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HELLO WORLD

α ⊠ ⊠ ¼ Δ Ω μs

0.1 Quick Start

- Install MiKTeX (`https://miktex.org/download`) (do a single user installation)
- This report uses LuaLaTeX—ensure you use `lualatex` to compile and do not use the `pdftex`/`pdflatex` command to compile
- Strongly recommended to use `output-directory=./out` when compiling to push all generated files in a sub-folder
- For the CM-Bright (sans serif) font, you must go to MiKTeX console (hit Windows key and type miktex and it should pop up) and manually download hfbright and cm-super packages by clicking Packages (left menu) and searching, right-click, then install. Or you can run these commands: `mpm --install=hfbright` and `mpm --install=cm-super`
- you should also install markdown package: `mpm --install=markdown`
- Install Perl for the makeglossaries package (`https://strawberryperl.com/`) and ensure perl is in the path (used for acronyms)
  - Possibility: If you get an error in the `xindy.pl` script when trying makeglossaries, this means a certain folder cannot be found, and we must patch the code to get it working. I've found this issue occurs for admin type installations mostly. Use the error file and line and locate the issue. In the else part, the 'die' statement forces the crash. We must replace this with the following (ensure correct / direction is used):
    `$cmd_dir = "C:/Path/To/Where/tex2xindy.exe/is/located";`
  - Common locations are:
    - `C:/Users/Kale/AppData/Roaming/MiKTeX/2.9/miktex/bin/x64`
    - `C:/Program Files/MiKTeX/miktex/bin/x64/internal`

Important note for beginners: When you install MiKTeX, you get a LaTeX installation and package manager. This operates independently of what tool you use to write LaTeX in (TeXStudio, TeXWorks, PyCharn, VScode, notepad). To compile a LaTeX document, you simple need to go to the command line and run a command that more or less says "compile this file". The tool that you use to write you code in just helps execute these commands, captures the output from the compilation process, and helps point to any errors.

This package uses lualatex instead the default pdftex command. You should be able to modify TeXStudio or VScode (example below) or whatever you use to make this the default. I also like to push the .pdf, and other auxiliary files to an 'out' folder.

Recommended compile command:
```
lualatex -file-line-error -interaction=nonstopmode -synctex=1 -
output-format=pdf -output-directory=out main.tex
```

Biblography: `biber main --output-directory ./out`

Glossary/Acronym: `makeglossaries -d ./out main`

PDF viewer: I like Sumatra as you can leave a PDF open in it and still re-compile (Adobe hogs the file).`https://www.sumatrapdfreader.org/free-pdf-reader`

0.1.1 Compiling with VSCode

Open VSCode and the `settings.json` file. Add the following code. If the outer-most brackets aren't there, copy this verbatim. If there are brackets, skip the outermost brackets and place the code inside.

```
 1
 2  {
 3      "latex-workshop.latex.recipes": [
 4          {
 5              "name": "compile lualatex",
 6              "tools": [
 7                  "mylualatex",
 8              ]
 9          },
10          {
11              "name": "compile bib gloss",
12              "tools": [
13                  "mybiber", "myglossary",
14              ]
15          },
16
17      ],
18      "latex-workshop.latex.tools": [
19          {
20              "name": "mylualatex",
21              "command": "lualatex",
22              "args": [
23                  "-synctex=1",
24                  "-interaction=nonstopmode",
25                  "-file-line-error",
26                  "-output-format=-pdf",
27                  "-output-directory=%DIR%/out",
28                  "%DOCFILE%"
29              ]
30          },
31          {
32              "name": "mybiber",
33              "command": "biber",
34              "args": [
35                  "main",
36                  "--output-directory", "out",
37              ]
38          },
39          {
40              "name": "myglossary",
41              "command": "makeglossaries",
42              "args": [
43                  "-d", "out",
```

4

```
44                  "main"
45              ]
46          },
47      ]
48
49 }
```

0.2 Introduction

This class is based off the `scrartcl` class in the KOMA-Script family. Don't let the name fool you—although plain and unassuming with a (dare I say) Microsoft Word-like appearance, this template has numerous bells and whistles that make your LaTeXing easier. It could easily lend itself well to school assignments or lab reports as well.

