PREPARING ARTICLES FOR COMPUTATIONAL COMPLEXITY

User's manual

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Abstract. This text describes the LaTeX 2$_\varepsilon$ document class cc, which is recommended for typesetting articles accepted for computational complexity.

Keywords. LaTeX 2$_\varepsilon$ document class, computational complexity.

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1. Submission

Submission of a manuscript implies

- that the work described has not been published before except possibly in conference proceedings; if the latter is the case, it must be clearly acknowledged in the submission and a clearly marked copy of the proceedings version should be sent as well (possibly by separate mail);
- that it is not under consideration for publication elsewhere;
- that its eventual publication has been approved by all coauthors;

- that, if and when the manuscript is accepted for publication, the authors agree to automatically transfer the copyright to the publisher; and
- that the manuscript will not be published elsewhere in any language without the consent of the copyright holder.

Manuscripts must be in English. Authors should send a PostScript™ file plus a short cover email, giving the contact author's name and address, either to the Editor-in-Chief or to one of the Editors. Submissions can also be sent by ordinary mail to the Editor-in-Chief.

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Information about computational complexity can be found at the journal's homepage `http://www.computational-complexity.org/`. There you also find a pointer to the publisher's page for computational complexity:

> `http://www.linkspringer.com/?genre=article&issn=1016-3328`,

which contains the current editorial board, information about subscription and prices, and more.

The following instructions only apply to final versions of *accepted* manuscripts for computational complexity. For a submission, you may follow these instructions or use your own setup and submit your article as a PostScript™ file or a typeset manuscript.

computational complexity expects authors of articles accepted for publication to submit camera-ready copy as a LaTeX 2_ε source file. If that cannot be provided, computational complexity will typeset the article. The editorial decision to accept or reject a manuscript is independent of the technology (computer or typewriter) used to prepare it.

2. Submission of the final version

Camera-ready copy can be produced with LaTeX 2_ε using the document class cc which is described below. All necessary files can be obtained in the WWW,

see `http://www.computational-complexity.org/` for the necessary files and installation instructions. The older LaTeX style file `cc.sty` should not be used anymore. There is no corresponding plainTeX style file.

2.1. Combining several files into one. When your article is typed, it might be distributed over several files. But the LaTeX 2$_\varepsilon$ source file that you submit must consist of exactly *one* file. You may, however, use the LaTeX 2$_\varepsilon$ environments `filecontents` and `filecontents*` to incorporate the contents of other LaTeX or ASCII(!) files, respectively, into the main LaTeX 2$_\varepsilon$ source file. These two environments can only be used *before* the `\documentclass` command. For example, PostScript™ files can be handled this way. (Note: it seems to be a feature that there must be a line break just after the environment's argument, in particular, a comment can only start on the following line.)

```
\begin{filecontents}{section1.tex}
  \section{First section}
  ... \cite{Eucleides} wrote ...
\end{filecontents}
\begin{filecontents*}{picture.ps}
%!PS-Adobe-2.0 EPSF-2.0
...
\end{filecontents*}
\begin{filecontents*}{myrefs.bib}
@book{Eucleides,
author = {Eucleides},
title = {Elements},
year = {about 300 BC},
}
\end{filecontents*}
\begin{filecontents}{main.bbl}
\begin{thebibliography}{1}

\bibitem[{Eucleides(about 300 BC)}]{Eucleides}
\textsc{Eucleides} (about 300 BC).
\newblock \emph{Elements}.

\end{thebibliography}
\end{filecontents}

\documentclass{cc}
\usepackage{graphics}
% ...
\begin{document}
\includegraphics{picture.ps}
\input{section1}
```

```
\bibliography{cc-journals,myrefs}
\end{document}
```

3. Using the document class cc

The freeware document class cc is intended for writing articles for computational complexity. But you may, of course, also use this class for your other work. For this purpose, several features of this class can be turned on or off. (Using noccpublish turns off the special requirements for computational complexity. Furthermore, this document class can also be used as a package if desired. Try `\usepackage{cc-cls}`. Thus you can, for example, combine it with the LaTeX 2_ε document class book.)

Before giving any description we would like to stress a major difference from standard LaTeX 2_ε: References and citations are, by default, more informative. We recommend this style. See below for details. (The new features can be turned off by options to `\documentclass`, see p. 18: noprefixes, and cccite or nonatbib, respectively.)

After the optional ⟨*secondary file contents*⟩, the standard structure of a computational complexity article starts with `\documentclass{cc}` and continues with optional personal declarations, information concerning author, title and content, and finally the article text including acknowledgments and references. The overall structure of a typical LaTeX 2_ε file is shown in Table 3.1. On computational complexity's homepage you can also find a template file `cctemplate.tex` reflecting this.

Most ⟨*personal macros and packages*⟩ can be freely used. If your file is processed successfully when sent to `cctest@computational-complexity.org`, then your macros and the packages you used should be ok.

The ⟨*contact email address*⟩ is the email address of the contact author. It is required for computational complexity to facilitate communication between the publisher and the authors. The author received a message acknowledging receipt of the manuscript, with the ⟨*received date*⟩ or ⟨*submission date*⟩. The ⟨*title*⟩ should be broken into balanced lines by `\\` if necessary. The ⟨*author list*⟩ contains the names and addresses of the authors separated by `\and`, each address consisting of a line with full author name and some address lines separated by `\\`. There should be no font or size changing commands. If an address line is very long and not nicely broken, `\newline` forces a break. Note the use of the tilde (`~`) in the name of the last author. It guarantees that `van~Author` is considered as her last name. Email and home page can be given as last line(s) of an address us-

```
⟨secondary file contents⟩
\documentclass{cc}

⟨personal macros and packages⟩

%\ccsps{year=2011,volume=20,...}
\contact{⟨contact email address⟩}
\submitted{⟨submission date⟩}
\title{⟨title⟩}
\author{⟨author list⟩}

\begin{abstract}
  ⟨abstract⟩
\end{abstract}

\begin{keywords}
  ⟨keywords⟩
\end{keywords}

\begin{subject}
  ⟨subject classification⟩
\end{subject}

\begin{document}

⟨article text⟩

\begin{acknowledge}
  ⟨acknowledgments⟩
\end{acknowledge}
%\noacknowledge% must if none!

\bibliography{⟨bibliography files⟩}

\end{document}
```

```
\author{
  First A. Author\\
  Department of Mathematics\\
  University of Somewhere\\
  Somewhere, USA 99999\\
  \email{faa@ford.somewhere.edu}\\
  \homepage
    {http://www.somewhere.edu/~faa/}

  \currentaddress
  Somewhere Sunny\\
  SAMOA\\
  \email{faa@sunny.samoa.gov}

  \and
  Second B. Author\\
  Faculty of Computer Science\\
  Anyplace College\\
  Anyplace, CANADA Z9Z 1X1\\
  \email{author@pearson.anyplace.edu}

  \otheraddress
  Private address of
    \textsc{Second B. Author}:\\
  Green Road\\
  Notown, MOON\\

  \and
  Third C. van~Author\\
  Electrical Engineering Division \\
  Institute of Nowhere\\
  Nowhere, ANTARCTICA\\
  \email{tcauthor@penguin.nowhere.ant}
  }
```

