

The **cmnotes** package (v1.0)

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The **cmnotes** package provides tools for typesetting lecture notes and provides an interface to the **camel** and **latex-tree** document processing systems.

1 Introduction

This package provides commands for typesetting lecture notes in various formats, and mimics some macros and environments from **exam.cls** for setting questions and answers, including multiple choice and multiple answer questions. The package also provides a standard interface to the **latex-tree** and **camel** python packages.

The most recent version of the package can be found at

<https://github.com/cardiffmaths/texmf/tex/latex/cmnotes>

2 Options

The following options are available.

| | |
|---------------------|-----------------------------------|
| proofs | proofs included (default). |
| noproofs | proofs excluded. |
| blankoproofs | blank box (for partial handouts). |
| answers | answers included (default). |
| noanswers | answers excluded. |
| blankanswers | blank box (for partial handouts). |

3 Macros

| | |
|---------------------------------|--------------------------|
| <code>\blankon</code> | Switch blank mode on. |
| <code>\blankoff</code> | Switch blank mode off. |
| <code>\setproofcolour</code> | Set the proof colour. |
| <code>\setsolutioncolour</code> | Set the solution colour. |

| | |
|-------------------------------|------------------------|
| <code>\setanswercolour</code> | Set the answer colour. |
| <code>\setscalefactor</code> | blah |
| <code>\setscaleimages</code> | blah |

4 Environments

| | |
|-----------------------|--|
| <code>blankbox</code> | The contents of a <code>blankbox</code> environment will be replaced by an empty box whose height to equal the height of the (hidden) contents multiplied by <code>\stretchfactor</code> . |
| <code>proof</code> | blah |
| <code>solution</code> | blah |
| <code>answer</code> | blah |

5 Questions and Answers

The package modifies some of the macros and environments found in `exam.cls` for defining different types of question, including multiple choice and multiple answer questions.

| | |
|------------------------|--|
| <code>questions</code> | A list environment for questions. |
| <code>\question</code> | Item type for the <code>questions</code> list environment. |
| <code>parts</code> | A list environment for parts of a question. These can an only be defined within a <code>\question</code> item. |
| <code>\part</code> | Item type for the <code>parts</code> list environment. |
| <code>answer</code> | An environment for answers. |
| <code>\ans</code> | A macro for short answers (wrapper for an <code>answer</code> environment). |

6 Implementation

6.1 Declare options and load packages

Declare and process options

```

1 \newif\if@noproofs\@noproofsfalse
2 \DeclareOption{noproofs}{\@noproofstrue}
3 \newif\if@blankproofs\@blankproofsfalse
4 \DeclareOption{blankproofs}{\@blankproofstrue}
5
6 \newif\if@nosolutions\@nosolutionsfalse
7 \DeclareOption{nosolutions}{\@nosolutionstrue}
8 \newif\if@blanksolutions\@blanksolutionsfalse
9 \DeclareOption{blanksolutions}{\@blanksolutionstrue}
10
11 \newif\if@noanswers\@noanswersfalse
12 \DeclareOption{noanswers}{\@noanswerstrue}
13 \newif\if@blankanswers\@blankanswersfalse
14 \DeclareOption{blankanswers}{\@blankanswerstrue}
15

