

Codehigh: Highlight Codes and Demos with I3RegEx and LPeg

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<https://github.com/lvjrr/codehigh>

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Contents

1	Package Interfaces	2
1.1	Introduction	2
1.2	Highlighting Code	2
1.3	Highlighting Demo	3
1.4	Highlighting File	4
1.5	Customization	4
1.6	Fake Verbatim Command	4
2	The Source Code	6
2.1	Variables and Functions	6
2.2	Set CodeHigh Options	7
2.3	Environments and Commands	7
2.4	Typeset CodeHigh Code	9
2.5	Typeset CodeHigh Demo	11
2.6	Add CodeHigh Languages	12
2.7	Add CodeHigh Themes	13
2.8	Parse and Highlight Code	14
2.9	Don't Highlight Code	16
2.10	Fake Verbatim Command	16
2.11	Tracing CodeHigh	16

Chapter 1

Package Interfaces

1.1 Introduction

Codehigh package uses `l3regex`¹ package in L^AT_EX3 Programming Layer to parse and highlight source codes and demos. It is more powerful than `listings` package, and more easy to use than `minted` package. But it is slower than both of them. Therefore in LuaTeX the package provides another way to highlight code: using L^Peg². L^Peg is much more powerful and faster than `l3regex`.

1.2 Highlighting Code

There are several predefined languages: `latex`, `latex/latex2`, `latex/latex3`, `latex/math` and `latex/table`. The following example is typeset by `codehigh` environment with default option `language=latex`.

```
% -*- coding: utf-8 -*-
\documentclass{article}
\usepackage[a4paper,margin=2cm]{geometry}
\usepackage{codehigh}
\usepackage{hyperref}
\newcommand*{\myversion}{2021C}
\newcommand*{\mydate}{Version \myversion\ (\the\year-\mylpad\month-\mylpad\day)}
\newcommand*{\mylpad}[1]{\ifnum#1<10 0\the#1\else\the#1\fi}
\setlength{\abc}{1}
\begin{document}
% some comment
\section{Section Name}
\subsection*{Suction Name}
Math  $a+b$ .
\end{document}
```

The following example is typeset by `codehigh` environment with option `language=latex/latex2`.

```
\def\abcd#1#2{
% some comment
\unskip
\setlength{\parindent}{Opt}%
\setlength{\parskip}{Opt}%
\setcounter{choice}{0}%
\let\item=\my@item@temp
\settowidth{\my@item@len}{\vbox{\halign{##1\hfil\cr\BODY\cr}}}%
\setcounter{choice}{0}%
}
```

¹<https://www.ctan.org/pkg/l3regex>

²<http://www.inf.puc-rio.br/~roberto/lpeg/>

This language is for highlighting LaTeX2 classes and packages. It highlights private commands and public commands with different colors.

The following example is typeset by `codehigh` environment with option `language=latex/latex3`.

```
\cs_new_protected:Npn \__codehigh_typeset_demo:
{
  \__codehigh_build_code:
  \__codehigh_build_demo:
  \dim_set:Nn \l_tmpa_dim { \box_wd:N \g__codehigh_code_box }
  \dim_set:Nn \l_tmpb_dim { \box_wd:N \g__codehigh_demo_box }
  \par\addvspace{0.5em}\noindent
  % more code
}
```

This language is for highlighting LaTeX3 classes and packages. It highlights private commands/variables and public commands/variables with different colors.

The following example is typeset by `codehigh` environment with option `language=latex/math`.

```
\begin{align}
\pi\left[\frac{13z^3}{\right]}\sin(2x+1)_0^4 = \frac{64}{3}\pi
\end{align}
```

The following example is typeset by `codehigh` environment with option `language=latex/table`.

```
\begin{tabular}[b]{|l|c|r|}
\hline
One & Two & Three \\
%\hline
Four & Five & Six \\
\hline%\hline\hline
Seven & Eight & Nine \\
\hline
\end{tabular}
```

1.3 Highlighting Demo

The followings are typeset by `demohigh` environment with option `language=latex/table`.

```
\begin{tabular}{lccr}
\hline
Alpha & Beta & Gamma & Delta \\
\hline
Epsilon & Zeta & Eta & Theta \\
\hline
Iota & Kappa & Lambda & Mu \\
\hline
\end{tabular}
```

Alpha	Beta	Gamma	Delta
Epsilon	Zeta	Eta	Theta
Iota	Kappa	Lambda	Mu

```
\begin{tabular}{llccrr}
\hline
Alpha & Beta & Gamma & Delta & Epsilon & Zeta \\
\hline
Eta & Theta & Iota & Kappa & Lambda & Mu \\
\hline
\end{tabular}
```

Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Eta	Theta	Iota	Kappa	Lambda	Mu

Note that `demohigh` environment will measure the width of source lines. When it is too large, the result will be put below.

