The ou-tma Package*

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Abstract

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

Contents

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*This document corresponds to ou-tma v1.20, dated 2025-04-07.

1   Introduction

The ou-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 on the styles used by the Open University (OU).

2   Compiling and installing ou-tma

To compile the ou-tma package:

> Enter ⇒   `pdflatex tma.ins`

To compile the ou-tma documentation:

> Enter ⇒   `pdflatex ou-tma.dtx`
>
> (several times)
>
> Enter ⇒   `makeindex -s gglo.ist -o ou-tma.gls ou-tma.glo`
>
> Enter ⇒   `makeindex -s gind.ist ou-tma`
>
> Enter ⇒   `pdflatex ou-tma.dtx`
>
> (several times)

The file `ou-tma.sty` should be placed in an appropriate location within the TeX directory structure. For example in a directory such as `tex/latex/tma`.

3   Usage

To use the ou-tma package, in its most basic form, it should be included in the preamble of your LaTeX document:

```
\documentclass[a4paper,11pt]{article}
\usepackage{tma}
⋮
\begin{document}
⋮
\end{document}
```

3.1   Options

A number of options are available to modify the results of using the ou-tma package. These should be included within the \usepackage declaration:

$$\texttt{\textbackslash usepackage[}\langle option,\dots\rangle\texttt{]tma}$$

The following options are available:

alph (*Opt*) alph: (default) question numbering as 1(b)(iii);

roman (*Opt*) roman: varies question numbering to sequence used by M381 i.e. 1(ii)(c);

cleveref (*Opt*) cleveref: question numbering creates automatic referencing for use with cleveref package;

pdfbookmark (*Opt*) pdfbookmark: add PDF bookmarks for each question using hyperref package; and

legacy (*Opt*) legacy: enables old definitions of \vec and \C for backward compatibility.

3.2   Macros and environments

The ou-tma package provides several valuable macros and environments, most are documented here.

3.2.1   Document level commands

The document-level commands are intended for use within the document's preamble. They generally affect what appears on the title page and the headers/footers.

The most essential part of an assignment is to identify who it has been written by
\myname and what it has been written for. To this end, the \myname macro is used to specify your name: this should be your name as recorded with the University. As names are not unique, the OU allocates a Personal Identification Number (or PIN) as a
\mypin unique identifier for each student; this should be declared with the \mypin macro. It is formed by a letter, followed by seven digits—or six digits and a letter X. This is distinct from the OUCU, or OU Computer User identifier that is used to log in to the OU website. Once the personal identification has been done, the module

being worked needs to be declared, the course code of your module should be given
\mycourse with the \mycourse macro and the number of the assignment using the \mytma
\mytma macro. Note that this is just the assignment number; there is no need to include
the characters TMA. The final document level command is used if you wish to set a
specific date that will be displayed on the compiled document title page; you may
\setdate use \setdate. This will override the default of using the compile date.

Example:

```
%     \myname{Anthony Neil Other}
%     \mypin{A1234567}
%     \mycourse{M101} % The original Maths introduction module
%     \mytma{02} % TMA02
%     \setdate{March 2025}
%
```

3.2.2   Question environment commands

These commands are the ones that, though few, comprise the bulk of the body of
the TMA answer content of a paper.

question (*env.*) Within a TMA, each answer should be placeed in a question environment.
The question number is printed across the margin, preceded by the question
string which defaults to 'Q' but may be redefined by use of the command
\setquestionstring \setquestionstrimg{⟨*required question number introduction*⟩}.   The question
number itself is automatically incremented unless one is specified in the optional
parameter. Since the question is presented as an environment, it may be convenient
to place each question in a separate file to be included in the main paper.

\qpart Often questions are comprised of multiple parts, therefore, \qpart indicates the
start of a question part. It will set the part identifier within the left-hand margin
space. Normally, the parts are lettered as a, b, c... unless the option roman has been
given to the ou-tma package when the parts are numbered as i, ii, iii... As with
the actual questions, this is an auto-incrementing value unless an optional value is
given. Note that the value should be numerical even if the parts are lettered or in
Roman numerals. Each new question restarts the numbering at 1, which will be
rendered as a or i as dictated by the options in effect.

There are occasions that the parts of questions may be further divided into sub-
\qsubpart parts; these may be declared using the \qsubpart macro. As with \qpart, this
is set in the left margin and automatically incremented: an option to choose the
sub-part number is also available. If a \qsubpart immediately follows a \qpart,
both marginal markers will be set on the same line.

