

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

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Abstract

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

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1 Introduction

Association for Computing Machinery is the world's largest educational and scientific computing society, which delivers resources that advance computing as a science and a profession¹. It was one of the early adopters of \TeX for its typesetting.

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

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

The 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 the package.

I am grateful to Matthew Fluet, John Owens, Craig Rodkin, Bernard Rous, David Shamma, Stephen Spencer 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

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 the package uses a number relatively recent packages, especially the ones related to the fonts.

If you decide to install the package yourself, follow the standard rules:

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

The 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>

¹<http://www.acm.org/>

- *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>
- *environ*, <http://www.ctan.org/pkg/environ>
- *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>
- *latex-tools*, <http://www.ctan.org/pkg/latex-tools>
- *libertine*, <http://www.ctan.org/pkg/libertine>
- *manyfoot*, <http://www.ctan.org/pkg/manyfoot>
- *microtype*, <http://www.ctan.org/pkg/microtype>
- *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>
- *setspace*, <http://www.ctan.org/pkg/setspace>
- *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>

2.2 Invocation and options

To use the 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.

There are several Boolean options which can take true or false values. They are listed in Table 2. The words `=true` can be omitted when setting the 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 copyeditors.

The option `screen` may in the future involve additional features suitable for on-screen versions of the 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 process: all author information becomes obscured.

Table 1: The possible values for the format option

Value	Meaning
manuscript	A manuscript. This is the default
acmsmall	Small single column format, used for CIE, CSUR, JACM, JDIQ, JEA, JERIC, JETC, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TEAC, TECS, TIS, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPS, TOS, TOSEM, TOSN, TRET, TSAS, TSC, TSLP, TWEB.
acmlarge	Large single column format, used for IMWUT, JOCCH, PACMPL, TAP
acmtog	Large double column format, used for TOG
sigconf	Proceedings format for most of ACM conferences (with the exceptions listed below)
siggraph	Proceedings format for SIGGRAPH and SIGGRAPH Asia conferences, published in ACM Transactions on Graphics journal issues
sigplan	Proceedings format for SIGPLAN conferences
sigchi	Proceedings format for SIGCHI conferences
sigchi-a	Format for SIGCHI extended abstract

Table 2: Boolean options

Option	Default	Meaning
review	false	A review version: lines are numbered, hyperlinks are colored
screen	false	A screen version: hyperlinks are colored
natbib	true	Whether to use natbib package (see Section 2.10)
anonymous	false	Whether to make author(s) anonymous
authorversion	false	Whether to generate a special version for authors' personal use or posting (see Section 2.3)

2.3 Topmatter commands

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

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

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

```
\acmJournal{TOMS}
```

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

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

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

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

name: the name of the conference *or* the name of the book as set by the editor.

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}
```

Normally this command is entered either by the editor or by the typesetter.

`\title` The command `\title`, as in `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.

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

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
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
PACMPL	PACM on Programming Languages
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
TALG	ACM Transactions on Algorithms
TALLIP	ACM Transactions on Asian and Low-Resource Language Information Processing
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
TIIS	ACM Transactions on Interactive Intelligent Systems
TISSEC	ACM Transactions on Information and System Security
TIST	ACM Transactions on Intelligent Systems and Technology
TKDD	ACM Transactions on Knowledge Discovery from Data
TMIS	ACM Transactions on Management Information Systems
TOCE	ACM Transactions on Computing Education
TOCHI	ACM Transactions on Computer-Human Interaction
TOCL	ACM Transactions on Computational Logic
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory
TODAES	ACM Transactions on Design Automation of Electronic Systems
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPS	ACM Transactions on Privacy and Security
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TRETS	ACM Transactions on Reconfigurable Technology and Systems
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

`\subtitle` Besides title, ACM classes allow subtitle, set with the `\subtitle{subtitle}` macro. The commands for specification of 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:

`\orcid`

`\affiliation`

`\email`

```

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

```

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

Note that some formats do not typeset e-mails of ORCID identifiers. Do not worry: 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 `\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, and author A_3 is affiliated with I_1 and I_3 , ...). 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 may try to save the space using the format

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

However, this format is not generally recommended.

<pre>\position \institution \department \streetaddress \city \state \postcode \country</pre>	<p>The <code>\affiliation</code> command is further structured to interact with the metadata extraction tools. Inside the this command you should use <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> <p>An example of the author block:</p>
--	---

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

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 commands `\title` and `\author`. Example:

```
\thanks{This work is supported by the Widget Corporation Grant
\#312-001.\\
Author's address: D. Pineo, Kingsbury Hall, 33 Academic Way, Durham,
N.H. 03824; email: dspineo@comcast.net; Colin Ware, Jere A. Chase
Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824; email:
cware@ccom.unh.edu;
Sean Fogarty, (Current address) NASA Ames Research Center, Moffett
Field, California 94035.}
```

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

`\titlenote` While the command `\thanks` generates a note without 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 correspond-
ing 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}
```

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

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

`\acmArticleSeq` The articles in the same issue of a journal have *sequential number*. It is used to
position black blob in same formats. By default it is the same as 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 rededine it to 5
```

`\acmPrice` The macro `\acmPrice{<price>}` sets the price for the article (by default 15.00), for

example,

```
\acmPrice{25.00}
```

`\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}
```

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

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

It is normally set by the typesetter.

`\acmBadgeR` Some conference articles get special distinction, 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. The 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 abstract, which puts the badges on the left margin. The argument 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 the journal or book. It is used by the typesetter.

`\terms` The macros `\terms{<term, term,...>}` and `\keywords{<keyword, keyword,...>}` set
`\keywords` the main terms and the additional keywords for the article. Term and keywords must be separated by commas, for example,

```
\terms{wireless, interference}  
\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 the 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 the result 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 need to just 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 ACM: the authors may transfer the rights to ACM, license them to ACM, some or all authors might be employees of the US or Canada Government, etc. Accordingly the command `\setcopyright{...}` is introduced. Its argument is the copyright status of the paper, for example, `\setcopyright{acmcopyright}`. The possible values for this command are listed in Table 4.

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

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

```

\acmYear{2016}
\copyrightyear{2015}

```

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

Table 4: Parameters for `\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 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.

the special form of the copyright statement for this case. Note that you still need the `\setcopyright` command and (optionally) `\copyrightyear` command to tell \TeX about the copyright owner and year. Also, you should be aware that due to the different sizes of the permission blocks for the printed version and authors’ version the page breaks might be different between them.

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

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

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

`\settopmatter` Some information in the top matter is printed for certain journals or proceedings and suppressed for others. You may override these defaults using the command `\settopmatter{<settings>}`. The settings and their meanings are listed in Table 5. For example,

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

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

Table 5: Settings for `\settopmatter` command

Parameter	Values	Meaning
<code>printccs</code>	true/false	Whether to print CCS categories
<code>printacmref</code>	true/false	Whether to print ACM bibliographic entry
<code>printfolios</code>	true/false	Whether to print page numbers (folios)

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

`\maketitle` The macro `\maketitle` must be the last command in the top matter group: i.e., 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 may redefine it if the list of author's name is too long, e.g.,

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

2.4 Algorithms

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

2.5 Figures and tables

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 the tables *before* the table bodies.
2. ACM uses the standard types for figures and types and adds several new ones. In total there are following types:

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

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

teaserfigure: a special figure before `\maketitle`.

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

3. Accordingly, when scaling the images, one should use the following sizes:

- (a) For `figure` in one-column mode, `figure*` in two-column mode or `teaserfigure`—`\textwidth` (in the one-column you can also use `\columnwidth`, which coincides with `\textwidth` in this case).
- (b) For `figure` in two-column mode—`\columnwidth`.
- (c) For `marginfigure`—`\marginparwidth`.
- (d) For `figure*` in SIGCHI Extended abstracts—`\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 TeX FAQ [1]. The simplest one is to use `\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 abstract extensively uses margin space. The package provides three environments for this with option captions:

sidebar: textual information on the margin

marginfigure: a figure on the margin

margintable: a table on 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 decision. A good way to do so is to put the contents into a `\minipage` of the width `\columnwidth`.

2.6 Theorems

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

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

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

2.7 Online-only and offline-only material

printonly
screenonly

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

```
\section{Supplementary materials}

\begin{printonly}
  This section is included in the online version of the paper.
\end{printonly}

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

We use `comment` package for typesetting this code, so `\begin` and `\end` should start at the first positions of the lines of their own (no initial spaces etc.).

2.8 Note about anonymous mode

anonsuppress

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

```

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

```

As for `printonly` and `screenonly` environments, `\begin{anonsuppress}` and `\end{anonsuppress}` should start the line of their own (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 the anonymous mode this section must be omitted: it gives too much information to the reviewers. Second, the data about the 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 `printonly` and `screenonly` environments, `\begin{acks}` and `\end{acks}` should start the line of their own (no leading or trailing spaces).

`\grantsponsor`
`\grantnum` All the financial support *must* be listed using the commands `\grantsponsor` and `\grantnum`. These commands tell the postprocessing software about the granting organization and the grant. The format of the command 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 `\sponsorID` of a `\grantsponsor` command. Some awards have their own web pages, which you can include using the optional argument of `\grantnum` command.

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. The work is
  supported by the \grantsponsor{GS501100001809}{National Natural
  Science Foundation of
  China}{http://dx.doi.org/10.13039/501100001809} under Grant
  No.:~\grantnum{GS501100001809}{61273304}
  and~\grantnum[http://www.nnsf.cn/youngscientsts]{GS501100001809}{Young
  Scientists' Support Program}.
\end{acks}

```

2.10 Bibliography

ACM uses *natbib* package for formatting of referencing and the style `ACM-Reference-Format.bst` for Bib_{TEX} processing. You may disable loading of *natbib* by using the option `natbib=false` in `\documentclass`. However, it is not recommended, as well as the use of Bib_{TEX} 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: the author-year format `acmauthoryear` or the numeric format `acmnumeric` using the command `\sitestyle`, for example,

```
\citestyle{acmauthoryear}
```

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

`\setcitestyle` You may further customize *natbib* using `\setcitestyle` command, for example,

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

If you use *natbib*, then commands like `\citep` and `\citeauthor` are automatically supported.

There are several customized Bib_{TEX} entries and fields in ACM style `ACM-Reference-Format.bst` you may want to be aware of.

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

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

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

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

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

There are special entries `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 entries you can use the `lastaccessed` field to add the access date to the URL.

There are two ways to enter video and audio sources in the bibliography corresponding to two different possibilities. For standalone sources available on WWW you can use an online entry, setting there `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 the sources available as attachments to conference proceedings and similar documents, you can use the usual `inproceedings` entry, again setting the `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 = "99.9999/woot07-S422",
  howpublished = "Video"
}
```

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

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

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, ACMDarkBlue. You can use them in the color assignments.

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 and the end of the page) and hyphenation at the end of the page. This is done by rather strict settings

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

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

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

3 Implementation

3.1 Identification

We start with the declaration who we are. Most .dtx files put driver code in a separate driver file .drv. 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 [2016/12/03 v1.25 Typesetting articles for Association of
7 Computing Machinery]
```

And the driver code:

```
8 <*gobble>
9 \documentclass{ltxdoc}
10 \usepackage{array,booktabs,amsmath,graphicx,fancyvrb,tabularx}
11 \usepackage[tt=false]{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 Options

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

```
26 \RequirePackage{xkeyval}
```

format The possible formats

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

```

35 \@DeclareACMFormat{acmsmall}
36 \@DeclareACMFormat{acmlarge}
37 \@DeclareACMFormat{acmtog}
38 \@DeclareACMFormat{sigconf}
39 \@DeclareACMFormat{siggraph}
40 \@DeclareACMFormat{sigplan}
41 \@DeclareACMFormat{sigchi}
42 \@DeclareACMFormat{sigchi-a}
43 \ExecuteOptionsX{format}

```

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

```

44 \define@boolkey+{acmart.cls}[@ACM@]{screen}[true]{%
45   \if@ACM@screen
46     \PackageInfo{\@classname}{Using screen mode}%
47   \else
48     \PackageInfo{\@classname}{Not using screen mode}%
49   \fi}{\PackageError{\@classname}{Option screen can be either true or
50     false}}
51 \ExecuteOptionsX{screen=false}

```

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

```

52 \define@boolkey+{acmart.cls}[@ACM@]{review}[true]{%
53   \if@ACM@review
54     \PackageInfo{\@classname}{Using review mode}%
55   \else
56     \PackageInfo{\@classname}{Not using review mode}%
57   \fi}{\PackageError{\@classname}{Option review can be either true or
58     false}}
59 \ExecuteOptionsX{review=false}

```

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

```

60 \define@boolkey+{acmart.cls}[@ACM@]{authorversion}[true]{%
61   \if@ACM@authorversion
62     \PackageInfo{\@classname}{Using authorversion mode}%
63   \else
64     \PackageInfo{\@classname}{Not using authorversion mode}%
65   \fi}{\PackageError{\@classname}{Option authorversion can be either true or
66     false}}
67 \ExecuteOptionsX{authorversion=false}

```

`\if@ACM@natbib@override` Whether to override the format decision about *natbib*

```

68 \newif\if@ACM@natbib@override
69 \@ACM@natbib@overridefalse

```

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

```

70 \define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
71   \@ACM@natbib@overridefalse
72   \if@ACM@natbib
73     \PackageInfo{\@classname}{Explicitly selecting natbib mode}%

```

```

74 \else
75 \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
76 \fi}{\PackageError{\@classname}{Option natbib can be either true or
77 false}}

```

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

```

78 \define@boolkey+{acmart.cls}[@ACM@]{anonymous}[true]{%
79 \if@ACM@anonymous
80 \PackageInfo{\@classname}{Using anonymous mode}%
81 \else
82 \PackageInfo{\@classname}{Not using anonymous mode}%
83 \fi}{\PackageError{\@classname}{Option anonymous can be either true or
84 false}}
85 \ExecuteOptionsX{anonymous=false}

