

# The `acmart` document class

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## 1 Introduction

This is the `acmart` document class, which is based upon the earlier `acmtrans` document style. Unfortunately, the copy of `acmtrans.sty` I'm working from doesn't contain any attributions, so I can't properly credit the original authors, although the original style seems to have been written by Leslie Lamport, with later modifications by Andrew Appel and Rebecca Davies.

The ACM class has two new options:

**preprint** for producing a version of the paper suitable for distribution as a preprint (this is the default)

**faircopy** for producing a version of the paper suitable for submission to the ACM for publication. Currently the only difference is that figures will automatically be put on pages by themselves with appropriate labels at the bottom of the page. In the future, this may also produce other differences to facilitate copy-editing, such as typesetting the text `\raggedright` instead of fully justified.

## 2 The docstrip modules

This code uses the following modules:

2e	generate code for L <sup>A</sup> T <sub>E</sub> X 2 <sub>ε</sub>
209	generate code for L <sup>A</sup> T <sub>E</sub> X 2.09
cls	generate a document class
trans	generate the <code>acmtrans</code> class
bib	generate the <code>acmbib</code> package
driver	generate a driver file for the documentation

## 3 The code

First we output the appropriate header information.

```
1 (*cls)
2 (*209)
3 % <*trans>
4 %\typeout{Document Style 'acmtrans' \fileversion\space <\filedate>
5 %(dmj).}
6 % %</trans>
7 % <*!trans>
8 \typeout{Document Style 'acmart' \fileversion\space <\filedate>
9 (dmj).}
10 % %</!trans>
11 </209)
12 %
13 (*2e)
14 \NeedsTeXFormat{LaTeX2e}
15 % <*trans>
16 % \ProvidesClass{acmart}[\filedate\space\fileversion\space ACM
17 % transactions class (dmj)]
18 % %</trans>
19 % <*!trans>
20 \ProvidesClass{acmart}[\filedate\space\fileversion\space ACM
21 article class (dmj)]
22 % %</!trans>
23 </2e)
```

`\@height` Next we add some useful abbreviations from the L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> kernel to the L<sup>A</sup>T<sub>E</sub>X 2.09 version of the document class.

```
\@width
\@minus 24 (*209)
\@plus 25 \def\@height{height}
26 \def\@width{width}
27 \def\@minus{minus}
28 \def\@plus{plus}
29 \def\hb@xt@{\hbox to}
30 </209)
```

`\if@faircopy`

```
31 \newif\if@faircopy
32 \@faircopyfalse
33 (*2e)
```

```

34
35 \DeclareOption{faircopy}{\@faircopytrue}
36
37 \DeclareOption{preprint}{\@faircopyfalse}
38
39 \DeclareOption{twocolumn}{%
40     \PackageWarningNoLine{acmart}{twocolumn mode is not supported}%
41 }

```

All other options are passed to the article class for processing.

```

42 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{article}}
43
44 \ProcessOptions\relax
45
46 \LoadClass{article}
47 </2e>

```

```

\ds@faircopy
\ds@preprint
\ds@twocolumn
48 <*209>
49 \def\ds@faircopy{\@faircopytrue}
50
51 \def\ds@preprint{\@faircopyfalse}
52
53 \def\ds@twocolumn{%
54     \typeout{Warning! twocolumn mode is not supported by acmart}%
55 }

```

```

56 \@twosidetrue
57 \@mparswitchtrue
58 \def\ds@draft{\overfullrule 5\p@}
59 \@options
60
61 \lineskip \p@
62 \normallineskip \p@
63 \def\baselinestretch{1}
64 \def\@ptsize{0} %needed for amssymbols.sty
65 </209>

```

```

\@normalsize
\normalsize
66 <*209>
67 \def\@normalsize{%
68     \@setsize\normalsize{12\p@}\xpt\xpt
69 </209>
70 <*2e>
71 \renewcommand{\normalsize}{%
72     \@setfontsize\normalsize\xpt\xiipt
73 </2e>
74     \abovedisplayskip 6\p@ \@plus2\p@ \@minus\p@
75     \belowdisplayskip \abovedisplayskip
76     \abovedisplayshortskip 6\p@ \@minus 3\p@
77     \belowdisplayshortskip 6\p@ \@minus 3\p@
78     \let\@listi\@listI
79 }

```

```

\small
80 (*209)
81 \def\small{%
82   \@setsize\small{11\p@}\ixpt\@ixpt
83 }/209)
84 (*2e)
85 \renewcommand{\small}{%
86   \@setfontsize\small\@ixpt{11}%
87 }/2e)
88   \abovedisplayskip 5\p@ \@plus 2\p@ \@minus \p@
89   \belowdisplayskip \abovedisplayskip
90   \abovedisplayshortskip 5\p@ \@minus 2\p@
91   \belowdisplayshortskip 5\p@ \@minus 2\p@
92   \def\@listi{%
93     \leftmargin\leftmargini
94     \topsep 5\p@ \@plus 2\p@ \@minus \p@
95     \parsep \z@ \@plus .7\p@
96     \itemsep 1.6\p@ \@plus .8\p@
97   }%
98 }

\footnotesize
99 (*209)
100 \def\footnotesize{%
101   \@setsize\footnotesize{10pt}\viipt\@viipt
102 }/209)
103 (*2e)
104 \renewcommand{\footnotesize}{%
105   \@setfontsize\footnotesize\@viipt{9.5}%
106 }/2e)
107   \abovedisplayskip 4\p@ \@plus \p@
108   \belowdisplayskip \abovedisplayskip
109   \abovedisplayshortskip 4\p@ \@minus \p@
110   \belowdisplayshortskip 4\p@ \@minus \p@
111   \def\@listi{%
112     \leftmargin\leftmargini
113     \topsep 4\p@ \@plus \p@
114     \parsep \z@ \@plus .5\p@
115     \itemsep \p@ \@plus .7\p@
116   }%
117 }

\scriptsize
\tiny 118 (*209)
\large 119 \def\scriptsize{\@setsize\scriptsize{8\p@}\viipt\@viipt}
\Large 120 \def\tiny{\@setsize\tiny{6\p@}\vpt\@vpt}
\LARGE 121 \def\large{\@setsize\large{14\p@}\xiipt\@xiipt}
\huge 122 \def\Large{\@setsize\Large{18\p@}\xivpt\@xivpt}
\Huge 123 \def\LARGE{\@setsize\LARGE{20\p@}\xviipt\@xviipt}
124 \def\huge{\@setsize\huge{25\p@}\xxpt\@xxpt}
125 \def\Huge{\@setsize\Huge{30\p@}\xxvpt\@xxvpt}
126 }/209)
127 (*2e)
128 \renewcommand{\scriptsize}{\@setfontsize\scriptsize\@viipt\@viipt}

```

```

129 \renewcommand{\tiny}{\@setfontsize\tiny\@vpt\@vpt}
130 \renewcommand{\large}{\@setfontsize\large\@xiipt\@xiipt}
131 \renewcommand{\Large}{\@setfontsize\Large\@xivpt\@xivpt}
132 \renewcommand{\LARGE}{\@setfontsize\LARGE\@xviipt\@xviipt}
133 \renewcommand{\huge}{\@setfontsize\huge\@xxpt\@xxpt}
134 \renewcommand{\Huge}{\@setfontsize\Huge\@xxvpt\@xxvpt}
135 </2e>

```

Added \rom for producing upright parens and numerals in italic text. The 2.09 definition of \rom is taken from `amsart.sty`, version 1.1b, 31 July 1991. – dmj, 4/19/96

```

136 <#209>
137 \def\rom#1{%
138     \leavevmode
139     \skip@\lastskip
140     \unskip\%
141     \ifdim\skip@=\z@\else\hskip\skip@\fi
142     {\rm#1}%
143 }
144 </209>
145 <2e>\let\rom\textup

146 \normalsize
147
148 \oddsidemargin .75in
149 \evensidemargin .75in
150 \marginparwidth .5in
151 \marginparsep .125in
152 \topmargin .25in
153 \headheight 12pt
154 \headsep 16pt
155 <209>\footheight 10pt
156 \footskip 15pt
157
158 \textheight 47pc
159 \textwidth 30pc
160 \columnsep 10pt
161 \columnseprule 0pt
162
163 \footnotesep 7pt
164 \skip\footins 15pt plus 4pt minus 3pt
165
166 \floatsep 12pt plus 2pt minus 2pt
167 \textfloatsep \floatsep
168
169 \intextsep 1pc plus 1pc
170
171 <209>\@maxsep 1pc
172
173 \dblfloatsep 12pt plus 2pt minus 2pt
174
175 \dbltextfloatsep 20pt plus 2pt minus 4pt
176
177 <209>\@dblmaxsep 20pt
178

```

```

179 \@fptop 0pt plus 1fil
180
181 \@fpsep 1pc plus 2fil
182
183 \@fpbot 0pt plus 1fil
184
185 \@dblftop 0pt plus 1fil
186
187 \@dblfpsep 8pt plus 2fil
188
189 \@dblfpbot 0pt plus 1fil
190
191 \marginparpush 6pt
192
193 \parskip 0pt plus .1pt
194
195 % \parindent moved to end
196
197 % \parindent 10pt
198
199 \partopsep 0pt

