Abstract

\textsc{Hevea} is a \LaTeX{} to \html{} translator. The input language is a fairly complete subset of \LaTeX\ 2ε (old \LaTeX{} style is also accepted) and the output language is \html{} that is (hopefully) correct with respect to version 5.

\textsc{Hevea} understands \LaTeX{} macro definitions. Simple user style files are understood with little or no modifications. Furthermore, \textsc{Hevea} customisation is done by writing \LaTeX{} code.

\textsc{Hevea} is written in Objective Caml, as many lexers. It is quite fast and flexible. Using \textsc{Hevea} it is possible to translate large documents such as manuals, books, etc. very quickly. All documents are translated as one single \html{} file. Then, the output file can be cut into smaller files, using the companion program \textsc{Hota}.

\textsc{Hevea} can also be instructed to output plain text or info files.

Information on \textsc{Hevea} is available at \url{http://hevea.inria.fr/}.
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Part A
Tutorial

1 How to get started

Assume that you have a file, a.tex, written in \LaTeX, using the article, book or report style. Then, translation is achieved by issuing the command:

```bash
# hevea a.tex
```

Probably, you will get some warnings. If He\TeX{} does not crash, just ignore them for the moment (Section 4 explains how to correct errors).

If everything goes fine, this will produce a new file, a.html, which you can visualise through a HTML browser.

If you wish to experiment He\TeX{} on small \LaTeX{} source fragments, then launch He\TeX{} without arguments. He\TeX{} will read its standard input and print the translation on its standard output. For instance:

```bash
# hevea

$x \in \mathcal{E}$
```

Incidentally, notice that the symbol “\textasciitilde" translates to the appropriate numerical character reference and that the calligraphic letter “\textasciitildeE” renders as a red “\textasciitildeE”. You can find some more elaborate examples\footnote{http://hevea.inria.fr/examples/index.html} in the on-line documentation.

2 Style files

\LaTeX{} style files are files that are not intended to produce output, but define document layout parameters, commands, environments, etc.

2.1 Standard base styles

The base style of a \LaTeX{} document is the argument to the \texttt{\documentclass} command (\texttt{\documentstyle} in old style). Normally, the base style of a document defines the structure and appearance of the whole document.

He\TeX{} really knows about two \LaTeX{} base styles, article and book. Additionally, the report base style is recognized and considered equivalent to book and the seminar base style for making slides is recognized and implemented by small additions on the article style.

Base style style is implemented by an He\TeX{} specific style file style.hva. More precisely, He\TeX{} interprets \texttt{\documentclass\{style\}} by attempting to load the file style.hva (see section C.1.1.1 on where He\TeX{} searches for files). Thus, at the moment, He\TeX{} distribution includes the files, article.hva, book.hva, etc.

2.2 Other base styles

Documents whose base style is not recognized by He\TeX{} can be processed when the unknown base style is a derivation of a recognized base style.

Let us assume that doc.tex uses an exotic base style such as acmconf. Then, typing hevea doc.tex will yield an error, since He\TeX{} cannot find the acmconf.hva file:
This situation is avoided by invoking \Hevea with the known base style file article.hva as an extra argument:

\# hevea article.hva doc.tex

The extra argument instructs \Hevea to load its article.hva style file before processing doc.tex. It will then ignore the document base style specified by \documentclass (or \documentstyle).

Observe that the fix above works because the acmconf and article base styles look the same to the document (i.e., they define the same macros). More generally, most base styles that are neither article nor book are in fact variations on either two of them. However, such styles usually provides extra macros. If users documents use these macros, then users should also instruct \Hevea about them (see section 4.1).

Finally, it is important to notice that renaming a base style file style.cls into style.hva will not work in general. As a matter of fact, base style files are \LaTeX and not \LaTEX source and \Hevea will almost surely fail on \LaTEX-ish input.

2.3 Other style files

A \LaTEX document usually loads additional style files, by using the commands \input or \usepackage or \input.

2.3.1 Files loaded with \input

Just like \LaTEX, \Hevea reacts to the construct \input{file} by loading the file file. (If I got it right, \Hevea even follows \LaTEX's crazy conventions on .tex extensions).

As it is often the case, assume that the document doc.tex has a \input{mymacros.tex} instruction in its preamble, where mymacros.tex gathers custom definitions. Hopefully, only a few macros give rise to trouble: macros that performs fine typesetting or \LaTEXish macros. Such macros need to be rewritten, using basic \LaTEX constructs (section 4 gives examples of macro-rewriting). The new definitions are best collected in a style file, mymacros.hva for instance. Then, doc.tex is to be translated by issuing the command:

\# hevea mymacros.hva doc.tex

The file mymacros.hva is processed before doc.tex (and thus before mymacros.tex). As a consequence of \Hevea behaviour with respect to definition and redefinition (see section B.8.1), the macro definitions in mymacros.hva take precedence over the ones in mymacros.tex, provided the document original definitions (the ones in mymacros.tex) are performed by \newcommand (or \newenvironment).

Another situation is when \Hevea fails to process a whole style file. Usually, this means that \Hevea crashes on that style file. The basic idea is then to write a mymacros.hva style file that contains alternative definitions for all the commands defined in mymacros.sty. Then, \Hevea should be instructed to load mymacros.hva and not to load mymacros.tex. This is done by invoking hevea as follows:

\# hevea mymacros.hva -e mymacros.tex doc.tex

Of course, mymacros.hva must now contain replacements for all the useful macros of mymacro.tex.

2.3.2 Files loaded with \usepackage

As far as I know, \LaTEX reacts to the construct \usepackage{name} by loading the file name.sty. \Hevea reacts in a similar, but different, manner, by loading the file name.hva.
\texttt{H\AE V\AE} distributions already includes quite a few .hva implementations of famous packages (see section B.17). When a given package (say \texttt{zorglub}) is not implemented, the situation may not be as bad as it may seem first. Hopefully, you are only using a few commands from package \texttt{zorglub}, and you feel confident enough to implement them yourself. Then, it suffices to put your definitions in file \texttt{zorglub.hva} and \texttt{H\AE V\AE} will react to \texttt{\usepackage{zorglub}} by loading \texttt{zorglub.hva}.

See section B.5.2 for the full story on \texttt{\usepackage}.

# 3 A note on style

## 3.1 Spacing, Paragraphs

Sequence of spaces normally are translated into one single space. Newlines in the input document undergo a special treatment. A newline triggers a special scanning mode that reads all following spaces and newlines. In case at least one additional newline character is read, then \texttt{H\AE V\AE} executes the \texttt{\par} command. Otherwise, \texttt{H\AE V\AE} outputs a single newline character. This process approximates \TeX{} process for introducing paragraph breaks and, as a result, empty lines produce paragraph breaks.

Space after commands with no argument is skipped (as in \LaTeX{}) — however this is not true in math mode, as explained in section 3.2.1.

The following two subsections describe management of paragraphs and spaces after command sequences in greater detail. They can be skipped in first reading.

### 3.1.1 Spurious Paragraphs

Paragraphs are rendered by the means of \texttt{p} elements. \texttt{H\AE V\AE} is a bit simplistic in breaking paragraphs and spurious paragraphs may be present in the final HTML document. Normally, as \texttt{H\AE V\AE} never outputs \texttt{p} elements whose contents is made of spaces only, this should not happen very often. Unfortunately, some commands do not produce any output in \TeX{}, while they do produce output in \texttt{H\AE V\AE}: those commands are \texttt{\label}, \texttt{\index} etc. \texttt{H\AE V\AE} translates \texttt{\label{\textit{name}}} into the anchor \texttt{\langle a id="\textit{name}"angle}. As a result, the following source fragment will introduce a spurious paragraph.

This a first paragraph.

\texttt{\label{label}}

This is another paragraph.

Indeed, whe have the following translation:

\begin{verbatim}
\texttt{<p>This a first paragraph.</p>}
\texttt{<p><a id="label"></a></p>}
\texttt{<p>This is another paragraph.</p>}
\end{verbatim}

Most of the time, such extra paragraphs remain unnoticed. Of course, they can be supressed by erasing one of the empty lines. For instance:

This a first paragraph.

\texttt{\label{label}}

This is another paragraph.

A similar situation occurs when a sectioning command is followed by \texttt{\label} and a paragraph break:

\texttt{\section*{(A section)\label{section:label}}}

First paragraph.
Produced HTML is, after a few cosmetic simplifications:

```html
<h2 class="section">A section</h2>
<p><a id="section:label"></a></p>
<p>First paragraph.</p>
```

Output is so, because closing the element `h2` implies re-opening a new paragraph. Here, two possible re-writing of source are:

```
\section*{A\label{section:label} section} \section*{A section}
```

```
First paragraph. \label{section:label}First paragraph.
```

In all cases, this amounts to avoiding a paragraph whose contents consists in a sole `\label` command.

Spurious paragraphs are more easily seen by running `hevea` with the command-line option `-dv`, which instructs `hevea` to add border on some of the elements it produces, including `p` elements.

### 3.1.2 Spaces after Commands

Space after commands with no argument is skipped. Consider the following example:

```
\newcommand{\open}{}
\newcommand{\close}{}
\open text opened by ‘‘\verb+\open+’’
and closed by ‘‘\verb+\close+’’\close.
```

We get:

```
(text opened by “\open” and closed by “\close”).
```

In the output above, the space after `\open` does not find its way to the output.

More generally, `HEVEA` tries to emulate `\LaTeX` behaviour in all situations, but discrepancies probably exist. Thus, users are invited to make explicit what they want. This is good practice anyway, because `\LaTeX` is mysterious here. Consider the following example, where the `\tryspace` macro is first applied and then expanded by hand:

```
\newcommand{\bfsymbol}{\textbf{symbol}}
\newcommand{\tryspace}[1]{#1 XXX}
\newcommand{\bfsymbol}{\textbf{symbol}}
\newcommand{\tryspace}{\bfsymbol}\`
\newcommand{\tryspace}{\bfsymbol}{\bfsymbol}\`
```

```
Some space: \tryspace{\bfsymbol}\`
No space: \bfsymbol XXX
```

Spacing is a bit chaotic here, the space after `symbol` remains when #1 is substituted for it by `\LaTeX` (or `HEVEA`).

```
Some space : symbol XXX
No space : symbolXXX
```

Note that, if a space before “XXX” is wanted, then one should probably write:

```
\newcommand{\tryspace}{\bfsymbol}{\bfsymbol}\`
```

Finally, whether the tabulation character is a space or not is random, so avoid tabs in your source document.
3.2 Math mode

H\TeX\,A math mode is not very far from normal text mode, except that all letters are shown in italics and that space after macros is echoed.

However, typesetting math formulas in HTML rises two difficulties. First, formulas contain symbols, such as Greek letters; second, even simple formulas do not follow the simple basic typesetting model of HTML.

3.2.1 Spacing in math mode

By contrast with L\TeX, spaces from the input are significant in math mode, this feature allows users to instruct H\TeX\,A on how to put space in their formulas. For instance, \alpha\rightarrow\beta is typeset without spaces between symbols, whereas \alpha \rightarrow \beta produces these spaces. Note that L\TeX ignores spaces in math mode, so that users can freely adjust H\TeX\,A output without changing anything to L\TeX output.

3.2.2 Symbols

Figure 1: Some symbols

\in: \in \notin: \notin \
\int: \int \prod: \prod \
\preceq: \preceq \prec: \prec \
\leq: \leq \geq: \geq \
\cup: \cup \cap: \cap \
\supset: \supset \subset: \subset \
\supseteq: \supseteq \subseteq: \subseteq

With respect to previous versions of H\TeX\,A since the beginning, the treatment of symbols has significantly evolved. Outputting symbols is now performed by using Unicode character references, an option that much more complies with standards than the previous option of selecting a “symbol” font. Observe that this choice is now possible, because more and more browsers correctly display such references. See Figure 1 for a few such symbols.

However, this means that ancient or purposely limited browsers (such as text-oriented browsers) cannot display maths, as translated by H\TeX\,A. For authors that insist on avoiding symbols that cannot be shown by any browser, H\TeX\,A offers a degraded mode that outputs text in place of symbols. H\TeX\,A operates in this mode when given the -textsymbols command-line option. Replacement text is in English. For instance, the “$\in$” symbol is replace by “in”. This is far from being satisfactory, but degraded mode may be appropriate for documents than contain few symbols.

3.2.3 Displays

Apart from containing symbols, formulas specify strong typesetting constraints: sub-elements must be combined together following patterns that departs from normal text typesetting. For instance, fractions numerators and denominators must be placed one above the other. H\TeX\,A handles such constraints in display mode only.

The main two operating modes of H\TeX\,A are text mode and display mode. Text mode is the mode for typesetting normal text, when in this mode, text items are echoed one following the other and paragraph breaks are just blank lines, both in input and output. The so called displayed-paragraph environments of L\TeX (such as center or quote) are rendered by HTML block-level elements (such as div or blockquote). Rendering is correct because both L\TeX displayed environments and HTML block-level elements start a
new line. Conversely, since opening a HTML block-level elements means starting a new line, any text that should appear inside a paragraph must be translated using only HTML text-level elements. HeVeA chooses to translate in-text formulas that way.

HeVeA display mode allows more control on text placement, since entering display mode means opening a HTML table element and that tables allow to control the relative position of their sub-elements. Displays come in two flavor, horizontal displays and vertical displays. An horizontal display is a one-row table, while a vertical display is a one-column table. These tables holds display sub-elements, displays sub-elements being centered vertically in horizontal display mode and horizontally in vertical display mode.

Display mode is first opened by opening a displaymath environment (e.g. by $$ or \[). Then, sub-displays are opened by \LaTeX constructs which require them. For instance, a displayed fraction (\frac) opens a vertical display.

The distinction between text and display modes clearly appears while typesetting math formulas. An in-text formula such as $\int_1^2 xdx = \frac{3}{2}$ appears as: $\int_1^2 xdx = \frac{3}{2}$, while the same formula has a better aspect in display mode:

![Displayed Formula](image)

As a consequence, HeVeA is more powerful in display mode and formulas should be displayed as soon as they get a bit complicated. This rule is also true in \LaTeX but it is more strict in HeVeA, since HTML capabilities to typeset formulas inside text are quite poor. In particular, it is not possible to get in-text “real” fractions or in-text limit-like subscripts.

Users should remember that HeVeA is not \TeX or \LaTeX and that HeVeA author neither is D. E. Knuth nor L. Lamport. Thus, some formulas may be rendered poorly. For instance, two fractions with different denominator and numerator height look strange.

![Fractions Example](image)

The reason is that vertical displays in an horizontal display are HTML tables that always get centered in the vertical direction. Such a crude model cannot faithfully emulate any \TeX box placement.

Users can get an idea on how HeVeA combines elements in display mode by giving the -dv command-line option, which instructs HeVeA to add borders to the table elements introduced by displays.

### 3.2.4 Arrays and display mode

By contrast with formulas, which HeVeA attempts to render with text-level elements only when they appear inside paragraphs, \LaTeX arrays always translate to the block-level element table, thereby introducing non-desired line breaks before and after in-text arrays. As a consequence, in-text arrays yield an acceptable output, only while alone in a paragraph.

However, since in some sense, all HTML tables are displayed, the array and tabular environments implicitly open display mode, thus allowing a satisfactory typesetting of formulas in arrays. More precisely, array elements whose column format specification is 1, c or r are typeset in display mode (see section B.10.2).
3.3 Warnings

When HEVEA thinks it cannot translate a symbol or construct properly, it issues a warning. This draws user attention onto a potential problem. However, rendering may be correct.

Note that all warnings can be suppressed with the -s (silent) option. When a warning reveals a real problem, it can often be cured by writing a specific macro. The next two sections introduce HEVEA macros, then section 4 describes how to proceed with greater detail.

3.4 Commands

Just like \LaTeX, HEVEA can be seen as a macro language, macros are rewritten until no more expansion is possible. Then, either some characters (such as letters, integers...) are outputed or some internal operation (such as changing font attributes, or arranging text items in a certain manner) are performed.

This scheme favors easy extension of program capabilities by users. However, predicting program behaviour and correcting errors may prove difficult, since final output or errors may occur after several levels of macro expansion. As a consequence, users can tailor HEVEA to their needs, but it remains a subtle task. Nevertheless, happy \LaTeX users should enjoy customizing HEVEA, since this is done by writing \LaTeX code.

3.5 Style choices

\LaTeX and HTML differ in many aspects. For instance, \LaTeX allows fine control over text placement, whereas HTML does not. More symbols and font attributes are available in \LaTeX than in HTML. Conversely, HTML has font attributes, such as color, which standard \LaTeX has not.

Therefore, there are many situations where HEVEA just cannot render the visual effect of \LaTeX constructions. Here some choices have to be made. For instance, calligraphic letters (\texttt{\textbackslash mathcal}) are rendered in red.

If you are not satisfied with HEVEA rendering of text style declarations, then you can choose your own, by redefining the \texttt{\textbackslash cal} macros, using \texttt{\renewcommand}, the macro redefinition operator of \LaTeX. The key point is that you need not worry about HEVEA internals: just redefine the old-\LaTeX style text-style declarations (i.e. \texttt{\it}, \texttt{\sc}, etc.) and everything should get fine:

\begin{verbatim}
\renewcommand{\sc}{\Huge}
\renewcommand{\cal}{\em}
\end{verbatim}

(See sections 4 and 5 on how to make such changes while leaving your file processable by \LaTeX, and section 10.2 for a more thorough description of customizing type styles).

Note that many of \LaTeX commands and environments are defined in the \texttt{hevea.hva} file that HEVEA loads before processing any input. These constructs are written using \LaTeX source code, in the end they invoke HEVEA internal commands.

Other \LaTeX constructs, such as \LaTeX key constructs or HEVEA internal commands (see section 8.3), that require special processing are defined in HEVEA source code. However, the vast majority of these definitions can be overridden by a redefinition. This may prove useless, since there is little point in redefining core constructs such as \texttt{\newcommand} for instance.

4 How to detect and correct errors

Most of the problems that occur during the translation of a given \LaTeX file (say \texttt{trouble.tex}) can be detected and solved at the macro-level. That is, most problems induce a macro-related warning and can be solved by writing a few macros. The best place for these macros is an user style file (say \texttt{trouble.hva}) given as argument to HEVEA.

\# hevea trouble.hva trouble.tex
By doing so, the macros written specially for H\LaTeX\ are not seen by L\TeX. Even better, trouble.tex is not changed at all.

A worth-mentioning alternative is inserting \texttt{\usepackage{trouble}} in the document preamble. Then, given H\LaTeX\ semantics for \texttt{\usepackage} (see Section B.5.2), H\LaTeX\-specific commands should be placed in the file “trouble.hva” file, while L\TeX\-specific commands should be placed in teh file “trouble.sty”.

Of course, adapting a document to H\LaTeX\ processing will be easier if the L\TeX\ source is written in a generic style, using macros. Note that this style is recommended anyway, since it facilitates document maintenance.

4.1 H\LaTeX\ does not know a macro

Consider the following L\TeX\ source excerpt:

\texttt{You can \texttt{\raisebox}.6ex\texttt{\em raise} text.}

L\TeX\ typesets this as follows:

\begin{verbatim}
You can \texttt{raise} text.
\end{verbatim}

Since H\LaTeX\ does not know about \texttt{\raisebox}, it incorrectly processes this input. More precisely, it first prints a warning message:

\texttt{trouble.tex:34: Unknown macro: \raisebox}

Then, it goes on by translating the arguments of \texttt{\raisebox} as if they were normal text. As a consequence some \texttt{.6ex} is finally found in the HTML output:

\begin{verbatim}
You can .6ex\texttt{raise} text.
\end{verbatim}

To correct this, you should provide a macro that has more or less the effect of \texttt{\raisebox}. It is impossible to write a generic \texttt{\raisebox} macro for H\LaTeX, because of HTML limitations. However, in this case, the effect of \texttt{\raisebox} is to raise the box a little. Thus, the first, numerical, argument to \texttt{\raisebox} can be ignored in a private \texttt{\raisebox} macro defined in trouble.hva:

\begin{verbatim}
\texttt{\newcommand{\raisebox}[2]{\texttt{$^\text{#2}$}}}\$\texttt{-\{mbox\#2\}}\$\$
\end{verbatim}

Now, translating the document yields:

\begin{verbatim}
You can \texttt{raise} text a little.
\end{verbatim}

Of course, this will work only when all \texttt{\raisebox} commands in the document raise text a little. Consider, the following example, where text is both raised a lowered a little:

\texttt{You can \texttt{\raisebox}.6ex\texttt{\em raise}}

or \texttt{\raisebox-.6ex\texttt{\em lower}} text.

Which L\TeX\ renders as follows:

\begin{verbatim}
You can \texttt{raise} or \texttt{lower} text.
\end{verbatim}

Whereas, with the above definition of \texttt{\raisebox}, H\LaTeX\ produces:

\begin{verbatim}
You can \texttt{raise} or \texttt{lower} text.
\end{verbatim}
A solution is to add a new macro definition in the trouble.hva file:

```
\newcommand{\lowerbox}[2]{$_{\mbox{#2}}$}
```

Then, trouble.tex itself has to be modified a little.

You can \raisebox{.6ex}{\em raise} or \lowerbox{-.6ex}{\em lower} text.

\HeVeA now produces a satisfying output:

You can \emph{raise} or \emph{lower} text.

Note that, for the document to remain \LaTeX-processable, it should also contain the following definition for \lowerbox:

```
\newcommand{\lowerbox}[2]{\raisebox{#1}{#2}}
```

This definition can safely be placed anywhere in trouble.tex, since by \HeVeA semantics for \newcommand (see section B.8.1) the new definition will not overwrite the old one.

### 4.2 \HeVeA incorrectly interprets a macro

Sometimes \HeVeA knows about a macro, but the produced HTML does not look good when seen through a browser. This kind of errors is detected while visually checking the output. However, \HeVeA does its best to issue warnings when such situations are likely to occur.

Consider, for instance, this definition of \blob as a small black square.

```
\newcommand{\blob}{\rule[.2ex]{1ex}{1ex}}
\blob \ Blob \blob
```

Which \LaTeX typesets as follows:

```
\blob
```

\HeVeA always translates \rule as \texttt{<hr>}, ignoring size arguments. Hence, it produces the following, wrong, output:

```
Blob
```

We may not be particularly commited to a square blob. In that case, other small symbols would perfectly do the job of \blob, such as a bullet (\texttt{\bullet}). Thus, you may choose to give \blob a definition in trouble.hva:

```
\newcommand{\blob}{\bullet}
```

This new definition yields the following, more satisfying output:

```
• Blob •
```
In case we do want a square blob, there are two alternatives. We can have \LaTeX\ typeset some subparts of the document and then to include them as images, section 6 explains how to proceed. We can also find a square blob somewhere in the variety of Unicode (or do I mean ISO 10646?) characters, and define \blob as a numerical character reference. Here, the character U+02588 seems ok.

\newcommand{\blob}{\@print@u{X2588}}

However, beware that not all browsers display all of Unicode...

4.3 \html\ crashes

\html\ failure may have many causes, including a bug. However, it may also stem from a wrong \LaTeX\ input. Thus, this section is to be read before reporting a bug...

4.3.1 Simple cases: \LaTeX\ also crashes

In the following source, environments are not properly balanced:

\begin{flushright}
\begin{quote}
This is right-flushed quoted text.
\end{quote}
\end{flushright}

Such a source will make both \LaTeX\ and \html\ choke. \html\ issues the following error message that shows the \LaTeX\ environment that is not closed properly:

./trouble.tex:6: Environment nesting error: html: 'DIV' closes 'BLOCKQUOTE'
./trouble.tex:4: Latex environment 'quote' is pending

Adios

Thus, when \html\ crashes, it is a good idea to check that the input is correct by running \LaTeX\ on it.

4.3.2 Complicated cases

Unfortunately, \html\ may crash on input that does not affect \LaTeX\. Such errors usually relate to environment or group nesting.

Consider for instance the following “optimized” version of a quoteright environment:

\newenvironment{quoteright}{\quote\flushright}{\endquote}

\begin{quoteright}
This a right-flushed quotation
\end{quoteright}

The \quote and \flushright constructs are intended to replace \begin{quote} and \begin{flushright}, while \endquote stands for \end{quote}. Note that the closing \endflushright is omitted, since it does nothing. \LaTeX\ accepts such an input and produces a right-flushed quotation.

However, \html\ usually translates \LaTeX\ environments to html block-level elements and it requires those elements to be nested properly. Here, \quote translates to <blockquote>, \flushright translates to <div class="flushright"> and \endquote translates to </blockquote>. At that point, \html\ refuses to generate obviously non-correct html and it crashes.
Giving up command: \@close
Giving up command: \endquote
Giving up command: \endquoteright
Giving up command: \end
./trouble.tex:7: Environment nesting error: html: 'BLOCKQUOTE' closes 'DIV'
./trouble.tex:5: Latex environment 'quoteright' is pending
Adios

Also notice that the error message above includes a backtrace showing the call-chain of commands.

In this case, the solution is easy: environments must be opened and closed consistently. \LaTeX{} style being recommended, one should write:

\begin{verbatim}
\newenvironment{quoteright}
{\begin{quote}\begin{flushright}}
{\end{flushright}\end{quote}}
\end{verbatim}

And we get:

This is a right–flushed quotation

Unclosed \LaTeX{} groups (\ldots) are another source of nuisance to \Hevea. Consider the following \texttt{horreur.tex} file:

\begin{verbatim}
\documentclass{article}

\begin{document}
In this sentence, a group is opened now {\em and never closed.\end{document}
\end{document}
\end{verbatim}

\LaTeX{} accepts this file, although it produces a warning:

```
# latex horreur.tex
This is TeX, Version 3.14159 (Web2C 7.2)
...
\end occurred inside a group at level 1)
Output written on horreur.dvi (1 page, 280 bytes).
```

By contrast, running \Hevea on \texttt{horreur.tex} yields a fatal error:

```
# hevea horreur.tex
Giving up command: \@raise@endocument
Giving up command: \endocument
Giving up command: \end
./horreur.tex:4: Environment nesting error: Latex env error: 'document' closes ''
./horreur.tex:3: Latex environment '' is pending
Adios
```

Thus, users should close opening braces where it belongs. Note that \Hevea error message “\texttt{Latex environment 'env' is pending}” helps a lot in locating the brace that hurts.

4.3.3 Desperate cases

If \Hevea crashes on \LaTeX{} source (not on \TeX{} source), then you may have discovered a bug, or this manual is not as complete as it should. In any case, please report to Luc.Maranget@inria.fr.

To be useful, your bug report should include \LaTeX{} code that triggers the bug (the shorter, the better) and mention \Hevea version number.
5 Making \texttt{HeVeA} and \texttt{LatEX} both happy

A satisfactory translation from \texttt{LatEX} to \texttt{html} often requires giving instructions to \texttt{HeVeA}. Typically, these instructions are macro definitions and these instructions should not be seen by \texttt{LatEX}. Conversely, some source that \texttt{LatEX} needs should not be processed by \texttt{HeVeA}. Basically, there are three ways to make input vary according to the processor, file loading, the \texttt{hevea} package and comments.

5.1 File loading

\texttt{HeVeA} and \texttt{LatEX} treat files differently. Here is a summary of the main differences:

- \texttt{LatEX} and \texttt{HeVeA} both load files given as arguments to \texttt{\input}, however when given the option \texttt{-e filename}, \texttt{HeVeA} does not load \texttt{filename}.
- \texttt{HeVeA} loads all files given as command-line arguments.
- Both \texttt{LatEX} and \texttt{HeVeA} load style files given as optional arguments to \texttt{\documentstyle} and as arguments to \texttt{\usepackage}, but the files are searched by following different methods and considering different file extensions.