```

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

```

86 \def\ACM@fontsize{}
87 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
88 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
89 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
90 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

91 \DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
92 \DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
93 \ProcessOptionsX
94 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}

```

3.3 Setting switches

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

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

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

```
96 \newif\if@ACM@journal
```

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

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

Setting up switches

```

98 \ifnum\ACM@format@nr=0\relax
99 \@ACM@manuscripttrue
100 \else
101 \@ACM@manuscriptfalse
102 \fi
103 \@ACM@sigchiamodefalse
104 \ifcase\ACM@format@nr
105 \relax % manuscript
106 \@ACM@journaltrue

```

```

107 \or % acmsmall
108 \ACM@journaltrue
109 \or % acmlarge
110 \ACM@journaltrue
111 \or % acmtog
112 \ACM@journaltrue
113 \or % sigconf
114 \ACM@journalfalse
115 \or % siggraph
116 \ACM@journalfalse
117 \or % sigplan
118 \ACM@journalfalse
119 \or % sigchi
120 \ACM@journalfalse
121 \or % sigchi-a
122 \ACM@journalfalse
123 \ACM@sigchiamodetrue
124 \fi

```

A format sets up `\if@ACM@natbib` only if `\ACM@natbib@override` is false (i.e. user did *not* overrode format's selection):

```

125 \if@ACM@natbib@override\else
126 \ACM@natbibtrue
127 \fi

```

3.4 Loading base class and package

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

```

128 \ifx\ACM@fontsize\empty
129 \ifcase\ACM@format@nr
130 \relax % manuscript
131 \def\ACM@fontsize{9pt}%
132 \or % acmsmall
133 \def\ACM@fontsize{10pt}%
134 \or % acmlarge
135 \def\ACM@fontsize{10pt}%
136 \or % acmtog
137 \def\ACM@fontsize{9pt}%
138 \or % sigconf
139 \def\ACM@fontsize{9pt}%
140 \or % siggraph
141 \def\ACM@fontsize{9pt}%
142 \or % sigplan
143 \def\ACM@fontsize{9pt}%
144 \or % sigchi
145 \def\ACM@fontsize{10pt}%
146 \or % sigchi-a
147 \def\ACM@fontsize{10pt}%
148 \fi
149 \fi

```

```

150 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
151 \LoadClass[\ACM@fontsize, reqno]{amsart}
152 \RequirePackage{microtype}

    We need totpages package to calculate the number of pages
153 \RequirePackage{totpages}

    The amsmath \collect@body is defined using \def. We load environ to access the
\long version of the command
154 \RequirePackage{environ}

    We use setspace for doublespacing
155 \if@ACM@manuscript
156 \RequirePackage{setspace}
157 \onehalfspacing
158 \fi

    Citations. We patch \setcitestyle to allow, e.g., \setcitestyle{sort} and
\setcitestyle{nosort}. We patch \citestyle to warn about undefined citation
styles.
159 \if@ACM@natbib
160 \RequirePackage{natbib}
161 \renewcommand{\bibsection}{%
162     \section*{\refname}%
163     \phantomsection\addcontentsline{toc}{section}{\refname}%
164 }
165 \renewcommand{\bibfont}{\bibliofont}
166 \renewcommand\setcitestyle[1]{
167 \@for\@tempa:=#1\do
168 {\def\@tempb{round}\ifx\@tempa\@tempb
169     \renewcommand\NAT@open{()\renewcommand\NAT@close{}}\fi
170 \def\@tempb{square}\ifx\@tempa\@tempb
171     \renewcommand\NAT@open{[]\renewcommand\NAT@close{]}}\fi
172 \def\@tempb{angle}\ifx\@tempa\@tempb
173     \renewcommand\NAT@open{\<\renewcommand\NAT@close{\>}}\fi
174 \def\@tempb{curly}\ifx\@tempa\@tempb
175     \renewcommand\NAT@open{\{\}\renewcommand\NAT@close{\}}\fi
176 \def\@tempb{semicolon}\ifx\@tempa\@tempb
177     \renewcommand\NAT@sep{;}\fi
178 \def\@tempb{colon}\ifx\@tempa\@tempb
179     \renewcommand\NAT@sep{;}\fi
180 \def\@tempb{comma}\ifx\@tempa\@tempb
181     \renewcommand\NAT@sep{,}\fi
182 \def\@tempb{authoryear}\ifx\@tempa\@tempb
183     \NAT@numbersfalse\fi
184 \def\@tempb{numbers}\ifx\@tempa\@tempb
185     \NAT@numberstrue\NAT@superfalse\fi
186 \def\@tempb{super}\ifx\@tempa\@tempb
187     \NAT@numberstrue\NAT@supertrue\fi
188 \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
189     \let\bibstyle=\@gobble\fi

```

```

190 \def\@tempb{bibstyle}\ifx\@tempa\@tempb
191   \let\bibstyle=\@citestyle\fi
192 \def\@tempb{sort}\ifx\@tempa\@tempb
193   \def\NAT@sort{\@ne}\fi
194 \def\@tempb{nosort}\ifx\@tempa\@tempb
195   \def\NAT@sort{\z}\fi
196 \def\@tempb{compress}\ifx\@tempa\@tempb
197   \def\NAT@cmprs{\@ne}\fi
198 \def\@tempb{nocompress}\ifx\@tempa\@tempb
199   \def\NAT@cmprs{\@z}\fi
200 \def\@tempb{sort&compress}\ifx\@tempa\@tempb
201   \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
202 \def\@tempb{mcite}\ifx\@tempa\@tempb
203   \let\NAT@merge\@ne\fi
204 \def\@tempb{merge}\ifx\@tempa\@tempb
205   \@ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}\fi
206 \def\@tempb{elide}\ifx\@tempa\@tempb
207   \@ifnum{\NAT@merge<\thr@}{\let\NAT@merge\thr@}\fi
208 \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
209   \NAT@longnamestrue\fi
210 \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
211   \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
212 \expandafter\NAT@find@eq\@tempa=\relax\@nil
213 \if\@tempc\relax\else
214   \expandafter\NAT@rem@eq\@tempc
215   \def\@tempb{open}\ifx\@tempa\@tempb
216     \xdef\NAT@open{\@tempc}\fi
217   \def\@tempb{close}\ifx\@tempa\@tempb
218     \xdef\NAT@close{\@tempc}\fi
219   \def\@tempb{aysep}\ifx\@tempa\@tempb
220     \xdef\NAT@aysep{\@tempc}\fi
221   \def\@tempb{yysep}\ifx\@tempa\@tempb
222     \xdef\NAT@yrsep{\@tempc}\fi
223   \def\@tempb{notesep}\ifx\@tempa\@tempb
224     \xdef\NAT@cmt{\@tempc}\fi
225   \def\@tempb{citesep}\ifx\@tempa\@tempb
226     \xdef\NAT@sep{\@tempc}\fi
227   \fi
228 }%
229 \NAT@@setcites
230 }
231 \renewcommand\citestyle[1]{%
232   \ifcsname bibstyle@#1\endcsname%
233   \csname bibstyle@#1\endcsname\let\bibstyle\gobble%
234   \else%
235   \@latex@error{Undefined ‘#1’ citestyle}%
236   \fi
237 }%
238 \fi

```

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

```

239 \newcommand{\bibstyle@acmauthoryear}{%
240   \setcitestyle{%
241     authoryear,%
242     open={()},close={}},citesep={;},%
243     aysep={},yysep={},,%
244     notesep={, }}}
```

`\bibstyle@acmnumeric` The default numeric format:

```

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

The default is numeric:

```
250 \citestyle{acmnumeric}
```

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

```

251 \def\@startsection#1#2#3#4#5#6{%
252   \if@noskipsec \leavevmode \fi
253   \par
254   \@tempskipa #4\relax
255   \@afterindenttrue
256   \ifdim \@tempskipa <\z@
257     \@tempskipa -\@tempskipa \@afterindentfalse
258   \fi
259   \if@nobreak
260     \everypar{}%
261   \else
262     \addpenalty\@secpenalty\advspace\@tempskipa
263   \fi
264   \@ifstar
265     {\@ssect{#3}{#4}{#5}{#6}}%
266     {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}%
267 \def\@sect#1#2#3#4#5#6[#7]#8{%
268   \ifnum #2>\c@secnumdepth
269     \let\@svsec\@empty
270   \else
271     \refstepcounter{#1}%
272     \protected@edef\@svsec{\@secntformat{#1}\relax}%
273   \fi
274   \@tempskipa #5\relax
275   \ifdim \@tempskipa>\z@
276     \begingroup
277       #6{%
278         \@hangfrom{\hskip #3\relax\@svsec}%
279         \interlinepenalty \@M #8\@par}%

```

```

280 \endgroup
281 \csname #1mark\endcsname{#7}%
282 \addcontentsline{toc}{#1}{%
283   \ifnum #2>\c@secnumdepth \else
284     \protect\numberline{\csname the#1\endcsname}%
285   \fi
286   #7}%
287 \else
288   \def\@svsechd{%
289     #6{\hskip #3\relax
290     \@svsec #8}%
291     \csname #1mark\endcsname{#7}%
292     \addcontentsline{toc}{#1}{%
293       \ifnum #2>\c@secnumdepth \else
294         \protect\numberline{\csname the#1\endcsname}%
295       \fi
296       #7}}%
297   \fi
298   \@xsect{#5}}
299 \def\@xsect#1{%
300   \@tempkipa #1\relax
301   \ifdim \@tempkipa>\z@
302     \par \nobreak
303     \vskip \@tempkipa
304     \@afterheading
305   \else
306     \@nbreakfalse
307     \global\@noskipsectrue
308     \everypar{%
309       \if@noskipsec
310         \global\@noskipsecfalse
311         {\setbox\z@\lastbox}%
312         \clubpenalty\@M
313         \begingroup \@svsechd \endgroup
314         \unskip
315         \@tempkipa #1\relax
316         \hskip -\@tempkipa
317       \else
318         \clubpenalty \@clubpenalty
319         \everypar{}%
320       \fi}%
321   \fi
322   \ignorespaces}
323 \def\@secntformat#1{\csname the#1\endcsname\quad}
324 \def\@ssect#1#2#3#4#5{%
325   \@tempkipa #3\relax
326   \ifdim \@tempkipa>\z@
327     \begingroup
328     #4{%
329     \hangfrom{\hskip #1}%

```

```

330         \interlinepenalty \@M #5\@par}%
331     \endgroup
332 \else
333     \def\@svsechd{#4{\hskip #1\relax #5}}%
334 \fi
335 \@xsect{#3}}

    And hyperref
336 \let\@footnotemark@nolink\@footnotemark
337 \let\@footnotetext@nolink\@footnotetext
338 \RequirePackage[bookmarksnumbered]{hyperref}
339 \urlstyle{rm}
340 \ifcase\ACM@format@nr
341 \relax % manuscript
342 \or % acmsmall
343 \or % acmlarge
344 \or % acmtog
345 \or % sigconf
346 \or % siggraph
347 \or % sigplan
348 \urlstyle{sf}
349 \or % sigchi
350 \or % sigchi-a
351 \urlstyle{sf}
352 \fi
353 \if@ACM@screen
354 \hypersetup{colorlinks,
355     linkcolor=ACMRed,
356     citecolor=ACMPurple,
357     urlcolor=ACMDarkBlue,
358     filecolor=ACMDarkBlue}
359 \else
360 \hypersetup{hidelinks}
361 \fi

    Bibliography mangling.
362 \if@ACM@natbib
363 \let\cite\cite
364 \let\cite\citep
365 \let\citeANP\citeauthor
366 \let\citeNN\citeyearpar
367 \let\citeyearNP\citeyear
368 \let\citeyear\citeyearpar
369 \let\citeNP\citealt
370 \def\shortcite#1{\citeyear{#1}}
371 \DeclareRobustCommand\citeA
372     {\begingroup\NAT@swafalse
373         \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
374 \providecommand\newblock{}%
375 \else
376 \providecommand\citename[1]{#1}

```

```
377 \fi
```

`\bibliographystyle` Amsart redefines `\bibliographystyle` since it prefers AMS bibliography. We turn it back to \LaTeX definition:

```
378 \def\bibliographystyle#1{%
379   \ifx\@begindocumenthook\@undefined\else
380     \expandafter\AtBeginDocument
381     \fi
382     {\if@filesw
383       \immediate\write\@auxout{\string\bibstyle{#1}}%
384       \fi}}
```

Graphics and color

```
385 \RequirePackage{graphicx, xcolor}
```

We define ACM colors according to [7]:

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

3.5 Paper size and paragraphing

We use geometry for dimensions

```
394 \RequirePackage{geometry}
395 \ifcase\ACM@format@nr
396 \relax % manuscript
397   \geometry{letterpaper,head=1pc}%
398 \or % acmsmall
399   \geometry{twoside=true,
400     includeheadfoot, head=1pc, foot=2pc,
401     paperwidth=6.75in, paperheight=10in,
402     top=58pt, bottom=44pt, inner=46pt, outer=46pt
403   }%
404 \or % acmlarge
405   \geometry{twoside=true, head=1pc, foot=2pc,
406     paperwidth=8.5in, paperheight=11in,
407     includeheadfoot,
408     top=78pt, bottom=114pt, inner=81pt, outer=81pt
409   }%
410 \or % acmtog
411   \geometry{twoside=true, head=1pc, foot=2pc,
412     paperwidth=8.5in, paperheight=11in,
413     includeheadfoot, columnsep=24pt,
414     top=52pt, bottom=75pt, inner=52pt, outer=52pt
```

