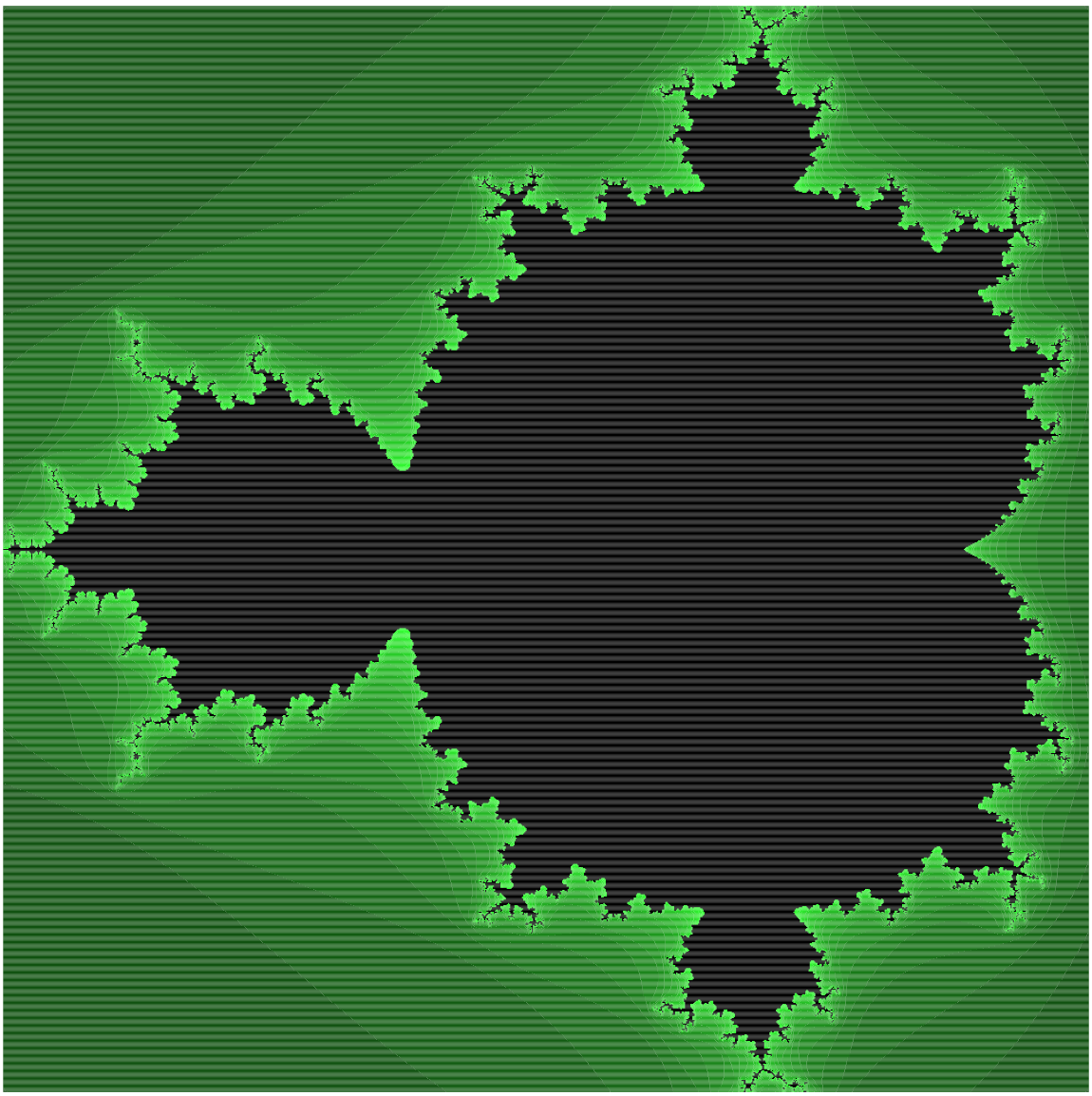
The Mandelbrot Set



The above image is *not* produced from:

```
Happy \expandafter      \expandafter\expandafter\expandafter{}\def\expandafTer%
#1#2#3#4#5#6#7{#4#5##1##2##3##4##5{##2##3##4##5##1}#4#2##1##2{#4##1####1{##2}}%
#4#3##1##2##3##4##5{##5##1##2##3##4}#4#1##1##2{##2##1}#4#6{}#4#7##1{#6}#7#7#6}%
\expandafter\expandafter{}\expandafTer\eXpandafter\expanDafter\expandafteR\def%
\exPandafter\Expandafter \expandaftEr\Expandafter\expanDafter\expAndafter ^^63%
 {\expandaftEr \expandafter {}\Expandafter}\expanDafter \expandAfter  ^^6f\def%
\eXpandaftEr   {\expandafter  \eXpandafter\expandafter\eXpandAfter\expandaftEr%
}\expandaftEr\Expandafter \expandaftEr\expandafter\expandaftEr\Expandafter\def%
 \eXpandAfter{\expandafter  \expandafter\expandafter \eXpandafter \expandafter%
\expandafter\expandafter \expandAftEr\expandafter\expandaftEr\expandafteR}\def%
\expandAftEr{\expandafter\expandafter\expandafter  \eXpandafter   \expandafter%
\expandafter\expandafter\eXpAndafter\expandafter\expandaftEr \expandafteR}\def%
\eXpAndafter{\expandafter     \expandafter\expandafter\eXpandafter\expandafter%
\expandafter\expandafter\eXpAndaftEr\expandafter\expandaftEr \exPandafter}\def%
\eXpAndaftEr{\expandafter\eXpandafter\expandafter\eXpAndAfter\expandafteR}\def%
\eXpAndAfter{\expandafter\eXpandafter\expandafter\eXpAndAftEr\expandafteR}\def%
\eXpAndAftEr {\expandafter \expandafter \expandafter \expandafter \expandafter%
 \expandafter\expandafter\expandafteR\expandafter   \expandafter \expandafter %
   \expAndafter\expandafter \expandafteR \expandAfter}\expandafter\eXpandafter%
     \expandafter \eXpandaftEr\expandaftEr\\expandafter\Expandafter 12^^21\bye%
```

… but from the code shown **on the back** of this paper.

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http://zrbabbler.sp.land.to/
http://d.hatena.ne.jp/zrbabbler/

```
############################################################