As a consequence, for having a file \texttt{latexonly} loaded by \texttt{LatEX} only, it suffices to use \texttt{\input{latexonly}} in the source and to invoke \texttt{HeVeA} as follows:

```
# hevea -e latexonly...
```

Having \texttt{heveaonly} loaded by \texttt{HeVeA} only is more simple: it suffices to invoke \texttt{HeVeA} as follows:

```
# hevea heveaonly...
```

Finally, if one has an \texttt{HeVeA} equivalent \texttt{style.hva} for a \texttt{LatEX} style file \texttt{style.sty}, then one should load the file as follows:

```
\usepackage{style}
```

This will result in, \texttt{LatEX} loading \texttt{style.sty}, while \texttt{HeVeA} loads \texttt{style.hva}. As \texttt{HeVeA} will not fail in case \texttt{style.hva} does not exist, this is another method for having a style file loaded by \texttt{LatEX} only.

Writing an \texttt{HeVeA}-specific file \texttt{file.hva} is the method of choice for supplying command definitions to \texttt{HeVeA} only. Users can then be sure that these definitions are not seen by \texttt{LatEX} and will not get echoed to the image file (see section 6).

The file \texttt{file.hva} can be loaded by either supplying the command-line argument \texttt{file.hva}, or by \texttt{\usepackage{file}} from inside the document. Which method is better depends on whether you choose to override or to replace the document definition. In the command-line case, definitions from \texttt{file.hva} are processed before the ones from the document and will override them, provided the document definitions are made using \texttt{newcommand} (or \texttt{newenvironment}). In the \texttt{\usepackage} case, \texttt{HeVeA} loads \texttt{file.hva} at the place where \texttt{LatEX} loads \texttt{file.sty}, hence the definitions from \texttt{file.hva} replace the definitions from \texttt{file.sty} in the strict sense.

5.2 The \texttt{hevea} package

The \texttt{hevea.sty} style file is intended to be loaded by \texttt{LatEX} and not by \texttt{HeVeA}. It provides \texttt{LatEX} with means to ignore or process some parts of the document. Note that \texttt{HeVeA} copes with the constructs defined in the \texttt{hevea.sty} file by default. It is important to notice that the \texttt{hevea.sty} style file from the distribution is a \texttt{package} in \texttt{LatEX} \LaTeX{} terms and that it is not compatible with old \texttt{LatEX}. Moreover, the \texttt{hevea} package loads the \texttt{comment} package which must be present. Also notice that, for compatibility, \texttt{HeVeA} reacts to \texttt{\usepackage{hevea}} by loading its own version of the \texttt{comment} package (Section B.17.6).
5.2.1 Environments for selecting a translator

\H\E\V\E\A and \LaTeX perform the following actions on source inside the latexonly, verblatex, htmlonly, rawhtml, toimage and verbimage environments:

<table>
<thead>
<tr>
<th>environment</th>
<th>\H\E\V\E\A</th>
<th>\LaTeX</th>
</tr>
</thead>
<tbody>
<tr>
<td>latexonly</td>
<td>ignore, \end{env} constructs are processed (see section 5.2.2)</td>
<td>process</td>
</tr>
<tr>
<td>verblatex</td>
<td>ignore</td>
<td>process</td>
</tr>
<tr>
<td>htmlonly</td>
<td>process</td>
<td>ignore</td>
</tr>
<tr>
<td>rawhtml</td>
<td>echo verbatim (see section 8.4)</td>
<td>ignore</td>
</tr>
<tr>
<td>toimage</td>
<td>send to the image file, \end{env} constructs and macro characters are processed (see section 6)</td>
<td>process</td>
</tr>
<tr>
<td>verbimage</td>
<td>send to the image file (see section 6)</td>
<td>process</td>
</tr>
</tbody>
</table>

As an example, this is how some text can be typeset in purple by \H\E\V\E\A and left alone by \LaTeX:

We get:
\begin{htmlonly}%
purple purple rain, purple rain%
\end{htmlonly}
\begin{latexonly}%
purple rain, purple rain%
\end{latexonly}%
\ldots
We get: purple rain, purple rain...

It is impossible to avoid the spurious space in \H\E\V\E\A output for the source above. This extra space comes from the newline character that follows \end{htmlonly}. Namely this construct must appear in a line of its own for \LaTeX to recognize it. Anyway, better control over spaces can be achieved by using the hevea boolean register or comments, see sections 5.2.3 and 5.3.

Also note that environments define a scope and that style changes (and non-global definitions) are local to them. For instance, in the example above, “…” appears in black in HTML output. However, as an exception, the environments image and verbimage do not create scope. It takes a little practice of \H\E\V\E\A to understand why this is convenient.

5.2.2 Why are there two environments for ignoring input?

Some scanning and analysis of source is performed by \H\E\V\E\A inside the latexonly environment, in order to allow latexonly to dynamically occur inside other environments.

More specifically, \end{env} macros are recognized and their \texttt{env} argument is tested against the name of the environment whose opening macro \texttt{env} opened the latexonly environment. In that case, macro expansion of \end{env} is performed and any further occurrence of \end{env'} is tested and may get expanded if it matches a pending \begin{env'} construct.

This enables playing tricks such as:

\newenvironment{latexhuge}
{\begin{latexonly}\huge}
{\end{latexonly}}

\begin{latexhuge}
This will appear in huge font in \LaTeX{} output only.
\end{latexhuge}

\LaTeX output will be:
This will appear in huge font in *LATEX* output only.

While there is no HEVEA output.

Since HEVEA somehow analyses input that is enclosed in the latexonly environment, it may choke. However, this environment is intended to select processing by *LATEX* only and might contain arbitrary source code. Fortunately, it remains possible to have input processed by *LATEX* only, regardless of what it is, by enclosing it in the verblatex environment. Inside this environment, HEVEA performs no other action than looking for \end{verblatex}. As a consequence, the \begin{verblatex} and \end{verblatex} constructs may only appear in the main flow of text or inside the same macro body, a bit like *LATEX* verbatim environment.

Relations between toimage and verbimage are similar. Additionally, formal parameters \#i are replaced by actual arguments inside the toimage environment (see end of section 6.3 for an example of this feature).

### 5.2.3 The hevea boolean register

Boolean registers are provided by the ifthen package (see [LATEX, Section C.8.5] and section B.8.5 in this document). Both the hevea.sty style file and HEVEA define the boolean register hevea. However, this register initial value is false for *LATEX* and true for HEVEA.

Thus, provided, both the hevea.sty style file and the ifthen packages are loaded, the “purple rain” example can be rephrased as follows:

We get:
\begin{verbatim}
{\ifthenelse{\boolean{hevea}}{\purple}{}}purple rain, purple rain\ldots
\end{verbatim}

We get: purple rain, purple rain...

Another choice is using the *TEX-style conditional macro \ifhevea (see Section B.16.1.4):

We get:
\begin{verbatim}
{\ifhevea\purple\fi purple rain, purple rain}\ldots
\end{verbatim}

We get: purple rain, purple rain...

### 5.3 Comments

HEVEA processes all lines that start with %HEVEA, while *LATEX* treats these lines as comments. Thus, this is a last variation on the “purple rain” example:

We get
\begin{verbatim}
%HEVEA\purple
purple rain, purple rain%
%HEVEA)%
\ldots
\end{verbatim}

(Note how comments are placed at the end of some lines to avoid spurious spaces in the final output.)

We get: purple rain, purple rain...

Comments thus provide an alternative to loading the hevea package. For user convenience, comment equivalents to the latexonly and toimage environment are also provided:
<table>
<thead>
<tr>
<th>environment</th>
<th>comment equivalent</th>
</tr>
</thead>
</table>
| \begin{latexonly} ... \end{latexonly} | %BEGIN LATEX
| \begin{toimage} ... \end{toimage}   | %BEGIN IMAGE

Note that \LaTeX, by ignoring comments, naturally performs the action of processing text between %BEGIN... and %END... comments. However, no environment is opened and closed and no scope is created while using comment equivalents.

6 With a little help from \LaTeX

Sometimes, \Hevea just cannot process its input, but it remains acceptable to have \LaTeX process it, to produce an image from \LaTeX output and to include a link to this image into \Hevea output. \Hevea provides a limited support for doing this.

6.1 The image file

While outputting doc.html, \Hevea echoes some of its input to the image file, doc.image.tex. Part of this process is done at the user’s request. More precisely, the following two constructs send text to the image file:

\begin{toimage}
text
\end{toimage}

%BEGIN IMAGE
text
%END IMAGE

Additionally, \usepackage commands, top-level and global definitions are automatically echoed to the image file. This enables using document-specific commands in text above.

Output to the image file builds up a current page, which is flushed by the \imageflush command. This command has the following effect: it outputs a strict page break in the image file, increments the image counter and output a <img src="pagename.png"> tag in \Hevea output file, where pagename is build from the image counter and \Hevea output file name. Then the imagen script has to be run by:

# imagen doc

This will process the doc.image.tex file through \LaTeX, dvips, ghostscript and a few others tools, which must all be present (see section C.4.1), finally producing one pagename.png file per page in the image file.

The usage of imagen is described at section C.1.5. Note that imagen is a simple shell script. Unix users can pass hevea the command-line option -fix. Then hevea will itself call imagen, when appropriate.

6.2 A toy example

Consider the “blob” example from section 4.2. Here is the active part of a blob.tex file:

\newcommand{\blob}{\rule[.2ex]{1ex}{1ex}}
\blob Blob \blob

This time, we would like \blob to produce a small black square, which \rule[.2ex]{1ex}{1ex} indeed does in \LaTeX. Thus we can write:
Now we issue the following two commands:

```
# hevea blob.tex
# imagen blob
```

And we get:

```
■ Blob ■
```

Observe that the trick can be used to replace missing symbols by small `.png` images. However, the cost may be prohibitive, text rendering is generally bad, fine placement is ignored and font style changes are problematic. Cost can be lowered using `\savebox`, but the other problems remain.

### 6.3 Including Postscript images

In this section, a technique to transform included Postscript images into included bitmap images is described. Note that this technique is used by HEVEA implementation of the `graphics` package (see section B.14.1), which provides a more standard manner to include Postscript images in \TeX documents.

Included images are easy to manage: it suffices to let \TeX do the job. Let `round.ps` be a Postscript file, which is included as an image in the source file `round.tex` (which must load the `epsf` package):

```
\begin{center}
\epsfbox{round.ps}
\end{center}
```

Then, HEVEA can have this image translated into a inlined (and centered) `.png` image by modifying source as follows:

```
\begin{center}
%BEGIN IMAGE
\epsfbox{round.ps}
%END IMAGE
%HEVEA\imageflush
\end{center}
```

(Note that the `round.tex` file still can be processed by \TeX, since comment equivalents of the `toimage` environment are used and that the `\imageflush` command is inside a `%HEVEA` comment — see section 5.3.)

Then, processing `round.tex` through HEVEA and `imagen` yields:
It is important to notice that things go smoothly because the `\usepackage{epsf}` command gets echoed to the image file. In more complicated cases, \LaTeX{} may fail on the image file because it does not load the right packages or define the right macros.

However, the above solution implies modifying the original \LaTeX{} source code. A better solution is to define the `\epsfbox` command, so that HEVEA echoes `\epsfbox` and its argument to the image file and performs `\imageflush`:

\begin{verbatim}
\newcommand{\epsfbox}[1]{%
  \begin{toimage}
  \epsfbox{#1}
  \end{toimage}
  \imageflush}
\end{verbatim}

Such a definition must be seen by HEVEA only. So, it is best put in a separate file whose name is given as an extra argument on HEVEA command-line (see section 5.1). Putting it in the document source protected inside an `\%HEVEA` comment is a bad idea, because it might then get echoed to the image file and generate trouble when \LaTeX{} is later run by `imagen`.

Observe that the above definition of `\epsfbox` is a definition and not a redefinition (i.e. `\newcommand` is used and not `\renewcommand`), because HEVEA does not know about `\epsfbox` by default. Also observe that this not a recursive definition, since commands do not get expanded inside the `toimage` environment.

Finally, if the Postscript image is produced from a bitmap, it is a pity to translate it back into a bitmap. A better idea is first to generate a PNG file from the bitmap source independantly and then to include a link to that PNG file in HTML output, see section 8.2 for a description of this more adequate technique.

### 6.4 Using filters

Some programs extend \LaTeX{} capabilities using a filter principle. In such a scheme, the document contains source fragments for the program. A first run of the program on \LaTeX{} source changes these fragments into constructs that \LaTeX{} (or a subsequent stage in the paper document production chain, such as `dvips`) can handle. Here again, the rule of the game is keeping HEVEA away from the normal process: first applying the filter, then making HEVEA send the filter output to the image file, and then having `imagen` do the job.

Consider the `gpic` filter, for making drawings. Source for `gpic` is enclosed in `.PS... .PE`, then the result is available to subsequent \LaTeX{} source as a \TeX{} box `\box\graph`. For instance the following source, from a `smile.tex` file, draws a “Smile!” logo as a centered paragraph:

```latex
\PS
\begin{center}
\box\graph
\end{center}
```

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Both the image description (.PS... .PE) and usage (\box\graph) are for the *image* file, and they should be enclosed by \%BEGIN IMAGE... \%END IMAGE comments. Additionally, the image link is put where it belongs by an \imageflush command:

\%BEGIN IMAGE
\PS
\ellipse "{\Large\bf Smile!}"
\PE
\%END IMAGE
\begin{center}\box\graph\end{center}

The gpic filter is applied first, then come hevea and imagen:

```
# gpic -t < smile.tex > tmp.tex
# hevea tmp.tex -o smile.html
# imagen smile
```

And we get:

![Smile!](image)

Observe how the -o argument to HEVEA is used and that imagen argument is HEVEA output basename (see section C.1.1.2 for the full definition of HEVEA output basename).

In the gpic example, modifying user source cannot be totally avoided. However, writing in a generic style saves typing. For instance, users may define the following environment for centered gpic pictures in \LaTeX:

```
\newenvironment{centergpic}{}{\begin{center}\box\graph\end{center}}
```

Source code will now be as follows:

```
\begin{centergpic}
\PS
\ellipse "{\Large\bf Smile!}"
\PE
\end{centergpic}
```

\LaTeX will process this source correctly, provided it is given its own definition for the centergpic environment beforehand:

```
\newenvironment{centergpic}
{\begin{toimage}}
{\box\graph\end{toimage}\begin{center}\imageflush\end{center}}
```

Assuming that the definition above is in a smile.hva file, the command sequence for translating smile.tex now is:

```
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```
# gpic -t < smile.tex > tmp.tex
# hevea smile.hva tmp.tex -o smile.html
tmp.tex:5: Warning: ignoring definition of \centergpic
tmp.tex:5: Warning: not defining environment centergpic
# imagen smile

The warnings above are normal: they are issued when \LaTeX runs across the \LaTeX-intended definition of the \texttt{centergpic} environment and refuses to override its own definition for that environment.

7 Cutting your document into pieces with \texttt{H\textsc{ACHEA}}

\texttt{H\textsc{ACHEA}} outputs a single .html file. This file can be cut into pieces at various sectional units by \texttt{H\textsc{ACHEA}}.

7.1 Simple usage

First generate your HTML document by applying \texttt{H\textsc{ACHEA}}:

```
# hevea doc.tex
```

Then cut \texttt{doc.html} into pieces by the command:

```
# hacha doc.html
```

This will generate a simple root file \texttt{index.html}. This root file holds document title, abstract and a simple table of contents. Every item in the table of contents contains a link to or into a file that holds a “cutting” sectional unit. By default, the cutting sectional unit is \texttt{section} in the \texttt{article} style and \texttt{chapter} in the \texttt{book} style. The name of those files are \texttt{doc001.html, doc002.html}, etc.

Additionally, one level of sectioning below the cutting unit (i.e. subsections in the \texttt{article} style and sections in the \texttt{book} style) is shown as an entry in the table of contents. Sectional units above the cutting section (i.e. parts in both \texttt{article} and \texttt{book} styles) close the current table of contents and open a new one. Cross-references are properly handled, that is, the local links generated by \texttt{H\textsc{ACHEA}} are changed into remote links.

The name of the root file can be changed using the \texttt{-o} option:

```
# hacha -o root.html doc.html
```

Some of \texttt{H\textsc{ACHEA}} output get replicated in all the files generated by \texttt{H\textsc{ACHEA}}. Users can supply a header and a footer, which will appear at the beginning and end of every page generated by \texttt{H\textsc{ACHEA}}. It suffices to include the following commands in the document preamble:

```
\htmlhead{header}
\htmlfoot{footer}
```

\texttt{H\textsc{ACHEA}} also makes every page it generates a clone of its input as regards attributes to the \texttt{<body ...> opening tag} and meta-information from the \texttt{<head>... </head> block}. See section B.2 for examples of this replication feature.

By contrast, style information specified in the \texttt{style} elements from rom the \texttt{<head>... </head> block} is not replicated. Instead, all style definitions are collected into an external style sheet file whose name is \texttt{doc.css}, and all generated HTML files adopt \texttt{doc.css} as an external style sheet. It is important to notice that, since version 1.08, \texttt{H\textsc{ACHEA}} produces a \texttt{style} element by itself, even if users do not explicitly use styles. As a consequence, \texttt{H\textsc{ACHEA}} normally produces a file \texttt{doc.css}, which should not be forgotten while copying files to their final destination after a run of \texttt{H\textsc{ACHEA}}.

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7.2 Advanced usage

\HACHA behaviour can be altered from the document source, by using a counter and a few macros.

A document that explicitly includes cutting macros still can be typeset by \LaTeX, provided it loads the \texttt{hevea.sty} style file from the \HEVEA distribution. (See section 5 for details on this style file). An alternative to loading the \texttt{hevea} package is to put all cutting instructions in comments starting with \%HEVEA.

7.2.1 Principle

\HACHA recognizes all sectional units, ordered as follows, from top to bottom: \texttt{part}, \texttt{chapter}, \texttt{section}, \texttt{subsection}, \texttt{subsubsection}, \texttt{paragraph} and \texttt{subparagraph}.

At any point between \texttt{\begin{document}} and \texttt{\end{document}}, there exists a current cutting sectional unit (cutting unit for short), a current cutting depth, a root file and an output file. Table of contents output goes to the root file, normal output goes to the output file. Cutting units start a new output file, whereas units comprised between the cutting unit and the cutting units plus the cutting depth add new entries in the table of contents.

At document start, the root file and the output file are \HACHA output file (\textit{i.e.} index.html). The cutting unit and the cutting depth are set to default values that depend on the document style.

7.2.2 Cutting macros

The following cutting instructions are for use in the document preamble. They command the cutting scheme of the whole document:

\texttt{\cuthere{secname}{itemtitle}} Attempt a cut.

- If \texttt{secname} is the current cutting unit or the keyword \texttt{now}, then a new output file is started and an entry in the current table of contents is generated, with title \texttt{itemtitle}. This entry holds a link to the new output file.
- If \texttt{secname} is above the cutting unit, then the current table of contents is closed. The output file is set to the current root file.
- If \texttt{secname} is below the cutting unit and less than the cutting depth away from it, then an entry is added in the table of contents. This entry contains \texttt{itemtitle} and a link to the point where \texttt{\cuthere} appears.
- Otherwise, no action is performed.

\texttt{\cutdef[depth]{secname}} Open a new table of contents, with cutting depth \texttt{depth} and cutting unit \texttt{secname}.

If the optional \texttt{depth} is absent, the cutting depth does not change. The output file becomes the root file. Result is unspecified if whatever \texttt{secname} expands to is a sectional unit name above the current cutting unit, is not a valid sectional unit name or if \texttt{depth} does not expand to a small positive number.
\cutend End the current table of contents. This closes the scope of the previous \cutdef. The cutting unit and cutting depth are restored. Note that \cutdef and \cutend must be properly balanced.

Commands \cuthere and \cutend have starred variants, which behave identically except for footnotes (see 7.3.6).

Default settings work as follows: \begin{document} performs
\cutdef*{\value{cuttingdepth}}{\cuttingunit}
and \end{document} performs \cutend*. All sectioning commands perform \cuthere, with the sectional unit name as first argument and the (optional, if present) sectioning command argument (i.e. the section title) as second argument. Note that starred versions of the sectioning commands also perform cutting instructions.

7.2.3 Table of links organisation

A table of links generated by HACuTA is a list of links to generated files. Additionally, some sublists may be present, up to a certain depth. The items in those sublists are links inside generated files, they point to sectional unit titles below the cutting unit, up to a certain depth.

More precisely, let A be a certain sectional unit (e.g. “part”), let B be just below A (e.g. “section”), and let C be just below C (e.g. “subsection”). Further assume that cutting is performed at level B with a depth of more than one. Then, every unit A holds a one or several tables of links to generated files, and each generated file normally holds a B unit. Sublists with links to C units inside B units normally appear in the tables of links of level A. The command-line options -tocbis and -tocter instruct hacha to put sublists at other places. With -tocbis sublists are duplicated at the beginning of the B level files; while with -tocter sublist only appear at the beginning of the B level files.

In my opinion, default style is appropriate for documents with short B units; while -tocbis style is appropriate for documents with long B units with a few sub-units; and -tocter style is appropriate for documents with long B units with a lot of sub-units.

Whatever the style is, if a B unit is cut (e.g. because its text is enclosed in \cutdef{C}... \cutend), then every C unit goes into its own file and there is no sublist after the relevant B level entry in the A level table of links.

7.2.4 Examples

Consider, for instance, a book document with a long chapter that you want to cut at the section level, showing subsections:
\chapter{A long chapter}
....
\chapter{The next chapter}

Then, you should insert a \cutdef at chapter start and a \cutend at chapter end:
\chapter{A long chapter}
%HEVEA\cutdef[1]{section}
....
%HEVEA\cutend
\chapter{The next chapter}

Then, the file that would otherwise contain the long chapter now contains the chapter title and a table of sections. No other change is needed, since the command \section already performs the appropriate \cuthere{section}{...} commands, which were ignored by default. (Also note that cutting macros are placed inside %HEVEA comments, for \LaTeX not to be disturbed).
The \cuthere macro can be used to put some document parts into their own file. This may prove appropriate for long cover pages or abstracts that would otherwise go into the root file. Consider the following document:
\documentclass{article}
\begin{document}
\begin{abstract} A big abstract \end{abstract}
...
Then, you make the abstract go to its own file as it was a cutting unit by typing:
\documentclass{article}
\usepackage{hevea}
\begin{document}
\cuthere{\cuttingunit}{Abstract}
\begin{abstract} A big abstract \end{abstract}
...
(Note that, this time, cutting macros appear unprotected in the source. However, \LaTeX{} still can process the document, since the \texttt{hevea} package is loaded).

### 7.2.5 More and More Pages in Output

In some situations it may be appropriate to produce many pages from one source files. More specifically, loading the \texttt{deepcut} package will put all sectioning units of your document (from \texttt{part} to \texttt{subsection} in their own file.

Similarly, loading the \texttt{figcut} package will make all figures and tables go into their own file. The \texttt{figcut} package accepts two options, \texttt{show} and \texttt{noshow}. The former, which is the default, instructs \TeX{} to repeat the caption into the main flow of text, with a link to the figure. The latter option disables the feature.

### 7.3 More Advanced Usage

In this section we show how to alter some details of \TeX{} behaviour. This includes controlling output file names and the title of generated web pages and introducing arbitrary cuts.

#### 7.3.1 Controlling output file names

When invoked as \texttt{hacha doc.html}, \TeX{} produces a \texttt{index.html} table of links file that points into \texttt{doc001.html, doc002.html}, etc. content files. This is not very convenient when one wishes to point inside the document from outside. However, the \texttt{\cutname{name}} command sets the name of the current output file name as \textit{name}.

Consider a document cut at the section level, which contains the following important section:
\section{Important\label{important} section}
...
To make the important section goes into file \texttt{important.html}, one writes:
\section{Important\label{important} section}\cutname{important.html}
...
Then, section “Important section” can be referenced from an \TeX{} unaware \texttt{HTML} page by:
In this document, there is a very
\texttt{<a href="important.html#important">important section</a>}.
7.3.2 Controlling page titles

When \Hevea creates a web page from a given sectional unit, the title of this page normally is the name of the sectional unit. For instance, the title of this very page should be “Cutting your document into pieces with \Hevea”. It is possible to insert some text at the beginning of all page titles, by using the $\texttt{htmlprefix}$ command. Hence, by writing $\texttt{htmlprefix\{\texttt{\textbackslash hevea\{} Manual: \}}}$ in the document, the title of this page would become: “\Hevea Manual: Cutting your document into pieces with \Hevea” and the title of all other pages would show the same prefix.

7.3.3 Links for the root file

The command $\texttt{\textbackslash toplinks\{prev\}\{up\}\{next\}}$ instructs \Hevea to put links to a “previous”, “up” and “next” page in the root file. The following points are worth noticing:

- The \texttt{toplink} command must appear in the document preamble ($i.e.$ before $\texttt{\begin{document}}$).
- The arguments prev, up and next should expand to urls, notice that these argument are processed (see section 8.1.1).
- When one of the expected argument is left empty, the corresponding link is not generated.

This feature can prove useful to relate documents that are generated independently by \Hevea and \Hevea.

7.3.4 Controlling link aspect from the document

By default the links to the previous, up and next pages show a small icon (an appropriate arrow). This can be changed with the command $\texttt{\textbackslash setlinkstext\{prev\}\{up\}\{next\}}$, where \texttt{prev}, \texttt{up} and \texttt{next} are some \LaTeX source. For instance the default behaviour is equivalent to:

\begin{verbatim}
\setlinkstext
\{\texttt{imgsrc[alt="Previous"]\{previous_motif.gif\}}
\{\texttt{imgsrc[alt="Up"]\{contents_motif.gif\}}
\{\texttt{imgsrc[alt="Next"]\{next_motif.gif}}\}
\end{verbatim}

Command $\texttt{\setlinkstext}$ behaves as $\texttt{\toplinks}$ does. That is, it must occur in document preamble, arguments are processed and empty arguments yield no effect ($i.e.$ defaults apply).

7.3.5 Cutting a document anywhere

Part of a document goes to a separate file when enclosed in a \texttt{cutflow} environment:

\begin{verbatim}
\begin{cutflow}\{title\}\ldots\end{cutflow}
\end{verbatim}

The content “...” will go into a file of its own, while the argument \texttt{title} is used as the title of the introduced HTML page.

The HTML page introduced here does not belong to the normal flow of text. Consequently, one needs an explicit reference from the normal flow of text into the content of the \texttt{cutflow} environment. This will occur naturally when the content of the \texttt{cutflow} environment. contains a \texttt{\label} construct. This look natural in the following quiz example:

\begin{verbatim}
\paragraph{A small quiz}
\begin{enumerate}
\item What is black?
\item What is white?
\item What is Dylan?
\end{enumerate}
\end{verbatim}
Answers in section \ref{answers}.\begin{cutflow}{Answers}\paragraph{Quiz answers}label{answers}\begin{enumerate}
\item Black is black.
\item White is white.
\item Dylan is Dylan.
\end{enumerate}\end{cutflow}

However, introducing HTML hyperlink targets and references with the \aname and \ahrefloc commands (see section 8.1.1) will be more practical most of the time.

The starred variant environment cutflow* is the same as cutflow, save for the HTML header and footer (see Section 7.1) which are not replicated in the introduced page.

7.3.6 Footnotes

Footnote texts (given as arguments either to \footnote or \footnotetext) do not go directly to output. Instead, footnote texts accumulate internally in a buffer, awaiting to be flushed. The flushing of notes is controlled by the means of a current flushing unit, which is a sectional unit name or document — a fictional unit above all units. At any point, the current flushing unit is the value of the command \@footnotelevel. In practice, the flushing of footnote texts is performed by two commands:

- \flushdef{secname} simply sets the flushing unit to secname.
- \footnoteflush{secname} acts as follows:
  - If argument secname is equal to or above the current flushing unit, then footnote texts are flushed (if any). In the output, the texts themselves are surrounded by special comments that tag them as footnote texts and record secname.
  - Otherwise, no action is performed.

The article style file performs \flushdef{document}, while the book style file performs \flushdef{chapter}. At the end of processing, \end{document} performs \footnoteflush{\@footnotelevel}, so as to flush any pending notes.

Cutting commands interact with footnote flushing as follows:

- \cuthere{secname} executes \footnoteflush{secname}. Remember that all sectioning commands perform \cuthere with their sectional unit name as argument.
- \cutdef{secname} saves the current flushing unit and buffer on some internal stack, starts a new buffer for footnote texts, and sets the current flushing unit to secname (by performing \flushdef{secname}).
- \cutend first flushes any pending texts (by performing \footnoteflush with the current flushing unit as argument), and restores the flushing unit and footnote text buffer saved by the matching \cutdef.
- The starred variants \cutdef* and \cutend* perform no operation that is related to footnotes.

Later, when running across footnote texts in its input file, HACoA sometimes put notes in a separate file. More precisely, HACoA has knowledge of the current cutting level, the current sectional unit where cuts occur — as given by the relevant \cutdef. Moreover, HACoA knows the current section level — that is, the last sectional command processed. Besides, HACoA extracts the note level from the comments that surround the notes (as given by the command \footnoteflush that produced the notes). Then, HACoA creates a separate file for notes when the cutting level and the note level differ, or when the current level is above the cutting level (e.g. the current level is document while the cutting level is chapter). As a result, notes should stay where they are when they occur at the end of HACoA output file and otherwise go to a separate file.
To make a complicated story even more complicated, footnotes in minipage environments or in the arguments to \title or \author have a different, I guess satisfactory, behaviour.
Given the above description, footnotes are managed by default as follows.

- In style article, hevea puts all footnotes go at the end of the HTML file. A later run of hacha creates a separate footnote file.
- In style book, footnotes are collected at the end of chapters. A later run of hacha leaves them where they are. Footnotes in the title or author names are managed specially, they will normally appear at the end of the root file.

In case you wish to adopt a book-like behaviour for an article (footnotes at the end of sections), it suffices to insert \flushdef{section} in the document preamble.

8 Generating HTML constructs

HEVEA output language being HTML, it is normal for users to insert hypertext constructs their documents, or to control colours.

8.1 High-Level Commands

HEVEA provides high-level commands for generating hypertext constructs. Users are advised to use these commands in the first place, because it is easy to write incorrect HTML and that writing HTML directly may interfere in nasty ways with HEVEA internals.

8.1.1 Commands for Hyperlinks

A few commands for hyperlink management and included images are provided, all these commands have appropriate equivalents defined by the hevea package (see section 5.2). Hence, a document that relies on these high-level commands still can be typeset by TEX, provided it loads the hevea package.

<table>
<thead>
<tr>
<th>Macro</th>
<th>HEVEA</th>
<th>LATEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>\ahref{url}{text}</td>
<td>make text an hyperlink to url</td>
<td>echo text</td>
</tr>
<tr>
<td>\footahref{url}{text}</td>
<td>make text an hyperlink to url</td>
<td>make url a footnote to text, url is shown in typewriter font</td>
</tr>
<tr>
<td>\ahrefurl{url}</td>
<td>make url an hyperlink to url, typeset url in typewriter font</td>
<td></td>
</tr>
<tr>
<td>\ahrefloc{label}{text}</td>
<td>make text an hyperlink to label inside the document</td>
<td>echo text</td>
</tr>
<tr>
<td>\aname{label}{text}</td>
<td>make text an hyperlink target with label label</td>
<td>echo text</td>
</tr>
<tr>
<td>\mailto{address}</td>
<td>make address a “mailto” link to address, typeset address in typewriter font</td>
<td></td>
</tr>
<tr>
<td>\imgsrc{attr}{url}</td>
<td>insert url as an image, attr are attributes in the HTML sense</td>
<td>do nothing</td>
</tr>
<tr>
<td>\home{text}</td>
<td>produce a home-dir url both for output and links, output aspect is: “~/text”</td>
<td></td>
</tr>
</tbody>
</table>

It is important to notice that all arguments are processed. For instance, to insert a link to my homepage, (http://pauillac.inria.fr/~maranget/index.html), you should do something like this:

\ahref{http://pauillac.inria.fr/~maranget/index.html}{his home page}
Given the frequency of ~, # etc. in urls, this is annoying. Moreover, the immediate solution, using \verb, \ahref{\verb" ... ~/maranget/..."}{his home page} does not work, since \LaTeX{} forbids verbatim formatting inside command arguments.

Fortunately, the url package provides a very convenient \url command that acts like \verb and can appear in other command arguments (unfortunately, this is not the full story, see section B.17.11). Hence, provided the url package is loaded, a more convenient reformulation of the example above is:

\ahref{\url{http://pauillac.inria.fr/~maranget/index.html}}{his home page}

Or even better:

\urldef{lucpage}{\url{http://pauillac.inria.fr/~maranget/index.html}}
\ahref{lucpage}{his home page}

It may seem complicated, but this is a safe way to have a document processed both by \LaTeX{} and HEVEA. Drawing a line between url typesetting and hyperlinks is correct, because users may sometime want urls to be processed and some other times not. Moreover, HEVEA (optionally) depends on only one third party package: url, which is as correct as it can be and well-written.

In case the \url command is undefined at the time \begin{document} is processed, the commands \url, \oneurl and \footurl are defined as synonymous for \ahref, \ahrefurl and \footahref, thereby ensuring some compatibility with older versions of HEVEA. Note that this usage of \url is deprecated.

### 8.1.2 HTML style colours

Specifying colours both for \LaTeX{} and HEVEA should be done using the color package (see section B.14.2). However, one can also specify text color using special type style declarations. The hevea.sty style file define no equivalent for these declarations, which therefore are for HEVEA consumption only.

Those declarations follow HTML conventions for colours. There are sixteen predefined colours:

\begin{verbatim}
\black, \silver, \gray, \white, \maroon, \red, \fuchsia, \purple, \green, \lime, \olive, \yellow, \navy, \blue, \teal, \aqua
\end{verbatim}

Additionally, the current text color can be changed by the declaration \htmlcolor{number}, where number is a six digit hexadecimal number specifying a color in the RGB space. For instance, the declaration \htmlcolor{404040} changes font color to dark gray.

### 8.2 More on included images

The \imgsrc command becomes handy when one has images both in Postscript and GIF (or PNG or JPG) format. As explained in section 6.3, Postscript images can be included in \LaTeX{} documents by using the \epsfbox command from the epsf package. For instance, if screenshot.ps is an encapsulated Postscript file, then a doc.tex document can include it by:

\epsfbox{screenshot.ps}

We may very well also have a GIF version of the screenshot image (or be able to produce one easily using image converting tools), let us store it in a screenshot.ps.gif file. Then, for HEVEA to include a link to the GIF image in its output, it suffices to define the \epsfbox command in the macro.hva file as follows:

\newcommand{\epsfbox}{1}{\imgsrc{#1.gif}}

Then HEVEA has to be run as:

# hevea macros.hva doc.tex

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Since it has its own definition of \epsfbox, HEVEA will silently include a link the GIF image and not to the Postscript image.

If another naming scheme for image files is preferred, there are alternatives. For instance, assume that Postscript files are of the kind name.ps, while GIF files are of the kind name.gif. Then, images can be included using \includeimage{name}, where \includeimage is a specific user-defined command:

\newcommand{\includeimage}[1]{\ifhevea\imgsrc{#1.gif}\else\epsfbox{#1.ps}\fi}

Note that this method uses the hevea boolean register (see section 5.2.3). If one does not wish to load the hevea.sty file, one can adopt the slightly more verbose definition:

\newcommand{\includeimage}[1]{%HEVEA\imgsrc{#1.gif}%BEGIN LATEX\epsfbox{#1.ps}%END LATEX}%

When the Postscript file has been produced by translating a bitmap file, this simple method of making a bitmap image and using the \imgsrc command is the most adequate. It should be preferred over using the more automated image file mechanism (see section 6), which will translate the image back from Postscript to bitmap format and will thus degrade it.

\section{Internal macros}

In this section a few of HEVEA internal macros are described. Internal macros occur at the final expansion stage of HEVEA and invoke Objective Caml code.

Normally, user source code should not use them, since their behaviour may change from one version of HEVEA to another and because using them incorrectly easily crashes HEVEA. However:

- Internal macros are almost mandatory for writing supplementary base style files.
- Casual usage is a convenient (but dangerous) way to finely control output (cf. the examples in the next section).
- Knowing a little about internal macros helps in understanding how HEVEA works.

The general principle of HEVEA is that \LaTeX{} environments \begin{env}... \end{env} get translated into HTML block-level elements \texttt{<block attributes>... \texttt{/block>}. More specifically, such block level elements are opened by the internal macro \texttt{\open{attributes}} and closed by the internal macro \texttt{\close{attributes}}. As a special case, \LaTeX{} groups \texttt{...} get translated into HTML \texttt{groups}, which are shadow block-level elements with neither opening nor closing tag.

In the following few paragraphs, we sketch the interaction of \texttt{\open{attributes}... \close{attributes}} with paragraphs. Doing so, we intend to warn users about the complexity of the task of producing correct HTML, and to encourage them to use internal macros, which, most of the time, take nasty details into account.

Paragraphs are rendered by \texttt{p} elements, which are opened and closed automatically. More specifically, a first \texttt{p} is opened after \texttt{\begin{document}}, then paragraph breaks close the active \texttt{p} and open a new one. The final \texttt{\end{document}} closes the last \texttt{p}. In any occasion, paragraphs consisting only of space characters are discarded silently.

Following HTML “normative reference [HTML-5a]”, block-level elements cannot occur inside \texttt{p}; more precisely, block-level opening tags implicitly close any active \texttt{p}. As a consequence, HEVEA closes the active \texttt{p} element when it processes \texttt{\open{attributes}} and opens a new \texttt{p} when it processes the matching \texttt{\close{attributes}}. Generally, no \texttt{p} element is opened by default inside block-level elements, that is, HEVEA does not immediately open \texttt{p} after having processed \texttt{\open{attributes}}. However, if a paragraph break occurs later, then a new \texttt{p} element is opened, and will be closed automatically when the current block is closed. Thus, the first “paragraph” inside block-level
elements that include several paragraphs is not a \texttt{p} element. That alone probably prevents the consistent styling of paragraphs with style sheets.

Groups behave differently, opening or closing them does not close nor open \texttt{p} elements. However, processing paragraph breaks inside groups involves temporarily closing all groups up to the nearest enclosing \texttt{p}, closing it, opening a new \texttt{p} and finally re-opening all groups. Opening a block-level element inside a group, similarly involves closing the active \texttt{p} and opening a new \texttt{p} when the matching \texttt{\close} is processed.

Finally, display mode (as introduced by $$) is also complicated. Displays basically are table elements with one row (\texttt{tr}), and \LaTeX{} manages to introduce table cells (\texttt{td}) where appropriate. Processing \texttt{\open} inside a display means closing the current cell, starting a new cell, opening the specified block, and then immediately opening a new display. Processing the matching \texttt{\close} closes the internal display, then the specified block, then the cell and finally opens a new cell. In many occasions (in particular for groups), either cell break or the internal display may get cancelled.

It is important to notice that primitive arguments \emph{are} processed (except for the \texttt{\print} primitive, and for some of the basic style primitives). Thus, some characters cannot be given directly (e.g. \# and \% must be given as \texttt{\#} and \texttt{\%}).

\texttt{\print[text]} Echo \texttt{text} verbatim. As a consequence use only ascii in \texttt{text}.

\texttt{\getprint[text]} Process \texttt{text} using a special output mode that strips off HTML tags. This macro is the one to use for processed attributes of HTML tags.

\texttt{\hr[\texttt{attr}]{\texttt{width}}{\texttt{height}}} Output an HTML horizontal rule, \texttt{attr} is attributes given directly (e.g. \texttt{SIZE=3 HOSHADE}), while \texttt{width} and \texttt{height} are length arguments given in the \LaTeX{} style (e.g. \texttt{2pt} or \texttt{.5\linewidth}).

\texttt{\print\texttt{\texttt{u}}[\texttt{n}]} Output the (Unicode) character “\texttt{n}”, which can be given either as a decimal number or an hexadecimal number prefixed by “X”.

\texttt{\open[\texttt{block}]{\texttt{attributes}}} Open HTML block-level element \texttt{block} with attributes \texttt{attributes}. The block name \texttt{block} \textbf{must} be lowercase. As a special case \texttt{block} may be the empty string, then a HTML \texttt{group} is opened.

\texttt{\close[\texttt{block}]} Close HTML block-level element \texttt{block}. Note that \texttt{\open} and \texttt{\close} must be properly balanced.

\texttt{\out@par[\texttt{arg}]} If occurring inside a \texttt{p} element, that is if a \texttt{<p}> opening tag is active, \texttt{\out@par} first closes it (by emitting \texttt{/p} ), then formats \texttt{arg}, and then re-open a \texttt{p} element. Otherwise \texttt{\out@par} simply formats \texttt{arg}. This command is adequate when formatting \texttt{arg} produces block-level elements.

Text-level elements are managed differently. They are not seen as blocks that must be closed explicitly. Instead they follow a “declaration” style, similar to the one of \LaTeX{} “text-style declarations” — namely, \texttt{\itshape}, \texttt{\em} etc. Block-level elements (and HTML groups) delimit the effect of such declarations.

\texttt{\span[\texttt{attr}]} Declare the text-level element \texttt{span} (with given attributes) as active. The text-level element \texttt{span} will get opened as soon as necessary and closed automatically, when the enclosing block-level elements get closed. Enclosed block-level elements are treated properly by closing \texttt{span} before them, and re-opening \texttt{span} (with given attributes) inside them. The following text-level constructs exhibit similar behaviour with respect to block-level elements.

\texttt{\style[\texttt{shape}]} Declare the text shape \texttt{shape} (which must be lowercase) as active. Text shapes are known as font style elements (\texttt{i}, \texttt{tt}, etc.; \texttt{warning}: most of font style elements are depreciated in HTML5, and some of them are no longer valid, prefer CSS in \texttt{span} tags) or phrase elements (\texttt{em}, etc.) in the HTML terminology.

\texttt{\styleattr[\texttt{name}]{\texttt{attr}}}} This command generalises both \texttt{\span} and \texttt{\style}, as both a text-level element name \texttt{name} and attributes are specified. More specifically, \texttt{\span[\texttt{attr}]} can be seen as a shorthand for \texttt{\styleattr[\texttt{span}]{\texttt{attr}}}; while \texttt{\style[\texttt{name}]} can be seen as a shorthand for \texttt{\styleattr[\texttt{name}]{}}.

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\fontsize{int} Declare the text-level element \texttt{span} with attribute \texttt{style="font-size:font-size"} as active. The argument \texttt{int} must be a small integer in the range 1, 2, \ldots, 7. \texttt{hevea} computes \texttt{font-size}, a CSS fontsize value, from \texttt{int}. More specifically, \texttt{font-size} will range from \texttt{x-small} to 120\% included in a \texttt{xx-large}, 3 being the default size \texttt{medium}. Notice that \texttt{\fontsize} is deprecated in favour of \texttt{\span} with proper fontsize declarations: \texttt{\span{style="font-size=x-small"}}, \texttt{\span{style="font-size=x-small"}}, \texttt{\span{style="font-size=small"}}, etc.

\fontcolor{color} Declare the text-level element \texttt{span} with attribute \texttt{"style=color"} as active. The argument \texttt{color} must be a color attribute value in the HTML style. That is either one of the sixteen conventional colours \texttt{black}, \texttt{silver} etc, or a RGB hexadecimal color specification of the form \texttt{#XXXXXX}. Note that the argument \texttt{color} is processed, as a consequence numerical color arguments should be given as \texttt{\#XXXXXX}.

\nostyle Close active text-level declarations and ignore further text-level declarations. The effect stops when the enclosing block-level element is closed.

\clearstyle Simply close active text-level declarations.

**Notice on font styling with CSS**

The preferred way to style text in new versions of the HTML “standard” is using style-sheet specifications. Those can be given as argument to a “\texttt{style}” attributes of HTML elements, most noticeably of the \texttt{span} elements. For instance, to get italics in old versions of HTML one used the text-level “\texttt{i}” element as in `<i>...</i>`. Now, for the same results of getting italics one may write: `<span style="font-style:italic">...</span>`. An indeed \texttt{hevea} styles text in that manner, starting from version 2.00. Such (verbose) declarations are then abstracted into style class declarations by \texttt{HEVEA} optimiser \texttt{esonja}, which is invoked by \texttt{hevea} when given option “\texttt{-O}”.

Notice that style attributes can be given to elements other than \texttt{span}. However, combining style attributes requires a little care as only one style attribute is allowed. Namely `<cite style="font-weight:bold" style="color:red">` is illegal and should be written `<cite style="font-weight:bold;color:red">`.

The command \texttt{\addstyle} can be handy for adding style to already style elements:

\addstyle{name:val}{attrs} Echo the space-separated attributes \texttt{attrs} of a tag with the \texttt{name:val} style declaration added to these attributes. The \texttt{style} attribute is added if necessary. Examples: \texttt{\addstyle{color:red}{href="#" style="color:red"}}, and \texttt{\addstyle{color:red}{href="#" style="font-style:italic"}} will produce \texttt{href="#" style="color:red"}, and \texttt{href="#" style="font-style:italic;color:red"}. Note that an unnecessary extra space can be added in some cases.

As an example, consider the following definition of a command for typesetting citation in bold, written directly in HTML:

\newcommand{\styledcite}[2][]\{\@styleattr{cite}{\@addstyle[#1]{style="font-weight:bold"}}#2\}

The purpose of the optional argument is to add style to specific citations, as in:

Two fundamental works: \texttt{\styledcite{The Holy Bible} and \styledcite[color=red]{Das Kapital}.}

Notice that the example is given for illustrating the usage of the \texttt{\addstyle} macros, which is intended for package writers. A probably simpler way to proceed would be to use \texttt{LaTeX} text-style declarations:

\newcommand{\styledcite}[2][]\{\@style[cite#1]{bf#2}\}

Two fundamental works: \texttt{\styledcite{The Holy Bible} and \styledcite[color=red]{Das Kapital}.}
8.4 The rawhtml environment

Any text enclosed between \begin{rawhtml} and \end{rawhtml} is echoed verbatim into the HTML output file. Similarly, \rawhtmlinput{file} echoes the contents of file file. In fact, rawhtml is the environment counterpart of the @@print command, but experience showed it to be much more error prone.

When \LaTeX{} was less sophisticated then it is now, rawhtml was quite convenient. But, as time went by, numerous pitfalls around rawhtml showed up. Here are a few:

- Verbatim means that no translation of any kind is performed. In particular, be aware that input encoding (see B.17.4) does not apply. Hence one should use ascii only, if needed non-ascii characters can be given as entity or numerical character references — e.g. &eacute; or &#x9; for é.

- The rawhtml environment should contain only HTML text that makes sense alone. For instance, writing \begin{rawhtml}<table>\end{rawhtml}... \begin{rawhtml}</table>\end{rawhtml} is dangerous, because \LaTeX{} is not informed about opening and closing the block-level element table. In that case, one should use the internal macros @open and @close.

- \begin{rawhtml}text\end{rawhtml} fragments that contain block-level elements will almost certainly mix poorly with p elements (introduced by paragraph breaks) and with active style declaration (introduced by, for instance, \it). Safe usage will most of the time means using the internal macros @nostyle and @out@par.

- When \LaTeX{} is given the command-line option -O, checking and optimisation of text-level elements in the whole document takes place. As a consequence, incorrect HTML introduced by using the rawhtml environment may be detected at a later stage, but this is far from being certain.

As a conclusion, do not use the rawhtml environment! A much safer option is to use the htmlonly environment and to write \TeX{} code. For instance, in place of writing:

\begin{rawhtml}
A list of links:
<ul>
</ul>
\end{rawhtml}

One can write:

\begin{htmlonly}
A list of links:
\begin{itemize}
\item \ahref{http://www.apple.com/}{Apple}.
\item \ahref{http://www.sun.com/}{Sun}.
\end{itemize}
\end{htmlonly}

If \LaTeX{} is targeted to text or info files (see Section 11). The text inside rawhtml environments is ignored. However there exists a rawtext environment (and a \rawtextinput command) to echo text verbatim in text or info output mode. Additionally, the raw environment and a \rawinput command echo their contents verbatim, regardless of \LaTeX{} output mode. Of course, when \LaTeX{} produces HTML, the latter environment and command suffer from the same drawbacks as rawhtml.
8.5 Examples

As a first example of using internal macros, consider the following excerpt from the `hevea.hva` file that defines the `center` environment:

\newenvironment{center}{\begin{div}[style="text-align:center"]}{\end{div}}

Notice that the code above is no longer present and is given here for explanatory purpose only. Now HEVEA uses style-sheets and the actual definition of the `center` environment is as follows:

\newstyle{.center}{text-align:center;margin-left:auto;margin-right:auto;}
\setenvclass{center}{center}
\newenvironment{center}{\begin{div}[class="getenvclass{center}"]. . .}{\end{div}}

Basically environments \begin{center} . . . \end{center} will, by default, be translated into blocks <div class="center"> . . . </div>. Additionally, the style class associated to center environments is managed through an indirection, using the commands \setenvclass and \getenvclass. See section 9.3 for more explanations.

Another example is the definition of the `purple` color declaration (see section 8.1.2):

\newcommand{\purple}{\@fontcolor{purple}}

HEVEA does not feature all text-level elements by default. However one can easily use them with internal macros. For instance this is how you can make all emphasised text blink:

\renewcommand{\em}{\@styleattr{em}{style="text-decoration:blink"}}

Then, here is the definition of a simplified `imgsrc` command (see section 8.1.1), without its optional argument:

\newcommand{\imgsrc}[1]{\@print{<img src="}}{#1}{\@print{">}}

Here, `@print` and `@getprint` are used to output HTML text, depending upon whether this text requires processing or not. Note that \begin{img}{src="#1"} is not correct, because the element `img` consists in a single tag, without a closing tag.

Another interesting example is the definition of the command `@doaelement`, which HEVEA uses internally to output A elements.

\newcommand{\@doaelement}[2]{\@nostyle\@print{<a}}{#1}{\@print{>}}{#2}{\@nostyle\@print{</a>}}

The command `@doaelement` takes two arguments: the first argument contains the opening tag attributes; while the second element is the textual content of the `A` element. By contrast with the `imgsrc` example above, tags are emitted inside groups where styles are cancelled by using the `@nostyle` declaration. Such a complication is needed, so as to avoid breaking proper nesting of text-level elements.

Here is another example of direct block opening. The `bgcolor` environment from the `color` package locally changes background color (see section B.14.2.1). This environment is defined as follows:

\newenvironment{bgcolor}[2][style="padding:1em"]{\begin{table}}{\end{table}}
The \texttt{bgcolor} environment operates by opening a \texttt{HTML} table (\texttt{table}) with only one row (\texttt{tr}) and cell (\texttt{td}) in its opening command, and closing all these elements in its closing command. In my opinion, such a style of opening block-level elements in environment opening commands and closing them in environment closing commands is good style. The one cell background color is forced with a \texttt{background-color} property in a \texttt{style} attribute. Note that the mandatory argument to \texttt{\begin{bgcolor}} is the background color expressed as a high-level color, which therefore needs to be translated into a low-level color by using the \texttt{@getcolor} internal macro from the \texttt{color} package. Additionally, \texttt{\begin{bgcolor}} takes \texttt{HTML} attributes as an optional argument. These attributes are the ones of the \texttt{table} element.

If you wish to output a given Unicode character whose value you know, the recommended technique is to define an ad-hoc command that simply call the \texttt{@print@u} command. For instance, ”blackboard sigma” is Unicode \texttt{U+02140} (hexa). Hence you can define the command \texttt{\bbsigma} as follows:

\begin{verbatim}
\newcommand{\bbsigma}{\@print@u{X2140}}
\end{verbatim}

### 8.6 The document charset

According to standards, as far as I understand them, \texttt{HTML} pages are made of Unicode (ISO 10646) characters. By contrast, a file in any operating system is usually considered as being made of bytes.

To account for that fact, \texttt{HTML} pages usually specify a \textit{document charset} that defines a translation from a flow of bytes to a flow of characters. For instance, the byte \texttt{0xA4} means Unicode \texttt{0x00A4} (¢) in the ISO-8859-1 (or latin1) encoding, and \texttt{0x20AC} (€) in the ISO-8859-15 (or latin9) encoding. Notice that \texttt{Hev\textbackslash{}EA} has no difficulty to output both symbols, in fact they are defined as Unicode characters:

\begin{verbatim}
\newcommand{\textcurrency}{\@print@u{XA4}}
\newcommand{\texteuro}{\@print@u{X20AC}}
\end{verbatim}

But the \texttt{@print@u} command may output the specified character as a byte, when possible, by the means of the \textit{output translator}. If not possible, \texttt{@print@u} outputs a numerical character references (for instance \texttt{&\#X20AC;}).

Of course, the document charset and the output translator must be synchronised. The command \texttt{\@def@charset} takes a charset name as argument and performs the operation of specifying the document character set and the output translator. It should occur in the document preamble. Valid charset names are ISO-8859-\textit{n} where \textit{n} is a number in 1..15, KOI8-R, US-ASCII (the default), windows-\textit{n} where \textit{n} is 1250, 1251, 1252 or 1257, or macintosh, or UTF-8. In case those charsets do not suffice, you may ask the author for other document charsets. Notice however that document charset is not that important, the default US-ASCII works everywhere! \textit{Input} encoding of source files is another, although related, issue — see Section B.17.4.

If wished so, the charset can be extracted from the current locale environment, provided this yields a valid (to \texttt{Hev\textbackslash{}EA}) charset name. This operation is performed by a companion script: \texttt{xcharset.exe}. It thus suffices to launch \texttt{Hev\textbackslash{}EA} as:

```
# hevea -exec xcharset.exe other arguments
```

### 9 Support for style sheets

#### 9.1 Overview

Starting with version 1.08, \texttt{Hev\textbackslash{}EA} offers support for style sheets (of the CSS variant see [CSS-2]).

Style sheets provide enhanced expressiveness. For instance, it is now possible to get “real” (whatever real means here) small caps in \texttt{HTML}, and in a relatively standard manner. There are other, discrete, maybe unnoticeable, similar enhancements.

However, style sheets mostly offer an additional mechanism to customise their documents to \texttt{Hev\textbackslash{}EA} users. To do so, users should probably get familiar with how \texttt{Hev\textbackslash{}EA} uses style sheets in the first place.
HEVEA interest for style sheets is at the moment confined to block-level elements (\texttt{div}, \texttt{table}, \texttt{H<n>}, etc.). The general principle is as follows: when a command or an environment gets translated into a block-level element, the opening tag of the block level element has a \texttt{class="name"} attribute, where \textit{name} is the command or environment name.

As an example the \LaTeX command \texttt{\subsection} is implemented with the element \texttt{h3}, resulting in HTML output of the form:

\begin{verbatim}
<h3 class="subsection">
...
</h3>
\end{verbatim}

By default, most styles are undefined, and default rendering of block-level elements applies. However, some packages (such as, for instance \texttt{fancysection}, see Section B.16.4) may define them. If you wish to change the style of section headers, loading the \texttt{fancysection} package may prove appropriate (see B.16.4). However, one can also proceed more directly, by appending new definitions to the \textit{document style sheet}, with the command \texttt{\newstyle}. For instance, here is a \texttt{\newstyle} to add style for subsections.

\begin{verbatim}
\newstyle{.subsection}{padding:1ex;color:nave;border:solid nave;}
\end{verbatim}

This declaration adds some style element to the \texttt{subsection} class (notice the dot!): blocks that declare to belong to the class will show dark-blue text, some padding (space inside the box) is added and a border will be drawn around the block. These specification will normally affect all subsections in the document.

The following points are worth noticing:

\begin{itemize}
\item To yield some effect, \texttt{\newstyle} commands \textit{must} appear in the document preamble, \textit{i.e.} before \texttt{\begin{document}}.
\item Arguments to \texttt{\newstyle} commands are processed.
\item The \texttt{hevea} package defines all style sheet related commands as no-ops. Thus, these commands do not affect document processing by \LaTeX.
\end{itemize}

9.2 Changing the style of all instances of an environment

In this very document, all \texttt{verbatim} environments appear over a light green background, with small left and right margins. This has been performed by simply issuing the following command in the document preamble.

\begin{verbatim}
\newstyle{.verbatim}{margin:1ex 1ex;padding:1ex;background:\#ccffcc;}
\end{verbatim}

Observe that, in the explicit numerical color argument above, the hash character “#” has to be escaped.

9.3 Changing the style of some instances of an environment

One can also change the style class attached to a given instance of an environment and thus control styling of environments more precisely.

As a matter of fact, the name of the class attribute of environment \textit{env} is referred to through an indirection, by using the command \texttt{\getenvclass{env}}. The class attribute can be changed with the command \texttt{\setenvclass{env}{class}}. The \texttt{\setenvclass} command internally defines a command \texttt{\env@class}, whose content is read by the \texttt{\getenvclass} command. As a consequence, the class attribute of environments follows normal scoping rules. For instance, here is how to change the style of one \texttt{verbatim} environment.

\begin{verbatim}
{\setenvclass{verbatim}{myverbatim}
\begin{verbatim}
This will be styled through class 'myverbatim', introduced by:
\end{verbatim}
\newstyle{.myverbatim}{margin:1ex 3x;padding:1ex;
color:maroon;
\end{verbatim}}
\end{verbatim}

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Observe how the class of environment `verbatim` is changed from its default value to the new value `myverbatim`. The change remains active until the end of the current group (here, the “}” at the end). Then, the class of environment `verbatim` is restored to its default value — which happen to be `verbatim`.

This example also shows two new ways to specify colours in style definition, with a conventional HTML color name (here maroon) or as a high-level color (see Section B.14.2), given as an argument to the `\@getstylecolor` internal command (here `Apricot` from the named color model).

A good way of specifying style class changes probably is by defining new environments.