```

415 }%
416 \or % sigconf
417 \geometry{twoside=true, head=1pc,
418   paperwidth=8.5in, paperheight=11in,
419   includeheadfoot, columnsep=2pc,
420   top=57pt, bottom=73pt, inner=54pt, outer=54pt
421 }%
422 \or % siggraph
423 \geometry{twoside=true, head=1pc,
424   paperwidth=8.5in, paperheight=11in,
425   includeheadfoot, columnsep=2pc,
426   top=57pt, bottom=73pt, inner=54pt, outer=54pt
427 }%
428 \or % sigplan
429 \geometry{twoside=true, head=1pc,
430   paperwidth=8.5in, paperheight=11in,
431   includeheadfoot=false, columnsep=2pc,
432   top=1in, bottom=1in, inner=0.75in, outer=0.75in
433 }%
434 \or % sigchi
435 \geometry{twoside=true, head=1pc,
436   paperwidth=8.5in, paperheight=11in,
437   includeheadfoot, columnsep=2pc,
438   top=66pt, bottom=73pt, inner=54pt, outer=54pt
439 }%
440 \or % sigchi-a
441 \geometry{twoside=false, head=1pc,
442   paperwidth=11in, paperheight=8.5in,
443   includeheadfoot, marginparsep=72pt,
444   marginparwidth=170pt, columnsep=20pt,
445   top=72pt, bottom=72pt, left=314pt, right=72pt
446 }%
447 \@mparswitchfalse
448 \reversemarginpar
449 \fi

```

\parindent Paragraphing

```

\parskip
450 \setlength\parindent{10\p@}
451 \setlength\parskip{\z@}
452 \ifcase\ACM@format@nr
453 \relax % manuscript
454 \or % acmsmall
455 \or % acmlarge
456 \or % acmtog
457 \setlength\parindent{9\p@}%
458 \or % sigconf
459 \or % siggraph
460 \or % sigplan
461 \or % sigchi
462 \or % sigchi-a

```

463 \fi

Footnotes require some consideration. We have several layers of footnotes: front-matter footnotes, “regular” footnotes and the special insert for bibstrip. In the old ACM classes 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 bibstrip from the rest of the paper. It is a full width rule.

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

466 \RequirePackage{manyfoot}
467 \SelectFootnoteRule[2]{copyrightpermission}
468 \DeclareNewFootnote{copyrightpermission}
```

\footnoterule Tschichold’s rules:

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

\endminipage We do not use footnote rules in minipages

```
471 \def\endminipage{%
472 \par
473 \unskip
474 \ifvoid\@mpfootins\else
475 \vskip\skip\@mpfootins
476 \normalcolor
477 \unvbox\@mpfootins
478 \fi
479 \@minipagefalse %% added 24 May 89
480 \color@endgroup
481 \egroup
482 \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}
```

\@makefnmark We do note use indentation for footnotes

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

\@footnotetext In sigchi-a mode our footnotes are on the margins!

```
484 \if@ACM@sigchiamode
485 \long\def\@footnotetext#1{\marginpar{%
486 \reset@font\small
487 \interlinepenalty\interfootnotelinepenalty
488 \protected@edef\@currentlabel{%
489 \csname p@footnote\endcsname\@thefnmark
490 }%
491 \color@begingroup
492 \@makefnmark#1
493 \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
```

```

494 \color@endgroup}}%
495 \fi

```

`\empfootnotetext` We want the footnotes in minipages centered:

```

496 \long\def\empfootnotetext#1{%
497 \global\setbox\empfootins\vbox{%
498 \unvbox\empfootins
499 \reset@font\footnotesize
500 \hsize\columnwidth
501 \@parboxrestore
502 \protected@edef\@currentlabel
503     {\csname p\empfootnote\endcsname\@thefnmark}%
504 \color@begingroup\centering
505     \makefnmark{%
506     \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
507 \color@endgroup}}

```

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

```

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

```

3.6 Fonts

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

```

509 \newif\if@ACM@newfonts
510 \@ACM@newfontstrue
511 \IfFileExists{libertine.sty}{\ClassWarning{\@classname}{You do not
512     have libertine package installed. Please upgrade your
513     TeX}\@ACM@newfontsfalse}
514 \IfFileExists{zi4.sty}{\ClassWarning{\@classname}{You do not
515     have zi4 package installed. Please upgrade your TeX}\@ACM@newfontsfalse}
516 \IfFileExists{newtxmath.sty}{\ClassWarning{\@classname}{You do not
517     have newtxmath package installed. Please upgrade your
518     TeX}\@ACM@newfontsfalse}

```

We use Times throughout.

```

519 \if@ACM@newfonts
520 \RequirePackage[tt=false]{libertine}
521 \RequirePackage[varqu]{zi4}
522 \RequirePackage[libertine]{newtxmath}
523 \else
524 \RequirePackage{textcomp}
525 \fi

```

The SIGCHI extended abstracts are sans serif:

```

526 \if@ACM@sigchiamode
527 \renewcommand{\familydefault}{\sfdefault}
528 \fi

```

3.7 Floats

We use caption package

```
529 \RequirePackage{caption, float}
530 \captionsetup[table]{position=top}
531 \if@ACM@journal
532   \captionsetup{labelfont={sf, small},
533     textfont={sf, small}, margin=\z@}
534   \captionsetup[figure]{name={Fig.}}
535 \else
536   \captionsetup{labelfont={bf},
537     textfont={bf}, labelsep=colon, margin=\z@}
538   \ifcase\ACM@format@nr
539     \relax % manuscript
540     \or % acmsmall
541     \or % acmlarge
542     \or % acmtog
543     \or % sigconf
544     \or % siggraph
545     \captionsetup{textfont={it}}
546     \or % sigplan
547     \captionsetup{labelfont={bf},
548       textfont={normalfont}, labelsep=period, margin=\z@}
549     \or % sigchi
550     \captionsetup[figure]{labelfont={bf, small},
551       textfont={bf, small}}
552     \or % sigchi-a
553     \captionsetup[figure]{labelfont={bf, small},
554       textfont={bf, small}}
555   \fi
556 \fi
```

sidebar The sidebar environment:

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

\@sidebar The processing of the saved text

```
560 \long\def\@sidebar#1{\bgroup\captionsetup{type=sidebar}%
561   \marginpar{\small#1}\egroup}
```

marginfigure The marginfigure environment:

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

\@marginfigure The processing of the saved text

```
563 \long\def\@marginfigure#1{\bgroup\captionsetup{type=figure}%
564   \marginpar{\centering\small#1}\egroup}
```

marginable The marginable environment:

```
565 \newenvironment{marginable}{\Collect@Body\@marginable}{}
```

```

\@margintable The processing of the saved text
566 \long\def\@margintable#1{\bgroup\captionsetup{type=table}%
567 \marginpar{\centering\small#1}\egroup}

```

SIGCHI extended abstract provides 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
568 \newdimen\fulltextwidth
569 \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)
570 \if@ACM@sigchiamode
571 \def\@dblfloat{\bgroup\columnwidth=\fulltextwidth
572 \let\@endfloatbox\@endwidefloatbox
573 \def\@fpsaddefault{\def\@fps{tp}}}%
574 \@float}
575 \fi

```

```

\end@dblfloat And the end. Just adding a \bgroup.
576 \if@ACM@sigchiamode
577 \def\end@dblfloat{%
578 \end@float\egroup}
579 \fi

```

```

\@endwidefloatbox This is the end of a wide box - we basically move everything to the left
580 \def\@endwidefloatbox{%
581 \par\vskip\z@skip
582 \@minipagefalse
583 \outer@nobreak
584 \egroup
585 \color@endbox
586 \global\setbox\@currbox=\vbox{\moveleft
587 \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
588 \wd\@currbox=\textwidth
589 }

```

3.8 Lists

```

590 \ifcase\ACM@format@nr
591 \relax % manuscript
592 \or % acsmall
593 \or % acmlarge
594 \or % acmtog
595 \or % sigconf
596 \or % siggraph
597 \or % sigplan
598 \def\labelenumi{\theenumi.}

```

```

599 \def\labelenumii{\theenumii.}
600 \def\labelenumiii{\theenumiii.}
601 \def\labelenumiv{\theenumiv.}
602 \or % sigchi
603 \or % sigchi-a
604 \fi

```

```

\descriptionlabel We do not use default colon as \amsart does:
605 \renewcommand{\descriptionlabel}[1]{\hspace\labelsep \upshape\bfseries #1}

```

```

\description AMS uses additional indent of 6pt. Frank recommends dropping it.

```

```

606 \renewenvironment{description}{\list{}{%
607   \itemindent-12\p@
608   \labelwidth\z@ \let\makelabel\descriptionlabel}%
609 }{
610   \endlist
611 }
612 \let\enddescription=\endlist % for efficiency

```

3.9 Top matter data

We use keyval interface to define journal title and relevant information

```

613 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
614   CIE,%
615   CSUR,%
616   IMWUT,%
617   JACM,%
618   JDIQ,%
619   JEA,%
620   JERIC,%
621   JETC,%
622   JOCCH,%
623   PACMPL,%
624   TAAS,%
625   TACCESS,%
626   TACO,%
627   TALG,%
628   TALLIP,%
629   TAP,%
630   TCPS,%
631   TEAC,%
632   TECS,%
633   TIIS,%
634   TISSEC,%
635   TIST,%
636   TKDD,%
637   TMIS,%
638   TOCE,%
639   TOCHI,%

```

```

640 TOCL,%
641 TOCS,%
642 TOCT,%
643 TODAES,%
644 TODS,%
645 TOG,%
646 TOIS,%
647 TOIT,%
648 TOMACS,%
649 TOMM,%
650 TOMPECS,%
651 TOMS,%
652 TOPC,%
653 TOPS,%
654 TOPLAS,%
655 TOS,%
656 TOSEM,%
657 TOSN,%
658 TRETs,%
659 TSAS,%
660 TSC,%
661 TSLP,%
662 TWEB%
663 }{%
664 \ifcase\@journalCode@nr
665 \relax % CIE
666 \def\@journalName{ACM Computers in Entertainment}%
667 \def\@journalNameShort{ACM Comput. Entertain.}%
668 \def\@permissionCodeOne{1544-3574}%
669 \or % CSUR
670 \def\@journalName{ACM Computing Surveys}%
671 \def\@journalNameShort{ACM Comput. Surv.}%
672 \def\@permissionCodeOne{0360-0300}%
673 \or % IMWUT
674 \def\@journalName{PACM on Interactive, Mobile, Wearable and
675 Ubiquitous Technologies}%
676 \def\@journalNameShort{PACM Interact. Mob. Wearable Ubiquitous Technol.}%
677 \def\@permissionCodeOne{2474-9567}%
678 \or % JACM
679 \def\@journalName{Journal of the ACM}%
680 \def\@journalNameShort{J. ACM}%
681 \def\@permissionCodeOne{0004-5411}%
682 \or % JDIQ
683 \def\@journalName{ACM Journal of Data and Information Quality}%
684 \def\@journalNameShort{ACM J. Data Inform. Quality}%
685 \def\@permissionCodeOne{1936-1955}%
686 \or % JEA
687 \def\@journalName{ACM Journal of Experimental Algorithmics}%
688 \def\@journalNameShort{ACM J. Exp. Algor.}%
689 \def\@permissionCodeOne{1084-6654}%

```

```

690 \or % JERIC
691 \def\@journalName{ACM Journal of Educational Resources in Computing}%
692 \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
693 \def\@permissionCodeOne{1073-0516}%
694 \or % JETC
695 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
696 \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
697 \def\@permissionCodeOne{1550-4832}%
698 \or % JOCC
699 \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
700 \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
701 \or % PACMPL
702 \def\@journalName{PACM on Programming Languages}%
703 \def\@journalNameShort{PACM Progr. Lang.}%
704 \def\@permissionCodeOne{2475-1421}%
705 \or % TAAS
706 \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
707 \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
708 \def\@permissionCodeOne{1556-4665}%
709 \or % TACCESS
710 \def\@journalName{ACM Transactions on Accessible Computing}%
711 \def\@journalNameShort{ACM Trans. Access. Comput.}%
712 \def\@permissionCodeOne{1936-7228}%
713 \or % TACO
714 \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
715 \or % TALG
716 \def\@journalName{ACM Transactions on Algorithms}%
717 \def\@journalNameShort{ACM Trans. Algor.}%
718 \def\@permissionCodeOne{1549-6325}%
719 \or % TALLIP
720 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
721 \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
722 \def\@permissionCodeOne{2375-4699}%
723 \or % TAP
724 \def\@journalName{ACM Transactions on Applied Perception}%
725 \or % TCPS
726 \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
727 \or % TEAC
728 \def\@journalName{ACM Transactions on Economics and Computation}%
729 \or % TECS
730 \def\@journalName{ACM Transactions on Embedded Computing Systems}%
731 \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
732 \def\@permissionCodeOne{1539-9087}%
733 \or % TIIS
734 \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
735 \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
736 \def\@permissionCodeOne{2160-6455}%
737 \or % TISSEC
738 \def\@journalName{ACM Transactions on Information and System Security}%
739 \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%

```

```

740 \def\@permissionCodeOne{1094-9224}%
741 \or % TIST
742 \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
743 \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
744 \def\@permissionCodeOne{2157-6904}%
745 \or % TKDD
746 \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
747 \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
748 \def\@permissionCodeOne{1556-4681}%
749 \or % TMIS
750 \def\@journalName{ACM Transactions on Management Information Systems}%
751 \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
752 \def\@permissionCodeOne{2158-656X}%
753 \or % TOCE
754 \def\@journalName{ACM Transactions on Computing Education}%
755 \def\@journalNameShort{ACM Trans. Comput. Educ.}%
756 \def\@permissionCodeOne{1946-6226}%
757 \or % TOCHI
758 \def\@journalName{ACM Transactions on Computer-Human Interaction}%
759 \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
760 \def\@permissionCodeOne{1073-0516}%
761 \or % TOCL
762 \def\@journalName{ACM Transactions on Computational Logic}%
763 \def\@journalNameShort{ACM Trans. Comput. Logic}%
764 \def\@permissionCodeOne{1529-3785}%
765 \or % TOCS
766 \def\@journalName{ACM Transactions on Computer Systems}%
767 \def\@journalNameShort{ACM Trans. Comput. Syst.}%
768 \def\@permissionCodeOne{0734-2071}%
769 \or % TOCT
770 \def\@journalName{ACM Transactions on Computation Theory}%
771 \def\@journalNameShort{ACM Trans. Comput. Theory}%
772 \def\@permissionCodeOne{1942-3454}%
773 \or % TODAES
774 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
775 \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
776 \def\@permissionCodeOne{1084-4309}%
777 \or % TODS
778 \def\@journalName{ACM Transactions on Database Systems}%
779 \def\@journalNameShort{ACM Trans. Datab. Syst.}%
780 \def\@permissionCodeOne{0362-5915}%
781 \or % TOG
782 \def\@journalName{ACM Transactions on Graphics}%
783 \def\@journalNameShort{ACM Trans. Graph.}%
784 \def\@permissionCodeOne{0730-0301}%
785 \or % TOIS
786 \def\@journalName{ACM Transactions on Information Systems}%
787 \def\@journalName{ACM Transactions on Information Systems}%
788 \def\@permissionCodeOne{1046-8188}%
789 \or % TOIT

```

