

## A L<sup>A</sup>T<sub>E</sub>X code

This is the appendix to Boris Veytsman's paper in *TUGboat* 35:2 (<http://tug.org/TUGboat/tb35-2>).

The code below is not too robust: it is easy to subvert it, e.g. by putting overlapping illustrations on a page. This is a subsection of the file `faosyb.dtx` which can be found at <https://github.com/filippogheri/FAOSYBLaTeXpackage>.

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This is hairy because output routines are hairy...

We need several insert boxes. Naming convention: the letter for the box size and two letter code for the location. We use `\newbox` instead of `\newinsert` since we do not use associated `\count`, `\dimen` and `\skip` registers.

```
\newbox\nfbox@S@ul
\nfbox@S@ur
\nfbox@S@ll
\nfbox@S@lr
\nfbox@S@UL
\nfbox@S@UR
\nfbox@S@LL
\nfbox@S@LR
\nfbox@T@ul
\nfbox@T@ur
\nfbox@T@UL
\nfbox@T@UR
\nfbox@W@ul
\nfbox@W@ll
\nfbox@W@UL
\nfbox@W@LL
\nfbox@B@ul
\nfbox@B@UL
```

`\tempboxb` Standard L<sup>A</sup>T<sub>E</sub>X has `\@tempboxa`. We need more...

```
\ifx\@tempboxb\undefined
\nfbox@tempboxb
\fi
```

`\standard@output` The standard L<sup>A</sup>T<sub>E</sub>X output routine is saved as `\standard@output`. We use it for one column pages—maybe one even wants a standard float here?

```
\edef\standard@output{\the\output}
```

`\output` Right now we use standard output on one column pages and the new one with two columns

```
\output{\if@twocolumn\the\nf@output\else\standard@output\fi}
```

`\nf@output` Here we define our own output routine.

```
\newtoks\nf@output
\nf@output {}
```

We define the current boxes `\curr@nfbox...`. Also, `uc` or `lc` mean Upper or Lower Current column

```
\ifodd\c@page
\global\let\curr@nfbox@S@ul\nfbox@S@UL
\global\let\curr@nfbox@S@ur\nfbox@S@UR
\global\let\curr@nfbox@S@ll\nfbox@S@LL
\global\let\curr@nfbox@S@lr\nfbox@S@LR
\global\let\curr@nfbox@T@ul\nfbox@T@UL
\global\let\curr@nfbox@T@ur\nfbox@T@UR
\global\let\curr@nfbox@W@ul\nfbox@W@UL
\global\let\curr@nfbox@W@ll\nfbox@W@LL
\global\let\curr@nfbox@B@ul\nfbox@B@UL
\else
```

An output routine for an illustrated book: Making the FAO Statistical Yearbook

```

\global\let\curr@nfbox@S@ul\nfbox@S@ul
\global\let\curr@nfbox@S@ur\nfbox@S@ur
\global\let\curr@nfbox@S@ll\nfbox@S@ll
\global\let\curr@nfbox@S@lr\nfbox@S@lr
\global\let\curr@nfbox@T@ul\nfbox@T@ul
\global\let\curr@nfbox@T@ur\nfbox@T@ur
\global\let\curr@nfbox@W@ul\nfbox@W@ul
\global\let\curr@nfbox@W@ll\nfbox@W@ll
\global\let\curr@nfbox@B@ul\nfbox@B@ul
\fi
\if@firstcolumn
\global\let\curr@nfbox@S@uc\curr@nfbox@S@ul
\global\let\curr@nfbox@S@lc\curr@nfbox@S@ll
\global\let\curr@nfbox@T@uc\curr@nfbox@T@ul
\else
\global\let\curr@nfbox@S@uc\curr@nfbox@S@ur
\global\let\curr@nfbox@S@lc\curr@nfbox@S@lr
\global\let\curr@nfbox@T@uc\curr@nfbox@T@ur
\fi
\let \par \@@par

```

There are several possibilities when we start the output routine for a single column in a two-column layout.