```latex
\newenvironment{flashyverbatim}
\begin{verbatim}
\setenvclass{verbatim}{myverbatim}
\verbatim
\end{verbatim}
```

Then, we can use `\begin{flashyverbatim}... \end{flashyverbatim}` to get verbatim environments style with the intended `myverbatim` style class.

### 9.4 Which class affects what

Generally, the styling of environment `env` is performed through the commands `\getenvclass{env}` and `\setenvclass{env}{...}`, with `\getenvclass{env}` producing the default value of `env`.

Concretely, this means that most of the environments are styled through an homonymous style class. Here is a non-exhaustive list of such environments

- `figure`, `table`, `itemize`, `enumerate`, `list`, `description`, `trivlist`, `center`, `flushleft`, `flushright`, `quote`, `quotation`, `verbatim`, `abstract`, `mathpar` (cf Section B.17.15), `lstlisting` (cf. Section B.17.13), etc.

All sectioning commands (`\part`, `\section` etc.) output `H\<n>` block-level elements, which are styled through style classes named `part`, `section`, etc.

List making-environment introduce extra style classes for items. More specifically, for list-making environments `itemize` and `enumerate`, `li` elements are styled as follows:

```latex
<ul class="itemize"> ...
<li class="li-itemize"> ...
</ul>
```

That is, `li` elements are styled as environments, the key name being `li-env`.

The `description`, `trivlist` and `list` environments (which all get translated into DL elements) are styled in a similar way, internal `DT` and `DD` elements being styles through names `dt-env` and `dd-env` respectively.

### 9.5 A few examples

#### 9.5.1 The title of the document

The command `\maketitle` formats the document title within a `table` element, with class `title`, for display. The name of the title is displayed inside block `h1`, with class `titlemain`, while all other information (author, date) are displayed inside block `h3`, with class `titlerest`.

```latex
<table class="title">
<tr>
<td style="padding: lex">
```

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Users can impact on title formatting by adding style in the appropriate style classes. For instance the following style class definitions:

\newstyle{.title}
{text-align:center;margin:1ex auto;color:navy;border:solid navy;}
\newstyle{.titlerest}{font-variant:small-caps;}

will normally produce a title in dark blue, centered in a box, with author and date in small-caps.

9.5.2 Enclosing things in a styled div

At the moment, due to the complexity of the task, environments \textit{tabular} and \textit{array} cannot be styled as others environments can be, by defining an appropriate class in the preamble. However, even for such constructs, limited styling can be performed, by using the \texttt{divstyle} environment. The opening command \texttt{\begin{divstyle}{class}} takes the name of a class as an argument, and translates to \texttt{<div class="class">}. Of course the closing command \texttt{\end{divstyle}} translates to \texttt{</div>}. The limitation is that the enclosed part may generate more \textit{HTML} blocks, and that not all style attribute defined in class class \texttt{class} will apply to those inner blocks.

As an example consider the style class definition below.

\newstyle{.ruled}{border:solid black;padding:1ex;background:\#eeddbb;color:maroon}

The intended behaviour is to add a black border around the inner block (with some padding), and to have text over a light brown background.

If we, for instance, enclose an \texttt{itemize} environment, the resulting effect is more or less what we have expected:

\begin{divstyle}{ruled}
\begin{itemize}
\item A ruled itemize
\item With two items.
\end{itemize}
\end{divstyle}

However, enclosing a centered \texttt{tabular} environment in a \texttt{divstyle{ruled}} one is less satisfactory.

\begin{divstyle}{ruled}
\begin{center}\begin{tabular}{|c|c|}
\hline \bf English & \bf French\\ \hline Good Morning & Bonjour\\ Thank You & Merci\\ Good Bye & Au Revoir\\ \hline
\end{tabular}\end{center}
\end{divstyle}

In the \textit{HTML} version of this document, one sees that the brown background extend on all the width of the displayed page.

This problem can be solved by introducing an extra table. We first open an extra centered table and then only open the \texttt{divstyle} environment.
<table>
<thead>
<tr>
<th>English</th>
<th>French</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Morning</td>
<td>Bonjour</td>
</tr>
<tr>
<td>Thank You</td>
<td>Merci</td>
</tr>
<tr>
<td>Good Bye</td>
<td>Au Revoir</td>
</tr>
</tbody>
</table>

This works because of the rules that govern the width of HTML table elements, which yield minimal width. This trick is used in numerous places by \LaTeX, for instance in document titles, and looks quite safe. Another solution is to specify the display property of the styling div block as being inline-block:

\newstyle{.ruledbis}
{border:solid black;padding:1ex;background:\#eedbb;color:maroon;display:inline-block;}

### 9.5.3 Styling the itemize environment

Our idea is highlight lists with a left border whose color fades while lists are nested. Such a design may be appropriate for tables of content, as the one of this document. The text above is typeset from the following \LaTeX source.

\begin{toc}
\item Part~A
\begin{toc}
\item Chapter~I
\begin{toc}
\item Section~I.1
\item Section~I.2
\end{toc}
\end{toc}
\end{toc}

For simplicity, we assume a limit of four over the nesting depth of toc environment. We first define four style classes toc1, toc2, toc3 and toc4 in the document preamble. Since those classes are similar, a command \newtocstyle is designed.

\newcommand{\newtocstyle}[2]{{\newstyle{.toc#1}{list-style:none;border-left:1ex solid #2;padding:0ex 1ex;}}}
\newtocstyle{1}{\@getstylecolor{Sepia}}
\newtocstyle{2}{\@getstylecolor{Brown}}
\newtocstyle{3}{\@getstylecolor{Tan}}
\newtocstyle{4}{\@getstylecolor{Melon}}

The toc environment uses a counter to record nesting depth. Notice how the style class of the itemize environment is redefined before \begin{itemize}.

\newcounter{toc}
\newenvironment{toc}{\stepcounter{toc}\setenvclass{itemize}{toc\thetoc}\begin{itemize}}{\addtocounter{toc}{-1}\end{itemize}}

The outputted HTML is:
9.6 Miscellaneous

9.6.1 HACtA and style sheets

HACtA now produces an additional file: a style sheet, which is shared by all the HTML files produced by HACtA. Please refer to section 7.1 for details.

9.6.2 Producing an external style sheet

By default, style declarations defined with \newstyle go into the header of the HTML document doc.html. However, one can send those declaration into an external style file, whose name is doc.css. Then, HACtA automatically relates doc.html to its style sheet doc.css. To achieve this behaviour, it suffices to set the value of the boolean register externalcss to true, by issuing the command \externalcsstrue in the preamble of the source document. Notice that HACtA output still can be processed by HACtA, with correct behaviour.

9.6.3 Linking to external style sheets

The HACtA command \loadcssfile{url} allows the user to link to an external style sheet (like the link option for HTML). The command takes an url of the external sheet as argument and emits the HTML text to link to the given external style sheet. As an example, the command

\loadcssfile{../abc.css}

produces the following HTML text in the head of the document.

<link rel="stylesheet" type="text/css" href="../abc.css">

To yield some effect, \loadcssfile must appear in the document preamble. Several \loadcssfile commands can be issued. Then the given external style sheets appear in the output, following source order.

Notice that the argument to \loadcssfile is processed. Thus, if it contains special characters such as "#" or "$", those must be specified as \\# and \\$ respectively. A viable alternative would be to quote the argument using the \url command from the url package (see Section B.17.11).

9.6.4 Limitations

At the moment, style class definitions cumulate, and appear in the style element in the order they are given in the document source. There is no way to cancel the default class definitions performed by HACtA before it starts to process the user’s document. Additionally, external style sheets specified with \loadcssfile appear before style classes defined with \newstyle. As a consequence (if I am right), styles declared by \newstyle take precedence over those contained in external style sheets. Thus, using external style-sheets, especially if they alter the styling of elements, may produce awkward results.

Those limitations do not apply of course to style classes whose names are new, since there cannot be default definitions for them. Then, linking with external style sheets can prove useful to promote uniform styling of several documents produced by HACtA.
10 Customising HEVEA

HEVEA can be controlled by writing \LaTeX code. In this section, we examine how users can change HEVEA default behaviour or add functionalities. In all this section we assume that a document \textit{doc.tex} is processed, using a private command file macros.hva. That is, HEVEA is invoked as:

\texttt{# hevea macros.hva doc.tex}

The general idea is as follows: one redefines \LaTeX constructs in macros.hva, using internal commands. This requires a good working knowledge of both \LaTeX and HTML. Usually, one can avoid internal commands, but then, all command redefinitions interact, sometimes in very nasty ways.

10.1 Simple changes

Users can easily change the rendering of some constructs. For instance, assume that all quotations in a text should be emphasised. Then, it suffices to put the following re-declaration in macros.hva:

\begin{verbatim}
\renewenvironment{quote}
  {\@open{blockquote}{}\@style{em}}
  {\@close{blockquote}}
\end{verbatim}

The same effect can be achieved without using any of the internal commands:

\begin{verbatim}
\let\oldquote\quote
\let\oldendquote\endquote
\renewenvironment{quote}{\oldquote\em}{\oldendquote}
\end{verbatim}

In some sense, this second solution is easier, when one already knows how to customise \LaTeX. However, this is less safe, since the definition of \texttt{\em} can be changed elsewhere.

There is yet another solution that takes advantage of style sheets. One can also add this line to the macros.hva file:

\begin{verbatim}
\newstyle{.quote}{font-style:oblique;}
\end{verbatim}

This works because the environment \texttt{quote} is styled through style class \texttt{quote} (see Section 9.2). Notice that this solution has very little to do with "emphasising" in the proper sense, since here we short-circuit the implicit path from \texttt{\em} to oblique fonts.

10.2 Changing defaults for type-styles

HEVEA default rendering of type style changes is described in section B.15.1. For instance, the following example shows the default rendering for the font shapes:

\begin{verbatim}
\itshape italic shape \slshape slanted shape
\scshape small caps shape \upshape upright shape
\end{verbatim}

By default, \texttt{\itshape} is italics, \texttt{\slshape} is oblique italics, \texttt{\scshape} is small-caps (thanks to style sheets) and \texttt{\upshape} is no style at all. All shapes are mutually exclusive, this means that each shape declaration cancels the effect of other active shape declarations. For instance, in the example, small caps shapes is small caps (no italics here).

If one wishes to change the rendering of some of the shapes (say slanted caps), then one should redefine the old-style \texttt{\sl} declaration. For instance, to render slanted as Helvetica (why so?), one should redefine \texttt{\sl} by \texttt{\renewcommand{\sl}{\@span{style="font-family:Helvetica"}}} in macros.hva.

Hence, redefining old-style declarations using internal commands should yield satisfactory output. However, since cancellation is done at the HTML level, a declaration belonging to one component may sometimes cancel the effect of another that belongs to another component. Anyway, you might have not noticed it if I had not told you.
10.3 Changing the interface of a command

Assume for instance that the base style of doc.tex is jsc (the Journal of Symbolic Computation style for articles). For running HeVeA, the jsc style can be replaced by article style, but for a few commands whose calling interface is changed. In particular, the \title command takes an extra optional argument (which HeVeA should ignore anyway). However, HeVeA can process the document as it stands. One solution to insert the following lines into macros.hva:

\input{article.hva}% Force document class 'article'
\let\oldtitle=\title
\renewcommand{\title}{[2]\{\oldtitle[#2]}}

The effect is to replace \title by a new command which calls HeVeA \title with the appropriate argument.

10.4 Checking the optional argument within a command

HeVeA fully implements \LaTeX \newcommand. That is, users can define commands with an optional argument. Such a feature permits to write a \epsfbox command that has the same interface as the \LaTeX \epsfbox command and echoes itself as it is invoked to the image file. To do this, the HeVeA \epsfbox command has to check whether it is invoked with an optional argument or not. This can be achieved as follows:

\newcommand{\epsfbox}{[2][!*!]{%}
  \ifthenelse{\equal{#1}{!*!}}{
    \begin{toimage}\epsfbox{#2}\end{toimage}}%No optional argument
  {\begin{toimage}\epsfbox[#1]{#2}\end{toimage}}%With optional argument
  \imageflush}

10.5 Changing the format of images

Semi-automatic generation of included images is described in section 6. Links to included images are generated by the \imageflush command, which calls the \imgsrr command:

\newcommand{\imageflush}{[1]{}%}
  {[@imageflush\stepcounter{image}\imgsrr[#1]{\hevaimgedir\jobname\theimage\heveaimageext}}

That is, you may supply a HTML-style attribute to the included image, as an optional argument to the \imageflush command.

By default, images are PNG images stored in .png files. HeVeA provides support for the alternative GIF image file format. It suffices to invoke hevea as:

# hevea gif.hva doc.tex

Then imagen must be run with option -gif:

# imagen -gif doc

A convenient alternative is to invoke hevea as:

# hevea -fix gif.hva doc.tex

Then hevea will invoke imagen with the appropriate option when it thinks images need to be rebuild. An even more convenient alternative is to load gif.hva from within document source, for instance with the \usepackage command.

HeVeA also provides support for the alternative SVG image file format. As for GIF images, it is more convenient to use option -fix to combine hevea and imagen invocations:

# hevea -fix svg.hva doc.tex
Notice that imagen production chain of SVG images always call pdflatex, even when not given the -pdf command-line option. Hence the source code of images must be processable by pdflatex. This precludes using latex-only packages such as pstricks for instance.

As not all browsers display SVG images, hevea and imagen are bit special: imagen produces both PNG\(^2\) and SVG images; while hevea offers both image sources, letting client browser select the most appropriate one by the means of teh srcset attribute of the img element.

### 10.6 Storing images in a separate directory

By redefining the \heveaimagedir command, users can specify a directory for images. More precisely, if the following redefinition occurs in the document preamble.

\renewcommand{\heveaimagedir}{dir}

Then, all links to images in the produced HTML file will be as “dir/...”. Then imagen must be invoked with option - todir:

# imagen -todir dir doc

As usual, hevea will invoke imagen with the appropriate option, provided it is passed the -fix option.

### 10.7 Controlling imagen from document source

The internal command \@addimagenopt{option} add the text option to imagen command-line options, when launched automatically by hevea (i.e. when hevea is given the -fix command-line option).

For instance, to instruct hevea/imagen to reduce all images by a factor of \(\sqrt{2}\), it suffices to state:

%H\m@addimagenopt{mag 707}

See section C.1.5 for the list of command-line options accepted by imagen.

## 11 Other output formats

It is possible to translate \LaTeX file into other formats than HTML. There are two such formats: plain text and info files. This enables producing postscript, HTML, plain text and info manuals from one (\LaTeX) input file.

### 11.1 Text

The \LaTeX file is processed and converted into a plain text formatted file. It allows some pretty-printing in plain text.

To translate into text, invoke Hevea as follow:

# hevea -text [-w <width>] myfile.tex

Then, Hevea produces myfile.txt a plain text translation of myfile.tex.

Additionally, the optional argument -w <number> sets the width of the output for text formatting. By default, The text will be 72 characters wide.

Nearly every environment has been translated, included lists and tables. The support is nearly the same as in HTML, excepted in some cases described hereafter.

Most style changes are ignored, because it is hardly possible to render them in plain text. Thus, there are no italics, bold fonts, underlinings, nor size change or colours... The only exception is for the verbatim environment that puts the text inside quotes, to distinguish it more easily.

\(^2\)or GIF, if gif.hva is loaded
Tables with borders are rendered in the same spirit as in \LaTeX. Thus for instance, it is possible to get vertical lines between some columns only. Table rendering can be poor in case of line overflow. The only way to correct this (apart from changing the tables themselves) is to adjust the formatting width, using the \texttt{-w} command-line option.

For now, maths are not supported at all in text mode. You can get very weird results with in-text mathematical formulas. Of course, simple expressions such as subscripts remains readable. For instance, $x^2$ will be rendered as $x^2$, but $\int_0^1 f(x)\,dx$ will yield something like $\text{int}_0^1 f(x)\,dx$.

### 11.2 Info

The file format info is also supported. Info files are text files with limited hypertext links, they can be read by using \texttt{emacs} info mode or the \texttt{info} program. Please note that \texttt{HEVEA} translates plain \LaTeX to info, and not \TeXinfo.

You can translate your \LaTeX files into info file(s) as follows:

```
# hevea -info [-w <width>] myfile.tex
```

Then, \texttt{HEVEA} produces the file \texttt{myfile.info}, an info translation of \texttt{myfile.tex}. However, if the resulting file is too large, it is cut into pieces automatically, and \texttt{myinfo.info} now contains references for all the nodes in the others files, which are named \texttt{myfile.info-1}, \texttt{myfile.info-2}, ... .

The optional argument \texttt{-w} has the same meaning as for text output.

The text will be organised in nodes that follow the pattern of \LaTeX sectioning commands. Menus are created to navigate through the sections easily.

A table of content is produced automatically. References, indexes and footnotes are supported, as they are in HTML mode. However, the info format only allows pointers to info nodes, \textit{i.e.} in \texttt{HEVEA} case, to sectional units. As a consequence all cross references lead to sectional unit headers.

## Part B

### Reference manual

This part follows the pattern of the \LaTeX reference manual [\LaTeX, Appendix C].

### B.1 Commands and Environments

#### B.1.1 Command Names and Arguments

\LaTeX comments that start with "%" and end at end of line are ignored and produce no output. Usually, \texttt{HEVEA} ignore such comments. However, \texttt{HEVEA} processes text that follows "%HEVEA" and some other comments have a specific meaning to it (see section 5.3).

Command names follow strict \LaTeX syntax. That is, apart from \texttt{#}, \texttt{$\$}, \texttt{~}, \texttt{\_} and \texttt{\^}, they either are "\" followed by a single non-letter character or "\" followed by a sequence of letters. Additionally, the letter sequence may be preceded by "\$" (and this is the case of many of \texttt{HEVEA} internal commands), or terminated by "\*" (starred variants are implemented as plain commands).

Users are strongly advised to follow strict \LaTeX syntax for arguments. That is, mandatory arguments are enclosed in curly braces \{...\} and braces inside arguments must be properly balanced. Optional arguments are enclosed in square brackets \[...\]. However, \texttt{HEVEA} does its best to read arguments even when they are not enclosed in curly braces. Such arguments are a single, different from "\", "\{" and "\", character or a command name. Thus, constructs such as \texttt{\'ecole, $a_1$} or \texttt{$a_\Gamma$} are recognized and processed as \texttt{\'ecole $a_1$} and \texttt{a$_\Gamma$}. By contrast, \texttt{a^{-\mbox{...}}} is not recognized and must be written \texttt{a^{-\{\mbox{...}\}}}.
Also note that, by contrast with \LaTeX{}, comments are parsed during argument scanning, as an important consequence brace nesting is also checked inside comments.

With respect to previous versions, \Hevea{} has been improved as regards emulation of complicated argument passing. That is, commands and their arguments can now appear in different static text bodies. As a consequence, \Hevea{} correctly processes the following source:

\begin{verbatim}
\newcommand{\boite}{\textbf}
\boite{In bold}
\end{verbatim}

The definition of \boite{} makes it reduces as \textbf{} and \Hevea{} succeeds in fetching the argument "(In bold)". We get

\begin{center}
In bold
\end{center}

The above example arguably is no "legal" \LaTeX{}, but \Hevea{} handles it. Of course, there remains numerous "clever" \LaTeX{} tricks that exploits \TeX{} internal behaviour, which \Hevea{} does not handle. For instance consider the following source:

\begin{verbatim}
\newcommand{\boite}[1]{\textbf#1}
\boite{{In bold}, Not in Bold.}
\end{verbatim}

\LaTeX{} typesets the text "In bold" using bold font, leaving the rest of the text alone. While \Hevea{} typesets everything using bold font. Here is \LaTeX{} output:

\begin{center}
In bold, Not in Bold.
\end{center}

Note that, in most similar situations, \Hevea{} will likely crash.

As a conclusion of this important section, Users are strongly advised to use ordinary command names and curly braces and not to think too much the \TeX{} way.

\subsection{Environments}

Environment opening and closing is performed like in \LaTeX{}, with \texttt{\begin{env}{} and \texttt{\end{env}}. The \texttt{*}-form of an environment is a plain environment. It is not advised to use \texttt{\env} and \texttt{\endenv} in place of \texttt{\begin{env}{} and \texttt{\end{env}}.

\subsection{Fragile Commands}

Fragile commands are not relevant to \Hevea{} and \texttt{\protect} is defined as a null command.

\subsection{Declarations}

Scope rules are the same as in \LaTeX{}.

\subsection{Invisible Commands}

I am a bit lost here. However spaces in the output should correspond to users expectations. Note that, to \Hevea{} being invisible commands is a static property attached to command name.

\subsection{The \texttt{\\} Command}

The \texttt{\} and \texttt{\*} commands are the same, they perform a line break, except inside arrays where they end the current row. Optional arguments to \texttt{\} and \texttt{\*} are ignored.
B.2 The Structure of the Document

Document structure is a bit simplified with respect to \LaTeX, since documents consist of only two parts. The preamble starts as soon as \texttt{H\TeX} starts to operate and ends with the \texttt{\begin{document}} construct. Then, any input occurring before \texttt{\end{document}} is translated to HTML. However, the preamble is processed and the preamble comprises the content of the files given as command-line arguments to \texttt{H\TeX}, see section C.1.1.1). As a consequence, command and environment definitions that occur before \texttt{\begin{document}} are performed, and they remain valid during all the processing.

In particular one can define a header and a footer, by using the \texttt{\htmlhead} and \texttt{\htmlfoot} commands in the preamble. Those commands register their argument as the header and the footer of the final HTML document. The header appears first while the footer appears last in (visible) HTML output. This is mostly useful when \texttt{H\TeX} output is later cut into pieces by \texttt{HC\TeX}, since both header and footer are replicated at the start and end of any file generated by \texttt{HC\TeX}. For instance, to append a copyright notice at the end of all the HTML pages, it suffices to invoke the \texttt{\htmlfoot} command as follows in the document preamble:

\begin{verbatim}
\htmlfoot{\copyright to me}
\end{verbatim}

The \texttt{\htmlhead} command cannot be used for changing anything outside of the HTML document body, there are specific commands for doing this. Those command must be used in the document preamble. One can change \texttt{H\TeX} default (empty) attribute of the opening \texttt{<body ...>} tag by redefining \texttt{\@bodyargs}. For instance, you get black text on a white background, when the following declaration occurs before \texttt{\begin{document}}:

\begin{verbatim}
\renewcommand{\@bodyargs}{style="color:black;background:white"}
\end{verbatim}

Since version 1.08, a recommended alternative is to use style sheets:

\begin{verbatim}
\newstyle{body}{color:black; background:white;}
\end{verbatim}

One can also change the default (empty) attribute of the opening \texttt{<html ...>} tag by redefining \texttt{\@htmlargs}. For instance you can set the language attribute of the whole document by issuing the following redefinition in the document preamble:

\begin{verbatim}
\renewcommand{\@htmlargs}{lang=en}
\end{verbatim}

Similarly, some elements can be inserted into the output file head element by redefining the \texttt{\@meta} command (Such elements typically are \texttt{meta}, \texttt{link}, etc.). As such text is pure HTML, it should be included in a \texttt{rawhtml} environment. For instance, you can specify author information as follows:

\begin{verbatim}
\let\oldmeta=\@meta
\renewcommand{\@meta}{\%
\oldmeta
\begin{rawhtml}
<meta name="Author" content="Luc Maranget">
\end{rawhtml}}
\end{verbatim}

Note how \texttt{\@meta} is first bound to \texttt{\oldmeta} before being redefined and how \texttt{\oldmeta} is invoked in the new definition of \texttt{\@meta}. Namely, simply overriding the old definition of \texttt{\@meta} would imply not outputting default meta-information.

The \texttt{\@charset} command holds the value of the (HTML) document character set. By default, this value is US-ASCII. In previous versions of \texttt{H\TeX}, one could change the value of the document character set by simply redefining \texttt{\@charset}. Then, it was users responsibility to provide a (\LaTeX) document in the corresponding encoding. This is no longer so, and users should \textit{not} redefine \texttt{\@charset} directly. Please, see Section 8.6 for details.
B.3 Sentences and Paragraphs

B.3.1 Spacing

Generally speaking, spaces (and single newline characters) in the source are echoed in the output. Browser then manage with spaces and line-breaks. Following \LaTeX{} behaviour, spaces after commands are not echoed. Spaces after invisible commands with arguments are not echoed either.

However this is no longer true in math mode, see section B.7.7 on spaces in math mode.

B.3.2 Paragraphs

New paragraphs are introduced by one blank line or more. Paragraphs are not indented. Thus the macros \texttt{\indent} and \texttt{\noindent} perform no action. Paragraph are rendered by p elements. In some occasions, this technique may produce spurious paragraphs (see 3.1.1).

B.3.3 Footnotes

The commands \texttt{\footnote}, \texttt{\footnotetext} and \texttt{\footnotemark} (with or without optional arguments) are supported. The footnote counter exists and (re)setting it or redefining \texttt{\thefootnote} should work properly. When footnotes are issued by a combination of \texttt{\footnotemark} and \texttt{\footnotetext}, a \texttt{\footnotemark} command must be issued first, otherwise some footnotes may get numbered incorrectly or disappear. Footnotes appear at document end in the \texttt{article} style and at chapters end in the \texttt{book} style. See section 7.3.6 for a description of how footnotes are flushed.

B.3.4 Accents and special symbols

Thanks to Unicode character references, \LaTeX{} can virtually output any symbol. It may happen that \LaTeX{} does not known about a particular symbol, that is, most of the time, \LaTeX{} does not known about a particular command. In that case a warning is issued to draw user attention. Users can then choose a particular symbol amongst the recognized ones, or as an explicit Unicode character reference (see Section 4.2 for an example of this technique).

Commands for making accents used in non-English languages, such as \texttt{\textasciigrave}, work when applied to accent-less (\textit{i.e.} ascii) letters and that the corresponding accented letters exist in the Unicode character set. Otherwise, the argument to the command is not modified and a warning is issued. For instance, consider the following source code, where, after a legitimate use of acute accents, one attempt to put an acute accent over the letter “h”:

```
"\Ecole" works as in \LaTeX{}, while "\h" does not.
```

\LaTeX{} output will be “Ècole” works as in \LaTeX{}, while “h” does not. And a warning will be issued.