```

```

16 \newif\if@blanktext\@blanktextfalse
17 \DeclareOption{blanktext}{\@blanktexttrue}
18
19 \newif\if@blankimages\@blankimagesfalse
20 \DeclareOption{blankimages}{\@blankimagestrue}
21 \newif\if@blankallimages\@blankallimagesfalse
22 \DeclareOption{blankallimages}{\@blankallimagestrue}
23
24 \newif\if@student\@studentfalse
25 \DeclareOption{student}{\%
26 \@noanswerstrue
27 \@blankproofstrue
28 \@blanksolutionstrue
29 \@blanktexttrue
30 \@blankimagestrue
31 }
32 \ProcessOptions
33 \relax

Type out some useful information
34 \typeout{-----}
35 \if@noproofs\typeout{No Proofs}\fi
36 \if@noanswers\typeout{No Answers}\fi
37 \if@blankproofs\typeout{Blank Proofs}\fi
38 \if@blanksolutions\typeout{Blank Solutions}\fi
39 \typeout{-----}

Load all required packages
40 \RequirePackage{amsmath,amsfonts,amssymb}
41 \RequirePackage[dvipsnames]{xcolor}
42 \RequirePackage{newfloat}
43 \RequirePackage{caption}
44 \RequirePackage{graphicx}
45 \RequirePackage{tikz}
46 \RequirePackage{comment}
47 \RequirePackage{environ}
48 \RequirePackage{setspace}
49 \RequirePackage{etoolbox}
50 \RequirePackage{tcolorbox}
51 \tcbuselibrary{breakable}
52 \tcbuselibrary{skins}

Set entity names (override these with culang.sty)
53 \let\proofname\@undefined
54 \newcommand{\proofname}{Proof}
55 \newcommand{\questionname}{Question}
56 \newcommand{\answername}{Answer}
57 \newcommand{\solutionname}{Solution}
58 \newcommand{\quizname}{Quiz}
59 \newcommand{\responsename}{Response}

```

6.2 Colours

Set default colours

```
60 \newcommand{\cmnotes@HideColour}{white}
61 \newcommand{\cmnotes@TextColour}{black}
62 \newcommand{\cmnotes@ShowColour}{black}
63 \newcommand{\cmnotes@ProofColour}{black}
64 \newcommand{\cmnotes@SolutionColour}{black}
65 \newcommand{\cmnotes@AnswerColour}{black}
66 \newcommand{\cmnotes@ResponseColour}{black}
67 \newcommand{\cmnotes@NextColour}{black}
68 \AtBeginDocument{
69 \color{\cmnotes@TextColour}
70 }
```

Commands for setting custom colours

```
71 \newcommand{\hidecolour}[1]{\renewcommand{\cmnotes@HideColour}{#1}}
72 \newcommand{\textcolour}[1]{\renewcommand{\cmnotes@TextColour}{#1}}
73 \newcommand{\showcolour}[1]{\renewcommand{\cmnotes@ShowColour}{#1}}
74 \newcommand{\proofcolour}[1]{\renewcommand{\cmnotes@ProofColour}{#1}}
75 \newcommand{\solutioncolour}[1]{\renewcommand{\cmnotes@SolutionColour}{#1}}
76 \newcommand{\answercolour}[1]{\renewcommand{\cmnotes@AnswerColour}{#1}}
77 \newcommand{\responsecolour}[1]{\renewcommand{\cmnotes@ResponseColour}{#1}}
```

6.3 Show/Hide

`\hideon` Basic show/hide commands and aliases
`\hideoff`

```
78 \newcommand{\hideon}{
79 \if@blankimages
80 \@blankimagesnowtrue
81 \@blanktikz
82 \fi
83 \color{\cmnotes@NextColour}
84 }
85 \newcommand{\hideoff}{
86 \if@blankallimages
87 \null
88 \else
89 \@blankimagesnowfalse
90 \@fixtikz
91 \fi
92 }
93 \newcommand{\blankson}{\hideon}
94 \newcommand{\blanksoff}{\hideoff}
```