```

790 \def\@journalName{ACM Transactions on Internet Technology}%
791 \def\@journalNameShort{ACM Trans. Internet Technol.}%
792 \def\@permissionCodeOne{1533-5399}%
793 \or % TOMACS
794 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
795 \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
796 \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
797 \or % TOMM
798 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
799 \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
800 \def\@permissionCodeOne{1551-6857}%
801 \def\@permissionCodeTwo{0100}%
802 \or % TOMPECS
803 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
804 \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
805 \def\@permissionCodeOne{2376-3639}%
806 \or % TOMS
807 \def\@journalName{ACM Transactions on Mathematical Software}%
808 \def\@journalNameShort{ACM Trans. Math. Softw.}%
809 \def\@permissionCodeOne{0098-3500}%
810 \or % TOPC
811 \def\@journalName{ACM Transactions on Parallel Computing}%
812 \def\@journalNameShort{ACM Trans. Parallel Comput.}%
813 \def\@permissionCodeOne{1539-9087}%
814 \or % TOPS
815 \def\@journalName{ACM Transactions on Privacy and Security}%
816 \def\@journalNameShort{ACM Trans. Priv. Sec.}%
817 \def\@permissionCodeOne{2471-2566}%
818 \or % TOPLAS
819 \def\@journalName{ACM Transactions on Programming Languages and Systems}%
820 \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
821 \def\@permissionCodeOne{0164-0925}%
822 \or % TOS
823 \def\@journalName{ACM Transactions on Storage}%
824 \def\@journalNameShort{ACM Trans. Storage}%
825 \def\@permissionCodeOne{1553-3077}%
826 \or % TOSEM
827 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
828 \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
829 \def\@permissionCodeOne{1049-331X}%
830 \or % TOSN
831 \def\@journalName{ACM Transactions on Sensor Networks}%
832 \def\@journalNameShort{ACM Trans. Sensor Netw.}%
833 \def\@permissionCodeOne{1550-4859}%
834 \or % TRET
835 \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
836 \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
837 \def\@permissionCodeOne{1936-7406}%
838 \or % TSAS
839 \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%

```

```

840 \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
841 \def\@permissionCodeOne{2374-0353}%
842 \or % TSC
843 \def\@journalName{ACM Transactions on Social Computing}%
844 \def\@journalNameShort{ACM Trans. Soc. Comput.}%
845 \def\@permissionCodeOne{2469-7818}%
846 \or % TSLP
847 \def\@journalName{ACM Transactions on Speech and Language Processing}%
848 \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
849 \def\@permissionCodeOne{1550-4875}%
850 \or % TWEB
851 \def\@journalName{ACM Transactions on the Web}%
852 \def\@journalNameShort{ACM Trans. Web}%
853 \def\@permissionCodeOne{1559-1131}%
854 \fi
855 \ClassInfo{\@classname}{Using journal code \@journalCode}%
856 }{%
857 \ClassError{\@classname}{Incorrect journal #1}%
858 }%

```

`\acmJournal` And the syntactic sugar around it

```
859 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}}
```

The defaults:

```

860 \def\@journalCode@nr{0}
861 \def\@journalName{}%
862 \def\@journalNameShort{\@journalName}%
863 \def\@permissionCodeOne{XXXX-XXXX}%
864 \def\@permissionCodeTwo{}%

```

`\acmConference` This is the conference command

```

865 \newcommand\acmConference[4][{}%
866 \gdef\acmConference@shortname{#1}%
867 \gdef\acmConference@name{#2}%
868 \gdef\acmConference@date{#3}%
869 \gdef\acmConference@venue{#4}%
870 \ifx\acmConference@shortname\empty
871 \gdef\acmConference@shortname{#2}%
872 \fi}
873 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
874 DC, USA}

```

`\subtitle` The subtitle macro

```

875 \def\subtitle#1{\def\@subtitle{#1}}
876 \subtitle{}

```

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

```

877 \newcount\num@authorgroups
878 \num@authorgroups=0\relax

```

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

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

```
879 \newcommand\author[2][]{%
880   \if@insideauthorgroup\else
881     \global\advance\num@authorgroups by 1\relax
882     \global\@insideauthorgrouptrue
883   \fi
884   \ifx\addresses\@empty
885     \if@ACM@anonymous
886       \gdef\addresses{\@author{Anonymous Author(s)}}%
887       \gdef\authors{Anonymous Author(s)}%
888     \else
889       \gdef\addresses{\@author{#2}}%
890       \gdef\authors{#2}%
891     \fi
892   \else
893     \if@ACM@anonymous\else
894       \g@addto@macro\addresses{\and\@author{#2}}%
895       \g@addto@macro\authors{\and#2}%
896     \fi
897   \fi
898   \if@ACM@anonymous
899     \ifx\shortauthors\@empty
900       \gdef\shortauthors{Anon.}%
901     \fi
902   \else
903     \def\@tempa{#1}%
904     \ifx\@tempa\@empty
905       \ifx\shortauthors\@empty
906         \gdef\shortauthors{#2}%
907       \else
908         \g@addto@macro\shortauthors{\and#2}%
909       \fi
910     \else
911       \ifx\shortauthors\@empty
912         \gdef\shortauthors{#1}%
913       \else
914         \g@addto@macro\shortauthors{\and#1}%
915       \fi
916     \fi
917   \fi}
```

`\affiliation` The macro `\affiliation` mimics `\address` from `amsart`. Note that it has an optional argument we do not currently need, but keep for the possible future use.

```
918 \newcommand{\affiliation}[2][]{%
919   \global\@insideauthorgroupfalse
920   \if@ACM@anonymous\else
```

```

921   \g@addto@macro\addresses{\affiliation{#1}{#2}}%
922   \fi}

\email The macro \email mimics \email from amsart. Agian it has an optional argument we
do not currently need, but keep for the possible future use.
923 \renewcommand{\email}[2][]{%
924   \if@ACM@anonymous\else
925     \g@addto@macro\addresses{\email{#1}{#2}}%
926   \fi}

\orcids Right now we do not typeset orcid's gobble

\@titlenotes The titlenotes
927 \def\@titlenotes{}

\@titlenote Adding note to the title
928 \def\@titlenote#1{%
929   \g@addto@macro\@title{\footnotemark}%
930   \if@ACM@anonymous
931     \g@addto@macro\@titlenotes{%
932       \stepcounter{footnote}\footnotetext{Title note}}%
933   \else
934     \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
935   \fi}

\@subtitlenotes The subtitlenotes
936 \def\@subtitlenotes{}

\@subtitlenote Adding note to the subtitle
937 \def\@subtitlenote#1{%
938   \g@addto@macro\@subtitle{\footnotemark}%
939   \if@ACM@anonymous
940     \g@addto@macro\@subtitlenotes{%
941       \stepcounter{footnote}\footnotetext{Subtitle note}}%
942   \else
943     \g@addto@macro\@subtitlenotes{%
944       \stepcounter{footnote}\footnotetext{#1}}%
945   \fi}

\@authornotes The authornotes
946 \def\@authornotes{}

\@authornote Adding note to the author
947 \def\@authornote#1{%
948   \if@ACM@anonymous\else
949     \g@addto@macro\addresses{\@authornotemark}
950     \g@addto@macro\@authornotes{%
951       \stepcounter{footnote}\footnotetext{#1}}%
952   \fi}

```

`\acmVolume` The current volume
953 `\def\acmVolume#1{\def\@acmVolume{#1}}`
954 `\acmVolume{1}`

`\acmNumber` The current number
955 `\def\acmNumber#1{\def\@acmNumber{#1}}`
956 `\acmNumber{1}`

`\acmArticle` The current article
957 `\def\acmArticle#1{\def\@acmArticle{#1}}`
958 `\acmArticle{1}`

`\acmArticleSeq` The sequence number
959 `\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}`
960 `\acmArticleSeq{\@acmArticle}`

`\acmYear` The current year
961 `\def\acmYear#1{\def\@acmYear{#1}}`
962 `\acmYear{2016}`

`\acmMonth` The current month
963 `\def\acmMonth#1{\def\@acmMonth{#1}}`
964 `\acmMonth{1}`

`\@acmPubDate` The publication date
965 `\def\@acmPubDate{\ifcase\@acmMonth\or`
966 `January\or February\or March\or April\or May\or June\or`
967 `July\or August\or September\or October\or November\or`
968 `December\fi~\@acmYear}`

`\acmPrice` The price
969 `\def\acmPrice#1{\def\@acmPrice{#1}}`
970 `\acmPrice{15.00}`

`\acmISBN` The book isbn
971 `\def\acmISBN#1{\def\@acmISBN{#1}}`
972 `\acmISBN{978-x-xxxx-xxxx-x/YY/MM}`

`\acmDOI` The paper doi
973 `\def\acmDOI#1{\def\@acmDOI{#1}}`
974 `\acmDOI{10.1145/nnnnnnn.nnnnnnn}`

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

`\@ACM@badge@width` The width of the badge
977 `\newlength\@ACM@badge@width`
978 `\setlength\@ACM@badge@width{5pc}`

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

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

`\acmBadgeR` Setting the right badge
982 `\newcommand\acmBadgeR[2][\@ACM@badgetrue`
983 `\def\@acmBadgeR@url{#1}%`
984 `\def\@acmBadgeR@image{#2}}`
985 `\def\@acmBadgeR@url{}`
986 `\def\@acmBadgeR@image{}`

`\acmBadgeL` Setting the left badge
987 `\newcommand\acmBadgeL[2][\@ACM@badgetrue`
988 `\def\@acmBadgeL@url{#1}%`
989 `\def\@acmBadgeL@image{#2}}`
990 `\def\@acmBadgeL@url{}`
991 `\def\@acmBadgeL@image{}`

`\startPage` The start page of the paper
992 `\def\startPage#1{\def\@startPage{#1}}`
993 `\startPage{}`

`\terms` Terms are mostly obsolete, we use CCS now. Still it makes sense to keep them for compatibility.
994 `\def\terms#1{\def\@terms{#1}}`
995 `\terms{}`

`\keywords` Keywords are mostly obsolete, we use CCS now. Still it makes sense to keep them for compatibility.
996 `\def\keywords#1{\def\@keywords{#1}}`
997 `\keywords{}`

`abstract` Amsart puts abstract in the box. Since we do not know whether we will use two column mode, we prefer to save the text
998 `\renewenvironment{abstract}{\Collect@Body\@saveabstract}{}`

`\@saveabstract` And saving the abstract
999 `\long\def\@saveabstract#1{\long\gdef\@abstract{#1}}`
1000 `\@saveabstract{}`

`\@empty` The long version of `\@empty` (to compare with `\@abstract`)
1001 `\long\def\@empty{}`

```

\if@ACM@printcss Whether to print CCS
1002 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printcss}[true]{%
1003   \if@ACM@printcss
1004     \ClassInfo{\@classname}{Printing CSS}%
1005   \else
1006     \ClassInfo{\@classname}{Suppressing CSS}%
1007   \fi}{\ClassError{\@classname}{printcss must be true or false}}

\if@ACM@printacmref Whether to print ACM bib
1008 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
1009   \if@ACM@printacmref
1010     \ClassInfo{\@classname}{Printing bibformat}%
1011   \else
1012     \ClassInfo{\@classname}{Suppressing bibformat}%
1013   \fi}{\ClassError{\@classname}{printacmref must be true or false}}

\if@ACM@printfolios Whether to print folios
1014 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
1015   \if@ACM@printfolios
1016     \ClassInfo{\@classname}{Printing folios}%
1017   \else
1018     \ClassInfo{\@classname}{Suppressing folios}%
1019   \fi}{\ClassError{\@classname}{printfolios must be true or false}}

\settopmatter The usual syntactic sugar
1020 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}

      Now the settings
1021 \settopmatter{printcss=true, printacmref=true}
1022 \if@ACM@manuscript
1023   \settopmatter{printfolios=true}
1024 \else
1025   \if@ACM@journal
1026     \settopmatter{printfolios=true}
1027   \else
1028     \settopmatter{printfolios=false}
1029   \fi
1030 \fi

\@received The container for the paper history
1031 \def\@received{}

\received The \received command
1032 \newcommand\received[2][\def\@tempa{#1}%
1033   \ifx\@tempa\@empty
1034     \ifx\@received\@empty
1035       \gdef\@received{Received #2}%
1036     \else
1037       \g@addto@macro{\@received}{; revised #2}%

```

```

1038 \fi
1039 \else
1040 \ifx\@received\@empty
1041 \gdef\@received{#1 #2}%
1042 \else
1043 \g@addto@macro{\@received}{; #1 #2}%
1044 \fi
1045 \fi}
1046 \AtEndDocument{%
1047 \ifx\@received\@empty\else
1048 \par\bigskip\noindent\small\normalfont\@received\par
1049 \fi}

```

3.10 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```

1050 \RequirePackage{comment}
1051 \excludecomment{CCSXML}

```

\@concepts This is the storage macro for concepts

```

1052 \let\@concepts\@empty