Note that question is an environment to be used with the \begin...\end structure,
\qpart and \qsubpart are both macros that lay down titles in the margin and are
designed to be used on a line on their own.

Example:

```
\begin{question}[⟨question number⟩]
⋮
\qpart[⟨part number⟩]
⋮
\qsubpart[⟨sub-part number⟩]
⋮
\end{question}
```

3.2.3 Mathematical symbology

Various mathematical symbols and elements are defined for convenience, working from the normal suggested formats used within Open University courses. These are mostly as proscribed by the various standards bodies too, for reference see "Quantities and units - Part 2: Mathematics" ISO 80000-2:2019[*]

These commands are created in such a manner that they will work correctly in both text and maths modes.

\dd **Differential operators** The general advise for most OU modules is to use an up-
\e   right letter 'd' when specifying differential variables, thus \dd is provided to
\ii   allow simple accomodation of this. Similarly, Euler's number and the imagi-
      nary unit representation of $\sqrt{-1}$ are both usually given upright letters of 'e',
      (\e), and 'i', (\ii), respectively.

Remember that it is always the exception that proves the rule: follow the the module guidebook for the course being completed.

Example 1: Differential

Code:

```
In display mode, compare \dd\ with $d$:
\[
\frac{\dd^2 y}{\dd x^2} + x\frac{\dd y}{\dd x} + y = 2\sin(x)\\
\]
and in line mode $\e^{\ii x} = \cos(x) + \ii\sin(x)$
```

Result:
In display mode, compare d with d:

$$\frac{\mathrm{d}^2 y}{\mathrm{d}x^2} + x\frac{\mathrm{d}y}{\mathrm{d}x} + y = 2\sin(x)$$

and in line mode $\mathrm{e}^{\mathrm{i}x} = \cos(x) + \mathrm{i}\sin(x)$

Number sets Standard 'black-board' fonts are used to indicate a number of frequently designated groups of numbers.

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[*]Available from British Standards Online as BS EN ISO-2:2019 (ISBN 978 0 539 23108 3), The European Standards Agency and The International Standard Organisetion. All are purchasable publications.

\N   \N: ℕ represents all natural numbers;

\Z   \Z: ℤ represents all integers;

\Q   \Q: ℚ represents all rational numbers;

\R   \R: ℝ represents all real numbers; and

\Complex   \Complex: ℂ represents all complex numbers.

Example 2: Number sets

Code:

```
The relationship between number sets:
\begin{itemize}
\item \N\ (Natural numbers) $\subseteq \Z$ (Integers);
        every natural number is also an integer.
\item \Z\ (Integers) $\subseteq \Q$ (Rational numbers);
        every integer is also a rational number.
\item \Q\ (Rational numbers) $\subseteq \R$ (Real
        numbers); every rational number is also a real
        number.
\item \Complex\ (Complex numbers) $\supseteq \R$ (Real
        number); complex numbers include real numbers as
        a subset, since they can be represented by
        $a+\ii b$ where $a$ and $b$ are real numbers.
\end{itemize}
```

Result:

The relationship between number sets:

- ℕ (Natural numbers) $\subseteq$ ℤ (Integers); every natural number is also an integer.

- ℤ (Integers) $\subseteq$ ℚ (Rational numbers); every integer is also a rational number.

- ℚ (Rational numbers) $\subseteq$ ℝ (Real numbers); every rational number is also a real number.

- ℂ (Complex numbers) $\supseteq$ ℝ (Real number); complex numbers include real numbers as a subset, since they can be represented by $a + ib$ where a and b are real numbers.

\vect **Vector notation** Two different vector representations are typically used on OU
\ve   modules, there is the two, or more, letter with an over arrow version given
       with \vect; and the emboldened upright letter version \ve—the latter is
       commonly handwritten as an underlined letter.

Example 3: Vectors

Code:

```
Given a point $A$ at the co-ordinate $(6, 3)$ and a
point $B$ at the co-ordinate $(-4, 8)$, the vector
$\vect{AB}$ has a gradient of $\frac{8-3}{-4-6} =
\frac{5}{-10} = -\frac{1}{2}$
The standard unit vectors are \ve{i} and \ve{j}.
They are usually at right angles to each other.
```

Result:

Given a point A at the co-ordinate $(6, 3)$ and a point B at the co-ordinate $(-4, 8)$, the vector $\overrightarrow{AB}$ has a gradient of $\frac{8-3}{-4-6} = \frac{5}{-10} = -\frac{1}{2}$ The standard unit vectors are **i** and **j**. They are usually at right angles to each other.

