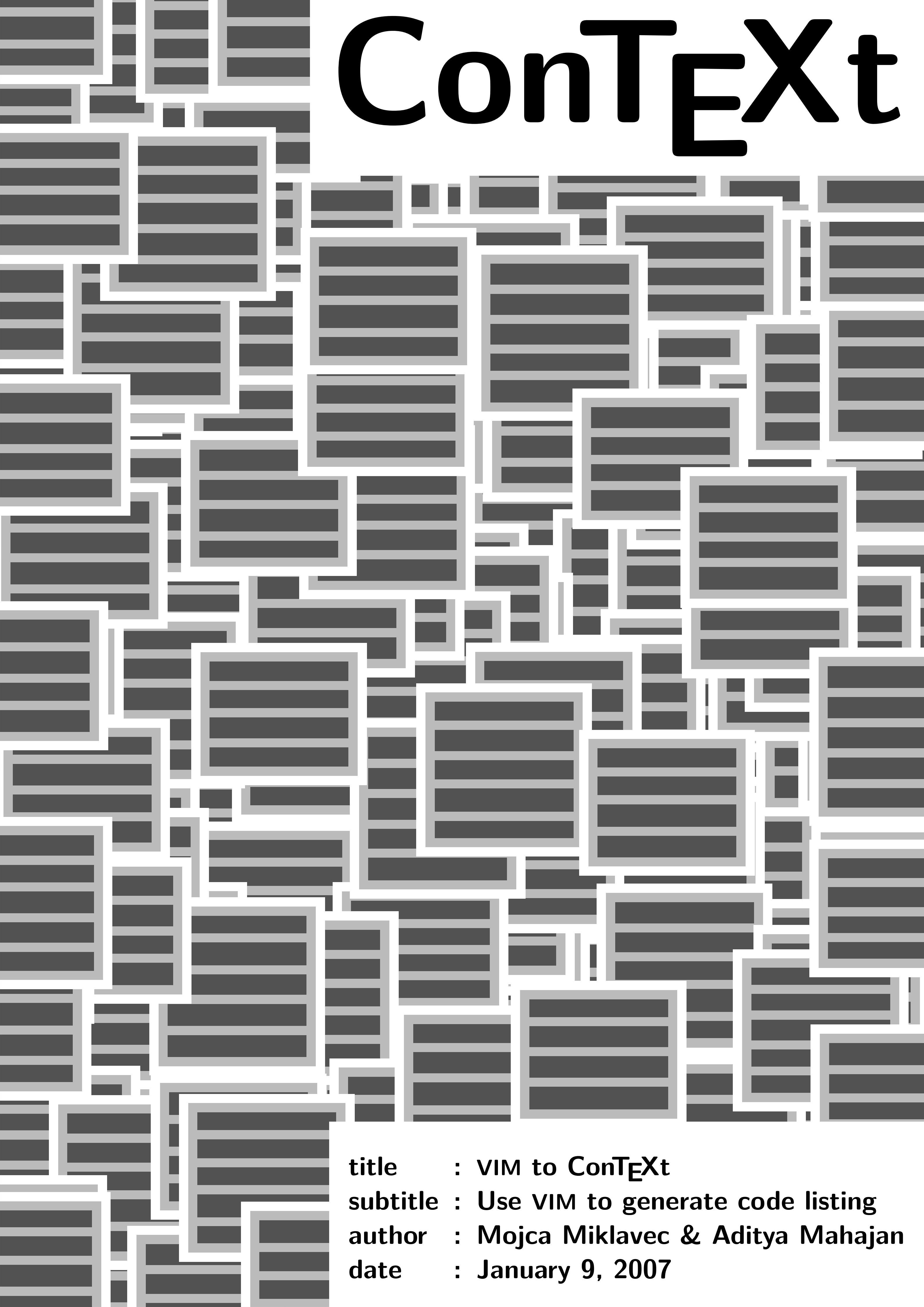
ConTeXt



title : VIM to ConTeXt
subtitle : Use VIM to generate code listing
author : Mojca Miklavec & Aditya Mahajan
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1 User Manual

ConTeXt has an excellent pretty printing capabilities for many languages. The code for pretty printing is written in TeX, and due to catcode jugglary verbatim typesetting is perhaps the trickiest part of TeX. This makes it difficult for a “normal” user to define syntax highlighting rules for a new language. This module, takes the onus of defining syntax highlighting rules away from the user and uses VIM editor to generate the syntax highlighting. There is a helper `2context.vim` script to do the syntax parsing in VIM. This is a stop-gap method, and hopefully with LuaTeX, things will be much easier.