6.4 Boxes

`\setstretchfactor` Set stretch factor for blank boxes. This parameter is passed to the `\setstretch` command of the `setspace` package.

```

95 \newcommand{\cmnotes@StretchFactor}{1}
96 \newcommand{\setstretchfactor}[1]{\renewcommand{\cmnotes@StretchFactor}{#1}}

cmnotesbox The basic box. This implements show/hide via \hideon and \hideoff.
97 \newcommand{\cmnotesboxtitle}{}
98 \newenvironment{cmnotesbox}{%
99 \par
100 \vspace*{\parskip}
101 \hideon
102 \begin{tcolorbox}[
103 breakable,
104 notitle,
105 boxrule=0.5pt,
106 colback=white,
107 before={\@fixtikz},
108 after={\hideoff},
109 coltext={\cmnotes@NextColour},
110 skin=enhanced,
111 height fixed for = first and middle,
112 ignore nobreak
113 ]
114 \textcolor{\cmnotes@TextColour}{\noindent\cmnotesboxtitle}
115 \begingroup
116 }{
117 \endgroup
118 \hideoff
119 \end{tcolorbox}
120 }
121 \AfterEndEnvironment{cmnotesbox}{\hideoff}

solution Solution box. Can be visible, blank or invisible.
Solutions are associated with examples.
(Answers are associated with questions, see below.)
Implements nosolutions using the comment package.
122 \if@nosolutions
123 \excludecomment{solution}
124 \else
125 \newcommand{\solutiontitle}{\noindent\textbf{\solutionname:}\enspace}
126 \newenvironment{solution}{
127 \renewcommand{\cmnotesboxtitle}{\solutiontitle}
128 \if@blanksolutions
129 \renewcommand{\cmnotes@NextColour}{\cmnotes@HideColour}
130 \setstretch{\cmnotes@StretchFactor}
131 \else
132 \renewcommand{\cmnotes@NextColour}{\cmnotes@SolutionColour}
133 \setstretch{1}
134 \fi
135 \begin{cmnotesbox}
136 }{

```

```

137 \end{cmnotesbox}
138 }
139 \fi

```

proof Proof box. Can be visible, blank or invisible.
 Proofs are associated with *theorems*.
 Implements **noproofs** using the **comment** package. Implements **blankproofs** by changing text colour. Any existing proof environment (e.g. from **amsthm**) are killed first.

```

140 \let\proof\@undefined
141 \let\endproof\@undefined
142 \if@noproofs
143 \excludecomment{proof}
144 \else
145 \newcommand{\prooftitle}{\noindent\textbf{\proofname:}\enspace}
146 \newenvironment{proof}{
147 \renewcommand{\cmnotesboxtitle}{\prooftitle}
148 \if@blankproofs
149 \renewcommand{\cmnotes@NextColour}{\cmnotes@HideColour}
150 \else
151 \renewcommand{\cmnotes@NextColour}{\cmnotes@ProofColour}
152 \fi
153 \begin{cmnotesbox}
154 }{
155 \end{cmnotesbox}
156 }
157 \fi

```

blankbox Blank box. Can be visible or blank.
 Implements the **blanktext** option by changing text colour.
 These can be used anywhere.

```

158 \newenvironment{blankbox}{
159 \renewcommand{\cmnotesboxtitle}{
160 \if@blanktext
161 \renewcommand{\cmnotes@NextColour}{\cmnotes@HideColour}
162 \setstretch{\cmnotes@StretchFactor}
163 \else
164 \renewcommand{\cmnotes@NextColour}{\cmnotes@ShowColour}
165 \setstretch{1}
166 \fi
167 \begin{cmnotesbox}
168 }{
169 \end{cmnotesbox}
170 }

```

answer Answer box. Can be visible, blank or invisible.
 Answers are associated with *exercises*.
 (Solutions are associated with examples, see above.)

Implements `noanswers` using the `environ` package.
 Implements `blankanswers` by changing text colour.
 We use `environ` because `\exludecomment` can not be
 used within a `\begin{parts}...\end{parts}` environment as
 defined in `exam.cls` and replicated below.

```

171 \newcommand{\answertitle}{\noindent\textbf{\answername:}\enspace}
172 \NewEnviron{answer}{%
173 \if@noanswers\else%
174 \renewcommand{\cmnotesboxtitle}{\answertitle}
175 \if@blankanswers
176 \renewcommand{\cmnotes@NextColour}{\cmnotes@HideColour}
177 \setstretch{\cmnotes@StretchFactor}
178 \else
179 \renewcommand{\cmnotes@NextColour}{\cmnotes@AnswerColour}
180 \setstretch{1}
181 \fi
182 \begin{cmnotesbox}
183 \BODY
184 \end{cmnotesbox}
185 \fi%
186 }{}

```

`\prf` Command for short proofs. (A wrapper for the `proof` environment.)

```

187 \newcommand{\prf}[1]{\begin{proof}{#1}\end{proof}}

```

`\sol` Command for short solutions. (A wrapper for the `solution` environment.)

```

188 \newcommand{\sol}[1]{\begin{solution}{#1}\end{solution}}

```

`\ans` Command for short answers. (A wrapper for the `answer` environment.)

```

189 \newcommand{\ans}[1]{\begin{answer}{#1}\end{answer}}

```

`\bbx` Command for short blank boxes. (A wrapper for the `blankbox` environment.)

```

190 \newcommand{\bbx}[1]{\begin{blankbox}{#1}\end{blankbox}}

```

6.5 Switches

`answerson` Environments to override global options (include/exclude answers).

