Make documentation with Emacs Org mode

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1 Introduction

As a programmer, I hate writting document. Acctaully, I like writting, I like share my knowledge to others, but I don't want to take time to adjust those font, format in Word or Powerpoint. But if I don't adjust them, my document would be very ugly, I'm shy to show it to others.

I use Emacs everyday for my coding. Fontunately, I found, with Org mode, I can use Emacs to write article and presentation. More imporatantly , it provides something I dreamed before:

- Only need focus on content, instead of format.
- Pure text , easy to add it into version control.
- Easy to convert from article to presentation. (just need change a keyword)

In this article, I will introduce how to configure Emacs, and show you some examples.

2 Envirionment

My work enviroment is :

- OS version: Ubuntu 12.10
- Emacs version: GNU Emacs 23.4.1
- Org mode version: Org mode version 8.1.1[1]

[1] Org mode is coming from Emacs, but it may xnot be the latest version, please make sure downloading latest version from this.

3 Basic configuration

Basically, Org mode are using the functionality of Latex/XeLatex to generate PDF file, so we need configure a completely Latex/XeLatex envionment. XeLatex is a flexiable choice, because it support specifing font which exists in your local system, it's pretty useful while you want to generate PDF which include Chinese words. In the end, you need add something into your .emacs to let Emacs know what's your default configration for your article and presentation.

3.1 Packages

```
sudo apt-get install texlive-full texlive-xetex latex-cjk-chinese
sudo apt-get install ttf-sil-gentium ttf-sil-gentium
sudo apt-get install ttf-dejavu
sudo apt-get install texinfo
```

3.2 Font

In Ubuntu, you can use "fc-list" to understand which fonts are installed in you loacal system.

```

For English fonts:
$ fc-list :lang=en
/usr/share/fonts/truetype/tlwg/TlwgTypo-Bold.ttf: Tlwg Typo:style=Bold
/usr/share/fonts/X11/Type1/lmtti10.pfb: LMMono10:style=Italic
/usr/share/fonts/truetype/arphic/uming.ttc: AR PL UMing TW MBE:style=Light
/usr/share/fonts/X11/Type1/lmtko10.pfb: LMMonoLt10:style=BoldOblique
/usr/share/fonts/X11/Type1/lmbo10.pfb: LMRomanDemi10:style=Oblique
/usr/share/fonts/truetype/tlwg/Umpush.ttf: Umpush:style=Book
/usr/share/fonts/X11/Type1/c0649bt_.pfb: Bitstream Charter:style=Italic
/usr/share/fonts/X11/Type1/p052024l.pfb: URW Palladio L:style=Bold Italic
...

For Chinese fonts:

$ fc-list :lang=zh
/usr/share/fonts/truetype/arphic/uming.ttc: AR PL UMing TW MBE:style=Light
/usr/share/fonts/truetype/arphic/ukai.ttc: AR PL UKai CN:style=Book
/usr/share/fonts/truetype/arphic/ukai.ttc: AR PL UKai HK:style=Book
/home/fni/.fonts/simsun.ttc: NSimSun新宋体,:style=Regular常规,
/usr/share/fonts/truetype/arphic/ukai.ttc: AR PL UKai TW:style=Book
/usr/share/fonts/X11/misc/wenquanyi_10ptb.pcf: WenQuanYi Bitmap Song:style=Bold
/usr/share/fonts/X11/misc/wenquanyi_12pt.pcf: WenQuanYi Bitmap Song:style=Regular
...
```