\st
\nd
Ordinal indicators The use of ordinal indicators is not specific to OU modules, but frequently is a useful element that is just inconvenient to produce.

\rd
\nth
So the standard four English ordinals are provided \st, \nd, \rd, and \nth, e.g. 1st, 2nd, 3rd, and 4th.

Note that the last ordinal is \nth not \th, the latter produces a thorn character, þ, and that only works if you have other than the default 7-bit font encoding (OT1).

Combinatoral notations There are two combinatoral forms that are commonly used in OU modules, the combination selecting r out of a total of n items where order does not matter, and the permutations of r out of n items were order matters.

\comb
\comb: $\{\langle n \rangle\}\{\langle r \rangle\}$. This is equievlent to

$$^nC_r = \frac{n!}{r!(n-r)!}$$

\perm
\perm: $\{\langle n \rangle\}\{\langle r \rangle\}$. This is equivalent to

$$^nP_r = \frac{n!}{(n-r)!}$$

Mathematical operators Additional mathematical operators are defined, again for convenience of entry.

\re
\re: $\mapsto \mathrm{Re}$

\im
\im: $\mapsto \mathrm{Im}$

\Log
\Log: $\mapsto \mathrm{Log}$

\Arg
\Arg: $\mapsto \mathrm{Arg}$

\Wnd
\Wnd: $\mapsto \mathrm{Wnd}$

\Res
\Res: $\mapsto \mathrm{Res}$

\Ker	\Ker: $\mapsto$ Ker
\Orb	\Orb: $\mapsto$ Orb
\Stab	\Stab: $\mapsto$ Stab
\Fix	\Fix: $\mapsto$ Fix

Derivatives There are three derivative forms defined specifically for speeding calculas entry and accuracy. One used the dx form and two use the partial, ∂x, form.

\deriv	\deriv: $\{\langle y\rangle\}\{\langle x\rangle\} \mapsto \frac{\mathrm{d}y}{\mathrm{d}x}$
\pderiv	\pderiv: $\{\langle y\rangle\}\{\langle x\rangle\} \mapsto \frac{\partial y}{\partial x}$
\psderiv	\psderiv: $\{\langle y\rangle\}\{\langle x\rangle\}\{\langle z\rangle\} \mapsto \frac{\partial^2 y}{\partial x\partial z}$

\rect **Additional symbols** \rect, $\square$, is defined particularly for the use of M208 people although others may find it useful.

Legacy elements There are a couple of macros which become enabled when using the `legacy` option. These are now deprecated and may be removed from a future version. There are name clashes with standard LaTeX commands, so please be aware of this if used.

\C	\C: is the original version of \Complex
\vec	\vec: is the original version of \vect

4   Implementation

```
 1 %% ou-tma.sty
 2 %% Copyright 2025 G. I. Riley <geoffr@adaso.com>
 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 Geoff 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 was 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 contributors. Acknowledgements to Bob Margolis and 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}

Before getting into the main package, it is necessary to ensure that the LaTeX3 extensions are loaded. Most modern versions of the LaTeX core have this rolled in as standard, but as a belt and braces approach, inclusion here does no harm.

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

4.1   Package Initialisation

We are starting off using the \ExplSyntaxOn command to enable the LaTeX3 extensions before declaring a set of 'constants' that will be used by our package. Working with the established conventions the constants are declared as variables are named to reflect their ownership and function. These are all declared as 'token lists' so that they may, effectively, hold string elements. Make the underscore character a letter!

g_tma_constant_name
(*Var*)

g_tma_constant_name: holds the students personal name

g_tma_constant_tma
(*Var*)

g_tma_constant_tma: holds the number of the TMA being answered

g_tma_constant_course
(*Var*)

g_tma_constant_course: holds the OU course code for the module being studied

g_tma_constant_pin
(*Var*)

g_tma_constant_pin: holds the students personal identification number

g_tma_constant_thedate
(*Var*)

g_tma_constant_thedate: holds the date to be printed on the front page of the TMA

```
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
```

These 'constants' are given initial generic values.

