Formatting information in Excel Spreadsheets

Introduction

This collection of features, new in xlrd version 0.6.1, is intended to provide the information needed to:

- display/render spreadsheet contents (say) on a screen or in a PDF file
- copy spreadsheet data to another file without losing the ability to display/render it.

The Palette; Colour Indexes

A colour is represented in Excel as a `(red, green, blue)` ("RGB") tuple with each component in `range(256)`. However it is not possible to access an unlimited number of colours; each spreadsheet is limited to a palette of 64 different colours (24 in Excel 3.0 and 4.0, 8 in Excel 2.0). Colours are referenced by an index ("colour index") into this palette.

Colour indexes 0 to 7 represent 8 fixed built-in colours: black, white, red, green, blue, yellow, magenta, and cyan.

The remaining colours in the palette (8 to 63 in Excel 5.0 and later) can be changed by the user. In the Excel 2003 UI, Tools -> Options -> Color presents a palette of 7 rows of 8 colours. The last two rows are reserved for use in charts.

The correspondence between this grid and the assigned colour indexes is NOT left-to-right top-to-bottom.

Indexes 8 to 15 correspond to changeable parallels of the 8 fixed colours – for example, index 7 is forever cyan; index 15 starts off being cyan but can be changed by the user.

The default colour for each index depends on the file version; tables of the defaults are available in the source code. If the user changes one or more colours, a `PALETTE` record appears in the XLS file – it gives the RGB values for *all* changeable indexes.

Note that colours can be used in "number formats": `[CYAN]....` and `[COLOR8]....` refer to colour index 7; `[COLOR16]....` will produce cyan unless the user changes colour index 15 to something else.

In addition, there are several "magic" colour indexes used by Excel:

`0x18` **(BIFF3-BIFF4),** `0x40` **(BIFF5-BIFF8):**

System window text colour for border lines (used in `XF` , `CF` , and `WINDOW2` records)

`0x19` **(BIFF3-BIFF4),** `0x41` **(BIFF5-BIFF8):**

System window background colour for pattern background (used in `XF` and `CF` records)

`0x43` :

System face colour (dialogue background colour)

`0x4D` :

System window text colour for chart border lines

`0x4E` :

System window background colour for chart areas

`0x4F` :

Automatic colour for chart border lines (seems to be always Black)

`0x50` :

System ToolTip background colour (used in note objects)

`0x51` :

System ToolTip text colour (used in note objects)

`0x7FFF` :

System window text colour for fonts (used in `FONT` and `CF` records).

> ⓘ **Note**
>
> `0x7FFF` appears to be the *default* colour index. It appears quite often in `FONT` records.

Default Formatting

Default formatting is applied to all empty cells (those not described by a cell record):

- Firstly, row default information (`ROW` record, `Rowinfo` class) is used if available.
- Failing that, column default information (`COLINFO` record, `Colinfo` class) is used if available.
- As a last resort the worksheet/workbook default cell format will be used; this should always be present in an Excel file, described by the `XF` record with the fixed index 15 (0-based). By default, it uses the worksheet/workbook default cell style, described by the very first `XF` record (index 0).

Formatting features not included in xlrd

- Asian phonetic text (known as "ruby"), used for Japanese furigana. See OOo docs s3.4.2 (p15)
- Conditional formatting. See OOo docs s5.12, s6.21 (CONDFMT record), s6.16 (CF record)
- Miscellaneous sheet-level and book-level items, e.g. printing layout, screen panes.
- Modern Excel file versions don't keep most of the built-in "number formats" in the file; Excel loads formats according to the user's locale. Currently, xlrd's emulation of this is limited to a hard-wired table that applies to the US English locale. This may mean that currency symbols, date order, thousands separator, decimals separator, etc are inappropriate.

  ❶ Note

  This does not affect users who are copying XLS files, only those who are visually rendering cells.