3.3 .emacs file

Adding following into your .emacs.

```

(require 'org)
(require 'org-install)
(require 'ob-ditaa)
(require 'org-latex)
(require 'ob-tangle)
(require 'ox-latex)

;; Let the exporter use the -shell-escape option to let latex
;; execute external programs.
```

```
11 ;; This obviously and can be dangerous to activate!
12
13 (setq org-latex-pdf-process
14       '("xelatex -shell-escape -interaction nonstopmode -output-directory %o %f"
15         "xelatex -shell-escape -interaction nonstopmode -output-directory %o %f"))
16
17
18 (unless (boundp 'org-latex-classes)
19   (setq org-latex-classes nil))
20 (add-to-list 'org-latex-classes
21              ;; beamer class, for presentations
22              '("beamer"
23                "\\documentclass[11pt]{beamer}\n
24 \\usepackage{fontspec}\n
25 \\usepackage{xeCJK}\n
26 \\setCJKmainfont[Mapping=tex-text]{WenQuanYi Micro Hei}\n
27 \\setCJKmonofont[Mapping=tex-text]{SimSun}\n
28 \\setmainfont[Mapping=tex-text]{TeXGyrePagella}\n
29 \\setmonofont[Mapping=tex-text]{Courier 10 Pitch}\n
30 \\setsansfont[Mapping=tex-text]{SimSun}\n
31 \\usetheme[pageofpages=of,% String used between the current page and the
32   % total page count.
33    alternativetitlepage=true,% Use the fancy title page.
34    titlepagelogo=logo-telekinesis,% Logo for the first page.
35 ]{PaloAlto} \n
36 \\usecolortheme{wolverine}\n
37       \\beamertemplateballitem\n
38       \\setbeameroption{show notes}
39       \\usepackage[utf8]{inputenc}\n
40       \\usepackage[T1]{fontenc}\n
41       \\usepackage{hyperref}\n
42       \\usepackage{color}
43       \\usepackage{listings}
44       \\lstset{numbers=none,tabsize=4,
45   frame=single,
46    basicstyle=\\small,
47   showspaces=false,showstringspaces=false,
48   showtabs=false,
49   keywordstyle=\\color{blue}\\bfseries,
50   commentstyle=\\color{red},
51   }\n
52   \\usepackage{verbatim}\n
53   \\institute{institute}\n
54   \\subject{{{{beamersubject}}}}\n"
55                ("\\section{%s}" . "\\section*{%s}")
56                ("\\begin{frame}[fragile]\\frametitle{%s}"
57                 "\\end{frame}"
58                 "\\begin{frame}[fragile]\\frametitle{%s}"
59                 "\\end{frame}")))
60
61 (add-to-list 'org-latex-classes
62              '("cn-article"
63                "\\documentclass[10pt,a4paper]{article}
64 \\usepackage{graphicx}
65 \\usepackage{xcolor}
66 \\usepackage{xeCJK}
67 \\usepackage{lmodern}
68 \\usepackage{verbatim}
69 \\usepackage{fixltx2e}
70 \\usepackage{longtable}
```

```
71  \\usepackage{float}
72  \\usepackage{tikz}
73  \\usepackage{wrapfig}
74  \\usepackage{soul}
75  \\usepackage{textcomp}
76  \\usepackage{listings}
77  \\usepackage{geometry}
78  \\usepackage{algorithm}
79  \\usepackage{algorithmic}
80  \\usepackage{marvosym}
81  \\usepackage{wasysym}
82  \\usepackage{latexsym}
83  \\usepackage{natbib}
84  \\usepackage{fancyhdr}
85  \\usepackage[xetex,colorlinks=true,CJKbookmarks=true,
86  linkcolor=blue,
87  urlcolor=blue,
88  menucolor=blue]{hyperref}
89  \\defaultfontfeatures{Mapping=tex-text}
90  \\usepackage{fontspec,xunicode,xltxtra}
91  \\setCJKmainfont{WenQuanYi Zen Hei} % 设置缺省中文字体
92  \\setmainfont{Gentium}
93  \\setsansfont[BoldFont=WenQuanYi Zen Hei Sharp]{AR PL UKai CN}
94  \\setmonofont{Ubuntu Mono}
95  \\newcommand\\fontnamemono{WenQuanYi Micro Hei} 等宽字体%
96  \\newfontinstance\\MONO{\\fontnamemono}
97  \\newcommand{\\mono}[1]{{\\MONO #1}}
98  \\hypersetup{unicode=true}
99  \\geometry{a4paper, textwidth=6.5in, textheight=10in,
100 marginparsep=7pt, marginparwidth=.6in}
101 \\definecolor{foreground}{RGB浅灰}{220,220,204}%
102 \\definecolor{background}{RGB浅黑}{62,62,62}%
103 \\definecolor{preprocess}{RGB浅紫}{250,187,249}%
104 \\definecolor{var}{RGB浅肉色}{239,224,174}%
105 \\definecolor{string}{RGB浅紫色}{154,150,230}%
106 \\definecolor{type}{RGB浅黄}{225,225,116}%
107 \\definecolor{function}{RGB浅天蓝}{140,206,211}%
108 \\definecolor{keyword}{RGB浅肉色}{239,224,174}%
109 \\definecolor{comment}{RGB深褐色}{180,98,4}%
110 \\definecolor{doc}{RGB浅铅绿}{175,215,175}%
111 \\definecolor{comdil}{RGB深灰}{111,128,111}%
112 \\definecolor{constant}{RGB粉红}{220,162,170}%
113 \\definecolor{buildin}{RGB深铅绿}{127,159,127}%
114 \\punctstyle{kaiming}
115 \\title{}
116 \\fancyfoot[C]{\\bfseries\\thepage}
117 \\chead{\\MakeUppercase\\sectionmark}
118 \\pagestyle{fancy}
119 \\tolerance=1000
120 [NO-DEFAULT-PACKAGES]
121 [NO-PACKAGES]"
122 ("\\section{%s}" . "\\section*{%s}")
123 ("\\subsection{%s}" . "\\subsection*{%s}")
124 ("\\subsubsection{%s}" . "\\subsubsection*{%s}")
125 ("\\paragraph{%s}" . "\\paragraph*{%s}")
126 ("\\subparagraph{%s}" . "\\subparagraph*{%s}")))
127
128
129 (setq org-export-latex- listings  t)
130 ;; Options for \lset  (commandreference to listing Manual)
```

```
(setq org-export-latex-listings-options
      '(
        ("basicstyle" "\\color{foreground}\\small\\mono")
        ("keywordstyle" "\\color{function}\\bfseries\\small\\mono")
        ("identifierstyle" "\\color{doc}\\small\\mono")
        ("commentstyle" "\\color{comment}\\small\\itshape")
        ("stringstyle" "\\color{string}\\small")
        ("showstringspaces" "false")
        ("numbers" "left")
        ("numberstyle" "\\color{preprocess}")
        ("stepnumber" "1")
        ("backgroundcolor" "\\color{background}")
        ("tabsize" "4")
        ("captionpos" "t")
        ("breaklines" "true")
        ("breakatwhitespace" "true")
        ("showspaces" "false")
        ("columns" "flexible")
        ("frame" "single")
        ("frameround" "tttt")
        ("framesep" "0pt")
        ("framerule" "8pt")
        ("rulecolor" "\\color{background}")
        ("fillcolor" "\\color{white}")
        ("rulesepcolor" "\\color{comdil}")
        ("framexleftmargin" "10mm")
        ))
;; Make Org use ido-completing-read for most of its completing prompts.
(setq org-completion-use-ido t)
;; 各种语言支持Babel
(org-babel-do-load-languages
 'org-babel-load-languages
 '((R . t)
   (emacs-lisp . t)
   (matlab . t)
   (C . t)
   (perl . t)
   (sh . t)
   (ditaa . t)
   (python . t)
   (haskell . t)
   (dot . t)
   (latex . t)
   (js . t)
   ))
```

