty
2038   \gdef\@currentauthors{\par##1}%
2039 \else
2040   \g@addto@macro\@currentauthors{\par##1}%
2041 \fi
2042 \gdef\and{ }}%
2043 \def\email##1##2{\ifx\@currentaffiliation\@empty
2044   \gdef\@currentaffiliation{\nolinkurl{##2}}%
2045 \else
2046   \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2047 \fi}%
2048 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2049   \gdef\@currentaffiliation{%
2050     \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2051     \setkeys{@ACM@affiliation@}{##1}##2}%
2052 \else
2053   \g@addto@macro\@currentaffiliation{\par
2054     \setkeys{@ACM@affiliation@}{obexpunctuation=false}%
2055     \setkeys{@ACM@affiliation@}{##1}##2}%
2056 \fi
2057 \global\let\and\@typeset@author@bx
2058 }%

```

Actual typesetting is done by the \and macro:

```

2059 \hspace=\textwidth
2060 \global\setbox\mktitle@bx=\vbox{\noindent
2061   \box\mktitle@bx\par\medskip\leavevmode
2062   \lineskip=1pc\relax\centering\hspace*{-1em}%
2063   \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.


```
2064 \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.

```
2065 \author@bx@wd=\columnwidth\relax
2066 \advance\author@bx@wd by -\author@bx@sep\relax
2067 \ifnum\@ACM@authorsperrow>0\relax
2068 \divide\author@bx@wd by \@ACM@authorsperrow\relax
2069 \else
2070 \ifcase\@num@authorgroups
2071 \relax % 0?
2072 \or % 1=one author per row
2073 \else % 2=two authors per row
2074 \divide\author@bx@wd by 2\relax
2075 \fi
2076 \fi
2077 \advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of `\addresses`:

```
2078 \gdef\@currentauthors{}%
2079 \gdef\@currentaffiliation{}%
2080 \def\@author##1{\ifx\@currentauthors\@empty
2081 \gdef\@currentauthors{\par##1}%
2082 \else
2083 \g@addto@macro\@currentauthors{\par##1}%
2084 \fi
2085 \gdef\@and{}}%
2086 \def\@email##1##2{\ifx\@currentaffiliation\@empty
2087 \gdef\@currentaffiliation{\nolinkurl{##2}}%
2088 \else
2089 \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2090 \fi}%
2091 \def\@affiliation##1##2{\ifx\@currentaffiliation\@empty
2092 \gdef\@currentaffiliation{%
2093 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2094 \setkeys{@ACM@affiliation@}{##1}##2}%
2095 \else
2096 \g@addto@macro\@currentaffiliation{\par
2097 \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2098 \setkeys{@ACM@affiliation@}{##1}##2}%
2099 \fi
2100 \global\let\and\@typeset@author@bx}%
2101 %
```

Actual typesetting is done by the `\and` macro

```
2102 \bgroup\hsize=\columnwidth
2103 \par\raggedright\leftskip=\z@
2104 \lineskip=1pc\noindent
2105 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}
```

```

\mkauthorsaddresses Typesetting authors' addresses in the footnote style
2106 \def\mkauthorsaddresses{%
2107   \ifnum\num@authors>1\relax
2108   Authors' \else Author's \fi
2109   \ifnum\num@authorgroups>1\relax
2110   addresses: \else address: \fi
2111   \bgroup
2112   \def\streetaddress##1{\unskip\@addpunct, ##1}%
2113   \def\postcode##1{\unskip\@addpunct, ##1}%
2114   \def\position##1{\unskip\ignorespaces}%
2115   \def\institution##1{\unskip\@addpunct, ##1}%
2116   \def\city##1{\unskip\@addpunct, ##1}%
2117   \def\state##1{\unskip\@addpunct, ##1}%
2118   \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
2119   \def\country##1{\unskip\@addpunct, ##1}%
2120   \def\and{\unskip\@addpunct; }%
2121   \def\author##1{##1}%
2122   \def\email##1##2{\unskip\@addpunct, \nolinkurl{##2}}%
2123   \addresses
2124   \egroup}

\@setaddresses This is an amsart macro that we do not need.
2125 \def\@setaddresses{}

\@authornotemark Adding a footnote mark to authors. This version adds a "normal" footnote mark.
2126 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}

\@@authornotemark Adding a footnote mark to authors with a given number
2127 \def\@@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}

\mkteasers Typesetting the teasers
2128 \def\mkteasers{%
2129   \ifx\@teaserfigures\@empty\else
2130     \def\@teaser##1{\par\bigskip\bgroup
2131       \captionsetup{type=figure}##1\egroup\par}
2132     \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par
2133       \noindent\@teaserfigures\par\medskip}%
2134     \fi}

\mkabstract Typesetting the abstract
2135 \def\mkabstract{\bgroup
2136   \ifx\@abstract\@lempty\else
2137   {\phantomsection\addcontentsline{toc}{section}{Abstract}%
2138     \if@ACM@journal
2139     \everypar{\setbox\z@\lastbox\everypar{}}\small
2140     \else
2141     \section*{Abstract}%
2142     \fi
2143     \ignorespaces\@abstract\par}%
2144   \fi\egroup}

```

`\@mkbibcitation` Print the bibcitation format

```
2145 \def\@mkbibcitation{\bgroup
2146 \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
2147 \def\footnotemark{}%
2148 \def\{\unskip}\ignorespaces}%
2149 \def\footnote{\ClassError{\@classname}{Please do not use footnotes
2150     inside a \string\title{} or \string\author{} command! Use
2151     \string\titlenote{} or \string\authornote{} instead!}}%
2152 \def\@article@string{\ifx\@acmArticle\@empty{\ } \else,
2153     Article~\@acmArticle\ \fi}%
2154 \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
2155 \noindent\bgroup
2156 \def\{\unskip}, \ignorespaces\authors\egroup. \@acmYear. \@title
2157 \ifx\@subtitle\@empty. \else: \@subtitle. \fi
2158 \if@ACM@nonacm\else
2159     % The 'nonacm' option disables 'printacmref' by default,
2160     % and the present \@mkbibcitation definition is never used
2161     % in this case. The conditional remains useful if the user
2162     % explicitly sets \settopmatter{printacmref=true}.
2163     \if@ACM@journal
2164         \textit{\@journalNameShort}
2165         \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
2166         \ref{TotPages}~\@pages@word.
2167     \else
2168         In \textit{\@acmBooktitle}%
2169         \ifx\@acmEditors\@empty\textit{.}\else
2170             \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
2171         \fi\
2172         ACM, New York, NY, USA%
2173         \@article@string\unskip, \ref{TotPages}~\@pages@word.
2174     \fi
2175 \fi
2176 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
2177 \par\egroup}
```

`\@printendtopmatter` End the top matter

```
2178 \def\@printendtopmatter{\par\bigskip}
```

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

```
2179 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}
```

`\@setauthorsaddresses`

```
2180 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}
```

3.15 Headers and Footers

We use `fancyhdr` for our headers and footers:

```
2181 \RequirePackage{fancyhdr}
```

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

```
2182 \if@ACM@review
2183   \newsavebox{\ACM@linecount@bx}
2184   \newlength\ACM@linecount@bxht
2185   \newcount\ACM@linecount
2186   \ACM@linecount\@ne\relax
2187   \def\ACM@mk@linecount{%
2188     \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{%
2189       \setlength{\ACM@linecount@bxht}{0pt}%
2190       \loop{\color{red}\scriptsize\the\ACM@linecount}\
2191         \global\advance\ACM@linecount by \@ne
2192       \addtolength{\ACM@linecount@bxht}{\baselineskip}%
2193       \ifdim\ACM@linecount@bxht<\textheight\repeat
2194         {\color{red}\scriptsize\the\ACM@linecount}\hfill
2195       \global\advance\ACM@linecount by \@ne}}
2196 \fi
```

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

```
2197 \def\ACM@linecountL{%
2198   \if@ACM@review
2199     \ACM@mk@linecount
2200     \begin{picture}(0,0)%
2201       \put(-26,-22){\usebox{\ACM@linecount@bx}}%
2202     \end{picture}%
2203   \fi}
```

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

```
2204 \def\ACM@linecountR{%
2205   \if@ACM@review
2206     \ACM@mk@linecount
2207     \begin{picture}(0,0)%
2208       \put(20,-22){\usebox{\ACM@linecount@bx}}%
2209     \end{picture}%
2210   \fi}
```

`\ACM@timestamp` The timestamp system

```
2211 \if@ACM@timestamp
2212   % Subtracting 30 from \time gives us the effect of rounding down despite
2213   % \numexpr rounding to nearest
2214   \newcounter{ACM@time@hours}
2215   \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
2216   \newcounter{ACM@time@minutes}
2217   \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
2218   \newcommand\ACM@timestamp{%
2219     \footnotesize%
2220     \ifx\@acmSubmissionID\@empty\relax\else
2221     Submission ID: \@acmSubmissionID.{ }%
2222     \fi
2223     \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
```

```

2224 \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
2225 Page \thepage\ of \@startPage--\pageref*{TotPages}.%
2226 }
2227 \fi

```

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

```

2228 \def\@shortauthors{%
2229 \if@ACM@anonymous
2230 Anon.
2231 \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
2232 \else\@shortauthors\fi}

```

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

```

2233 \def\@headfootfont{\sffamily}

```

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

```

2234 \fancypagestyle{standardpagestyle}{%
2235 \fancyhf{}%
2236 \renewcommand{\headrulewidth}{\z@}%
2237 \renewcommand{\footrulewidth}{\z@}%
2238 \def\@acmArticlePage{%
2239 \ifx\@acmArticle\empty%
2240 \if@ACM@printfolios\thepage\fi%
2241 \else%
2242 \@acmArticle\if@ACM@printfolios:\thepage\fi%
2243 \fi%
2244 }
2245 \ifcase\ACM@format@nr
2246 \relax % manuscript
2247 \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
2248 \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
2249 \fancyhead[RE]{\@shortauthors}%
2250 \fancyhead[LO]{\ACM@linecountL\shorttitle}%
2251 \if@ACM@nonacm\else%
2252 \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
2253 \fi%
2254 \or % acmsmall
2255 \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
2256 \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
2257 \fancyhead[RE]{\@headfootfont\@shortauthors}%
2258 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2259 \if@ACM@nonacm\else%
2260 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2261 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2262 \fi%
2263 \or % acmlarge
2264 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2265 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%

```

```

2266 \fancyhead[LO]{\ACM@linecountL}%
2267 \fancyhead[RO]{\@headfootfont
2268 \shorttitle\quad\textbullet\quad\@acmArticlePage}%
2269 \if@ACM@nonacm\else%
2270 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2271 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2272 \fi%
2273 \or % acmtog
2274 \fancyhead[LE]{\ACM@linecountL\@headfootfont
2275 \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2276 \fancyhead[LO]{\ACM@linecountL}%
2277 \fancyhead[RE]{\ACM@linecountR}%
2278 \fancyhead[RO]{\@headfootfont
2279 \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
2280 \if@ACM@nonacm\else%
2281 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2282 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2283 \fi%
2284 \else % Proceedings
2285 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2286 \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2287 \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
2288 \if@ACM@nonacm\else%
2289 \fancyhead[LE]{\ACM@linecountL\@headfootfont\acmConference@shortname,
2290 \acmConference@date, \acmConference@venue}%
2291 \fancyhead[RO]{\@headfootfont\acmConference@shortname,
2292 \acmConference@date, \acmConference@venue\ACM@linecountR}%
2293 \fi%
2294 \fi
2295 \if@ACM@sigchiamode
2296 \fancyheadoffset[LL]{\dimexpr(\marginparsep+\marginparwidth)}%
2297 \fi
2298 \if@ACM@timestamp
2299 \fancyfoot[LO,RE]{\ACM@timestamp}
2300 \fi
2301 }
2302 \pagestyle{standardpagestyle}

```

```

\@folio@wd Folio blob width, height, offsets and max number
\@folio@ht 2303 \newdimen\@folio@wd
\@folio@voffset 2304 \@folio@wd=\z@
\@folio@max 2305 \newdimen\@folio@ht
2306 \@folio@ht=\z@
2307 \newdimen\@folio@voffset
2308 \@folio@voffset=\z@
2309 \def\@folio@max{1}
2310 \ifcase\ACM@format@nr
2311 \relax % manuscript
2312 \or % acmsmall
2313 \@folio@wd=45.75pt\relax

```

```

2314 \@folio@ht=1.25in\relax
2315 \@folio@voffset=.2in\relax
2316 \def\@folio@max{8}
2317 \or % acmlarge
2318 \@folio@wd=43.25pt\relax
2319 \@folio@ht=79pt\relax
2320 \@folio@voffset=.55in\relax
2321 \def\@folio@max{10}
2322 \fi

```

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

```

2323 \def\@folioblob{\@tempcnta=0\@acmArticleSeq\relax
2324 \ifnum\@tempcnta=0\relax\else
First, we calculate \@acmArticleSeq modulo \@folio@max
2325 \loop
2326 \ifnum\@tempcnta>\@folio@max\relax
2327 \advance\@tempcnta by - \@folio@max
2328 \repeat
2329 \advance\@tempcnta by -1\relax
2330 \@tempdima=\@folio@ht\relax
2331 \multiply\@tempdima by \the\@tempcnta\relax
2332 \advance\@tempdima by -\@folio@voffset\relax
2333 \begin{picture}(0,0)
2334 \makebox[\z@]{\raisebox{-\@tempdima}{%
2335 \rlap{%
2336 \raisebox{-0.45\@folio@ht}{\z@}[\z@]{%
2337 \rule{\@folio@wd}{\@folio@ht}}}%
2338 \parbox{\@folio@wd}{%
2339 \centering
2340 \textcolor{white}{\LARGE\sffamily\bfseries\@acmArticle}}}}
2341 \end{picture}\fi}
2342

```

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

```

2343 \fancypagestyle{firstpagestyle}{%
2344 \fancyhf{}%
2345 \renewcommand{\headrulewidth}{\z@}%
2346 \renewcommand{\footrulewidth}{\z@}%
2347 \ifcase\ACM@format@nr
2348 \relax % manuscript
2349 \fancyhead[L]{\ACM@linecountL}%
2350 \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
2351 \if@ACM@nonacm\else%
2352 \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
2353 \fi%
2354 \or % acmsmall
2355 \if@ACM@nonacm\else%
2356 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2357 \@acmNumber, Article \@acmArticle. Publication date:

```

```

2358     \@acmPubDate.}%
2359 \fi%
2360 \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2361 \fancyhead[LO]{\ACM@linecountL}%
2362 \fancyhead[RO]{\@folioblob}%
2363 \fancyheadoffset[RO,LE]{0.6\@folio@wd}%
2364 \or % acmlarge
2365 \if@ACM@nonacm\else%
2366 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2367 \acmNumber, Article \@acmArticle. Publication date:
2368 \@acmPubDate.}%
2369 \fi%
2370 \fancyhead[RO]{\@folioblob}%
2371 \fancyhead[LE]{\ACM@linecountL\@folioblob}%
2372 \fancyhead[LO]{\ACM@linecountL}%
2373 \fancyheadoffset[RO,LE]{1.4\@folio@wd}%
2374 \or % acmtog
2375 \if@ACM@nonacm\else%
2376 \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2377 \acmNumber, Article \@acmArticle. Publication date:
2378 \@acmPubDate.}%
2379 \fi%
2380 \fancyhead[L]{\ACM@linecountL}%
2381 \fancyhead[R]{\ACM@linecountR}%
2382 \else % Conference proceedings
2383 \fancyhead[L]{\ACM@linecountL}%
2384 \fancyhead[R]{\ACM@linecountR}%
2385 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
2386 \fi
2387 \if@ACM@timestamp
2388 \ifnum\ACM@format@nr=0\relax % Manuscript
2389 \fancyfoot[LO,RE]{\ACM@timestamp\quad
2390 \if@ACM@nonacm\else
2391 \footnotesize Manuscript submitted to ACM
2392 \fi}
2393 \else
2394 \fancyfoot[LO,RE]{\ACM@timestamp}
2395 \fi
2396 \fi
2397 }

```

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

```

2398 \let\ACM@ps@plain\ps@plain
2399 \let\ACM@ps@myheadings\ps@myheadings
2400 \let\ACM@ps@headings\ps@headings
2401 \def\ACM@restore@pagestyle{%
2402 \let\ps@plain\ACM@ps@plain
2403 \let\ps@myheadings\ACM@ps@myheadings
2404 \let\ps@headings\ACM@ps@headings}
2405 \AtBeginDocument{\ACM@restore@pagestyle}

```


3.16 Sectioning

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

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

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

```
2406 \def\ACM@NRadjust#1{%
2407   \begingroup
2408   \expandafter\ifx\csname Sectionformat\endcsname\relax
2409   % do nothing when \Sectionformat is unknown
2410   \def\next{\endgroup #1}%
2411   \else
2412   \def\next{\endgroup
2413     \let\realSectionformat\Sectionformat
2414     \def\ACM@sect@format@{#1}%
2415     \let\Sectionformat\ACM@NR@adjustedSectionformat
2416     %% next lines added 2018-06-17 to ensure section number is styled
2417     \let\real@adddotafter\@adddotafter
2418     \let\@adddotafter\ACM@adddotafter
2419     #1{}% imposes the styles, but nullifies \MakeUppercase
2420     \let\@adddotafter\real@adddotafter
2421   }%
2422   \fi \next
2423 }
```

`\ACM@NR@adjustedSectionformat`

```
2424 \def\ACM@NR@adjustedSectionformat#1#2{%
2425   \realSectionformat{\ACM@sect@format{#1}}{#2}%
2426   \let\Sectionformat\realSectionformat}
2427 \DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
2428 \def\ACM@sect@format@null#1{#1}
2429 \let\ACM@sect@format@\ACM@sect@format@null
```

```

2430 \AtBeginDocument{%
2431 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
2432 \let\LTX@adddotafter\@adddotafter
2433 \fi
2434 }

```

\ACM@adddotafter

```

2435 \def\ACM@adddotafter#1{\ifx\relax#1\relax\else\LTX@adddotafter{#1}\fi}

```

Sectioning is different for different levels

```

2436 \renewcommand\section{\@startsection{section}{1}{\z@}%
2437 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2438 {.25\baselineskip}%
2439 {\ACM@NRadjust\@secfont}}
2440 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
2441 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2442 {.25\baselineskip}%
2443 {\ACM@NRadjust\@subsecfont}}
2444 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
2445 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2446 {-3.5\p@}%
2447 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}}
2448 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
2449 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2450 {-3.5\p@}%
2451 {\ACM@NRadjust{\@parfont\@adddotafter}}}}
2452 \renewcommand\part{\@startsection{part}{9}{\z@}%
2453 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
2454 {4\p@}%
2455 {\ACM@NRadjust\@parfont}}

```

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

```

2456 \def\section@raggedright{\@rightskip\@flushglue
2457 \rightskip\@rightskip
2458 \leftskip\z@skip
2459 \parindent\z@}

```

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

```

\@subsecfont 2460 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
\@subsubsecfont 2461 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 2462 \def\@subsubsecfont{\sffamily\itshape}
2463 \def\@parfont{\itshape}
2464 \setcounter{secnumdepth}{3}
2465 \ifcase\ACM@format@nr
2466 \relax % manuscript
2467 \or % acsmall
2468 \or % acmlarge
2469 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
2470 \def\@subsecfont{\sffamily\large\section@raggedright}

```

```

2471 \or % acmtog
2472 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
2473 \def\@subsecfont{\sffamily\large\section@raggedright}
2474 \or % sigconf
2475 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
2476 \def\@subsecfont{\bfseries\Large\section@raggedright}
2477 \or % siggraph
2478 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
2479 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
2480 \or % sigplan
2481 \def\@secfont{\bfseries\Large\section@raggedright}
2482 \def\@subsecfont{\bfseries\section@raggedright}
2483 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
2484   {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2485   {.25\baselineskip}%
2486   {\@subsubsecfont}}
2487 \def\@subsubsecfont{\bfseries\section@raggedright}
2488 \renewcommand\paragraph{\@startsection{paragraph}{4}{\z@}%
2489   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2490   {-3.5\p@}%
2491   {\@parfont\@addspaceafter}}
2492 \def\@parfont{\bfseries\itshape}
2493 \renewcommand\subparagraph{\@startsection{subparagraph}{5}{\z@}%
2494   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2495   {-3.5\p@}%
2496   {\@subparfont\@addspaceafter}}
2497 \def\@subparfont{\itshape}
2498 \or % sigchi
2499 \setcounter{secnumdepth}{1}
2500 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
2501 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
2502 \or % sigchi-a
2503 \setcounter{secnumdepth}{0}
2504 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
2505 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
2506 \fi

```

`\@adddotafter` Add punctuation after a sectioning command

```
2507 \def\@adddotafter#1{#1\@addpunct{.}}
```

`\@addspaceafter` Add space after a sectioning command

```
2508 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

3.17 TOC lists

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

2509 \providecommand*\dotsep{4.5}

3.18 Theorems

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

2510 \def\@acmplainbodyfont{\itshape}

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

2511 \def\@acmplainindent{\parindent}

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

2512 \def\@acmplainheadfont{\scshape}

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

2513 \def\@acmplainnotefont{\@empty}

Customization of the acmplain theorem style:

2514 \ifcase\ACM@format@nr

2515 \relax % manuscript

2516 \or % acmsmall

2517 \or % acmlarge

2518 \or % acmtog

2519 \or % sigconf

2520 \or % siggraph

2521 \or % sigplan

2522 \def\@acmplainbodyfont{\itshape}

2523 \def\@acmplainindent{\z@}

2524 \def\@acmplainheadfont{\bfseries}

2525 \def\@acmplainnotefont{\normalfont}

2526 \or % sigchi

2527 \or % sigchi-a

2528 \fi

acmplain The acmplain theorem style

2529 \newtheoremstyle{acmplain}%

2530 {.5\baselineskip\@plus.2\baselineskip

2531 \@minus.2\baselineskip}% space above

2532 {.5\baselineskip\@plus.2\baselineskip

2533 \@minus.2\baselineskip}% space below

2534 {\@acmplainbodyfont}% body font

2535 {\@acmplainindent}% indent amount

2536 {\@acmplainheadfont}% head font

2537 {.%} punctuation after head

2538 {.5em}% spacing after head

2539 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec

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

2540 \def\@acmdefinitionbodyfont{\normalfont}

`\@acmdefinitionindent` The amount to indent the acmdefinition theorem style.
2541 `\def\@acmdefinitionindent{\parindent}`

`\@acmdefinitionheadfont` The font to typeset the head of the acmdefinition theorem style.
2542 `\def\@acmdefinitionheadfont{\itshape}`

`\@acmdefinitionnotefont` The font to typeset the note of the acmdefinition theorem style.
2543 `\def\@acmdefinitionnotefont{\@empty}`

Customization of the acmdefinition theorem style:

```

2544 \ifcase\ACM@format@nr
2545 \relax % manuscript
2546 \or % acsmall
2547 \or % acmlarge
2548 \or % acmtog
2549 \or % sigconf
2550 \or % siggraph
2551 \or % sigplan
2552 \def\@acmdefinitionbodyfont{\normalfont}
2553 \def\@acmdefinitionindent{\z@}
2554 \def\@acmdefinitionheadfont{\bfseries}
2555 \def\@acmdefinitionnotefont{\normalfont}
2556 \or % sigchi
2557 \or % sigchi-a
2558 \fi

```

`acmdefinition` The acmdefinition theorem style

```

2559 \newtheoremstyle{acmdefinition}%
2560 { .5\baselineskip\@plus.2\baselineskip
2561   \@minus.2\baselineskip}% space above
2562 { .5\baselineskip\@plus.2\baselineskip
2563   \@minus.2\baselineskip}% space below
2564 {\@acmdefinitionbodyfont}% body font
2565 {\@acmdefinitionindent}% indent amount
2566 {\@acmdefinitionheadfont}% head font
2567 {.%} punctuation after head
2568 {.5em}% spacing after head
2569 {\thmname{#1}\thmnumber{ #2}\thmnote{ \@acmdefinitionnotefont(#3)}}% head spec

```

Make `acmplain` the default theorem style.

```

2570 \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.

```

2571 \AtEndPreamble{%
2572   \if@ACM@acmthm
2573   \theoremstyle{acmplain}
2574   \@ifundefined{theorem}{%
2575     \newtheorem{theorem}{Theorem}[section]
2576   }{}
2577   \@ifundefined{conjecture}{%
2578     \newtheorem{conjecture}[theorem]{Conjecture}
2579   }{}
2580   \@ifundefined{proposition}{%
2581     \newtheorem{proposition}[theorem]{Proposition}
2582   }{}
2583   \@ifundefined{lemma}{%
2584     \newtheorem{lemma}[theorem]{Lemma}
2585   }{}
2586   \@ifundefined{corollary}{%
2587     \newtheorem{corollary}[theorem]{Corollary}
2588   }{}
2589   \theoremstyle{acmdefinition}
2590   \@ifundefined{example}{%
2591     \newtheorem{example}[theorem]{Example}
2592   }{}
2593   \@ifundefined{definition}{%
2594     \newtheorem{definition}[theorem]{Definition}
2595   }{}
2596   \fi
2597   \theoremstyle{acmplain}
2598 }

```

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

```
2599 \def\@proofnamefont{\scshape}
```

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

```
2600 \def\@proofindent{\indent}
```

Customization of the proof environment.

```

2601 \ifcase\ACM@format@nr
2602 \relax % manuscript
2603 \or % acmsmall
2604 \or % acmlarge
2605 \or % acmtog
2606 \or % sigconf
2607 \or % siggraph
2608 \or % sigplan
2609 \def\@proofnamefont{\itshape}
2610 \def\@proofindent{\noindent}
2611 \or % sigchi

```

```
2612 \or % sigchi-a
2613 \fi
```

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

```
2614 \renewenvironment{proof}[1][\proofname]{\par
2615   \pushQED{\qed}%
2616   \normalfont \topsep6\p@\@plus6\p@\relax
2617   \trivlist
2618   \item[\@proofindent\hskip\labelsep
2619     {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
2620 }{%
2621   \popQED\endtrivlist\endpfalse
2622 }
```

3.19 Acknowledgments

`\acks` This is a comment-like structure

```
2623 \specialcomment{acks}{%
2624   \begingroup
2625   \section*{Acknowledgments}
2626   \phantomsection\addcontentsline{toc}{section}{Acknowledgments}
2627 }{%
2628   \endgroup
2629 }
```

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

```
2630 \def\grantsponsor#1#2#3{#2}
```

`\grantnum`

```
2631 \newcommand\grantnum[3][]{#3%
2632   \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}
```

3.20 Conditional typesetting

We use the comment package for conditional typesetting:

```
2633 \AtEndPreamble{%
2634   \if@ACM@screen
2635     \includecomment{screenonly}
2636     \excludecomment{printonly}
2637   \else
2638     \excludecomment{screenonly}
2639     \includecomment{printonly}
2640   \fi
2641   \if@ACM@anonymous
2642     \excludecomment{anonsuppress}
2643     \excludecomment{acks}
2644   \else
2645     \includecomment{anonsuppress}
2646   \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/hypertext/bibstyles/>).