Table 3.1: Typical structure of the LaTeX 2_ε source and an example of an `\author` declaration

ing the commands `\email{`⟨*email-address*⟩`}` and `\homepage{`⟨*www-address*⟩`}`. To give a different current address, use `\currentaddress` to separate the lines of the latter from the standard address. It produces a new address block entitled `Current address of \textsc{`⟨*present author name*⟩`}:\\` . The command `\otheraddress` can be used to specify another address block for the present author without such a heading. An ⟨*abstract*⟩, ⟨*keywords*⟩

and a ⟨*subject classification*⟩ are required for articles in computational complexity. The ⟨*abstract*⟩ should summarize, in less than 150 words, the context, content and conclusions of the paper. List four to six ⟨*keywords*⟩ characterizing the article. A ⟨*subject classification*⟩ should be given according to the Mathematical Subject Classification 2000 (MSC 2000), which can be found in the Internet, see computational complexity's homepage `http://www.computational-complexity.org/`.

The ⟨*article text*⟩ can be structured by `\section`, `\subsection`, and `\subsubsection`. Use `\\` to split long headings. A table of contents should normally *not* be used. You can use diverse theorem and proof environments described below. Finally your text might end with ⟨*acknowledgments*⟩ including funding information, references to previous versions, and thanks for help.

3.1. Theorems and proofs. Typing theorems is much easier than finding or proving them. We give some examples.

```
\begin{theorem}\label{thm1}
  This is a very simple theorem.
\end{theorem}
```

THEOREM 3.1. *This is a very simple theorem.*

This environment supports an optional argument. Often it is used to supply source information:

```
\begin{theorem}[\cite{knu84}]
  \label{thm2}
  This is a theorem
  by somebody else.
\end{theorem}
```

THEOREM 3.2 (Knuth 1984). *This is a theorem by somebody else.*

In rare occasions, you might prefer an unnumbered theorem:

```
\begin{theorem*}
  This theorem is so important
  that it has no number.
\end{theorem*}
```

THEOREM. *This theorem is so important that it has no number.*

Of course, we are not restricted to theorems:

```
\begin{lemma}
  \label{res:lemma}
  We can also have lemmas.
  \begin{enumerate}
  \item\label{lemma:1}
    It has two claims.
  \item\label{lemma:2}
    And it shows how lists
    are used, formatted
    and referenced.
  \end{enumerate}
\end{lemma}
```

LEMMA 3.3. *We can also have lemmas.*

(i) It has two claims.

(ii) And it shows how lists are used, formatted and referenced.

You can replace `theorem` by `lemma` to obtain lemmas instead of theorems in the above examples. Further, you can use the theorem-like environments listed in Table 3.2. Each of these environments has a starred form which produces

environment	title	environment	title
`answer`	Answer	`note`	Note
`assumption`	Assumption	`observation`	Observation
`claim`	Claim	`openquestion`	Open Question
`conjecture`	Conjecture	`problem`	Problem
`convention`	Convention	`proposition`	Proposition
`corollary`	Corollary	`question`	Question
`definition`	Definition	`remark`	Remark
`example`	Example	`result`	Result
`exercise`	Exercise	`theorem`	Theorem
`fact`	Fact	`thesis`	Thesis
`hypothesis`	Hypothesis	`warning`	Warning
`lemma`	Lemma	`namedtheorem`	⟨*user specified*⟩
`notation`	Notation		

Table 3.2: Defined theorem-like environments

no number. Moreover, you can give examples, and continue them.

```
\begin{example}
  \label{myfirst}
  Or you give an example.
\end{example}
\begin{contexample}{myfirst}
  Sometimes it is nice
  to continue an example.
\end{contexample}
```

EXAMPLE 3.4. Or you give an example. ◊

EXAMPLE 3.4 CONTINUED. Sometimes it is nice to continue an example. ◊

Note that an example is always terminated by a lozenge (◊). You can redefine `\eoesymbol` if you prefer another (or no) symbol. The other theorem-like environments can be continued in this way:

```
\begin{continued}{res:lemma}
  This continues the lemma.
\end{continued}
```

LEMMA 3.3 CONTINUED. *This continues the lemma.*

All this is not enough? Ok, we also support a theorem-like environment with a name that you can choose yourself.

```
\begin{namedtheorem}{Fundamental
    theorem}
  \label{FunThm}
  This is a simple named
  theorem with a number.\qed
\end{namedtheorem}
\begin{namedtheorem*}{Fundamental
    lemma}
  \label{FunLemma}
  This is a simple named
  theorem without number.
\end{namedtheorem*}
```

FUNDAMENTAL THEOREM 3.5. *This is a simple named theorem with a number.* □

FUNDAMENTAL LEMMA. *This is a simple named theorem without number.*

Note that the references to the labels are "Fundamental theorem 3.5" and "Fundamental lemma", respectively.

Typing proofs is even easier:

```
\begin{proof}
  This is a very simple proof.
\end{proof}
```

PROOF. This is a very simple proof. □

The default qed symbol is an open square (□). Sometimes, not a proof but only an outline of a proof or a sketch is given. This can be done as follows:

```
\begin{namedproof}
  {Outline of proof}
  [following \textsc{Third}]
  This is a named proof.
  Its title claims that this
  is only an outline.
\end{namedproof}
```

OUTLINE OF PROOF (following THIRD). This is a named proof. Its title claims that this is only an outline. □

Typesetting of proofs should only be done with these proof environments. There is one further problem. Sometimes a proof (or an example) terminates with a list, an equation, or some other similar environment. Then the end of proof mark often seems to be placed incorrectly. If so, place `\qed` at the end of this environment. Usually this fixes this problem. (If not, maybe you can spend a few extra words at the end of your proof?)

Typing equations can be done as usual. But note that amsmath provides a lot of additional equation-like environments, see $\mathcal{AMS}$ (1996) or Chapter 8 in Goossens *et al.* (1995).