Yeah, most of above configration are copied from other articles in Internet. But there are something need to point out.

3.3.1 Specify to use XeLatex

By default, pdflatex will be used to generate PDF.
Following statement can be used to spcify using XeLatex

```

(setq org-latex-pdf-process
      '("xelatex -shell-escape -interaction nonstopmode -output-directory %o %f"
        "xelatex -shell-escape -interaction nonstopmode -output-directory %o %f"))
```

3.3.2 Specify your article/presentation configration

For Article,

```
(add-to-list 'org-latex-classes
             '("cn-article"
               "\\documentclass[10pt,a4paper]{article}
 ...
\\usepackage[xetex,colorlinks=true,CJKbookmarks=true,
linkcolor=blue,
urlcolor=blue,
menucolor=blue]{hyperref}
\\defaultfontfeatures{Mapping=tex-text}
\\usepackage{fontspec,xunicode,xltxtra}
\\setCJKmainfont{WenQuanYi Zen Hei} % 设置缺省中文字体
\\setmainfont{Gentium}
\\setsansfont[BoldFont=WenQuanYi Zen Hei Sharp]{AR PL UKai CN}
\\setmonofont{Ubuntu Mono}
\\newcommand\\fontnamemono{WenQuanYi Micro Hei} 等宽字体%
\\newfontinstance\\MONO{\\fontnamemono}
\\newcommand\\fontnamemono{WenQuanYi Micro Hei} 等宽字体%
\\newfontinstance\\MONO{\\fontnamemono}
\\newcommand{\\mono}[1]{{\\MONO #1}}
\\hypersetup{unicode=true}
```