```
2647 \newcommand\showeprint[2][arxiv]{%
2648   \def\@tempa{#1}%
2649   \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
2650   \def\@tempb{arxiv}%
2651   \ifx\@tempa\@tempb
2652     arXiv:\href{http://arxiv.org/abs/#2}{#2}\else arXiv:#2%
2653   \fi}
```

3.22 End of Class

```
2654 \normalsize\normalfont\frenchspacing
2655 </class>
```


References

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

Change History

1.48	General: Added prologue option to xcolor	42	General: Added anonsuppress environment	30
	Bib code cleanup (Zack Weinberg)	30	Added authorversion option (closes https://github.com/borisveytsman/acmart/issues/9)	30
	Documentation update (siggraph)	30		
1.49	General: New journal: DTRAP	30	v1.04	
1.53	General: New journals: PACMCGIT, TIOT, TDSCI	30	\acmArticleSeq: Name change by Matthew Fluet	60
	Rearranged docs	30	\acmDOI: Name change by Matthew Fluet	60
1.54	General: Moved footnote stuff before hyperref call (Ross Moore)	30	\acmISBN: Name change by Matthew Fluet	60
			General: Updated bibliography for siggraph	30
v1.00			v1.05	
	General: First released version	30	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	30
v1.01	General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/acmart/issues/1)	30	Patched \setcitestyle command; closes https://github.com/borisveytsman/acmart/issues/19	30
	Defined ACM colors	30		
	Explicitly put draft option (closes https://github.com/borisveytsman/acmart/issues/4)	33	v1.06	
	Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/acmart/issues/5)	30	\@ACM@badge@skip: Added macro	60
			\@ACM@badge@width: Added macro	60
			\@ACM@title@width: Added macro	60
			\@mktitle@i: Added processing badges	74
			Made generic	74
			\@mktitle@ii: Now this macro is obsolete	75
v1.02	General: Added TOPS and TSC (closes https://github.com/borisveytsman/acmart/issues/12)	30	\@mktitle@iii: Added processing badges	75
	Documentation changes (closes https://github.com/borisveytsman/acmart/issues/13)	30	Made more generic	75
			\@mktitle@iv: Made more generic	76
			\@printtopmatter: Added processing badges	72
			\@subtitlefont: Added macro	74
			\@titlefont: Added macro	73
v1.03	\@formatdoi: Added macro	66	\acmBadgeL: Added macro	61
	\if@ACM@authorversion: Added macro	32	\acmBadgeR: Added macro	61
	\maketitle: Added special case of authorversion	69	\if@ACM@badge: Added macro	60
			v1.07	
			\maketitle: Corrected a bug with abstract footnotes	69

	Corrected a bug with permssion and footnotes order	69		\bibstyle@acmauthoryear: Added macro	37
v1.08	General: SIGPLAN reformatting by Matthew Fluet	30		\bibstyle@acmnumeric: Added macro	37
	Typos corrected (Tobias Pape) . . .	30		\if@ACM@printfolios: Added macro	62
v1.09	General: Revert SIGPLAN caption rules	30		General: Font adjustments for acmsmall	77
				Increased font size for ACM Large	34
v1.10	\maketitle: Corrected a bug with doi in manuscript and author vertision, https://github.com/borisveytsman/acmart/issues/36	69		Print bibliographic information by default for the proceedings	62
	General: Changes of ‘licensedothergov’ wording	64		standardpagestyle: Added headers for sigs	85
	standardpagestyle: Reversed folios location	85		Expanded headers for sigchi-a . . .	85
v1.11	General: Customization of ACM theorem styles and proof environment by Matthew Fluet . . .	30	v1.14	\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use	37
				\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use . .	37
v1.12	\@marginfigure: Now centering by default	47		General: \citestyle updates (Matthew Fluet)	30
	\@marginfigure: Now centering by default	47		Patched \citestyle	35
	\@parfont: Moved to \section@raggedright	90	v1.15	\@ACM@addtoaddress: Added macro	76
	\copyrightpermissionfootnoterule: Added macro	44		\@mkauthors@iii: New authors system	79
	\descriptionlabel: Redefined	49		\@shortauthors: Introduced macro .	85
	\footnoterule: Made shorter	44		\@typeset@author@bx: Moved to separate macro	79
	\if@ACM@natbib@override: Added macro	32		\acks: Added macro	95
	\if@ACM@newfonts: Added macro . .	45		\affiliation: Added code for author groups	57
	\maketitle: Moved thankses to copyrightpermission box	69		\author: Added code for author groups	57
	\section@raggedright: Introduced macro	90		\city: Added macro	76
	General: Added graceful behavior when libertine fonts are absent . .	45		\country: Added macro	76
	Documentation updates	30		\department: Added macro	76
v1.13	\@mpfootnotetext: Made minipage footnotes centered	40		\grantnum: Added macro	95
	\bibliographystyle: Redefined macro	41		\grantsponsor: Added macro	95
				\if@insideauthorgroup: Introduced macro	56
				\institution: Added macro	76
				\num@authorgroups: Renamed	56
				\orcid: Introduced macro	58
				\position: Added macro	76
				\postcode: Added macro	76
				\state: Added macro	76
				\streetaddress: Added macro	76

standardpagestyle: Better handling of anonymous mode	85	Include 'References' in PDF bookmarks (Matthew Fluet)	35
v1.16		v1.20	
\@headfootfont: Added macro	85	\@mkabstract: Deleted spurious space	82
General: Formatting header/footer (Matthew Fluet)	30	General: Bug fixes for bst	30
standardpagestyle: Customize header/footer text font	85	v1.21	
v1.17		\showeprint: Added macro	96
\@makefnmark: Redefined	40	v1.22	
\@mkauthors: TOG now uses the same authors block as other journals . . .	77	General: More bibliography changes for Aptara	30
\@mkauthors@ii: Deleted	79	v1.23	
\@mkbibcitation: Added \nobreak Changed format for sigs	83	General: Add PACMPL journal option	30
\acmArticle: The default is now numerical	59	v1.24	
\acmMonth: The default must be numerical. Closes #50.	60	General: Add IMWUT journal option	49
\acmNumber: The default is now numerical	59	v1.25	
\acmVolume: The default is now numerical	59	General: Updated PACMPL	49
\acmYear: The default is now numerical	60	v1.26	
\description: Decreased indent . . .	49	General: Corrected \shortcite bug .	30
\grantnum: Added url	95	Documentation typos fixed (thanks to Stephen Spencer)	30
\grantsponsor: Renamed	95	v1.27	
\if@ACM@printacmref: Renamed from \if@ACM@printbib	62	\if@ACM@printccs: Typo corrected .	61
General: Slightly decreased margins for sigs	42	v1.28	
standardpagestyle: Added paper title to sigs	85	\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato)	63
v1.18		General: Corrected option natbib behavior	37
\@mkauthors@i: Now we andify affiliations	78	Got rid of warnings in pdf keywords	40
\@typeset@author@line: Added macro	78	v1.29	
General: Natbib is now the default for all formats	30	\@mkabstract: Removed spurious indentation (John Wickerson) . . .	82
v1.19		\ccsdesc@parse: Add spacing after bullet and around rightarrow; semicolon separators no longer in bold/italic (John Wickerson)	63
\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet) . . .	82	General: Increased head to 13pt	42
\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet) . . .	95	standardpagestyle: Corrected printfolios (Matthew Fluet)	85
General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet)	30	v1.30	
		\department: Added optional parameter	76
		General: Added \frenchspacing	96
		Bibtex style now recognizes https:// in doi	30
		Switched to T1: looks like libertine has problems with \l in OT1	46
		Updated IMWUT and PACMPL	49

v1.31		\if@ACM@timestamp: Added macro (Michael D. Adams)	32
	\@additionalaffiliation: Added macro		58
	\@mkbibcitation: Disabled linebreak		83
	\@startsection: Added		
	\tochangmeasure		37
	Redefined macro		39
	\@textbottom: Redefined		45
	\acmMonth: The default now is the current month (Matteo Riondato)		60
	\acmYear: The default now is the current year (Matteo Riondato) . .		60
	\additionalaffiliation: Added macro		58
	\l@section: Redefined macro . .		40
	\l@subsection: Redefined macro		40
	General: Documentation changes . . .		30
v1.32			
	\@formatdoi: New doi format		66
	General: Added POMACS journal option		30
	Format siggraph is now obsolete .		30
v1.33			
	\@ACM@addtoaddress: Added obexpunctuation code		76
	\@mkauthors@i: Added obexpunctuation code		78
	\@mkauthors@iii: Added obexpunctuation code		79
	\@mkauthors@iv: Added obexpunctuation code		80
	\@subtitlefont: Added		
	\normalsize		74
	\ACM@linecountL: Renamed macro .		84
	\ACM@linecountR: Added macro . . .		84
	\ACM@timestamp: Added current page number		84
	Added macro (Michael D. Adams) .		84
	Added submission id		84
	\acmSubmissionID: Added macro . .		60
	\city: Added obexpunctuation code		76
	\country: Added obexpunctuation code		76
	\department: Added obexpunctuation code		76
	\if@ACM@affiliation@obexpunctuation: Added macro		58
	\if@ACM@authordraft: Added macro		33
	\if@ACM@natbib@override: Deleted macro		32
		\institution: Added obexpunctuation code	76
		\maketitle: Fixed the bug with figures on top and bottom of the title page, thanks to David Epstein	69
		\position: Added obexpunctuation code	76
		\postcode: Added obexpunctuation code	76
		\state: Added obexpunctuation code	76
		\streetaddress: Added obexpunctuation code	76
		General: Added acmart-preload-hook	30
		Added cmap and glyphunicode .	45
		BibTeX comma before articleno bug corrected	30
		BibTeX crossref bug corrected . . .	30
		BibTeX numpages bug corrected .	30
		Documentation updates	30
		Moved \citename definition for non-natbib bibliography, so a package may redefine it	41
		Switched to Type 1 fonts for libertine even if OTF-capable engine is used (Kai Mindermann) .	46
		firstpagestyle: Added right linecount for two-column formats	87
		Added timestamp (Michael D. Adams)	87
		standardpagestyle: Added right linecount for two-column formats	85
		Added timestamp (Michael D. Adams)	85
v1.34			
		\@mkbibcitation: Deleted DOI from doi numbers	83
		\ACM@linecount@bx: Rulers now are continuous	84
		\ACM@linecountL: Rulers now are continuous	84
		\ACM@linecountR: Rulers now are continuous	84
		\maketitle: Added date to the bibstrip in conf proceedings	69
		Deleted 'DOI' from doi numbers .	69
		Rearranged bibstrip	69
		The \terms command is now obsolete	69

	\terms: The \terms command now just produces a warning	61		\ACM@linecount@bx: Work around a bug in xcolor: looks like cmyk colors in boxes do not work	84
v1.35	\bibstyle@acmauthoryear: Square brackets for author-year style	37		\ccdesc@parse@finish: Added macro	63
	General: BibTeX bug fixed: et al.	30		\city: We now do not print this even in SIG	76
	If the copyright is set to usgov or rightsretained, the price is suppressed	64		\country: Fixed bugs with extra spaces	76
v1.36	\@ACM@authorsperrrow: Added macro	62		\l@section: Redefined macro	39