`answersoff` As with all environments they can be used as switches:

```

\answerson ... \endanswerson
\answersoff ... \endanswersoff

191 \newif\if@globalnoanswers\@globalnoanswersfalse
192 \newif\if@globalblankanswers\@globalblankanswersfalse
193 \if@noanswers
194 \@globalnoanswerstrue
195 \fi
196 \if@blankanswers
197 \@globalblankanswerstrue

```

```

198 \fi
199 \newenvironment{answerson}{
200 \@noanswersfalse
201 \@blankanswersfalse
202 \begingroup
203 }{
204 \endgroup
205 \if@globalnoanswers\@noanswerstrue\else\@noanswersfalse\fi
206 \if@globalblankanswers\@blankanswerstrue\else\@blankanswersfalse\fi
207 }
208 \newenvironment{answersoff}{
209 \@noanswerstrue
210 \begingroup
211 }{
212 \endgroup
213 \if@globalnoanswers\@noanswerstrue\else\@noanswersfalse\fi
214 }

```

6.6 Images

```

\setscaleimage  modify scale of hidden images
215 \newcommand{\cmnotes@ScaleHiddenImages}{1.5}
216 \newcommand{\setscaleimages}[1]{\renewcommand{\cmnotes@ScaleHiddenImages}{#1}}

blankimagesnow  hide images and tikz pictures this uses an internal switch @blankimagesnow
217 \newif\if@blankimagesnow
218 \if@blankallimages
219 \@blankimagesnowtrue
220 \fi

\includegraphics  Redefine includegraphics
221 \let\oldincludegraphics=\includegraphics
222 \renewcommand\includegraphics[2][{}]{
223 \if@blankimagesnow
224 \scalebox{\cmnotes@ScaleHiddenImages}{
225 \phantom{\oldincludegraphics[#1]{#2}}
226 }
227 \else
228 \oldincludegraphics[#1]{#2}
229 \fi
230 }

\tikzmagic  Tikz magic!
231 \if@blankimagesnow
232 \tikzset{
233 every picture/.append style={%
234 scale=\cmnotes@ScaleHiddenImages,
235 execute at end picture={\draw[fill=white,rounded corners=5pt] (current bounding box.south west)
236 }

```



```

237 }
238 \fi

\@blanktikz Internal command.
239 \newcommand{\@blanktikz}{
240 \if@blankimagesnow
241 \tikzset{
242 every picture/.append style={%
243 scale=\cmnotes@ScaleHiddenImages,
244 execute at end picture={\draw[gray!20,thick,fill=white] (current bounding box.south west) recta
245 }
246 }
247 \fi
248 }

\@fixtikz Internal command. Draws a white box around each tikzpicture when @blankim-
agesnow is true
249 \newcommand{\@fixtikz}{
250 \tikzset{
251 every picture/.style={}
252 }
253 }

blankgraphics If option blankimages is used, the image is replaced with blank space of the same
size.
254 \newcommand{\blankgraphics}[2][scale=1]{
255 \if@blankimages
256 \scalebox{\cmnotes@ScaleHiddenImages}{\phantom{\oldincludegraphics[#1]{#2}}}
257 \else
258 \oldincludegraphics[#1]{#2}
259 \fi
260 }

altgraphics Shows the second image if option blankimages is set, otherwise shows the first
image.
261 \newlength\imageheight
262 \newlength\imagewidth
263 \newcommand{\altgraphics}[3][scale=1]{
264 \if@blankimages
265 \settoheight{\imageheight}{\oldincludegraphics[#1]{#2}}
266 \settowidth{\imagewidth}{\oldincludegraphics[#1]{#2}}
267 \scalebox{\cmnotes@ScaleHiddenImages}{
268 \oldincludegraphics[height=\imageheight,width=\imagewidth,keepaspectratio]{#3}
269 }
270 \else
271 \oldincludegraphics[#1]{#2}
272 \fi
273 }