This document is intended to be a guide on how to use it as well as offer some tips and hacks for producing a good doc.

0.3 Customizing your Doc

0.3.1 !

Class Options `memo` use a memo format instead.

`compact` use a compact format (sections not on a new page, and different title page.)

`serif` change the font to serif (knfonts light instead of CM-Bright).

0.3.2 Tweaking Switches

```
 1 %%% Draft toggles
 2 \DarkModePDF % if you want a dark theme
 3 \DraftMark  % puts a draft water mark
 4 \PreLimMark % auto set
 5 \ShowGrid
 6
 7
 8 %%% some formatting toggles
 9 \togglefalse{SecOnNewPage}  % insert new page before each ←
      section?
10 \secwiselabelnums % if you want figures and table numbers to be ←
      based on section, ie 1.1, 1.2, etc.
11
12
13 \TocCecskip=0.7em  % if you want to spread or compress ToC to ←
      fit page better
```

5

```
14  \ToCextrabottomroom=2em % enlarges ToC page to help cram stuff
15  \ToCrightmargin=0pt % pushes page numbers closer to ToC for ←
        easier reading
16  \pullToCcloser=-12pt % pulls ToC closer to section heading for ←
        more room
17
18  \floatlefthanglabel % hanging float labels and float flushed ←
        left.. experimental..
19
20  \noSectionNumbers % completely disable section numbers (possibly←
         for a memo)
21
22
23  \toggletrue{showListOfFigsTabs} %< show figs/tables contents
24  \togglefalse{samepgListOfFigsTabs} %< on the same page?
```

0.3.3 PDF metadata and PDF-A Compliance

This class tries to be PDF-A compliant. It uses the pdfx class to write document metadata (pdf properties). Most of the titling commands will clean and store the pdf data, but to write it, use \writePDFmetadata (see penlight documentation for details) before the document.

0.4 Sections

This class by default will insert a page break on a new section. Using the etoolbox package, you can disable this behaviour with \togglefalse{SecOnNewPage}. if you want to invert the behaviour for a particular section, use !

For paragraphs, if you would like the text to appear on a new line (rather than run in), use !.

```
1  use [short title for ToC]{Section title}
2         * will suppress number and ToC listing
3  \section{}
4  \subsection
5  \subsubsection
6  \paragraph
7  Custom
8  \section! will not necessarily put the section on a new page. By←
        default, sections go on a new page
9  \paragraph!   Will push the following text on a new line. ←
       Without "!", the text begins on the same line as the heading
```

6

```
10  On any of the section/sub commands, using a + will add a letter ↩
        after it.
11
12  \sectionM{} is a front/back-matter section--will make a section ↩
        that shows up in ToC and PDF bookmarks, but no number
```

The sections are redefined so that + will append a letter. \reset[sub]sectionletter

Add a manual page break in ToC \addtocontents{toc}{\protect\newpage}

0.5 References and Citations

0.5.1 References

I use the facilities of the cleveref package, which automatically type Figure Table etc I like using s. f. t. etc. to label my things, it's easier to type than the typically recommended sec: fig: tab: Examples: \cref{f.m602fTUV} \label{s.steadystate}

0.5.2 Citations/Bibliography

The .bib files contain the reference information. Call the key with \cite{key}.

I have a command that prints the title then adds the reference (in italic): \citeT{key}.

If you want to use data from a .bib file but not add it to the citation list, wrap the command like so \begin{refsection}\fullcite{##1}\end{refsection}

I like JabRef to help manage my .bib files https://www.jabref.org/

0.5.3 Acronyms

This class provides acronyms with \ac. It supresses links to the Acronym entry (unlike \gls{} which links to the glossary), and instead tries to use tooltips over the acronyms that show the long-form. If you want to place something different in place of the tooltip text, set \def\ackeyToolTipText{Text Shown On Tooltip For: ackey}