	\@mkauthors@iii: Added authorsperrrow override	79		\postcode: We now do not print this even in SIG	76
	\@mkauthors@iv: Added authorsperrrow override	80		\state: We now do not print this even in SIG	76
	\if@ACM@authordraft: Corrected typo, thanks to bargteil	33		\streetaddress: We now do not print this even in SIG	76
	General: Added PACMHCI journal options	49		General: Added 'textcase' package	35
	Added the possibility to adjust number of author boxes per row in conference formats	30		Added heightrounded to geometry	42
				Added new copyright version: licensedcagov	30
				Added package cleveref	30
				Added Ross Moore code for glyphtounicode	45
v1.37	\description: Reduce list indentation (Matthew Fluet)	49		Bibliography changes	30
	\descriptionlabel: Reduce list indentation (Matthew Fluet)	49	v1.41	General: Added new badges	30
	\normalparindent: Set \normalparindent (Matthew Fluet)	44	v1.42	General: Deleted ACM badges	30
	General: Reduce list indentation (Matthew Fluet)	48	v1.43	\@startsection: Added \makeatletter	39
	Set \normalparindent; Reduce list indentation (Matthew Fluet)	30		\country: Added comma before country for journals	76
v1.38			v1.44	\@acmBooktitle: Added macro	56
	General: Increase default font size for SIGPLAN	30, 34		\@acmEditors: Added macro	56
v1.39	\@authornotemark: Added macro	82		\@editorsAbbrev: Added macro	56
	\authornotemark: Added macro	59		\@folioblob: Suppress the blob if acmArticleSeq is empty	87
v1.40	\@copyrightowner: Added new copyright version: licensedcagov	65		\@mkbibcitation: If the paper has just one page, use 'page' instead of 'pages'	83
	\@copyrightpermission: Added new copyright version: licensedcagov	66		\ACM@restore@pagestyle: Added macro	88
	\@mkauthors@i: Switched to MakeTextUppercase	78		\acmArticle: The default is now empty	59
	\@parfont: Switched to MakeTextUppercase	90		\acmArticleSeq: Now acmArticle might be empty	60
				\acmBooktitle: Added macro	56
				\editor: Added macro	56

<code>\if@ACM@acmthm</code> : Added macro	31	v1.47	
<code>\maketitle</code> : Empty DOI or ISBN are not printed (by Michael Ekstrand)	69	v1.48	General: New journal: THRI 30
General: Added package <code>refcount</code>	30		<code>\@headfootfont</code> : Deleted unnecessary switch (Michael D. Adams) 85
Deleted package <code>cleveref</code>	30		<code>\@mkabstract</code> : Removed spurious indentation if abstract is followed by an empty line 82
Put theorem defs in a separate style	30		<code>\ACM@timestamp</code> : Formatting change (Michael D. Adams) 84
v1.45			<code>\if@ACM@review</code> : Review mode now switches on folios 31
<code>\@folioblob</code> : Switched			<code>\maketitle</code> : Added <code>acmart</code> and version info to <code>pdfcreator</code> tag . . . 69
<code>\bfseries\sffamily</code> to <code>\sffamily\bfseries</code>	87		Added language and <code>doctitle</code> attributes to PDF (Andreas Reichinger) 69
<code>\@parfont</code> : Switched			Suppressed empty DOI (Serguei Mokhov) 69
<code>\bfseries\sffamily</code> to <code>\sffamily\bfseries</code>	90		General: <code>\citeyear</code> no longer behaves like <code>\citeyearpar</code> 41
<code>\@titlefont</code> : Switched			Code prettying (Michael D. Adams) 30
<code>\bfseries\sffamily</code> to <code>\sffamily\bfseries</code>	73		Initial support for Biblatex (Daniel Thomas) 30
v1.46			Misc entries in the bibliography no longer produce a separate date . . 30
<code>\@mkauthorsaddresses</code> : Introduced macro	82		Typos fixed (Jamie Davis) 30
<code>\@mkbibcitation</code> : Added subtitle . .	83		v1.50
<code>\@printendtopmatter</code> : Made it <code>\par\bigskip</code> uniformly	83		<code>\@copyrightpermission</code> : New copyright statements for <code>iw3c2w3[g]</code> 66
<code>\@printtopmatter</code> : Deleted rule . . .	72		v1.51
<code>\@setauthorsaddresses</code> : Introduced macro	83		General: Corrected the bug with price suppression 64
<code>\ACM@linecount@bx</code> : Rearranged the code to get rid of spurious underfull messages (Benjamin Byholm)	84		Suppress price if the copyright is set to <code>iw3c2w3</code> or <code>iw3c2w3g</code> 64
<code>\author</code> : Started counting authors . .	57		XeTeX now uses OTF fonts (Joachim Breitner) 46
<code>\authorsaddresses</code> : Introduced macro	58		<code>firstpagestyle</code> : We now use journal abbreviation for footers 87
<code>\country</code> : Corrected spacing for institution	76		<code>standardpagestyle</code> : We now use journal abbreviation for footers . . 85
<code>\if@ACM@acmthm</code> : Modified description	31		v1.52
<code>\liningnums</code> : Workaround for compatibility with <code>fontspec</code>	46		<code>\@copyrightowner</code> : Rewording of licenses 65
<code>\maketitle</code> : Added authors' addresses	69		<code>\@copyrightpermission</code> : Another rewording of copyright statements for <code>iw3c2w3[g]</code> 66
Thankses go before authors' addresses	69		
<code>\num@authors</code> : Introduced macro . . .	56		
General: Added <code>etoolbox</code>	30		
Bst file bug fixes: label width is calculated correctly	30		
Delayed <code>hypersetup</code> since journal options may change screen mode	40		
PACM now set screen to true	49		
Restore theorem defs to class file . .	30		

v1.53		\author: Added submission id in	
	General: Added PACMCGIT, TIOT,	anonymous mode	57
	TDSCI	\if@ACM@nonacm: Added macro	32
v1.54		General: Added Ross's patch for	
	\@mkbibcitation: Bug corrected	sectioning	90
	(Ross Moore)	Deleted indent for subsubsection	90
	\@shortauthors: Added submission	XeTeX now uses T1 encoding	46
	id in anonymous mode		
	\ACM@NR@adjustedSectionformat:	v1.55	
	Added macro	\@mkbibcitation: Bug corrected	83
	\ACM@NRadjust: Added macro	General: Typo corrected (Zack	
	\ACM@adddotafter: Added macro	Weinberg)	35

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		
\backslash \$	1649, 1653	\backslash ACM@sigchiamodefals
\backslash @	1403, 1415, 1418, 1421, 1426, 1506, 1527, 1540	150
\backslash @authornotemark	..	\backslash ACM@sigchiamodetrue
	1204, 2127	170
\backslash @par	329, 386	\backslash ACM@timestamptrue
\backslash @ACM@addtoaddress	..	121
	1887, 1910, 1911, 1913	\backslash ACM@title@width
\backslash @ACM@authorsperrow	..	1234,
	1275, 2018, 2019, 2067, 2068	1824, 1826, 1827, 1830, 1831, 1839, 1853, 1855, 1856, 1864
\backslash @ACM@badge@skip	...	\backslash DeclareACMFormat
	1235, 1750, 1827, 1831, 1837, 1846, 1856, 1862, 1871	..
\backslash @ACM@badge@width	..	38, 39, 40, 41, 42, 43, 44, 45, 46, 47
	1232, 1749, 1754, 1826, 1830, 1836, 1848, 1855, 1857, 1860, 1872, 1875	\backslash M
\backslash @ACM@badgefalse	...	329, 368, 386, 395
\backslash @ACM@badgetrue	1237, 1242	\backslash abstract
\backslash @ACM@commabox	...	1254, 2136, 2143
	1887, 1891, 1892	\backslash acmArticle
\backslash @ACM@journalfalse	..	1210, 1213, 1648, 2152, 2153, 2239, 2242, 2261, 2271, 2282, 2340, 2357, 2367, 2377
	161, 163, 165, 167, 169	\backslash acmArticlePage
\backslash @ACM@journaltrue	..	...
	153, 155, 157, 159	2238, 2255, 2256, 2265, 2268, 2275, 2279
\backslash @ACM@labelwidth	...	\backslash acmArticleSeq
	730, 733, 741, 746, 772	1212, 2323
\backslash @ACM@manuscriptfalse	148	\backslash acmBadgeL@image
\backslash @ACM@manuscripttrue	146	...
\backslash @ACM@newfontfalse	...	1244, 1246, 1747, 1749, 1825, 1834, 1836, 1858, 1860
	631, 634, 637	\backslash acmBadgeL@url
\backslash @ACM@newfontstrue	628	1243, 1245, 1748, 1835, 1859
\backslash @ACM@printacmreffalse	...	\backslash acmBadgeR@image
	85	...
\backslash @ACM@printfoliostrue	68	1239, 1241, 1752, 1754, 1829, 1845, 1848, 1873, 1875
\backslash @ACM@reviewtrue	122	\backslash acmBadgeR@url
\backslash @ACM@screenttrue	...	1238, 1240, 1753, 1847, 1874
	854, 883, 889, 895, 901	\backslash acmBooktitle
		...
		1084, 1638, 2168
		\backslash acmDOI
		1228, 1640, 1643, 1650, 1654, 2176
		\backslash acmEditors
		1089, 1090, 1091, 1094, 2169, 2170
		\backslash acmISBN
		1226, 1652
		\backslash acmMonth
		1216, 1218, 1648
		\backslash acmNumber
		1208, 2165, 2261, 2271, 2282, 2357, 2367, 2377
		\backslash acmPrice
		1222, 1649, 1653
		\backslash acmPubDate
		1218, 2165, 2261, 2271, 2282, 2358, 2368, 2378
		\backslash acmSubmissionID
		...
		1113, 1114, 1129, 1130, 1224, 2220, 2221, 2231
		\backslash acmVolume
		1206, 2165, 2260, 2270, 2281, 2356, 2366, 2376
		\backslash acmYear
		1214, 1221, 1559, 1648, 2156
		\backslash acmdefinitionbodyfont
		...
		2540, 2552, 2564
		\backslash acmdefinitionheadfont
		...
		2542, 2554, 2566
		\backslash acmdefinitionindent
		...
		2541, 2553, 2565
		\backslash acmdefinitionnotefont
		...
		2543, 2555, 2569
		\backslash acmownedfalse
		1354, 1357, 1360, 1366, 1370, 1373, 1376, 1379, 1385, 1388, 1392
		\backslash acmownedtrue
		...
		1341, 1350, 1382
		\backslash acmplainbodyfont
		...
		2510, 2522, 2534
		\backslash acmplainheadfont
		...
		2512, 2524, 2536
		\backslash acmplainindent
		...
		2511, 2523, 2535
		\backslash acmplainnotefont
		...
		2513, 2525, 2539
		\backslash @adddotafter
		...
		2417, 2418, 2420, 2432, 2447, 2451, 2507
		\backslash @additionalaffiliation
		...
		1155, 1156

<code>\@addpunct</code>	2112, 2113, 2115, 2116, 2117, 2118, 2119, 2120, 2122, 2179, 2180, 2507, 2508, 2619	<code>\@concepts</code>	1312, 1322, 1664, 1666, 1687	2176, 2220, 2231, 2513, 2543, 2632, 2649	
<code>\@addspaceafter</code>	2491, 2496, 2508	<code>\@copyrightowner</code>	1397, 1624	<code>\@endfloatbox</code>	697
<code>\@affiliationfont</code>	1940, 1945, 1949, 1952, 1955, 1958, 1961, 1964, 1992, 2010	<code>\@copyrightpermission</code>	1435, 1616	<code>\@endpfalse</code>	2621
<code>\@afterheading</code>	360, 1695	<code>\@copyrightyear</code>	1558, 1624, 1626	<code>\@endwidefloatbox</code>	697, 705
<code>\@afterindentfalse</code>	306, 1694	<code>\@currbox</code>	711, 712, 713	<code>\@finalstrut</code>	418, 431
<code>\@afterindenttrue</code>	304	<code>\@currentaffiliation</code>	2011, 2014, 2036, 2043, 2044, 2046, 2048, 2049, 2053, 2079, 2086, 2087, 2089, 2091, 2092, 2096	<code>\@float</code>	699
<code>\@article@string</code>	2152, 2165, 2173	<code>\@currentaffiliations</code>	1969, 1970, 1971, 1973, 1976, 1988, 1989, 1994	<code>\@flushglue</code>	2456
<code>\@author</code>	1112, 1117, 1122, 1978, 2037, 2080, 2121	<code>\@currentauthors</code>	1967, 1968, 1975, 1979, 1980, 1982, 2010, 2013, 2035, 2037, 2038, 2040, 2078, 2080, 2081, 2083, 2126, 2127	<code>\@fnsymbol</code>	1579
<code>\@authorfont</code>	1939, 1944, 1948, 1951, 1954, 1957, 1960, 1963, 1980, 2010	<code>\@currentlabel</code>	413, 427	<code>\@folio@ht</code>	2303, 2330, 2336, 2337