```
31 \tl_gset:Nn \g_tma_constant_name {name}
32 \tl_gset:Nn \g_tma_constant_tma {tma}
33 \tl_gset:Nn \g_tma_constant_course {course}
34 \tl_gset:Nn \g_tma_constant_pin {pin}
35 \tl_gset:Nn \g_tma_constant_thedate {the~date}
```

Then commands are provided to retrieve the values when required.

\name **\name:** returns the students name

\tma **\tma:** returns the working TMA number

\course **\course:** returns the OU course reference

\pin **\pin:** returns the students personal identification number

\thedate **\thedate:** returns the date to be printed on the title page of the TMA

```
36 \newcommand{\name}{\g_tma_constant_name}
37 \newcommand{\tma}{\g_tma_constant_tma}
38 \newcommand{\course}{\g_tma_constant_course}
39 \newcommand{\pin}{\g_tma_constant_pin}
40 \newcommand{\thedate}{\g_tma_constant_thedate}
```

Finally, macros are provided to set the values of the 'constants': these should only be used within the preamble. Use within the body of the text is unpredicable.

\myname **\myname:** {⟨*name*⟩} Set the students name

\mytma **\mytma:** {⟨*TMA number*⟩} Set the TMA number

\mycourse **\mycourse:** {⟨*course code*⟩} Set the OU course code for the module

\mypin **\mypin:** {⟨*pin*⟩} Set the students personal identification number

\setdate **\setdate:** {⟨*the date*⟩} Set the required date to display on the title page, default is the date of report generation

```
41 \NewDocumentCommand{\myname}{m}{%
42 \tl_gset:Nn \g_tma_constant_name{#1}}
43 \NewDocumentCommand{\mytma}{m}{%
44 \tl_gset:Nn \g_tma_constant_tma{#1}}
45 \NewDocumentCommand{\mycourse}{m}{%
46 \tl_gset:Nn \g_tma_constant_course{#1}}
```

```
47 \NewDocumentCommand{\mypin}{m}{%
48  \tl_gset:Nn \g_tma_constant_pin{#1}}
49 \NewDocumentCommand{\setdate}{m}{%
50  \date{#1}\tl_gset:Nn \g_tma_constant_thedate{#1}}
```

That's the end of the LaTeX3 extensions requiring the extension switch, so it can be turned off.

```
51 \ExplSyntaxOff
```

Set the `\title` and `\author` ready for use by the `\maketitle` macro at the start of the main document. They use the constants defined above so that changes are automatically reflected. They may be redefined by the user if required.

```
52 \title{\textbf{TMA: \course-\tma}}
53 \author{\textbf{\name\space\pin}}
```

In order to allow the question introduction string to be modified, a general LaTeX string is created along with a macro to set it.

\tma@questionstring \tma@questionstring: Hold the string to be printed before the question number, the default is 'Q'.

\setquestionstring \setquestionstring: {⟨*string*⟩} Set the string to precede the question number

```
54 \NewDocumentCommand{\tma@questionstring}{}{\relax}
55 \NewDocumentCommand{\setquestionstring}{m}{%
56  \RenewDocumentCommand{\tma@questionstring}{}{#1}}
```

Set the default date to 'today'.

```
57 \setdate{\today}
```

4.2   Package Loading

Here we load the useful packages that have proven their worth for OU students over the years. Many have properties that are utilised by the rest of the ou-tma package.

```
58 % %%%%%%%%%%%%%%%%%%%%%%%%%
59 %% Package Loading
60 % %%%%%%%%%%%%%%%%%%%%%%%%%%
61
62 \RequirePackage{amsmath}
63 \RequirePackage{amssymb}
64 \RequirePackage{amsthm}
65 \RequirePackage{wasysym}
66 \RequirePackage{bm}
67 \RequirePackage{upgreek}
68 \RequirePackage{graphicx}
69 \RequirePackage{lastpage}
70 \RequirePackage{xifthen}
```

```
71 \RequirePackage{verbatim}
72 \RequirePackage{fancyhdr}
73 \RequirePackage{geometry}
74 \RequirePackage{calc}
75 \RequirePackage[UKenglish]{isodate} % use UK format for date
76 \cleanlookdateon % remove th,st, rd from date
77
```

4.3   Geometry Settings

An important part of TMA answering is providing a consistent output, to this end
the following page geometry has been brought together as a compromise suitable
for most modules.