3.2. Labels and references. Labels and references, as we use them, have been known since the time LaTeX was born. But note that references using the document class cc are more informative than usual. For example,

`\ref{myfirst}` now produces: Example 3.4. In the standard setup, you would have obtained: 3.4. If you use the document class option noprefixes, `\ref` behaves as usual. We recommend to adopt the new style. You can access the bare (unprefixed) form with `\bare\ref{myfirst}` unless you issue the document class option nobare. (The latter might be necessary to save space.)

```
We have seen two theorems:\\
\ref{thm1} and \bare\ref{thm2}.
```

We have seen two theorems:
Theorem 3.1 and 3.2.

Further, list items in theorem-like environments produce either only the item number or the theorem reference plus the item number, depending on whether the reference occurs near the theorem or not. (Near means, after this theorem (or lemma, ...) and before the next theorem or equation.) For example, `\ref{lemma:1}` here produces Lemma 3.3(i). You can force the short form: `\short\ref{lemma:1}` yields (i), or the whole form: `\whole\ref{lemma:1}` yields Lemma 3.3(i). If you issue the document class option notheoremitemprefixes, subitems are referenced as in standard LaTeX 2ε: you always obtain the short form.

3.3. Bibliography and citations. The most comfortable citation scheme comes with the natbib package. By default this is loaded. Let's begin with an example:

```
Don \citeauthor{knu84}'s design
of \TeX{}, as described in The
\TeX{}book \citep{knu84},
enabled the typesetting of texts
containing complicated formulas.
In \citet{knu86b,knu86c,%
knu86d,knu86e} the
underlying programs and fonts
are collected.  On this basis,
\LaTeX{} and \LaTeXe{} were
developed, see \citet{goomit95,%
lam94,kopdal99}.
(Graphics can be included in many
ways, see \citealp*{goomit96g}.)
```

Don Knuth's design of TeX, as described in The TeXbook (Knuth 1984), enabled the typesetting of texts containing complicated formulas. In Knuth (1986a,b,c,d) the underlying programs and fonts are collected. On this basis, LaTeX and LaTeX 2ε were developed, see Goossens *et al.* (1995); Kopka & Daly (1999); Lamport (1994). (Graphics can be included in many ways, see Goossens, Mittelbach & Rahtz 1996.)

The command `\citet` (equivalent to `\cite`) is used for textual citations and the command `\citep` for parenthetical citations. Multiple citations are simply listed in one command. The alternative commands `\citealt` and `\citealp` produce the same output but without parentheses. This avoids nested parentheses in text which is already inside parentheses. Note that the years are in parentheses in the running text, but without parentheses if the reference itself

is in parentheses. Several papers in the same year are distinguished as "Knuth (1986d), Knuth (1986c)". Further examples:

`\citet{knu84}`	⇒ Knuth (1984)
`\citet{knu84,knu86b,knu86c,knu86d,knu86e}`	⇒ Knuth (1984, 1986a,b,c,d)
`\citep{knu84}`	⇒ (Knuth 1984)
`\citealt{knu84}`	⇒ Knuth 1984
`\citealp{knu84}`	⇒ Knuth 1984
`\citeauthor{knu84}`	⇒ Knuth
`\citeyear{knu84}`	⇒ 1984
`\citet{goomit95}`	⇒ Goossens *et al.* (1995)
`\citet*{goomit95}`	⇒ Goossens, Mittelbach & Samarin (1995)
`\citeauthor*{goomit95}`	⇒ Goossens, Mittelbach & Samarin

If the first author's name contains a *von* part, such as "della Robbia", then `\citet{dRob98}` produces "della Robbia (1998)", even at the beginning of a sentence. One can force the first letter to be in upper case with the command `\Citet` instead. Other upper case commands also exist. More features are documented with the natbib package, see Daly (1999).

Bibliography is best produced using BibTeX. See Kopka & Daly (1999), Lamport (1994), Goossens *et al.* (1995) or Patashnik (1988) for information about using BibTeX. Then `\bibliography{`⟨*bibliography files*⟩`}` produces the bibliography. (The `\bibliographystyle` is automatically issued by the class, so you need not do this.) In this case, the BibTeX file(s) and the `.bbl` file should be embedded in the LaTeX 2ε source file using the `filecontents` environment (see above).

The BibTeX file `journals.bib`, available on computational complexity's homepage `http://www.computational-complexity.org/`, contains macros for a number of journals and conference proceedings. If in your document you have `\bibliography{cc-journals,myrefs}`, then an entry `journal = FOCS99,` in your file `myrefs.bib` will produce: 'Proceedings of the 40th Annual IEEE Symposium on Foundations of Computer Science, New York City NY' when BibTeX is run. (Note that `journals` must precede your own bibliography file!) Since this will be updated only sporadically, the latest conference proceedings may be missing here.

3.3.1. . . . without natbib. If the package natbib is not installed on your system for some obscure reason, you can issue the option cccite to switch to the old computational complexity style of referring to the bibliography. This still works but is not recommended any more.

```
Don \citeauthor{knu84}'s design
of \TeX{}, as described in The
\TeX{}book \parencite{knu84},
enabled the typesetting of texts
containing complicated formulas.
In \citemul{knu86b,knu86c,%
knu86d,knu86e} the
underlying programs and fonts
are collected.  On this basis,
\LaTeX{} and \LaTeXe{} were
developed, see \cite{goomit95},
\cite{lam94}, \cite{kopdal99}.
(Graphics can be included in many
ways, see \shortcite{goomit96g}.)
```

Don Knuth's design of TEX, as described in The TEXbook (Knuth 1984), enabled the typesetting of texts containing complicated formulas. In Knuth (1986a,b,c,d) the underlying programs and fonts are collected. On this basis, LATEX and LATEX 2ε were developed, see Goossens *et al.* (1995), Lamport (1994), Kopka & Daly (1999). (Graphics can be included in many ways, see (Goossens *et al.* 1996).)

Using numbered references are used if the references give no additional information. (As most hand-made references do.) This is not recommended:

```
Don Knuth's design
of \TeX{}, as described in The
\TeX{}book \cite{knu84},
enabled the typesetting of texts
containing complicated formulas.
In \cite{knu86b,knu86c,%
knu86d,knu86e} the
underlying programs and fonts
are collected.  On this basis,
\LaTeX{} and \LaTeXe{} were
developed, see \cite{goomit95,%
lam94,kopdal99}.
(Graphics can be included in many
ways, see \cite{goomit96g}.)
```

Don Knuth's design of TEX, as described in The TEXbook [5], enabled the typesetting of texts containing complicated formulas. In [6–9] the underlying programs and fonts are collected. On this basis, LATEX and LATEX 2ε were developed, see [4, 10, 11]. (Graphics can be included in many ways, see [3].)