```

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

```

1053 \newcommand\ccsdesc[2][100]{%
1054 \ccsdesc@parse#1~#2~}

```

\ccsdesc@parse The parser of the expression Significance~General~Specific:

```

1055 \def\ccsdesc@parse#1~#2~#3~{%
1056 \expandafter\ifx\csname CCS@#2\endcsname\relax
1057 \expandafter\gdef\csname CCS@#2\endcsname{\textbullet\textbf{#2} $\to$ }%
1058 \g@addto@macro{\@concepts}{\csname CCS@#2\endcsname}\fi
1059 \expandafter\g@addto@macro\expandafter{\csname CCS@#2\endcsname}{%
1060 \ifnum#1>499\textbf{#3; } \else
1061 \ifnum#1>299\textit{#3; } \else
1062 #3; \fi\fi}}

```

3.11 Copyright system

This is from acmcopyright.sty

\if@printcopyright A flag whether to print copyright symbol

```

1063 \newif\if@printcopyright
1064 \@printcopyrighttrue

```

\if@printpermission Whether to print permission block

```

1065 \newif\if@printpermission
1066 \@printpermissiontrue

```

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

```
1067 \newif\if@acmowned
1068 \@acmownedtrue
```

Keys:

```
1069 \define@choicekey*{ACM@}{acmcopyrightmode}[%
1070 \acm@copyrightinput\acm@copyrightmode]{none,acmcopyright,acmlicensed,%
1071 rightsretained,usgov,usgovmixed,cagov,cagovmixed,%
1072 licensedusgovmixed,licensedcagovmixed,othergov,licensedothergov}{%
1073 \@printpermissiontrue
1074 \@printcopyrighttrue
1075 \@acmownedtrue
1076 \ifnum\acm@copyrightmode=0\relax % none
1077 \@printpermissionfalse
1078 \@printcopyrightfalse
1079 \@acmownedfalse
1080 \fi
1081 \ifnum\acm@copyrightmode=2\relax % acmlicensed
1082 \@acmownedfalse
1083 \fi
1084 \ifnum\acm@copyrightmode=3\relax % rightsretained
1085 \@acmownedfalse
1086 \fi
1087 \ifnum\acm@copyrightmode=4\relax % usgov
1088 \@printpermissiontrue
1089 \@printcopyrightfalse
1090 \@acmownedfalse
1091 \fi
1092 \ifnum\acm@copyrightmode=6\relax % cagov
1093 \@acmownedfalse
1094 \fi
1095 \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
1096 \@acmownedfalse
1097 \fi
1098 \ifnum\acm@copyrightmode=9\relax % licensedcagovmixed
1099 \@acmownedfalse
1100 \fi
1101 \ifnum\acm@copyrightmode=10\relax % othergov
1102 \@acmownedtrue
1103 \fi
1104 \ifnum\acm@copyrightmode=11\relax % licensedothergov
1105 \@acmownedfalse
1106 \fi}
```

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

```
1107 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
1108 \setcopyright{acmcopyright}
```

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

```

1109 \def\@copyrightowner{%
1110 \ifcase\acm@copyrightmode\relax % none
1111 \or % acmcopyright
1112 ACM\@.
1113 \or % acmlicensed
1114 Copyright held by the owner/author(s). Publication rights licensed to
1115 ACM\@.
1116 \or % rightsretained
1117 Copyright held by the owner/author(s).
1118 \or % usgov
1119 \or % usgovmixed
1120 ACM\@.
1121 \or % cagov
1122 Crown in Right of Canada.
1123 \or %cagovmixed
1124 ACM\@.
1125 \or %licensedusgovmixed
1126 Copyright held by the owner/author(s). Publication rights licensed to
1127 ACM\@.
1128 \or %licensedcagovmixed
1129 Copyright held by the owner/author(s). Publication rights licensed to
1130 ACM\@.
1131 \or % othergov
1132 ACM\@.
1133 \or % licensedothergov
1134 Copyright held by the owner/author(s). Publication rights licensed to
1135 ACM\@.
1136 \fi}

```

\@formatdoi Print a clickable doi

```

1137 \def\@formatdoi#1{\url{http://dx.doi.org/#1}}

```

\@copyrightpermission The canned permission block.

```

1138 \def\@copyrightpermission{%
1139 \ifcase\acm@copyrightmode\relax % none
1140 \or % acmcopyright
1141 Permission to make digital or hard copies of all or part of this
1142 work for personal or classroom use is granted without fee provided
1143 that copies are not made or distributed for profit or commercial
1144 advantage and that copies bear this notice and the full citation on
1145 the first page. Copyrights for components of this work owned by
1146 others than ACM must be honored. Abstracting with credit is
1147 permitted. To copy otherwise, or republish, to post on servers or to
1148 redistribute to lists, requires prior specific permission
1149 and\hspace*{.5pt}/or a fee. Request permissions from
1150 permissions@acm.org.
1151 \or % acmlicensed
1152 Permission to make digital or hard copies of all or part of this
1153 work for personal or classroom use is granted without fee provided
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```

1155 advantage and that copies bear this notice and the full citation on
1156 the first page. Copyrights for components of this work owned by
1157 others than the author(s) must be honored. Abstracting with credit
1158 is permitted. To copy otherwise, or republish, to post on servers
1159 or to redistribute to lists, requires prior specific permission
1160 and\hspace*{.5pt}/or a fee. Request permissions from
1161 permissions@acm.org.
1162 \or % rightsretained
1163 Permission to make digital or hard copies of part or all of this work
1164 for personal or classroom use is granted without fee provided that
1165 copies are not made or distributed for profit or commercial advantage
1166 and that copies bear this notice and the full citation on the first
1167 page. Copyrights for third-party components of this work must be
1168 honored. For all other uses, contact the
1169 owner\hspace*{.5pt}/author(s).
1170 \or % usgov
1171 This paper is authored by an employee(s) of the United States
1172 Government and is in the public domain. Non-exclusive copying or
1173 redistribution is allowed, provided that the article citation is
1174 given and the authors and agency are clearly identified as its
1175 source.
1176 \or % usgovmixed
1177 ACM acknowledges that this contribution was authored or co-authored
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1182 for personal or classroom use is granted. Copies must bear this
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1185 honored. To copy otherwise, distribute, republish, or post,
1186 requires prior specific permission and\hspace*{.5pt}/or a
1187 fee. Request permissions from permissions@acm.org.
1188 \or % cagov
1189 This article was authored by employees of the Government of Canada.
1190 As such, the Canadian government retains all interest in the
1191 copyright to this work and grants to ACM a nonexclusive,
1192 royalty-free right to publish or reproduce this article, or to allow
1193 others to do so, provided that clear attribution is given both to
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1195 Permission to make digital or hard copies for personal or classroom
1196 use is granted. Copies must bear this notice and the full citation
1197 on the first page. Copyrights for components of this work owned by
1198 others than the Canadian Government must be honored. To copy
1199 otherwise, distribute, republish, or post, requires prior specific
1200 permission and\hspace*{.5pt}/or a fee. Request permissions from
1201 permissions@acm.org.
1202 \or % cagovmixed
1203 ACM acknowledges that this contribution was co-authored by an
1204 affiliate of the national government of Canada. As such, the Crown

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1206 Reprints must include clear attribution to ACM and the author's
1207 government agency affiliation. Permission to make digital or hard
1208 copies for personal or classroom use is granted. Copies must bear
1209 this notice and the full citation on the first page. Copyrights for
1210 components of this work owned by others than ACM must be honored.
1211 To copy otherwise, distribute, republish, or post, requires prior
1212 specific permission and\hspace*{.5pt}/or a fee. Request permissions
1213 from permissions@acm.org.
1214 \or % licensedusgovmixed
1215 Publication rights licensed to ACM\@. ACM acknowledges that this
1216 contribution was authored or co-authored by an employee, contractor
1217 or affiliate of the United States government. As such, the
1218 Government retains a nonexclusive, royalty-free right to publish or
1219 reproduce this article, or to allow others to do so, for Government
1220 purposes only.
1221 \or % licensedcagovmixed
1222 Publication rights licensed to ACM\@. ACM acknowledges that this
1223 contribution was authored or co-authored by an employee, contractor
1224 or affiliate of the national government of Canada. As such, the
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1227 purposes only.
1228 \or % othergov
1229 ACM acknowledges that this contribution was authored or co-authored
1230 by an employee, contractor or affiliate of a national government. As
1231 such, the Government retains a nonexclusive, royalty-free right to
1232 publish or reproduce this article, or to allow others to do so, for
1233 Government purposes only.
1234 \or % licensedothergov
1235 Publication rights licensed to ACM\@. ACM acknowledges that this
1236 contribution was authored or co-authored by an employee, contractor
1237 or affiliate of a national government. As such, the Government
1238 retains a nonexclusive, royalty-free right to publish or reproduce
1239 this article, or to allow others to do so, for Government purposes
1240 only.
1241 \fi}

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

1242 \def\copyrightyear#1{\def\@copyrightyear{#1}}
1243 \copyrightyear{\@acmYear}

\@teaserfigures The teaser figures container

1244 \def\@teaserfigures{}

teaserfigure The teaser figure

1245 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}

\@saveteaser Saving the teaser

1246 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}

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

```
1247 \renewcommand{\thanks}[1]{%
1248   \ifnotempty{#1}{%
1249     \if@ACM@anonymous
1250       \g@addto@macro\thankses{\thanks{A note}}%
1251     \else
1252       \g@addto@macro\thankses{\thanks{#1}}%
1253     \fi}}
```

3.12 Typesetting top matter

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

```
1254 \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 `thankses`. The latter 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.

```
1255 \def\maketitle{%
1256   \if@ACM@anonymous
1257     % Anonymize omission of \author-s
1258     \ifnum\@authorgroups=0\author{}\fi
1259   \fi
1260   \begingroup
1261   \let\@footnotemark\@footnotemark@nolink
1262   \let\@footnotetext\@footnotetext@nolink
1263   \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
1264   \@topnum\z@ % this prevents figures from falling at the top of page
1265               % 1
1266   \hsize=\textwidth
1267   \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
1268   \@mktitle\if@ACM@sigchiamode\else\mkauthors\fi\mkteasers
1269   \@printtopmatter
1270   \if@ACM@sigchiamode\mkauthors\fi
1271   \setcounter{footnote}{0}%
1272   \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
1273   \@titlenotes
1274   \@subtitlenotes
1275   \@authornotes
1276   \let\@makefnmark\relax \let\@thefnmark\relax
1277   \let\@makefntext\noindent
1278   \ifx\@empty\thankses\else
1279     \footnotetextcopyrightpermission{%
1280       \def\par{\let\par\@par}\parindent\z@\@setthanks}%
1281   \fi
1282   \footnotetextcopyrightpermission{\parindent\z@\@parskip0.1\baselineskip}
```

```

1283 \if@ACM@authorversion\else
1284 \if@printpermission\@copyrightpermission\par\fi
1285 \fi
1286 \if@ACM@manuscript\else
1287 \if@ACM@journal\else % Print the conference short name
1288 {\itshape \acmConference@shortname, \acmConference@venue}\par
1289 \fi
1290 \fi
1291 \if@printcopyright
1292 \copyright\ \@copyrightyear\ \@copyrightowner\
1293 \else
1294 \@copyrightyear.\
1295 \fi
1296 \if@ACM@manuscript
1297 Manuscript submitted to ACM\
1298 \else
1299 \if@ACM@authorversion
1300 This is the author's version of the work. It is posted here for
1301 your personal use. Not for redistribution. The definitive Version
1302 of Record was published in
1303 \if@ACM@journal
1304 \emph{\@journalName}%
1305 \else
1306 \emph{Proceedings of \acmConference@name, \acmConference@date}%
1307 \fi
1308 \ifx\@acmDOI\@empty
1309 .
1310 \else
1311 , \@formatdoi{\@acmDOI}.
1312 \fi\
1313 \else
1314 \if@ACM@journal
1315 \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle\
1316 \$\@acmPrice\
1317 DOI: \nolinkurl{\@acmDOI}%
1318 \else % Conference
1319 \@acmISBN
1320 \ifx\@acmPrice\@empty.\else\dots$\@acmPrice\fi\
1321 DOI: \nolinkurl{\@acmDOI}%
1322 \fi
1323 \fi
1324 \fi}%
1325 \endgroup
1326 \setcounter{footnote}{0}%
1327 \mkabstract
1328 \if@ACM@printcss
1329 \ifx\@concepts\@empty\else\bgroup
1330 {\@specialsection{CCS Concepts}%
1331 \@concepts\par}\egroup
1332 \fi

```

```

1333 \fi
1334 \if\@terms\@empty\else\bgroup
1335   {\@specialsection{General Terms}%
1336    \@terms\par}\egroup
1337 \fi
1338 \ifx\@keywords\@empty\else\bgroup
1339   {\if@ACM@journal
1340    \@specialsection{Additional Key Words and Phrases}%
1341    \else
1342     \@specialsection{Keywords}%
1343     \fi
1344     \@keywords}\par\egroup
1345 \fi
1346 \andify\authors
1347 \andify\shortauthors
1348 \global\let\authors=\authors
1349 \global\let\shortauthors=\shortauthors
1350 \if@ACM@printacmref
1351   \@mkbibcitation
1352 \fi
1353 \hypersetup{pdfauthor={\authors},
1354   pdftitle={\@title}, pdfkeywords={\@concepts}}%
1355 \@printendtopmatter
1356 \@afterindentfalse
1357 \@afterheading
1358 }

```

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

```

1359 \def\@specialsection#1{%
1360   \ifcase\ACM@format@nr
1361   \relax % manuscript
1362     \par\medskip\small\noindent#1: %
1363   \or % acmsmall
1364     \par\medskip\small\noindent#1: %
1365   \or % acmlarge
1366     \par\medskip\small\noindent#1: %
1367   \or % acmtog
1368     \par\medskip\small\noindent#1: %
1369   \or % sigconf
1370     \section*{#1}%
1371   \or % siggraph
1372     \section*{#1}%
1373   \or % sigplan
1374     \paragraph*{#1}%
1375   \or % sigchi
1376     \section*{#1}%
1377   \or % sigchi-a
1378     \section*{#1}%
1379   \fi}