```
./tmp.tex:3741: Warning: Application of '\e' on 'h' failed
```

Observe that using input encodings is a convenient alternative to accent commands — see Section B.17.4.

B.4 Sectioning

B.4.1 Sectioning Commands

Sectioning commands from \texttt{\part} down to \texttt{\subparagraph} are defined in base style files. They accept an optional argument and have starred versions.

The non-starred sectioning commands from \texttt{\part} down to \texttt{\subsubsection} show section numbers in sectional unit headings, provided their \texttt{level} is greater than or equal to the current value of the \texttt{secnumdepth} counter. Sectional unit levels and the default value of the \texttt{secnumdepth} counter are the same as in \LaTeX{}.
Furthermore, given a sectional unit \texttt{secname}, the counter \texttt{secname} exists and the appearance of sectional units numbers can be changed by redefining \texttt{\the secname}. For instance, the following redefinition turn the numbering of chapters into alphabetic (uppercase) style:

\begin{verbatim}
\renewcommand{\thechapter}{\Alph{chapter}}
\end{verbatim}

When jumping to anchors, browsers put the targeted line on top of display. As a consequence, in the following code:

\begin{verbatim}
\section{A section}
\label{section:section}
...
See Section:\ref{section:section}
\end{verbatim}

Clicking on the link produced by \texttt{\ref{section:section}} will result in not displaying the targeted section title. A fix is writing:

\begin{verbatim}
\section{\label{section:section}A section}
...
See Section:\ref{section:section}
\end{verbatim}

Starting with version 2.04, \LaTeX{} and \HeVeA{} will use the label name (\texttt{section:section} above) for the table of contents they generate. Notice that this behaviour applies to the \texttt{\label} command that occurs first in the sectioning command argument.

\section*{B.4.2 The Appendix}

The \texttt{\appendix} command exists and should work as in \LaTeX{}.

\section*{B.4.3 Table of Contents}

\LaTeX{} now generates a table of contents, using a procedure similar to the one of \LaTeX{} (a .htoc file is involved). One inserts this table of contents in the main document by issuing the command \texttt{\tableofcontents}. Table of contents is controlled by the counter \texttt{tocdepth}. By default, the table of contents shows sectioning units down to the subsubsection level in \texttt{article} style and down to the subsection level in \texttt{book} (or \texttt{report}) style. To include more or less sectioning units in the table of contents, one should increase or decrease the \texttt{tocdepth} counter. It is important to notice that \LaTeX{} produces such a table of contents, only when it has total control over cross-references. More precisely, \LaTeX{} cannot produce the table of contents when it reads \LaTeX{}-produced \texttt{.aux} files. Instead, it should read its own \texttt{.haux} files. This will naturally occur if no \texttt{.aux} files are present, otherwise these \texttt{.aux} files should be deleted, or \LaTeX{} should be instructed not to read them with the command-line option \texttt{-fix} (see Sections B.11.1 and C.1.1.4).

One can also add extra entries in the table of contents by using the command \texttt{\addcontentsline}, in a way similar to \LaTeX{} homonymous command. However, hyperlinks need to be introduced explicitly, as in the following example, where an anchor is defined in the section title and referred to in the argument to \texttt{\addcontentsline}:

\begin{verbatim}
\subsection*{\aname{no:number}{Use \hacha{}}}
\addcontentsline{toc}{subsection}{\ahrefloc{no:number}{Use \hacha{}}}
\end{verbatim}

(See Section 8.1.1 for details on commands related to hyperlinks.)

There is no list of figures nor list of tables.
Use H\LaTeX\r

However, H\LaTeX\ has a more sophisticated way of producing a kind of map w.r.t. the sectioning of the document. A later run of H\LaTeX\ on H\LaTeX\ output file splits it in smaller files organized in a tree whose nodes are tables of links. By contrast with H\TeX, starred sectioning commands generate entries in these tables of contents. Table of contents entries hold the optional argument to sectioning commands or their argument when there is no optional argument. Section 7 explains how to control H\LaTeX.

B.5 Classes, Packages and Page Styles

B.5.1 Document Class

Both H\TeX\ \texttt{documentclass} and old H\TeX\ \texttt{documentstyle} are accepted. Their argument \textit{style} is interpreted by attempting to load a \texttt{style.hva} file. Presently, only the style files \texttt{article.hva}, \texttt{seminar.hva}, \texttt{book.hva} and \texttt{report.hva} exist, the latter two being equivalent.

If one of the recognized styles has already been loaded at the time when \texttt{documentclass} or \texttt{documentstyle} is executed, then no attempt to load a style file is made. This allows to override the document style file by giving one of the four recognized style files of H\LaTeX\ as a command line argument (see 2.2).

Conversely, if H\LaTeX\ attempt to load \texttt{style.hva} fails, then a fatal error is flagged, since it can be sure that the document cannot be processed.

B.5.2 Packages and Page Styles

H\LaTeX\ reacts to \texttt{\usepackage[options]{pkg}} in the following way:

1. The whole \texttt{\usepackage} command with its arguments gets echoed to the \texttt{image} file (see 6).

2. H\LaTeX\ attempt to load file \texttt{pkg.hva}, (see section C.1.1.1 on where H\LaTeX\ searches for files).

Note that H\LaTeX\ will not fail if it cannot load \texttt{pkg.hva} and that no warning is issued in that case.

The H\LaTeX\ distribution contains implementations of some packages, such as \texttt{verbatim}, \texttt{colors}, \texttt{graphics}, etc.

In some situations it may not hurt at all if H\LaTeX\ does not implement a package, for instance H\LaTeX\ does not provide an implementation for the \texttt{fullpage} package.

Users needing an implementation of a package that is widely used and available are encouraged to contact the author. Experienced users may find it fun to attempt to write package implementations by themselves.

B.5.3 The Title Page and Abstract

All title related commands exist, with the following peculiarities:

- The argument to the \texttt{\title} command appears in the \texttt{HTML} document header. As a consequence, titles should remain simple. Normal design (as regards H\LaTeX) is for \texttt{\title} to occur in the document preamble, so that the title is known at the time when the document header is emitted (while processing \texttt{\begin{document}}). However, there are two subtleties.

  If no \texttt{\title} command occurs in document preamble and that one \texttt{\title} command appears in the document, then the title is saved into the \texttt{.haux} file for a next run of H\LaTeX\ to put it in the \texttt{HTML} document header.

  If \texttt{\title} commands are present both in preamble and after \texttt{\begin{document}}, then the former takes precedence.

- When not present the date is left empty. The \texttt{\today} command generates will work properly only if \texttt{hevea} is invoked with the \texttt{-exec xxdate.exe} option. Otherwise \texttt{\today} generates nothing and a warning is issued.
The abstract environment is present in all base styles, including the book style. The titlepage environment does nothing.

B.6 Displayed Paragraphs

Displayed-paragraph environments translate to block-level elements.

In addition to the environments described in this section, H\texttt{EV}A implements the \texttt{center}, \texttt{flushleft} and \texttt{flushright} environments. H\texttt{EV}A also implements the correspodant \texttt{\LaTeX} style declaration \texttt{\centering} \texttt{\raggedright} and \texttt{\raggedleft}, but these declarations may not work as expected, when they do not appear directly inside a displayed-paragraph environment or inside an array element.

B.6.1 Quotation and Verse

The \texttt{quote} and \texttt{quotation} environments are the same thing: they translate to \texttt{BLOCKQUOTE} elements. The \texttt{verse} environment is not supported.

B.6.2 List-Making environments

The \texttt{itemize}, \texttt{enumerate} and \texttt{description} environments translate to the \texttt{ul}, \texttt{ol}, and \texttt{DL} elements and this is the whole story.

As a consequence, no control is allowed on the appearances of these environments. More precisely optional arguments to \texttt{\item} do not function properly inside \texttt{itemize} and \texttt{enumerate}. Moreover, item labels inside \texttt{itemize} or numbering style inside \texttt{enumerate} are browser dependent.

However, customized lists can be produced by using the \texttt{list} environment (see next section).

B.6.3 The list and trivlist environments

The \texttt{list} environment translates to the \texttt{DL} element. Arguments to \texttt{\begin{list}} are handled as follows:

\begin{itemize}
\item \texttt{\begin{list} \{default_label\} \{decls\}}
\end{itemize}

The first argument \texttt{default_label} is the label generated by an \texttt{\item} command with no argument. The second argument, \texttt{decls} is a sequence of declarations. In practice, the following declarations are relevant:

\begin{itemize}
\item \texttt{\usecounter\{counter\}} The counter \texttt{counter} is incremented by \texttt{\refstepcounter} by every \texttt{\item} command with no argument, before it does anything else.
\end{itemize}

\begin{itemize}
\item \texttt{\renewcommand\{\makelabel\} \{\textbf\{label\}\}} The command \texttt{\item} executes \texttt{\makelabel\{label\}}, where \texttt{label} is the item label, to print its label. Thus, users can change label formatting by redefining \texttt{\makelabel}. The default definition of \texttt{\makelabel} simply echoes \texttt{label}.
\end{itemize}

As an example, a list with an user-defined counter can be defined as follows:

\begin{verbatim}
\newcounter\{coucou\}
\begin{list}\{\the\coucou\}\{\%
  \usecounter\{\coucou\}\%
  \renewcommand\{\makelabel\} \{\textbf\{\#1\}\}.
\%
\}\end{list}
\end{verbatim}

\begin{itemize}
\item First item.
\item Second item.
\end{itemize}

The \texttt{trivlist} environment is also supported. It is equivalent to the \texttt{description} environment.
B.6.4 Verbatim

The verbatim and verbatim* environments translate to the PRE element. Inside verbatim*, spaces are replaced by underscores (“␣”).

Similarly, \verb and \verb* translate to the CODE text element.

The alltt environment is supported.

B.7 Mathematical Formulae

B.7.1 Math Mode Environment

The three ways to use math mode ($...$, $(...)$ and \begin{math}...\end{math}) are supported. The three ways to use display math mode ($$...$$, \[...\] and \begin{displaymath}...\end{displaymath}) are also supported. Furthermore, \ensuremath behaves as expected.

The equation, eqnarray, eqnarray* environments are supported. Equation labelling and numbering is performed in the first two environments, using the equation counter. Additionally, numbering can be suppressed in one row of an eqnarray, using the \nonumber command.

Math mode is not as powerful in HEVEA as in LATEX. The limitations of math mode can often be surpassed by using math display mode. From the HTML point of view, this means that math mode does not close the current flow of text and that formulas in math mode must be rendered using text-level elements only. By contrast, displayed formulas can be rendered using block-level elements. This means that HEVEA have much more possibilities in display context than inside normal flow of text. In particular, stacking text elements one above the other is possible only in display context.

B.7.2 Common Structures

HEVEA admits, subscript (_), superscripts (^) and fractions (\frac{numer}{denom}). The best effect is obtained in display mode, where HTML table element is extensively used. By contrast, when not in display mode, HEVEA uses only SUB and SUP text-level elements to render superscripts and subscript, and the result may not be very satisfying.

However, simple subscripts and superscripts, such as $x_i$ or $x^2$, are always rendered using the SUB and SUP text-level elements and their appearance should be correct even in in-text formulas.

When occurring outside math mode, characters _ and ^ act as ordinary characters and get echoed to the output. However, a warning is issued.

An attempt is made to render all ellipsis constructs (\ldots, \cdots, \vdots and \ddots). The effect may be strange for the latter two.

B.7.3 Square Root

The nth root command \sqrt is supported only for n=3,4, thanks to the existence of Unicode characters for the same. For the others, we shift to fractional exponents, in which case, the \sqrt command is defined as follows:

\newcommand{\sqrt}[3][2]{\left(#2\right)^{1/#1}}

B.7.4 Unicode and mathematical symbols

The support for unicode symbols offered by modern browsers allows to translate almost all math symbols correctly.

Log-like functions and variable sized symbols are recognized and their subscripts and superscripts are put where they should in display mode. Subscript and superscript placement can be changed using the \limits and \nolimits commands. Big delimiters are also handled.
B.7.5 Putting one thing above/below/inside

The commands \stackrel, \underline and \overline are recognized. They produce sensible output in display mode. In text mode, these macros call the \textstackrel, \textunderline and \textoverline macros. These macros perform the following default actions

\textstackrel \textunderline \textoverline

\textunderline Underlines its argument, using the U text-level element.
\textoverline Overlines using style-sheets (used <SPAN> with a top border).

The command \boxed works well both in display and normal math mode. Input of the form \boxed{\frac{\pi}{2}} produces $\frac{\pi}{2}$ in normal math, and

\boxed{\frac{\pi}{2}}

in display-math mode. The commands \bigl, \bigr etc. are also rendered well. Some examples can be found in the test file random-math.html provided with the distribution.

B.7.6 Math accents

Math accents that have corresponding text accents (\hat, \tilde, etc.) are handled by default. They in fact act as the corresponding text-mode accents (Section B.3.4). As a consequence, they work properly only on ascii letters. This may be quite cumbersome, but at least some warnings draw user’s attention on the problem. If accents are critical to your document and that \H E V E A issues a lot of warnings, a solution is to redefine the math accent command. A suggested replacement is using limit superscripts. That way accents are positioned above symbols in display mode and after symbols in text mode.

\renewcommand{\hat}[1]{\mathop{#1}\limits^\textasciicircum\nolimits}

Displayed:

$$\hat{\mu} = \hat{\Delta}.$$

In text: $\hat{\mu} = \hat{\delta}$

The \vec command is rendered differently in display and non-display mode. In display mode, the arrow appears in normal position, while in non-display the arrow appears as an ordinary superscript.

\vec{u} in text mode: $\vec{u}$, \vec{u} in display mode: $\vec{u}$

Most “extensible accents” (\widetilde, \widehat, etc.) are not even defined. There are a few exceptions:

\underline and \overbrace

Brace “accents”:

$\underbrace{1 \times 2 \times \cdots \times n}$ \underbrace $\overbrace{1 \times 2 \times \cdots \times n}$ \overbrace

And arrow “accents”:

$\overleftarrow{1 \times 2 \times \cdots \times n}$ \overleftarrow $\overrightarrow{1 \times 2 \times \cdots \times n}$ \overrightarrow
B.7.7 Spacing

By contrast with \LaTeX, space in the input matters in math mode. One or more spaces are translated to one space. Furthermore, spaces after commands (such as \texttt{\alpha}) are echoed except for invisible commands (such as \texttt{\tt}). This allows users to control space in their formulas, output being near to what can be expected.

Explicit spacing commands (\texttt{\,}, \texttt{\!}, \texttt{\:} and \texttt{\;}) are recognized, the first two commands do nothing, while the others two output one space.

B.7.8 Changing Style

Letters are italicized inside math mode and this cannot be changed. The appearance of other symbols can be changed using \LaTeX\_2\epsilon style changing commands (\texttt{\mathbf}, etc.). The commands \texttt{\boldmath} and \texttt{\unboldmath} are not recognized. Whether symbols belonging to the symbol font are affected by style changes or not is browser dependent.

The \texttt{\cal} declaration and the \texttt{\mathcal} command (that yield calligraphic letters in \LaTeX) exist. They yield red letters by default.

Observe that this does not correspond directly to how \LaTeX\ manage style in math mode and that, in fact, style cannot really change in math mode.

Math style changing declarations \texttt{\displaystyle} and \texttt{\textstyle} do nothing when \HV\ is already in the requested mode, otherwise they issue a warning. This is so because \HV\ implements displayed maths as tables, which require to be both opened and closed and introduce line breaks in the output. As a consequence, warnings on \texttt{\displaystyle} are to be taken seriously.

The commands \texttt{\scriptstyle} and \texttt{\scriptscriptstyle} perform type size changes.

B.8 Definitions, Numbering

B.8.1 Defining Commands

\HV\ understands command definitions given in \LaTeX\ style. Such definitions are made using \texttt{\newcommand}, \texttt{\renewcommand} and \texttt{\providecommand}. These three constructs accept the same arguments and have the same meaning as in \LaTeX, in particular it is possible to define an user command with one optional argument. However, \HV\ is more tolerant: if command \texttt{name} already exists, then a subsequent \texttt{\newcommand{name}...} is ignored. If macro \texttt{name} does not exists, then \texttt{\renewcommand{name}...} performs a definition of \texttt{name}. In both cases, \LaTeX\ would crash, \HV\ just issues warnings.

The behaviour of \texttt{\newcommand} allows to shadow document definition, provided the new definitions are processed before the document definitions. This is easily done by grouping the shadowing definition in a specific style file given as an argument to \HV\ (see section 5.1). Conversely, changes of base macros (i.e. the ones that \HV\ defines before loading any user-specified file) must be performed using \texttt{\renewcommand}.

Scoping rules apply to macros, as they do in \LaTeX. Environments and groups define a scope and command definition are local to the scope they occur.

It is worth noticing that \HV\ also partly implements \TeX\ definitions (using \texttt{\def}) and bindings (using \texttt{\let}), see section B.16.1 for details.

B.8.2 Defining Environments

\HV\ accepts environment definitions and redefinitions by \texttt{\newenvironment} and \texttt{\renewenvironment}. The support is complete and should conform to \LaTeX, Sections C.8.2.

Environments define a scope both for commands and environment definitions.

B.8.3 Theorem-like Environments

New theorem-like environments can also be introduced and redefined, using \texttt{\newtheorem} and \texttt{\renewtheorem}.
Note that, by contrast with plain environments definitions, theorem-like environment definitions are global definitions.

B.8.4 Numbering

\LaTeX{} counters are (fully ?) supported. In particular, defining a counter \textit{cmd} with \texttt{\newcounter{cmd}} creates a macro \texttt{\the cmd} that outputs the counter value. Then the \texttt{\the cmd} command can be redefined. For instance, section numbering can be turned into alphabetic style by:

\begin{verbatim}
\renewcommand{\thesection}{\alph{section}}
\end{verbatim}

Note that \TeX{} style for counters is not supported at all and that using this style will clobber the output. However, \texttt{\HVeA} implements the calc package that makes using \TeX{} style for counters useless in most situations (see section B.17.3).

B.8.5 The \texttt{ifthen} Package

The \texttt{ifthen} package is partially supported. The one unsupported construct is the \texttt{\lengthtest} test expression, which is undefined.

As a consequence, \texttt{\HVeA} accepts the following example from the \LaTeX{} manual:

\begin{verbatim}
\newcounter{ca}\newcounter{cb}\%
\newcommand{\printgcd}[2]{\%
  \setcounter{ca}{#1}\setcounter{cb}{#2}\%
  \whiledo{\not(\value{ca}= \value{cb})}{\%
    {\iftnenelse{\value{ca}>\value{cb}}}{\addtocounter{ca}{-\value{cb}}}{\addtocounter{cb}{-\value{ca}}}%
    gcd(\arabic{ca}, \arabic{cb}) = \%
  }\arabic{ca}.}\%
\end{verbatim}

For example: \texttt{\printgcd{54}{30}}

For example: \emph{Gcd(54,30) = gcd(24, 30) = gcd(24, 6) = gcd(18, 6) = gcd(12, 6) = gcd(6, 6) = 6}.

Additionally, a few boolean registers are defined by \texttt{\HVeA}. Some of them are of interest to users.

\begin{description}
  \item[hevea] Initial value is \texttt{true}. The \texttt{hevea.sty} file also defines this register with initial value \texttt{false}.
  \item[mmode] This register value reflects \texttt{\HVeA} operating mode, it is \texttt{true} in math-mode and \texttt{false} otherwise.
  \item[display] This register value reflects \texttt{\HVeA} operating mode, it is \texttt{true} in display-mode and \texttt{false} otherwise.
  \item[footer] Initial value is \texttt{true}. When set false, \texttt{\HVeA} does not insert its footer “This document has been translated by \texttt{\HVeA}”.
\end{description}

Finally, note that \texttt{\HVeA} also recognised à la \LaTeX{} conditional macros (see section B.16.1.4). Such macros are fully compatible with the boolean registers of the \texttt{ifthen} package, as it is the case in \LaTeX{}.

B.9 Figures and Other Floating Bodies

Figures and tables are put where they appear in source, regardless of their placement arguments. They are outputted inside a \texttt{BLOCKQUOTE} element and they are separated from enclosing text by two horizontal rules.

Captions and cross referencing are handled. However captions are not moved at end of figures: instead, they appear where the \texttt{\caption} commands occur in source code. The \texttt{\suppressfloats} command does nothing and the figure related counters (such as \texttt{topnumber}) exist but are useless.

\begin{verbatim}
get marginal notes in the left margin, use \texttt{\reversemarginpar}.
\end{verbatim}
Marginal notes are handled in a \TeX specific way. By default, all notes go in the right margin. Issuing \texttt{\reversemarginpar} causes the notes to go in the left margin. Unsurprisingly, issuing \texttt{\normalmarginpar} reverts to default behaviour.

The \texttt{\marginpar} command has an optional argument.

\begin{verbatim}
\marginpar\{left\_text\}\{right\_text\}
\end{verbatim}

If optional argument \texttt{left\_text} is present and that notes go in the left margin, then \texttt{left\_text} is the text of the note. Otherwise, \texttt{right\_text} is the text of the note. As a conclusion, marginal notes in \TeX always go to a fixed side of the page, which side being controlled by the commands \texttt{\normalmarginpar} (right side) and \texttt{\reversemarginpar} (left side). This departs from \LaTeX that selects a default side depending on the parity of the page counter.

Marginal notes are styled by the means of two environment style classes (see Section 9.3) : \texttt{marginpar} and \texttt{marginparside}. The latter \texttt{marginparside} takes care of margins and placement as a float, its value is \texttt{marginparright} for notes in the right margin and \texttt{marginparleft} for notes in the left margin. Users are not expected to alter those. The \texttt{marginpar} environment style class governs the general aspect of all marginal notes. Users can control the aspect of all marginal notes by defining a new style class and assigning the \texttt{marginpar} environment style class. For instance, to get all marginal notes in red font, and taking 10\% of the page width (in place of the default 20\%), one can issue the following commands in the document preamble.

\begin{verbatim}
\newstyle{.mynote}{width:10\%; color:red;}
\setenvclass{marginpar}{mynote}
\end{verbatim}

B.10  Lining It Up in Columns

B.10.1  The \texttt{tabbing} Environment

Limited support is offered. The \texttt{tabbing} environment translate to a flexible \texttt{tabular}-like environment. Inside this environment, the command \texttt{\kill} ends a row, while commands \texttt{\=} and \texttt{\>} start a new column. All other tabbing commands do not even exist.

B.10.2  The \texttt{array} and \texttt{tabular} environments

These environments are supported, using \texttt{HTML} \texttt{table} element, rendering is satisfactory in most (not too complicated) cases. By contrast with \LaTeX, some of the array items always are typeset in display mode. Whether an array item is typeset in display mode or not depends upon its column specification, the \texttt{l}, \texttt{c} and \texttt{r} specifications open display mode while the remaining \texttt{p} and \texttt{@} do not. The \texttt{l}, \texttt{c}, \texttt{r} and \texttt{@} specifications disable word wrap, while the \texttt{p} specification enables it.

Entries in a column whose specification is \texttt{l} (resp. \texttt{c} or \texttt{r}) get left-aligned (resp. centered or right-aligned) in the horizontal direction. They will get top-aligned in the vertical direction if there are other column specifications in the same array that specify vertical alignment constraints (such as \texttt{p\{wd\}}, see below). Otherwise, vertical alignment is unspecified.

Entries in a column whose specification is \texttt{p\{wd\}} get left-aligned in the horizontal direction and top-aligned in the vertical direction and a paragraph break reduces to one line break inside them. This is the only occasion where \TeX makes a distinction between LR-mode and paragraph mode. Also observe that the length argument \texttt{wd} to the \texttt{p} specification is ignored.

Some \LaTeX array features are not supported at all:

- Optional arguments to \texttt{\begin{array}} and \texttt{\begin{tabular}} are ignored.
- The command \texttt{\vline} does not exists.

Some others are partly rendered:
• Spacing between columns is different.
• © formatting specifications in \multicolumn argument are ignored.
• If a | appears somewhere in the column formatting specification, then the array is shown with borders.
• The command \hline does nothing if the array has borders (see above). Otherwise, an horizontal rule is outputted.
• The command \cline ignores its argument and is equivalent to \hline.
• Similarly the command \extracolsep issues a warning and ignores its argument.

Additionally, the tabular* environment is recognised and gets rendered as an HTML table with an advisory width attribute.

By default, HEVEA implements the array package (see [\LaTeX-bis, Section 5.3] and section B.17.2 in this document), which significantly extends the array and tabular environments.

### B.11 Moving Information Around

#### B.11.1 Files

In some situations, HEVEA uses some of the ancillary files generated by \LaTeX. More precisely, while processing file doc.tex, the following files may be read:

- .aux The file doc.aux contains cross-referencing information, such as figure or section numbers. If this file is present, HEVEA reads it and put such numbers (or labels) inside the links generated by the \ref command. If the .aux file is not present, or if the hevea command is given the -fix option, HEVEA will instead use .haux files.

- .haux Such files are HEVEA equivalents of .aux files. Indeed, they are .aux files tailored to HEVEA needs. Two runs of HEVEA might be needed to get cross references right.

- .htoc This file contains a formatted table of contents. It is produced while reading the .haux file. As consequence a table of contents is available only when the .haux file is read.

- .hbbl The doc.hbbl file is generated by bibhva from doc.haux. When present, it is read by the \bibliography command.

- .bb1 The doc.bbl file is generated by Bib\TeX from doc.aux. When present, and if no doc.hbbl exists, doc.bbl is read by the \bibliography command.

- .hidx and .hind HEVEA computes its own indexes, using .hidx files for storing index references and, using .hind files for storing formatted indexes. Index formatting significantly departs from the one of \LaTeX. Again, several runs of HEVEA might be needed to get indexes right.

HEVEA does not fail when it cannot find an auxiliary file. When another run of HEVEA is needed, a warning is issued, and it is user’s responsibility to rerun HEVEA. However, the convenient -fix command-line option instructs HEVEA to rerun itself, until it believes it has reached stable state.
B.11.2 Cross-References

The \LaTeX commands \texttt{\label} and \texttt{\ref} are changed by \TeX into HTML anchors and local links, using the "a" element. Additionally, numerical references to sectional units, figures, tables, etc. are shown, as they would appear in the .dvi file. Numerical references to pages (such as generated by \texttt{\pageref}) are not shown; only an link is generated.

The anchor used is the \texttt{label} argument to \texttt{\label{label}}. More precisely, \texttt{\label{label}} translates to \texttt{<a id="label"></a>}; while \texttt{\ref{label}} translates to \texttt{<a name="#label">nnn</a>}, where \texttt{nnn} is the appropriate numerical reference to a section. As a consequence spaces are better avoided in \texttt{label}.

Starting with \TeX version 2.04, the HTML anchors used by \texttt{\label} and \texttt{\ref} cannot differ from the arguments to these commands anymore. Moreover, when \texttt{\label{label}} occurs inside the argument of a sectioning command \textit{i.e.} in section title, as recommended by section B.4.1, then \TeX and \LaTeX will use \texttt{label} as the "id" attribute of the corresponding section. For instance, the \TeX source of this very section is:

\subsection{Cross-References\label{cross-reference}}

It translates to HTML similar to

\begin{verbatim}
<h3 class="subsection" id="cross-reference">B.11.2 Cross-References</h3>
\end{verbatim}

Notice that no \texttt{<a id="cross-reference"></a>} appears above. Instead \texttt{id="cross-reference"} appears in the enclosing h3 header element.

While processing a document \texttt{doc.tex}, cross-referencing information can be computed in two different, mutually exclusive, ways, depending on whether \LaTeX has been previously run or not:

- If there exists a file \texttt{doc.aux} and that \texttt{hevea} has not been given the command-line option \texttt{-fix}, then cross-referencing information is extracted from that file. Of course, the \texttt{doc.aux} file has to be up-to-date, that is, it should be generated by running \LaTeX as many times as necessary. (For \TeX needs, one run is probably sufficient).

- If no \texttt{doc.aux} file exists or if \texttt{hevea} has been given the \texttt{-fix} command-line option, then \TeX expect to find cross-referencing information in the file \texttt{doc.haux}.

The second option is recommended.

When using its own \texttt{doc.haux} file, \TeX will output a new \texttt{doc.haux} file at the end of its processing. This new \texttt{doc.haux} file contains actualised cross referencing information. Hence, in that case, \TeX may need to run twice to get cross-references right. Note that, just like \LaTeX, \TeX issues a warning then the cross-referencing information it generates differs from what it has read at start-up, and that it does not fail if \texttt{doc.haux} does not exist.

Observe that if a non-correct \texttt{doc.aux} file is present, then cross-references will apparently be wrong. However the links are correct.

B.11.3 Bibliography and Citations

The \texttt{\cite} macro is supported. Its optional argument is correctly handled. Citation labels are extracted from the .aux file if present, from the .haux file otherwise. Note that these labels are put there by \LaTeX in the first case, and by \TeX in the second case, when they process the \texttt{\bibitem} command.

Using \texttt{Bib}\TeX

All \texttt{Bib}\TeX related commands exist and echo the appropriate information into the .haux file.

In particular, the \texttt{\bibliography} command exists and attempts to load the formatted bibliography, \textit{i.e.} to load the .hbbl file. The .hbbl file is produced from the .haux file by the companion program \texttt{bibhva} (see C.1.4). To include the bibliographic references extracted from .bib databases, it should normally suffice to do:

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In case no .hbbl file exists, the \bibliography command attempts to load the .bbl file normally used while combining \LaTeX{} and \BibTeX{}. Thus, another way to extract bibliographic references from .bib databases is:

```
# latex doc.tex
# bibtex doc
# hevea doc.tex
```

In case both files exist, notice that loading the .hbbl file has priority over loading the .bbl file.

### B.11.4 Splitting the Input

The \input{} and \include{} commands exist and they perform exactly the same operation of searching (and then processing) a file, whose name is given as an argument. See section C.1.1.1 on how HEVEA searches files. However, in the case of the \include{} command, the file is searched only when previously given as an argument to the \includeonly{} command.

Note the following features:

- \TeX{} syntax for \input{} is not supported. That is, one should write \input{filename}.
  
- If \texttt{filename} is excluded with the -e command-line option (see section C.1.1.4), then HEVEA does not attempt to load \texttt{filename}. Instead, it echoes \texttt{\input{filename}} and \texttt{\include{filename}} commands into the image file. This sounds complicated, but this is what you want!

- HEVEA does not fail when it cannot find a file, it just issues a warning.

The \texttt{\listfiles} command is a null command.

### B.11.5 Index and Glossary

Glossaries are not handled (who uses them?).

While processing a document \texttt{doc.tex}, index entries go into the file \texttt{doc.hidx}, while the formatted index gets written into the file \texttt{doc.hind}. As with \LaTeX{}, two runs of HEVEA are normally needed to format the index. However, if all index producing commands (normally \texttt{\index}) occur before the index formatting command (normally \texttt{\printindex}), then only one run is needed.

As in \LaTeX{}, index processing is not enabled by default and some package has to be loaded explicitly in the document preamble. To that aim, HEVEA provides the standard package \texttt{makeidx}, and two extended packages that allow the production of several indexes (see section B.17.7).

Formatting of indexes in HEVEA departs from \LaTeX{} behaviour. More precisely the \texttt{theindex} environment does not exist. Instead, indexes are formatted using special \texttt{indexenv} environments. Those details do not normally concern users. However, the number of columns in the presentation of the index can be controlled by setting the value of the \texttt{indexcols} counter (default value is two).

### B.11.6 Terminal Input and Output

The \texttt{\typeout} command echos its argument on the terminal, macro parameter \#i are replaced by their values. The \texttt{\typein} command is not supported.
B.12  Line and Page Breaking

B.12.1  Line Breaking

The advisory line breaking command \linebreak will produce a line break if it has no argument or if its optional argument is 4. The \nolinesbreak command is a null command.

The \ and \* commands output a \texttt{<BR>} tag, except inside arrays where the close the current row. Their optional argument is ignored. The \newline command outputs a \texttt{<BR>} tag.

All other line breaking commands, declarations or environments are silently ignored.

B.12.2  Page Breaking

They are no pages in the physical sense in HTML. Thus, all these commands are ignored.

B.13  Lengths, Spaces and Boxes

B.13.1  Length

All length commands are ignored, things go smoothly when \LaTeX{} syntax is used (using the \newlength, \setlength, etc. commands, which are null macros). Of course, if lengths are really important to the document, rendering will be poor.

Note that \LaTeX{} length syntax is not at all recognised. As a consequence, writing things like \texttt{\textwidth=10cm} will clobber the output. Users can correct such misbehaviour by adopting \LaTeX{} syntax, here they should write \texttt{\setlength{\textwidth}{10cm}}.

B.13.2  Space

The \hspace, \vspace and \addvspace spacing commands and their starred versions recognise positive explicit length arguments. Such arguments get converted to a number of non-breaking spaces or line breaks. Basically, the value of \texttt{1em} or \texttt{1ex} is one space or one line-break. For other length units, a simple conversion based upon a \texttt{10pt} font is used.

\HeVe\ cannot interpret more complicated length arguments or perform negative spacing. In these situations, a warning is issued and no output is done.

Spacing commands without arguments are recognised. The \enspace, \quad and \qquad commands output one, two and four non-breaking spaces, while the \smallskip, \medskip and \bigskip output one, one, and two line breaks.

Stretchable lengths do not exist, thus the \hfill and \vfill macros are undefined.

B.13.3  Boxes

Box contents is typeset in text mode (i.e. non-math and non-display mode). Both \LaTeX{} boxing commands \texttt{\mbox} and \texttt{\makebox} commands exist. However \makebox generates a specific warning, since \HeVe\ ignore the length and positioning instructions given as optional argument.

Similarly, the boxing with frame \texttt{\fbox} and \texttt{\framebox} commands are recognised and issues a warning. When in display mode, \fbox frames its argument by enclosing it in a table with borders. Otherwise, \fbox calls the \texttt{\textfbox} command, which issues a warning and typesets its argument inside a \mbox (and thus no frame is drawn). Users can alter the behaviour of \fbox in non-display mode by redefining \texttt{\textfbox}.

Boxes can be saved for latter usage by storing them in \texttt{bins}. New bins are defined by \texttt{\newsavebox\{cmd\}}. Then some text can be saved into \texttt{cmd} by \texttt{\sbox\{cmd\}\{text\}} or \texttt{\begin\{lrbox\}\{cmd\} text \end\{lrbox\}}. The text is translated to HTML, as if it was inside a \mbox and the resulting output is stored. It is retrieved
(and outputted) by the command \usebox{cmd}. The \savebox command reduces to \sbox, ignoring its optional arguments.

The \rule commands translate to a HTML horizontal rule (<HR>) regardless of its arguments.

All other box-related commands do not exist.

**B.14 Pictures and Colours**

**B.14.1 The picture environment and the graphics Package**

It is possible to have pictures and graphics processed by imagen (see section 6.1). In the case of the picture environment it remains the users responsibility to explicitly choose source chunks that will get rendered as images. In the case of the commands from the graphics package, this choice is made by HEVEA.

For instance consider the following picture:

```latex
\newcounter{cms}
\setlength{\unitlength}{1mm}
\begin{picture}(50,10)
  \put(0,7){\makebox(0,0)[b]{cm}}
  \multiput(10,7)(10,0){5}{\addtocounter{cms}{1}\makebox(0,0)[b]{\arabic{cms}}}
  \multiput(1,0)(1,0){49}{\line(0,1){2.5}}
  \multiput(5,0)(10,0){5}{\line(0,1){5}}
  \thicklines
  \put(0,0){\line(1,0){50}}
  \multiput(0,0)(10,0){6}{\line(0,1){5}}
\end{picture}
```

Users should enclose all picture elements in a toimage environment (or inside %BEGIN IMAGE... %END IMAGE comments) and insert an \imageflush command, where they want the image to appear in HTML output:

```latex
%BEGIN IMAGE
\newcounter{cms}
\setlength{\unitlength}{1mm}
\begin{picture}(50,10)
  ...
\end{picture}
%END IMAGE
%HEVEA\imageflush
```

This will result in normal processing by \LaTeX and image inclusion by HEVEA:

```
\begin{center}
\scalebox{.5}{\includegraphics{round.ps}}
\scalebox{.75}{\includegraphics{round.ps}}
\includegraphics{round.ps}
\end{center}
```

All commands from the graphics package are implemented using the automatic image inclusion feature. More precisely, the outermost invocations of the \includegraphics, \scalebox, etc. commands are sent to the image image file and there will be one image per outermost invocation of these commands.

For instance, consider a document doc.tex that loads the graphics package and that includes some (scaled) images by:

```latex
\begin{center}
\scalebox{0.5}{\includegraphics{round.ps}}
\scalebox{0.75}{\includegraphics{round.ps}}
\includegraphics{round.ps}
\end{center}
```
Then, issuing the following two commands:

```
# hevea doc.tex
# imagen doc
```

yields HTML that basically consists in three image links, the images being generated by `imagen`. Since the advent of `pdflatex`, using `\includegraphics` to insert bitmap images (e.g., `.gif` or `.jpg`) became frequent. In that case, users are advised not to use IEEEa default implementation of the `graphics` package. Instead, they may use a simple variation of the technique described in Section 8.2.

**B.14.2 The color Package**

IEEEa partly implements the `color` package. Implemented commands are `\definecolor`, `\color`, `\colorbox`, `\textcolor`, `\colorbox` and `\fcolorbox`. Other commands do not exist. At startup, colours `black`, `white`, `red`, `green`, `blue`, `cyan`, `yellow` and `magenta` are pre-defined.

Colours are defined by `\definecolor{name}{model}{spec}`, where `name` is the color name, `model` is the color model used, and `spec` is the color specification according to the given model. Defined colours are used by the declaration `\color{name}` and by the command `\textcolor{name}{text}`, which change text color. Please note that, the `\color` declaration accepts color specifications directly when invoked as `\color[\textwidth]{spec}`. The `\textcolor` command has a similar feature.

As regards color models, IEEEa implements the `rgb`, `cmyk`, `hsv` and `hls` color models. In those models, color specifications are floating point numbers less than one. For instance, here is the definition for the red color:

```latex
\definecolor{red}{rgb}{1, 0, 0}
```

The named color model is also supported, in this model color specification are just names... Named colours are the ones of dvips.

GreenYellow, Yellow, Goldenrod, Dandelion, Apricot, Peach, Melon, YellowOrange, Orange, BurntOrange, Bittersweet, RedOrange, Mahogany, Maroon, BrickRed, Red, OrangeRed, RubineRed, WildStrawberry, Salmon, CarnationPink, Magenta, VioletRed, Rhodamine, Mulberry, RedViolet, Fuchsia, Lavender, Thistle, Orchid, DarkOrchid, Purple, Plum, Violet, RoyalPurple, BlueViolet, Periwinkle, CadetBlue, CornflowerBlue, MidnightBlue, NavyBlue, RoyalBlue, Blue, Cerulean, Cyan, ProcessBlue, SkyBlue, Turquoise, TealBlue, Aquamarine, BlueGreen, Emerald, JungleGreen, SeaGreen, Green, ForestGreen, PineGreen, LimeGreen, YellowGreen, SpringGreen, OliveGreen, RawSienna, Sepia, Brown, Tan, Gray, Black, White.

There are at least three ways to use colours from the named model.

1. Define a color name for them.
2. Specify the named color model as an optional argument to `\color` and `\textcolor`.
3. Use the names directly (IEEEa implements the `color` package with the `usenames` option given).

That is:

1. `\definecolor{rouge-brique}{named}{BrickRed}\textcolor{rouge-brique}{Text as a brick}`.
2. `\textcolor[named]{BrickRed}{Text as another brick}`.
3. `\textcolor{BrickRed}{Text as another brick}`.

IEEEa also implements the `\colorbox` and `\fcolorbox` commands.

`\colorbox{red}{Red background}`, `\fcolorbox{magenta}{red}{Red background, magenta border}`.
Those two commands accept an optional first argument that specifies the color model, as \textcolor does:
\fcolorbox[named]{RedOrange}{Apricot}{Apricot background, RedOrange border}.

Colours should be used carefully. Too many colours hinders clarity and some of the colours may not be readable on the document background color.

B.14.2.1 The bgcolor environment

With respect to the \LaTeX{} color package, HEVEA features an additional bgcolor environment, for changing the background color of some subparts of the document. The bgcolor environment is a displayed environment and it normally starts a new line. Simple usage is \begin{bgcolor}{color}... \end{bgcolor}, where color is a color defined with \definecolor. Hence the following source yield a paragraph with a red background:

\begin{bgcolor}{red}
\color{yellow}Yellow letters on a red background
\end{bgcolor}

The bgcolor environment is implemented by one-cell \texttt{table} element, it takes an optional argument that is used as an attribute for the inner \texttt{td} element (default value is \texttt{style="padding:1em"}). Advanced users may change the default, for instance as:

\begin{bgcolor}[style="padding:0"]{yellow}
\color{red}Red letters on a yellow background
\end{bgcolor}

The resulting output will be red letters on a yellow background and no padding:

B.14.2.2 From High-Level Colours to Low-Level Colours

High-level colours are color names defined with \definecolor. Low-level colours are \texttt{HTML}-style colours. That is, they are either one of the sixteen conventional colours black, silver etc., or a RGB hexadecimal color specification of the form ","#XXXXXX".

One changes the high-level high-color into a low-level color by \@getcolor{high-color}. Low-level colours are appropriate inside \texttt{html} attributes and as arguments to the \@fontcolor internal macro. An example of \@getcolor usage can be found at the end of section 8.5.

There is also \@getstylecolor command that acts like\@getcolor, except that it does not output the double quotes around RGB hexadecimal color specifications. Such low-level colours are appropriate for style definitions in cascading style sheets [CSS-2]. See Section 9.3 for an example.

B.15 Font Selection

B.15.1 Changing the Type Style

All \LaTeX{} declarations and environments for changing type style are recognised. Aspect is rather like \LaTeX{} output, but there is no guarantee.

As \texttt{HTML} does not provide the same variety of type styles as \LaTeX{} does. However \texttt{CSS} provide a wide variety of font properties. HEVEA uses generic properties, proper rendering will then depend upon user agent. For instance, it belongs to the user agent to make a difference between italics (rendered by the font style "italic") and slanted (rendered by the font style "oblique").

Here is how HEVEA implements text-style declarations by default:
Text-style commands also exist; they are defined as \texttt{\{decl\}}. For instance, \texttt{tt} is defined as a command with one argument whose body is \texttt{\ttfamily#1}. Finally, the \emph{\texttt{emph}} command for emphasised text also exists; it yields text-level elements.

As in \LaTeX, type styles consists in three components: \emph{shape}, \emph{series} and \emph{family}. \HeVeA implements the three components by making one declaration to cancel the effect of other declarations of the same kind.

Old style declarations are also recognised, they translate to text-level elements. However, no elements are cancelled when using old style declaration. Thus, the source \texttt{\{\sl \sc slanted and small caps\}} yields “slanted” small caps. Users need probably not worry about this. However, this has an important practical consequence: to change the default rendering of type styles, one should redefine old style declaration in order to benefit from the cancellation mechanism. See section 10.2 for a more thorough description.

### B.15.2 Changing the Type Size

All declarations, from \texttt{\tiny} to \texttt{\Huge} are recognised. Output is not satisfactory inside headers elements generated by sectioning commands.

### B.15.3 Special Symbols

The \texttt{\symbol{}{num}} outputs character number \emph{num} (decimal) from the Unicode character set. This departs from \LaTeX, which outputs symbol number \emph{num} in the current font.

### B.16 Extra Features

This section describes \HeVeA functionalities that extends on plain \LaTeX, as defined in [\LaTeX]. Most of the features described here are performed by default.

#### B.16.1 \TeX macros

Normally, \HeVeA does not recognise constructs that are specific to \TeX. However, some of the internal commands of \HeVeA are homonymous to \TeX macros, in order to enhance compatibility. Note that full compatibility with \TeX is not guaranteed.

##### B.16.1.1 À la \TeX macros definitions

The \texttt{\{def\}} construct for defining commands is supported. It is important to notice that \HeVeA semantics for \texttt{\{def\}} follows \TeX semantics. That is, defining a command that already exists with \texttt{\{def\}} succeeds.

Delimiting characters in command definition are somehow supported. Consider the following example from the \TeX Book:

\begin{verbatim}
\def\Look{\textsc{Look}}
\def\x{\textsc{x}}
\def\cs AB#1#2C$#3$ {#3{ab#1}#1 c\x #2}
c AB \{\Look\}C$\{And $\}\{look\}$$ 5.
\end{verbatim}

It yields: \texttt{And \{look\}ab\Look\Look\Look c5}.

Please note that delimiting characters are supported as far as I could, problems are likely with delimiting characters which include spaces or command names, in particular the command name \texttt{\{.} One can include \texttt{\{.} in a command argument by using the grouping characters \texttt{\{\{.}:

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he said "Alors cette accolade ouvrante \{''\} ?" (in French).

Another issue regards comments: "\%" in arguments may give undefined behaviours, while comments are better avoided while defining macros. As an example, the following code will not be handled properly by \Hevea:

\def\x\% #1{y}
\def\othercs#1{\cs#1A}
\othercs{coucouA}

\LaTeX output is "coucouA", while \Hevea output is "coucouA". Here is \LaTeX output: "coucouA" Please note that in most situations this discrepancy will make \Hevea crash.

B.16.1.2 The $\texttt{\let}$ construct

\Hevea also processes a limited version of $\texttt{\let}$:

\let macro-name1 = macro-name2

The effect is to bind $\texttt{macro-name1}$ to whatever $\texttt{macro-name2}$ is bound to at the time $\texttt{\let}$ is processed. This construct may prove very useful in situations where one wishes to slightly modify basic commands. See sections 10.3 and B.2 for examples of using $\texttt{\let}$ in such a situation.

B.16.1.3 The $\texttt{\global}$ construct

It is possible to escape scope and to make global definitions and bindings by using the $\texttt{\TeX}$ construct $\texttt{\global}$. The $\texttt{\global}$ construct is significant before $\texttt{\def}$ and $\texttt{\let}$ constructs.

Also note that $\texttt{\gdef}$ is equivalent to $\texttt{\global\def}$.

B.16.1.4 $\texttt{\TeX}$ Conditional Macros

The $\texttt{\newif\ifname}$, where $\texttt{name}$ is made of letters only, creates three macros: $\texttt{\ifname}$, $\texttt{name\true}$ and $\texttt{name\false}$. The latter two set the $\texttt{name}$ condition to $\texttt{true}$ and $\texttt{false}$, respectively. The $\texttt{\ifname}$ command tests the condition $\texttt{name}$:

\ifname
  text1
\else
  text2
\fi

Text $\texttt{text1}$ is processed when $\texttt{name}$ is $\texttt{true}$, otherwise $\texttt{text2}$ is processed. If $\texttt{text2}$ is empty, then the $\texttt{\else}$ keyword can be omitted.

Note that $\texttt{\Hevea}$ also implements $\texttt{\LaTeX}$ $\texttt{ifthen}$ package and that $\texttt{\TeX}$ simple conditional macros are fully compatible with $\texttt{\LaTeX}$ boolean registers. More precisely, we have the following correspondences:
\begin{center}
\begin{tabular}{|c|c|}
\hline
L\TeX{} & \newif{} \\
\hline
\name{}true & \setboolean{}{true} \\
\name{}false & \setboolean{}{false} \\
\name{}{text}_1\texttt{else} text_2\texttt{fi} & \ifthenelse{}{boolean}{text_1}{text_2} \\
\hline
\end{tabular}
\end{center}

B.16.1.5 Other \TeX{} Macros

\LaTeX{} implements the macros \unskip{} and \endinput{}. It also supports the \csname{}... \endcsname{} construct.

B.16.2 Command Definition inside Command Definition

If one strictly follows the L\TeX{} manual, only commands with no arguments can be defined inside other commands. Parameters (i.e. \#n) occurring inside command bodies refer to the outer definition, even when they appear in nested command definitions. That is, the following source:

\begin{verbatim}
\newcommand{\outercom}[1]{\newcommand{\insidecom}{#1}\insidecom}
\outercom{outer}
\end{verbatim}

yields this output:

\begin{verbatim}
outer
\end{verbatim}

Nevertheless, nested commands with arguments are allowed. Standard parameters \#n still refer to the outer definition, while nested parameters \##n refer to the inner definition. That is, the source:

\begin{verbatim}
\newcommand{\outercom}[1]{\newcommand{\insidecom}[1]{\##1}\insidecom{inner}}
\outercom{outer}
\end{verbatim}

yields this output:

\begin{verbatim}
inner
\end{verbatim}

B.16.3 Date and time

Date and time support is not enabled by default, for portability and simplicity reasons.

However, \LaTeX{} source distribution includes a simple (sh) shell script \texttt{xxdate.exe} that activates date and time support. The \texttt{hevea} command, should be invoked as:

\begin{verbatim}
# hevea -exec xxdate.exe ... 
\end{verbatim}

This will execute the script \texttt{xxdate.exe}, whose output is then read by \LaTeX{}. As a consequence, standard L\TeX{} counters \texttt{year}, \texttt{month}, \texttt{day} and \texttt{time} are defined and L\TeX{} command \texttt{\today} works properly. Additionally the following counters and commands are defined:

\begin{center}
\begin{tabular}{|l|l|}
\hline
\texttt{Counter} & \texttt{Command} \\
\hline
weekday & \texttt{\today} \\
Hour & \texttt{\ampm} \\
hour & \texttt{\timezone} \\
minute & \texttt{\heveadate} \\
second & \texttt{Output of the \today\ Unix command} \\
\hline
\end{tabular}
\end{center}

\begin{verbatim}
68
\end{verbatim}
Note that I chose to add an extra option (and not an extra \@exec primitive) for security reasons. You certainly do not want to enable \Hevea to execute silently an arbitrary program without being conscious of that fact. Moreover, the \Hevea program does not execute xxdate.exe by default since it is difficult to write such a script in a portable manner.

Windows users should enjoy the same features with the version of xxdate.exe included in the Win32 distribution.

B.16.4 Fancy sectioning commands

Loading the fancysection.hva file will radically change the style of sectional units headers: they appear over a green background, the background color saturation decreases as the sectioning commands themselves do. Additionally, the document background color is white.

Note: Fancy section has been re-implemented using style-sheets. While it respects the old behaviour, users are encouraged to try out style-sheets for more flexibility. See Section 9 for details.

The fancysection.hva file is intended to be loaded after the document base style. Hence the easiest way to load the fancysection.hva file is by issuing \usepackage{fancysection} in the document preamble. To allow processing by \LaTeXe, one may for instance create an empty fancysection.sty file.

As an alternative, to use fancy section style in doc.tex whose base style is article you should issue the command:

```
# hevea article.hva fancysection.hva doc.tex
```

You can also make a doc.hva file that contains the two lines:

```
\input{article.hva}
\input{fancysection.hva}
```

And then launch hevea as:

```
# hevea doc.hva doc.tex
```

Sectioning command background colours can be changed by redefining the corresponding colours (part, chapter, section,...). For instance, you get various mixes of red and orange by:

```
\definecolor{part}{named}{BrickRed}
\definecolor{section}{named}{RedOrange}
\definecolor{subsection}{named}{BurntOrange}
```

(See section B.14.2 for details on the named color model that is used above.)

Another choice is issuing the command \colorsections{hue}, where hue is a hue value to be interpreted in the HSV model. For instance,

```
\definecolor{part}{named}{BrickRed}
\definecolor{section}{named}{RedOrange}
\definecolor{subsection}{named}{BurntOrange}
```

(See section B.14.2 for details on the named color model that is used above.)

Another choice is issuing the command \colorsections{hue}, where hue is a hue value to be interpreted in the HSV model. For instance,

```
\definecolor{part}{named}{BrickRed}
\definecolor{section}{named}{RedOrange}
\definecolor{subsection}{named}{BurntOrange}
```

(See section B.14.2 for details on the named color model that is used above.)

Another choice is issuing the command \colorsections{hue}, where hue is a hue value to be interpreted in the HSV model. For instance,

```
\definecolor{part}{named}{BrickRed}
\definecolor{section}{named}{RedOrange}
\definecolor{subsection}{named}{BurntOrange}
```

(See section B.14.2 for details on the named color model that is used above.)

Another choice is issuing the command \colorsections{hue}, where hue is a hue value to be interpreted in the HSV model. For instance,
B.16.5 Targeting Windows

At the time of this release, Windows support for symbols through Unicode is not as complete as the one of Linux, which I am using for testing HEVEA.

One of the most salient shortcomings is the inability to display sub-elements for big brackets, braces and parenthesis, which HEVEA normally outputs when it processes \left[, \right]\) etc.

We (hopefully) expect Windows fonts to display more of Unicode easily in a foreseeable future. As a temporary fix, we provide a style file \texttt{winfonts.hva}. Authors concerned by producing pages that do not look too ugly when viewed through Windows browsers are thus advised to load the file \texttt{winfonts.hva}. For instance they can invoke HEVEA as:

```
# hevea winfonts.hva ...
```

At the moment, loading \texttt{winfonts.hva} only changes the rendering of \LaTeX\ big delimiters, avoiding the troublesome Unicode entities.

More generally, it remains authors responsibility to be careful not to issue too refined Unicode entities. To that aim, authors that target a wide audience should first limit themselves to the most common symbols (\textit{e.g.} use \texttt{\leq} \textit{≤} in place of \texttt{\preceq} \textit{⪯}) and, above all, they should control the rendering of their documents using several browsers.

B.16.6 MathJax support

MathJax support is enabled by loading the \texttt{mathjax} package. Two operating mode modes are provided: explicit and automatic. Notice that HEVEA distribution includes a innocuous \texttt{mathjax.sty} for \LaTeX\ compatibility — see also Sec. C.4.2.

B.16.6.1 Explicit mode

Explicit mode is enabled when \texttt{\usepackage{mathjax}} appears in the document preamble, or when HEVEA is invoked as “\texttt{hevea mathjax.hva}...”.

Basic consists in one environment \texttt{displayjax} and one command \texttt{\textjax}. The environment is appropriate for displayed maths. As an example, the following source

\begin{verbatim}
A displayed formula:
\begin{displayjax}
\frac{\pi}{4} = \left[1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \cdots + \frac{(-1)^n}{2n+1} + \cdots \right]
\end{displayjax}
\end{verbatim}

is displayed as follows: A displayed formula:

\[
\frac{\pi}{4} = \left[1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \cdots + \frac{(-1)^n}{2n+1} + \cdots \right]
\]

The \texttt{\textjax} command is appropriate for inline mathematical contents. For instance, the following source

\begin{verbatim}
"A nice inline formula:
\texttt{\textjax{\frac{\pi}{4} = \left[1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \cdots + \frac{(-1)^n}{2n+1} + \cdots \right].}"
\end{verbatim}

is typeset as: “A nice inline formula: \[
\frac{\pi}{4} = \left[1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \cdots + \frac{(-1)^n}{2n+1} + \cdots \right]."

Advanced support consists in the \texttt{mathjax} environment. Source code enclosed in \texttt{\begin{mathjax}\ldots\end{mathjax}} will be reproduced into output for the MathJax script to handle it. However, HEVEA does not start any other action. Thanks to this feature, users can have any (recognised by MathJax) displayed math environment processed by MathJax. For instance, the following source

\begin{verbatim}
\begin{mathjax}
A displayed formula:
\begin{displaymath}
\frac{\pi}{4} = \left[1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \cdots + \frac{(-1)^n}{2n+1} + \cdots \right]
\end{displaymath}
\end{mathjax}
\end{verbatim}

is displayed as follows: A displayed formula:

\[
\frac{\pi}{4} = \left[1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \cdots + \frac{(-1)^n}{2n+1} + \cdots \right]
\]
Finally, notice that a document that uses the explicit MathJax constructs can be processed by \LaTeX, provided it loads the \texttt{mathjax.sty} file present in \TeX{}\texttt{\LaTeX e} distribution. This can be done simply by having the line \texttt{\usepackage{mathjax}} in the document preamble. Then, \TeX{}\texttt{\LaTeX e} and \TeX{}\texttt{\LaTeX} will react appropriately (see sections 2.3.2 and B.5.2).

\subsection*{B.16.6.2 Automatic mode}

Automatic mode is enabled when \texttt{\usepackage[auto]{mathjax}} appears in the document preamble, or when \TeX{}\texttt{\LaTeX e} is invoked as “\texttt{hevea mathjaxauto.hva}...”. In automatic mode, \TeX{}\texttt{\LaTeX e} will pass all mathematical text to MathJax. This mode seems by far the most practical, but beware:

\begin{enumerate}
\item There is no communication back from MathJax to \TeX{}\texttt{\LaTeX e}. As result, equation numbers, as generated for instance by the \texttt{equation} environment, will not find their way to the final display.
\item Some constructs, such as \texttt{\mbox}, are not handled by MathJax.
\end{enumerate}

\subsection*{B.16.6.3 Customising the MathJax script}

By default \TeX{}\texttt{\LaTeX e} insert a reference to the “default” MathJax script with “default” configuration parameters. Advanced users can change this setting by redefining the \texttt{\jax@meta} command, which must contain the appropriate \texttt{<script>} element. See the file \texttt{html/mathjax.hva} for details.

\section*{B.17 Implemented Packages}

\TeX{}\texttt{\LaTeX e} distribution includes .\texttt{hva} packages that are implementations of \TeX{}\texttt{\LaTeX e} packages. Packages described in the “\textit{Blue Book}” (\texttt{makeidx}, \texttt{ifthen}, \texttt{graphics} —and \texttt{graphicx}!—, \texttt{color}, \texttt{alltt}) are provided. Additionally, quite a few extra packages are provided. I provide no full documentation for these packages, users should refer to the first pages of the package documentation, which can usually be found in the book \texttt{\LaTeX e\-bis}, in your local \TeX{}\texttt{\LaTeX e} installation or in a TeX CTAN-archive.

At the moment, most package options are ignored, except for the babel package, where it is essential.

\subsection*{B.17.1 AMS compatibility}

\TeX{}\texttt{\LaTeX e} \texttt{amsmath} package defines some of the constructs of the \texttt{amsmath} package. At the moment, supported constructs are the \texttt{cases} environment and matrix environments \texttt{\LaTeX e\-bis}, Section 8.4], the environments for multi-line displayed equations (\texttt{gather}, \texttt{split}...) \texttt{\LaTeX e\-bis}, Section 8.5] and the \texttt{\numberwithin} command \texttt{\LaTeX e\-bis}, Section 8.6.2].

\TeX{}\texttt{\LaTeX e} provides support for the \texttt{amssymb} symbols using Unicode. I found Unicode equivalent for most symbols. However, a few symbols remain undefined (\textit{e.g.} \texttt{\varsubsetneqq}).

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Table 1: Column specifications from the array package

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>m{width}</code></td>
<td>Equivalent to the p column specification (the width argument is ignored, entries are typeset in paragraph mode with paragraph breaks being reduced to a single line break), except that the entries are centered vertically.</td>
</tr>
<tr>
<td><code>b{width}</code></td>
<td>Equivalent to the p column specification, except that the entries are bottom-aligned vertically.</td>
</tr>
<tr>
<td><code>{decl}</code></td>
<td>Can be used before l, c, r, p{...}, m{...} or b{...}. It inserts decl in front of the entries in the corresponding column.</td>
</tr>
<tr>
<td><code>{decl}</code></td>
<td>Can be used after l, c, r, p{...}, m{...} or b{...}. It inserts decl after entries in the corresponding column.</td>
</tr>
<tr>
<td><code>{decl}</code></td>
<td>Equivalent to @{decl}</td>
</tr>
</tbody>
</table>

B.17.2 The array and tabularx packages

The array package is described in [B\TeX-bis, Section 5.3] and in the local documentation of modern B\TeX installations. It is a compatible extension of B\TeX arrays (see B.10.2). Basically, it provides new column specifications and a \texttt{newcolumntype} construct for user-defined column specifications. Table 1 gives a summary of the new column specifications and of how HEVEA implements them.

Note that centered, top-aligned or bottom-aligned in the vertical direction, do not have exactly the same meaning in B\TeX and in HTML. However, the aspect is the same when all columns agree w.r.t. vertical alignment. Ordinary column types (c, 1 and r) do not specify vertical alignment, which therefore becomes browser dependent.

The `{decl}` and `<{decl}` constructs permit the encoding of \TeX\ \texttt{cases} macro as follows:

\begin{verbatim}
\def\cases#1{\left\{\begin{array}{l>{$}l<{$}}#1\end{array}\right.}
\end{verbatim}

(This is an excerpt of the \texttt{latexcommon.hva} file.)

New column specifications are defined by the \texttt{newcolumntype} construct:

\begin{verbatim}
\newcolumntype{col}[narg]{body}
\end{verbatim}

Where \texttt{col} is one letter, the optional \texttt{narg} is a number (defaults to 0), and \texttt{body} is built up with valid column specifications and macro-argument references (#int). Examples are:

\begin{verbatim}
\newcolumntype{C}>{\bf}c
\newcolumntype{E}[1]{*{#1}{c}}
\begin{tabular}{CE{3}}
\hline
one & two & three & four \\
five & six & seven & eight \\
\hline
\end{tabular}
\end{verbatim}

The column specification \texttt{C} means that entries will be typeset centered and using bold font, while the column specifications \texttt{E{num}} stands for \emph{num} centered columns. We get:

<table>
<thead>
<tr>
<th>one</th>
<th>two</th>
<th>three</th>
<th>four</th>
</tr>
</thead>
<tbody>
<tr>
<td>five</td>
<td>six</td>
<td>seven</td>
<td>eight</td>
</tr>
</tbody>
</table>

HEVEA implements column specifications with commands defined in the \texttt{newcommand} style. Thus, they have the same behaviour as regards double definition, which is not performed and induces a warning message. Thus, a column specification that is first defined in a \texttt{macro.hva} specific file, overrides the document definition.
The `tabularx` package [\LaTeX-bis, Section 5.3.5] provides a new tabular environment `tabularx` and a new column type `X`. HEVEA makes the former equivalent to `tabular` and the latter equivalent to `p\{ignored\}`. By contrast with the subtle array formatting that the `tabularx` package performs, this may seem a crude implementation. However, rendering is usually correct, although different.

More generally and from the HTML point of view such sophisticated formatting is browser job in the first place. However, the HTML definition allows suggested widths or heights for table entries and table themselves. From HEVEA point of view, drawing the border line between what can be specified and what can be left to the browser is not obvious at all. At the moment HEVEA choice is not to specify too much (in particular, all length arguments, either to column specifications or to the arrays themselves, are ignored). As a consequence, the final, browser viewed, aspect of arrays will usually be different from their printed aspect.

B.17.3 The calc package

The calc package enables using traditional, infix, notation for arithmetic operations inside the `num` argument to the \texttt{\setcounter\{name\}\{num\}} and \texttt{\addtocounter\{name\}\{num\}} constructs (see [\LaTeX-bis, Section A.4])

The calc package provides a similar extension of the syntax of the `len` argument to the \texttt{\setlength} and \texttt{\addtolength} constructs. HEVEA does not implement this extension, since it does not implement length registers in the first place.

B.17.4 Specifying the document input encoding, the inputenc package

The inputenc package enables \LaTeX to process a file according to various 8 bits encodings, plus UTF-8. The one used encoding is specified as an option while loading the package \texttt{\usepackage[encoding]\{inputenc\}}. At the moment, HEVEA recognises ten latin encodings (from latin1 to latin10), the koi8-r encoding, the ascii encoding, four windows encodings, the applemac encoding, and the utf8 encoding. It is important to notice that loading the inputenc package alters the HTML document charset. For instance if the \texttt{latin9} input encoding is selected by:

\[\usepackage[latin9]\{inputenc\}\]

Then, the document charset is ISO-8859-15, which is an enhanced version of ISO-8859-1 with some characters for Œ, œ and €. The rationale behind changing the output document charset at the same time as changing the input encoding is to allow non-ascii bytes in the input file to be replicated as themselves in the output file.

However, one can change the document charset (and the output translator) by using the internal command \texttt{\@def@charset}. For instance, one can specify latin1 encoding, while producing HTML pages in ascii:

\[\usepackage[latin1]\{inputenc\}\]
\[\%HEVEA\@def@charset{US-ASCII}\]

See section 8.6 for a more thorough description of HTML charset management.

The inputenc package also provides the command \texttt{\inputencoding\{encoding\}} that changes the input encoding at any time. The argument \texttt{encoding} can be any of the options accepted by \texttt{\usepackage[encoding]\{inputenc\}}. The command \texttt{\inputencoding} of HEVEA follows the behaviour of its \LaTeX counterpart, it the sense that it obeys scope rules. Notice that \texttt{\inputencoding} does not change the document output encoding and charset.

B.17.5 More symbols

HEVEA implements the following packages: latexsym amssymb, textcomp (a.k.a. “Text companion”) and eurosym (a nice € symbol in \LaTeX).
B.17.6 The comment package

The comment package provides two commands, \excludecomment and \includecomment, for (re-)defining new environments that ignore their content or that do nothing. The comment environment is also defined as an environment of the first kind.

B.17.7 Multiple Indexes with the index and multind packages

\HVEA supports several simultaneous indexes, following the scheme of the index package, which is present in modern \LaTeX distributions. This scheme is backward compatible with the standard indexing scheme of \LaTeX.

Support is not complete, but the most useful commands are available. More precisely, \HVEA knows the following commands:

\begin{itemize}
  \item \texttt{\newindex{\textit{tag}}{\textit{ext}}{\textit{ignored}}{\textit{indexname}}} Declare an index. The first argument \textit{tag} is a tag to select this index in other commands; \textit{ext} is the extension of the index information file generated by \LaTeX (e.g., \texttt{idx}); \textit{ignored} is ignored by \HVEA; and \textit{indexname} is the title of the index. There also exists a \texttt{\renewindex} commands that takes the same arguments and that can be used to redefine previously declared indexes.
  \item \texttt{\makeindex} Perform \texttt{\newindex{default}{idx}{ind}{Index}}.
  \item \texttt{\index{\textit{tag}}{\textit{arg}}} Act as the \LaTeX \texttt{\index} command except that the information extracted from \textit{arg} goes to the \textit{tag} index. The \textit{tag} argument defaults to \texttt{default}, thereby yielding standard \LaTeX behaviour for the \texttt{\index} command without an optional argument. There also exists a starred-variant \texttt{\index*} that Additionally typesets \textit{arg}.
  \item \texttt{\printindex{\textit{tag}}} Compute, format and output index whose tag is \textit{tag}. The \textit{tag} argument defaults to \texttt{default}.
\end{itemize}

The \texttt{\multind} package is supported to some extend, but \texttt{\index} is definitely to be preferred.

B.17.8 “Natural” bibliographies, the natbib package

\LaTeX version of \texttt{natbib} is present in modern installations.

Implementation is quite complete and compatible with version 8.0 of the \texttt{natbib} package (with the keyval style command \texttt{\setcitestyle}).

Unimplemented features are the sorting and compression of references. Automatic generation of an index of citations is handled, but the current implementation probably is quite fragile.

B.17.9 Multiple bibliographies

The multibib package

\HVEA provides a slightly incomplete implementation of the \texttt{multibib} package. The one non-implemented feature is the simultaneous definition of more than one bibliography. That is one cannot invoke \texttt{\newcites} as follows:

\begin{verbatim}
\newcites{suf1, suf2}{Title1, Title2}
\end{verbatim}

Instead, one should perform to calls to the \texttt{\newcites} command:

\begin{verbatim}
\newcites{suf1}{Title1}\newcites{suf2}{Title2}
\end{verbatim}

\footnote{http://www.ctan.org/pkg/natbib.html}
The `chapterbib` package

A basic implementation is provided. At the moment, you can define one bibliography per included file and no toplevel bibliography. `HEVA` implementation of this package recognises the option `sectionbib` and provides the command `\sectionbib` to change the sectioning command introduced by bibliographies.

B.17.10 Support for `babel`

B.17.10.1 Basics

`HEVA` offers support for the `\LaTeX` package `babel`. When it reads the command

\begin{verbatim}
\usepackage[lang-list]{babel}
\end{verbatim}

it loads `babel.hva`, and sends it the saved `lang-list`. The file `babel.hva` then looks at each language (say `x`) in it, and loads `x.hva`, which offers support for the language `x`. As in `\LaTeX`, the last language in the list is selected as default. As an example the command

\begin{verbatim}
\usepackage[english,french,german]{babel}
\end{verbatim}

would load `babel.hva`, then the files `english.hva`, `french.hva`, `german.hva` containing the respective definitions, and finally activate the definitions in `german.hva` and sets the current language to `german`.

B.17.10.2 Commands and languages

The following babel commands for changing and querying the language work as in `\LaTeX`:

1. `\selectlanguage`: to change the language
2. `\iflanguage`: to branch after comparing with current language

The language specific details are described in the corresponding `.hva` file, just as in the `.sty` file for `\LaTeX`. Users need to supply this file for their language, or modify/check the files if they are already supplied with the distribution. The list of languages is given below.

<table>
<thead>
<tr>
<th>american</th>
<th>australian</th>
<th>brazil</th>
<th>catalan</th>
</tr>
</thead>
<tbody>
<tr>
<td>check</td>
<td>croatian</td>
<td>danish</td>
<td>dutch</td>
</tr>
<tr>
<td>english</td>
<td>esperanto</td>
<td>finnish</td>
<td>french</td>
</tr>
<tr>
<td>galician</td>
<td>german</td>
<td>italian</td>
<td>magyar</td>
</tr>
<tr>
<td>norsk</td>
<td>nynorsk</td>
<td>polish</td>
<td>portuguese</td>
</tr>
<tr>
<td>romanian</td>
<td>russian</td>
<td>slovak</td>
<td>slovene</td>
</tr>
<tr>
<td>spanish</td>
<td>swedish</td>
<td>turkish</td>
<td></td>
</tr>
</tbody>
</table>

B.17.10.3 Writing `hva` files

The languages for which `.hva` files are available with the distribution are english, french, german, austrian, czech and portuguese. These may need to be modified as not all accents and hyphenation techniques are supported.

They can be written/modified as simple `\TeX` files (see the section B.16.1.1 on writing `\TeX` macros for details). As an example, one may also take a look at the file `french.hva`, which describes the details for french.

Note how all definitions are inside the definition for `\french@babel`, which is the command that `\selectlanguage{french}` would call. Similar commands need to be provided (i.e. `\x@babel` in `\x.hva` for language `x`).

Notice that it is wise to write the `\x.hva` in plain ascii only. Some definitions may involve specifying Unicode characters, for doing so, using the `\@print@u` is recommended (cf. Section 8.3). The definition

\begin{verbatim}
4 ../html/french.hva
\end{verbatim}
of Unicode characters can be found at http://www.unicode.org/charts/. Most language specific Unicode characters can be found in the first few files.

B.17.11 The \url package

\LaTeX{} source\textsuperscript{6}.

This package in fact provides a enhanced \verb command that can appear inside other command arguments. This command is named \url, but it can be used for any verbatim text, including DOS-like path names. Hence, one can insert urls in one’s document without worrying about \LaTeX{} active characters:

This is a complicated url: \url{http://foo.com/~user#label%coucou}.

which gets typeset as: “This is a complicated url: http://foo.com/~user#label%coucou.”

The main use for the \url command is to specify urls as arguments to \Hevea{} commands for hyperlinks (see section 8.1.1):

\begin{verbatim}
\hevea{} home page is
\ahrefurl{\url{http://hevea.inria.fr/}}
\end{verbatim}

It yields: “\Hevea{} home page is http://hevea.inria.fr/”.

However the \url command is fragile, as a consequence it cannot be used inside \footahref first argument (This is a \LaTeX{} problem, not an \Hevea{} one). The url package solves this problem by providing the \urldef command for defining commands whose body is typeset by using \url:

\begin{verbatim}
\urldef{\heveahome}{\url}{http://hevea.inria.fr/}
\end{verbatim}

Such a source defines the robust command \heveahome as the intended url. Hence the following source works as expected:

Have a look at \footahref{\heveahome}{\hevea{} home page}

It yields: “Have a look at \Hevea{} home page”\textsuperscript{7}.

Using \url inside command definitions with a \#i argument is a bad idea, since it gives “verbatim” a rather random meaning. Unfortunately, in some situations (e.g, no \%, no \#), it may work in \LaTeX{}. By contrast, it does not work in \Hevea. In such situations, \urldef should be used.

\Hevea{} implementation is somehow compatible at the “programming level”. Thus, users can define new commands whose argument is understood verbatim. The urlhref.hva style file from the distribution takes advantage of this to define the \url command, so that it both typesets an url and inserts a link to it. The urlhref.hva style file (which is an \Hevea{} style file and not a \LaTeX{} style file) can be adequate for bibliographic references, which often use \url for its typesetting power. Of course, loading urlhref.hva only makes sense when all arguments to \url are urls...

B.17.12 Verbatim text: the moreverb and verbatim packages

These two packages provide new commands and environments for processing verbatim text. I recommend using moreverb rather than verbatim, since \Hevea{} implementation is more advanced for the former package.

\textsuperscript{5}http://www.unicode.org/charts/
\textsuperscript{6}http://www.ctan.org/pkg/url.html
\textsuperscript{7}http://hevea.inria.fr/
B.17.13 Typesetting computer languages: the listings package

I strongly recommend the listings package. Learning the user interface requires a little effort, but it is worth it.

H\TeX\ does a quite compatible implementation, please refer to the original package documentation. Do not hesitate to report discrepancies. Note that H\TeX\ does not produce very compact HTML in case you use this package. This can be cured by giving hevea the command-line option -O (see C.1.1.4).

The lstlisting environment is styled through an homonymous style class (see 9.2 and 9.3) and most lstlisting environments get translated to div elements with the appropriate \getenvclass{lstlisting} class, which, by default is lstlisting. A few points deserve mention:

1. The definition of default style class lstlisting includes the important declarations font-family:monospace; and white-space:pre; which, more or less, specify non-proportional font and mandatory line breaks. In case you replace lstlisting by another style class (by \setenvclass{lstlisting}{another one}), your alternate definition should probably feature an identical specification. Otherwise, rendering would be poor, as regards spacing and line breaks.

2. When listings are framed, that is, when some frame=... or background=... keyval specifications are active, they no longer get translated to div elements. Instead they get translated to one cell tables whose td and table elements are styled through style classes lstlisting and lstframe, respectively. Of course, those two style classes follow the usual \setenvclass/\getenvclass mechanism. That way, one can for instance center all framed listings by issuing the following declaration in the document preamble:

\newstyle{.lstframe}{margin:auto;}

Notice that the default style class lstframe is empty.

3. Unfortunately the white-space:pre; style declaration is still a bit young, and some browsers implement it in rather incomplete fashion. This is particularly true as regards text copy-pasted from browser display. In case you want to provide your readers with easy copy-paste of listings, you can, by issuing the command \lstavoidwhitepre in the document preamble. Then, white-space:pre; is not used any longer: spaces get rendered by non-breaking space entities and line-breaks by <BR> elements, which significantly increase output size. However, as a positive consequence, display remains correct and text copy-pasted from browser display indeed possesses the line-breaks shown in display.

B.17.14 (Non-)Multi page tabular material

Those two packages provide \LaTeX\ users with the possibility to typeset tabular material over several pages [\LaTeX-bis, Section 5.4]. Of course, H\TeX\ does not care much about physical pages. Thus the super\texttt{table} and long\texttt{table} environments are rendered more or less as \texttt{tabular} environments inside \texttt{table} environments.

B.17.15 Typesetting inference rules: the mathpartir package

The mathpartir package, authored by D. Rémy, essentially provides two features:

1. An environment mathpar for typesetting a sequence of math formulas in mixed horizontal and vertical mode. The environment selects the best arrangement according to the line width, exactly as paragraph mode does for words.

2. A command \texttt{\inferrule} (and its starred variant) for typesetting inferences rules.

We give a short description, focussing on H\TeX\-related details. Users are encouraged to refer to the original documentation\footnote{http://pauillac.inria.fr/~remy/latex/index.html#tir} of the package.

In the following, comments on rule typesetting apply to H\TeX\ output and not to \LaTeX output.

\footnote{http://pauillac.inria.fr/~remy/latex/index.html#tir}
B.17.15.1 The mathpar environment

In its \LaTeX version, the \texttt{mathpar} environment is a "paragraph mode for formulas". It allows to typeset long list of formulas putting as many as possible on the same line:

\begin{mathpar}
A-Formula \and Longer-Formula \and And \and The-Last-One
\end{mathpar}

In the example above, formulas are separated with \texttt{\and}. The \LaTeX implementation also changes the meaning of paragraph breaks (either explicit as a \texttt{\par} command or implicit as a blank line) to act as \texttt{\and}. It also redefines the command \texttt{\\\\} as an explicit line-break in the flow of formulas.

\begin{mathpar}
\int_0^2 xdx = \frac{3}{2} \\
\int_0^3 xdx = \frac{5}{2}
\end{mathpar}

The \HVEA version is simplistic: Formulas are typeset in math display mode, \texttt{\and} separators always produce horizontal space, while \texttt{\\} always produce line-breaks. However, when prefixed by \texttt{\hva} the meaning of explicit separators is reversed: that is, \texttt{\hva\and} produces a line-break, while \texttt{\hva\\} produces horizontal space. Hence, we can typeset the previous example on two lines:

\begin{mathpar}
A-Formula \hva\and Longer-Formula \hva\and And \and The-Last-One
\end{mathpar}

It is to be noticed that the \LaTeX version of the package defines \texttt{\hva} as a no-op, so as to allow explicit instructions given to \HVEA not to impact on the automatic typesetting performed by \LaTeX.

B.17.15.2 The \texttt{inferrule} macro

The \texttt{\inferrule} macro is designed to typeset inference rules. It should only be used in math mode (or display math mode). It takes three arguments, the first being optional, specifying the label, premises, and conclusions respectively. The premises and the conclusions are both lists of formulas, and are separated by \texttt{\\}. A simple example of its use is

\begin{verbatim}
\inferrule
[\text{label}]
{one \\ two \\ three \\ or \\ more \\ premises}
{and \\ any \\ number \\ of \\ conclusions \\ as \\ well}
\end{verbatim}
which gives the following rendering:

\[
\begin{array}{c}
\text{LABEL} \\
\hline
\text{one} & \text{two} & \text{three} & \text{or} & \text{more} & \text{premises} \\
\hline
\text{and} & \text{any} & \text{number} & \text{of} & \text{conclusions} & \text{as} & \text{well}
\end{array}
\]

Again, \texttt{HEVEA} is simplistic. Where \LaTeX\ performs actual typesetting, interpreting `\` as horizontal or vertical breaks, \texttt{HEVEA} always interpret `\` as an horizontal break. In fact \texttt{HEVEA} interpret all separators (`\`, `\and`) as horizontal breaks, when they appear in the arguments of the \texttt{\inferrule} command. Nevertheless prefixing separators with `\hva` yields vertical breaks:

\[
\begin{array}{c}
\text{\inferrule} \\
\{aa \hva bb\} \\
\{dd \and ee \and ff\}
\end{array}
\]

\[
\begin{array}{cc}
\hline
aa & bb \\
\hline
dd & ee & ff
\end{array}
\]

The color of the horizontal rule that separates the premises and conclusions can be changed by redefining the command \texttt{\mpr@hhline@color}. This color must be specified as a low-level color (cf. Section B.14.2.2).

\subsubsection{B.17.15.3 Options}

By default, lines are centered in inference rules. However, this can be changed either by using \texttt{\mprset{flushleft}} or \texttt{\mprset{center}}, as shown below.

\[
\begin{array}{c}
\\$\mprset{flushleft}\\n\text{\inferrule} \\
\{a \and bbb \hva ccc \and dddd\} \\
\{e \and ff \hva gg\}
\end{array}
\]

\[
\begin{array}{cccc}
& a & bbb & ccc & dddd \\
& e & ff & gg
\end{array}
\]

\[
\$\]

\subsubsection{B.17.15.4 Derivation trees}

The \texttt{mathpartir} package provides a starred variant \texttt{\inferrule*}. In \LaTeX, the boxes produced by \texttt{\inferrule} and \texttt{\inferrule*} differ as regards their baseline, the second being well adapted to derivation trees. All this is irrelevant to \texttt{HEVEA}, but \texttt{\inferrule*} remains of interest because of its interface: the optional argument to the \texttt{\inferrule*} command is a list of \texttt{key=value} pairs in the style of \texttt{keyval}. This makes the variant command much more flexible.

<table>
<thead>
<tr>
<th>key</th>
<th>Effect for value v</th>
</tr>
</thead>
<tbody>
<tr>
<td>before</td>
<td>Execute v before typesetting the rule. Useful for instance to change the maximal width of the rule.</td>
</tr>
<tr>
<td>left</td>
<td>Put a label v on the left of the rule</td>
</tr>
<tr>
<td>Right</td>
<td>As left, but on the right of the rule.</td>
</tr>
<tr>
<td>lab</td>
<td>Put a label v above the inference rule, in the style of \texttt{\inferrule}.</td>
</tr>
<tr>
<td>vdots</td>
<td>Raise the rule by v and insert vertical dots, the length argument is translated to a number of line-skips.</td>
</tr>
</tbody>
</table>
Additionally, the value-less key `center` centers premises and conclusions (this is the default), while `flushleft` commands left alignment of premises and conclusions (as `\mprset{flushleft}` does). Other keys defined by the LaTeX package exist and are parsed, but they perform no operation.

As an example, the code