Note that only `\cite` makes sense here! Although this is acceptable, the first style is preferred since it is more informative.

3.4. Mathematical typesetting à la amsmath. We recommend to use the features provided by amsmath, amsfonts, and amssymb. By default the class already loads these packages. For example, the `gather` environment allows you to combine several equations into one, `gather*` produces no numbers. The `align` or `align*` environments are similar to `eqnarray` but you only need one ampersand `&`. Other than `eqnarray`, `align` and all other amsmath environments take care of the position of the number: there will be no overlap between number and formula! The `multline` or `multline*` environment allows you to type very long equations, the first line is flushed left, the last line is flushed

right and all others are centered. The `alignat` or `alignat*` environment allows you to put two or more equations on a line, aligned with those on the other lines.

See $\mathcal{AMS}$ (1996) or Chapter 8 in the LaTeX companion (Goossens *et al.*, 1995) for a complete description. But note that amsthm is not compatible with the cc class and must not be used. (The same holds for its derivative apthm.)

3.5. Reminders.

- The following items tend to be overlooked:
  - email address of contact author,
  - key words,
  - subject classification,
  - submission or received date.

  Please make sure you have filled them appropriately.
- Manuscripts are in *(American) English*. Authors are encouraged to have their contribution checked for *grammar*, and to use a spelling checker. We emphasize that *American spelling* should be used.
- Use `\hyphenation{`⟨*hyphenation exceptions*⟩`}` or `\-` if words are not correctly hyphenated.
- *Abbreviations* should be spelled out in full when first used. (With LaTeX, try the package acronym.)
- Non-negative *integers* up to twelve should usually be spelled out.
- *Funding information* and help from friends and referees go into the acknowledgments section.
- *Appendices* should not be used.
- Read your `.log` file carefully. There should be no `Overfull \hbox`, and certainly no visible one (more than `1pt`). If necessary, reword the text. (Sometimes `\begin{sloppypar}` ... `\end{sloppypar}` or local use of `\sloppy`, `\tolerance=`⟨*number*⟩, `\emergencystretch=`⟨*dimension*⟩ help, see Goossens *et al.* (1995).)

- *Blank (redundant) spaces* should be minimized by careful arrangement of tables and figures.

- *Avoid starting* a sentence with a symbol.

- It is best to *avoid footnotes*.

- *Figures and tables* are to be inserted in the text nearest their first reference. They should be arranged so as not to cause an excessive amount of blank space on the remainder of the page.

- Goossens *et al.* (1996) describe various ways to include *pictures* in LaTeX 2$_\varepsilon$. They also mention how to scale pictures up or down, which can be used for fine tuning and to avoid redundant white space. (Try to stick to `\includegraphics{`⟨*PostScript file*⟩`}` and `\input{`⟨*gnuplot LaTeX file*⟩`}`.)

  Alternatively, original India ink drawings are possible. Please send one set of originals which must be clear and clean. Ensure that the figures (including letterings and numbers) are large enough to be clearly seen after reduction to 86%.

- Recall that LaTeX has tools to build *lists*, the environments `itemize` and `enumerate` are the most frequent. Please, use them!

  Note that a list in a theorem is numbered differently than outside.

- *Font selection* in LaTeX 2$_\varepsilon$'s new font selection scheme (nfss) should be done using the commands

  `\emph{...}`, `\texttt{...}`, `\textbf{...}`,
  `\textsf{...}`, `\textsc{...}`, `\textrm{...}`,

  and so on. Usually, you should only use the first one. In any case, try to use them as rarely as possible! In math mode there are similar commands. Note that `\mathbb{`⟨*letter(s)*⟩`}` produces blackboard bold letters and `\mathcal{`⟨*letter(s)*⟩`}` produces calligraphic letters. For mathematical operators you should not use font selection but `\operatorname{`name`}`.

- Normally, you should not at all be concerned about *line or page breaks*. Also, *vertical space* should be correctly adjusted by the document class. Use the corresponding commands only if no other solution is possible. If you need to use `\\` in plain text, you probably did something wrong.

3.6. Commands for the journal editor and publishers. The journal editor and publishers will insert the publishing data (right after the `\documentclass`).

For Springer Pubishing Services there is a special macro `\ccsps` to handle the entire production flow. Its argument is a comma separated list of `key=value` pairs and `key` singletons. This list is interpreted by the package xkeyval. A singleton `key` in the list is interpreted as `key=`⟨*default*⟩, and causes the key `key` to be set to its default value (provided it has one). In particular, for boolean keys this `key` always means `key=true`.

```
\ccsps{
  issuestage,
  year=⟨year⟩,
  volume=⟨volume⟩,
  issue=⟨issue⟩,
  firstpage=⟨firstpage⟩,
  ...
}
```

There are a lot more options to be chosen:

- The key `submitted` sets the received date. Note, that this setting overrides the `\received` date.
- The boolean key `revisionstage` turns on (or off) the revision features. Initially set to `false`.
  - The key `DOImsnr` sets the manuscript number. It can be set to any value. This is the *Article No.* occuring in the helper strip. Default `??`.
  - The boolean keys `TYPESET`, `DISK`, `LE` and `CP` set certain hooks in the help strip. Initially set to `false`.
  - The key `draftcopy` can be set to any value to be used as a watermark. Default `Uncorrected proof`.
  - The boolean key `grid` turns on (or off) the alignment grid. Initially set to `false`.
- The boolean key `issuestage` turns on (or off) the display of publication details like volume, issue, pages, doi and more. Initially set to `false`.
  - The key `year` sets the publishing year. Default `\the\year`.

- The key `volume` sets the volume. Default `??`.
- The key `issue` sets the issue. Default `??`.
- The key `firstpage` sets the number of the first page. Default `1`.
- The key `copyholder` sets the copyright holder. The default is `Springer Basel AG` or `The Author(s)` for normal or open access, respectively.
- The key `doisuffix` sets the doi to `10.1007/s00037-`⟨*year*⟩`-`⟨*doisuffix*⟩. Alternatively, the key `doi` sets the entire doi. Initially set to `10.1007/s00037-`⟨*year*⟩`-????-?`.
- The key `onlinedate` sets the online date. Default `??`.
- Deprecated: The key `onlinefirstyear` is the same as the publishing year, see `year`.
- Deprecated: The key `coveryear` sets the (two digit) cover year for use in the article identifier (above the DOI). Default last two digits of `\the\year`.