```

Set `\clubpenalty` and `\widowpenalty` to their maximum values to inhibit widows and orphans. – dmj, 4/17/96

```

200 \clubpenalty\@M
201 \widowpenalty\@M
202
203 (*209)
204 \@lowpenalty 51
205 \@medpenalty 151
206 \@highpenalty 301
207
208 \@beginparpenalty -\@lowpenalty
209 \@endparpenalty -\@lowpenalty
210 \@itempenalty -\@lowpenalty
211 </209>

```

### 3.1 Section headings

```

\c@part
\c@section 212 (*209)
\c@subsection 213 \newcounter {part}
\c@subsubsection 214 \newcounter {section}
\c@paragraph 215 \newcounter {subsection}[section]
216 \newcounter {subsubsection}[subsection]
217 \newcounter {paragraph}[subsubsection]

\thepart
\thesection 218 \def\thepart{\Roman{part}}
\thesubsection 219 \def\thesection{\arabic{section}}
\thesubsubsection 220 \def\thesubsection{\thesection.\arabic{subsection}}
\theparagraph 221 \def\thesubsubsection{\thesubsection.\arabic{subsubsection}}
222 \def\theparagraph{\thesubsubsection.\arabic{paragraph}}
223 </209>

```

```

\if@uhead
224 \newif\if@uhead
225 \uheadfalse
226
227 (209)\setcounter{secnumdepth}{3}

\part
228 \def\part{%
229   \@startsection{part}{9}{\z@}{-10\p@ \@plus -4\p@ \@minus -2\p@}
230   {4\p@}{\normalsize\sf\@uheadtrue}%
231 }

\section
232 \def\section{%
233   \@startsection{section}{1}{\z@}{-10\p@ \@plus -4\p@ \@minus -2\p@}%
234   {4\p@}{\normalsize\sf\@uheadtrue}%
235 }

\subsection
236 \def\subsection{%
237   \@startsection{subsection}{2}{\z@}{-8\p@ \@plus -2\p@ \@minus -\p@}
238   {4\p@}{\normalsize\sf}%
239 }

\subsubsection
240 \def\subsubsection{%
241   \@startsection{subsubsection}{3}{\parindent}{6\p@ \@plus \p@}%
242   {-5\p@}{\normalsize\it}%
243 }

\paragraph
244 \def\paragraph{%
245   \@startsection{paragraph}{3}{\parindent}{6\p@ \@plus \p@}%
246   {-5\p@}{\normalsize\it}%
247 }

\@period \subsubsections and \paragraphs are set as run-in headings, with a period added
after the heading. However, if the text immediately following the \subsubsection
or \paragraph is either another section header or (more likely) a list of some sort,
then the period should be omitted, since the heading will be put on a line by
itself. This is implemented in a rather grotty way using \@period and modifying
\@startsection, \@xsect, and \@trivlist.
248 \let\@period=.

\@startsection
249 \def\@startsection#1#2#3#4#5#6{%
250   \if@noskipsec
251     \global\let\@period\@empty
252     \leavevmode
253     \global\let\@period.%
254   \fi
255   \par

```

```

256 \@tempskipa #4\relax
257 \@afterindenttrue
258 \ifdim \@tempskipa <\z@
259     \@tempskipa -\@tempskipa
260     \@afterindentfalse
261 \fi
262 \if@nobreak
263     \everypar{}%
264 \else
265     \addpenalty\@secpenalty
266     \advspace\@tempskipa
267 \fi
268 \@ifstar
269     {\@ssect{#3}{#4}{#5}{#6}}
270     {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}%
271 }

```

`\@sect`

```

272 \def\@sect#1#2#3#4#5#6[#7]#8{%
273     \ifnum #2>\c@secnumdepth
274         \let\@svsec\@empty
275     \else
276         \refstepcounter{#1}%
277 (*209)
278         \edef\@svsec{%
279             \begingroup
280                 \ifnum#2>2 \noexpand\rm \fi
281                 \csname the#1\endcsname
282             \endgroup
283             \ifnum #2=1\relax .\fi
284             \hskip .5em
285         }%
286 (/209)
287 (*2e)
288         \protected@edef\@svsec{%
289             \textup{\csname the#1\endcsname}%
290             \ifnum #2=1\relax .\fi
291             \hskip .5em
292         }%
293 (/2e)
294 \fi
295 \@tempskipa #5\relax
296 \ifdim \@tempskipa>\z@
297     \begingroup
298         #6\relax
299         \@hangfrom{\hskip #3\relax\@svsec}%
300     \begingroup
301     \interlinepenalty \@M

```

Unfortunately, we're probably stuck with this. (Or we could redefine `\@M` :-)

It might be worthwhile defining a variant of `\@startsection` that first uppercases the title and then just passes everything along to `\@startsection`. That would make us a little more bullet-proof, since we wouldn't have to worry about tracking future changes in `\@sect`. But it might be more trouble than it's really



worth.

```
302         \if@uhead
303             \uppercase{#8}%
304         \else
305             #8%
306         \fi
307         \par
308     \endgroup
309 \endgroup
310 \csname #1mark\endcsname{#7}%
311 \addcontentsline{toc}{#1}{%
312     \ifnum #2>\c@secnumdepth \else
313         \protect\numberline{\csname the#1\endcsname}%
314     \fi
315     #7%
316 }%
317 \else
318     \def\@svsechd{%
319         #6%
320         \hskip #3\relax
321         \@svsec
322         \if@uhead
323             \uppercase{#8}%
324         \else
325             #8%
326         \fi
327         \csname #1mark\endcsname{#7}%
328         \addcontentsline{toc}{#1}{%
329             \ifnum #2>\c@secnumdepth \else
330                 \protect\numberline{\csname the#1\endcsname}%
331             \fi
332             #7%
333         }%
334     }%
335 \fi
336 \@xsect{#5}%
337 }
```

\@xsect

```
338 \def\@xsect#1{%
339     \@tempskipa #1\relax
340     \ifdim \@tempskipa>\z@
341         \par
342         \nobreak
343         \vskip \@tempskipa
344         \@afterheading
345     \else
346         \global\@nobreakfalse
347         \global\@noskipsectrue
348         \everypar{%
349             \if@noskipsec
350                 \global\@noskipsecfalse
351                 \clubpenalty\@M
352                 \hskip -\parindent
```

```

353             \begingroup
354             \@svsechd
           Can't we decide here whether to put the period in? Might have to introduce
           a new flag, though. How unpleasant.
355             \@period
356             \endgroup
357             \unskip
358             \@tempskipa #1\relax
359             \hskip -\@tempskipa
360         \else
361             \clubpenalty \@clubpenalty
362             \everypar{}%
363         \fi
364     }%
365 \fi
366 \ignorespaces
367 }

```

Q. What is \@period doing in \@trivlist?

A. To handle the case where a trivlist is the first item after a \subsubsection or \paragraph.

Surely there has to be a better way of handling this.

\@trivlist

```

368 \def\@trivlist{%
369     \@topsepadd\topsep
370     \if@noskipsec
371         \global\let\@period\@empty
372         \leavevmode
373         \global\let\@period.%
374     \fi
375     \ifvmode
376         \advance\@topsepadd\partopsep
377     \else
378         \unskip
379         \par
380     \fi
381     \if@inlabel
382         \@noparitemtrue
383         \@noparlisttrue
384     \else
385         \@noparlistfalse
386         \@topsep\@topsepadd
387     \fi
388     \advance\@topsep \parskip
389     \leftskip\z@skip
390     \rightskip\@rightskip
391     \parfillskip\@flushglue
392 (*2e)
393     \par@deathcycles\z@
394     \@setpar{%
395         \if@newlist
396             \advance\par@deathcycles\@ne

```

```

397         \ifnum\par@deathcycles>\@m
398             \@noitemerr{\@par}%
399         \fi
400     \else
401         {\@par}%
402     \fi
403 }%
404 /2e)
405 (209) \setpar{\if@newlist\else{\@par}\fi}
406 \global\@newlisttrue
407 \outerparskip\parskip
408 }

```

## 3.2 Appendices

```

409 (*trans)
410 \newcommand{\apbf}{\small\bf}
411 %% \newfont{\apbf}{cmbx9}

```

```

\@withappendix Page numbering style for appendices
412 \def\@withappendix#1{\rm A--\number #1}

```

appenheader

```

413 \def\appenheader{%
414 (209) \global\@topnum\z@
415 (209) \global\@botroom \textheight
416 (2e) \suppressfloats[t]%
417 (209) \begin{@float}{figure}[b]
418 (2e) \begin{@float}{figure}![b]
419     \footnotesize
420     \newfont{\sc}{cmcsc10}% %%* ACK!
421     \parindent\z@
422     \null
423     \vskip -\textfloatsep
424     \vskip 11\p@
425     \hrule \@height .2\p@ \@width 30pc
426     \vskip 2\p@
427     \rule{\z@}{10\p@}%
428     \ignorespaces
429 }
430
431 \def\endappenheader{%
432     \end{@float}
433     \global\let\appendixhead\@empty
434 }

```

\appendixhead

```

435 \long\def\appendixhead#1#2#3#4{%
436     \section*{Appendix}
437
438     An appendix to this paper is available in electronic form
439     (PostScript™ TM). Any of the following methods
440     may be used to obtain it; or see the inside back cover of a
441     current issue for up-to-date instructions.