For Presentation,

```
(unless (boundp 'org-latex-classes)
  (setq org-latex-classes nil))
(add-to-list 'org-latex-classes
             ;; beamer class, for presentations
             '("beamer"
               "\\documentclass[11pt]{beamer}\n
               "\\documentclass[11pt]{beamer}\n
               \\usepackage{fontspec}\n
               \\usepackage{xeCJK}\n
               \\setCJKmainfont[Mapping=tex-text]{WenQuanYi Micro Hei}\n
               \\setCJKmonofont[Mapping=tex-text]{SimSun}\n
               \\setmainfont[Mapping=tex-text]{TeXGyrePagella}\n
               \\setmonofont[Mapping=tex-text]{Courier 10 Pitch}\n
               \\setsansfont[Mapping=tex-text]{SimSun}\n
               \\usetheme[pageofpages=of,% String used between the current page and the
               % total page count.
                alternativetitlepage=true,% Use the fancy title page.
                titlepagelogo=logo-telekinesis,% Logo for the first page.
               ]{PaloAlto} \n %set theme
               \\usecolortheme{wolverine}\n
 ....
```

Just please notice, you need make sure configured fonts and themes existed in your local system. You can check your font with "fc-list" command, and check your theme with :

```
$ ls /usr/share/texmf/tex/latex/beamer/base/themes/theme/
beamercolorthemechameleon.sty beamerthemeCambridgeUS.sty beamerthemeMalmoe.sty
beamercolorthemefreewilly.sty  beamerthemeCopenhagen.sty beamerthemeMarburg.sty
beamercolorthemenouvelle.sty  beamerthemeDarmstadt.sty beamerthemeMontpellier.sty
beamerinnerthemefancy.sty      beamerthemedefault.sty      beamerthemePaloAlto.sty
beamerouterthemedecolines.sty beamerthemeDresden.sty     beamerthemePittsburgh.sty
```

```
beamerthemeAnnArbor.sty      beamerthemeFrankfurt.sty    beamerthemeRochester.sty
beamerthemeAntibes.sty       beamerthemeGoettingen.sty   beamerthemeSingapore.sty
beamerthemeBergen.sty        beamerthemeHannover.sty     beamerthemeSzeged.sty
beamerthemeBerkeley.sty      beamerthemeIlmenau.sty      beamerthemeTorino.sty
beamerthemeBerlin.sty        beamerthemeJuanLesPins.sty  beamerthemeWarsaw.sty
beamerthemeBoadilla.sty      beamerthemeLuebeck.sty      compatibility
beamerthemeboxes.sty         beamerthemeMadrid.sty
```

4 Examples

4.1 A article example

```
#+LaTeX_CLASS: cn-article
#+TITLE: My little document

* Introduction 1

  - 测试中文字符 .
** Normal distribution

   Probability density of the normal distribution, using familiar TeX notation
   for formulae:

   $$\frac{1}{\sqrt{2\pi\sigma^2}}e^{ -\frac{(x-\mu)^2}{2\sigma^2} }$$

** Some table

| *Greek God*     | *Roman God* | *Element*      |
        |-----------------+-------------+----------------|
| Zeus              | Jupiter     | Sky and clouds |
| Hera              | Juno        | Family         |
| Poseidon          | Neptune     | Sea            |
| Hades[fn:hades] | Pluto       | Underworld     |

[fn:hades] a good person
```

You can check here to see what's the PDF like.

4.2 A presentation example

You can check here to see the org file.
You can check here to see what's the PDF like.

5 References

- presentations-with-org-mode-beamer
- nice-looking-pdfs-with-org-mode
- About-Theme
- About-Font