◦ The boolean key `pdfpage` turns on (or off) all settings for producing the online pdf. In particular, if it is off then the helper strip, linenumbers and a draft watermark are displayed. Initial settings is `false`.

◦ The boolean key `xlink` turns on (or off) settings for hyperlinks. Initial settings is `false`.

For publication in computational complexity abstract, keywords and subjection classification are usually required. The commands `\noabstract`, `\nokeywords` and `\nosubject` may be used to turn off errors raised by missing abstract, keywords and subject classification, respectively.

OUT-OF-DATE: Prior to mid 2011 the declaration

`\ccpublish{`⟨*year*⟩`}{`⟨*volume*⟩`}{`⟨*number*⟩`}{`⟨*first page*⟩`}`

was inserted next to author and title information. Further, the commands `\electronic` and `\printed` switches the ISSN to the electronic or printed version, respectively.

3.7. Disclaimer. The macros are not guaranteed to be free of errors, and any bugs, inconsistencies, and suggestions for further improvement or other comments should be reported to `nuesken@bit.uni-bonn.de`.

4. Quick upgrade: from bare LaTeX to cc

Replace your `\documentclass{...}` command with the line

```
\documentclass[nonatbib,noprefixes]{cc}
```

and adjust author, title, keywords and subject classification according to Table 3.1 (page 5). (In particular, all this information must appear before the `\begin{document}`.) The title may be too long for the running head. You need to supply `\titlehead{`⟨*short title*⟩`}` then.

If there are any `\newtheorem` commands then turn them off and use the cc theorem environments described in Section 3.1. (Note that there is an environment `namedtheorem` for theorem-like environments with unforeseen names. You can also use this in a definition like

```
\newenvironment{bla}{\theorem}{\endtheorem}
\newenvironment{foo}{\namedtheorem{Foo}}{\endnamedtheorem}
```

if necessary.) If there are definitions for proofs or qed signs then turn them off, too; the cc class provides these things.

For publication in computational complexity you should next switch to author-year citations. To do so:

- remove the option `nonatbib`,
- add your `.bib`-file in

  ```
  \begin{filecontents*}{\jobname.bib}
    ...
  \end{filecontents*}
  ```

  before `\documentclass`,
- throw away your handwritten environment `thebibliography` if any and the command `\bibliographystyle` if present, and replace it or your `\bibliography` command with `\bibliography{`⟨*name of your* `.bib`*-file*⟩`}`.
- Then run `latex`, `bibtex` and `latex` twice and
- adjust the text at the citation points: In particular, replace all `\cite` commands with either `\citet` for textual, `\citep` for parenthetical or `\citealt` for use inside parentheses. (Well, `\cite` is usually equivalent to `\citet`. However, changing all shows that it's done.)

Finally, you may want to switch to more intelligent `\ref`, see Section 3.2. To do so just remove the option `noprefixes` and adapt text at your `\ref` commands, usually by removing words like Theorem, Section before them and parentheses around equation references.

5. Make your document portable

In order to make your cc source file portable to persons who did not yet install the cc class, include the file `cc-cls-inline.tex`. This file can be found on the journal's homepage `http://www.computational-complexity.org/`. Please do not forget to remove the following changes prior to sending your file to computational complexity, it will have no effect there. You have two options:

1. Simply include the entire file `cc-cls-inline.tex` in your file just before the `\documentclass` command. This has the drawback that your personal texts starts only after many lines irrelevant to you.

2. Insert your file in the following framework:

```
\newif\ifcc\IfFileExists{cc.cls}{\cctrue}{\ccfalse}\ifcc

%%% Include your document here
%%% (formatted as described in this documentation or
%%%  sketched by the template file cctemplate.tex).

\else

%%% Include cc-cls-inline.tex here.

\typeout{Please call latex again.}
\makeatletter\expandafter\@@end
\fi
```

   This has the advantage that the cc stuff is at the end. The drawback is that you need to call LaTeX once more.

6. Commands

`\documentclass[`⟨*options*⟩`]{cc}` Possible ⟨*options*⟩ are:

- any option from the article document class. (a4paper, a4paper, b5paper, letterpaper, legalpaper, executivepaper, landscape, 10pt, 11pt, 12pt, oneside, twoside, draft, final, titlepage, notitlepage, onecolumn, twocolumn, leqno, fleqn, openbib, though not all of them might produce nice results.) Note that all the *paper options invoke the option textarea=none, you need to add textarea=cc (or similar, see below) after the *paper option to get the same text area as in computational complexity then.
- any option from the $\mathcal{AMS}$ packages (if they are not disabled by noams). (intlimits, nointlimits, sumlimits, nosumlimits, namelimits, nonamelimits, leqno, reqno, centertags, tbtags, cmex10, fleqn.)
- localnumbering, longarticle (default): theorem and equation numbering is local to each section, e.g. Theorem 3.4.
- globalnumbering, shortarticle: theorem and equation numbering is global, e.g. Theorem 17.
- ccpublish (default): requirements as for publication in computational complexity.
- noccpublish: `\contact`, `abstract`, `keywords` and `subject` are optional now.

Further, the following ⟨*options*⟩ are available. They are mainly intended to deactivate certain standard features of the class, in cases where these cause trouble.

- ams (default): use the $\mathcal{AMS}$ packages amsmath (which includes amstext, amsgen, amsbsy, amsopn), amsfonts, amssymb.
- noams: do not use the $\mathcal{AMS}$ packages.
- cclayout, nocclayout turn the computational complexity layout on or off.
- textarea=cc (default with ccpublish) always takes the newest cc text area from the following:
  - textarea=cc2 (119mm × 45.5pc) picks the cc text area (after July 2011),
  - textarea=cc1 (141mm × 200mm) picks the cc text area (before July 2011),

For downward compatibility the option cctextarea equaling textarea=cc and nocctextarea equaling textarea=none still work. All these options have no effect with nocclayout.