0.6 Float commands

This package offers float commands for inserting tables and figures

```
1  \InsertTable[htbp]%
2  {you can \input here or type \begin{tabular}...}%
3  +{Caption goes here: egManitoba interface transfers.}%
4  {\label{t.trans}}% label goes here
5  [optional]%Optional table footnotes here
6
7  \InsertFigure[htbp]%
8  {\includegraphics[options]{path/to/figure.pdf}}%
9  +{A long run on caption that is needlessly long}%
10 {\label{f.1}}%
11
12 NOTE: you can put a *  directly after
13 InsertTable or InsertFigure,
14 and it will make it a wide table/fig
15 that is flush left, no star will indent the float a bit
16
17 Put a + before the caption to justify it
```

Some helpful commands.

```
1
2  \RotPDF*+{\include...}
3      * star will restore the pdf back to normal orientation
4      + will add a pagebreak before
5
6  \RotFloatPage{\Insert [H]...}
7    If you want a rotated float (figure or table) on its own page↩
         , use this with the [H] float placement
8
9  \FloatNextPage{\Insert [H]...}
10   If you have a big float and you know it should be on its own ↩
         page right after
11
12 \BoxSameSizeImg{O{t} O{t} m m}
13   make a box the same size of an image
```

0.6.1 Extras

The `halwidth`-key is shorthand for `width=0.5\linewidth`. `halfwidth-` makes 0.48, and `fullwidth` is full.

0.7 Tabular matter

This class uses the author's `lutabulartools` package, and the author highly suggests we follow the `booktabs` way of making tables (no vertical lines).

0.7.1 References

Tabular 101: https://en.wikibooks.org/wiki/LaTeX/Tables
How to make nice tables: https://inf.ethz.ch/personal/markusp/teaching/guides/guide-tables.pdf

0.7.2 Columns

Column	Use
L,N,R{X.Y}	`siunitx` number column (where X.Y is number format)
X,Z,Y	tabularx column, X=justified, Z=ragged (usually preferred), or Y=centered
P,M,B {wid}	ragged instead of justified equiv to p,m,b
V, T {wid}	horizontally centered plus vertically centered (V) / top aligned (T) paragraph cell
~	inject default tablcolsep, equiv to @{\hspace {\tabcolsep }}
The defaults	
S	see siunitx doc
l,c,r	Left, center, right, fits to width
p,m,b {wid}	A top, middle, bottom aligned paragraph cell, allows \newline and \nl

In a paragraph cell (ie p, P, X, Z, Y, you can specify line-breaks with \newline or a short version \nl (defined in this class))

Rules (lines)

```
1  \toprule
2  \midrule
3  \bottomrule      \cmidrule(){}
4  \gmidrule        custom light gray mid rule
```

Footnotes

```
1  tnote{ltr}:
2  tfnote{ltr}:
3
```

9

```
4  \reseturef or \resetatnotes - reset automatic lettering
5  atnote{key}: automatic table note
6  atfnote{key}: automatic table footnote
```

Note: if using a float, After endtabular%
Make sure a % and no new lines after, this improves

0.7.3 Hacks

I like exploiting \rlap for hanging characters, ex:

```
1  \begin{tabular}{ll}\toprule
2  \MC{Voltage\rlap{,}\\kV} & \MC{←
       Current\rlap{,}\\Amps} \\\←
       bottomrule
3  \end{tabular}
```

Voltage,	Current,
kV	Amps

0.7.3.1 Spacing

Use the following commands outside the tabular environment. For different vertical
spacing, use \renewcommand{\arraystretch}{1.2}.
For different spacing, \setlength\tabcolsep{2ex}

0.7.3.2 Columns

If you have a multicolumn (say by using \MC), and the multicolumn is wider than the
combined width of your columns underneath and they were not fixed-width columns
(p,P,m,M,b,B,T,V,X,Z,Y), if you want them to be the same width, just use one of the
aforementioned fixed-width columns. You might need to tweak a bit though.