```

```

442
443 \begin{itemize}
444 \item By anonymous ftp from {\apbf acm.org}, file
445 {\apbf [pubs.journals.#1.append]p#2.ps}
446 \item Send electronic mail to {\apbf mailserve@acm.org} containing
447 the line\ \ {\apbf send~[anonymous.pubs.journals.#1.append]p#2.ps}
448 \item By {\it Gopher} from {\apbf acm.org}
449 \item By anonymous ftp from {\apbf ftp.cs.princeton.edu},
450 file {\apbf pub/#1/append/p#2.ps}
451 \item Hardcopy from {\it Article Express}, for a fee: phone
452 800-238-3458, fax 201-216-8526, or write P.O.~Box~1801, Hoboken NJ
453 07030; and request {\sc acm-#1-appendix-{\small #2}}.
454 \end{itemize}
455
456 \clearpage
457 \pagenumbering{withappendix}
458 \appendix
459 \par
460 \noindent{\sc this document is the appendix to the following
461 paper:}
462 \hfill
463 \vskip 1em
464 \vbox{\sf \parindent\z@\@title}%
465 \vskip .5em
466 \vbox{\sf \parindent\z@\@author}%
467 \vskip .5em\noindent
468 \vskip 10\p@\noindent #4
469 \vskip 11\p@\noindent
470 \hrule \@height .2\p@
471 \par
472 \begin{bottomstuff}
473 \permission
474 \copyright #3 ACM
475 \par
476 \end{bottomstuff}
477 }
478 </trans>

```

\appendix

```

479 \def\appendix{%
480 \par
481 \part{Appendix}%
482 \par
483 \setcounter{section}{0}%
484 \setcounter{subsection}{0}%
485 \def\thesection{\Alph{section}}%
486 \def\thesubsection{\thesection.\arabic{subsection}}%
487 }

```

### 3.3 Lists

```

488 \labelsep 5pt
489
490 \settowidth{\leftmargin}{(9)}

```

```

491 \addtolength\leftmargini\labelsep
492
493 \settowidth{\leftmarginii}{(b)}
494 \addtolength\leftmarginii\labelsep
495
496 \leftmarginiii \leftmarginii
497 \leftmarginiv \leftmarginii
498 \leftmarginv \leftmarginii
499 \leftmarginvi \leftmarginii
500 \leftmargin \leftmargini
501
502 \labelwidth\leftmargini
503 \advance\labelwidth-\labelsep

\@listI
\@listi 504 \def\@listI{%
505     \leftmargin\leftmargini
506     \parsep \z@ \@plus \p@
507     \topsep 6\p@ \@plus 2\p@ \@minus 2\p@
508     \itemsep 2\p@ \@plus \p@ \@minus .5\p@
509 }
510
511 \let\@listi\@listI
512
513 \@listi

\@listii
514 \def\@listii{%
515     \leftmargin\leftmarginii
516     \labelwidth\leftmarginii
517     \advance\labelwidth-\labelsep
518     \topsep \z@ \@plus \p@
519     \parsep \z@ \@plus .5\p@
520     \itemsep \parsep
521 }

\@listiii
522 \def\@listiii{%
523     \leftmargin\leftmarginiii
524     \labelwidth\leftmarginiii
525     \advance\labelwidth-\labelsep
526     \topsep \z@ \@plus \p@
527     \parsep \z@ \@plus .5\p@
528     \itemsep \parsep
529 }

\@listiv
530 \def\@listiv{%
531     \leftmargin\leftmarginiv
532     \labelwidth\leftmarginiv
533     \advance\labelwidth-\labelsep
534 }

\@listv

```

```

535 \def\@listv{%
536   \leftmargin\leftmarginv
537   \labelwidth\leftmarginv
538   \advance\labelwidth-\labelsep
539 }

```

\@listvi

```

540 \def\@listvi{%
541   \leftmargin\leftmarginvi
542   \labelwidth\leftmarginvi
543   \advance\labelwidth-\labelsep
544 }

```

enumerate

```

545 \def\enumerate{%
546   \ifnum \@enumdepth >3
547     \@toodeep
548   \else
549     \advance\@enumdepth \@ne
550     \edef\@enumctr{enum\romannumeral\the\@enumdepth}%
551     \list{\csname label\@enumctr\endcsname}{%
552       \usecounter{\@enumctr}%
553       \def\makelabel##1{##1\hss}}%
554     }%
555   \fi
556 }
557
558 \let\endenumerate\endlist

```

longenum

```

559 (*trans)
560 \def\longenum{%
561   \ifnum \@enumdepth >3
562     \@toodeep
563   \else
564     \advance\@enumdepth \@ne
565     \edef\@enumctr{enum\romannumeral\the\@enumdepth}%
566     \list{\csname label\@enumctr\endcsname}{%
567       \usecounter{\@enumctr}%
568       \labelwidth\z@
569     }%
570   \fi
571 }
572 %\leftmargin\z@ \itemindent\parindent}\fi} - this indents each item in
573 %   enumerate
574
575 \let\endlongenum\endlist
576 </trans)

```

Added \rom around all list labels. - dmj, 4/19/96

```

577 \def\labelenumi{\rom{(\arabic{enumi})}}
578 \def\theenumi{\arabic{enumi}}
579 \def\labelenumii{\rom{(\alph{enumii})}}
580 \def\theenumii{\alph{enumii}}

```

```

581 \def\p@enumii{\rom{\theenumi}}
582 \def\labelenumiii{\rom{\roman{enumiii}.}}
583 \def\theenumiii{\roman{enumiii}}
584 \def\p@enumiii{\rom{\theenumi(\theenumii)}}
585 \def\labelenumiv{\rom{\Alph{enumiv}.}}
586 \def\theenumiv{\Alph{enumiv}}
587 \def\p@enumiv{\rom{\p@enumiii\theenumiii}}

```

#### itemize

```

588 \def\itemize{%
589   \list{---\hskip -\labelsep}{%
590     \settowidth{\leftmargin}{---}%
591     \labelwidth\leftmargin
592     \addtolength{\labelwidth}{-\labelsep}%
593   }%
594 }
595
596 \let\enditemize\endlist

```

#### longitem

```

597 (*trans)
598 \def\longitem{%
599   \list{---}{%
600     \labelwidth\z@
601     \leftmargin\z@
602     \itemindent\parindent
603     \advance\itemindent\labelsep
604   }%
605 }
606
607 \let\endlongitem\endlist
608 </trans>

```

#### verse

```

609 \def\verse{%
610   \let\@=\@centercr
611   \list{}{%
612     \leftmargin 2pc
613     \itemindent -1.5em
614     \listparindent \itemindent
615     \rightmargin\leftmargin
616     \advance\leftmargin 1.5em
617   }%
618   \item[]
619 }
620
621 \let\endverse\endlist

```

#### quotation

```

622 \def\quotation{%
623   \list{}{%
624     \leftmargin 2pc
625     \listparindent .5em
626     \itemindent\listparindent

```

```

627     \rightmargin\leftmargin
628     \parsep \z@ \@plus \p@
629   }%
630   \item[]
631 }
632
633 \let\endquotation=\endlist

```

**quote**

```

634 \def\quote{%
635   \list{}{%
636     \leftmargin 2pc
637     \rightmargin\leftmargin
638   }%
639   \item[]
640 }
641
642 \let\endquote=\endlist

```

**description**

```

643 \def\description{%
644   \list{}{%
645     \listparindent\parindent
646     \labelwidth\z@
647     \leftmargin\z@
648     \itemindent\parindent
649     \advance\itemindent\labelsep
650     \def\makelabel##1{\it ##1.}%
651   }%
652 }
653
654 \let\enddescription\endlist

```

**describe**

```

655 \def\describe#1{%
656   \list{}{%
657     \listparindent\parindent
658     \settowidth{\labelwidth}{#1}%
659     \leftmargin\labelwidth
660     \addtolength\leftmargin\labelsep
661     \def\makelabel##1{##1\hfil}%
662   }%
663 }
664
665 \let\enddescribe\endlist

```

**program** There must be a more robust way of doing this. Should really do it by checking we are in a figure, but that would require some added bookkeeping.

```

666 \def\program{%
667 (209) \ifx\@currsize\normalsize
668 (2e) \ifdim\fontsize pt=10pt
669   \small
670 \else
671   \rm

```



```

672     \fi
673     \tabbing
674 }
675
676 \let\endprogram\endtabbing