- textarea=full makes the text area as large as possible (with $\frac{1}{2}$in margin to all sides).
- textarea=none takes whatever is there. This is same as nocctextarea.
- noothermargins, classicalmargins, printmargins, balancedmargins: Choose margin mode. noothermargins leaves the margins alone, classicalmargins leaves the outer margin but fits the inner one to paper and text widths, printmargins puts 5mm to the outer edge, balancedmargins makes both margins equal.
- autotitle (default): at `\begin{document}` the title is generated, and at `\end{document}` the receipt information and affiliations are generated.
- noautotitle: `\maketitle` and `\makeendtitle` must be explicitly written.
- ccsectioning (default): use centered section headings and in-line subsection and subsubsection headings.
- noccsectioning: use section, subsection, subsubsection, paragraph, subparagraph headings as with the article document class.
- natbib (default): use the citation scheme provided by the natbib package by Patrick W. Daly, the options sort&compress (default), sort and nosort decide whether multiple citations are sorted or not (compression only affects numerical citations).
- cccite: use the (old) author-year citation scheme of computational complexity.
- nocccite, nonatbib: do neither use the natbib nor the computational complexity citation scheme.
- onecolumnbibliography (default), twocolumnbibliography: With these options you can choose one or two columns for the bibliography.
- twocolumnendtitle (default), onecolumnendtitle: With these options you can choose one or two columns for the bibliography.
- cctheorems (default): theorem like environments are defined as described.
- nocctheorems: theorem like environments are *not* defined at all.

- prefixes (default): references to theorems, equations, and so on, come with prefixes, e.g. `\ref{res:lemma}` produces 'Lemma 3.3' rather than only '3.3',
- noprefixes: references behave as in standard LaTeX 2_ε,
- bare (default): `\label` produces two labels instead of one, a long form for `\ref` and a short form for `\bare\ref`,
- nobare: `\label` works as usual, `\bare\ref` is equivalent to `\ref` (but gives a warning),
- theoremitemprefixes (default): references to subtopics of a theorem (or lemma ...) consist of the theorem reference and the item reference, for example, `\ref{lemma:2}` produces 'Lemma 3.3(ii)'. In fact, between Lemma 3.3 and the following theorem or equation (Example 3.4 in our case) you would have obtained '(ii)'. This short form can be forced by `\short\ref{lemma:2}`. You can also force the whole form by `\whole\ref{lemma:2}`.
- notheoremitemprefixes: with this option you always get the short form.
- separateequationcounting: Do not count equations together with theorems, lemmas, ...
- noseparateequationcounting (default): Count equations together with theorems, lemmas, ...
- ccalgorithms (default): Load the algorithms stuff.
- noccalgorithms: Do not load the algorithms stuff.

And finally there are some options for font, input and multilingual support.

- OT1 (default): use the font encoding scheme OT1 (this is standard with LaTeX).
- T1: use the new font encoding scheme T1 (256 characters per font instead of 128).
- nolatin1 (default): do not use the input encoding scheme latin1 (this is standard with LaTeX).
- latin1: use the input encoding scheme latin1 (so Umlaute, äöüi, and so on can be typed in literally).
- utf8 (default): use the input encoding scheme utf-8.
- noutf8: do not use the input encoding scheme utf-8.

- noinputenc: do not use any input encoding scheme, so that loading the package inputenc can be done afterwards.
- nobabel (default): do not use babel for multilingual support.
- babel (default): load babel for multilingual support (at an appropriate place, i.e. before inputenc), required languages must be included as options to the `\documentclass`.
- multilingual: this is an abbreviation for T1, latin1 and babel.
- nomultilingual: this is an abbreviation for OT1, nolatin1 and nobabel.

`\contact{`⟨*contact email address*⟩`}`

Preamble command to specify the email address of the contact author. This is required for publications in computational complexity.

`\received{`⟨*submission date*⟩`}` `\submitted{`⟨*submission date*⟩`}`

Preamble command to declare the submission or received date of the manuscript. (Both variants do exactly the same!) Use the format `27 July 2011`.

`\author{`⟨*author list*⟩`}`

Preamble command to specify the authors and their addresses. Different authors are separated by `\and`. If you are not writing for computational complexity footnotes can be produced by `\thanks{`⟨*text*⟩`}`. If an author has a different current address, use `\currentaddress`. For an other type of other address, use `\otheraddress` followed by a line like `Guest address of \textsc{`⟨*author name*⟩`}`. Use the macros `\email{`⟨*email-address*⟩`}` and `\homepage{`⟨*www-address*⟩`}` to specify the email address and home page, respectively. The combination of these things can be seen best in the example in Table 3.1.

Note that from this declaration also the list of authors in the title and the short list of authors for the running head is derived. Usually, the automatism should work well. If not (maybe the authors' names are very long), you can use `\authorhead{`⟨*last name list*⟩`}` to specify the author list for the running head. Similarly, you can use `\authorlist{`⟨*name list*⟩`}` if the the automatic extraction of the author names for the title does not work as expected.

`\title{`⟨*title*⟩`}`

Preamble command to specify the title. If the title is not broken nicely, you can use \\ to improve line breaking. Long titles do not fit into the running head. In this case please specify a shorter version using `\titlehead{`⟨*short title*⟩`}`.

`\subtitle{`⟨*subtitle*⟩`}`

`\version{`⟨*version*⟩`}`

These preamble command allows to insert, e.g., 'Preliminary version' under the title.

`\date{`⟨*date*⟩`}`

Preamble command, default is `\today`. This date is *not* used when the article is published in computational complexity, but it is put in the header when using the option noccpublish.

`\begin{abstract}` ⟨*text*⟩ `\end{abstract}`

Preamble environment to specify the abstract.

`\begin{keywords}` ⟨*list of keywords*⟩ `\end{keywords}`

Preamble environment to specify keywords.

`\begin{subject}` ⟨*subject classification*⟩ `\end{subject}`

Preamble environment to specify the subject classification.

`\begin{acknowledge}` ⟨*acknowledgments*⟩ `\end{acknowledge}`

Environment for acknowledgments. Funding information can also be included here. If there are no acknowledgements you *must* put `\noacknowledge` instead.

`\bibliography{`⟨*list of bibliography files*⟩`}`

Command to produce the bibliography from the ⟨*list of bibliography files*⟩ using BibTeX.

`\begin{theorem}[`⟨*citation*⟩`]` ⟨*theorem text*⟩ `\end{theorem}`

`\begin{theorem*}[`⟨*citation*⟩`]` ⟨*theorem text*⟩ `\end{theorem*}`

Environment for theorems. There are similar environments, for example, `lemma`, `definition`, `example`. Compare Table 3.2 for a complete list. Each of them has a starred version that is not numbered.

`\begin{continued}{`⟨*label-key*⟩`}` ⟨*theorem text*⟩ `\end{continued}`

`\begin{contexample}{`⟨*label-key*⟩`}` ⟨*example text*⟩ `\end{contexample}`

Environment to continue theorems-like environments. Note that examples need a different environment since they use an end of example mark.