The main macro of this module is `\definevimtyping`. The best way to explain it is by using an example. Suppose you want to pretty print ruby code in ConTeXt. So you can do

```
\definevimtyping [RUBY]  [syntax=ruby]
```

after which you can get ruby highlighting by

```
\startRUBY
....
\stopRUBY
```

For example

```
#!  /usr/bin/ruby
# This is my first ruby program
puts "Hello World"
```

This was typed as

```
\definevimtyping [RUBY] [syntax=ruby]

\startRUBY
#! /usr/bin/ruby
# This is my first ruby program
puts "Hello World"
\stopRUBY
```

The typing can be setup using `\setupvimtyping`.

```
                      *
\setupvimtyping [..,..=..,..]

*   syntax       =  IDENTIFIER
    colorscheme  =  IDENTIFIER
    space        =  yes  on  no
    tab          =  NUMBER
    start        =  NUMBER
    stop         =  NUMBER
    numbering    =  yes  no
    step         =  NUMBER
    numberstyle  =
    numbercolor  =  IDENTIFIER
    before       =  COMMAND
    after        =  COMMAND
```

Here `syntax` is the syntax file in VIM for the language highlighting that you want. See `:he syntax.txt` inside VIM for details. `colorscheme` provides the sytax highlighting for various regions. Right now, only one colorscheme (`default`) is defined. It is based on `ps_color.vim` colorscheme in VIM. If there is a particular colorscheme that you will like, you can convert it into ConTeXt. `space=(yes|on|no)` makes the space significant, visible, and unsignificant respectively. `tab` specifies the number of spaces a tab is equivalent to. It's default value is 8. `start` and `stop` specify which lines to read from a file. These options only make sense for highlighting files and should not to be set by `\setupvimtyping`. `numbering` enables line numbering, and `step` specifies which lines are numbered. `numberstyle` and `numbercolor` specify the style and color of line numbers.

A new typing region can be define using `\definevimtyping`.

```
\definevimtyping [.1.] [.2.]
                        =
                     OPTIONAL

1   IDENTIFIER

2   inherits from \setupvimtyping
```

Minor changes in syntax highlighting can be made easily. For example, Mojca likes ‘void’ to be bold in C programs. This can be done as follows

```
\definevimtyping [C] [syntax=c,numbering=on]

\startvimcolorscheme[default]

\definevimsyntax
  [Type]
  [style=boldmono]

\definevimsyntax
  [PreProc]
  [style=slantedmono]

\stopvimcolorscheme

\startC
#include <stdio.h>
#include <stdlib.h>

void main()
{
   printf("Hello World\n") ;
   return;
}
\stopC
```

which gives

```
#include <stdio.h>
#include <stdlib.h>

void main()
{
   printf("Hello World\n") ;
   return;
}
```

The second command provided by this module is `\definetypevimfile` for typesetting files. The syntax of this command is

```
\definetypevimfile [.1.] [.2.]
                         OPTIONAL
1   IDENTIFIER
2   inherits from \setupvimtyping
```

For example, to pretty print a ruby file you can do

```
\definetypevimfile[typeRUBY] [syntax=ruby]
```

after which one can use

```
\typeRUBY[option]{rubyfile}
```

We hope that this is sufficient to get you started. The rest of this document gives the implementation details of the module. If you want to change something, read ahead.

2 Module Details

The synax highlighting of the source here is done using `t-vim` module. There is a bug in the module due to which line numberings for different filetypes use the same counter. In the source we use a round–about method to correct this. Right now, in case someone needs this module for numbering more than one filetype, let me know, and I will try to iron out the bug.

```
\writestatus  {loading}   {Context Module for ViM Sytax Highlighting}
```

```
\startmodule[vim]
```

```
\unprotect
```

```
\definesystemvariable {vs}  % Vim Syntax
```

First of all we take care of bold monotype. By default, CONTEXT uses latin modern fonts. If you want to get bold monotype in latin modern, you need to use `modern-base` typescript. For example:

```
\usetypescript[modern-base][texnansi] \setupbodyfont[modern]
\starttext
{\tt\bf This is bold monotype}
\stoptext
```

