The **tma** Package*

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Abstract

The **tma** package provides macros and environments to assist in writing Tutor Marked Assessments (TMAs) for Open University courses.

Contents

1   Introduction

The **tma** package simplifies the creation of TMAs by providing an environment to encompass answers to questions, commands to enumerate parts and subparts of those questions, and a set of macros fascilitating mathematical entry based upon the styles used by the Open University.

2   Usage

To use the **tma** package it should be included in the preamble of your LaTeX document:

```
%    \documentclass[a4paper,11pt]{article}
%    \usepackage{tma}
%
```

\name

\tma

\course

\pin

\thedate

\thequestion

\theqpart

\theqsubpart

\theqpart

\theqsubpart

\theqpart

\theqsubpart

3   Implementation

```
1 %% tma.sty
2 %% Copyright 2025 G. I. Riley
3 %
4 % This work may be distributed and/or modified under the
5 % conditions of the LaTeX Project Public License, either version 1.3
6 % of this license or (at your option) any later version.
7 % The latest version of this license is in
8 %    http://www.latex-project.org/lppl.txt
9 % and version 1.3 or later is part of all distributions of LaTeX
10 % version 2005-12-01 or later.
11 %
12 % This work has the LPPL maintenance status 'maintained'.
13 %
14 % The Current Maintainer of this work is G. I. Riley.
15 %
16 %% This package may be freely used, especially by, but not limited to, students,
17 %% lecturers, and staff of the Open University. It has been created by the
18 %% efforts of many who are now or have been connected with the Open University
19 %% Students Association. No acknowledgement is _required_ for using this package
20 %% within the production of a _Tutor Marked Assessment._
```

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Package Options

- [alph] (default) question numbering as 1(b)(iii)

- [roman] varies question numbering to sequence used by M381 i.e. 1(ii)(c)

- [cleveref] question numbering creates automatic referencing for use with cleveref package

- [pdfbookmark] add PDF bookmarks for each question using hyperref package

- [legacy] enables old definitions of \vec and \C for backward compatibility

To use a package option, place the option(s) before the package name: \usepackage[roman,cleveref]{tma}

```
21 \RequirePackage{expl3} % LaTeX3 "experimental"
```

---

*This document corresponds to tma v1.19, dated 2025-02-18.