```latex
\begin{mathpar}
\inferrule* [Left=Foo]
{\inferrule* [Right=Bar, width=8em, leftskip=2em, rightskip=2em, vdots=1.5em]
{a \and a \and bb \hva \cc \and dd}
{ee}
\and ff \and gg}
{hh}
\hva \and
\inferrule* [lab=XX]{uu \and vv}{ww}
\end{mathpar}
```

produces the following output:

```
a a bb
cc dd

ee

\begin{array}{c}
F O O
\end{array}

\begin{array}{c}
B A R
\end{array}

\begin{array}{c}
XX
\end{array}

\begin{array}{c}
ff
\end{array}
\begin{array}{c}
gg
\end{array}
\begin{array}{c}
hh
\end{array}
\begin{array}{c}
w w
\end{array}
```

### B.17.16 The ifpdf package

This package should be present in modern `latex` installations. Basically, the package defines a boolean register `pdf`, whose value is true for tools that produce PDF (such as `pdflatex`) and false for tools that produce DVI (such as `latex`).

The hevea version of the package simply defines the boolean register `pdf` with initial value true. Command-line option `-pdf` is also added to `imagen` command-line options (by using the command `\@addimagenopt`, see Section 10.7). As a result, `imagen` will normally call `pdflatex` in place of `latex`.

In case standard `latex` processing in `imagen` is wished, one can issue the command `\pdffalse` after loading the ifpdf package and before `\begin{document}`. Then, no command line option is added. Hence, to achieve `latex` processing of the `image` file, while still loading the ifpdf package, one writes:

```
\usepackage{ifpdf}
\%HEVEA\pdffalse
```

### B.17.17 Typesetting Thai

HeVEA features an implementation of Andrew Seagar’s technique for Thai in L\TeX, by the means of the package `thai.hva` in the distribution.

As regards input encoding, Thai users of HeVEA could (perhaps) use `\usepackage[utf8]{inputenc}`. However, the typesetting of Thai is more subtle than just proper characters. For that reason, Thai in L\TeX is better performed by another technique, which HeVEA supports. See this specific document\(^9\).

### B.17.18 Hanging paragraphs

The `hanging` package is implemented. HeVEA implementation consists of no-ops, except for the `hangparas` environment, which is partially implemented. Assume the following usage of `hangparas`:

\[^9\]http://hevea.inria.fr/doc/thaihevea.html
where \( wd \) is a length that makes sense both for \( \text{\LaTeX} \) and CSS (typically \( 2\text{ex} \)). Then HTML output will reproduce \( \text{\LaTeX} \) output for \( n = 1 \), regardless of the given value of argument \( n \). That is, in any paragraph inside the environment, all lines except the first get indented by \( wd \).

### B.17.19 The cleveref package

The cleveref package attempts (and mostly succeeds) typesetting references cleverly. Its main feature is a \texttt{\textbackslash cref} command that accepts several, comma separated, label references and typesets them as a list (which can be one-element long, of course) prefixed with sectional unit names. The \TeX{} implementation is quite complete, but it does not support some of the subtleties of the \( \text{\LaTeX} \) implementations, especially as regards customisation.

### B.17.20 Other packages

The \texttt{fancyverb} and \texttt{colortbl} packages are partly implemented.

The \texttt{xspace} package is implemented, in simple cases, rendering is satisfactory, but beware: \TeX{} differs significantly from \( \text{\LaTeX} \), and discrepancies are likely.

The \texttt{chngcntr} package is implemented. This package provides commands to connect (and disconnect) counters once they are created.

The \texttt{import} package is partially implemented: all starred commands are missing.

The \texttt{booktabs} package is implemented. This package provides nicer rulers in tables as specific commands. \TeX{} defines those as no-ops.

### Part C

#### Practical information

#### C.1 Usage

##### C.1.1 \TeX{} usage

The \texttt{hevea} command has two operating modes, normal mode and filter mode. Operating mode is determined by the nature of the last command-line argument.

##### C.1.1.1 Command line arguments

The \texttt{hevea} command interprets its arguments as names of files and attempts to process them. Given an argument \texttt{filename} there are two cases:

- If \texttt{filename} is \texttt{base.tex} or \texttt{base.hve}, then a single attempt to open \texttt{filename} is made.

- In other cases, a first attempt to open \texttt{filename.tex} is made. In case of failure, a second attempt to open \texttt{filename} is made.

In all attempts, implicit filenames are searched along \texttt{hevea} search path, which consist in:

1. the current directory “.,”

2. user-specified directories (with the \texttt{-I} command-line option),

3. \texttt{hevea} library directory.
4. one of the sub-directories html, text or info from hevea library directory, depending upon hevea output format,

The hevea library directory is fixed at compile-time (this is where hevea library files are installed) and typically is /usr/local/lib/hevea. However, this compile-time value can be overridden by setting the HEVEADIR shell environment variable. In all cases, the value of hevea library directory can be accessed from the processed document as the value of the command \@hevealibdir.

C.1.1.2 Normal mode

If the last argument has an extension that is different from .hva or has no extension, then it is interpreted as the name of the main input file. The main input file is the document to be translated and normally contains the \documentclass command. In that case two basenames are defined:

- The input basename, basein, is defined as the main input file name, with extension removed when present.
- The output basename, baseout, is basein with leading directories omitted. However the output basename can be changed, using the -o option (see below).

HEVEA will attempt to load the main input file. Ancillary files from a previous run of \LaTeX (i.e. .aux, .bbl and .idx files) will be searched as basein.ext. The output base name governs all files produced by HEVEA. That is, HTML output of HEVEA normally goes to the file baseout.html, while cross-referencing information goes into baseout.haux. Furthermore, if an image file is generated (cf. section 6), its name will be baseout.image.tex.

Thus, in the simple case where the hevea command is invoked as:

```
# hevea file.tex
```

The input basename is file and the output basename also is file. The main input file is searched once along hevea search path as file.tex. HTML output goes into file file.html, in the current directory. In the more complicated case where the hevea command is invoked as:

```
# hevea ./dir/file
```

The input base name is ./dir/file and the output basename is file. The main input file is loaded by first attempting to open file ./dir/file.tex, then file ./dir/file. HTML output goes into file file.html, in the current directory.

Finally, the output base name can be a full path, but you have to use option -o. For instance, we consider:

```
# hevea -o out/out.html file.tex
```

Then, HTML output goes into out/out.html — notice that directory out must exist. Furthermore, hevea output base name is out/out. This means that hevea generates files out/out.haux, out/out.image.tex etc.

The article.hva, seminar.hva, book.hva and report.hva base style files from HEVEA library are special. Only the first base style file is loaded and the \documentclass command has no effect when a base style file is already loaded. This feature allows to override the document base style. Thus, a document file.tex can be translated using the article base style as follows:

```
# hevea article.hva file.tex
```
C.1.1.3 Filter mode

If there is no command-line argument, or if the last command-line argument has the extension .hva, then there is neither input base name nor output base name, the standard input is read and output normally goes to the standard output. Output starts immediately, whithout waiting for \begin{document}. In other words hevea acts as a filter.

Please note that this operating mode is just for translating isolated \LaTeX constructs. The normal way to translate a full document file.tex being “hevea file.tex” and not “hevea < file.tex > file.html”.

C.1.1.4 Options

The hevea command recognises the following options:

- \texttt{-version} Show hevea version and exit.
- \texttt{-v} Verbose flag, can be repeated to increase verbosity. However, this is mostly for debug.
- \texttt{-dv} Add border around some of the block-level elements issued. Specifically, all div and p are bordered, while the structure of displayed material is also shown.
- \texttt{-s} Suppress warnings.
- \texttt{-I dirname} Add dirname to the search path.
- \texttt{-o name} Make name the output basename. However, if name is base.html, then the output basename is base. Besides, -o - makes H\TeX\ output to standard output.
- \texttt{-e filename} Prevent hevea from loading any file whose name is filename. Note that this option applies to all files, including \texttt{hevea.hva} and base style files.
- \texttt{-fix} Iterate H\TeX\ until a fixpoint is found. Additionally, images get generated automatically.
- \texttt{-O} Optimise HTML by calling esponja (see section C.1.3).
- \texttt{-exec prog} Execute file prog and read the output. The file prog must have execution permission and is searched by following the searching rules of hevea.
- \texttt{-francais} Deprecated by babel support. This option issues a warning message.
- \texttt{-help} Print version number and a short help message.

The following options control the HTML code produced by hevea. By default, hevea outputs a page encoded in US-ASCII with most symbols rendered as HTML or numerical Unicode entities.

- \texttt{-entities} Render symbols by using entities. This is the default.
- \texttt{-textsymbols} Render symbols by English text.
- \texttt{-moreenties} Enable the output of some infrequent entities. Use this option to target browsers with wide entities support.
- \texttt{-mathml} Produces MathML output for equations, very experimental.
- \texttt{-pedantic} Be strict in interpreting HTML definition. In particular, this option disable size and color changes inside <PRE>... </PRE>, which are otherwise performed.

The following options select and control alternative output formats (see section 11):

- \texttt{-text} Output plain text. Output file extension is .txt.
- \texttt{-info} Output info format. Output file extension is .info.
- \texttt{-w width} Set the line width for text or info output, defaults to 72.

Part A of this document is a tutorial introduction to H\TeX, while Part B is the reference manual of H\TeX.
C.1.2  H\textsc{acha} usage

The \texttt{hacha} command interprets its argument \texttt{base.html} as the name of a \texttt{HTML} source file to cut into pieces.

It also recognises the following options:

- \texttt{-v}  Be a little verbose.

- \texttt{-o filename}  Make \texttt{H\textsc{acha}} output go into file \texttt{filename} (defaults to \texttt{index.html}). Additionally, if \texttt{filename} is a composite filename, \texttt{dir/base}, then all files outputted by \texttt{H\textsc{acha}} will reside in directory \texttt{dir}.

- \texttt{-tocbis}  Another style for table of contents: sub-tables are replicated at the beginning of every file.

- \texttt{-tocter}  Like \texttt{-tocbis} above, except that sub-tables do not appear in the main table of contents (see Section 7.2.3).

- \texttt{-nolinks}  Do not insert Previous/Up/Next links in generated pages.

- \texttt{-hlf}  Output a \texttt{base.hlf} file, showing in which output files are the anchors from the input file gone. The format of this summary is one “\texttt{anchor\tfile}” line per anchor. This information may be needed by other tools.

- \texttt{-help}  Print version number and a short help message.

Section 7 of the user manual explains how to alter \texttt{H\textsc{acha}} default behaviour.

C.1.3  \texttt{esponja} usage

The program \texttt{esponja} is part of \texttt{H\textsc{eva}} and is designed to optimise \texttt{hevea} output. However, \texttt{esponja} can also be used alone to optimise text-level elements in \texttt{HTML} files. Since \texttt{esponja} fails to operate when it detects incorrect \texttt{HTML}, it can be used as a partial \texttt{HTML} validator.

C.1.3.1  Operating mode

The program \texttt{esponja} interprets its arguments as names of files and attempt to process them. It is important to notice that \texttt{esponja} will replace files by their optimised versions, unless instructed not to do so with option \texttt{-n}.

Invoking \texttt{esponja} as

\texttt{# esponja foo.html}

will alter \texttt{foo.html}. Of course, if \texttt{esponja} does not succeed in making \texttt{foo.html} any smaller or if \texttt{esponja} fails, the original \texttt{foo.html} is left unchanged. Note that this feature allows to optimise all \texttt{HTML} files in a given directory by:

\texttt{# esponja *.html}

C.1.3.2  Options

The command \texttt{esponja} recognises the following options:

- \texttt{-v}  Be verbose, can be repeated to increase verbosity.

- \texttt{-n}  Do not alter input files. Instead, \texttt{esponja} output for file \texttt{input.html} goes to file \texttt{input.esp}. Option \texttt{-n} implies option \texttt{-v}.

- \texttt{-u}  Output \texttt{esponja} intermediate version of \texttt{HTML}. In most occasions, this amounts to pessimize instead of to optimise. It may yield challenging input for other \texttt{HTML} optimisers.
C.1.4 bibhva usage

The program bibhva is a simple wrapper, which basically forces \texttt{bibtex} into accepting a \texttt{.haux} file as input and producing a \texttt{.hbbl} file as output. Usage is \texttt{bibhva bibtex-options basename}.

C.1.5 imagen usage

The command imagen is a simple shell script that translates a \LaTeX{} document into many .\texttt{png} images. The imagen script relies on much software to be installed on your computer, see Section C.4.1.

It is a companion program of \texttt{H\textsc{ev}A}, which must have been previously run as:

\begin{verbatim}
# hevea... base\_tex
or
# hevea... -o base\_html...
\end{verbatim}

In both cases, \texttt{base} is \texttt{H\textsc{ev}A} output basename. When told to do so (see section 6) \texttt{H\textsc{ev}A} echoes part of its input into the \texttt{base\_image.tex} file.

The imagen script should then be run as:

\begin{verbatim}
# imagen base
\end{verbatim}

The imagen script produces one \texttt{basenunn.png} image file per page in the \texttt{base\_image.tex} file.

This is done by first calling \texttt{latex} on \texttt{base\_image.tex}, yielding one \texttt{dvi} file. Then, \texttt{dvips} translates this file into one single Postscript file that contains all the images, or into one Postscript file per image, depending upon your version of \texttt{dvips}. Postscript files are interpreted by ghostscript (\texttt{gs}) that outputs \texttt{ppm} images, which are then fed into a series of transformations that change them into .\texttt{png} files.

The imagen script recognises the following options:

- \texttt{-mag nnnn} Change the enlarging ratio that is applied while translating DVI into Postscript. More precisely, \texttt{dvips} is run with \texttt{-xnnnn} option. Default value for this ratio is 1414, this means that, by default, imagen magnifies \LaTeX{} output by a factor of 1.414.

- \texttt{-extra command} Insert \texttt{command} as an additional stage in imagen \texttt{ppm} to \texttt{png} production chain. \texttt{command} is an Unix filter that expects a \texttt{ppm} image in its standard input and outputs a \texttt{ppm} image on its standard output. A sensible choice for \texttt{command} is one command from the netpbm package, several such commands piped together, or various invocations of the convert command from ImageMagick.

- \texttt{-quant number} Add an extra color quantisation step in imagen \texttt{ppm} image production chain, where \texttt{number} is the maximal number of colors in the produced images. This option may be needed as a response to a failure in the image production chain. It can also help in limiting image files size.

- \texttt{-png} Output PNG images. This is the default.

- \texttt{-gif} Output GIF images in place of PNG images. GIF image files have a .\texttt{gif} extension. Note that \texttt{hevea} should have been previously run as \texttt{hevea gif\_hva base\_tex} (so that the proper .\texttt{gif} filename extension is given to image file references from within the HTML document).

- \texttt{-svg} Output SVG images in addition to PNG (or GIF) images. Note that \texttt{hevea} should have been previously run as \texttt{hevea svg\_hva base\_tex}.

- \texttt{-pnm} Output PPM images. This option mostly serves debugging purposes. Experimented users can also take advantage of it for performing additional image transformation or adopting exotic image formats.

- \texttt{-t arg} Pass option “-t arg” to dvips. For instance, using “-t a3” may help when images are truncated on the right.

- \texttt{-pdf} Have imagen call pdflatex instead of latex.
The first three options enable users to correct some misbehaviours. For instance, when the document base style is `seminar`, image orientation may be wrong and the images are too small. This can be cured by invoking `imagen` as:

```bash
# imagen -extra "pnmflip -ccw" -mag 2000 base
```

Notice that `hevea` calls `imagen` by itself, when given the command-line option `-fix`. In that situation, the command-line options of `imagen` can be controlled from source file by using the command `\@addimagenopt` (see Section 10.7).

### C.1.6 Invoking hevea, hacha and imagen

In this section, we give a few sequence of (Unix) commands to build the HTML version of a document in various situations. The next section gives a few `Makefile`'s for similar situations.

We translate a file `doc.tex` that requires a specific style file `doc.hva`. The file is first translated into `doc.html` by `hevea`, which also reads the specific style file `doc.hva`. Then, `hacha` cuts `doc.html` into several, `doc001.html`, `doc002.html`, etc. also producing the table of links file `index.html`.

```bash
# hevea -fix doc.hva doc.tex
# hacha doc.html
```

Thanks to the command-line option `-fix`, `hevea` runs the appropriate number of times automatically. In case `hevea` produces a non-empty `doc.image.tex` file, then `hevea` calls `imagen` by itself (because of option `-fix`). Hence, the above sequence of two commands is also appropriate in that situation.

In case some problem occurs, it is sometime convenient to run `imagen` by hand. It is time not to use the option `-fix`.

```bash
# rm -f doc.image.tex
# hevea doc.hva doc.tex
```

Now, `hevea` normally has shown the `imagen` command line that it would have run, if it had been given the option `-fix`. For instance, if `doc.hva` includes `\input{gif.hva}`, then `hevea` shows the following warning:

```
HeVeA Warning: images may have changed, run 'imagen -gif doc'
```

Now, one can run `imagen` as it should be.

It is sometime convenient not to clobber the source directory with numerous target files. It suffices to instruct `hevea` and `hacha` to output files in a specific directory, say `doc`.

```bash
# hevea -fix -o doc/doc.html doc.hva doc.tex
# hacha -o doc/index.html doc/doc.html
```

Notice that `hevea` does not create the target directory `doc`: it must exist before `hevea` runs. Again, in case `hevea` calls `imagen`, image generation should proceed smoothly and the final files `doc001.png`, `doc002.png`, ... should go into directory `doc`.

In all situations, while installing files to their final destination, it is important not to forget any relevant files. In particular, in addition to the root file (`index.html`), contents files (`doc001.html`, `doc002.html`, etc.) and images (`doc001.png`, `doc002.png`, etc.), one should not forget the arrow images and the style sheet generated by `hacha` (`contents_motif.gif`, `next_motif.gif`, `previous_motif.gif` and `doc.css`).

As a consequence, producing all files into the subdirectory `doc` may be a good idea, since then one easily install all relevant files by copying `doc` to a public destination.

```bash
# cp -r doc $(HOME)/public_html
```

However, one then also installs the auxiliary files of `hevea`, and `hevea` output file `doc.html`, which is no longer useful once `hacha` has run. Hence, those should be erased beforehand.

```bash
# rm -f doc/doc.html,aux,ind,toc} doc/doc.image.tex
# cp -r doc $(HOME)/public_html
```
C.1.7 Using make

Here is a typical Makefile, which is appropriate when no images are produced.

```
HEVEA=hevea
HEVEAOPTS=-fix
HACHA=hacha
#document base name
DOC=doc
index.html: $(DOC).html
   $(HACHA) -o index.html $(DOC).html

$(DOC).html: $(DOC).hva $(DOC).tex
   $(HEVEA) $(HEVEAOPTS) $(DOC).hva $(DOC).tex

clean:
   rm -f $(DOC).html $(DOC).h{toc,aux,ind}
   rm -f index.html $(DOC)[0-9][0-9][0-9].html $(DOC).css
```

Note that the clean rule removes all the doc001.html, doc002.html, etc. and doc.css files produced by hacha. Also note that make clean also removes the doc.haux, doc.hind and doc.htoc files, which are HEVEA auxiliary files.

When the image file feature is used, one can use the following, extended, Makefile:

```
HEVEA=hevea
HEVEAOPTS=-fix
HACHA=hacha
#document base name
DOC=doc
DIR=$(HOME)/public_html/$(DOC)
BASE=$(DIR)/$(DOC)
index.html: $(BASE).html
   $(HACHA) -tocter -o $(DIR)/index.html $(BASE).html

$(DIR)/index.html: $(BASE).html
   $(HACHA) -tocter -o $(DIR)/index.html $(BASE).html
```

Observe that the clean rule now also gets rid of doc.image.tex and of the various files produced by imagen.

With the following Makefile, hevea, imagen, hacha all output their files into a specific directory DIR.

```
HEVEA=hevea
HEVEAOPTS=-fix
HACHA=hacha
#document base name
DOC=doc
DIR=$(HOME)/public_html/$(DOC)
BASE=$(DIR)/$(DOC)

$(DIR)/index.html: $(BASE).html
   $(HACHA) -tocter -o $(DIR)/index.html $(BASE).html
```
$(BASE).html: $(DOC).hva $(DOC).tex

partialclean:
    rm -f $(BASE).h{tml,aux,toc,ind} $(BASE).image.*

clean:
    rm -f $(DIR)/*

The above Makefile directly produces HTML and PNG files into the final directory $(HOME)/public_html/$(DOC). The new partialclean entry erases files that are not useful anymore, once imagen and hacha have performed their tasks.

However, most often, it is more appropriate to build HTML and PNG files in a specific directory, and then to copy them to their final destination.

... 

#document base name
DOC=doc
DIR=$(DOC)
BASE=$(DIR)/$(DOC)
INSTALLDIR=$(HOME)/public_html/$(DOC)

... 

install: partialclean
    cp $(DIR)/* $(INSTALLDIR)

... 

C.2 Browser configuration

By default, H\TeX\A does not anymore use the \texttt{FACE=symbol} attribute to the \texttt{<FONT ...>} tag. As a consequence, browser configuration is no longer needed.

H\TeX\A now extensively outputs Unicode entities. This first means that H\TeX\A targets modern browsers with decent unicode support, and only those.

In case your browser is recent and that you nevertheless experience display problems on H\TeX\A-generated pages, see the excellent Alan Wood’s Unicode Resources\textsuperscript{10}. It may help to understand display problems and even to solve them by configuring browsers or installing some fonts.

C.3 Availability

C.3.1 Internet stuff

H\TeX\A home page is \url{http://hevea.inria.fr/}. It contains links to the on-line manual\textsuperscript{11} and to the distribution\textsuperscript{12}.

The author can be contacted at \texttt{Luc.Maranget@inria.fr}.

\textsuperscript{10}\url{http://www.alanwood.net/unicode/}
\textsuperscript{11}\url{http://hevea.inria.fr/doc/}
\textsuperscript{12}\url{http://hevea.inria.fr/distrib}
C.3.2 Law

HAVeA can be freely used and redistributed without modifications. Modifying and redistributing HAVeA implies a few constraints. More precisely, HAVeA is distributed under the terms of the Q Public License, but HAVeA binaries include the Objective Caml runtime system, which is distributed under the Gnu Library General Public License (LGPL). See the LICENSE\textsuperscript{13} file for details.

The manual itself is distributed under the terms of the Free Document Dissemination Licence\textsuperscript{14}.

C.4 Installation

C.4.1 Requirements

The programs \texttt{hevea} and \texttt{hacha} are written in Objective Caml\textsuperscript{15}. Thus, you really need Objective Caml (the more recent version, the better) to compile them. However, some binary distributions exist, which are managed by people other than me (thanks to them). Links to some of these distributions appear in HAVeA home page.

HAVeA users may instruct the program not to process a part of the input (see section 6). Instead, this part is processed into a bitmap file and HAVeA outputs a link to the image file. L\TeX{} source is changed into \texttt{.png} images by the imagen script, which basically calls, L\TeX{}, dvips, ghostscript\textsuperscript{16} and the convert command from the image processing package ImageMagick\textsuperscript{17}.

To benefit from the full functionality of HAVeA, you need all this software. However, HAVeA runs without them, but then you will have to produce images by yourself.

C.4.2 Principles

The details are given in the README file from the distribution. Basically, HAVeA should be given a library directory. The installation procedure stores the hevea.hva and base style files in this directory. There are two compilation modes, the \texttt{opt} mode selects the native code OCaml compiler ocamlopt, while the \texttt{byte} mode selects the bytecode OCaml compiler ocamlc. In HAVeA case, ocamlopt produces code that is up to three times as fast as the one produced by ocamlc. Thus, default compilation mode is \texttt{opt}, however it may be the case on some systems that only ocamlc is available.

Note that, when installing HAVeA from the source distribution, the \texttt{hevea.sty} (and mathjax.sty) style files are simply copied to HAVeA library directory. It remains users (and package maintainers) responsibility to make those files accessible to L\TeX{}.

C.5 Other L\TeX{} to HTML translators

This short section gives pointers to a few other translators. I performed not extensive testing and make no thorough comparison.

\texttt{LaTeX2html}\texttt{LaTeX2html} is a full system. It is written in perl and calls \texttt{LATEX} when in trouble. As a consequence, \texttt{LaTeX2html} is powerful but it may fail on large documents, for speed and memory reasons. More information on \texttt{LaTeX2html} can be found at

\texttt{http://www-dsed.llnl.gov/files/programs/unix/latex2html/}

\textsuperscript{13}\texttt{http://hevea.inria.fr/distri/LICENSE}
\textsuperscript{14}\texttt{http://pauillac.inria.fr/~lang/licence/v1/fddl.html}
\textsuperscript{15}\texttt{http://caml.inria.fr/ocaml/}
\textsuperscript{16}\texttt{http://www.cs.wisc.edu/~ghost/index.html}
\textsuperscript{17}\texttt{http://www.imagemagick.org/}
**TTH**  The principle behind TTH is the same as the one of \TeX\: write a fast translator as a lexer, use symbol fonts and tables. However, there are differences, TTH accepts both \TeX\ and \LaTeX\ source, TTH is written in C and the full source is not available (only `lex` output is available). Additionally, TTH insist on not using any kind of \LaTeX\ generated information and will show proper cross-reference labels, even when no `.aux` file is present. TTH output is a single document, whereas \TeX\ can cut the output of \TeX\ into several files. (however there exists a commercial version of TTH that provides this extra functionality). TTH can be found at

http://hutchinson.belmont.ma.us/tth/.

**TeX4ht**  TeX4ht is a highly configurable TeX-based authoring system dedicated mainly to produce hypertext. It interacts with TeX-based applications through style files and postprocessors, leaving the processing of the source files to the native TeX compiler. As a result, TeX4ht may be more powerful than \TeX, but may also be more difficult to configure. More information on TeX4ht can be found at:

http://www.tug.org/tex4ht/

**htmlgen**  The `htmlgen` translator is specialized for producing the Caml manuals. This is \TeX\ direct ancestor and I owe much to its author, X. Leroy. See `htmlgen` for a description of `htmlgen` and a (bit outdated) discussion on \LaTeX\ to HTML translation.

### C.6 Acknowledgements

The following people contributed to \TeX\ development:

- Philip A. Viton, maintains a Windows (win32) port of \TeX. 
- Tibault Suzanne authored the HTML 5 generator that now is the default generator of \TeX. 
- Abhishek Thakur implemented most of the new features of version 1.08, including, translations of symbols to Unicode entities, the babel package, and style sheet support. 
- Christian Queinnec wrote an extra lexer to translate code snippets produced by its tool VideoC for writing pedagogical documents on programming. The very principle he introduced for interfacing the videoC lexer with \TeX\ main lexer is now used extensively throughout \TeX\ source code. 
- Andrew Seagar is at the origin of support for the Thai language. He is the author of the document “How to Use \TeX\ with the Thai Character Set”. 
- Pierre Boulet, by using \TeX\ as a stage in his tool MDoc for documenting Objective Caml source code, forced me into debugging \TeX\ implementation of the alltt environment. 
- Nicolas Tessaud implemented the `-text` and `-info` output modes (see section 11). 
- Georges Mariano asked for many feature, and argued a lot to have them implemented. 
- Many users contributed by sending bug reports.

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