```

### 3.4 Theorems and proofs

```
\@begintheorem
```

```

677 \def\@begintheorem#1#2{%
678     \trivlist
679     \item[%
        The following two lines seem a little peculiar (repeated 5 times).
680         \hskip \parindent
681         \hskip \labelsep
682         {\sc #1\enskip #2.}%
683     ]\it
684 }

```

```
\@opargbegintheorem
```

```

685 \def\@opargbegintheorem#1#2#3{%
686     \trivlist
687     \item[%
688         \hskip \parindent
689         \hskip \labelsep
690         \begingroup
691             \savebox\@tempboxa{\sc #3}%
692             {\sc #1}%
693             \enskip #2%
694             \ifdim \wd\@tempboxa>\z@
695                 \enskip
        Added parentheses around subtitle of lemma. – dmj, 4/19/96
696                 (\box\@tempboxa)%
697             \fi.%
698         \endgroup
699     ]\it
700 }

```

```
\if@qeded
```

```

701 \newif\if@qeded
702 \global\@qededfalse

```

```
proof
```

```

703 \def\proof{%
704     \global\@qededfalse
705     \@ifnextchar[{\@xproof}{\@proof}%
706 }
707
708 \def\endproof{%
709     \if@qeded\else\qed\fi
710     \endtrivlist
711 }

```

```

\@proof
712 \def\@proof{%
713   \trivlist
714   \item[%
715     \hskip \parindent
716     \hskip \labelsep
717     {\sc Proof.}]%
718   ]
719   \ignorespaces
720 }

\@xproof
721 \def\@xproof[#1]{%
722   \trivlist
723   \item[\hskip\parindent \hskip\labelsep{\sc Proof #1.}]%
724   \ignorespaces
725 }

\qed
726 \def\qed{%
727   \unskip
728   \kern 10\p@
729   \begingroup
730     \unitlength\p@
731     \linethickness{.4\p@}%
732     \framebox(6,6){}%
733   \endgroup
734   \global\@qededtrue
735 }

\newdef
736 \def\newdef#1#2{%
737   \expandafter\@ifdefinable\csname #1\endcsname
738     {\@definecounter{#1}%
739     \expandafter\xdef\csname the#1\endcsname{\@thmcounter{#1}}%
740     \global\@namedef{#1}{\@defthm{#1}{#2}}%
741     \global\@namedef{end#1}{\@endtheorem}%
742   }%
743 }

\@defthm
744 \def\@defthm#1#2{%
745   \refstepcounter{#1}%
746   \@ifnextchar[{\@ydefthm{#1}{#2}}{\@xdefthm{#1}{#2}}%
747 }

\@xdefthm
748 \def\@xdefthm#1#2{%
749   \@begindef{#2}{\csname the#1\endcsname}%
750   \ignorespaces
751 }

```

`\@ydefthm`

```
752 \def\@ydefthm#1#2[#3]{%
753   \trivlist
754   \item[%
755     \hskip \parindent
756     \hskip \labelsep
757     \begingroup
758       \savebox\@tempboxa{\it #3}%
759       {\it #2}%
760       \enskip \csname the#1\endcsname
761       \ifdim \wd\@tempboxa>\z@
762         \enskip
```

The following is inconsistent with the corresponding line in `\opargbegintheorem`.

```
763       \rom(\box\@tempboxa\rom)%
764       \fi.%
765     \endgroup
766   ]%
767   \ignorespaces
768 }
```

`\@begindef`

```
769 \def\@begindef#1#2{%
770   \trivlist
771   \item[%
772     \hskip \parskip
773     \hskip \labelsep
```

The following is inconsistent with the corresponding line in `\opargbegintheorem`.

```
774     {\it #1\enskip \rom{#2}.}%
775   ]%
776 }
```

`\theequation`

```
777 \def\theequation{\arabic{equation}}
```

`titlepage`

```
778 \def\titlepage{%
779   \@restonecolfalse
780   \if@twocolumn
781     \@restonecoltrue
782     \onecolumn
783   \else
784     \newpage
785   \fi
786   \thispagestyle{empty}%
787   \c@page\z@
788 }
789
790 \def\endtitlepage{%
791   \if@restonecol
792     \twocolumn
793   \else
794     \newpage
```

```

795     \fi
796 }

797 \arraycolsep 2.5pt
798
799 (*209)
800 \tabcolsep 6pt
801 \arrayrulewidth .4pt
802 \doublerulesep 2pt
803 \tabbingsep \labelsep
804
805 \skip\@mpfootins = \skip\footins
806 \fboxsep = 3pt \fboxrule = .4pt
807 \!/209)

```

### 3.5 Tables of contents

```

\@pnumwidth
\@tocrmarg 808 (*209)
  \dotsep 809 \def\@pnumwidth{1.55em}
\c@tocdepth 810 \def\@tocrmarg {2.55em}
  811 \def\dotsep{4.5}
  812 \setcounter{tocdepth}{3}

\tableofcontents

813 \def\tableofcontents{%
814     \section*{Contents\@mkboth{CONTENTS}{CONTENTS}}
815     \@starttoc{toc}%
816 }

\l@part

817 \def\l@part#1#2{%
818     \addpenalty\@secpenalty
819     \addvspace{2.25em \@plus \p@}%
820     \begingroup
821         \@tempdima 3em
822         \parindent \z@
823         \rightskip \@pnumwidth
824         \parfillskip -\@pnumwidth
825         \begingroup
826             \large
827             \bf
828             \leavevmode
829             #1%
830             \hfil
831             \hb@xt@\@pnumwidth{\hss #2}%
832         \endgroup
833     \par
834     \nobreak
835     \endgroup
836 }

\l@section

```

```

837 \def\l@section#1#2{%
838     \addpenalty\secpenalty
839     \addvspace{1.0em \@plus \p@}%
840     \@tempdima 1.5em
841     \begingroup
842         \parindent \z@
843         \rightskip \@pnumwidth
844         \parfillskip -\@pnumwidth
845         \bf
846         \leavevmode
847         #1%
848         \hfil
849         \hb@xt@\@pnumwidth{\hss #2}%
850         \par
851     \endgroup
852 }

\l@section
\l@subsection 853 \def\l@subsection{\@dottedtocline{2}{1.5em}{2.3em}}
854
855 \def\l@subsubsection{\@dottedtocline{3}{3.8em}{3.2em}}

\listoffigures
\l@figure 856 \def\listoffigures{%
857     \section*{List of Figures\@mkboth{LIST OF FIGURES}{LIST OF FIGURES}}
858     \@starttoc{lof}%
859 }
860
861 \def\l@figure{\@dottedtocline{1}{1.5em}{2.3em}}

\listoftables
\l@table 862 \def\listoftables{%
863     \section*{List of Tables\@mkboth{LIST OF TABLES}{LIST OF TABLES}}
864     \@starttoc{lot}%
865 }
866
867 \let\l@table\l@figure
868 </209)

```

### 3.6 Bibliographies and indexes

thebibliography Which is the correct definition, this one or the one at the end of the file?

```

869 \def\thebibliography#1{%
870     \par
871     \footnotesize
872     \@startsection{subsection}{2}{\z@}{16\p@ \@plus 2\p@ \@minus \p@}
873     {2\p@}{\sf}*{\uppercase{\refname}}
874     \list{\arabic{enumi}.}{%
875         \settowidth\labelwidth{99.}%
876         \leftmargin\labelwidth
877         \advance\leftmargin\labelsep
878         \topsep \z@
879         \parsep \z@ \@plus .1\p@

```

```

880     \itemsep \parsep
881     \usecounter{enumi}%
882   }%
883   \def\newblock{\hskip .11em \@plus .33em \@minus .07em}%
884   \sloppy
885   \widowpenalty4500
886   \clubpenalty4500
887   \sfcode'\.=1000
888   \relax
889 }
890
891 \let\endthebibliography=\endlist

\if@restonecol
892 (*209)
893 \newif\if@restonecol

  theindex
894 \def\theindex{%
895   \@restonecoltrue
896   \if@twocolumn \@restonecolfalse \fi
897   \columnseprule \z@
898   \columnsep 35\p@
899   \twocolumn[section*{Index}]
900   \@mkboth{INDEX}{INDEX}%
901   \thispagestyle{plain}%
902   \parindent\z@
903   \parskip\z@ \@plus .3\p@\relax
904   \let\item\@idxitem
905 }
906
907 \def\endtheindex{%
908   \if@restonecol
909     \onecolumn
910   \else
911     \clearpage
912   \fi
913 }

  \@idxitem
  \subitem 914 \def\@idxitem{\par\hangindent 40\p@}
  \subsubitem 915 \def\subsubitem{\par\hangindent 40\p@ \hspace*{20\p@}}
  \indexspace 916 \def\subsubitem{\par\hangindent 40\p@ \hspace*{30\p@}}
917 \def\indexspace{\par \vskip 10\p@ \@plus 5\p@ \@minus 3\p@\relax}
918 (/209)

\footnoterule This is supposed to be of 0 overall height.
                Wait a minute. Height .004 points? Surely joking.
919 \def\footnoterule{%
920   \kern-3\p@
921   \hrule \@width 47\p@ \@height .004\p@
922   \kern 2.6\p@
923 }