3.1   Package Initialisation

```
22 %%%%%%%%%%%%%%%%%%%%%%%%%%
23 %% Package Initialization
24 %%%%%%%%%%%%%%%%%%%%%%%%%%
25 \ExplSyntaxOn
26 \tl_new:N \g_tma_constant_name
27 \tl_new:N \g_tma_constant_tma
28 \tl_new:N \g_tma_constant_course
29 \tl_new:N \g_tma_constant_pin
30 \tl_new:N \g_tma_constant_thedate
31
32 \tl_gset:Nn \g_tma_constant_name {name}
33 \tl_gset:Nn \g_tma_constant_tma {tma}
34 \tl_gset:Nn \g_tma_constant_course {course}
35 \tl_gset:Nn \g_tma_constant_pin {pin}
36 \tl_gset:Nn \g_tma_constant_thedate {the~date}
37
38 \newcommand{\name}{\g_tma_constant_name}
39 \newcommand{\tma}{\g_tma_constant_tma}
40 \newcommand{\course}{\g_tma_constant_course}
41 \newcommand{\pin}{\g_tma_constant_pin}
42 \newcommand{\thedate}{\g_tma_constant_thedate}
43
44 \NewDocumentCommand{\myname}{m}{%
45  \tl_gset:Nn \g_tma_constant_name{#1}}
46 \NewDocumentCommand{\mytma}{m}{%
47  \tl_gset:Nn \g_tma_constant_tma{#1}}
48 \NewDocumentCommand{\mycourse}{m}{%
49  \tl_gset:Nn \g_tma_constant_course{#1}}
50 \NewDocumentCommand{\mypin}{m}{%
51  \tl_gset:Nn \g_tma_constant_pin{#1}}
52 \NewDocumentCommand{\setdate}{m}{%
53  \date{#1}\tl_gset:Nn \g_tma_constant_thedate{#1}}
54 \ExplSyntaxOff
55
56 \title{\textbf{TMA: \course-\tma}}
57 \author{\textbf{\name\space\pin}}
58
59
60 \NewDocumentCommand{\tma@questionstring}{}{\relax}
61 \NewDocumentCommand{\setquestionstring}{m}{%
62  \RenewDocumentCommand{\tma@questionstring}{}{#1}}
63 \setdate{\today}
64
65 %%%%%%%%%%%%%%%%%%%%%%%%%%
66 %% Package Loading
67 %%%%%%%%%%%%%%%%%%%%%%%%%%
68
69 \RequirePackage{amsmath}
70 \RequirePackage{amssymb}
71 \RequirePackage{amsthm}
72 \RequirePackage{wasysym}
73 \RequirePackage{bm}
74 \RequirePackage{upgreek}
75 \RequirePackage{graphicx}
76 \RequirePackage{lastpage}
77 \RequirePackage{xifthen}
78 \RequirePackage{verbatim}
79 \RequirePackage{fancyhdr}
80 \RequirePackage{geometry}
```

```
81 \RequirePackage{calc}
82 \RequirePackage[UKenglish]{isodate} % use UK format for date
83 \cleanlookdateon % remove th,st, rd from date
84
85 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
86 %% Geometry Settings
87 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
88
89 \geometry{
90 headheight=10mm,
91 headsep=5mm,
92 bottom=25mm,
93 footskip=15mm,
94 left=30mm,
95 right=30mm,
96 marginparwidth=0mm,
97 marginparsep=0mm,
98 includemp
99 }
100
101 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
102 %% Margin Notes
103 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
104
105 \NewDocumentCommand{\marginnote}{m}{\marginpar{#1}}
106 \NewDocumentCommand{\marginnotes}{}{
107 \geometry{
108   marginparwidth=40mm,
109   marginparsep=5mm,
110   left=20mm,
111   right=15mm
112 }
113 }
114
115 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
116 %% Question Numbering
117 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
118
119 \newcounter{question}
120 \newcounter{qpart}[question]
121 \newcounter{qsubpart}[qpart]
122 \renewcommand{\thequestion}{\arabic{question}}
123
124 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
125 %% Option Handling
126 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
127 % Define boolean flags
128 \newif\iftma@roman
129 \newif\iftma@usecleveref
130 \newif\iftma@usepdfbookmark
131 \newif\iftma@legacy
132
133 % Set default options
134 \tma@romanfalse          % Default numbering is 'alph'
135 \tma@useclevereffalse    % Default is not to use cleveref
136 \tma@usepdfbookmarkfalse % Default is not to use pdfbookmark
137 \tma@legacyfalse         % Default is not to use legacy definitions
138
139 % Define commands with default values
140 \renewcommand{\theqpart}{\alph{qpart}}
141 \renewcommand{\theqsubpart}{\roman{qsubpart}}
```

```
142 \NewDocumentCommand{\tma@crefname}{mmm}{\relax}
143 \NewDocumentCommand{\tma@stepcounter}{m}{\stepcounter{#1}}
144 \NewDocumentCommand{\tma@bookmark}{O{0}mm}{\relax}
