

Typesetting lecture notes with `multinotes.sty`

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1 Options

The following package options are available.

| Option | Effect |
|---|--|
| <code>blanks</code> | <code>\blank</code> macros and <code>blankbox</code> environments replaced by whitespace |
| <code>noproofs</code> | proofs excluded |
| <code>blankproofs</code> | proofs replaced by whitespace |
| <code>noanswers</code> | answers excluded |
| <code>blankanswers</code> | answers replaced by whitespace |
| <code>langA</code> | include <code>langA</code> content |
| <code>langA</code> , <code>langB</code> | include <code>langA</code> and <code>langB</code> content |
| <code>parallel</code> | typeset languages simultaneously in separate columns |
| <code>slides</code> | landscape mode with screen fonts |

1.1 Preamble commands

The following preamble commands are available.

| Command | |
|---------------------------------------|---|
| <code>\textcolour{}</code> | set text colour |
| <code>\backgroundcolour{}</code> | set background colour |
| <code>\showcolour{}</code> | set text colour of blank boxes |
| <code>\proofcolour{}</code> | set text colour of proofs |
| <code>\answercolour{}</code> | set text colour of answer boxes |
| <code>\framedblankboxes</code> | for framed blankboxes |
| <code>\framedproofs</code> | for framed proofs |
| <code>\framedanswers</code> | for framed answers |
| <code>\setboxrule{}</code> | set frame thickness |
| <code>\setstretchfactor{}</code> | to accomodate handwriting in blank boxes |
| <code>\setimagestretchfactor{}</code> | to accomodate hand-drawing in blank boxes |

2 Inline boxes

The following macros replace their content by whitespace in response to different options. These can be used for partial handouts to accompany lectures or videos, or for missing-word exercises etc.

- `\blank{...}` is emptied by the `blanks` option.
- `\fillbox{...}` is emptied by `blankanswers` and `noanswers`.
- `\ans{...}` is emptied by `blankanswers` and removed for `noanswers`.

2.1 `\blank`

Inline text is replaced by whitespace.

```
Here is some \blank{text} to be hidden.
```

Here is some to be hidden.

2.2 `\fillbox`

Similar to `\blank` but controlled by the `blankanswers` option.

```
Roses are \fillbox{red}, violets are \fillbox{blue}.
```

Roses are red, violets are blue.

2.3 `\ans`

Similar to `\fillbox` but also controlled by the `noanswers` option.

- `blankanswers` replaces the content by blank space.
- `noanswers` removes the answer completely.

```
What is  $7\times 8$ ? \ans{54}
```

What is 7×8 ? 54

3 Display boxes

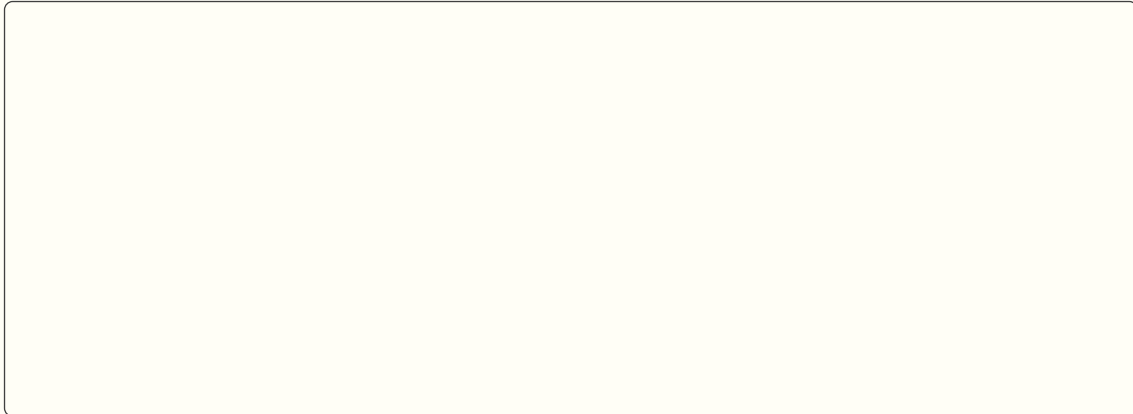
The following environments replace displayed content by whitespace. The `proof` and `answer` environments can also be removed entirely (courtesy of the `comment` package).

- `\begin{blankbox}...\end{blankbox}` is controlled by the `blank` option.
- `\begin{proof}...\end{proof}` is controlled by `blankproofs` and `noproofs`.
- `\begin{answer}...\end{answer}` is controlled by `blankanswers` and `noanswers`.

3.1 The `blankbox` environment

3.1.1 A simple `blankbox`

```
\begin{blankbox}  
\lipsum[1]  
\end{blankbox}
```



3.1.2 A blankbox with an optional title

```
\begin{blankbox}[\sl Some ideas]
\lipsum[13]
\end{blankbox}
```

Some ideas

3.1.3 A custom blankbox environment

Custom boxes controlled by the `blank` option can be defined as follows.

```
\newenvironment{solution}{
  \begin{blankbox}[\sl Sol.]
}{
  \end{blankbox}
}
\begin{solution}
Blah, blah ...
\end{solution}
```

Sol.