Out of convenience, I erase the padding on the ends of tabular, because I like the way
it looks. To bring it back with the ~ column like ~lllr~. Here's an example:

```
1  \begin{tabular}{~ll~}\toprule
2  hello & world \\
3  \bottomrule
4  \end{tabular}
5
6  \begin{tabular}{ll}\toprule
7  hello & world \\
8  \bottomrule
9  \end{tabular}
```

hello	world

hello	world

Use @{} to remove space between columns, or @{'code'} to insert code between
column !{code} adds code keeps the space though.
Use >{'code'} <{'code'} to sandwich a cell with code of your choice

Note: with the siunitx columns N, L, R type columns, need to surround text with {} (and text that may come after a number) to get alignment correct

0.7.4 Common Errors

Common Errors Extra \cr You have too many & or forgot to put a \\to end your row siunitx invalid input You probably forgot to wrap text wit {} (note that you should not wrap multicolumn with {}) tex capacity exeeded put {} after midrule ? \MC on a p{} column?

Misplaced noalign -if you use \midrule etc before the \\ you will get this error

Misplaced omit or span if you use a multicolumn or non-number column in an siunitx column and forget to wrap with {}

0.8 List commands

https://texblog.org/2008/10/16/lists-enumerate-itemize-description-and-how-to-change-the

```
1  \ContParaAfterList  If you're showing a list (itemize) and want ←
       the list to be in the same paragraph as the next lines, use ←
       this command to fix the spacing
2       Otherwise, it will assume a new pagagraph follows the list ←
           and space will be larger
3  Lists   \ begin{itemize enumerate}[moresep] will give more room ←
       between items
4       [twocol] will put them over two columns
```

Added an autoamtically punctuate list. This is particularly useful if you have a large list and aren't entirely sure of the order

- one;
- two;
- three; and
- four.

0.9 Utilities

in addition to etoolbox,we have \invtoggle{}, \gettogglestate, \ifdefOR{d1}{d2}{t}{f}, \ifstringeqx{}{}{}[], \DoIfnotEmpty{}{}[], \DoWithoutPrinting{}, \DontDo{},

Some other stuff:

\makealph{num} \makeAlph{num}

```
1  \hl{highlight text}
2  \todo{todo note in margin}
3  \todoL{todo note on a new line}
```

0.10 Symbols

if you \toggletrue{dollarsignafter} 2 M $

0.11 Hacks

With KOMA-Script, we can make margin wider or smaller.
\begin{addmargin}[left indentation]{indentation} ... \end{addmargin}

 makes an invisible character of same size

\llap{}, \rlap{}, \clap{} allows text to have no width (ie overlaps), left, right
or center aligned \llap{} useful for left hanging labels (section, fig, tables), but these
in general are good for hacking tables to create an item of zero width which will not
adjust column width. If you want to use these as the first thing in a paragraph, use
\Llap, \Rlap, and \Clap, otherwise, you may get some unwanted space.

Horizontal spacing: I use \, to produce a thin space: good for initials, or units like
K.\,Ewasiuk, 177\,lbs

\enlargethispage https://latexref.xyz/_005cenlargethispage.html

https://tex.stackexchange.com/questions/74353/what-commands-are-there-for-horizontal-spa

If you need to add a forced page break, we have some options. These should be done
at the very end of the report writing process though.

https://tex.stackexchange.com/questions/9852/what-is-the-difference-between-page-break-a
9855#9855 pagebreak – create a new page and fill the page
newpage – perform a new page and don't let the paragraphs spread
clearpage – perform new page but ensure all floats are inputted

0.12 Typography

```
1
2
3
4  Typing units like kV, MW
5      Use a backslash in front. I define units using the siunitx ↩
          package
6      \kV  \MW
7      This produces a smaller space and keeps the units together
```

0.12.0.1 Know your dashes

```
1  - is a hyphen: old-timers\\
2  -- is an en-dash and used for ranges ↩
      like: 0--60\\
3  --- is an em-dash: Kale---the cool ↩
      guy---said that
4        em-dashes are cool!
```

- is a hyphen: old-timers
– is an en-dash and used for ranges like: 0–60
— is an em-dash: Kale—the cool guy—said that
em-dashes are cool!