% mandelbros.tex
\documentclass[a4paper]{article}
\usepackage{tcmandelbrot}
\begin{document}
\mandelbrotmesh{500} % 500 pixels for unit
\mandelbrotsize{10cm} % image dimension is 10cmx10cm
\noindent\mandelbrot
\end{document}

############################################################
% tcmandelbrot.sty
\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{tcmandelbrot}
\def\tcmb@pkgname{tcmandelbrot}
\def\tcmb@error{\PackageError\tcmb@pkgname}
\RequirePackage{color}
%% variagles
\chardef\tcmb@maxiter=20  % maximum iteration count
\newif\iftcmb@ok
\newcount\tcmb@ix
\newcount\tcmb@iy
\newcount\tcmb@cnt
\newcount\tcmb@k % temporary
\newdimen\tcmb@xc % c = xc + i yc
\newdimen\tcmb@yc
\newdimen\tcmb@x % z = x + i y
\newdimen\tcmb@y
\newdimen\tcmb@xx % z^2 = xx + i yy
\newdimen\tcmb@yy
\newdimen\tcmb@t % temporary
\newdimen\tcmb@u % temporary
% (run-length compression)
\newcount\tcmb@runlen
% \tcmb@prevcolor (pseudovar)
% (drawing parameter)
\newdimen\tcmb@unit % drawing unit
% \tcmb@mesh (pseudovar) % mesh count
% \tcmb@dsize (dimen macro) % drawing size (edge length)
%---------------------------------------- parameter settings
%% \mandelbrotmesh{<integer>}
\newcommand*\mandelbrotmesh[1]{%
  \tcmb@cnt=#1\relax
  \tcmb@okfalse
  \ifnum\tcmb@cnt>1 \ifnum\tcmb@cnt<1001
    \tcmb@oktrue
  \fi\fi
  \iftcmb@ok
    \mathchardef\tcmb@mesh\tcmb@cnt
  \else
    \tcmb@error{Bad value(\the\tcmb@cnt)}\@ehc
  \fi
}
%% \mandelbrotsize{<dimen>}
\newcommand*\mandelbrotsize[1]{%
  \tcmb@u=#1\relax
  \ifnum\tcmb@u>\z@
    \edef\tcmb@dsize{\the\tcmb@u}%
  \else
    \tcmb@error{Bad value(\the\tcmb@unit)}\@ehc
  \fi
}
%---------------------------------------- helpers
%% \tcmb@r{<dimen>]
\def\tcmb@r#1{%
  \expandafter\tcmb@r@a\the#1%
}
\begingroup
  \lccode`8=`p\lccode`9=`t
  \lowercase{\gdef\tcmb@r@a#189{#1}}
\endgroup
%---------------------------------------- pixel boxes
\newbox\tcmb@boxclose
\newbox\tcmb@boxbase
% This is a bit tricky....