```
78 % %%%%%%%%%%%%%%%%%%%%%%%%%%%
79 %% Geometry Settings
80 % %%%%%%%%%%%%%%%%%%%%%%%%%%%
81
82 \geometry{
83   headheight=10mm,
84   headsep=5mm,
85   bottom=25mm,
86   footskip=15mm,
87   left=30mm,
88   right=30mm,
89   marginparwidth=0mm,
90   marginparsep=0mm,
91   includemp
92 }
```

4.4   Margin Notes

By default, no margin notes are assumed to be required, however, if one is wanted,
\marginnotes the \marginnotes command will set up the side margin ready to accept notes using
\marginnote the \marginnote{⟨note⟩} command.

```
93  % %%%%%%%%%%%%%%%%%%%%%%%%%%%
94  %% Margin Notes
95  % %%%%%%%%%%%%%%%%%%%%%%%%%%%
96
97  \NewDocumentCommand{\marginnote}{m}{\marginpar{#1}}
98  \NewDocumentCommand{\marginnotes}{}{
99    \geometry{
100     marginparwidth=40mm,
101     marginparsep=5mm,
102     left=20mm,
103     right=15mm
104   }
105 }
```

4.5   Question Numbering

We set up three counters to keep track of the question number along with associated parts and subparts.

question (*Ctr*) **question:** Holds the current question number, when a new question is started this value is used unless one is provided, in either case the used value is incremented as saved back here. When used, the `\qpart` is automatically reset so that the first part will be part 1.

qpart (*Ctr*) **qpart:** Holds the current part number as a numeric value, as with the question number this may be overridden and is incremented after being used. When used, the `\qsubpart` is automatically reset so that the first subpart will be sub-part 1.

qsubpart (*Ctr*) **qsubpart:** Holds the current sub-part number as a numeric value, again, the value may be overridden and is incremented after being used.

```
106 % %%%%%%%%%%%%%%%%%%%%%%%%%%%
107 %% Question Numbering
108 % %%%%%%%%%%%%%%%%%%%%%%%%%%%
109
110 \newcounter{question}
111 \newcounter{qpart}[question]
112 \newcounter{qsubpart}[qpart]
```

The question number is set to print as arabic digits,

```
113 \renewcommand{\thequestion}{\arabic{question}}
```

4.6   Option Handling

In order to handle the incoming options for the ou-tma package, we create a set of four new boolean tokens.

tma@roman (*bool*) **tma@roman:** False indicates 'alph' numbering, true indicates 'roman' numbering of parts and subpart.

tma@usecleveref (*bool*) **tma@usecleveref:** True indicates that the cleveref package is requested.

tma@usepdfbookmark (*bool*) **tma@usepdfbookmark:** True indicated that the pdfbookmark package is requested.

tma@legacy (*bool*) **tma@legacy:** True indicted that the commands `\Complex` and `\vect` will be redefined to the legacy commands `\C` and `\vec`.

```
114 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%
115 %% Option Handling
116 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
117 % Define boolean flags
```

```
118 \newif\iftma@roman
119 \newif\iftma@usecleveref
120 \newif\iftma@usepdfbookmark
121 \newif\iftma@legacy
122
123 % Set default options
124 \tma@romanfalse          % Default numbering is 'alph'
125 \tma@useclevereffalse    % Default is not to use cleveref
126 \tma@usepdfbookmarkfalse % Default is not to use pdfbookmark
127 \tma@legacyfalse         % Default is not to use legacy definitions
```

We now set up the default states and commands for the ou-tma package operation.

\theqpart \theqpart: returns the current question part number as either an alpha or roman index.

\theqsubpart \theqsubpart: returns the current question subpart number as either a roman or an alpha index.

\tma@crefname \tma@crefname: {⟨*label type*⟩}{⟨*singular name*⟩}{⟨*plural name*⟩} Declares a label with singular and plural spellings for the cleveref package.

\tma@stepcounter \tma@stepcounter: {⟨*counter name*⟩} Increments the named counter by one.

\tma@bookmark \tma@bookmark: [⟨*level*⟩]{⟨*text*⟩}{⟨*name*⟩} The level is optional, numerical, the default is zero, the top level. The text is what will appear in the bookmark panel, and the name is what may be used as a reference to the location from other parts of the document.

\tma@pageref \tma@pageref: {⟨*name*⟩} returns the page number, if known, that contains the bookmark with the label name.