```

### 3.7 Floats and captions

```

\@makefntext
924 \long\def\@makefntext#1{%
925     \parindent 1em
926     \noindent $^{\@thefnmark}$#1%
927 }

\c@topnumber    Changed float placement parameters in an attempt to enforce the ACM's styles.
\topfraction    In particular, set bottomnumber and \bottomfraction to 0 to inhibit floats from
\c@bottomnumber appearing at the bottom of a page. There should be a minimum of four lines of
\bottomfraction text on a page, so \textfraction should be set to
\c@totalnumber
\textfraction   
$$4 \times \left( \frac{\text{\baselineskip}}{\text{\textheight}} \right) = 4 \times \left( \frac{1 \text{ pc}}{47 \text{ pc}} \right) \approx .085106$$

\floatpagefraction
\c@dbltopnumber We'll round this up to .086 since it's probably better to require a little more than
\dbltopfraction we need than to risk allowing less than we want. Finally, we set \topfraction
\dblfloatpagefraction to .92 so that floats at the top of a page will be allowed to take up as
                    much as  $1 - \text{\textfraction}$  of the page. [Note: need to check what value of
                    \floatpagefraction should be.] – dmj, 4/17/96

928 (209)\setcounter{topnumber}{2}
929 \def\topfraction{.92}
930 \setcounter{bottomnumber}{0}
931 \def\bottomfraction{0}
932 (209)\setcounter{totalnumber}{3}
933 \def\textfraction{.086}
934 \def\floatpagefraction{.6}
935 (209)\setcounter{dbltopnumber}{2}
936 (209)\def\dbltopfraction{.7}
937 (209)\def\dblfloatpagefraction{.5}

\@makecaption   Changed colon to period in “long caption” case. [8/14/95–dmj]
                We should think about consolidating and/or merging some of the numerous
                caption macros. For example, \nocaption would be unnecessary if \caption
                did something sensible when handed an empty argument. Also, much of
                \@makecaption is identical to code found elsewhere, and should probably be
                shared.

938 \long\def\@makecaption#1#2{%
939     \vskip 1pc
940     \setbox\@tempboxa\hbox{#1.\quad #2}%
941     \ifdim \wd\@tempboxa >\hsize
942         #1.\quad #2\par
943     \else
944         \centerline{\box\@tempboxa}%
945     \fi
946 }

\nocaption
947 \def\nocaption{%
948     \refstepcounter\@capttype
949     \par
950     \vskip 1pc

```

```

951   \centerline{\footnotesize \csname fnum@\@capytype \endcsname}%
952 }

\c@figure
\thefigure 953 (209)\newcounter{figure}
\fps@figure 954 \def\thefigure{\@arabic\c@figure}
\ftype@figure Changed \fps@figure from “tbp” to “tp” so that tables will only occur at the
\ext@figure top of pages by default. Note that the author can still override this with an
\figurename explicit optional argument on a figure or table environment, but that case should
\fnum@figure be taken care of by having bottomnumber and \bottomfraction both set to 0.
Also changed \fps@table accordingly. – dmj, 4/17/96

955 \def\fps@figure{tp}
956 \def\ftype@figure{1}
957 \def\ext@figure{lof}
958 \def\figurename{Fig.}
959 \def\fnum@figure{\figurename~\thefigure}

\figfilename
\@figfilename 960 \def\figfilename{\gdef\@figfilename}
961 \let\@figfilename\@empty

figure If producing fair copy, we force each figure onto a page by itself by (a) forcing a
placement specifier of “p” and (b) resizing the figure to be a full page in height.

962 \if@faircopy
963 (209) \newenvironment{figure}{%
964 (2e) \renewenvironment{figure}[1][p]{%
965 \let\normalsize\footnotesize
966 \normalsize
967 (209) \ifnextchar[{\@figure}{\@figure []}%
968 (2e) \@float{figure}[p]%
969 }{\end@float
970 \global\setbox\@currbox\vbox to\textheight{%
971 \vskip\@fptop
972 \unvbox\@currbox
973 \vskip\@fpbot

What to do about figures with no numbers? Should we issue a warning? Should
check with ACM to make sure that a caption number is always required.

974 \noindent \fnum@figure
975 \ifx\@figfilename\@empty\else
976 : {\tt \@figfilename}%
977 \global\let\@figfilename\@empty
978 \fi
979 }%
980 }
981 \else
982 (209) \newenvironment{figure}{%
983 (2e) \renewenvironment{figure}{%
984 \let\normalsize\footnotesize
985 \normalsize
986 \@float{figure}
987 }{\end@float}
988 \fi

```



```

\@figure
989 (209)\def\@figure[#1]{\@float{figure}[p]}

figure* We don't support twocolumn mode, so figure* is identical to figure.
990 \expandafter\let\csname figure*\endcsname\figure
991 \expandafter\let\csname endfigure*\endcsname\endfigure

table
992 (209)\newenvironment{table}{%
993 (2e)\renewenvironment{table}{%
994 \let\normalsize\footnotesize
995 \normalsize
996 \@float{table}%
997 }\end@float}

table*
998 \expandafter\let\csname table*\endcsname\table
999 \expandafter\let\csname endtable*\endcsname\endtable

\thetable See documentation of \fps@figure. – dmj, 4/17/96
\c@table 1000 (209)\newcounter{table}
\fps@table 1001 \def\thetable{\@Roman\c@table}
\ftype@table 1002 \def\fps@table{tp}
\ext@table 1003 \def\ext@table{2}
\tablename 1004 \def\ext@table{lot}
\fnum@table 1005 \def\tablename{Table}
1006 \def\fnum@table{\tablename~\thetable}

\@narrowfig
\@nfigbox 1007 \newdimen\@narrowfig
\@nfcapbox 1008 \newbox\@nfcapbox
\if@nfeven 1009 \newbox\@nfcapbox
1010 \newif\if@nfeven

acmtable
1011 \def\acmtable#1{%
1012 \@narrowfig #1\relax
1013 \let\caption\@atcap
1014 \let\nocaption\@atnocap
1015 \@ifnextchar[{\@ntab}{\@ntab[\fps@table]}%
1016 }
1017
1018 \def\@ntab[#1]{%
1019 \expandafter\table\expandafter[#1]%
1020 \setbox\@nfigbox\ vbox\bgroup
1021 \hsize \@narrowfig
1022 \@parboxrestore
1023 }
1024
1025 \def\endacmtable{%
1026 \hb@xt@\textwidth{%
1027 \hfil
1028 \vbox{%

```

```

1029         \hsize \@narrowfig
1030         \box\@nfcapbox{%
1031             \baselineskip 4\p@
1032             \hbox{\vrule \@height .4\p@ \@width \hsize}%
1033         }%
1034         \vskip -\p@
1035         \box\@nfigbox
1036         \vskip -\p@
1037         \begingroup
1038             \baselineskip 4\p@
1039             \hbox{\vrule \@height .4\p@ \@width \hsize}%
1040         \endgroup
1041     }%
1042     \hfil
1043 }%
1044 \end@float
1045 }

```

\@atmakecap

```

1046 \def\@atmakecap#1#2{%
1047     \setbox\@tempboxa\hbox{#1.\quad #2}%
1048     \ifdim \wd\@tempboxa >\hsize
1049         \sloppy #1.\quad #2 \par
1050     \else
1051         \centerline{\box\@tempboxa}%
1052     \fi
1053 }

```

\@atcap

```

1054 \def\@atcap{%
1055     \par
1056     \egroup
1057     \refstepcounter\@capttype
1058     \@dblarg{\@atcapx\@capttype}%
1059 }

```

\@atcapx

```

1060 \long\def\@atcapx#1[#2]#3{%
1061     \addcontentsline{\csname ext@#1\endcsname}{#1}{%
1062         \protect\numberline{\csname the#1\endcsname}{\ignorespaces #2}%
1063     }%
1064     \setbox\@nfcapbox\vbox{%
1065         \hsize \wd\@nfigbox
1066         \@parboxrestore
1067         \@atmakecap{\csname fnum@#1\endcsname}{\ignorespaces #3}%
1068     \par
1069     }%
1070 }

```

\@atnocap

```

1071 \def\@atnocap{%
1072     \egroup
1073     \refstepcounter\@capttype
1074     \setbox\@nfcapbox\vbox{%

```

```

1075         \hsize \wd\@nfigbox
1076         \centerline{\footnotesize \fnum@table}
1077     }%
1078 }

```

narrowfig

```

\@nfig 1079 \def\narrowfig#1{%
1080     \@narrowfig #1\relax
1081     \let\caption\@nfcap
1082     \let\nocaption\@nfnocap
1083     \ifnextchar[{\@nfig}{\@nfig[\fps@figure]}%
1084 }
1085
1086 \def\@nfig[#1]{%
1087     \expandafter\figure\expandafter[#1]%
1088     \setbox\@nfigbox\vbox\bgroup
1089         \hsize\@narrowfig
1090         \@parboxrestore
1091 }
1092
1093 \def\endnarrowfig{%
1094     \hb@xt@\textwidth{%
1095         \if@nfeven
1096             \box\@nfcapbox \hfil \box\@nfigbox
1097         \else
1098             \box\@nfigbox \hfil \box\@nfcapbox
1099         \fi
1100     }%
1101 %     \end@float
1102 \endfigure
1103 }

```

Ah ha! So captions have to go at end of figure, not before. Seems a little unfriendly. Actually, it's necessary for narrowfig, but doesn't seem to be necessary for acmtable.