```

`hidegraphics` To manually specify different dimensions for the ‘blanks’ and ‘full’ versions of an image

```

274 \newcommand{\hidegraphics}[2][scale=1]{
275 \if@blankimages
276 \oldincludegraphics[#1]{#2}
277 \else
278 \null
279 \fi
280 }
281 \newcommand{\showgraphics}[2][scale=1]{
282 \if@blankimages
283 \null
284 \else
285 \oldincludegraphics[#1]{#2}
286 \fi
287 }

```

6.7 Macros and environments adapted from exam.cls

Commands to define symbols for choices and checkboxes

```

288 \newcommand{\choicechar}[1]{\def\choice@char{#1}}
289 \newcommand{\chosenchar}[1]{\def\chosen@char{#1}}
290 \newcommand{\checkboxchar}[1]{\def\checkbox@char{#1}}
291 \newcommand{\checkedchar}[1]{\def\checked@char{#1}}

```

Set default symbols

```

292 \newcommand{\bigsquare}{\raisebox{0.5ex}{\fbox{\phantom{\rule{0.5ex}{0.5ex}}}}}
293 \choicechar{$\bigcirc$}
294 \chosenchar{$\text{\rlap{\,$\checkmark$}}\bigcirc$}
295 \checkboxchar{$\bigsquare$}
296 \checkedchar{$\text{\rlap{\,$\checkmark$}}\bigsquare$}

```

Hooks (for customization)

```

297 \newcommand\questionshook{}
298 \newcommand\partshook{}
299 \newcommand\subpartshook{}
300 \newcommand\subsubpartshook{}
301 \newcommand\choiceshook{}
302 \newcommand\checkboxeshook{}

```

Counters

```

303 \newcounter{question}
304 \newcounter{partno}
305 \newcounter{subpart}
306 \newcounter{subsubpart}
307 \newcounter{choice}

```

Item labels for questions, parts, subparts and subsubparts

```

308 \newcommand\questionlabel{\arabic{question}.}
309 \newcommand\partlabel{(\alph{partno})}

```

```

310 \newcommand\subpartlabel{(\roman{subpart})}
311 \newcommand\subsubpartlabel{\alph{subsubpart}.}

Questions

312 \newenvironment{questions}{
313   \def\@queslevel{question}
314   \def\question{
315     \def\thequestiontitle{\questionname~thequestion}
316     \@checkqueslevel{question}
317     \item
318   }
319   \def\subpart{
320     \@checkqueslevel{subpart}
321     \item
322   }
323   \def\subsubpart{
324     \@checkqueslevel{subsubpart}
325     \item
326   }
327   \list{\questionlabel}{
328     \usecounter{question}
329     \settowidth{\leftmargin}{10.\hskip\labelsep}
330     \labelwidth\leftmargin\advance\labelwidth-\labelsep
331     \partopsep=0pt
332     \questionshook
333   }
334 }{
335 \endlist
336 }

Parts

337 \newenvironment{parts}{
338   \def\@queslevel{part}
339   \def\part{
340     \@checkqueslevel{part}
341     \item
342   }
343   \list{\partlabel}{
344     \usecounter{partno}\def\makelabel##1{\hss\llap{##1}}
345     \settowidth{\leftmargin}{(m)\hskip\labelsep}
346     \labelwidth\leftmargin\advance\labelwidth-\labelsep
347     \topsep=0pt
348     \partopsep=0pt
349     \partshook
350   }
351 }{
352 \endlist
353 }

Subparts

354 \newenvironment{subparts}{