```
128 % Define commands with default values
129 \renewcommand{\theqpart}{\alph{qpart}}
130 \renewcommand{\theqsubpart}{\roman{qsubpart}}
131 \NewDocumentCommand{\tma@crefname}{mmm}{\relax}
132 \NewDocumentCommand{\tma@stepcounter}{m}{\stepcounter{#1}}
133 \NewDocumentCommand{\tma@bookmark}{O{0}mm}{\relax}
134 \NewDocumentCommand{\tma@pageref}{m}{\pageref{#1}}
```

Declare each of the valid options for the option processing system. In each case, the action is to set the appropriate boolean to true or false.

```
135 % Declare options
136 \DeclareOption{roman}{%
137  \tma@romantrue%
138 }
139 \DeclareOption{alph}{%
140  \tma@romanfalse%
141 }
142 \DeclareOption{cleveref}{%
143  \tma@useclevereftrue%
```

```
144 }
145 \DeclareOption{pdfbookmark}{%
146   \tma@usepdfbookmarktrue%
147 }
148 \DeclareOption{legacy}{%
149   \tma@legacytrue%
150 }
151 \DeclareOption*{%
152   \PackageWarning{ou-tma}{Unknown option '\CurrentOption'}%
153 }
```

Go ahead, process those options!

```
154 % Process options
155 \ProcessOptions\relax
```

4.7   Debugging Options

A short section of code outputting to the log the state of the four main options that may be passed to the ou-tma package.

```
156 \typeout{*************** OPTION RESULTS **********}
157 \iftma@usepdfbookmark
158 \typeout{pdfbookmark is TRUE}
159 \else
160 \typeout{pdfbookmark is FALSE}
161 \fi
162 \iftma@roman
163 \typeout{roman is TRUE}
164 \else
165 \typeout{roman is FALSE}
166 \fi
167 \iftma@usecleveref
168 \typeout{cleveref is TRUE}
169 \else
170 \typeout{cleveref is FALSE}
171 \fi
172 \iftma@legacy
173 \typeout{legacy is TRUE}
174 \else
175 \typeout{legacy is FALSE}
176 \fi
177 \typeout{************* END OPTION RESULTS **********}
```

4.8   Package adjustments based on Options

```
178 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%
179 %% Set Up Package Based on Options
180 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%
181
182 % Set question numbering
183 \iftma@roman
```

```
184 \renewcommand{\theqpart}{\roman{qpart}}
185 \renewcommand{\theqsubpart}{\alph{qsubpart}}
186 \else
187 \renewcommand{\theqpart}{\alph{qpart}}
188 \renewcommand{\theqsubpart}{\roman{qsubpart}}
189 \fi
190 % Load hyperref if necessary
191 \iftma@usepdfbookmark
192 \AtBeginDocument{%
193  \hypersetup{%
194   colorlinks=true,%
195   linkcolor=blue,%
196   urlcolor=blue,%
197   pdfstartview=FitH,%
198   pdftitle={TMA~\tma}, %
199   pdfauthor={\name~-~\pin}, %
200   pdfkeywords={OUCU:~\pin, TMA~\tma}, %
201   pdfsubject=\course%
202  }%
203 }
204 \RequirePackage[pdfencoding=unicode,psdextra]{hyperref}
205 \fi
206
207 % Load cleveref if necessary
208 \iftma@usecleveref
209 % Ensure hyperref is loaded before cleveref
210 \@ifpackageloaded{hyperref}%
211 {}%
212 {\RequirePackage[pdfencoding=unicode,psdextra]{hyperref}}
213 \RequirePackage{cleveref}
214 % Redefine commands for cleveref
215 \RenewDocumentCommand{\tma@crefname}{mmm}{\crefname{#1}{#2}{#3}}
216 \RenewDocumentCommand{\tma@stepcounter}{m}{\refstepcounter{#1}}
217 \fi
218
219 % Redefine commands for pdfbookmark
220 \iftma@usepdfbookmark
221 \RenewDocumentCommand{\tma@pageref}{m}{\pageref*{#1}}
222 \RenewDocumentCommand{\tma@bookmark}{O{0} +m +m}{%
223  \pdfbookmark[#1]{#2}{#3}%
224 }
225 \fi
226
227 \setquestionstring{Q}
228
```

4.9   Question Environment

```
229 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%
230 %% Question Environment
231 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%
232
233 % Set up cref names if cleveref is used
234 \iftma@usecleveref
235 \tma@crefname{question}{question}{questions}
236 \tma@crefname{qpart}{part}{parts}
```