CONTEXT does not provide any style alternative for bold monotype and slanted monotype, so we provide one here. These will only work if your font setup knows about bold and slanted monotype.

```
\definealternativestyle [\v!bold\v!mono,\v!mono\v!bold]       [\tt\bf] []
\definealternativestyle [\v!slanted\v!mono,\v!mono\v!slanted] [\tt\sl] []
```

`\startvimc..`

To start a new vim colorscheme.

```
\def\startvimcolorscheme[#1]%
  {\pushmacro\vimcolorscheme
   \edef\vimcolorscheme{#1}}
```

```
\def\stopvimcolorscheme
  {\popmacro\vimcolorscheme}
```

`\definevim..`
`\definevim..`

These macros should always occur inside a `\startvimcolorschme ...\stopvimcolorscheme` pair. The `\definevimsyntax` macro defines syntax highlighting rules for VIM's syntax highlighting regions. It takes three arguments `style`, `color` and `command`. The most common VIM syntax highlighting regions are defined in the end of this file. The `\definevimsyntaxsynonyms` macro just copies the settings from another syntax highlighting region.

```
\def\definevimsyntax
  {\dodoubleargumentwithset\dodefinevimsyntax}
```

```
\def\dodefinevimsyntax[#1]% [#2]
  {\getparameters[\??vs\vimcolorscheme#1]} %[#2]
```

```
\def\definevimsyntaxsynonyms
  {\dodoubleargumentwithset\dodefinevimsyntaxsynonyms}
```

```
\def\dodefinevimsyntaxsynonyms[#1][#2]%
  {\copyparameters[\??vs\vimcolorscheme#1][\??vs\vimcolorscheme#2]
                  [\c!style,\c!color,\c!command]}
```

`\vimsyntax`

This is just a placeholder macro. The `2context.vim` script marks the highlightin reigions by `\s[...]{...}`. While typing the generated files, we locally redefine `\s` to `\vimsyntax`.

```
\def\vimsyntax[#1]#2%
  {\dostartattributes{\??vs\vimcolorscheme Normal}\c!style\c!color\empty%
   \dostartattributes{\??vs\vimcolorscheme #1}\c!style\c!color\empty%
   \getvalue{\??vs#1\c!command}{#2}%
    \dostopattributes%
    \dostopattributes}
```

`\setupvimt..`
`\typevimfile`

There are three settings for `\setupvimtyping`: `syntax`, which tells VIM which syntax rules to use; `tab`, which sets the `tabstop` in VIM; and `space` which takes care of spaces.

`\typevimfile` macro basically calls VIM with appropriate settings and sources the `2context.vim` script. The result is slow, because parsing by VIM is slow. Do not use this method for anything larger than a few hundred lines. For large files, one option is to pre–prase them, and then typeset the result. We have not provided any interface for that, but it is relatively easy to implement.