```

`\@printtopmatter` The printing of top matter starts the 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 on the margins.

```

1380 \def\@printtopmatter{%
1381   \ifx\@startPage\@empty
1382     \gdef\@startPage{1}%
1383   \else
1384     \setcounter{page}{\@startPage}%
1385   \fi
1386   \thispagestyle{firstpagestyle}%
1387   \noindent
1388   \ifcase\ACM@format@nr
1389   \relax % manuscript
1390     \box\mkttitle@bx\par
1391     \noindent\hrulefill\par
1392   \or % acmsmall
1393     \box\mkttitle@bx\par
1394     \noindent\hrulefill\par
1395   \or % acmlarge
1396     \box\mkttitle@bx\par
1397     \noindent\hrulefill\par
1398   \or % acmtog
1399     \twocolumn[\box\mkttitle@bx]%
1400   \or % sigconf
1401     \twocolumn[\box\mkttitle@bx]%
1402   \or % siggraph
1403     \twocolumn[\box\mkttitle@bx]%
1404   \or % sigplan
1405     \twocolumn[\box\mkttitle@bx]%
1406   \or % sigchi
1407     \twocolumn[\box\mkttitle@bx]%
1408   \or % sigchi-a
1409     \par\box\mkttitle@bx\par\bigskip
1410     \if@ACM@badge
1411       \marginpar{\noindent
1412         \ifx\@acmBadgeL@image\@empty\else
1413           \href{\@acmBadgeL@url}{%
1414             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
1415           \hskip\@ACM@badge@skip
1416         \fi
1417         \ifx\@acmBadgeR@image\@empty\else
1418           \href{\@acmBadgeR@url}{%
1419             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
1420         \fi}%
1421       \fi
1422     \fi
1423 }

```

`\@mkttitle` The title of the article

```

1424 \def\@mktitle{%
1425   \ifcase\ACM@format@nr
1426   \relax % manuscript
1427   \@mktitle@i
1428   \or % acsmall
1429   \@mktitle@i
1430   \or % acmlarge
1431   \@mktitle@i
1432   \or % acmtog
1433   \@mktitle@i
1434   \or % sigconf
1435   \@mktitle@iii
1436   \or % siggraph
1437   \@mktitle@iii
1438   \or % sigplan
1439   \@mktitle@iii
1440   \or % sigchi
1441   \@mktitle@iii
1442   \or % sigchi-a
1443   \@mktitle@iv
1444   \fi
1445 }

```

\@titlefont The font to typeset title

```

1446 \def\@titlefont{%
1447   \ifcase\ACM@format@nr
1448   \relax % manuscript
1449   \LARGE\bfseries\sffamily
1450   \or % acsmall
1451   \LARGE\bfseries\sffamily
1452   \or % acmlarge
1453   \LARGE\bfseries\sffamily
1454   \or % acmtog
1455   \Huge\sffamily
1456   \or % sigconf
1457   \Huge\sffamily\bfseries
1458   \or % siggraph
1459   \Huge\sffamily\bfseries
1460   \or % sigplan
1461   \Huge\bfseries
1462   \or % sigchi
1463   \Huge\sffamily\bfseries
1464   \or % sigchi-a
1465   \Huge\bfseries
1466   \fi}

```

\@subtitlefont The font to typeset title

```

1467 \def\@subtitlefont{%
1468   \ifcase\ACM@format@nr
1469   \relax % manuscript

```

```

1470 \mdseries
1471 \or % acmsmall
1472 \mdseries
1473 \or % acmlarge
1474 \mdseries
1475 \or % acmtog
1476 \LARGE
1477 \or % sigconf
1478 \LARGE\mdseries
1479 \or % siggraph
1480 \LARGE\mdseries
1481 \or % sigplan
1482 \LARGE\mdseries
1483 \or % sigchi
1484 \LARGE\mdseries
1485 \or % sigchi-a
1486 \mdseries
1487 \fi}

```

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

```

1488 \def\mktitle@i{\hsize=\textwidth
1489 \ACM@title@width=\hsize
1490 \ifx\acmBadgeL@image\empty\else
1491 \advance\ACM@title@width by -\ACM@badge@width
1492 \advance\ACM@title@width by -\ACM@badge@skip
1493 \fi
1494 \ifx\acmBadgeR@image\empty\else
1495 \advance\ACM@title@width by -\ACM@badge@width
1496 \advance\ACM@title@width by -\ACM@badge@skip
1497 \fi
1498 \setbox\mktitle@bx=\vbox{\noindent\@titlefont
1499 \ifx\acmBadgeL@image\empty\else
1500 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\acmBadgeL@url}{%
1501 \includegraphics[width=\ACM@badge@width]{\acmBadgeL@image}}}%
1502 \hskip\ACM@badge@skip
1503 \fi
1504 \parbox[t]{\ACM@title@width}{\raggedright
1505 \@titlefont\noindent
1506 \@title
1507 \ifx\@subtitle\empty\else
1508 \par\noindent{\@subtitlefont\@subtitle}
1509 \fi}%
1510 \ifx\acmBadgeR@image\empty\else
1511 \hskip\ACM@badge@skip
1512 \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\acmBadgeR@url}{%
1513 \includegraphics[width=\ACM@badge@width]{\acmBadgeR@image}}}%
1514 \fi
1515 \par\bigskip}}%

```

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

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

```

1516 \def\@mktitle@iii{\hsize=\textwidth
1517   \setbox\mktitle@bx=\vbox{\@titlefont\centering
1518     \@ACM@title@width=\hsize
1519     \if@ACM@badge
1520       \advance\@ACM@title@width by -2\@ACM@badge@width
1521       \advance\@ACM@title@width by -2\@ACM@badge@skip
1522       \parbox[b]{\@ACM@badge@width}{\strut
1523         \ifx\@acmBadgeL@image\@empty\else
1524           \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}}{%
1525             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
1526         \fi}%
1527       \hskip\@ACM@badge@skip
1528     \fi
1529     \parbox[t]{\@ACM@title@width}{\centering\@titlefont
1530       \@title
1531       \ifx\@subtitle\@empty\else
1532         \par\noindent{\@subtitlefont\@subtitle}
1533       \fi
1534     }%
1535     \if@ACM@badge
1536       \hskip\@ACM@badge@skip
1537       \parbox[b]{\@ACM@badge@width}{\strut
1538         \ifx\@acmBadgeR@image\@empty\else
1539           \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}}{%
1540             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
1541         \fi}%
1542     \fi
1543     \par\bigskip}}%

```

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

```

1544 \def\@mktitle@iv{\hsize=\textwidth
1545   \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
1546     \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
1547     \noindent\@title
1548     \ifx\@subtitle\@empty\else
1549       \par\noindent\@subtitlefont\@subtitle
1550     \fi
1551     \par\bigskip}}%

```

`\@ACM@addtoaddress` The macro adds an item to 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 on the end of the line. We use the magic cleaders trick for this.

```

1552 \newbox\@ACM@commabox
1553 \def\@ACM@addtoaddress#1{%
1554   \ifvmode\else
1555     \setbox\@ACM@commabox=\hbox{, }%
1556     \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
1557   \fi
1558   #1}

```

\institution Theoretically we can define the macros for \affiliation inside the \@mkauthors-style
\position commands. However, this would lead to a strange error if an author uses them outside
\department \affiliation. Of course we can make them produce an error message, but...
\streetaddress We follow the strange American tradition of no comma before zip code.

```

\city 1559 \if@ACM@journal
\state 1560 \let\position\@gobble
\postcode 1561 \def\institution#1{#1\ignorespaces}%
\country 1562 \let\department\@gobble
1563 \let\streetaddress\@gobble
1564 \let\city\@gobble
1565 \let\state\@gobble
1566 \let\postcode\@gobble
1567 \let\country\@gobble
1568 \else
1569 \def\position#1{#1\par}%
1570 \def\institution#1{#1\par}%
1571 \def\department#1{#1\par}%
1572 \def\streetaddress#1{#1\par}%
1573 \let\city\@ACM@addtoaddress
1574 \let\state\@ACM@addtoaddress
1575 \def\postcode#1{\unskip\space#1}%
1576 \let\country\@ACM@addtoaddress
1577 \fi

```

\@mkauthors Typesetting authors

```

1578 \def\@mkauthors{\beginngroup
1579   \hsize=\textwidth
1580   \ifcase\ACM@format@nr
1581     \relax % manuscript
1582     \@mkauthors@i
1583     \or % acmsmall
1584     \@mkauthors@i
1585     \or % acmlarge
1586     \@mkauthors@i
1587     \or % acmtog
1588     \@mkauthors@i
1589     \or % sigconf
1590     \@mkauthors@iii
1591     \or % siggraph
1592     \@mkauthors@iii
1593     \or % sigplan

```

```

1594 \mkauthors@iii
1595 \or % sigchi
1596 \mkauthors@iii
1597 \or % sigchi-a
1598 \mkauthors@iv
1599 \fi
1600 \endgroup
1601 }

```

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

```

1602 \def\@authorfont{\Large\sffamily}

```

\@affiliationfont Font for affiliations

```

1603 \def\@affiliationfont{\normalsize\normalfont}

```

Adjusting fonts for different formats

```

1604 \ifcase\ACM@format@nr
1605 \relax % manuscript
1606 \or % acmsmall
1607 \def\@authorfont{\large\sffamily}
1608 \def\@affiliationfont{\small\normalfont}
1609 \or % acmlarge
1610 \or % acmtog
1611 \def\@authorfont{\LARGE\sffamily}
1612 \def\@affiliationfont{\large}
1613 \or % sigconf
1614 \def\@authorfont{\LARGE}
1615 \def\@affiliationfont{\large}
1616 \or % siggraph
1617 \def\@authorfont{\normalsize\normalfont}
1618 \def\@affiliationfont{\normalsize\normalfont}
1619 \or % sigplan
1620 \def\@authorfont{\Large\normalfont}
1621 \def\@affiliationfont{\normalsize\normalfont}
1622 \or % sigchi
1623 \def\@authorfont{\bfseries}
1624 \def\@affiliationfont{\mdseries}
1625 \or % sigchi-a
1626 \def\@authorfont{\bfseries}
1627 \def\@affiliationfont{\mdseries}
1628 \fi

```

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

```

1629 \def\@typeset@author@line{%
1630 \andify\@currentauthors\par\noindent
1631 \@currentauthors\def\@currentauthors{}%
1632 \ifx\@currentaffiliations\@empty\else
1633 \andify\@currentaffiliations

```

```

1634     \unskip, {\@currentaffiliations}\par
1635     \fi
1636     \def\@currentaffiliations{}}

```

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

```

1637 \def\@mkauthors@i{%
1638   \def\@currentauthors{}%
1639   \def\@currentaffiliations{}%
1640   \global\let\and\@typeset@author@line
1641   \def\@author##1{%
1642     \ifx\@currentauthors\@empty
1643       \gdef\@currentauthors{\@authorfont\MakeUppercase{##1}}%
1644     \else
1645       \g@addto@macro{\@currentauthors}{\and\MakeUppercase{##1}}%
1646     \fi
1647     \gdef\and{}}%
1648   \def\email##1##2{%
1649     \def\@tempa{##2}\ifx\@tempa\@empty\else
1650       \ifx\@currentaffiliations\@empty
1651         \gdef\@currentaffiliations{\@affiliationfont##2}%
1652       \else
1653         \g@addto@macro{\@currentaffiliations}{\and##2}%
1654       \fi
1655     \fi
1656     \fi
1657     \global\let\and\@typeset@author@line}
1658   \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par\medskip
1659     \noindent\addresses\@typeset@author@line
1660     \par\medskip}%
1661 }

```

`\@mkauthors@ii` `\@mkauthors@i` was version used in acmtog. No longer necessary

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

```
1662 \newbox\author@bx
```

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

```
1663 \newdimen\author@bx@wd
```

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

```
1664 \newskip\author@bx@sep
1665 \author@bx@sep=1pc\relax
```

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

```

1666 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd\def\and{\par}%
1667   \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
1668     \@authorfont\@currentauthors\par\@affiliationfont
1669     \@currentaffiliation}\egroup

```

```

1670 \box\author@bx\hspace{\author@bx@sep}%
1671 \gdef\@currentauthors{}%
1672 \gdef\@currentaffiliation{}}

```

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

```

1673 \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.

```

1674 \author@bx@wd=\textwidth\relax
1675 \advance\author@bx@wd by -\author@bx@sep\relax
1676 \ifcase\@num@authorgroups
1677 \relax % 0?
1678 \or % 1=one author per row
1679 \or % 2=two authors per row
1680 \divide\author@bx@wd by \@num@authorgroups\relax
1681 \or % 3=three authors per row
1682 \divide\author@bx@wd by \@num@authorgroups\relax
1683 \or % 4=two authors per row (!)
1684 \divide\author@bx@wd by 2\relax
1685 \else % three authors per row
1686 \divide\author@bx@wd by 3\relax
1687 \fi
1688 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

1689 \gdef\@currentauthors{}%
1690 \gdef\@currentaffiliation{}%
1691 \def\@author##1{\ifx\@currentauthors\@empty
1692 \gdef\@currentauthors{\par##1}%
1693 \else
1694 \g@addto@macro\@currentauthors{\par##1}%
1695 \fi
1696 \gdef\and{}}%
1697 \def\@email##1##2{\ifx\@currentaffiliation\@empty
1698 \gdef\@currentaffiliation{\nolinkurl{##2}}%
1699 \else
1700 \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
1701 \fi}%
1702 \def\@affiliation##1##2{\ifx\@currentaffiliation\@empty
1703 \gdef\@currentaffiliation{##2}%
1704 \else
1705 \g@addto@macro\@currentaffiliation{\par##2}%
1706 \fi
1707 \global\let\and\@typeset@author@bx
1708 }%

```

Actual typesetting is done by \and macro:

```

1709 \hsize=\textwidth
1710 \global\setbox\mktitle@bx=\vbox{\noindent
1711 \box\mktitle@bx\par\medskip\leavevmode
1712 \lineskip=1pc\relax\centering\hspace*{-1em}%
1713 \addresses\let\and\@typeset@author@bx\and\par\bigskip}}

```

\@mkauthors@iv The sigchia version. Now we put authors in the main text, and no more than 2 authors per line.