1. Wide or big non-floats completely cover the page. In this case we do not need to create columns, and directly go to the output.
2. The column is occupied by tall or single nonfloats. We make a column of nonfloats and send it further.
3. There is room for text on the page, but its height (`\@colroom`) is different from the one known to the page builder (`\vsize`). In this case we change `\vsize` and return.
4. The room for text is exactly `\vsize`. In this case we form a column and return.

```

\global\@colht=\textheight
\ifdim\ht\curr@nfbox@B@ul>0.5\baselineskip
\global\advance\@colht by -\textheight
\fi
\ifdim\ht\curr@nfbox@W@ul>0.5\baselineskip
\global\advance\@colht by -0.5\textheight
\fi
\ifdim\ht\curr@nfbox@W@ll>0.5\baselineskip
\global\advance\@colht by -0.5\textheight
\fi
\ifdim\@colht < \baselineskip
\nf@output@widepage
\else
\nf@makecol
\fi
}

```

`\nf@output@widepage` The macro `\nf@output@widepage` outputs a page completely filled by wide pictures.

```

\def\nf@output@widepage{%
\unvbox\@cclv
\penalty\outputpenalty
\if@firstcolumn\else
\ClassError{faosyb}{Wide or big nonfloats defined too late. Move
them up}{I encountered Big or Wide floats when I already made the
first column. Please move them up}
\fi
\ifdim\ht\curr@nfbox@B@ul>0.5\baselineskip
\setbox\@tempboxa\vsplit\curr@nfbox@B@ul to \textheight

```

```

\setbox\@outputbox \vbox\bgroup
\boxmaxdepth \@maxdepth
\box\@tempboxa
\vfill
\egroup
\else
\setbox\@tempboxa\vsplit\curr@nfbox@W@ul to 0.5\textheight
\setbox\@tempboxb\vsplit\curr@nfbox@W@ll to 0.5\textheight
\setbox\@outputbox\vbox\bgroup
\boxmaxdepth \@maxdepth
\box\@tempboxa
\nointerlineskip
\box\@tempboxb
\vfill
\egroup
\fi
\global\vsizetextheight
\global\@colht\textheight
\@outputpage
\@firstcolumntrue
}

```

`\nf@makecol` This macro tries to make one column of text. If successful, it puts first column into temporary storage, and outputs the page when or if the second column is ready.

When we start `\nf@makecol`, `\@colht` already reflects possible wide nonfloats. This to get `\@colroom`, we need to take into account only the narrow ones

```

\def\nf@makecol{%
\global\@colroom\@colht
\ifdim\ht\curr@nfbox@T@uc>0.5\baselineskip
\global\@colroom=0pt
\fi
\ifdim\ht\curr@nfbox@S@uc>0.5\baselineskip
\global\advance\@colroom by -0.5\textheight
\fi
\ifdim\ht\curr@nfbox@S@lc>0.5\baselineskip
\global\advance\@colroom by -0.5\textheight
\fi
}

```

Now there could be two cases. If `\@colroom` is small, we fill the column with the non-floats only. Otherwise we have a “mixed” column with both text and nonfloats.

```

\ifdim\@colroom<0.5\baselineskip
\nf@makenfcol
\else
\nf@makemixedcol
\fi}

```

`\nf@makenfcol` This macro outputs a column with only non-floats. If it is called, we already know that the narrow non-floats would fill the column, so we do not do any additional checks.

```

\def\nf@makenfcol{%
\unvbox\@cclv
\penalty\outputpenalty
\ifdim\@colht>0.9\textheight % one tall or two squares
\ifdim\ht\curr@nfbox@T@uc>0.5\baselineskip
\setbox\@outputbox\vbox\bgroup
\boxmaxdepth \@maxdepth
\vsplit \curr@nfbox@T@uc to \textheight
\egroup
\else
\setbox\@outputbox\vbox\bgroup

```

```

        \boxmaxdepth \@maxdepth
        \vsplit\curr@nfbox@S@uc to 0.5\textheight
        \nointerlineskip
        \vsplit\curr@nfbox@S@lc to 0.5\textheight
    \egroup
    \fi
else % one square
    \ifdim\ht\curr@nfbox@S@uc>0.49\textheight
        \setbox\@outputbox\vsplit \curr@nfbox@S@uc to 0.5\textheight
    \else
        \setbox\@outputbox\vsplit \curr@nfbox@S@lc to 0.5\textheight
    \fi
\fi
\nf@opcol
}

```

`\nf@makemixedcol` This macro is used when we have a mix of text with nonfloats (or possibly just text).