<code>\@authornotemark</code>	1196, 1202, 2126	<code>\@dblarg</code>	315	<code>\@folio@max</code>	2303, 2326, 2327
<code>\@authornotes</code>	1193, 1197, 1592	<code>\@dblfloat</code>	695	<code>\@folio@voffset</code>	2303, 2332
<code>\@authorsaddresses</code>	1172, 1600, 2180	<code>\@department</code>	1159, 1160	<code>\@folio@wd</code>	2303, 2337, 2338, 2363, 2373
<code>\@auxout</code>	492	<code>\@dotsep</code>	2509	<code>\@folioblob</code>	2323, 2360, 2362, 2370, 2371
<code>\@begindocumenthook</code>	488	<code>\@editorsAbbrev</code>	1088, 1093, 2170	<code>\@footnotemark</code>	434, 1577
<code>\@botnum</code>	1582	<code>\@empty</code>	172, 319, 1079, 1090, 1110, 1113, 1127, 1129, 1134, 1135, 1141, 1293, 1294, 1300, 1307, 1312, 1596, 1600, 1640, 1649, 1652, 1653, 1654, 1664, 1669, 1719, 1747, 1752, 1825, 1829, 1834, 1842, 1845, 1858, 1866, 1873, 1883, 1969, 1979, 1987, 1988, 2037, 2043, 2048, 2080, 2086, 2091, 2129, 2152, 2157, 2169,	<code>\@footnotemark@nolink</code>	434, 1577
<code>\@citestyle</code>	238	<code>\@empty</code>	172, 319, 1079, 1090, 1110, 1113, 1127, 1129, 1134, 1135, 1141, 1293, 1294, 1300, 1307, 1312, 1596, 1600, 1640, 1649, 1652, 1653, 1654, 1664, 1669, 1719, 1747, 1752, 1825, 1829, 1834, 1842, 1845, 1858, 1866, 1873, 1883, 1969, 1979, 1987, 1988, 2037, 2043, 2048, 2080, 2086, 2091, 2129, 2152, 2157, 2169,	<code>\@footnotetext</code>	409, 435, 1578
<code>\@classname</code>	25, 27, 35, 51, 53, 54, 59, 61, 62, 67, 70, 71, 76, 78, 79, 84, 90, 91, 96, 98, 99, 104, 106, 107, 112, 114, 115, 120, 124, 125, 136, 141, 194, 629, 632, 635, 855, 884, 890, 896, 902, 1064, 1066, 1154, 1249, 1259, 1261, 1262, 1265, 1267, 1268, 1271, 1273, 1274, 1276, 1277, 2149	<code>\@editorsAbbrev</code>	1088, 1093, 2170	<code>\@footnotetext@nolink</code>	435, 1578
<code>\@clubpenalty</code>	374	<code>\@empty</code>	172, 319, 1079, 1090, 1110, 1113, 1127, 1129, 1134, 1135, 1141, 1293, 1294, 1300, 1307, 1312, 1596, 1600, 1640, 1649, 1652, 1653, 1654, 1664, 1669, 1719, 1747, 1752, 1825, 1829, 1834, 1842, 1845, 1858, 1866, 1873, 1883, 1969, 1979, 1987, 1988, 2037, 2043, 2048, 2080, 2086, 2091, 2129, 2152, 2157, 2169,	<code>\@for</code>	214

<code>\@journalCode</code>	778, 855, 884, 890, 896, 902, 1064	<code>\@em</code>	317	863, 867, 871, 875, 882, 888, 894, 900,
<code>\@journalCode@nr</code>	778, 836, 1069	<code>\@makefnmark</code>	408,	906, 910, 917, 921,
<code>\@journalName</code>	838, 842, 846, 850, 857, 861, 865, 869, 873, 877, 880, 886, 892, 898, 904, 908, 912, 915, 919, 923, 925, 927, 931, 933, 937, 941, 945, 949, 953, 957, 961, 965, 969, 973, 977, 981, 985, 989, 993, 997, 1000, 1004, 1007, 1012, 1016, 1020, 1024, 1028, 1032, 1036, 1040, 1044, 1048, 1052, 1056, 1060, 1070, 1071, 1636	<code>\@makefntext</code>	408, 417, 430, 1595	929, 935, 939, 943, 947, 951, 955, 959, 963, 967, 971, 975, 979, 983, 987, 991, 995, 998, 1002, 1009, 1014, 1018, 1022, 1026, 1030, 1034, 1038, 1042, 1046, 1050, 1054, 1058, 1062, 1072, 1648
<code>\@journalNameShort</code>	839, 843, 847, 852, 858, 862, 866, 870, 874, 878, 881, 887, 893, 899, 905, 909, 913, 916, 920, 928, 934, 938, 942, 946, 950, 954, 958, 962, 966, 970, 974, 978, 982, 986, 990, 994, 1001, 1005, 1008, 1013, 1017, 1021, 1025, 1029, 1033, 1037, 1041, 1045, 1049, 1053, 1057, 1061, 1071, 2164, 2260, 2270, 2281, 2356, 2366, 2376	<code>\@marginfigure</code>	687, 688	<code>\@permissionCodeTwo</code>
<code>\@keywords</code>	1251, 1669, 1675, 1688	<code>\@marginable</code>	690, 691	1010, 1073
<code>\@latex@error</code>	282	<code>\@minipagefalse</code>	608, 707	<code>\@plus</code>
<code>\@empty</code>	1256, 2136	<code>\@minus</code>	2437, 2441, 2445, 2449, 2453, 2484, 2489, 2494, 2531, 2533, 2561, 2563	395, 403, 612, 2437, 2441, 2445, 2449, 2453, 2484, 2489, 2494, 2530, 2532, 2560, 2562, 2616
<code>\@listI</code>	754, 758	<code>\@mkabstract</code>	1662, 2135	<code>\@printcopyrightfalse</code>
<code>\@listi</code>	751, 758	<code>\@mkauthors</code>	1585, 1587, 1915	1353, 1365
<code>\@listii</code>	759	<code>\@mkauthors@i</code>	1919, 1921, 1923, 1925, 1974	<code>\@printcopyrighttrue</code>
<code>\@listiii</code>	762	<code>\@mkauthors@ii</code>	2004	1337, 1349
<code>\@listiv</code>	764	<code>\@mkauthors@iii</code>	1927, 1929, 1931, 1933, 2015	<code>\@printendtopmatter</code>
<code>\@listv</code>	766	<code>\@mkauthors@iv</code>	1935, 2064	1693, 2178
<code>\@listvi</code>	768	<code>\@mkauthorsaddresses</code>	1173, 2106	<code>\@printpermissionfalse</code>
		<code>\@mkbibcitation</code>	1682, 2145	1352
		<code>\@mkteasers</code>	1585, 2128	<code>\@printpermissiontrue</code>
		<code>\@mktitle</code>	1585, 1759	1339, 1348, 1364
		<code>\@mktitle@i</code>	1762, 1764, 1766, 1768, 1823	<code>\@printtopmatter</code>
		<code>\@mktitle@ii</code>	1851	1586, 1718
		<code>\@mktitle@iii</code>	1770, 1772, 1774, 1776, 1851	<code>\@proofindent</code>
		<code>\@mktitle@iv</code>	1778, 1879	2600, 2610, 2618
		<code>\@mpargs</code>	611	<code>\@proofnamefont</code>
		<code>\@mparswitchfalse</code>	573	2599, 2609, 2619
		<code>\@mpfootins</code>	422, 423, 603, 604, 606	<code>\@received</code>
		<code>\@mpfootnotetext</code>	421	1295, 1297, 1300, 1301, 1303, 1307, 1308
		<code>\@ne</code>	240, 244, 248, 250, 478, 2186, 2191, 2195	<code>\@rightskip</code>
		<code>\@nil</code>	259	2456, 2457
		<code>\@nbreakfalse</code>	362, 402	<code>\@saveabstract</code>
		<code>\@noskipsecfalse</code>	366	1253, 1254
		<code>\@noskipsectrue</code>	363	<code>\@saveteaser</code>
		<code>\@pages@word</code>	2146, 2166, 2173	1561, 1562
		<code>\@par</code>	1598, 1604	<code>\@secCNTformat</code>
		<code>\@parboxrestore</code>	426	322, 379
		<code>\@parfont</code>	2451, 2455, 2460	<code>\@secfont</code>
		<code>\@permissionCodeOne</code>	840, 844, 848, 853, 859,	2439, 2460
				<code>\@secpenalty</code>
				311
				<code>\@sect</code>
				315, 316
				<code>\@setaddresses</code>
				2125
				<code>\@setauthorsaddresses</code>
				1604, 2180
				<code>\@setthanks</code>
				1598, 2179

\@shortauthors	\@tempc . 260, 261, 263,	acks (environment) 22
. . . . 2228 , 2249 ,	265 , 267 , 269 , 271 , 273	\ACM@adddotafter
2257 , 2265 , 2275 , 2287	\@tempcnta . 2323, 2324,	. . . . . 2418 , 2435
\@sidebar 684 , 685	2326 , 2327 , 2329 , 2331	\acm@copyrightinput 1343
\@specialsection	\@tempdimA	\acm@copyrightmode
1665 , 1671 , 1673 , 1697	2330 , 2331 , 2332 , 2334	. . . . 1343 , 1351 ,
\@ssect 314 , 380	\@tempskipA	1356 , 1359 , 1363 ,
\@startPage 1247 ,	303 , 305 , 306 , 311 ,	1369 , 1372 , 1375 ,
1719 , 1720 , 1722 , 2225	324 , 325 , 356 , 357 ,	1378 , 1381 , 1384 ,
\@startsection	359 , 371 , 372 , 381 , 382	1387 , 1391 , 1398 , 1436
. . . . 300 , 392 , 2436 ,	\@textbottom 612	\ACM@fontsize
2440 , 2444 , 2448 ,	\@textsuperscript	128 , 172 , 175 , 177 ,
2452 , 2483 , 2488 , 2493	. . . . 433 , 1584 , 1589	179 , 181 , 183 , 185 ,
\@starttoc 392	\@texttop 613	187 , 189 , 191 , 194 , 195
\@subparfont 2496 , 2497	\@thefnmark 414 , 428 ,	\ACM@format 32 , 136
\@subsecfont 2443 , 2460	433 , 1584 , 1589 , 1594	\ACM@format@nr 32 , 136 ,
\@subsubsecfont 2447 , 2460	\@title 1176 , 1686 ,	140 , 145 , 151 , 173 ,
\@subtitle 1096 , 1185 ,	1841 , 1865 , 1882 , 2156	444 , 513 , 578 , 663 ,
1842 , 1843 , 1866 ,	\@titlefont 1781 , 1833 ,	715 , 1698 , 1726 ,
1867 , 1883 , 1884 , 2157	1840 , 1852 , 1864 , 1880	1760 , 1782 , 1803 ,
\@subtitelfont	\@titlenotes	1917 , 1941 , 2245 ,
1802 , 1843 , 1867 , 1884	1174 , 1178 , 1181 , 1590	2310 , 2347 , 2388 ,
\@subtitlenotes	\@tochangmeasure 333 , 346	2465 , 2514 , 2544 , 2601
1183 , 1187 , 1190 , 1591	\@toclevel 317	\ACM@linecount
\@svsec 319 , 322 , 328 , 343	\@tocline 405 , 406 , 407	. . . . 2185 , 2186 ,
\@svsechd 341 , 369 , 389	\@topnum 1580	2190 , 2191 , 2194 , 2195
\@teaser 1562 , 2130	\@typeset@author@bx	\ACM@linecount@bx
\@teaserfigures . . . .	. . . . . 2008,	. . . . 2182 , 2201 , 2208
1560 , 1562 , 2129 , 2133	2057 , 2063 , 2100 , 2105	\ACM@linecount@bxht
\@tempa 214 ,	\@typeset@author@line	2184 , 2189 , 2192 , 2193
215 , 217 , 219 , 221 ,	1966 , 1977 , 1999 , 2001	\ACM@linecountL
223 , 225 , 227 , 229 ,	\@undefined 488 , 648	. . . . 2197 , 2247 ,
231 , 233 , 235 , 237 ,	\@width 592 , 599	2250 , 2255 , 2258 ,
239 , 241 , 243 , 245 ,	\@exp 399 , 400	2264 , 2266 , 2274 ,
247 , 249 , 251 , 253 ,	\@xsect 354 , 355 , 391	2276 , 2286 , 2289 ,
255 , 257 , 259 , 262 ,	\@ 509 , 1113 , 1624 ,	2349 , 2360 , 2361 ,
264 , 266 , 268 , 270 ,	1629 , 1644 , 1649 ,	2371 , 2372 , 2380 , 2383
272 , 1133 , 1134 ,	1653 , 2148 , 2156 , 2190	\ACM@linecountR
1292 , 1293 , 1987 ,	\@{ 222	. . . . 2204 , 2277 , 2279 ,
2632 , 2648 , 2649 , 2651	\}@ 222	2287 , 2292 , 2381 , 2384
\@tempb 215 , 217 ,	\@_ 1087 , 1318 , 1328 ,	\ACM@mk@linecount
219 , 221 , 223 , 225 ,	1624 , 1626 , 1649,	. . . . 2187 , 2199 , 2206
227 , 229 , 231 , 233 ,	2152 , 2153 , 2171 , 2225	\ACM@NR@adjustedSectionformat
235 , 237 , 239 , 241,		. . . . . 2415 , 2424
243 , 245 , 247 , 249 ,		\ACM@NRadjust
251 , 253 , 255 , 257,		. . . . 2406 , 2439 ,
262 , 264 , 266 , 268 ,		2443 , 2447 , 2451 , 2455
270 , 272 , 2650 , 2651		\ACM@ps@headings
\@tempboxa 611		. . . . . 2400 , 2404

<code>\ACM@ps@myheadings</code>	1196, 1202, 1204, 2001, 2063, 2105, 2123	<code>\authorsaddresses</code> <u>13</u> , <u>1172</u>
<code>\ACM@ps@plain</code>	2398, 2402	B
<code>\ACM@restore@pagestyle</code>	2398	<code>\baselineskip</code>
<code>\ACM@sect@format</code>	2425, 2427	. . . . . 1614, 1835, 1847, 1859, 1874, 2192, 2437, 2438, 2441, 2442, 2445, 2449, 2484, 2485, 2489, 2494, 2530, 2531, 2532, 2533, 2560, 2561, 2562, 2563
<code>\ACM@sect@format@</code>	2414, 2427, 2429	<code>\begin</code> . 20, 2200, 2207, 2333
<code>\ACM@sect@format@null</code>	2428, 2429	<code>\beginingroup</code> 326, 369, 383, 392, 477, 1576, 1915, 2407, 2624
<code>\ACM@timestamp</code>	2211, 2299, 2389, 2394	<code>\bfseries</code> . . 770, 1610, 1784, 1786, 1788, 1792, 1794, 1796, 1798, 1800, 1960, 1963, 2154, 2340, 2460, 2461, 2475, 2476, 2478, 2479, 2481, 2482, 2487, 2492, 2500, 2501, 2504, 2505, 2524, 2554
<code>\acmArticle</code>	14, <u>1210</u>	<code>\bgroup</code>
<code>\acmArticleSeq</code>	14, <u>1212</u>	. . . . . 685, 688, 691, 696, 1156, 1664, 1669, 2008, 2102, 2111, 2130, 2135, 2145, 2155
<code>\acmBadgeL</code>	15, <u>1242</u>	<code>\bibfont</code> 212
<code>\acmBadgeR</code>	15, <u>1237</u>	<code>\bibliofont</code> 212
<code>\acmBooktitle</code>	8, <u>1084</u>	<code>\bibliographystyle</code> . <u>487</u>
<code>\acmConference</code>	8, <u>1074</u>	<code>\bibsection</code> 208