```
1714 \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.

```

1715 \author@bx@wd=\columnwidth\relax
1716 \advance\author@bx@wd by -\author@bx@sep\relax
1717 \ifcase\num@authorgroups
1718 \relax % 0?
1719 \or % 1=one author per row
1720 \else % 2=two authors per row
1721 \divide\author@bx@wd by 2\relax
1722 \fi
1723 \advance\author@bx@wd by -\author@bx@sep\relax

```

Now, parsing of \addresses:

```

1724 \gdef\@currentauthors{}%
1725 \gdef\@currentaffiliation{}%
1726 \def\author##1{\ifx\@currentauthors\@empty
1727 \gdef\@currentauthors{\par##1}%
1728 \else
1729 \g@addto@macro\@currentauthors{\par##1}%
1730 \fi
1731 \gdef\and{}%
1732 \def\email##1##2{\ifx\@currentaffiliation\@empty
1733 \gdef\@currentaffiliation{\nolinkurl{##2}}%
1734 \else
1735 \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
1736 \fi}%
1737 \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
1738 \gdef\@currentaffiliation{##2}%
1739 \else
1740 \g@addto@macro\@currentaffiliation{\par##2}%
1741 \fi
1742 \global\let\and\@typeset@author@bx}%
1743 %

```

Actual typesetting is done by \and macro

```

1744 \bgroup\hsize=\columnwidth
1745 \par\raggedright\leftskip=\z@
1746 \lineskip=1pc\noindent
1747 \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}

```

```

\@authornotemark Adding footnote mark to authors
1748 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark}}

\@mkteasers Typesetting teasers
1749 \def\@mkteasers{%
1750   \ifx\@teaserfigures\@empty\else
1751     \def\@teaser##1{\par\bigskip\bgroup
1752       \captionsetup{type=figure}##1\egroup\par}
1753     \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par
1754       \noindent\@teaserfigures\par\medskip}%
1755     \fi}

\@setaddresses This is an amsart macro, which we do not need.
1756 \def\@setaddresses{}

\@mkabstract Typesetting abstract
1757 \def\@mkabstract{\bgroup
1758   \ifx\@abstract\@empty\else
1759     {\if@ACM@journal
1760       \small\noindent
1761       \else
1762         \section*{Abstract}%
1763       \fi
1764       \phantomsection\addcontentsline{toc}{section}{Abstract}%
1765       \ignorespaces\@abstract\par}%
1766   \fi\egroup}

\@mkbibcitation Print bibcitation format
1767 \def\@mkbibcitation{\bgroup
1768   \def\footnotemark{}%
1769   \par\medskip\small\noindent{\bfseries ACM Reference format:}\par\nobreak
1770   \noindent\authors. \@acmYear. \@title.
1771   \if@ACM@journal
1772     \textit{\@journalNameShort}
1773     \@acmVolume, \@acmNumber, Article~\@acmArticle\ (\@acmPubDate),
1774     \ref{TotPages}~pages.
1775   \else
1776     In \textit{Proceedings of \@acmConference@name, \@acmConference@venue,
1777       \@acmConference@date
1778       \ifx\@acmConference@name\@acmConference@shortname\else
1779         \ (\@acmConference@shortname)\fi
1780       ,} \ref{TotPages}~pages.
1781   \fi\par
1782   \noindent DOI: \nolinkurl{\@acmDOI}
1783 \par\egroup}

\@printendtopmatter End the top matter
1784 \def\@printendtopmatter{\par\medskip
1785   \ifcase\ACM@format@nr

```

```

1786 \relax % manuscript
1787 \noindent\hrulefill\par\medskip
1788 \or % acmsmall
1789 \noindent\hrulefill\par\medskip
1790 \or % acmlarge
1791 \noindent\hrulefill\par\medskip
1792 \or % acmtog
1793 \par\bigskip
1794 \or % sigconf
1795 \par\bigskip
1796 \or % siggraph
1797 \par\bigskip
1798 \or % sigplan
1799 \par\bigskip
1800 \or % sigchi
1801 \par\bigskip
1802 \or % sigchi-a
1803 \fi
1804 }

```

\setthanks We redefine \setthanks using \long
1805 \def\setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}

3.13 Headers and Footers

We use fancyhdr for our headers and footers:

```
1806 \RequirePackage{fancyhdr}
```

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

```

1807 \if@ACM@review
1808 \newsavebox{\ACM@linecount@bx}
1809 \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{%
1810 \newlength\ACM@linecount@bxht\setlength{\ACM@linecount@bxht}{-\baselineskip}
1811 \@tempcnta\@ne\relax
1812 \loop{\color{ACMRed}\scriptsize\the\@tempcnta}\@
1813 \advance\@tempcnta by \@ne
1814 \addtolength{\ACM@linecount@bxht}{\baselineskip}
1815 \ifdim\ACM@linecount@bxht<\textheight\repeat}}
1816 \fi

```

\ACM@linecount How to display the box

```

1817 \def\ACM@linecount{%
1818 \if@ACM@review
1819 \begin{picture}(0,0)%
1820 \put(-26,-22){\usebox{\ACM@linecount@bx}}%
1821 \end{picture}%
1822 \fi}

```

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

```
1823 \def\@shortauthors{\if@ACM@anonymous Anon.\else\shortauthors\fi}
```

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

```
1824 \def\@headfootfont{%
1825   \ifcase\ACM@format@nr
1826   \relax % manuscript
1827   \sffamily
1828   \or % acmsmall
1829   \sffamily
1830   \or % acmlarge
1831   \sffamily
1832   \or % acmtog
1833   \sffamily
1834   \or % sigconf
1835   \sffamily
1836   \or % siggraph
1837   \sffamily
1838   \or % sigplan
1839   \sffamily
1840   \or % sigchi
1841   \sffamily
1842   \or % sigchi-a
1843   \sffamily
1844   \fi}
```

`standardpagestyle` The pagestyle for all pages but the first one

```
1845 \fancypagestyle{standardpagestyle}{%
1846   \fancyhf{}%
1847   \renewcommand{\headrulewidth}{\z@}%
1848   \renewcommand{\footrulewidth}{\z@}%
1849   \ifcase\ACM@format@nr
1850   \relax % manuscript
1851   \fancyhead[LE]{\ACM@linecount\if@ACM@printfolios\thepage\fi}%
1852   \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
1853   \fancyhead[RE]{\@shortauthors}%
1854   \fancyhead[LO]{\ACM@linecount\shorttitle}%
1855   \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}%
1856   \or % acmsmall
1857   \fancyhead[LE]{\ACM@linecount\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
1858   \fancyhead[RO]{\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
1859   \fancyhead[RE]{\@headfootfont\@shortauthors}%
1860   \fancyhead[LO]{\ACM@linecount\@headfootfont\shorttitle}%
1861   \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1862     \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
1863   \or % acmlarge
1864   \fancyhead[LE]{\ACM@linecount\@headfootfont
1865     \@acmArticle:\if@ACM@printfolios\thepage\quad\textbullet\quad\fi\@shortauthors}%
```

```

1866 \fancyhead[LO]{\ACM@linecount}%
1867 \fancyhead[RO]{\@headfootfont
1868 \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi}%
1869 \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1870 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
1871 \or % acmtog
1872 \fancyhead[LE]{\ACM@linecount\@headfootfont
1873 \@acmArticle:\if@ACM@printfolios\thepage\quad\textbullet\quad\fi\@shortauthors}%
1874 \fancyhead[LO]{\ACM@linecount}%
1875 \fancyhead[RO]{\@headfootfont
1876 \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi}%
1877 \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1878 \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
1879 \else % Proceedings
1880 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
1881 \fancyhead[LO]{\ACM@linecount\@headfootfont\shorttitle}%
1882 \fancyhead[RE]{\@headfootfont\@shortauthors}%
1883 \fancyhead[LE]{\ACM@linecount\@headfootfont\acmConference@shortname,
1884 \acmConference@date, \acmConference@venue}%
1885 \fancyhead[RO]{\@headfootfont\acmConference@shortname,
1886 \acmConference@date, \acmConference@venue}%
1887 \fi
1888 \if@ACM@sigchiamode
1889 \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
1890 \fi
1891 }
1892 \pagestyle{standardpagestyle}

```

```

\@folio@wd Folio blob width, height, offsets and max number
\@folio@ht 1893 \newdimen\@folio@wd
\@folio@voffset 1894 \@folio@wd=\z@
\@folio@max 1895 \newdimen\@folio@ht
1896 \@folio@ht=\z@
1897 \newdimen\@folio@voffset
1898 \@folio@voffset=\z@
1899 \def\@folio@max{1}
1900 \ifcase\ACM@format@nr
1901 \relax % manuscript
1902 \or % acmsmall
1903 \@folio@wd=45.75pt\relax
1904 \@folio@ht=1.25in\relax
1905 \@folio@voffset=.2in\relax
1906 \def\@folio@max{8}
1907 \or % acmlarge
1908 \@folio@wd=43.25pt\relax
1909 \@folio@ht=79pt\relax
1910 \@folio@voffset=.55in\relax
1911 \def\@folio@max{10}
1912 \fi

```

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

```
1913 \def\@folioblob{\@tempcnta=\@acmArticleSeq\relax
First, we calculate \@acmArticleSeq modulo \@folio@max
1914 \loop
1915   \ifnum\@tempcnta>\@folio@max\relax
1916   \advance\@tempcnta by - \@folio@max
1917   \repeat
1918   \advance\@tempcnta by -1\relax
1919   \@tempdima=\@folio@ht\relax
1920   \multiply\@tempdima by \the\@tempcnta\relax
1921   \advance\@tempdima by -\@folio@voffset\relax
1922   \begin{picture}(0,0)
1923     \makebox[\z@]{\raisebox{-\@tempdima}{%
1924       \rlap{%
1925         \raisebox{-0.45\@folio@ht}[\z@][\z@]{%
1926           \rule{\@folio@wd}{\@folio@ht}}}%
1927       \parbox{\@folio@wd}{%
1928         \centering
1929         \textcolor{white}{\LARGE\bfseries\sffamily\@acmArticle}}}}%
1930   \end{picture}}
1931
```

`firstpagestyle` The pagestyle for the first page only.

```
1932 \fancypagestyle{firstpagestyle}{%
1933   \fancyhf{}%
1934   \renewcommand{\headrulewidth}{\z@}%
1935   \renewcommand{\footrulewidth}{\z@}%
1936   \ifcase\ACM@format@nr
1937   \relax % manuscript
1938   \fancyhead[L]{\ACM@linecount}%
1939   \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
1940   \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
1941   \or % acmsmall
1942   \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1943     \@acmNumber, Article \@acmArticle. Publication date:
1944     \@acmPubDate.}%
1945   \fancyhead[LE]{\ACM@linecount\@folioblob}%
1946   \fancyhead[LO]{\ACM@linecount}%
1947   \fancyhead[RO]{\@folioblob}%
1948   \fancyheadoffset[RO,LE]{0.6\@folio@wd}%
1949   \or % acmlarge
1950   \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1951     \@acmNumber, Article \@acmArticle. Publication date:
1952     \@acmPubDate.}%
1953   \fancyhead[RO]{\@folioblob}%
1954   \fancyhead[LE]{\ACM@linecount\@folioblob}%
1955   \fancyhead[LO]{\ACM@linecount}%
1956   \fancyheadoffset[RO,LE]{1.4\@folio@wd}%

```

```

1957 \or % acmtog
1958 \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
1959 \@acmNumber, Article \@acmArticle. Publication date:
1960 \@acmPubDate.}%
1961 \fancyhead[L]{\ACM@linecount}%
1962 \else % Conference proceedings
1963 \fancyhead[L]{\ACM@linecount}%
1964 \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
1965 \fi
1966 }

```

3.14 Sectioning

Sectioning is different for different levels

```

1967 \renewcommand\section{\@startsection{section}{1}{\z@}%
1968 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
1969 {.25\baselineskip}%
1970 {\@secfont}}
1971 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
1972 {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
1973 {.25\baselineskip}%
1974 {\@subsecfont}}
1975 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{10pt}%
1976 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
1977 {-3.5\p@}%
1978 {\@subsubsecfont\@adddotafter}}
1979 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
1980 {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
1981 {-3.5\p@}%
1982 {\@parfont\@adddotafter}}
1983 \renewcommand\part{\@startsection{part}{9}{\z@}%
1984 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
1985 {4\p@}%
1986 {\@parfont}}

```

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

```

1987 \def\section@raggedright{\@rightskip\@flushglue
1988 \rightskip\@rightskip
1989 \leftskip\z@skip
1990 \parindent\z@}

```

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

```

\@subsecfont 1991 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeUppercase}
\@subsubsecfont 1992 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\@parfont 1993 \def\@subsubsecfont{\sffamily\itshape}
1994 \def\@parfont{\itshape}
1995 \setcounter{secnumdepth}{3}
1996 \ifcase\ACM@format@nr
1997 \relax % manuscript