We check whether the page builder has the right idea about the text size; if not, we return from the output routine

```

\def\nf@makemixedcol{%
    \ifdim\@colroom=\vsize
        \nf@makemixedcol@
    \else
        \global\vsize=\@colroom
        \unvbox\@cclv
        \penalty\outputpenalty
    \fi}

```

`\nf@makemixedcol@` And now the real work of `\nf@makemixedcol@`

```

\def\nf@makemixedcol@{%
    \ifvoid\footins
        \setbox\@outputbox \box \@cclv
    \else
        \setbox\@outputbox \vbox {%
            \boxmaxdepth \@maxdepth
            \unvbox \@cclv
            \vskip \skip\footins
            \color@begingroup
            \normalcolor
            \footnoterule
            \unvbox \footins
            \color@endgroup
        }%
    \fi
    \ifdim\ht\curr@nfbox@S@uc>0.49\textheight
        \setbox\@tempboxa\vsplit\curr@nfbox@S@uc to 0.5\textheight
        \setbox\@outputbox \vbox
            \bgroup
                \box\@tempboxa
                \nointerlineskip
            \box\@outputbox
        \egroup
    \fi
    \ifdim\ht\curr@nfbox@S@lc>0.49\textheight
        \setbox\@tempboxa\vsplit\curr@nfbox@S@lc to 0.5\textheight
        \setbox\@outputbox \vbox
            \bgroup
                \box\@outputbox
            \nointerlineskip
        \egroup
    \fi
}

```

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```

        \box\@tempboxa
    \egroup
\fi
\nf@opcol}

```

`\nf@opcol` This is like the standard L<sup>A</sup>T<sub>E</sub>X `\@outputdblcol`, but with the treatment of wide nonfloats.

```

\def\nf@opcol{%
  \if@firstcolumn
    \global\@firstcolumnfalse
    \global\setbox\@leftcolumn\box\@outputbox
  \else
    \global\@firstcolumntrue
    \ifdim\ht\curr@nfbox@W@ul>0.5\baselineskip
      \setbox\@tempboxa\vsplit \curr@nfbox@W@ul to 0.5\textheight
    \else
      \setbox\@tempboxb\box\@tempboxa
    \fi
    \setbox\@outputbox \vbox\bgroup
      \box\@tempboxa
      \nointerlineskip
      \hb@xt@\textwidth {%
        \hb@xt@\columnwidth {%
          \box\@leftcolumn \hss}%
        \hfil
        {\normalcolor\vrule \@width\columnseprule}%
        \hfil
        \hb@xt@\columnwidth {%
          \box\@outputbox \hss}%
      }%
    \egroup
    \ifdim\ht\curr@nfbox@W@ll>0.5\baselineskip
      \setbox\@tempboxa\vsplit \curr@nfbox@W@ll to 0.5\textheight
      \setbox\@outputbox\vbox\bgroup
        \box\@outputbox
        \nointerlineskip
        \box\@tempboxa
      \egroup
    \fi
  \@outputpage
  \global\vsizetextheight
  \global\@colhttextheight
  \global\@colroomtextheight
\fi}

```

`\standard@clearpage` The usual `\clearpage` flushes the floats. We keep it in `\standard@clearpage`

```
\let\standard@clearpage\clearpage
```

`\clearpage` Now we can define `\clearpage` to take care of the mode:

```

\def\clearpage{%
  \if@twocolumn
    \nf@clearpage
  \else
    \standard@clearpage
  \fi}

```

`\nf@totalheight` The total height of all non-floats

```

\def\nf@totalheight{\dimexpr(
  \ht\nfbox@S@UL+
  \ht\nfbox@S@UR+

```

```

\ht\nfbox@S@LL+
\ht\nfbox@S@LR+
\ht\nfbox@T@UL+
\ht\nfbox@T@UR+
\ht\nfbox@W@UL+
\ht\nfbox@W@LL+
\ht\nfbox@B@UL+
\ht\nfbox@S@ul+
\ht\nfbox@S@ur+
\ht\nfbox@S@ll+
\ht\nfbox@S@lr+
\ht\nfbox@T@ul+
\ht\nfbox@T@ur+
\ht\nfbox@W@ul+
\ht\nfbox@W@ll+
\ht\nfbox@B@ul)}

```

`\nf@clearpage` We keep ejecting pages until get rid of nf stuff

```

\def\nf@clearpage{%
\write\m@ne{}}%
\if@firstcolumn
\ifdim\dimexpr(\pagetotal+\nf@totalheight)>\baselineskip
\leavevmode
\null\vfill\newpage
\null\vfill\newpage
\fi
\else
\leavevmode
\null\vfill\newpage
\fi
\ifdim\nf@totalheight>\baselineskip
\nf@clearpage\fi
}

```

`\clearspread` This is like `\cleardoublepage`, but with the logic inverted:

```

\def\clearspread{\clearpage\ifodd\c@page
\hbox{ }\newpage\if@twocolumn\hbox{ }\newpage\fi\fi\@firstcolumntrue}

```

We need to clear everything at the end

```

\AtEndDocument{\if@twocolumn
\ifdim\nf@totalheight>\baselineskip
\null\vfill\clearpage\fi
\fi}

```