Taking care of line–numbering is more tricky. We could not get `\setuplinenumbering` to work properly, so implement our own line–numbering mechanism. This is a bit awkward, since it places line–number after each `^M` in the source file. So, if the source code line is larger than one typeset line, the line number will be on the second line. To do it correctly, we need to read lines from the vimsyntax file one-by-one. Our own mechanism for line–numbering is plain. Unlike ConTeXt's core verbatim highlighting, multiple blank lines are displayed and numbered.

```
\def\setupvimtyping
  {\dosingleargument\getparameters[\??vs]}
```

```
\def\typevimfile
  {\dosingleempty\dotypevimfile}
```

```
\def\notypevimfile[#1][#2]#3%
  {\dotypevimfile[#1,#2]{#3}}
```

```
\def\dotypevimfile[#1]#2%
  {\doiffileelse{#2}
   {\dodotypevimfile[#1]{#2}}
   {\reporttypingerror{#2}}}
```

```
\def\dodotypevimfile[#1]#2%
```

```
  {\@@vsbefore
   \bgroup
   \initializevimtyping{#1}
   \runvimsyntax{#2}
    % The strut is needed for the output to be the same when not using
    % numbering.  Otherwise, multiple par's are ignored.  We need to figure out
    % a mechanism to imitate this behaviour even while using line numbering.
    \input #2-vimsyntax.tmp\relax%
   \egroup
   \@@vsafter}

\makecounter{vimlinenumber}

\def\doplacevimlinenumber
  {%Always place the first linenumber
   \showvimlinenumber
   %Calculate step in futute
   \let\placevimlinenumber\dodoplacevimlinenumber
   \pluscounter{vimlinenumber}}

\def\dodoplacevimlinenumber
  {\ifnum\numexpr(\countervalue{vimlinenumber}/\@@vsstep)*\@@vsstep\relax=%
         \numexpr\countervalue{vimlinenumber}\relax
      \showvimlinenumber
  \fi
   \pluscounter{vimlinenumber}}

\def\showvimlinenumber
  {\inmargin%TODO: make configurable
      {\dostartattributes\??vs\c!numberstyle\c!numbercolor\empty
       \countervalue{vimlinenumber}
       \dostopattributes}}

\def\initializevimtyping#1
  {\setupvimtyping[#1]
   %Make sure that stop is not empty
   \doifempty{\@@vsstop}{\setvalue{\@@vsstop}{0}}
   \doifelse{\@@vsstart}{\v!continue}
    {\setvalue{@@vsstart}{\countervalue{vimlinenumber}}}
    {\setcounter{vimlinenumber}{\doifnumberelse{\@@vsstart}{\@@vsstart}{1}}}
   \whitespace
  %\page[\v!preference]} gaat mis na koppen, nieuw:  later \nobreak
   \setupwhitespace[\v!none]%
   \obeylines
   \ignoreeofs
   \ignorespaces
   \activatespacehandler\@@vsspace
   \let\s=\vimsyntax
   \def\tab##1{\dorecurse{##1}{\space}}% TODO: allow customization
   \def\vimcolorscheme{\@@vscolorscheme}
   \processaction[\@@vsnumbering]
   [     \v!on=>\let\placevimlinenumber\doplacevimlinenumber,
        \v!off=>\let\placevimlinenumber\relax,
    \s!unknown=>\let\placevimlinenumber\relax,
    \s!default=>\let\placevimlinenumber\relax,
   ]
   \def\obeyedline{\placevimlinenumber\par\strut}
   }
```

```
\def\runvimsyntax#1
   {\executesystemcommand
      {texmfstart bin:vim
          "-u NONE  % No need to read unnessary configurations
           -e       % run in ex mode
           -c \letterbackslash"set noswapfile\letterbackslash"
           -c \letterbackslash"set tabstop=\@@vstab\letterbackslash"
           -c \letterbackslash"set cp\letterbackslash"
           -c \letterbackslash"syntax on\letterbackslash"
           -c \letterbackslash"set syntax=\@@vssyntax\letterbackslash"
           -c \letterbackslash"let contextstartline=\@@vsstart\letterbackslash"
           -c \letterbackslash"let contextstopline=\@@vsstop\letterbackslash"
           -c \letterbackslash"source kpse:2context.vim\letterbackslash"
           -c \letterbackslash"wqa\letterbackslash"
            " #1}}
```

`\definetyp..` This macro allows you to define new file typing commands. For example

```
\definetypevimfile[typeRUBY] [syntax=ruby]
```

after which one can use

```
\typeRUBY[option]{rubyfile}
```

```
\def\definetypevimfile
  {\dodoubleargument\dodefinetypevimfile}
```

```
\def\dodefinetypevimfile[#1][#2]%
  {\unexpanded\setvalue{#1}{\dodoubleempty\notypevimfile[#2]}}
```

`\definevim..` This macro allows you to pretty print code snippets. For example

```
\definevimtyping [RUBY] [syntax=ruby]
\startRUBY
# This is my first ruby program
puts "Hello World"
\stopRUBY
```

gives

```
# This is my first ruby program
puts "Hello World"
```

```
\def\definevimtyping
  {\dodoubleargument\dodefinevimtyping}
```

```
\def\dodefinevimtyping[#1][#2]%
  {\setevalue{\e!start#1}{\noexpand\dostartbuffer[vimsyntax][\e!start#1][\e!stop#1]}%
   \setvalue{\e!stop#1}{\dodotypevimfile[#2]{\TEXbufferfile{vimsyntax}}}}
```

Some defaults.

```
\setupvimtyping
  [        syntax=context,
           \c!tab=8,
         \c!space=\v!yes,
         \c!start=1,
          \c!stop=0,
        \c!before=,
         \c!after=,
     \c!numbering=\v!off,
   \c!numberstyle=\v!smallslanted,
   \c!numbercolor=,
          \c!step=1,
      colorscheme=default,
  ]
```

Pre-defined Syntax : This is based on `ps_color.vim`, which does not use any bold typeface.