`\begin{namedtheorem}{`⟨*heading*⟩`}[`⟨*citation*⟩`]`
⟨*theorem text*⟩
`\end{namedtheorem}`

`\begin{namedtheorem*}{`⟨*heading*⟩`}[`⟨*citation*⟩`]`
⟨*theorem text*⟩
`\end{namedtheorem*}`

This also is an environment for theorems. Other than theorem, the ⟨*heading*⟩, e.g. 'Theorem', is specified explicitly. Thus a 'Fundamental Theorem' can be easily typed.

`\begin{proof}[`⟨*citation*⟩`]` ⟨*proof text*⟩ `\end{proof}`

This is the standard environment to type proofs. The default qed symbol is an open square (□), but you can redefine `\qedsymbol`. You can use `\qed` to force the qed symbol at an earlier place. This is usually necessary whenever a proof terminates with a math environment or a list.

`\begin{namedproof}[`⟨*end of proof mark*⟩`]{`⟨*heading*⟩`}[`⟨*citation*⟩`]`
⟨*proof text*⟩
`\end{namedproof}`

Environment to type proof-like things which differ in ⟨*heading*⟩ and optionally also in the ⟨*end of proof mark*⟩. Note that the latter is typeset in math mode.

`\begin{enumerate}*` ⟨*items*⟩ `\end{enumerate}`

This is simply a variant of the traditional `enumerate` environment, it continues a previously terminated list. This allows you to make intermediate remarks and then continue your numbered list.

`\label{`⟨*key*⟩`}`, `\ref{`⟨*key*⟩`}`, `\bare\ref{`⟨*key*⟩`}`, `\short\ref{`⟨*key*⟩`}`, `\whole\ref{`⟨*key*⟩`}`

These macros are used for referencing. `\label` defines a label, `\ref` produces a reference to the label with the corresponding ⟨*key*⟩. In the standard

setup, a theorem will be referenced as 'Theorem 3.4' or the like. Unless the document class option nobare was given, `\bare\ref` produces a short label, e.g. '3.4'.

The other two modifications are important for references to list items in theorem-like environments. Usually, the reference would be the whole reference which is forced by `\whole\ref`, for example, `\whole\ref{lemma:1}` is Lemma 3.3(i). But near the theorem, that is until the next theorem or equation, a shortened form is used which is forced by `\short\ref`, for example, `\short\ref{lemma:1}` is (i). This feature can be turned off by the document class option notheoremitemprefixes.

`\begin{thebibliography}{}`
`\bibitem[`⟨*label*⟩`]{`⟨*key*⟩`}` ⟨*bibliographic information*⟩
`\end{thebibliography}`

This environment is used to typeset the references. For each reference there is a `\bibitem`. Usually, this is automatically produced by BibTeX.

`\citet*[`⟨*prefix*⟩`][`⟨*postfix*⟩`]{`⟨*key*⟩`}`,
`\citep*[`⟨*prefix*⟩`][`⟨*postfix*⟩`]{`⟨*key*⟩`}`,
`\citealt*[`⟨*prefix*⟩`][`⟨*postfix*⟩`]{`⟨*key*⟩`}`,
`\citealp*[`⟨*prefix*⟩`][`⟨*postfix*⟩`]{`⟨*key*⟩`}`,
`\citeauthor*[`⟨*prefix*⟩`][`⟨*postfix*⟩`]{`⟨*key*⟩`}`,
`\citeyear[`⟨*prefix*⟩`][`⟨*postfix*⟩`]{`⟨*key*⟩`}`

These macros are defined by the package natbib. With the option cccite they loose most of their functionality. With the options nocccite or nonatbib they are not defined.

All of these can have a comma separated list of ⟨*key*⟩s. The star indicates that the full list of authors should be used if possible. The ⟨*prefix*⟩ precedes, the ⟨*postfix*⟩ follows the citation. If only one optional argument is present, it is considered to be the ⟨*postfix*⟩. The ⟨*postifx*⟩ may be empty to allow the specification of a ⟨*prefix*⟩ only. There are several examples in Section 3.3.

```
\citet{goomit95}\\
\citeauthor{kopdal99}\\
\citeyear{knu84}\\
\cite{knu84,knu86b,knu86c}\\
\citealt{lam94}\\
\citep{goomit96g}\\
This\nocite{pat88}
produces no text but a
bibliography entry.
```

Goossens *et al.* (1995)
Kopka & Daly
1984
Knuth (1984, 1986c,d)
Lamport 1994
(Goossens *et al.*, 1996)
This produces no text but a bibliography entry.

`\cite{`⟨*key*⟩`}`, `\citeauthor{`⟨*key*⟩`}`, `\citeyear{`⟨*key*⟩`}`, `\citemul{`⟨*key*⟩`}`, `\shortcite{`⟨*key*⟩`}`, `\parencite{`⟨*key*⟩`}`, `\nocite{`⟨*key*⟩`}`

These obsolete macros are used for citations when the option cccite is used.

`\setlength{\headrulewidth}{`⟨*width*⟩`}`

If a head rule is desired, use this in the preamble. The default value for ⟨*width*⟩ is `.4pt`. Note that this has only an effect with the document class option noccpublish.

`\maketitle`

This command produces the title if not done yet. You never need this command unless you use the document class option noautotitle.

`\makeendtitle`

This command produces receipt information and affiliations if not done yet. You do not need this command unless you use the document class option noautotitle.

`\ccsps{`⟨*keyvaluelist*⟩`}`

Preamble command to define publishing service information. See Section 3.6 for details.

`\electronic`, `\printed`

Commands *for the editor*. Switches the ISSN to the electronic or to the printed version.

```
\begin{algorithm}{rs}[Repeated
  squaring]
\item An element
  $x \in \mathbb{Z}_{m}$ and
  an exponent $e \in \{ 2,
  \dots, \varphi(m)\}$.
\item $x^{e} \in \mathbb{Z}_{m}$.
  \begin{block}
  \item
    Compute the binary
    representation $(e_{n},
    \dots, e_{0})$ of $e$.
  \item
    \algolabel{B}
    $z \gets x$.
  \item
    \algolabel{D}
    \begin{forblock}
      {$i = n-1, \dots, 0$}
      \algolabel{C}
    \item $z \gets z^{2}$.
      \begin{ifblock}
        {$e_{i}=1$}
      \item $z \gets z * x$.
      \end{ifblock}
    \end{forblock}
  \item
    \algolabel{G}
    \RETURN $z$.
  \end{block}
\end{algorithm}
\hrule\medskip
B: \stepref{rs}{B}\\
C: \ref{rs-C}, \whole\ref{rs-C}\\
D: \short\ref{rs-D},
   \whole\ref{rs-D}
```

ALGORITHM 7.1. Repeated squaring.