\global\setbox\tcmb@boxclose\hbox{%
  \global\setbox\tcmb@boxbase\hbox{%
    \color[gray]{0}}}
\tcmb@xx\p@
\tcmb@cnt\z@ \loop
  \newbox\tcmb@boxend
  \tcmb@yy0.2\tcmb@xx
  \global\setbox\tcmb@boxclose\hbox{%
    \global\setbox\tcmb@boxend\hbox{%
      \color[rgb]{\tcmb@r\tcmb@yy,\tcmb@r\tcmb@xx,\tcmb@r\tcmb@yy}}}%
  \advance\tcmb@xx-0.04\p@
  \advance\tcmb@cnt\@ne
\ifnum\tcmb@cnt<\tcmb@maxiter \repeat
%---------------------------------------
%% \mandelbrot
\newcommand*\mandelbrot{%
  \vbox{%
    \offinterlineskip
    \tcmb@initialize
    \tcmb@iy\tcmb@iystt \loop
      \tcmb@yc\tcmb@iy\p@ \divide\tcmb@yc\tcmb@mesh
      \message{<\tcmb@r\tcmb@yc>}%
      \hbox{%
        \tcmb@ix-\tcmb@ixstt \loop
        \tcmb@xc\tcmb@ix\p@ \divide\tcmb@xc\tcmb@mesh
          \tcmb@getcount
          \tcmb@setpixel
          \advance\tcmb@ix\@ne
        \ifnum\tcmb@ix<\tcmb@ixend \repeat
        \tcmb@flushpixel
      }%
      \advance\tcmb@iy\m@ne
    \ifnum\tcmb@iy>-\tcmb@iyend \repeat
  }%
}
%% \tcmb@initialize
\def\tcmb@initialize{%
  % stt, end
  \tcmb@u1.5\p@ \tcmb@u\tcmb@mesh\tcmb@u
  \divide\tcmb@u\p@ \mathchardef\tcmb@ixstt\tcmb@u
  \tcmb@cnt\tcmb@mesh \multiply\tcmb@cnt\tw@
  \advance\tcmb@cnt-\tcmb@ixstt \mathchardef\tcmb@ixend\tcmb@cnt
  \mathchardef\tcmb@iystt\tcmb@mesh
  \mathchardef\tcmb@iyend\tcmb@mesh
  \tcmb@cnt\tcmb@mesh \multiply\tcmb@cnt\tw@
  \tcmb@unit=\tcmb@dsize\relax \divide\tcmb@unit\tcmb@cnt
  \tcmb@runlen\z@ \chardef\tcmb@prevcolor\z@
}
%% \tcmb@setpixel
\def\tcmb@setpixel{%
  \ifnum\tcmb@cnt=\tcmb@prevcolor
    \advance\tcmb@runlen\@ne
  \else
    \tcmb@flushpixel
    \chardef\tcmb@prevcolor\tcmb@cnt \tcmb@runlen\@ne
  \fi
}
%% \tcmb@flushpixel
\def\tcmb@flushpixel{%
  \ifnum\tcmb@runlen>\z@
    \tcmb@k\tcmb@prevcolor \advance\tcmb@k\tcmb@boxbase
    \unhcopy\tcmb@k
    \vrule width\tcmb@runlen\tcmb@unit height\tcmb@unit depth\z@
    \unhcopy\tcmb@boxclose
  \fi
}
%---------------------------------------
%% \tcmb@getcount
\def\tcmb@getcount{%
  \tcmb@x\tcmb@xc \tcmb@y\tcmb@yc
  \tcmb@cnt\tcmb@maxiter
  \tcmb@getcount@iter
}
\def\tcmb@getcount@iter{%
  \tcmb@xx\tcmb@r\tcmb@x\tcmb@x \tcmb@t\tcmb@xx
  \tcmb@yy\tcmb@r\tcmb@y\tcmb@y \advance\tcmb@t\tcmb@yy
  \ifnum\tcmb@cnt=\z@ \tcmb@t\maxdimen \fi
  \ifdim\tcmb@t<4\p@
    \tcmb@y\tw@\tcmb@y \tcmb@y\tcmb@r\tcmb@x\tcmb@y
    \advance\tcmb@y\tcmb@yc
    \tcmb@x\tcmb@xx \advance\tcmb@x-\tcmb@yy
    \advance\tcmb@x\tcmb@xc
    \advance\tcmb@cnt\m@ne
    \expandafter\tcmb@getcount@iter
  \fi
}
%---------------------------------------- default values
\mandelbrotmesh{500} % 500 pixels for unit
                     % (so the whole image has 1000x1000)
\mandelbrotsize{8cm} % image dimension is 8cmx8cm
%---------------------------------------- all done
\endinput
```