Using $\LaTeX\,2_\varepsilon$ to Produce IMS Examination Papers

The purpose of this document is to describe the use of $\LaTeX\,2_\varepsilon$ to produce IMS examination papers. A separate document describes the examination style file in more detail.

The overall structure

The overall structure of an examination paper is based on a skeleton file containing the title page material[1], followed by a number of lines of the form

```
\breakpoint\vspace{2ex}\input reg1
```

Each question is prepared as a separate file and, at the preparation stage, is allocated a temporary code. In the above case a question (on regression?) is prepared as a file `reg1.tex` and is allocated the code REG1. This code will be used to identify the question during all but the final stages of production; in the final print a question number will be generated automatically.

This system has a number of advantages over producing the entire paper as a single file. In particular, it facilitates

(i) working on just a subset of the questions ('commenting out' with a leading `%` the questions not wanted);

(ii) reordering questions (where feasible) at the final print stage to improve pagination;

(iii) assembling a paper from questions contributed by several examiners;

(iv) using the same question (or variants of the same question) in separate examination papers;

(v) reusing questions set in previous years.

The structure of the skeleton file will not be illustrated in detail here. You will usually find it is most convenient to use one based on that used to produce the previous year's paper. Note the line near the beginning which uses the `\printstyle` command to specify the printing style to be used. The four standard styles are as follows:

0: No title page, temporary question codes, no page breaks, 'draft' indication with date and time of processing.

1: No title page, temporary question codes, one question per page, 'draft' indication with date and time of processing.

2: Title page, temporary question codes, one question per page, 'draft' indication with date and time of processing.

3: Final version.

[1] The skeleton file for a paper MA123 is typically named `ma123.tex`. While developing questions for 'complicated' papers it is sometimes convenient to use a skeleton file, typically named `justafew.tex`, which omits the title page material.

Style 1 is generally used at most stages in the production process. Style 3 should **not** be used until the final stage.

The structure of individual questions

Each question file begins with a line specifying the question code: the `\question` command is used here. Questions are divided into sections and subsections using modified versions of the LaTeX 2_ε `\section` command and `enumerate` environment.

The input

```
\question ABC1
\section
This is the first section.  The main text of the section
is set with no indent.  If I add just a few more words
you'll see what I mean \ldots
\marks{15}
\section
This is the second section \ldots
\marks{15}
\section
And this is the third section \ldots
\marks{10}
```

will produce the output

ABC1. (a) This is the first section. The main text of the section is set with no indent. If I add just a few more words you'll see what I mean ... [15 marks]
(b) This is the second section ... [15 marks]
(c) And this is the third section ... [10 marks]

The question code ABC1 will be replaced in the output by the appropriate question number when `\printstyle 3` is used.

If a question is further subdivided into parts these are produced using a modification of the `enumerate` environment. The input

```
\question ABC2
\section
Text `setting the scene' for the first section \ldots
\begin{enumerate}
\item
The first thing you're asked to do \ldots
\item
Another thing you're asked to do \ldots
\end{enumerate}
\marks{18}
\section
Text `setting the scene' for the second section.  This section may be
unrelated to the first section, whereas subsections within a section
will generally be closely related. \ldots
\begin{enumerate}
\item
The first thing you're asked to do in the second section \ldots
\item
Another thing you're asked to do in the second section \ldots
\item
Yet another thing you're asked to do in the second section \ldots
\end{enumerate}
\marks{22}
```

will produce the output

ABC2. (a) Text 'setting the scene' for the first section ...

(i) The first thing you're asked to do ...

(ii) Another thing you're asked to do ...

[18 marks]

(b) Text 'setting the scene' for the second section. This section may be unrelated to the first section, whereas subsections within a section will generally be closely related. ...

(i) The first thing you're asked to do in the second section ...

(ii) Another thing you're asked to do in the second section ...

(iii) Yet another thing you're asked to do in the second section ...

[22 marks]

As the second example illustrates, subsections are set as hanging paragraphs. This arrangement is suitable for displaying a series of (typically fairly short and closely related) instructions, whereas sections (set flush left) tend to be rather longer and less closely related.

Some questions consist, in effect, of a single section which presents a series of instructions. Two possible layouts for such a question are represented by the following examples. While it is not possible to lay down hard and fast rules for the choice of a layout, the first is generally appropriate when components of the question can be expressed as fairly short instructions, while the second is more suitable when the descriptions of the components are rather longer.

The input

```
\question DEF1
Text ‘setting the scene’ for the whole question \ldots
\begin{enumerate}
\item
The first thing you’re asked to do (described in a paragraph which is
set with a hanging indent) \ldots
\marks{7}
\item
Another thing you’re asked to do \ldots
\marks{13}
\item
Another thing you’re asked to do \ldots
\marks{12}
\item
The last thing you’re asked to do \ldots
\marks{8}
\end{enumerate}
```

will produce the output

DEF1. Text 'setting the scene' for the whole question ...

(i) The first thing you're asked to do (described in a paragraph which is set with a hanging indent) ... [7 marks]

(ii) Another thing you're asked to do ... [13 marks]

(iii) Another thing you're asked to do ... [12 marks]

(iv) The last thing you're asked to do ... [8 marks]

while the input

```
\question DEF2
Text `setting the scene' for the whole question \ldots

\section % Note the blank line preceding this
The first thing you're asked to do (described in a moderately lengthy
paragraph which, as you can see, is not indented) \ldots
\marks{12}
\section
Another quite lengthy paragraph, describing the next thing you're asked to do.
(If these paragraphs were set with a hanging indent we would tend to lose
track of where the left margin is---and we'd waste space!)
\marks{10}
\section
Another thing you're asked to do \ldots
\marks{8}
\section
The last thing you're asked to do \ldots
\marks{10}
```

will produce the output

DEF2. Text 'setting the scene' for the whole question ...

(a) The first thing you're asked to do (described in a moderately lengthy paragraph which, as you can see, is not indented) ... [12 marks]

(b) Another quite lengthy paragraph, describing the next thing you're asked to do. (If these paragraphs were set with a hanging indent we would tend to lose track of where the left margin is—and we'd waste space!) [10 marks]

(c) Another thing you're asked to do ... [8 marks]

(d) The last thing you're asked to do ... [10 marks]

Incorporating graphics

Diagrams can cause problems. The use of physical cut-and-paste should be avoided if at all possible. The most common, and potentially the least troublesome, approach is the incorporation of Encapsulated PostScript files. These are allowed for in the style file, and their incorporation in the paper is signalled by using the examination style file with the `graphics` option. They are inserted at the appropriate point in the paper as follows:

```
\begin{center}
\includegraphics[width=3.5in]{mypic}
\end{center}
```

The example above relates to a file `mypic.eps`. Note that the `.eps` filetype is not specified; this is to facilitate the production of a PDF version of the paper later. (For more information on the use of `\includegraphics` see documentation for the `graphicx` package.)

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