0.12.0.2 Know how spaces, new lines, and comments work in LaTeX

```
1  This will all
2  be one sentence.
3
4  \ \ \ \ New paragraph from blank line ↩
      .
5  Supercali% <<see percent/comment
6  fragilstitic% <<<
7  expilaidocuious  % << no space
8
9  \ \ \ \ It is useful to break ideas
10 into separate lines.
11 And makes it easy to
12 move lines around
13 if you change you mind, or
14 parse out lists like
15 cat,
16 dog, and
17 fish.
```

This will all be one sentence.

New paragraph from blank line. Supercalifrag-ilstiticexpilaidocuious

It is useful to break ideas into separate lines. And makes it easy to move lines around if you change you mind, or parse out lists like cat, dog, and fish.

0.13 Packages

Here are some packages which I think the documentation is worth reading.

```
V links V
```

xparse	The smart way to define commands and environments.
etoolbox	Useful "scripting" tools like toggles, if-else, and hook into commands and environments.

booktabs	Better rules(lines) for tables
lutabulartools	Provides \MC and enhances booktabs.
	You may want to see `makecell` and `multirow` as well.
tabularx	The tabularx environment.
longtable	table that can extend past one page
ltxtable	Long tabularx

siunitx	Units and numbers in text and tables.

enumitem	Fancy lists and key-val options.
autopuncitems	Automatically punctuate lists

floatrow	Used to help with the InsertTable/Figure.
caption	Tweak captions.
graphicx	enhanced includegraphics

cleveref	Allows cref and coustomization of captions

relsize	Provides relative sizing commands like \smaller.

KOMA-Script	You shouldn't have to mess around with this, but if you wanna tweak the class go for it.
yamlvars	Make definitions with yaml. Used for report variables
LuaTeX	The reference manual.

0.14 Math with LaTeX

Math on "pure" numbers:

\fpeval	\fpeval{1+2.5}->3.5 (floating point math)
\inteval	\inteval{5/2}->3 (division is rounded)

For a list of functions, see `https://ctan.math.washington.edu/tex-archive/macros/latex/contrib/l3packages/xfp.pdf`

Math on dimensions/lengths:

\dimeval	\rule{\dimeval{1cm+1cm}}{1pt}->⎯⎯⎯⎯

14

\skipeval a\hspace{\skipeval{1cm plus 1cm - (1cm plus 0.5cm)}}b->ab

            a

            a

If multiplying a length, wrap the dimension in brackets and apply the scale AFTER, like (5em)*2

Note: if above does not work, you can try the old way:
\rule{\dimexpr(\linewidth-3in)\relax}{1pt}
or use \gluexpr()\relax in place of \skipeval

Note: glue/skip is stretchy, it has an X plus P minus M where it can stretch and shrink. https://tex.stackexchange.com/questions/64756/what-is-glue-stretching https://tex.stackexchange.com/questions/64756/what-is-glue-stretching

0.15 Hydro Stuff

Note: the settings of section 0.4 do not apply to Hydro reports.

0.15.1 Report Variables

This package can use YAMLvars.

0.15.2 Interconnection Study Macros

```
1  Hydro Report Macros R:\TariffStudies\MH-Report-Template\_↩
     boilerplate\hydromacros.sty
2
3  \Study  Processes, ifs, sis, fs (or group in front) and ↩
     enters glossary item
4  \aStudy an ies, a fs, etc. does this correctly
5  \Agreement  Same as above but with agreement
6  \GenStation Types out the generating station
7  \Request    Puts IR or TSR
8  \Firm   Puts NRIS if it's a generator study, DNR if it's a ↩
     tariff study
9  \SecS   Puts NRIS if it's a generator study, DNR if it's a ↩
     tariff study
10 \ifIFS{x}[y]    Types x if study type is ifs, otherwise types y ↩
     (optional)
11 \ifGroupStudy
```

15

```
12  \ifTariffStudy
13  \PSSE    \Mhtrans (mh transmission system)
14  \Customer   IC for oait, EC for oatt
15  \IntUpgrades    isus and toids
16
17
18
19
20
21  When typing acronyms    Excel spreadsheet is used to manage ↩
        acronyms
22      Best to use \gls{oait}
23      For example. This will ensure Open Access Interconnection ↩
           Tariff is only typed the first time
```

End of document.