VIM uses hex mode for setting colors, I do not want to convert them to rgb values.

```
\startvimcolorscheme[default]
```

```
\setupcolor[hex]
```

```
\definecolor  [vimsyntax!default!Special]     [h=907000]
\definecolor  [vimsyntax!default!Comment]     [h=606000]
\definecolor  [vimsyntax!default!Number]      [h=907000]
\definecolor  [vimsyntax!default!Constant]    [h=007068]
\definecolor  [vimsyntax!default!PreProc]     [h=009030]
\definecolor  [vimsyntax!default!Statement]   [h=2060a8]
\definecolor  [vimsyntax!default!Type]        [h=0850a0]
\definecolor  [vimsyntax!default!Todo]        [h=e0e090]
```

```
\definecolor  [vimsyntax!default!Error]       [h=c03000]
\definecolor  [vimsyntax!default!Identifier]  [h=a030a0]
\definecolor  [vimsyntax!default!SpecialKey]  [h=1050a0]
\definecolor  [vimsyntax!default!Underline]   [h=6a5acd]
```

```
\definevimsyntax
```

```
  [Normal]
  [\c!style=\v!mono,\c!color=\maintextcolor]

\definevimsyntax
  [Constant]
  [\c!style=\v!mono,\c!color=vimsyntax!default!Constant]

\definevimsyntaxsynonyms
  [Character,Boolean,Float]
  [Constant]

\definevimsyntax
  [Number]
  [\c!style=\v!mono,\c!color=vimsyntax!default!Number]

\definevimsyntax
  [Identifier]
  [\c!style=\v!mono,\c!color=vimsyntax!default!Identifier]

\definevimsyntaxsynonyms
  [Function]
  [Identifier]

\definevimsyntax
  [Statement]
  [\c!style=\v!mono,\c!color=vimsyntax!default!Statement]

\definevimsyntaxsynonyms
  [Conditional,Repeat,Label,Operator,Keyword,Exception]
  [Statement]

\definevimsyntax
  [PreProc]
  [\c!style=\v!mono,\c!color=vimsyntax!default!PreProc]

\definevimsyntaxsynonyms
  [Include,Define,Macro,PreCondit]
  [PreProc]

\definevimsyntax
  [Type,StorageClass, Structure, Typedef]
  [\c!style=\v!mono, \c!color=vimsyntax!default!Type]

\definevimsyntax
  [Special]
  [\c!style=\v!mono,\c!color=vimsyntax!default!Special]

\definevimsyntax
  [SpecialKey]
  [\c!style=\v!mono,\c!color=vimsyntax!default!SpecialKey]

\definevimsyntax
  [Tag,Delimiter]
  [\c!style=\v!mono]

\definevimsyntax
  [Comment,SpecialComment]
  [\c!style=\v!mono,\c!color=vimsyntax!default!Comment]

\definevimsyntax
  [Debug]
  [\c!style=\v!mono]

\definevimsyntax
  [Underlined]
  [\c!style=\v!mono,\c!command=\underbar]

\definevimsyntax
  [Ignore]
  [\c!style=\v!mono]

\definevimsyntax
  [Error]
  [\c!style=\v!mono,\c!color=vimsyntax!default!Error]

\definevimsyntax
  [Todo]
  [\c!style=\v!mono,\c!color=vimsyntax!default!Todo]

\stopvimcolorscheme

\protect

\stopmodule
```

An example usage:

```
\doifnotmode{demo}{\endinput}
```

```
\setupcolors[state=start]

\setupbodyfont[10pt]

\definevimtyping  [MATLAB]  [syntax=matlab]

\starttext
\startMATLAB
function russell_demo()
r = 3; c = 4; p = 0.8; action_cost = -1/25;
obstacle = zeros(r,c); obstacle(2,2)=1;
terminal = zeros(r,c); terminal(1,4)=1; terminal(2,4)=1;
absorb = 1;
wrap_around = 0;
noop = 0;
T = mk_grid_world(r, c, p, obstacle, terminal, absorb, wrap_around, noop);
nstates = r*c + 1;
if noop
  nact = 5;
else
  nact = 4;
end
R = action_cost*ones(nstates, nact);
R(10,:)  = 1;
R(11,:)  = -1;
R(nstates,:)  = 0;
discount_factor = 1;

V = value_iteration(T, R, discount_factor);

Q = Q_from_V(V, T, R, discount_factor);
[V, p] = max(Q, [], 2);

use_val_iter = 1;
[p,V] = policy_iteration(T, R, discount_factor, use_val_iter);

\stopMATLAB

\page

\typevimfile[numbering=on,numbercolor=red,step=5]{\jobname.tex}

\stoptext
```