```
237 \tma@crefname{qsubpart}{section}{sections}
238 \fi
239
240 \NewDocumentEnvironment{question}{O{0}}{%
241 \ifthenelse{#1>0}{\setcounter{question}{#1-1}}{\relax}%
242 \tma@stepcounter{question}%
243 \tma@bookmark{Question \thequestion}%
244   {question\thequestion}%
245 \makebox[0em][r]{\large{\tma@questionstring~\thequestion\hspace{0.3em}}}\par%
246 }{%
247   \par \vspace{3em}%
248 }
249
250 \NewDocumentCommand{\qpart}{O{0}}{%
251 \ifthenelse{#1>0}{\setcounter{qpart}{#1-1}}{\relax}%
252 \tma@stepcounter{qpart}%
253 \tma@bookmark[1]{\thequestion.\theqpart}%
254   {qpart.\thequestion.\theqpart}%
255 \par%
256 \makebox[0pt][r]{\large{(\theqpart)\hspace{1.5em} }}%
257 }
258
259 \NewDocumentCommand{\qsubpart}{O{0}}{%
260 \ifthenelse{#1>0}{\setcounter{qsubpart}{#1-1}}{\relax}%
261 \tma@stepcounter{qsubpart}%
262 \tma@bookmark[2]{\thequestion.\theqpart.\theqsubpart}%
263   {qsubpart.\thequestion.\theqpart.\theqsubpart}%
264 \ifthenelse{\value{qsubpart}>1}%
265 {\par}{}%
266 \hspace{-2em}\makebox[2em][l]{\large{(\theqsubpart)}}%
267 }
268
```

4.10   Mathematical commands

```
269 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
270 %% Mathematical Commands
271 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
272
273 %% Differential Operators
274 \NewDocumentCommand{\dd}{}{\ensuremath{\mathop{}\!\mathrm{d}}}
275 \NewDocumentCommand{\e}{}{\ensuremath{\mathrm{e}}}
276 \NewDocumentCommand{\ii}{}{\ensuremath{\mathrm{i}}}
277
278 %% Number Sets
279 \NewDocumentCommand{\N}{}{\ensuremath{\mathbb{N}}}
280 \NewDocumentCommand{\Z}{}{\ensuremath{\mathbb{Z}}}
281 \NewDocumentCommand{\Q}{}{\ensuremath{\mathbb{Q}}}
282 \NewDocumentCommand{\R}{}{\ensuremath{\mathbb{R}}}
283 \NewDocumentCommand{\Complex}{}{%
284   \ensuremath{\mathbb{C}}} % Changed from \C to \Complex
285 \NewDocumentCommand{\Rr}{}{\ensuremath{\mathcal{R}}}
286
287 %% Vector Notation
288 \NewDocumentCommand{\vect}{m}{%
289   \ensuremath{\overrightarrow{#1}}} % Changed from \vec to \vect
```

```
290 \NewDocumentCommand{\ve}{m}{\ensuremath{\textbf{#1}}}
291
292 %% Ordinal Indicators
293 \NewDocumentCommand{\st}{}{\textsuperscript{st}}
294 \NewDocumentCommand{\nd}{}{\textsuperscript{nd}}
295 \NewDocumentCommand{\rd}{}{\textsuperscript{rd}}
296 \NewDocumentCommand{\nth}{}{\textsuperscript{th}}
297
298 %% Additional Symbols
299 \NewDocumentCommand{\rect}{}{\ensuremath{\sqsubset\!\!\sqsupset}}
300
301 %% Combinatorial Notations
302 \NewDocumentCommand{\comb}{mm}{\ensuremath{{}^{#1}C_{#2}}}
303 \NewDocumentCommand{\perm}{mm}{\ensuremath{{}^{#1}P_{#2}}}
304
305 %% Mathematical Operators
306 \DeclareMathOperator{\re}{Re}
307 \DeclareMathOperator{\im}{Im}
308 \DeclareMathOperator{\Log}{Log}
309 \DeclareMathOperator{\Arg}{Arg}
310 \DeclareMathOperator{\Wnd}{Wnd}
311 \DeclareMathOperator{\Res}{Res}
312 \DeclareMathOperator{\Ker}{Ker}
313 \DeclareMathOperator{\Orb}{Orb}
314 \DeclareMathOperator{\Stab}{Stab}
315 \DeclareMathOperator{\Fix}{Fix}
316
317 %% Derivatives
318 \NewDocumentCommand{\deriv}{mm}{%
319  \frac{\dd{}#1}{\dd{}#2}}
320 \NewDocumentCommand{\pderiv}{mm}{%
321  \frac{\partial #1}{\partial #2}}
322 \NewDocumentCommand{\psderiv}{mmm}{%
323  \frac{\partial^2 #1}{\partial #2 \partial #3}}
324
325 % Legacy Definitions
326 \iftma@legacy
327 % Redefine \vec to old definition
328 \RenewDocumentCommand{\vec}{m}{\ensuremath{\overrightarrow{#1}}}
329 % Redefine \C to old definition
330 \ProvideDocumentCommand{\C}{}{\ensuremath{\mathbb{C}}}
331 \RenewDocumentCommand{\C}{}{\ensuremath{\mathbb{C}}}
332 \fi
333
```

4.11   Theorem Environment

