

The `tma` Package*

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2025-02-18 (v1.19)

Abstract

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

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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 facilitating 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}
%
```

`\myname`

The `\myname` macro is used to specify your personal name: this should be your name as recorded with the University.

Example:

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

```
% \myname{Anthony Neil Other}
%
```

`\mytma`

Use the `\mytma` macro to declare the number of the Tutor Marked Assignment that is being answered in this document.

Example:

```
% \mytma{02} % TMA02
%
```

`\mycourse`

Declare the course code of your module with the `\mycourse` macro.

Example:

```
% \mycourse{M101} % The original Maths introduction module
%
```

`\mypin`

Nothing to do with credit cards, this `\mypin` is your Open University Personal Identification Number. It is formed by a letter, followed by seven digits or six digits and a letter X.

Example:

```
% \mypin{A1234567}
%
```

`\setdate`

If you wish to set a specific date that will be displayed on the compiled document title page, you may use `\setdate`

`question`

(*env.*)

`\qpart`

`\qsubpart`

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..

```

Adapted by Peter McFarlane from various sources. All errors of style or content are mine or subsequent contributor. Acknowledgements to Bob Margolis, and also Rob Lynas (from whom some macros are plagiarised). Further contributions from Steve Mayer and Tim Dale. Annotations, in part, and further modification by Geoff Riley.

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"

```

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}{0{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[pdftencoding=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}{0{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}{0{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}{0{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}{0{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

```


[illegible]