\@nfcap

```

1104 \def\@nfcap{%
1105     \par
1106     \egroup
1107     \refstepcounter\@capttype
1108     \@dblarg{\@nfcapx\@capttype}%
1109 }

```

\@nfmakecap

```

1110 \def\@nfmakecap #1#2{%
1111     \setbox\@tempboxa\hbox{#1.\quad #2}%
1112     \ifdim \wd\@tempboxa >\hsize
1113         \sloppy #1.\quad #2 \par
1114     \else
1115         \@@line{%
1116             \if@nfeven\else\hfil\fi
1117             \box\@tempboxa
1118             \if@nfeven\hfil\fi

```

```

1119     }%
1120     \fi
1121 }

```

`\@nfcapx`

```

1122 \long\def\@nfcapx#1[#2]#3{%
1123     \addcontentsline{\csname ext@#1\endcsname}{#1}{%
1124         \protect\numberline{\csname the#1\endcsname}{\ignorespaces #2}}%
1125     }%
1126     \@seteven
1127     \setbox\@nfcapbox\vbox to \ht\@nfigbox{%
1128         \hsize \textwidth
1129         \advance\hsize -2pc
1130         \advance\hsize -\wd\@nfigbox
1131         \@parboxrestore
1132         \vfil
1133         \@nfmakcap{\csname fnum@#1\endcsname}{\ignorespaces #3}}%
1134     \par
1135     \vfil
1136 }%
1137 }

```

`\@fnocap`

```

1138 \def\@fnocap{%
1139     \egroup
1140     \refstepcounter\@capttype
1141     \@seteven
1142     \setbox\@nfcapbox\vbox to \ht\@nfigbox{%
1143         \hsize \textwidth
1144         \advance\hsize -2pc
1145         \advance\hsize -\wd\@nfigbox
1146         \@parboxrestore
1147         \vfil
1148         \@@line{%
1149             \if@nfeven\else\hfil\fi
1150             \footnotesize \fnum@figure
1151             \if@nfeven\hfil\fi
1152         }%
1153         \vfil
1154     }%
1155 }

```

`\@seteven`

```

\@nfmmsg 1156 \def\@seteven{%
1157     \@nfeventrue
1158     \@ifundefined{r@nf\thefigure}{-}{%
1159         \edef\@tmpnf{\csname r@nf\thefigure\endcsname}%
1160         \edef\@tmpnf{\expandafter\@cdr\@tmpnf\@nil}%
1161         \ifodd\@tmpnf\relax
1162         \@nfevenfalse
1163     \fi
1164     }%
1165     \label{nf\thefigure}%
1166     \edef\@tmpnfx{\if@nfeven e\else o\fi}%

```

```

1167 \edef\@tmpnf{%
1168   \write\@unused{%
1169     \noexpand\ifodd \noexpand\c@page
1170       \noexpand\if \@tmpnfx e%
1171         \noexpand\@nfmsg{\thefigure}
1172       \noexpand\fi
1173     \noexpand\else
1174       \noexpand\if \@tmpnfx o%
1175         \noexpand\@nfmsg{\thefigure}%
1176       \noexpand\fi
1177     \noexpand\fi
1178   }%
1179 }%
1180 \@tmpnf
1181 }
1182
1183 <209>\def\@nfmsg#1{Bad narrowfig: Figure #1 on page \thepage}
1184 <*2e>
1185 \def\@nfmsg#1{%
1186   \PackageWarning{acmart}{Bad narrowfig: Figure #1 on page \thepage}%
1187 }
1188 </2e>

```

```

\@narrowfig
  \@nfigbox 1189 \newdimen\@narrowfig
  \@nfcapbox 1190 \newbox\@nfigbox
  \if@nfeven 1191 \newbox\@nfcapbox
              1192 \newif\if@nfeven

```

**authinfo** Could be redone so that order isn't important. But maybe not worth effort.

```

1193 \newenvironment{authinfo}{%
1194   \newcommand{\name}[1] {Name: ##1\newline }
1195   \newcommand{\address}[1] {Address: ##1\newline }
1196   \newcommand{\affiliation}[1] {Affiliation: ##1\newline }
1197   \newcommand{\biography}[1] {Biography: ##1\newline}
1198 }{}

```

**sponsor** sponsor should be redone as a real environment. But this has to await clarification from ACM about what they want the markup to be.

```

1199 \newenvironment{sponsor}[2]{%
1200   Sponsor: #1\strut\newline
1201   \parbox{3.in}{#2}%
1202 }{\newline}

```

```

\and
\maketitle 1203 \def\and{\ and\}
1204
1205 %* Probably still needs more work
1206
1207 \def\maketitle{%
1208   \newpage
1209   \thispagestyle{titlepage}%
1210 <209> \global\@topnum\z@
1211 <*2e>

```

```

1212 \suppressfloats[t]%
1213 </2e>
1214 % \par
1215 \begingroup
1216 \lineskip \z@
1217 \null
1218 \vskip -30\p@\relax
1219 \parindent\z@
1220 \begingroup
1221 \LARGE
1222 \raggedright
1223 \hyphenpenalty\@M
1224 \sf \@title
1225 \par
1226 \endgroup
1227 \vskip 13.5\p@
1228 % \normalsize
1229 % \sf
1230 %\vskip 13.5pt between title and author
1231 \begingroup
1232 \addtolength{\baselineskip}{2\p@}%
1233 \sf
1234 \@author\par
1235 % \vskip -2pt
1236 \endgroup
1237 \begingroup
1238 \footnotesize
1239 % \baselineskip 17pt\relax
1240 \medskip
1241 % \hbox{\vrule height .2pt width 30pc}%
1242 \rule{\textwidth}{.2\p@}%

```

The space around the abstract doesn't look quite right. Should investigate and fix. Maybe change \parskip in front matter to get uniform spacing (if that's what's desired).

```

1243 \ifvoid\@abstract
1244 (2e) \PackageWarning{acmart}{an abstract is required}%
1245 (*209)
1246 \typeout{^^JPackage acmart Warning: an abstract
1247 is required^^J}%
1248 </209>
1249 \else
1250 \vskip 8.5\p@
1251 \box\@abstract
1252 \fi
1253 \ifx\@categories\@empty \else
1254 \vskip 4\p@\relax %\vskip8.5 space above abstract
1255 (209) \def\and{\unskip{\rm;} }%
1256 (2e) \def\and{\unskip\textup; }%
1257 Categories and Subject Descriptors: \@categories\par
1258 \fi
1259 \ifx\@terms\@empty\else
1260 \vskip 4\p@
1261 General Terms: \ignorespaces

```

```

1262         \@terms
1263         \par
1264     \fi
1265     \ifx\@keywords\@empty\else
1266         \vskip 4\p@
1267         Additional Key Words and Phrases: \ignorespaces
1268         \@keywords
1269         \par
1270     \fi
1271 \endgroup
1272 \label{\@firstpg}%
1273 %
1274 %     \hbox{\vrule height .2pt width 30pc}%
1275 \rule{\textwidth}{.2\p@}%
1276 %
1277 \vskip 23\p@
1278 \endgroup
1279 \let\maketitle\relax

```

Now we empty out a few temporary variables. However, note that we don't clear out \@author and \@title, since we need those later for \appendixhead.

```

1280 \global\let\@categories\@empty
1281 \global\let\@terms\@empty
1282 \global\let\@keywords\@empty
1283 }

```

```

abstract
\@abstract 1284 \newbox\@abstract

1285 \def\abstract{%
1286     \everypar{}%
1287     \global\setbox\@abstract\vbox\bgroup
1288         \footnotesize
1289         \trivlist\item[]\ignorespaces
1290 }
1291
1292 \def\endabstract{%
1293     \endtrivlist
1294     \egroup
1295     \ifx\maketitle\relax
1296 <*2e>
1297         \PackageWarning{acmart}{%
1298             the abstract must be specified before the \MessageBreak
1299             \string\maketitle\space command%
1300         }%
1301 </2e>
1302 <*209>
1303     \typeout{^^JPackage acmart Warning:
1304         the abstract must be specified before the^^J%
1305         \string\maketitle\space command^^J%
1306     }%
1307 </209>
1308     \box\@abstract
1309     \fi
1310 }