<code>\acmConference@date</code>	1077, 1620, 2290, 2292	<code>\bibstyle</code> 236, 238, 280, <u>492</u>
<code>\acmConference@name</code>	1076, 1085, 1086	<code>\bibstyle@acmauthoryear</code> <u>286</u>
<code>\acmConference@shortname</code>	1075, 1079, 1080, 1086, 1087, 1620, 2289, 2291	<code>\bibstyle@acmnumeric</code> <u>292</u>
<code>\acmConference@venue</code>	1078, 1620, 2290, 2292	<code>\bigskip</code> . . 1308, 1744, 1850, 1878, 1886, 2063, 2105, 2130, 2178
<code>\acmdefinition</code>	2559	<code>\box</code> 712, 1728, 1730, 1732, 1734, 1736, 1738, 1740, 1742, 1744, 2000, 2012, 2061, 2132
<code>\acmDOI</code>	15, <u>1228</u>	C
<code>\acmISBN</code>	14, <u>1226</u>	<code>\c@footnote</code> 1579
<code>\acmJournal</code>	7, <u>1068</u>	
<code>\acmMonth</code>	14, <u>1216</u>	
<code>\acmNumber</code>	14, <u>1208</u>	
<code>\acmplain</code>	2529	
<code>\acmPrice</code>	14, <u>1222</u> , 1361, 1367, 1389, 1393	
<code>\acmSubmissionID</code>	14, <u>1224</u>	
<code>\acmVolume</code>	14, <u>1206</u>	
<code>\acmYear</code>	14, <u>1214</u>	
<code>\addcontentsline</code> 210,	210, 335, 348, 2137, 2626	
<code>\additionalaffiliation</code>	10, <u>1155</u>	
<code>\addpenalty</code>	311	
<code>\addresses</code>	1110, 1112, 1117, 1122, 1151, 1169,	
<code>\addtolength</code>	739, 740, 741, 745, 746, 2192	
<code>\addvspace</code>	311, 403	
<code>\advance</code>	755, 760, 763, 765, 767, 769, 1105, 1107, 1826, 1827, 1830, 1831, 1855, 1856, 2017, 2034, 2066, 2077, 2191, 2195, 2327, 2329, 2332	
<code>\affiliation</code>	9, 1148, 1986, 2048, 2091	
<code>\and</code>	1094, 1122, 1123, 1138, 1144, 1977, 1982, 1984, 1994, 1999, 2008, 2042, 2057, 2063, 2085, 2100, 2105, 2120	
<code>\anonsuppress</code> (environ- ment)	21	
<code>\AtBeginDocument</code>	68, 85, 481, 489, 731, 1361, 1367, 1389, 1393, 2405, 2430	
<code>\AtEndDocument</code>	1306	
<code>\AtEndPreamble</code>	457, 649, 2571, 2633	
<code>\author</code>	9, 1104, 1573, 1574, 2150	
<code>\author@bx</code> 2004, 2009, 2012		
<code>\author@bx@sep</code>	2006, 2012, 2017, 2034, 2066, 2077	
<code>\author@bx@wd</code>	2005, 2008, 2016, 2017, 2019, 2025, 2027, 2029, 2031, 2034, 2065, 2066, 2068, 2074, 2077	
<code>\authornote</code>	13, 1155, <u>1194</u> , 2151	
<code>\authornotemark</code>	13, <u>1200</u>	
<code>\authors</code>	1115, 1118, 1123, 1677, 1679, 1685, 2156	

<code>\c@secnumdepth</code>	<code>\color@endgroup</code>	591, 598, 600, 612,
318, 332, 336, 345, 349	. . . . . 419, 432, 609	685, 688, 691, 696,
<code>\captionsetup</code>	<code>\columnwidth</code> 425,	698, 702, 705, 723,
. . . . 655, 657, 659,	592, 696, 2065, 2102	724, 725, 726, 754,
661, 670, 672, 675,	<code>\contentsnamefont</code> . . 396	759, 762, 764, 766,
678, 685, 688, 691, 2131	<code>\copy</code> 1892	768, 838, 839, 840,
<code>\ccdesc@parse@finish</code> <u>1335</u>	<code>\copyright</code> 1624	842, 843, 844, 846,
<code>\ccsdesc</code> <u>15</u> , <u>1313</u>	<code>\copyrightpermissionfootnoterule</code>	847, 848, 850, 852,
<code>\ccsdesc@parse</code> <u>1314</u> , <u>1315</u>	. . . . . <u>591</u>	853, 857, 858, 859,
<code>\ccsdesc@parse@end</code> .	<code>\copyrightyear</code> . . <u>16</u> , <u>1558</u>	861, 862, 863, 865,
. <u>1314</u> , <u>1335</u>	<code>\country</code> <i>II</i> , <u>1165</u> , <u>1895</u> , <u>2119</u>	866, 867, 869, 870,
<code>\ccsdesc@parse@finish</code>	<code>\csname</code>	871, 873, 874, 875,
. <u>1334</u> , <u>1335</u>	280, 331, 333, 337,	877, 878, 880, 881,
CCSXML (environment) . . <u>15</u>	344, 346, 350, 379,	882, 886, 887, 888,
<code>\centering</code> <u>396</u> , <u>429</u> , <u>508</u> ,	399, 400, 414, 428,	892, 893, 894, 898,
689, 692, 1852,	1317, 1318, 1320,	899, 900, 904, 905,
1864, 2009, 2062, 2339	1321, 1322, 1323,	906, 908, 909, 910,
<code>\cite</code> <u>470</u> , <u>471</u> , <u>482</u> , <u>486</u>	1324, 1327, 1329,	912, 913, 915, 916,
<code>\citeA</code> 476	1690, 1692, 2408, 2431	917, 919, 920, 921,
<code>\citealt</code> 475	<code>\CurrentOption</code> . 129,	923, 925, 927, 928,
<code>\citeANP</code> 472	130, 131, 132, 133, 134	929, 931, 933, 934,
<code>\citeauthor</code> 472		935, 937, 938, 939,
<code>\citeN</code> 470	D	941, 942, 943, 945,
<code>\citename</code> 483	<code>\day</code> 2223	946, 947, 949, 950,
<code>\citeNN</code> 473	<code>\DeclareNewFootnote</code>	951, 953, 954, 955,
<code>\citeNP</code> 475	. . . . . 595, 597	957, 958, 959, 961,
<code>\citet</code> 471	<code>\DeclareOptionX</code>	962, 963, 965, 966,
<code>\citestyle</code> <u>23</u> , <u>278</u> , <u>298</u>	. . . . . 38, 129,	967, 969, 970, 971,
<code>\citeyear</code> 474	130, 131, 132, 133, 134	973, 974, 975, 977,
<code>\citeyearNP</code> 474	<code>\DeclareRobustCommand</code>	978, 979, 981, 982,
<code>\citeyearpar</code> <u>473</u> , <u>486</u>	. . . . . 476, 2427	983, 985, 986, 987,
<code>\city</code> . . <i>II</i> , <u>1162</u> , <u>1895</u> , <u>2116</u>	<code>\DeclareTextFontCommand</code>	989, 990, 991, 993,
<code>\ClassError</code> . . . . .	. . . . . 650	994, 995, 997, 998,
. . . . 35, 1066, 1154,	<code>\def</code> 25, 38,	1000, 1001, 1002,
1262, 1268, 1274, 2149	128, 175, 177, 179,	1004, 1005, 1007,
<code>\ClassInfo</code>	181, 183, 185, 187,	1008, 1009, 1010,
. . . . 136, 194, 1064,	189, 191, 215, 217,	1012, 1013, 1014,
1259, 1261, 1265,	219, 221, 223, 225,	1016, 1017, 1018,
1267, 1271, 1273, 1276	227, 229, 231, 233,	1020, 1021, 1022,
<code>\ClassWarning</code>	235, 237, 239, 240,	1024, 1025, 1026,
. . . . 27, 141, 629,	241, 242, 243, 244,	1028, 1029, 1030,
632, 635, 1249, 1277	245, 246, 247, 248,	1032, 1033, 1034,
<code>\cleaders</code> 1892	249, 251, 253, 255,	1036, 1037, 1038,
<code>\clubpenalty</code> 368, 374	257, 258, 262, 264,	1040, 1041, 1042,
<code>\CodelineIndex</code> 17	266, 268, 270, 272,	1044, 1045, 1046,
<code>\Collect@Body</code> 684,	300, 316, 341, 355,	1048, 1049, 1050,
687, 690, 1253, 1561	379, 380, 389, 392,	1052, 1053, 1054,
<code>\color</code> 1612, 2190, 2194	405, 406, 407, 408,	1056, 1057, 1058,
<code>\color@begingroup</code> 416, 429	410, 421, 433, 438,	1060, 1061, 1062,
<code>\color@endbox</code> 710	439, 440, 441, 487,	1068, 1069, 1070,

1071, 1072, 1073,	2228, 2233, 2238,	2011, 2105, 2124,
1084, 1088, 1089,	2309, 2316, 2321,	2131, 2144, 2156, 2177
1090, 1096, 1133,	2323, 2401, 2406,	<code>\else</code> . . . 52, 60, 69, 77,
1155, 1156, 1157,	2410, 2412, 2414,	89, 97, 105, 113,
1158, 1159, 1160,	2424, 2428, 2435,	123, 147, 260, 281,
1171, 1172, 1174,	2456, 2460, 2461,	310, 317, 320, 332,
1175, 1183, 1184,	2462, 2463, 2469,	336, 340, 345, 349,
1193, 1194, 1206,	2470, 2472, 2473,	361, 373, 388, 464,
1208, 1210, 1212,	2475, 2476, 2478,	480, 486, 488, 603,
1214, 1216, 1218,	2479, 2481, 2482,	642, 660, 1086,
1222, 1224, 1226,	2487, 2492, 2497,	1092, 1106, 1113,
1228, 1238, 1239,	2500, 2501, 2504,	1116, 1120, 1121,
1240, 1241, 1243,	2505, 2507, 2508,	1129, 1132, 1137,
1244, 1245, 1246,	2510, 2511, 2512,	1140, 1143, 1150,
1247, 1249, 1251,	2513, 2522, 2523,	1168, 1180, 1189,
1254, 1256, 1279,	2524, 2525, 2540,	1195, 1203, 1260,
1291, 1292, 1316,	2541, 2542, 2543,	1266, 1272, 1283,
1335, 1395, 1397,	2552, 2553, 2554,	1286, 1296, 1299,
1434, 1435, 1558,	2555, 2599, 2600,	1302, 1307, 1326,
1560, 1562, 1571,	2609, 2610, 2630,	1330, 1331, 1567,
1584, 1589, 1598,	2632, 2648, 2649, 2650	1585, 1596, 1600,
1604, 1697, 1718,	<code>\define@boolkey</code>	1601, 1608, 1615,
1759, 1781, 1802,	49, 57, 65, 74, 82,	1618, 1619, 1625,
1823, 1851, 1879,	94, 102, 110, 118,	1630, 1637, 1642,
1888, 1895, 1896,	1153, 1257, 1263, 1269	1645, 1646, 1649,
1898, 1899, 1900,	<code>\define@choicekey</code> . .	1651, 1652, 1653,
1901, 1903, 1905,	. . . . . 32, 778, 1342	1654, 1664, 1669,
1906, 1909, 1912,	<code>\define@cmdkey</code> 1275	1672, 1721, 1747,
1915, 1939, 1940,	<code>\definecolor</code>	1752, 1825, 1829,
1944, 1945, 1948,	. . . 496, 497, 498,	1834, 1842, 1845,
1949, 1951, 1952,	499, 500, 501, 502, 503	1858, 1866, 1873,
1954, 1955, 1957,	<code>\department</code>	1883, 1889, 1890,
1958, 1960, 1961,	. 11, 1159, <u>1895</u> , 2118	1903, 1904, 1905,
1963, 1964, 1966,	<code>\description</code> <u>771</u>	1906, 1908, 1909,
1968, 1973, 1974,	<code>\descriptionlabel</code> <u>770</u> , <u>773</u>	1912, 1969, 1981,
1975, 1976, 1978,	<code>\dimexpr</code> . . 694, 712, 2296	1987, 1993, 2009,
1985, 1986, 1987,	<code>\divide</code> 2019, 2025, 2027,	2020, 2030, 2039,
2008, 2015, 2037,	2029, 2031, 2068, 2074	2045, 2052, 2069,
2043, 2048, 2064,	<code>\do</code> 214	2073, 2082, 2088,
2080, 2086, 2091,	<code>\DocInput</code> 21	2095, 2108, 2110,
2106, 2112, 2113,	<code>\documentclass</code> 9	2129, 2136, 2140,
2114, 2115, 2116,	<code>\dots</code> 1653	2146, 2152, 2157,
2117, 2119, 2120,		2158, 2167, 2169,
2121, 2122, 2125,		2176, 2220, 2231,
2126, 2127, 2128,	E	2232, 2241, 2251,
2130, 2135, 2145,	<code>\edef</code> 129, 130, 131, 132, 317	2259, 2269, 2280,
2146, 2147, 2148,	<code>\editor</code> 9, <u>1090</u>	2284, 2288, 2324,
2149, 2152, 2156,	<code>\egroup</code> 610, 686,	2351, 2355, 2365,
2178, 2179, 2180,	689, 692, 703, 709,	2375, 2382, 2390,
2187, 2197, 2204,	1166, 1666, 1675,	2393, 2411, 2435,

	2632, 2637, 2644, 2652	\fancyfoot	2252,	1333, 1355, 1358,
\email	9, <u>1167</u> ,		2260, 2270, 2281,	1362, 1368, 1371,
	1985, 2043, 2086, 2122		2285, 2299, 2350,	1374, 1377, 1380,
\emph	1636, 1638		2352, 2356, 2366,	1383, 1386, 1390,
\empty	2239		2376, 2385, 2389, 2394	1394, 1433, 1557,
\EnableCrossrefs	19	\fancyhead .	2247, 2248,	1569, 1574, 1575,
\end . . .	22, 2202, 2209, 2341		2249, 2250, 2255,	1585, 1587, 1599,
\end@dblfloat	<u>701</u>		2256, 2257, 2258,	1605, 1606, 1607,
\end@float	<u>703</u>		2264, 2266, 2267,	1613, 1616, 1617,
\endcsname	279,		2274, 2276, 2277,	1621, 1622, 1627,
	280, 331, 333, 337,		2278, 2286, 2287,	1639, 1644, 1649,
	344, 346, 350, 379,		2289, 2291, 2349,	1653, 1654, 1655,
	399, 400, 414, 428,		2360, 2361, 2362,	1656, 1657, 1658,
	1317, 1318, 1320,		2370, 2371, 2372,	1659, 1667, 1668,
	1321, 1322, 1323,		2380, 2381, 2383, 2384	1674, 1676, 1683,
	1324, 1327, 1329,	\fancyheadoffset . . .		1717, 1723, 1751,
	1690, 1692, 2408, 2431		. . . 2296, 2363, 2373	1755, 1756, 1757,
\enddescription	<u>777</u>	\fancyhf	2235, 2344	1779, 1801, 1822,
\endgroup . . .	330, 369,	\fancypagestyle	2234, 2343	1828, 1832, 1838,
	387, 402, 1660,	\fi . . .	54, 62, 71, 79, 91,	1844, 1849, 1861,
	1937, 2410, 2412, 2628		99, 107, 115, 125,	1863, 1868, 1876,
\endlist	<u>775, 777</u>		144, 149, 171, 192,	1877, 1885, 1893,
\endminipage	<u>600</u>		193, 204, 216, 218,	1903, 1905, 1906,