145 \NewDocumentCommand{\tma@pageref}{m}{\pageref{#1}}
146
147 % Declare options
148 \DeclareOption{roman}{%
149  \tma@romantrue%
150 }
151
152 \DeclareOption{alph}{%
153  \tma@romanfalse%
154 }
155
156 \DeclareOption{cleveref}{%
157  \tma@useclevereftrue%
158 }
159
160 \DeclareOption{pdfbookmark}{%
161  \tma@usepdfbookmarktrue%
162 }
163
164 \DeclareOption{legacy}{%
165  \tma@legacytrue%
166 }
167
168 \DeclareOption*{%
169  \PackageWarning{tma}{Unknown option '\CurrentOption'}%
170 }
171
172 % Process options
173 \ProcessOptions\relax
174
175 \typeout{*************** OPTION RESULTS **********}
176 \iftma@usepdfbookmark
177 \typeout{pdfbookmark is TRUE}
178 \else
179 \typeout{pdfbookmark is FALSE}
180 \fi
181 \iftma@roman
182 \typeout{roman is TRUE}
183 \else
184 \typeout{roman is FALSE}
185 \fi
186 \iftma@usecleveref
187 \typeout{cleveref is TRUE}
188 \else
189 \typeout{cleveref is FALSE}
190 \fi
191 \iftma@legacy
192 \typeout{legacy is TRUE}
193 \else
194 \typeout{legacy is FALSE}
195 \fi
196 \typeout{************* END OPTION RESULTS **********}
197
198
199 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
200 %% Set Up Package Based on Options
201 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
202
```

```
203 % Set question numbering
204 \iftma@roman
205 \renewcommand{\theqpart}{\roman{qpart}}
206 \renewcommand{\theqsubpart}{\alph{qsubpart}}
207 \else
208 \renewcommand{\theqpart}{\alph{qpart}}
209 \renewcommand{\theqsubpart}{\roman{qsubpart}}
210 \fi
211 % Load hyperref if necessary
212 \iftma@usepdfbookmark
213 \AtBeginDocument{%
214  \hypersetup{%
215   colorlinks=true,%
216   linkcolor=blue,%
217   urlcolor=blue,%
218   pdfstartview=FitH,%
219   pdftitle={TMA~\tma}, %
220   pdfauthor={\name~|~\pin}, %
221   pdfkeywords={OUCU:~\pin, TMA~\tma}, %
222   pdfsubject=\course%
223  }%
224 }
225 \RequirePackage[pdfencoding=unicode,psdextra]{hyperref}
226 \fi
227
228 % Load cleveref if necessary
229 \iftma@usecleveref
230 % Ensure hyperref is loaded before cleveref
231 \@ifpackageloaded{hyperref}%
232 {}%
233 {\RequirePackage[pdfencoding=unicode,psdextra]{hyperref}}
234 \RequirePackage{cleveref}
235 % Redefine commands for cleveref
236 \RenewDocumentCommand{\tma@crefname}{mmm}{\crefname{#1}{#2}{#3}}
237 \RenewDocumentCommand{\tma@stepcounter}{m}{\refstepcounter{#1}}
238 \fi
239
240 % Redefine commands for pdfbookmark
241 \iftma@usepdfbookmark
242 \RenewDocumentCommand{\tma@pageref}{m}{\pageref*{#1}}
243 \RenewDocumentCommand{\tma@bookmark}{O{0} +m +m}{%
244  \pdfbookmark[#1]{#2}{#3}%
245 }
246 \fi
247
248 \setquestionstring{Q}
249
250 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
251 %% Question Environment
252 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
253
254 % Set up cref names if cleveref is used
255 \iftma@usecleveref
256 \tma@crefname{question}{question}{questions}
257 \tma@crefname{qpart}{part}{parts}
258 \tma@crefname{qsubpart}{section}{sections}
259 \fi
260
261 \NewDocumentEnvironment{question}{O{0}}{%
262  \ifthenelse{#1>0}{\setcounter{question}{#1-1}}{\relax}%
263  \tma@stepcounter{question}%
```

```
264  \tma@bookmark{Question \thequestion}%
265    {question\thequestion}%
266  \makebox[0em][r]{\large{\tma@questionstring~\thequestion\hspace{0.3em}}}\par%
267  }{%
268  \par \vspace{3em}%
269  }
270
271  \NewDocumentCommand{\qpart}{O{0}}{%
272  \ifthenelse{#1>0}{\setcounter{qpart}{#1-1}}{\relax}%
273  \tma@stepcounter{qpart}%
274  \tma@bookmark[1]{\thequestion.\theqpart}%
275    {qpart.\thequestion.\theqpart}%
276  \par%
277  \makebox[0pt][r]{\large{(\theqpart)\hspace{1.5em} }}%
278  }
279
280  \NewDocumentCommand{\qsubpart}{O{0}}{%
281  \ifthenelse{#1>0}{\setcounter{qsubpart}{#1-1}}{\relax}%
282  \tma@stepcounter{qsubpart}%
283  \tma@bookmark[2]{\thequestion.\theqpart.\theqsubpart}%
284    {qsubpart.\thequestion.\theqpart.\theqsubpart}%