```

```

\terms
\@terms 1311 \def\terms{\gdef\@terms}
1312
1313 \let\@terms\@empty

\keywords
\@keywords 1314 \def\keywords{\gdef\@keywords}
1315
1316 \let\@keywords\@empty

\category
\@category 1317 \def\category#1#2#3{%
\@categories 1318 \ifnextchar [{\@category{#1}{#2}{#3}}{\@category{#1}{#2}{#3} []}%
1319 }

Should probably issue some sort of warning if the first or second arguments are
empty.

1320 \def\@category#1#2#3[#4]{%
1321 \edef\@tempa{\ifx \@categories\@empty \else ; \fi}%
1322 \begingroup
1323 <209> \def\protect{\noexpand\protect\noexpand}%
1324 <2e> \let\protect\@unexpandable@protect
1325 \let\and\relax
1326 \xdef\@categories{%
1327 \@categories
1328 \@tempa
1329 #1 [{\bf #2}]%
1330 \if!#4!%
1331 \if!#3!\else : #3\fi
1332 \else
1333 : \space
1334 \if!#3!\else #3\kern\z@---\hskip\z@\fi
1335 {\it #4}%
1336 \fi
1337 }%
1338 \endgroup
1339 }
1340
1341 \let\@categories\@empty

bottomstuff
1342 \def\bottomstuff{%
1343 (*209)
1344 \global\@topnum\z@
1345 \global\@botroom \textheight
1346 \@float{figure}[b]
1347 </209>
1348 (*2e)
1349 \enlargethispage{-\baselineskip}%
1350 \suppressfloats[t]%
1351 \@float{figure}![b]
1352 </2e>
1353 \footnotesize
1354 \parindent\z@

```



```

1355     \null
1356     \vskip -\textfloatsep
1357     \vskip 10\p@
1358     \hrule \@height .2\p@ \@width 30pc
1359 %     \vskip 2\p@

```

Changed this to 4pt to make up for lack of 10pt strut which used to be here in place of the 0pt strut. Could put 10pt strut back in, but then we'd get extra space if there is a blank line after the `\begin{bottomstuff}`.

```

1360     \vskip 4\p@

```

Took this out since a 0pt rule isn't very useful

```

1361 %     \rule{\z@}{\z@}%
1362     \ignorespaces
1363 }

```

For  $\text{\LaTeX} 2_\epsilon$ , all we need at the end is `\end@float`. For  $\text{\LaTeX} 2.09$ , we also put in a strut to put in a little extra space at the bottom of the first page.

```

1364 (2e)\let\endbottomstuff\end@float
1365 (*209)
1366 \def\endbottomstuff{%
1367     \par
1368     \strut
1369     \end@float
1370 }
1371 (/209)

```

`\permission` Removed final line ("Permissions may be requested from Publications Dept, ACM Inc., 1515 Broadway, New York, NY 10036 USA, fax +1 (212) 869-0481, or [permissions@acm.org](mailto:permissions@acm.org)." ) at request of G. Criscione. – 5/12/96

```

1372 \long\def\permission{\par
1373     Permission to make digital or hard copies of part or all of this
1374     work for personal or classroom use is granted without fee provided
1375     that copies are not made or distributed for profit or direct
1376     commercial advantage and that copies show this notice on the first
1377     page or initial screen of a display along with the full citation.
1378     Copyrights for components of this work owned by others than ACM
1379     must be honored. Abstracting with credit is permitted. To copy
1380     otherwise, to republish, to post on servers, to redistribute to
1381     lists, or to use any component of this work in other works,
1382     requires prior specific permission and/or a fee.
1383     \par
1384 }

```

`acks` Should this use small-caps instead?

```

1385 \newenvironment{acks}{%
1386     \@startsection{subsection}{2}{\z@}{-16\p@ \@plus -2\p@ \@minus -\p@}
1387     {2\p@}{\sf}*{\footnotesize ACKNOWLEDGMENTS}%
1388 }{\par}

```

`received`

```

1389 \newenvironment{received}{%
1390     \par
1391     \footnotesize

```

```

1392     \advvspace{18\p@ \@minus 4\p@}%
1393     \parindent\z@
1394 }{-%
1395     \label{@lastpg}%
1396     \par
1397 }

1398 \mark{{}{}}

\ps@myheadings
1399 \def\ps@myheadings{%
1400     \let\@mkboth\@gobbletwo
1401     \def\@oddhead{%
1402 %         \null
1403         \hfill\small\sf\rightmark
1404         \hskip 19\p@
1405         {\Large$\cdot$}%
1406         \hskip 17\p@
1407         \thepage
1408     }%
1409     \def\@oddfoot{\null\hfill\tiny\@runningfoot}
1410     \def\@evenhead{%
1411         \small\sf\thepage
1412         \hskip 17\p@
1413         {\Large$\cdot$}%
1414         \hskip 19\p@
1415         \leftmark
1416         \hfill
1417 %     \null
1418     }%
1419     \def\@evenfoot{\tiny\@runningfoot \hfill\null}%
1420     \let\partmark\@gobble
1421     \let\sectionmark\@gobble
1422     \let\subsectionmark\@gobble
1423 }

\runningfoot
\@runningfoot 1424 \def\runningfoot#1{\def\@runningfoot{#1}}
\firstfoot 1425
\@firstfoot 1426 \let\@runningfoot\@empty
\pages 1427
1428 \def\firstfoot#1{\def\@firstfoot{#1}}
1429
1430 \let\@firstfoot\@empty
1431
1432 \def\pages{\pageref{@firstpg}--\pageref{@lastpg}}

\ps@titlepage
1433 \def\ps@titlepage{%
1434     \let\@mkboth\@gobbletwo
1435     \let\@oddhead\@empty
1436     \def\@oddfoot{\null\hfill\tiny\@firstfoot}%
1437     \let\@evenhead\@empty
1438     \def\@evenfoot{\tiny\@firstfoot\hfill\null}%
1439 }

```

```

\today
1440 \def\today{%
1441     \ifcase\month \or
1442     January\or
1443     February\or
1444     March\or
1445     April\or
1446     May\or
1447     June\or
1448     July\or
1449     August\or
1450     September\or
1451     October\or
1452     November\or
1453     December
1454     \fi
1455     \space\number\day, \number\year
1456 }

```

`marray` `marray` is a variant of `array` where every entry is in `\displaystyle` rather than `\textstyle`

```

1457 \def\marray{%
1458     \arraycolsep 2.5\p@
1459     \let\@acol\@arrayacol
1460     \let\@classz\@marrayclassz
1461     \let\@classiv\@marrayclassiv
1462     \let\@arraycr
1463     \let\@halign\@empty
1464     \@tabarray
1465 }
1466
1467 \let\endmarray\endarray

```

`\@marrayclassiv`

```

\@marrayclassz 1468 \def\@marrayclassiv{\@adddtopreamble{\$ \displaystyle \@nextchar$}}
1469
1470 \def\@marrayclassz{%
1471     \ifcase \@lastchclass
1472     \@acolampacol
1473     \or \@ampacol
1474     \or
1475     \or
1476     \or \@addamp
1477     \or \@acolampacol
1478     \or \@firstampfalse \@acol
1479     \fi
1480     \edef\@preamble{%
1481         \@preamble
1482         \ifcase \@chnum
1483             \hfil$\relax\displaystyle\@sharp$\hfil
1484             \or $\relax\displaystyle\@sharp$\hfil
1485             \or \hfil$\relax\displaystyle\@sharp$%
1486         \fi
1487     }%

```

```

1488 }
1489 \ps@myheadings
1490
1491 \pagenumbering{arabic}
1492
1493 \onecolumn
1494
1495 %\if@faircopy \raggedright \fi
1496
1497 \parindent 10pt
1498 </cls>

```

## 4 Bibliography stuff

The following code was adapted from version 4 of `chicago.sty` by Glenn Paulley (`gnpaulle@bluebox.uwaterloo.ca`) for the new ACM bibliography style, which is similar (but not identical) to the “Chicago” style. It should be used with the `acmtrans`  $\text{\LaTeX}$  style. The code was originally adapted by Andrew Appel and Rebecca Davies and later reworked by David M. Jones. Most of the prehistory of `chicago.sty` has been removed from the comments below, and the code has been modernized and reorganized somewhat in the interests of efficiency and (hopefully) maintainability.

The `acmtrans`  $\text{\LaTeX}$  style has support for abbreviated author lists and for year-only citations. This is implemented by having the citations actually look like

```
\citeauthoryear{<full-author-info>}{<abbrev-author-info>}{<year>}
```

These labels are processed by the following  $\text{\LaTeX}$  commands.

`\cite` produces citations with full author list and year, e.g., “[Brown 1978; Jarke, Turner, Stohl, et al. 1985]”

`\citeA` produces citations with only the full author list, e.g., “[Brown; Jarke, Turner and Stohl]”

`\shortcite` produces citations with an abbreviated author list and year.

`\shortciteA` produces only the abbreviated author list.

`\citeyear` produces the year information only, within brackets.

`\citeN` produces citations with the full author list and year, but can be used as nouns in a sentence; parentheses appear only around the year, not around the author names, e.g., “Shneiderman [1978] states that...”. If given multiple citekeys, the items referred to should all have the same author; otherwise, an error is signaled.

`\shortciteN` is a variant of `\citeN` that uses an abbreviated author list.

Each of these macros also has a `*`-form, which suppresses the brackets that would normally surround the citation. (For `\citeN` and `\shortciteN`, the `*`-forms are identical to the normal forms.)