Input: An element $x \in \mathbb{Z}_m$ and an exponent $e \in \{2, \dots, \varphi(m)\}$.
Output: $x^e \in \mathbb{Z}_m$.

1. Compute the binary representation $(e_n, \dots, e_0)$ of e.
2. $z \leftarrow x$.
3. For $i = n-1, \dots, 0$ do 4–6
4. $\quad z \leftarrow z^2$.
5. $\quad$ If $e_i = 1$ then
6. $\quad\quad z \leftarrow z * x$.
7. Return z.

B: Step 2 in Algorithm 7.1
C: 3–6, Algorithm 7.1 step 3–6
D: 3, Algorithm 7.1 step 3

Table 7.1: An example algorithm

7. Commands for algorithms

The commands and environments related to algorithms can also be used independently, try `\usepackage{ccalgo}` to activate them. For a longer example, see Table 7.1.

```
\begin{algorithm}{⟨masterkey⟩}[⟨citation⟩]
  \item ⟨input⟩
  \item ⟨output⟩
  \begin{block}
    ⟨body⟩
  \end{block}
\end{algorithm}
```

This is a specialization of the following environment `namedalgorithm`. You may define such specializations using `\newalgorithm`.

`\newalgorithm{`⟨*environment name*⟩`}[`⟨*list of required items*⟩`]{`⟨*heading*⟩`}`.

You can use this to specialize the following environment `namedalgorithm`.

```
\begin{namedalgorithm}{⟨heading⟩}[⟨list of required items⟩]
  {⟨masterkey⟩}[⟨citation⟩]
  \item ⟨first required item⟩
  ...
  \item ⟨last required item⟩
  \begin{block}
    ⟨body⟩
  \end{block}
\end{namedalgorithm}
```

Typesetting algorithms is an art by itself. We hope that this environment is flexible enough to reflect also your taste. The environment `namedalgorithm` takes four arguments, two of them are optional. The ⟨*list of required items*⟩ is a comma separated list of titles for required items. It defaults to: `Input,Output`. Thus the first required item is entitled `Input` and the second and last required item is entitled `Output`. An interactive protocol might have many more required items, for example, `Common input,Prover's input,Verifier's input,Output`. The ⟨*heading*⟩ could be `Algorithm` or `Extended Euclidean Algorithm`, it will be referenced together with the number (if any). The ⟨*masterkey*⟩ is used to set a label; this is obligatory since labels to steps or ranges of steps in the algorithm are created using this. Finally ⟨*citation*⟩ usually is either a phrase describing the algorithm, or a reference.

The ⟨*body*⟩ is a sequence of steps and blocks.

`\item[`⟨*label*⟩`]` starts a new step of the algorithm, either numbered or labelled ⟨*label*⟩. As usual, a `\label` command after the item refers to the step,

but it is wiser to use `\algolabel{`⟨*subkey*⟩`}` instead which is equivalent to `\label{`⟨*masterkey*⟩`-`⟨*subkey*⟩`}`. (Note that also items with given ⟨*label*⟩ can have an `\algolabel` or a `\label`!) A reference must then be written `\stepref{`⟨*masterkey*⟩`}{`⟨*subkey*⟩`}` or `\ref{`⟨*masterkey*⟩`-`⟨*subkey*⟩`}`. If the standard width of the item labels is not enough, use

```
\settowidth{\steplabelwidth}{\makeoptalgolabel{⟨widest label⟩}}
```

before the first step in the algorithm to adjust this. (If you have a problem because your algorithm is longer than 99 steps then you should better use `\settowidth{\steplabelwidth}{\makealgolabel{999}}`.)

`\begin{block}` ⟨*body*⟩ `\end{block}` produces an indented block. An `\algolabel{`⟨*subkey*⟩`}` before the ⟨*body*⟩ generates a reference to the *range* of steps inside the block. Actually, the environment `block` is combined from environments `indention` and `range`. `\begin{indention}` ⟨*body*⟩ `\end{indention}` just produces some indented lines, while `\begin{range}` `\algolabel{`⟨*subkey*⟩`}` ⟨*body*⟩ `\end{range}` allows to reference a range of steps.

More advanced facilities might help you:

- `\begin{ifblock}{`⟨*condition*⟩`}` ⟨*body*⟩ `\end{ifblock}`
- `\begin{elifblock}{`⟨*condition*⟩`}` ⟨*body*⟩ `\end{elifblock}`
- `\begin{elseblock}` ⟨*body*⟩ `\end{elseblock}`
- `\begin{forblock}{`⟨*loop control*⟩`}` ⟨*body*⟩ `\end{forblock}`
- `\begin{whileblock}{`⟨*condition*⟩`}` ⟨*body*⟩ `\end{whileblock}`
- `\begin{untilblock}{`⟨*condition*⟩`}` ⟨*body*⟩ `\end{untilblock}`
- `\begin{blockwhile}{`⟨*condition*⟩`}` ⟨*body*⟩ `\end{blockwhile}`
- `\begin{blockuntil}{`⟨*condition*⟩`}` ⟨*body*⟩ `\end{blockuntil}`

For example, the first of these is almost equivalent to:

```
\item
  \IF ⟨condition⟩ \THEN
\begin{block}
  ⟨body⟩
\end{block}
```

The actual implementation also takes care of a label to the entire range of steps. If you put a label in an `ifblock`, you reference the range containing the If step and the then block. If you need a reference for the If step itself, or you use ⟨*label*⟩ for all steps, then put `\item[`⟨*label*⟩`]\algolabel{`⟨*subkey*⟩`}` before the `ifblock`.

Typesetting keywords is done as follows: `\keyword{`⟨*name*⟩`}` produces a keyword. `\FOR`, `\DO`, `\WHILE`, `\REPEAT`, `\UNTIL`, `\IF`, `\THEN`, `\ELSE`, `\RETURN` are predefined keywords. Further, `\COMMENT{`⟨*comment*⟩`}` can be used to type comments.

8. Interaction with other packages

hyperref This package must be loaded after cc-cls. Otherwise, references will not work as expected with hyperref.

beamer If you want to use cc-cls, ccthm and/or ccalgo you must use the option noamsthm to beamer and make sure that babel is loaded with at least the language english before calling ccthm or ccalgo.

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

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