```

```

355 \def\@queslevel{subpart}
356 \list{\subpartlabel}{
357     \usecounter{subpart}\def\makelabel##1{\hss\llap{##1}}
358     \settowidth{\leftmargin}{vii.\hskip\labelsep}
359     \labelwidth\leftmargin\advance\labelwidth-\labelsep
360     \topsep=0pt
361     \partopsep=0pt
362     \subpartshook
363 }
364 }{
365 \endlist
366 }

Subsubparts
367 \newenvironment{subsubparts}{
368 \def\@queslevel{subsubpart}
369 \list{\subsubpartlabel}{
370     \usecounter{subsubpart}\def\makelabel##1{\hss\llap{##1}}
371     \settowidth{\leftmargin}{(\psi)\hskip\labelsep}
372     \labelwidth\leftmargin\advance\labelwidth-\labelsep
373     \topsep=0pt
374     \partopsep=0pt
375     \subsubpartshook
376 }
377 }{
378 \endlist
379 }

Choices
380 \renewcommand\thechoice{\Alph{choice}.}
381 \newcommand\choicelabel{\thechoice}
382 \newif\if@correctchoice
383 \@correctchoicefalse
384 \newcommand\CorrectChoiceEmphasis[1]{
385 \def\CorrectChoice@Emphasis{#1}
386 }
387 \CorrectChoiceEmphasis{\bfseries}
388 \let\correctchoiceemphasis\CorrectChoiceEmphasis
389 \newenvironment{choices}{
390 \list{\choice@char}{
391 \usecounter{choice}
392 \settowidth{\leftmargin}{W.\hskip\labelsep}
393     \def\choice{
394     \if@correctchoice
395     \endgroup
396     \fi
397     \item
398 }
399 \def\CorrectChoice{
400 \if@correctchoice
401     \endgroup

```

```

402         \fi
403         \if@noanswers
404 \item
405 \else
406 \if@blankanswers
407 \item
408 \else
409 \begingroup
410             \@correctchoicetrue
411 \CorrectChoice@Emphasis
412             \item[\chosen@char]
413         \fi
414 \fi
415 }
416 \let\correctchoice\CorrectChoice
417         \topsep=2pt
418         \partopsep=0pt
419         \choiceshook
420 }
421 }{
422 \if@correctchoice
423 \endgroup
424 \fi
425 \endlist
426 }

Checkboxes
427 \newenvironment{checkboxes}{
428 \list{\checkbox@char}{
429 \usecounter{choice}
430         \settowidth{\leftmargin}{W.\hskip\labelsep}
431         \def\choice{
432             \if@correctchoice
433                 \endgroup
434             \fi
435 \item
436 }
437 \def\CorrectChoice{
438     \if@correctchoice
439         \endgroup
440     \fi
441     \if@noanswers
442         \item
443 \else
444 \if@blankanswers
445 \item
446 \else
447 \begingroup
448         \@correctchoicetrue
449         \CorrectChoice@Emphasis

```

```

450             \item[\checked@char]
451 \fi
452 \fi
453 }
454     \let\correctchoice\CorrectChoice
455     \topsep=2pt
456     \partopsep=0pt
457     \checkboxeshook
458 }
459 }{
460     \if@correctchoice
461         \endgroup
462     \fi
463     \endlist
464 }
465 %% Validatte nesting level
466 %     \begin{macrocode}
467 \def\@checkqueslevel#1{
468     \begingroup
469     \def\@temp{#1}
470     \ifx\@temp\@queslevel
471         \null
472     \else
473         \ClassError{cmnotes}{
474             I found a #1 where I expected to find a \@queslevel
475             \MessageBreak
476         }{
477             Both #1 and \@queslevel \space can be used only inside the correct
478             \MessageBreak \space \space
479             environment and outside of any smaller environment
480             \MessageBreak
481         }
482     \fi
483     \endgroup
484 }
485
486 Move up one level
487 \long\def\uplevel#1{
488     \par\bigskip
489     \vbox{
490         \leftskip=\@totalleftmargin
491         \advance\leftskip-\leftmargin
492         \advance\@totalleftmargin-\leftmargin
493         \advance\linewidth\leftmargin
494         #1
495     }
496     \nobreak
497 }

```

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