285  \ifthenelse{\value{qsubpart}>1}%
286  {\par}{}%
287  \hspace{-2em}\makebox[2em][l]{\large{(\theqsubpart)}}%
288  }
289
290  %%%%%%%%%%%%%%%%%%%%%%%%%%%%
291  %% Mathematical Commands
292  %%%%%%%%%%%%%%%%%%%%%%%%%%%%
293
294  %% Differential Operators
295  \NewDocumentCommand{\dd}{}{\ensuremath{\mathop{}\!\mathrm{d}}}
296  \NewDocumentCommand{\e}{}{\ensuremath{\mathrm{e}}}
297  \NewDocumentCommand{\ii}{}{\ensuremath{\mathrm{i}}}
298
299  %% Number Sets
300  \NewDocumentCommand{\N}{}{\ensuremath{\mathbb{N}}}
301  \NewDocumentCommand{\Z}{}{\ensuremath{\mathbb{Z}}}
302  \NewDocumentCommand{\Q}{}{\ensuremath{\mathbb{Q}}}
303  \NewDocumentCommand{\R}{}{\ensuremath{\mathbb{R}}}
304  \NewDocumentCommand{\Complex}{}{%
305  \ensuremath{\mathbb{C}}} % Changed from \C to \Complex
306  \NewDocumentCommand{\Rr}{}{\ensuremath{\mathcal{R}}}
307
308  %% Vector Notation
309  \NewDocumentCommand{\vect}{m}{%
310  \ensuremath{\overrightarrow{#1}}} % Changed from \vec to \vect
311  \NewDocumentCommand{\ve}{m}{\ensuremath{\textbf{#1}}}
312
313  %% Superscript Notations
314  \NewDocumentCommand{\st}{}{\textsuperscript{st}}
315  \NewDocumentCommand{\nd}{}{\textsuperscript{nd}}
316  \NewDocumentCommand{\rd}{}{\textsuperscript{rd}}
317  \NewDocumentCommand{\nth}{}{\textsuperscript{th}}
318
319  % Additional Symbols
320  \NewDocumentCommand{\rect}{}{\ensuremath{\sqsubset\!\!\sqsupset}}
321
322  %% Combinatorial Notations
323  \NewDocumentCommand{\comb}{mm}{\ensuremath{{}^{#1}C_{#2}}}
324  \NewDocumentCommand{\perm}{mm}{\ensuremath{{}^{#1}P_{#2}}}
```

```
325
326 %% Mathematical Operators
327 \DeclareMathOperator{\re}{Re}
328 \DeclareMathOperator{\im}{Im}
329 \DeclareMathOperator{\Log}{Log}
330 \DeclareMathOperator{\Arg}{Arg}
331 \DeclareMathOperator{\Wnd}{Wnd}
332 \DeclareMathOperator{\Res}{Res}
333 \DeclareMathOperator{\Ker}{Ker}
334 \DeclareMathOperator{\Orb}{Orb}
335 \DeclareMathOperator{\Stab}{Stab}
336 \DeclareMathOperator{\Fix}{Fix}
337
338 %% Derivatives
339 \NewDocumentCommand{\deriv}{mm}{%
340  \frac{\mathrm{d}#1}{\mathrm{d}#2}}
341 \NewDocumentCommand{\pderiv}{mm}{%
342  \frac{\partial #1}{\partial #2}}
343 \NewDocumentCommand{\psderiv}{mmm}{%
344  \frac{\partial^2 #1}{\partial #2 \partial #3}}
345
346 % Legacy Definitions
347 \iftma@legacy
348 % Redefine \vec to old definition
349 \RenewDocumentCommand{\vec}{m}{\ensuremath{\overrightarrow{#1}}}
350 % Redefine \C to old definition
351 \ProvideDocumentCommand{\C}{}{\ensuremath{\mathbb{C}}}
352 \RenewDocumentCommand{\C}{}{\ensuremath{\mathbb{C}}}
353 \fi
354
355 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
356 %% Theorem Environment
357 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
358
359 \newtheorem{lemma}{Lemma}
360 \newtheorem{theorem}{Theorem}
361 % Define \blacksmiley without loading wasysym
362 \ProvideDocumentCommand{\blacksmiley}{}{%
363  \ensuremath{\unicode{263B}}} % Unicode for blacksmiley emoji
364 \RenewDocumentCommand{\qedsymbol}{}{\blacksmiley}
365
366 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
367 %% Miscellaneous Settings
368 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
369
370 \RenewDocumentCommand{\thefootnote}{}{\fnsymbol{footnote}}
371 \numberwithin{equation}{question}
372 \setlength{\parindent}{0pt}
373 \setlength{\parskip}{2ex plus 0.3ex minus 0.2ex}
374
375 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
376 %% Header and Footer Settings
377 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
378
379 \pagestyle{fancy}
380 \fancyhf{} % Clear all headers and footers
381 \fancyhead[L]{\textrm{\name\ \pin}}
382 \fancyhead[C]{\textrm{\course\ TMA-\tma}}
383 \fancyhead[R]{\textrm{Page \thepage\ of \tma@pageref{LastPage}}}
384 \RenewDocumentCommand{\headrulewidth}{}{0pt} % Remove header rule
385
```

```
386 %%%%%%%%%%%%%%%%%%%%%%%%%%%
387 %% End of Package
388 %%%%%%%%%%%%%%%%%%%%%%%%%%%
389
390 \endinput
```