```
334 % %%%%%%%%%%%%%%%%%%%%%%%%%%%
335 %% Theorem Environment
336 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%
337
338 \newtheorem{lemma}{Lemma}
339 \newtheorem{theorem}{Theorem}
340 % Define \blacksmiley without loading wasysym
341 \ProvideDocumentCommand{\blacksmiley}{}{%
342  \ensuremath{\unicode{263B}}} % Unicode for blacksmiley emoji
```

```
343 \RenewDocumentCommand{\qedsymbol}{}{\blacksmiley}
344
```

4.12   Miscellaneous Settings

```
345 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
346 %% Miscellaneous Settings
347 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
348
349 \RenewDocumentCommand{\thefootnote}{}{\fnsymbol{footnote}}
350 \numberwithin{equation}{question}
351 \setlength{\parindent}{0pt}
352 \setlength{\parskip}{2ex plus 0.3ex minus 0.2ex}
353
```

4.13   Header and Footer Settings

```
354 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
355 %% Header and Footer Settings
356 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
357
358 \pagestyle{fancy}
359 \fancyhf{} % Clear all headers and footers
360 \fancyhead[L]{\textrm{\name\ \pin}}
361 \fancyhead[C]{\textrm{\course\ TMA-\tma}}
362 \fancyhead[R]{\textrm{Page \thepage\ of \tma@pageref{LastPage}}}
363 \RenewDocumentCommand{\headrulewidth}{}{0pt} % Remove header rule
364
365 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
366 %% End of Package
367 % %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
368
369 \endinput
```

Change History

v1.12

General: Standardized package name to 'tma' to make it compatible with CTAN. Avoided redefining standard LaTeX commands. Consolidated geometry settings. Adjusted loading order of packages. Improved code readability and comments. Added 'legacy' option to allow old definitions of \vec and \C. . . 9

v1.13

General: Arranged for \qsubpart to go on the same line as the \qpart when there is no intervening text \qsubpart

indents further than \qpart. . . . 9

v1.14

General: Allow replacement of Question marker tag using \setquestionstring. References with cleveref not working. Replaced my attempts at keeping \qpart and \qsubpart on the same line with Steve Mayers contribution. 9

v1.15

General: Define \setdate and \thedate to allow the header date to be used within the document, eg header and footer. 9

v1.16
  General: Added File Properties to
    pdf files using the hyperref setup
    system when in pdfbookmark
    mode. 9
v1.17
  General: Rewritten with LaTeX3
    syntax from the 'xparse' package
    to make commands less fragile.
    Finally, I got the alignment of
    part and subpart numbering to
    line up correctly. 9
v1.18
  General: PDF metadata doesn't set
    correctly so I have removed it:
    the cause is an incompatibility
    between LaTeX unicode and the
    PDF restricted character
    allowance. 9

v1.19
  General: PDF metadata
    (apparently) was solved with
    help from Steve Mayers; all down
    to the use of commands as string
    containers. New (LaTeX3)
    commands are robust and fail to
    expand within the context of the
    metadata and bookmarks; old
    (LaTeX2e) commands are fragile
    and correctly expanded. I have a
    mix of old commands and new
    variables now. 9
v1.20
  General: Package name changed
    from 'tma' to 'ou-tma' to become
    a little more descriptive and to
    abide by the minimum package
    name length suggested by CTAN. 9

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Numbers written in italic refer to the page where the corresponding entry is de-
scribed; numbers underlined refer to the code line of the definition; numbers in
roman refer to the code lines where the entry is used.