```

```

1998 \or % acmsmall
1999 \or % acmlarge
2000 \def\@secfont{\sffamily\large\section@raggedright\MakeUppercase}
2001 \def\@subsecfont{\sffamily\large\section@raggedright}
2002 \or % acmtog
2003 \def\@secfont{\sffamily\large\section@raggedright\MakeUppercase}
2004 \def\@subsecfont{\sffamily\large\section@raggedright}
2005 \or % sigconf
2006 \def\@secfont{\bfseries\Large\section@raggedright\MakeUppercase}
2007 \def\@subsecfont{\bfseries\Large\section@raggedright}
2008 \or % siggraph
2009 \def\@secfont{\bfseries\sffamily\Large\section@raggedright\MakeUppercase}
2010 \def\@subsecfont{\bfseries\sffamily\Large\section@raggedright}
2011 \or % sigplan
2012 \def\@secfont{\bfseries\Large\section@raggedright}
2013 \def\@subsecfont{\bfseries\section@raggedright}
2014 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
2015   {- .75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2016   {.25\baselineskip}%
2017   {\@subsubsecfont}}
2018 \def\@subsubsecfont{\bfseries\section@raggedright}
2019 \renewcommand\paragraph{\@startsection{paragraph}{4}{\z@}%
2020   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2021   {-3.5\p@}%
2022   {\@parfont\@addspaceafter}}
2023 \def\@parfont{\bfseries\itshape}
2024 \renewcommand\subparagraph{\@startsection{subparagraph}{5}{\z@}%
2025   {- .5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
2026   {-3.5\p@}%
2027   {\@subparfont\@addspaceafter}}
2028 \def\@subparfont{\itshape}
2029 \or % sigchi
2030 \setcounter{secnumdepth}{1}
2031 \def\@secfont{\bfseries\sffamily\section@raggedright\MakeUppercase}
2032 \def\@subsecfont{\bfseries\sffamily\section@raggedright}
2033 \or % sigchi-a
2034 \setcounter{secnumdepth}{0}
2035 \def\@secfont{\bfseries\sffamily\section@raggedright\MakeUppercase}
2036 \def\@subsecfont{\bfseries\sffamily\section@raggedright}
2037 \fi

```

\@adddotafter Add punctuation after the command

```
2038 \def\@adddotafter#1{#1\@addpunct{.}}
```

\@addspaceafter Add space after the command

```
2039 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

3.15 Theorems

```
\@acmplainbodyfont The font to typeset the acmplain theorem style body.
2040 \def\@acmplainbodyfont{\itshape}

\@acmplainindent The amount to indent the acmplain theorem style.
2041 \def\@acmplainindent{\parindent}

\@acmplainheadfont The font to typeset the acmplain theorem style head.
2042 \def\@acmplainheadfont{\scshape}

\@acmplainnotefont The font to typeset the acmplain theorem style note.
2043 \def\@acmplainnotefont{\@empty}

      Customization of acmplain theorem style:
2044 \ifcase\ACM@format@nr
2045 \relax % manuscript
2046 \or % acmsmall
2047 \or % acmlarge
2048 \or % acmtog
2049 \or % sigconf
2050 \or % siggraph
2051 \or % sigplan
2052 \def\@acmplainbodyfont{\itshape}
2053 \def\@acmplainindent{\z@}
2054 \def\@acmplainheadfont{\bfseries}
2055 \def\@acmplainnotefont{\normalfont}
2056 \or % sigchi
2057 \or % sigchi-a
2058 \fi

acmplain The acmplain theorem style
2059 \newtheoremstyle{acmplain}%
2060 { .5\baselineskip\@plus.2\baselineskip
2061 \@minus.2\baselineskip}% space above
2062 { .5\baselineskip\@plus.2\baselineskip
2063 \@minus.2\baselineskip}% space below
2064 {\@acmplainbodyfont}% body font
2065 {\@acmplainindent}% indent amount
2066 {\@acmplainheadfont}% head font
2067 { .}% punctuation after head
2068 { .5em}% spacing after head
2069 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont( #3)}}}% head spec

\@acmdefinitionbodyfont The font to typeset the acmdefinition theorem style body.
2070 \def\@acmdefinitionbodyfont{\normalfont}

\@acmdefinitionindent The amount to indent the acmdefinition theorem style.
2071 \def\@acmdefinitionindent{\parindent}
```

`\@acmdefinitionheadfont` The font to typeset the acmdefinition theorem style head.
2072 `\def\@acmdefinitionheadfont{\itshape}`

`\@acmdefinitionnotefont` The font to typeset the acmdefinition theorem style note.
2073 `\def\@acmdefinitionnotefont{\@empty}`

Customization of acmdefinition theorem style:

```
2074 \ifcase\ACM@format@nr
2075 \relax % manuscript
2076 \or % acmsmall
2077 \or % acmlarge
2078 \or % acmtog
2079 \or % sigconf
2080 \or % siggraph
2081 \or % sigplan
2082 \def\@acmdefinitionbodyfont{\normalfont}
2083 \def\@acmdefinitionindent{\z@}
2084 \def\@acmdefinitionheadfont{\bfseries}
2085 \def\@acmdefinitionnotefont{\normalfont}
2086 \or % sigchi
2087 \or % sigchi-a
2088 \fi
```

`acmdefinition` The acmdefinition theorem style

```
2089 \newtheoremstyle{acmdefinition}%
2090 { .5\baselineskip\@plus.2\baselineskip
2091 \@minus.2\baselineskip}% space above
2092 { .5\baselineskip\@plus.2\baselineskip
2093 \@minus.2\baselineskip}% space below
2094 {\@acmdefinitionbodyfont}% body font
2095 {\@acmdefinitionindent}% indent amount
2096 {\@acmdefinitionheadfont}% head font
2097 { .}% punctuation after head
2098 { .5em}% spacing after head
2099 {\thmname{#1}\thmnumber{ #2}\thmnote{ \@acmdefinitionnotefont(#3)}}% head spec
```

The definitions for theorems:

```
2100 \theoremstyle{acmplain}
2101 \newtheorem{theorem}{Theorem}[section]
2102 \newtheorem{conjecture}[theorem]{Conjecture}
2103 \newtheorem{proposition}[theorem]{Proposition}
2104 \newtheorem{lemma}[theorem]{Lemma}
2105 \newtheorem{corollary}[theorem]{Corollary}
2106 \theoremstyle{acmdefinition}
2107 \newtheorem{example}[theorem]{Example}
2108 \newtheorem{definition}[theorem]{Definition}
2109 \theoremstyle{acmplain}
```

`\@proofnamefont` The font to typeset the proof name.
2110 `\def\@proofnamefont{\scshape}`

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

```
2111 \def\@proofindent{\indent}
```

Customization of proof environment.

```
2112 \ifcase\ACM@format@nr
2113 \relax % manuscript
2114 \or % acmsmall
2115 \or % acmlarge
2116 \or % acmtog
2117 \or % sigconf
2118 \or % siggraph
2119 \or % sigplan
2120 \def\@proofnamefont{\itshape}
2121 \def\@proofindent{\noindent}
2122 \or % sigchi
2123 \or % sigchi-a
2124 \fi
```

`proof` We want some customization of proof environment.

```
2125 \renewenvironment{proof}[1][\proofname]{\par
2126 \pushQED{\qed}%
2127 \normalfont \topsep6\p@\@plus6\p@\relax
2128 \trivlist
2129 \item[\@proofindent\hskip\labelsep
2130 {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
2131 }{%
2132 \popQED\endtrivlist\@endpfalse
2133 }
```

3.16 Acknowledgments

`\acks` This is a comment-like structure

```
2134 \specialcomment{acks}{%
2135 \begingroup
2136 \section*{Acknowledgments}
2137 \phantomsection\addcontentsline{toc}{section}{Acknowledgments}
2138 }{%
2139 \endgroup
2140 }
```

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

```
2141 \def\grantsponsor#1#2#3{#2}
```

`\grantnum`

```
2142 \newcommand\grantnum[3][]{#3%
2143 \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}
```

3.17 Conditional typesetting

We use the comment package for conditional typesetting:

```
2144 \if@ACM@screen
2145   \includecomment{screenonly}
2146   \excludecomment{printonly}
2147 \else
2148   \excludecomment{screenonly}
2149   \includecomment{printonly}
2150 \fi
2151 \if@ACM@anonymous
2152   \excludecomment{anonsuppress}
2153   \excludecomment{acks}
2154 \else
2155   \includecomment{anonsuppress}
2156 \fi
```

3.18 Additional bibliography commands

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

```
2157 \newcommand\showeprint[2][arxiv]{%
2158   \def\@tempa{#1}%
2159   \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
2160   \def\@tempb{arxiv}%
2161   \ifx\@tempa\@tempb
2162     arXiv:\href{http://arxiv.org/abs/#2}{#2}\else arXiv:#2%
2163   \fi}
```

3.19 End of Class

```
2164 \normalsize\normalfont
2165 </class>
```

References

- [1] UK T_EX Users Group. UK list of T_EX frequently asked questions. <http://www.tex.ac.uk>, 2016.
- [2] Michael Downes and Barbara Beeton. *The amsart, amsproc, and amsbook document classes*. American Mathematical Society, August 2004. <http://www.ctan.org/pkg/amslatex>.
- [3] Cristophe Fiorio. *algorithm2e.sty—package for algorithms*, October 2015.
- [4] Rogério Brito. *The algorithms bundle*, August 2009.
- [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.
- [8] Axel Sommerfeldt. *The subcaption package*, April 2013. <http://www.ctan.org/pkg/subcaption>.
- [9] Boris Veytsman, Bern Schandl, Lee Netherton, and CV 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>.

Change History

v1.00	General: First released version	22	v1.05	General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib	22
v1.01	General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/acmart/issues/1)	22		Patched \setcitestyle command; closes https://github.com/borisveytsman/acmart/issues/19	22
	Defined ACM colors	22	v1.06	\@ACM@badge@skip: Added macro	46
	Explicitly put draft option (closes https://github.com/borisveytsman/acmart/issues/4)	24		\@ACM@badge@width: Added macro	45
	Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/acmart/issues/5)	22		\@ACM@title@width: Added macro	46
v1.02	General: Added TOPS and TSC (closes https://github.com/borisveytsman/acmart/issues/12)	22		\@mktitle@i: Added processing badges	58
	Documentation changes (closes https://github.com/borisveytsman/acmart/issues/13)	22		Made generic	58
v1.03	\@formatdoi: Added macro	50		\@mktitle@ii: Now this macro is obsolete	58
	\if@ACM@authorversion: Added macro	23		\@mktitle@iii: Added processing badges	59
	\maketitle: Added special case of authorversion	53		Made more generic	59
	General: Added anonsuppress environment	22		\@mktitle@iv: Made more generic	59
	Added authorversion option (closes https://github.com/borisveytsman/acmart/issues/9)	22		\@printtopmatter: Added processing badges	55
v1.04	\acmArticleSeq: Name change by Matthew Fluet	45		\@subtitlefont: Added macro	57
	\acmDOI: Name change by Matthew Fluet	45		\@titlefont: Added macro	57
	\acmISBN: Name change by Matthew Fluet	45		\acmBadgeL: Added macro	46
	General: Updated bibliography for siggraph	22		\acmBadgeR: Added macro	46
			v1.07	\if@ACM@badge: Added macro	45
				\maketitle: Corrected a bug with abstract footnotes	53
				Corrected a bug with permission and footnotes order	53
			v1.08	General: SIGPLAN reformatting by Matthew Fluet	22
				Typos corrected (Tobias Pape)	22
			v1.09	General: Revert SIGPLAN caption rules	22
			v1.10	\maketitle: Corrected a bug with doi in manuscript and author version, https://github.com/borisveytsman/acmart/issues/36	53

General: Changes of	v1.14
‘licensedothergov’ wording	\@bibstyle@acmauthoryear: Moved
standardpagestyle: Reversed folios	def of \@bibstyle@acmauthoryear
location	before use
v1.11	\@bibstyle@acmnumeric: Moved def of
General: Customization of ACM	\@bibstyle@numeric before use
theorem styles and proof	General: \@citestyle updates
environment by Matthew Fluet	(Matthew Fluet)
v1.12	Patched \@citestyle
\@marginfigure: Now centering by	v1.15
default	\@ACM@addtoaddress: Added macro
\@marginable: Now centering by	\@mkauthors@iii: New authors
default	system
\@parfont: Moved to	\@shortauthors: Introduced macro
\@section@raggedright	\@typeset@author@bx: Moved to
\@copyrightpermissionfootnoterule:	separate macro
Added macro	\acks: Added macro
\@descriptionlabel: Redefined	\@affiliation: Added code for author
\@footnoterule: Made shorter	groups
\@if@ACM@natbib@override: Added	\author: Added code for author
macro	groups
\@if@ACM@newfonts: Added macro	\city: Added macro
\@maketitle: Moved thanks to	\country: Added macro
copyrightpermission box	\department: Added macro
\@section@raggedright: Introduced	\grantnum: Added macro
macro	\grantsponsor: Added macro
General: Added graceful behavior	\@if@insideauthorgroup: Introduced
when libertine fonts are absent	macro
Documentation updates	\institution: Added macro
v1.13	\@num@authorgroups: Renamed
\@empfootnotetext: Made minipage	\orcid: Introduced macro
footnotes centered	\@position: Added macro
\@bibliographystyle: Redefined	\@postcode: Added macro
macro	\@state: Added macro
\@bibstyle@acmauthoryear: Added	\@streetaddress: Added macro
macro	standardpagestyle: Better handling
\@bibstyle@acmnumeric: Added	of anonymous mode
macro	v1.16
\@if@ACM@printfolios: Added macro	\@headfootfont: Added macro
General: Font adjustments for	General: Formatting header/footer
acmsmall	(Matthew Fluet)
Increased font size for ACM Large	standardpagestyle: Customize
Print bibliographic information by	header/footer text font
default for the proceedings	v1.17
standardpagestyle: Added headers	\@makefnmark: Redefined
for sigs	\@mkauthors: TOG now uses the same
Expanded headers for sigchi-a	authors block as other journals
Suppressed folios if sig	\@mkauthors@ii: Deleted
	\@mkbibcitation: Added \nobreak
	Changed format for sigs

\acmArticle: The default is now numerical	45	v1.19	\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet) .	65
\acmMonth: The default must be numerical. Closes #50.	45		\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet) .	74
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