3.2 The proof environment

- `blankproofs` replaces the contents by blank space.
- `noproofs` removes the proof completely.

The `noproofs` option is implemented using the `comment` package. For it to work properly, the opening and closing commands `\begin{proof}` and `\end{proof}` must each appear on a line of its own, with no additional whitespace. This also applies to the `answer` environment and `noanswers` option (see below).

Here is a proof (might be removed).

Aliquam lectus. Vivamus leo. Quisque ornare tellus ullamcorper nulla. Mauris porttitor pharetra tortor. Sed fringilla justo sed mauris. Mauris tellus. Sed non leo. Nullam elementum, magna in cursus sodales, augue est scelerisque sapien, venenatis congue nulla arcu et pede. Ut suscipit enim vel sapien. Donec congue. Maecenas urna mi, suscipit in, placerat ut, vestibulum ut, massa. Fusce ultrices nulla et nisl. \square

This is produced by the following code.

```
\begin{proof}
...
\end{proof}
```

Here is a proof with a custom title (might be removed).

Proof of main theorem Aliquam lectus. Vivamus leo. Quisque ornare tellus ullamcorper nulla. Mauris porttitor pharetra tortor. Sed fringilla justo sed mauris. Mauris tellus. Sed non leo. Nullam elementum, magna in cursus sodales, augue est scelerisque sapien, venenatis congue nulla arcu et pede. Ut suscipit enim vel sapien. Donec congue. Maecenas urna mi, suscipit in, placerat ut, vestibulum ut, massa. Fusce ultrices nulla et nisl. \square

This is produced by the following code.

```
\begin{proof}[\sl Proof of main theorem]
...
\end{proof}
```

3.3 The answer environment

- `blankanswers` replaces the content by blank space.
- `noanswers` removes the answer completely.

Here is an answer environment (might be removed).

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

This is produced by the following code.

```
\begin{answer}  
...  
\end{answer}
```

Here is an answer environment with a custom title (might be removed)

Ans. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

This is produced by the following code.

```
\renewcommand{\answername}{\bf Ans.}  
\begin{answer}  
...  
\end{answer}
```

4 Questions, choices and checkboxes

The package replicates the list environments found in `exam.cls`, namely `questions`, `parts`, `subparts`, `choices` and `checkboxes` and makes them responsive to `blankanswers` and `noanswers`. For example,

```
\begin{exercise}\label{exe:demo}  
\begin{questions}  
\question What is  $8 \times 8$ ? \ans{54}  
\question State Pythagoras' theorem. \ans{$a^2+b^2=c^2$}  
\end{questions}  
\end{exercise}
```

Here is a list of questions inside a (theorem-like) exercise environment.

1

1. First question.

(a) First part Answer to first part.

(b) Second part

- (i) First subpart. Answer to first subpart.
- (ii) Second subpart. Answer to second subpart.
- (c) Third part Answer to third part.
2. Second question Answer to second question.

4.1 Multiple choice questions

In what year did Columbus first cross the Atlantic?

- ☐ 1490
- ☐ 1491
- ☒ **1492**
- ☐ 1493

This is produced by the following code.

```
In what year did Columbus first cross the Atlantic?
\begin{choices}
\choice 1490
\choice 1491
\correctchoice 1492
\choice 1493
\end{choices}
```

4.2 Multiple answer questions

Which of the following were members of the Beatles?

- ☒ **John**
- ☒ **Paul**
- ☒ **George**
- ☐ Zippy

This is produced by the following code.

```
Which of the following were members of the Beatles?
\begin{checkboxes}
\correctchoice John
\correctchoice Paul
\correctchoice George
\choice Zippy
\end{checkboxes}
```

2

Here is a (theorem-like) quiz with a fill-the-blanks question, a true-or-false question, a multiple choice question, and a multiple answer question.

Roses are `\fillbox{red}`, violets are `\fillbox{blue}`.

1. Fill in the blanks: *Roses are* *red*, *violets are* *blue*.
2. The rain in Spain falls mainly on the plain.
☒ **True**
☐ False
3. In what year did Columbus first cross the Atlantic?
☐ 1490
☐ 1491
☒ **1492**
☐ 1493
4. Which of the following were members of the Beatles?
☒ **John**
☒ **Paul**
☒ **George**
☐ Bingo

5 Videos

For PDF output, video content is rendered as hyperlinks.

5.1 `\includevideo`

The `\includevideo` command mirrors `\includegraphics`.

```
\includevideo[scale=0.5]{https://www.youtube.com/embed/oCDXhvXye9E}
```

5.2 The video environment

A new float called `video` mimics the `figure` and `table` environments. These can be framed and captioned. A corresponding `\listofvideos` (suffix `.lov`) can be included.

