The 'decimal' package (version 1·1)

A. Syropoulos * and R. W. D. Nickalls †

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Abstract

In traditional English typography the decimal point is printed as a raised dot. The *decimal* package provides this functionality by making the full point, or period (.) active in maths mode, and implementing the `\cdot` character instead. In addition, the command `\.` is redefined in such a way that that it produces a full point in math mode, but retains its usual functionality in text mode.

1 Introduction

The decimal point (decimal separator) is variously implemented as a comma (European), a full point (North American), or as a raised full point (English). While the comma and full point have always been supported in electronic typesetting, the English raised decimal point has been somewhat overlooked—until now. For a nice history of the decimal fraction see the chapter on *The invention of decimal fractions and of logarithms* in Scott[1] (1960).

In Great Britain until about 1970 or so the decimal separator was typically implemented as a raised dot (middle dot). For example, when currency decimalisation was introduced in the UK in 1971, the recommended way of writing currency was with a raised dot, as in £21·34. However, since then there has been a gradual decline in the use of the raised point most probably owing to the fact that this glyph was not generally available on electronic typewriters or computer wordprocessors. While the raised dot does make occasional appearances in British newspapers, it is seldom seen nowadays, even in British scientific journals. This decline was highlighted recently when the British journal Nature reprinted

*Department of Civil Engineering, Democritus University of Thrace, Xanthi, Greece. email: apostolo@obelix.ee.duth.gr

†Department of Anaesthesia, Nottingham University Hospitals, City Hospital Campus, Nottingham, UK. email: dicknickalls@doctors.org.uk web: `www.tinyurl.com/dicknickalls`

[1] Scott JF (1960). *A history of mathematics* (Taylor & Francis, London), pp 266.

some 1953 articles (containing the raised point) as part of the 50^{th} anniversary of the discovery of the double helix. For example, one of the reprinted articles (*Nature* 2003; 421, 400–401) states that Franklin and Gosling mentioned the "... very strong reflexion at 3·4 A ...". Ironically, if this sentence were published in a journal in Britain today the Ångström symbol would be typeset correctly but the decimal point would most likely be typeset in the American 'full point' style as 3.4 Å.

The most pleasing position of the raised decimal point is level with the center of the 'equals' sign, as shown by the expression $x = 0{\cdot}3456$, and this is what the *decimal* package implements. However, in old texts the practice was to place the full point rather higher, as in 25·345. While this is a bit too high for visual comfort nowadays, the reason for the original high position lies in the name used by metal type-setters for the decimal point, namely a 'turned' full point, as mentioned in the following extract from an 80 year-old *Authors' & Printers' Dictionary*.[2]

> **decimal fractions**, no decimal can be plural, or take verb in pl., however many figures it contains; (typ.) print in figures. The decimal point in all cases to be a full point turned.

But what is meant by a full point 'turned'? The clue comes from the 'turned commas' entry in the dictionary, as follows.

> **turned commas** (typ.), those used at the commencement of a quotation, as these ", two apostrophes being at the end.

If we use a turned comma to show the location a full point would occupy if 'turned' in the same way, we can see that the position is somewhat high, as in the decimal fraction 2‘6. Swapping the turned comma for a similarly turned full point we obtain 2·6, which shows the decimal point in essentially the position we observe in older texts. All is now clear—the typesetter simply turned the metal block of the full point through 180 deg and, *eh presto*, he had a practical decimal point, albeit slightly on the high side.

2 Usage

First implement the *decimal* package using the `\usepackage{}` command in the preamble.

[2] Collins H (1921). Authors' & Printers' Dictionary: a guide for authors, editors, printers, correctors of the press, compositors, and typists. With a full list of abbreviations. An attempt to codify the best typographical practices of the present day. (pub: Humphrey Milford, London).

```
\usepackage{decimal}
```

The *decimal* package will now operate globally to implement the English decimal point where one types a fullpoint in math mode. For example the value 123·456 is obtained by typing `$123.456$`. The correct positioning of the decimal is preserved even when the smaller mathmode fonts are used, as shown in the following two examples.

$$23{\cdot}562^{1{\cdot}23^{2{\cdot}6}} \qquad j = \sqrt{\underbrace{ax^2+bx+c}_{-3{\cdot}78} + \cos(3\pi/4+\theta)}$$

On those occasions when a true full point is required in math mode (e.g. at the end of a series of equations) then this is implemented by typing `\.` For example

$$y = ax^2 + bx + c.$$

is obtained by typing `$y = ax^2 + bx +c\.$`

It is important to appreciate that there are math mode commands which include a full point as an integral part of the command, and in these cases one must, of course, *not* use the `\.` command. A common situation where this arises is in the typesetting of unbalanced vertical braces, in which case a full point is used by one of the commands (`\right.`) to represent the absent brace. For example, the structure

$$\left\{ \begin{array}{l} x = -b/6 \\ y = (4ac - b^2)/7 \end{array} \right.$$

is typeset by the following code

```
\[
\left\{
  \begin{array}{l}
  \displaystyle   x =  -b/6 \\
  \displaystyle   y = (4ac - b^2)/7
  \end{array}
\right.
\]
```

which uses the command `\right.` to balance the left brace command `\left\{` before the array. Since the full point is part of the command then there is no need to use the `\.` command.

If we now add some punctuation to the above structure, say, a comma terminating the first line and a full point to terminate the second line as follows,

$$\left\{ \begin{array}{l} x = -b/6, \\ y = (4ac - b^2)/3. \end{array} \right.$$

then we add the full point using the command `\.` as shown in the following code.

```
\[
\left\{
  \begin{array}{l}
  \displaystyle   x =  -b/6, \\
  \displaystyle   y = (4ac - b^2)/7\.
  \end{array}
\right.
\]
```

Outside math mode the command `\.` performs its usual function of placing a dot above a character, for example the command `\.{a}` generates the ȧ character.

3 Known bugs

Problem with `mathpazo` package

For some reason the raised point fails to be implemented if the decimal package is installed *before* the `mathpazo` package. The workaround is simply to install the decimal package AFTER the mathpazo package, as follows

```
\usepackage{mathpazo}
\usepackage{decimal}
```

4 History

- May 2, 2005 — version 1·1
- July 12, 2003 — first release (version 1·0)