\endtrivlist	2621		220, 222, 224, 226,	1908, 1909, 1912,
\enspace	2508		228, 230, 232, 234,	1914, 1936, 1965,
environments:			236, 238, 240, 242,	1972, 1983, 1997,
abstract	18		244, 246, 248, 250,	1998, 2009, 2032,
acks	22		252, 254, 256, 258,	2033, 2041, 2047,
anonsuppress	21		263, 265, 267, 269,	2056, 2075, 2076,
CCSXML	15		271, 273, 274, 283,	2084, 2090, 2099,
marginfigure	20		285, 299, 301, 307,	2108, 2110, 2134,
margintable	20		312, 317, 323, 334,	2142, 2144, 2146,
printonly	21		338, 347, 351, 353,	2153, 2157, 2171,
screenonly	21		376, 377, 390, 401,	2174, 2175, 2176,
sidebar	20		420, 456, 466, 484,	2196, 2203, 2210,
teaserfigure	18		486, 490, 493, 511,	2222, 2227, 2231,
\everypar	309, 364, 375, 2139		575, 589, 607, 625,	2232, 2240, 2242,
\excludecomment .	1311,		644, 647, 653, 680,	2243, 2247, 2248,
	2636, 2638, 2642, 2643		681, 700, 704, 729,	2253, 2262, 2272,
\ExecuteOptionsX . . .			1063, 1081, 1087,	2283, 2285, 2293,
	48, 56, 64, 73, 81,		1095, 1109, 1114,	2294, 2297, 2300,
	93, 101, 109, 117, 127		1119, 1124, 1125,	2322, 2341, 2350,
\expandafter	259, 261,		1130, 1131, 1139,	2353, 2359, 2369,
	489, 611, 1317,		1145, 1146, 1147,	2379, 2385, 2386,
	1318, 1320, 1321,		1152, 1170, 1182,	2392, 2395, 2396,
	1327, 1329, 2408, 2431		1192, 1199, 1205,	2422, 2433, 2435,
			1221, 1262, 1268,	2506, 2528, 2558,
			1274, 1288, 1289,	2596, 2613, 2632,
			1298, 1304, 1305,	2640, 2646, 2649, 2653
F			1309, 1325, 1332,	
\familydefault	652	\firstpagestyle	<u>2343</u>	

<code>\floatname</code>	683	<code>\geometry</code>		<code>\if@ACM@authordraft</code>	
<code>\footnote</code>	2149		515, 518, 525, 532,		118, 504, 1609
<code>\footnotemark</code> 441, 1176,			539, 546, 553, 560, 567	<code>\if@ACM@authorversion</code>	
1185, 2126, 2127, 2147		<code>\getrefnumber</code>	2146		74, 1615, 1631
<code>\footnoterule</code>	598	<code>\global</code>		<code>\if@ACM@badge</code>	
<code>\footnotesep</code>	418, 431		363, 366, 402, 422,		1230, 1745, 1854, 1870
<code>\footnotesize</code>			711, 1105, 1107,	<code>\if@ACM@journal</code>	138,
. 424, 2219, 2252,			1108, 1149, 1580,		656, 1284, 1602,
2260, 2270, 2281,			1582, 1679, 1680,		1619, 1635, 1647,
2285, 2352, 2356,			1977, 1999, 2000,		1670, 1897, 2138, 2163
2366, 2376, 2385, 2391			2009, 2057, 2060,	<code>\if@ACM@manuscript</code> .	
<code>\footnotetext</code>	1179,		2100, 2132, 2191, 2195		137,
1181, 1188, 1191, 1198		<code>\grantnum</code>	22, 2631		201, 1281, 1618, 1628
<code>\footnotetextauthorsaddress</code>		<code>\grantsponsor</code>	22, 2630	<code>\if@ACM@natbib</code>	
1597, 1603					94, 206, 297, 469
<code>\footnotetextcopyrightpermission</code>		H			
1608		<code>\hbox</code>	433, 1584, 1589, 1891	<code>\if@ACM@natbib@override</code>	94
<code>\footrulewidth</code> 2237, 2346		<code>\headrulewidth</code> 2236, 2345		<code>\if@ACM@newfonts</code> 627, 638	
<code>\format</code>	32	<code>\hfill</code>	1881, 2194	<code>\if@ACM@nonacm</code>	82,
<code>\frenchspacing</code>	2654	<code>\href</code>	1748, 1753, 1835,		1608, 1646, 2158,
<code>\fulltextwidth</code>			1847, 1859, 1874, 2652		2251, 2259, 2269,
693, 696, 712		<code>\hrule</code>	592, 599, 1881		2280, 2288, 2351,
		<code>\hsize</code>	425,		2355, 2365, 2375, 2390
			1583, 1823, 1824,	<code>\if@ACM@printacmref</code>	
G			1851, 1853, 1879,		1263, 1681
<code>\g@addto@macro</code>			1916, 2008, 2059, 2102	<code>\if@ACM@printccs</code>	
1094, 1122, 1123,		<code>\hskip</code>	328,		1257, 1663
1138, 1144, 1151,			342, 372, 385, 389,	<code>\if@ACM@printfolios</code>	
1169, 1176, 1178,			1750, 1837, 1846,		1269,
1181, 1185, 1187,			1862, 1871, 1892, 2618		2240, 2242, 2247,
1190, 1196, 1197,		<code>\hspace</code>	1446,		2248, 2285, 2350, 2385
1202, 1204, 1297,			1457, 1466, 1491,	<code>\if@ACM@review</code>	
1303, 1322, 1329,			1503, 1524, 2012, 2062		65, 2182, 2198, 2205
1562, 1566, 1568,		<code>\Huge</code>	1790, 1792,	<code>\if@ACM@screen</code> 49, 458, 2634	
1982, 1994, 2040,			1794, 1796, 1798, 1800	<code>\if@ACM@sigchiamode</code>	
2046, 2053, 2083,		<code>\hypersetup</code>			139,
2089, 2096, 2126, 2127			459, 465, 467, 1684		409, 651, 695, 701,
<code>\gdef</code>	1075,				1585, 1587, 2009, 2295
1076, 1077, 1078,		I			
1080, 1084, 1091,		<code>\if</code>	260	<code>\if@ACM@timestamp</code>	110, 2211, 2298, 2387
1093, 1112, 1115,		<code>\if@ACM@acmthm</code>	57, 2572	<code>\if@acmowned</code>	1340
1117, 1118, 1128,		<code>\if@ACM@affiliation@obey</code>		<code>\if@acmnew</code>	398, 491
1136, 1142, 1254,		<code>\if@ACM@affiliation@obey</code>			1153,
1278, 1295, 1301,			1890, 1903, 1905,	<code>\if@insideauthorgroup</code>	1102, 1106
1318, 1320, 1321,			1906, 1907, 1909, 1912		
1327, 1720, 1980,		<code>\if@ACM@anonymous</code> 102,		<code>\if@nobreak</code>	308
1984, 1989, 2013,			1111, 1121, 1126,	<code>\if@noskipsec</code>	301, 365
2014, 2035, 2036,			1150, 1168, 1177,	<code>\if@printcopyright</code> .	
2038, 2042, 2044,			1186, 1195, 1565,		1336, 1623
2049, 2078, 2079,			1572, 1601, 2229, 2641	<code>\if@printpermission</code>	
2081, 2085, 2087, 2092					1338, 1616

<code>\ifcase</code>	2048, 2080, 2086, 151, 173, 444, 513, 578, 663, 715, 836, 1218, 1398, 1436, 1698, 1726, 1760, 1782, 1803, 1917, 1941, 2021, 2070, 2245, 2310, 2347, 2465, 2514, 2544, 2601	<code>\labelsep</code>	732, 740, 745, 755, 760, 763, 765, 767, 769, 2618
<code>\ifcstype</code>	279	<code>\labelwidth</code> .	755, 760, 763, 765, 767, 769, 772
<code>\ifdim</code>	305, 325, 357, 382, 2193	<code>\LARGE</code>	1784, 1786, 1788, 1811, 1813, 1815, 1817, 1819, 1948, 1951, 2340
<code>\IfFileExists</code>	629, 632, 635	<code>\Large</code>	1939, 1957, 2475, 2476, 2478, 2479, 2481
<code>\IfInteger</code>	1276	<code>\large</code>	1610, 1944, 1949, 1952, 2469, 2470, 2472, 2473
<code>\ifNAT@numbers</code>	486	<code>\lastbox</code>	367, 2139
<code>\ifnum</code>	140, 145, 317, 318, 332, 336, 345, 349, 1330, 1331, 1351, 1356, 1359, 1363, 1369, 1372, 1375, 1378, 1381, 1384, 1387, 1391, 1574, 2018, 2067, 2107, 2109, 2146, 2324, 2326, 2388	<code>\immediate</code>	400, 492
<code>\ifPDFTeX</code>	615	<code>\includecomment</code>	2635, 2639, 2645
<code>\ifvmode</code>	1889	<code>\includegraphics</code> ...	1749, 1754, 1836, 1848, 1860, 1875
<code>\ifvoid</code>	603	<code>\indent</code>	2600
<code>\ifx</code>	172, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 262, 264, 266, 268, 270, 272, 488, 1079, 1086, 1090, 1110, 1113, 1127, 1129, 1134, 1135, 1141, 1201, 1293, 1294, 1300, 1307, 1317, 1326, 1596, 1600, 1640, 1649, 1652, 1653, 1654, 1664, 1669, 1719, 1747, 1752, 1825, 1829, 1834, 1842, 1845, 1858, 1866, 1873, 1883, 1969, 1979, 1987, 1988, 2037, 2043,	<code>\input</code>	616
		<code>\InputIfFileExists</code> ..	26
		<code>\institution</code>	11, 1158, 1895, 2115
		<code>\interfootnotelinepenalty</code>	412
		<code>\interlinepenalty</code> ..	329, 386, 412
		<code>\item</code>	2618
		<code>\itshape</code> ..	1620, 2462, 2463, 2492, 2497, 2510, 2522, 2542, 2609
		J	
		<code>\jobname</code>	397, 400
		K	
		<code>\kern</code>	591, 592, 598, 599, 1881
		<code>\keywords</code>	15, 1251
		L	
		<code>\l@section</code>	405
		<code>\l@subsection</code> ..	405, 406
		<code>\l@subsubsection</code> ...	407
		<code>\labelenumi</code>	723
		<code>\labelenumii</code>	724
		<code>\labelenumiii</code>	725
		<code>\labelenumiv</code>	726
		<code>\let</code>	236, 238, 250, 252, 254, 280, 319, 434, 435, 470, 471, 472, 473, 474, 475, 478, 482, 613, 648, 697, 758, 773, 777, 1161, 1162, 1163, 1164, 1165, 1312, 1577, 1578, 1593, 1594, 1595, 1598, 1604, 1679, 1680, 1910, 1911, 1913, 1977, 1999, 2057, 2063, 2100, 2105, 2398, 2399, 2400, 2402, 2403, 2404, 2413, 2415, 2417, 2418, 2420, 2426, 2429, 2432

<code>\libertineLF</code>	650	<code>\moveleft</code>	711	<code>\newsavebox</code>	2183
<code>\lineskip</code>	2062, 2104	<code>\multiply</code>	2331	<code>\newskip</code>	752, 2006
<code>\linespacing</code>	395, 396	N			
<code>\liningnums</code>	648	<code>\NAT@@setcites</code>	276	2575, 2578, 2581,	
<code>\list</code>	771	<code>\NAT@aysep</code>	267	2584, 2587, 2591, 2594	
<code>\listisep</code>	752, 753, 757	<code>\NAT@citetp</code>	478	<code>\newtheoremstyle</code>	2529, 2559
<code>\listparindent</code>	756	<code>\NAT@close</code>		<code>\newwrite</code>	399
<code>\LoadClass</code>	195	216, 218, 220, 222, 265		<code>\next</code>	2410, 2412, 2422
<code>\long</code>	410,	<code>\NAT@cmprs</code>	244, 246, 248	<code>\nobreak</code>	358, 2154
421, 685, 688, 691,		<code>\NAT@cmt</code>	271	<code>\noindent</code>	408,
1254, 1256, 1562, 2179		<code>\NAT@ctype</code>	478	1308, 1595, 1700,	
<code>\loop</code>	2190, 2325	<code>\NAT@etype</code>	478	1702, 1704, 1706,	
<code>\LTX@adddotafter</code>	2432, 2435	<code>\NAT@find@eq</code>	259	1725, 1746, 1833,	
M					
<code>\makeatletter</code>	392	<code>\NAT@fullfalse</code>	478	1840, 1843, 1867,	
<code>\makebox</code>	1610, 2334	<code>\NAT@longnamestrue</code>	256	1881, 1882, 1884,	
<code>\makelabel</code>	773	<code>\NAT@merge</code>	250, 252, 254	1967, 2000, 2001,	
<code>\MakeTextUppercase</code>	1980, 1982,	<code>\NAT@nmfmt</code>	258	2060, 2104, 2132,	
2460, 2469, 2472,		<code>\NAT@numbersfalse</code>	230	2133, 2154, 2155, 2610	
2475, 2478, 2500, 2504		<code>\NAT@numberstrue</code> 232, 234		<code>\nolinkurl</code>	2044,
<code>\maketitle</code>	19, 1571	<code>\NAT@open</code>	216,	2046, 2087, 2089, 2122	
<code>\MakeUppercase</code>	2419	218, 220, 222, 263, 478		<code>\normalcolor</code>	605
<code>\marginfigure</code>	687	<code>\NAT@partrue</code>	478	<code>\normalfont</code> 433, 1308,	
<code>marginfigure</code> (environ- ment)	20	<code>\NAT@rem@eq</code>	261	1589, 1940, 1945,	
<code>\marginpar</code>	410,	<code>\NAT@sep</code> 224, 226, 228, 273		1954, 1955, 1957,	
686, 689, 692, 1746		<code>\NAT@sort</code>	240, 242, 248	1958, 2525, 2540,	
<code>\marginparsep</code>	694, 2296	<code>\NAT@superfalse</code>	232	2552, 2555, 2616, 2654	
<code>\marginparwidth</code>	694, 2296	<code>\NAT@supertrue</code>	234	<code>\normalparindent</code>	590
<code>\margintable</code>	690	<code>\NAT@swafalse</code>	477	<code>\normalsize</code> 1802, 1940,	
<code>margintable</code> (environ- ment)	20	<code>\NAT@up</code>	258	1954, 1955, 1958, 2654	
<code>\mbox</code>	258	<code>\NAT@yrsep</code>	269	<code>\num@authorgroups</code>	1098,
<code>\mdseries</code>	1805, 1807, 1809,	<code>\NeedsTeXFormat</code>	1	1107, 1574, 2021,	
1813, 1815, 1817,		<code>\newblock</code>	479	2025, 2027, 2070, 2109	
1819, 1821, 1961, 1964		<code>\newbox</code>	1570, 1887, 2004	<code>\num@authorors</code>	1100, 1105, 2107