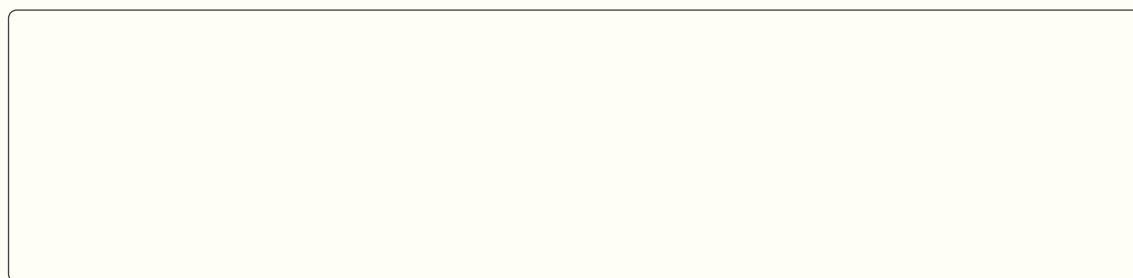
```
\begin{video}  
  \centering  
  \includevideo[scale=0.5]{https://www.youtube.com/embed/oCDXhvXye9E}  
  \caption{Proof of theorem~1\label{vid:pf1}}  
\end{video}
```


6 Images

6.1 `\includegraphics`

`\includegraphics{img}` replaces `img` by whitespace whenever the `blanks` option is set.

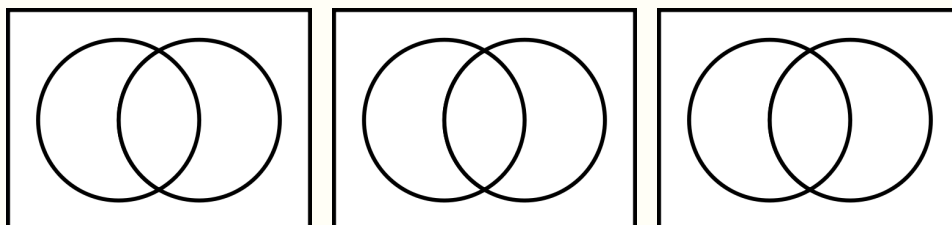
```
\begin{blankbox}
\resizebox{0.3\textwidth}{!}{\includegraphics{AcupB}}
\end{blankbox}
```



6.2 `\includetwographics`

`\includetwographics{img1}{img2}` shows `img2` whenever `blanks`, `blankproofs` or `blankanswers` is set, otherwise it shows `img1`. This can be used to print partial images in handout notes and exercise sheets.

```
\begin{blankbox}
\resizebox{0.3\textwidth}{!}{\includetwographics[scale=1]{AcupB}{emptyset}}
\resizebox{0.3\textwidth}{!}{\includetwographics[scale=1]{AcapB}{emptyset}}
\resizebox{0.3\textwidth}{!}{\includetwographics[scale=1]{Acomp}{emptyset}}
\end{blankbox}
```



6.3 TikZ

Here is a tikz picture in a blankbox. The `\blanktikz` command should make it disappear when the `blanks` option is set.

```
\begin{blankbox}  
\blanktikz  
\resizebox{0.5\textwidth}{!}{\tikz\pic{rwalk};}  
\end{blankbox}
```

7 Slides

The `slides` option produces a landscape document with big fonts. The package defines the macro `\framebreak`. This produces a `\newpage` when the `slides` option is set, but otherwise has no effect. There is some scope to extend this functionality. Landscape mode is handy for bilingual (two-column) documents.

A Prime numbers quiz

1. What are the prime factors of 42?

- ☐ 3×14
- ☒ $2 \times 3 \times 7$
- ☐ 2×21

2. What are the prime factors of 150?

- ☒ $2 \times 3 \times 5 \times 5$
- ☐ $3 \times 3 \times 5 \times 5$
- ☐ 6×25

3. What is the LCM of 13 and 3?

- ☐ 13
- ☐ 3
- ☒ 39

4. What is the HCF of 32 and 24?

- ☐ 2
- ☒ 8
- ☐ 4

5. What is the LCM of 24 and 36?

- ☐ 12
- ☒ 72
- ☐ 30

6. What is the HCF of 104 and 136?

- ☒ 8
- ☐ 12
- ☐ 13

7. What is the HCF of 3×13 and $2^2 \times 13$?

- ☐ 9
- ☐ 17
- ☒ 13

8. What is the LCM of $2^2 \times 3^2 \times 5$ and $2^3 \times 3 \times 5$?

- ☒ 360
- ☐ 16 120
- ☐ 30

9. What is the HCF of $2 \times 5 \times 13$ and 22×13 ?

- ☐ 13
- ☒ 26
- ☐ 52

10. Find the LCM of $3^2 \times 11 \times 13$ and 3×11^2 .

- ☐ 1287
- ☒ 14 157
- ☐ 429