Abbreviated author lists use the “et al.” construct.

This L<sup>A</sup>T<sub>E</sub>X style file must be used a **modern** (1995 or later) version of the `acmtrans` BIB<sub>T</sub>E<sub>X</sub> style.

```

1499 <*bib>
1500 <cls>\typeout{Using ACM bibliography style}
1501 %
1502 <!*cls & 2e>
1503 \ProvidesPackage{acmbib}{\filedate\space\fileversion\space
1504 ACM bibliography style}
1505 </!cls & 2e>
1506 %
1507 <!cls & 209>\typeout{Package 'acmbib' \fileversion\space <\filedate>.}
1508 %

```

## 4.1 Citation macros

Removed `\def\@citeseppen{-1000}` from beginning of all cite macros, since that was left over from `named.sty` and not actually used anywhere, although it might not be a bad idea to incorporate something of that sort into our code. – dmj 8/8/95

Each `\cite`-like macro must do three things:

1. Define `\@cite`, which will be used to format the in-text citation. Typically, this must decide whether to put brackets around the reference, and handles the optional argument to `\cite`.
2. Define `\citeauthoryear`, which determinines which part of the citation information is used in the citation.
3. Call the appropriate low-level citation command, which should be essentially identical to the standard L<sup>A</sup>T<sub>E</sub>X `\cite` command. In this style, this is either `\@citenormal`, which separates multiple citations by semi-colons, or `\@citeyear`, which uses a comma to separate multiple references. The latter is used whenever the output consists of a series of years.

`\bibyear` See the description of `output.year.check` in `acmtrans.dtx` for an explanation of why this is necessary. The `\unskip` and `\ignorespaces` are to eliminate any extra space that might creep in otherwise. (The first `\unskip` is the only one that should be necessary, but the others don't hurt.)

```

1509 \newcommand\bibyear[2]{%
1510     \unskip\quad\ignorespaces#1\unskip
1511     \if#2..\quad \else \quad#2\relax \fi
1512 }

```

`\bibemph`

```

\bibemphic 1513 <*2e>
\bibemphsc 1514 \let\bibemph\emph
            1515 \let\bibemphic\emph
            1516 \let\bibsc\textsc
            1517 </2e>
            1518 <*209>
            1519 \newcommand{\bibemph}[1]{\em#1}
            1520 \newcommand{\bibemphic}[1]{\em#1/}
            1521 \newcommand{\bibsc}[1]{\sc#1}

```

1522 </209>

`\@normalcite` `\@normalcite` is used for any citation commands that should surround their output with square brackets.

```
1523 \def\@normalcite{%
1524   \def\@cite##1##2{##1\if@tempswa , ##2\fi}}%
1525 }
```

`\@citeNB` `\@citeNB` puts in no brackets at all.

```
1526 \def\@citeNB{%
1527   \def\@cite##1##2{##1\if@tempswa , ##2\fi}}%
1528 }
```

`\@citeRB` `\@citeRB` just produces a right bracket; the left bracket will be supplied by `\citeauthorityyear`. This is used by `\citeN` and `\shortciteN`, which only put brackets around the years, not around the authors.

```
1529 \def\@citeRB{%
1530   \def\@cite##1##2{##1\if@tempswa , ##2\fi}}%
1531 }
```

`\start@cite` Should explain this.

```
1532 \def\start@cite#1#2{%
1533   \edef\citeauthorityyear##1##2##3{%
1534     ###1%
1535     \ifnum#2=\z@ \else\ ##2\fi
1536   }%
1537   \ifnum#1=\thr@@
1538     \let\@@cite\citeyear
1539   \else
1540     \let\@@cite\citenormal
1541   \fi
1542   \ifstar{\@citeNB\@@cite}{\@normalcite\@@cite}}%
1543 }
```

`\cite` This is using the abbreviated author list, rather than the full author list. Is this correct? At any rate, it should be consistent with `\citeNP`.

```
1544 \def\cite{\start@cite13}
```

`\citeNP`

```
1545 \def\citeNP{\cite*}
```

`\citeA`

```
1546 \def\citeA{\start@cite10}
```

`\citeANP`

```
1547 \def\citeANP{\citeA*}
```

`\shortcite`

```
1548 \def\shortcite{\start@cite23}
```

`\shortciteNP`

```
1549 \def\shortciteNP{\shortcite*}
```

```

\shortciteA
1550 \def\shortciteA{\start@cite20}

\shortciteANP
1551 \def\shortciteANP{\shortciteA*}

\citeyear
1552 \def\citeyear{\start@cite30}

\citeyearNP
1553 \def\citeyearNP{\citeyear*}

\citeN
1554 \def\citeN{%
1555   \@citeRB
1556   \def\citeauthoryear##1##2##3{##1\ [#3%
1557     \def\reserved@a{##1}%
1558     \def\citeauthoryear####1####2####3{%
1559       \def\reserved@b{####1}%
1560       \ifx\reserved@a\reserved@b
1561         ###3%
1562       \else
1563 (*2e)
1564         \PackageError{acmart}{author mismatch in \string\citeN}%
1565 (/2e)
1566 (*209)
1567         \errmessage{Package acmart Error: author mismatch
1568           in \string\citeN^^J^^J%
1569           See the acmart package documentation for explanation}%
1570 (/209)
1571       \fi
1572     }%
1573   }%
1574   \@ifstar\@citeyear\@citeyear
1575 }

\shortciteN
1576 \def\shortciteN{%
1577   \@citeRB
1578   \def\citeauthoryear##1##2##3{##2\ [#3%
Should \shortciteN compare the full author lists or the abbreviated author lists
(as it currently does)?
1579     \def\reserved@a{##2}%
1580     \def\citeauthoryear####1####2####3{%
1581       \def\reserved@b{####2}%
1582       \ifx\reserved@a\reserved@b
1583         ###3%
1584       \else
1585 (*2e)
1586         \PackageError{acmart}{%
1587           author mismatch in \string\shortciteN
1588         }%

```

```

1589 </2e>
1590 <*209>
1591             \errmessage{Package acmart Error: author mismatch
1592                 in \string\shortciteN^^J^^J%
1593                 See the acmart package documentation for explanation}%
1594 </209>
1595             \fi
1596         }%
1597     }%
1598     \ifstar\@citeyear\@citeyear
1599 }

\@citenormal
\@citeyear 1600 \def\@citenormal{%
1601     \ifnextchar [{\@tempwattrue\@citex;}
1602                 {\@tempwafalse\@citex; []}%
1603 }
1604 %
1605 \def\@citeyear{%
1606     \ifnextchar [{\@tempwattrue\@citex,}%
1607                 {\@tempwafalse\@citex, []}%
1608 }

\@citex Although multiple citations within a single cite command should normally be
separated by semi-colons, there are times when commas should be used instead.
So, we modify the \@citex macro to take the delimiter as a parameter.

1609 \def\@citex#1[#2]#3{%
1610     \let\@citea\@empty
1611     \@cite{%
1612         \@for\@citeb:=#3\do{%
1613             \citea
1614             \def\@citea{#1 }%
1615             \edef\@citeb{\expandafter\@iden\@citeb}%
1616             \if@filesw
1617                 \immediate\write\@auxout{\string\citation{\@citeb}}%
1618             \fi
1619             \@ifundefined{b@\@citeb}{%
1620 (2e)                 {\reset@font\bfseries ?}%
1621 (209)                {\bf ?}%
1622 (2e)                 \G@refundefinedtrue
1623 (2e)                 \@latex@warning{%
1624 (209)                \@warning{%
1625                     Citation ‘\@citeb’ on page \thepage\space undefined%
1626                 }%
1627             }%
1628             {\csname b@\@citeb\endcsname}%
1629         }%
1630     }{#2}%
1631 }

\@biblabel (from apalike.sty) No labels in the bibliography.
1632 \let\@biblabel\@gobble
1633 </bib>

```



`\bibindent` Indent second and subsequent lines of bibliographic entries. Stolen from openbib.sty: `\newblock` is set to `\@empty`. (???)

```
1634 <*cls>
1635 \newdimen\bibindent
1636 \bibindent=1.5em
```

`\refname`

```
1637 (209)\def\refname{References}
```

`thebibliography` Which is the correct definition of `thebibliography`, this one or the earlier one?

```
1638 \def\thebibliography#1{%
1639   \footnotesize
1640   \section*{%
1641     \refname
1642     \@mkboth{\uppercase{\refname}}{\uppercase{\refname}}%
1643   }%
1644   \list{[\arabic{enumi}]}{%
1645     \settowidth\labelwidth{[#1]}%
1646     \leftmargin\labelwidth
1647     \advance\leftmargin\labelsep
1648     \advance\leftmargin\bibindent
1649     \itemindent -\bibindent
1650     \listparindent \itemindent
1651     \parsep \z@
1652     \usecounter{enumi}%
1653   }%
1654   \let\newblock\@empty
1655   \sloppy
1656   \sfcode'\.=1000\relax
1657 }
1658 </cls>
```