<code>\medskip</code>	1700, 1702,	<code>\newcommand</code>	286, 292,	<code>\number</code>	317
1704, 1706, 2000,		485, 1074, 1148,		<code>\numberline</code>	337, 350
2002, 2061, 2133, 2154		1200, 1237, 1242,		<code>\numexpr</code>	2213, 2215, 2217
<code>\mktitle@bx</code>	1570,	1292, 1313, 1902,		O	
1728, 1730, 1732,		1907, 2218, 2631, 2647		<code>\onehalfspacing</code>	203
1734, 1736, 1738,		<code>\newcount</code>	1098, 1100, 2185	<code>\openout</code>	400
1740, 1742, 1744,		<code>\newcounter</code>	2214, 2216	<code>\or</code>	154, 156, 158,
1833, 1852, 1880,		<code>\newdimen</code>	693, 730,	160, 162, 164, 166,	
2000, 2060, 2061, 2132		2005, 2303, 2305, 2307		168, 176, 178, 180,	
<code>\month</code>	1217, 2223	<code>\newenvironment</code>	687, 690, 1561	182, 184, 186, 188,	
		1230, 1336, 1338, 1340		190, 446, 447, 448,	
		<code>\newlength</code>	1232, 1234, 1235, 2184	449, 450, 451, 453,	
				454, 517, 524, 531,	

538, 545, 552, 559,	1953, 1956, 1959,	2002, 2008, 2010,
566, 580, 581, 582,	1962, 2023, 2024,	2038, 2040, 2046,
584, 585, 586, 587,	2026, 2028, 2072,	2053, 2061, 2063,
588, 665, 666, 667,	2254, 2263, 2273,	2081, 2083, 2089,
668, 669, 671, 674,	2312, 2317, 2354,	2096, 2103, 2105,
677, 717, 718, 719,	2364, 2374, 2467,	2130, 2131, 2132,
720, 721, 722, 727,	2468, 2471, 2474,	2133, 2143, 2154,
728, 841, 845, 849,	2477, 2480, 2498,	2177, 2178, 2179, 2614
856, 860, 864, 868,	2502, 2516, 2517,	\paragraph 1712, 2448, 2488
872, 876, 879, 885,	2518, 2519, 2520,	\parbox 508, 1839, 1857,
891, 897, 903, 907,	2521, 2526, 2527,	1864, 1872, 2188, 2338
911, 914, 918, 922,	2546, 2547, 2548,	\parindent 576, 590, 739,
924, 926, 930, 932,	2549, 2550, 2551,	1598, 1604, 1614,
936, 940, 944, 948,	2556, 2557, 2603,	2448, 2459, 2511, 2541
952, 956, 960, 964,	2604, 2605, 2606,	\parskip 576, 1614
968, 972, 976, 980,	2607, 2608, 2611, 2612	\part 2452
984, 988, 992, 996,	\orcid 9, <u>1171</u>	\PassOptionsToClass
999, 1003, 1006,	\outer@nobreak 708	..... 133, 134
1011, 1015, 1019,		\pdfgentounicode ... 624
1023, 1027, 1031,	P	\pdfglyphtounicode .
1035, 1039, 1043,	\p@ 403,	..... 617, 618,
1047, 1051, 1055,	576, 583, 591, 592,	619, 620, 621, 622, 623
1059, 1218, 1219,	598, 599, 2437,	\pdfstringdefDisableCommands
1220, 1399, 1401,	2441, 2445, 2446,	..... 437
1404, 1406, 1407,	2449, 2450, 2453,	\phantomsection
1409, 1411, 1413,	2454, 2484, 2489,	.... 210, 2137, 2626
1416, 1419, 1422,	2490, 2494, 2495, 2616	\popQED 2621
1424, 1427, 1430,	\PackageError 54, 62, 71, 79,	\position ... 11, 1157,
1437, 1448, 1459,	91, 99, 107, 115, 125	1161, 1162, 1163,
1467, 1473, 1479,	\PackageInfo 51, 53, 59, 61, 67,	1164, 1165, <u>1895</u> , 2114
1493, 1505, 1512,	70, 76, 78, 84, 90,	\postcode 11, 1164, <u>1895</u> , 2113
1526, 1533, 1539,	96, 98, 104, 106,	printonly (environment) 21
1546, 1551, 1701,	112, 114, 120, 124,	\ProcessOptionsX ... 135
1703, 1705, 1707,	855, 884, 890, 896, 902	\proof <u>2614</u>
1709, 1711, 1713,	\PageIndex 16	\proofname 2614
1715, 1729, 1731,	\pageref 2225	\protect 337, 350
1733, 1735, 1737,	\pagestyle 2302	\protected@edef 322, 413, 427
1739, 1741, 1743,	\par . 302, 358, 394, 601,	\providecommand 479, 483, 2509
1763, 1765, 1767,	706, 1308, 1598,	\ProvidesClass 5
1769, 1771, 1773,	1604, 1616, 1620,	\ProvidesFile 3
1775, 1777, 1785,	1666, 1675, 1700,	\ps@headings .. 2400, 2404
1787, 1789, 1791,	1702, 1704, 1706,	\ps@myheadings 2399, 2403
1793, 1795, 1797,	1728, 1730, 1732,	\ps@plain 2398, 2402
1799, 1806, 1808,	1744, 1843, 1850,	\pushQED 2615
1810, 1812, 1814,	1867, 1878, 1881,	\put 2201, 2208
1816, 1818, 1820,	1884, 1886, 1905,	
1920, 1922, 1924,	1906, 1908, 1909,	
1926, 1928, 1930,	1967, 1971, 2000,	
1932, 1934, 1943,		
1946, 1947, 1950,		

	Q			
<code>\qed</code>	.....	2615	
<code>\quad</code>	.....	379, 2265, 2268, 2275, 2279, 2389	
	R			
<code>\raggedright</code>	.....	1839, 1880, 2103	
<code>\raisebox</code>	.....	1610, 1835, 1847, 1859, 1874, 2334, 2336	
<code>\real@adddotafter</code>	..	.....	2417, 2420
<code>\realSectionformat</code>	..	.....	2413, 2425, 2426
<code>\received</code>	.....	18, <u>1292</u>	
<code>\RecordChanges</code>	.....	18	
<code>\ref</code>	.....	2166, 2173	
<code>\refname</code>	.....	209, 210	
<code>\refstepcounter</code>	....	321	
<code>\relax</code>	140, 145, 152, 174, 259, 260, 303, 322, 324, 328, 342, 356, 371, 381, 389, 400, 445, 514, 579, 613, 664, 716, 837, 1099, 1101, 1105, 1107, 1200, 1201, 1317, 1326, 1351, 1356, 1359, 1363, 1369, 1372, 1375, 1378, 1381, 1384, 1387, 1391, 1398, 1436, 1593, 1594, 1699, 1727, 1761, 1783, 1804, 1918, 1942, 2007, 2016, 2017, 2018, 2019, 2022, 2025, 2027, 2029, 2031, 2034, 2062, 2065, 2066, 2067, 2068, 2071, 2074, 2077, 2107, 2109, 2126, 2146, 2186, 2215, 2217, 2220, 2246, 2311, 2313, 2314, 2315, 2318, 2319, 2320, 2323, 2324, 2326, 2329,		
			2330, 2331, 2332, 2348, 2388, 2408, 2431, 2435, 2466, 2515, 2545, 2602, 2616	
	<code>\removelastskip</code>	....	394
	<code>\renewcommand</code>	..	208, 212, 213, 216, 218, 220, 222, 224, 226, 228, 278, 652, 770, 1104, 1167, 1563, 1579, 2118, 2236, 2237, 2345, 2346, 2436, 2440, 2444, 2448, 2452, 2483, 2488, 2493	
	<code>\renewenvironment</code>	..	. 684, 771, 1253, 2614	
	<code>\repeat</code>	.....	2193, 2328
	<code>\RequirePackage</code>	....	.... 30, 31, 196, 197, 198, 199, 200, 202, 205, 207, 436, 494, 495, 505, 512, 593, 614, 626, 639, 641, 643, 645, 646, 654, 1310, 1315, 2181
	<code>\reset@font</code>	....	411, 424
	<code>\reversemarginpar</code>	..	574	
	<code>\rightskip</code>	.....	2457
	<code>\rlap</code>	.....	2335
	<code>\rule</code>	.....	418, 431, 2337
	S			
	<code>\savebox</code>	.....	2188
	<code>screenonly (environ- ment)</code>	.....	21
	<code>\scriptsize</code>	...	2190, 2194	
	<code>\scshape</code>	.....	2512, 2599
	<code>\section</code>	.....	209, 1708, 1710, 1714, 1716, 2141, 2436, 2625
	<code>\section@raggedright</code>	....	<u>2456</u> , 2460, 2461, 2469, 2470, 2472, 2473, 2475, 2476, 2478, 2479, 2481, 2482, 2487, 2500, 2501, 2504, 2505
	<code>\Sectionformat</code>	....	2409, 2413, 2415, 2426
	<code>\SelectFootnoteRule</code>	.....	594, 596
	<code>\setbox</code>	....	367, 422, 711, 1833, 1852, 1880, 1891, 2000, 2009, 2060, 2132, 2139
	<code>\setcitestyle</code>	.....	.... 23, 213, 287, 293
	<code>\setcopyright</code>	..	16, <u>1395</u>	
	<code>\setcounter</code>	....	1588, 1661, 1722, 2215, 2217, 2464, 2499, 2503
	<code>\setkeys</code>	.....	38, 143, 1068, 1279, 1395, 1990, 1991, 1995, 1996, 2050, 2051, 2054, 2055, 2093, 2094, 2097, 2098
	<code>\setlength</code>	576, 577, 583, 590, 732, 733, 738, 744, 747, 748, 749, 750, 1233, 1236, 2189		
	<code>\settopmatter</code>	..	18, 88, <u>1279</u> , 1280, 1282, 1285, 1287, 1290, 2162	
	<code>\setTrue</code>	.....	393
	<code>\SetWatermarkColor</code>	..	507	
	<code>\SetWatermarkFontSize</code>	..	506	
	<code>\SetWatermarkText</code>	..	508	
	<code>\sfdefault</code>	.....	652
	<code>\sffamily</code>	.....	1784, 1786, 1788, 1790, 1792, 1794, 1798, 1939, 1944, 1948, 2233, 2340, 2460, 2461, 2462, 2469, 2470, 2472, 2473, 2478, 2479, 2500, 2501, 2504, 2505
	<code>\shortauthors</code>	19, 1127, 1128, 1135, 1136, 1138, 1141, 1142, 1144, 1678, 1680, 2232		
	<code>\shortcite</code>	.....	482, 485
	<code>\shorttitle</code>	....	2250, 2258, 2268, 2279, 2286
	<code>\showeprint</code>	.....	<u>2647</u>
	<code>\sidebar</code>	.....	<u>682</u>
	<code>sidebar (environment)</code>	..	20	
	<code>\skip</code>	.....	604

<code>\small</code> .. 411, 686, 689, 692, 1308, 1700, 1702, 1704, 1706, 1945, 2139, 2154, 2350	<code>\the</code> 1215, 1217, 2190, 2194, 2223, 2331	<code>\upshape</code> 770
<code>\smallskipamount</code> ... 753	<code>\theACM@time@hours</code> 2217, 2224	<code>\url</code> 1434, 2632
<code>\space</code> 346, 1690, 1912, 2632	<code>\theACM@time@minutes</code> 2224	<code>\urlstyle</code> ... 443, 452, 455
<code>\specialcomment</code> 2623	<code>\theenumi</code> 723	<code>\usebox</code> 2201, 2208
<code>\standardpagestyle</code> . 2234	<code>\theenumii</code> 724	<code>\usepackage</code> 10, 11, 12, 13, 14, 15
<code>\startPage</code> 15, 1247	<code>\theenumiii</code> 725	V
<code>\state</code> . 11, 1163, 1895, 2117	<code>\theenumiv</code> 726	<code>\vbox</code> 422, 711, 1833, 1852, 1880, 2000, 2060, 2132
<code>\stepcounter</code> ... 1179, 1181, 1188, 1191, 1198	<code>\thefootnote</code> 1579	<code>\vskip</code> 359, 394, 604, 612, 706
<code>\streetaddress</code> 11, 1161, 1895, 2112	<code>\theoremstyle</code> 2570, 2573, 2589, 2597	<code>\vtop</code> 2009
<code>\string</code> 492, 1249, 2150, 2151	<code>\thepage</code> 2225, 2240, 2242, 2247, 2248, 2285, 2350, 2385	W
<code>\strut</code> 1857, 1872	<code>\thispagestyle</code> 1724	<code>\wd</code> 713, 1892
<code>\strutbox</code> 418, 431	<code>\thmname</code> 2539, 2569	<code>\write</code> 492
<code>\subparagraph</code> 2493	<code>\thmnote</code> 2539, 2569	X
<code>\subsection</code> 2440	<code>\thmnumber</code> 2539, 2569	<code>\xdef</code> 263, 265, 267, 269, 271, 273
<code>\subsubsection</code> 2444, 2483	<code>\thr@</code> 254	Y
<code>\subtitle</code> 9, 1096	<code>\time</code> 2212, 2215, 2217	<code>\year</code> 1215, 2223
<code>\subtitlenote</code> .. 13, 1184	<code>\title</code> 9, 2150	Z
T	<code>\titlenote</code> .. 13, 1175, 2151	<code>\z@</code> 242, 246, 305, 325, 357, 367, 382, 395, 418, 431, 577, 612, 658, 662, 673, 738, 744, 756, 1580, 1582, 1598, 1604, 1610, 1614, 1835, 1847, 1859, 1874, 2103, 2139, 2236, 2237, 2304, 2306, 2308, 2334, 2336, 2345, 2346, 2436, 2440, 2444, 2452, 2459, 2483, 2488, 2493, 2523, 2553
<code>\teaserfigure</code> 1561	<code>\topsep</code> ... 757, 761, 2616	<code>\z@skip</code> 394, 706, 761, 2458
<code>teaserfigure</code> (environ- ment) 18	<code>\trivlist</code> 2617	
<code>\terms</code> 15, 1249	<code>\tw@</code> 252	
<code>\textbf</code> 1319, 1330	<code>\two@digits</code> ... 2223, 2224	
<code>\textbullet</code> 439, 1318, 2265, 2268, 2275, 2279	<code>\twocolumn</code> 1734, 1736, 1738, 1740, 1742	
<code>\textcolor</code> 2340	U	
<code>\textheight</code> 2193	<code>\unskip</code> 370, 438, 602, 1160, 1166, 1171, 1892, 1895, 1896, 1898, 1899, 1900, 1901, 1902, 1912, 1971, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2122, 2148, 2156, 2173, 2180	
<code>\textit</code> 1331, 2164, 2168, 2169, 2170	<code>\unvbox</code> 423, 606, 611	
<code>\textrightarrow</code> . 440, 1328		
<code>\textwidth</code> 694, 712, 713, 1583, 1823, 1851, 1879, 1916, 2016, 2059		
<code>\thanks</code> 13, 1563, 2179		
<code>\thankses</code> 1566, 1568, 1596, 2179		