1.4 Highlighting File

Using `\dochighinput` command, you can input and highlight some file. The last chapter of this manual is typeset with the following code line:

```
\dochighinput[language=latex/latex3]{codehigh.sty}
```

In reading an input file, lines starting with `%%` will be omitted, and lines starting with `%%>` will be extracted and typeset as normal text.

1.5 Customization

The following example changes default background colors with `\CodeHigh` command:

```
\CodeHigh{language=latex/table,style/main=yellow9,style/code=red9,style/demo=azure9}
```

Note that `codehigh` package will load `ninecolors`³ package for proper color contrast.

```
\begin{tabular}{lccr}
\hline
Alpha & & Beta & & Gamma & & Delta & \\\
\hline
Epsilon & & Zeta & & Eta & & Theta & \\\
\hline
Iota & & Kappa & & Lambda & & Mu & \\\
\hline
\end{tabular}
```

Alpha	Beta	Gamma	Delta
Epsilon	Zeta	Eta	Theta
Iota	Kappa	Lambda	Mu

To modify or add languages and themes, please read the source files `codehigh.sty` and `codehigh.lua` for reference.

1.6 Fake Verbatim Command

To ease the pain of writing verbatim commands (such as in `tabularx` and `tabularray` tables), This package provides `\fakeverb` command.

This command will remove the backslashes in the following control symbols before typesetting its content:

Input	Result	Remark
<code>\\</code>	<code>\</code>	Need to be escaped only when typesetting other control symbols in this table
<code>\{</code>	<code>{</code>	Need to be escaped only when left and right curly braces are unmatched
<code>\}</code>	<code>}</code>	Need to be escaped only when left and right curly braces are unmatched
<code>\#</code>	<code>#</code>	Always need to be escaped
<code>\^</code>	<code>^</code>	Need to be escaped only when there are more than one in a row
<code>_</code>	<code>_</code>	Need to be escaped only when more than one in a row or after control words
<code>\%</code>	<code>%</code>	Always need to be escaped

The argument of `\fakeverb` command need to be enclosed with curly braces. Therefore it could be safely used inside `tabularray` tables and other LaTeX commands.

³<https://www.ctan.org/pkg/ninecolors>

Here is an example of using `\fakeverb` commands inside `tabularx` environment:

```

\begin{tabularx}{0.5\textwidth}{lX}
\hline
Alpha & \fakeverb{\abc{}}$&_{\uvw 123} \\\
\hline
Beta & \fakeverb{\bfseries\ \#\%} \\\
\hline
\end{tabularx}

```

Alpha	<code>\abc{}}\$&_{\uvw 123}</code>
Beta	<code>\bfseries\ \#\%</code>

Here is another example of using `\fakeverb` commands inside `\fbox` command:

```

Hello\fbox{\fakeverb{${\left\\\{A\right.}$\#}}Verb!

```

Hello	<code>\${\left\\\{A\right.}\$\#}</code>	Verb!
-------	---	-------

Chapter 2

The Source Code

2.1 Variables and Functions

```
\NeedsTeXFormat{LaTeX2e}
\RequirePackage{expl3}
\ProvidesExplPackage{codehigh}{2024-11-20}{2024A}
  {Highlight codes and demos with l3regex and lpeg}

%\RequirePackage{xparse}
%\RequirePackage{l3benchmark}
\RequirePackage{catchfile}
\RequirePackage{xcolor}
\RequirePackage{ninecolors}
\RequirePackage{varwidth}
\RequirePackage{iftex}
\legacy_if:nT {LuaTeX} {\RequirePackage{luatexbase}}

\int_new:N \l__codehigh_a_int
\int_new:N \l__codehigh_b_int
\tl_new:N \l__codehigh_a_tl
\tl_new:N \l__codehigh_b_tl
\tl_new:N \l__codehigh_c_tl
\tl_new:N \l__codehigh_d_tl
\tl_new:N \l__codehigh_m_tl

\cs_generate_variant:Nn \regex_set:Nn {cn}
\cs_generate_variant:Nn \seq_set_split:Nnn {NVV}
\cs_generate_variant:Nn \str_remove_once:Nn {NV}
\cs_generate_variant:Nn \tl_log:n {e}
\cs_generate_variant:Nn \tl_set:Nn {Ne}
\cs_generate_variant:Nn \tl_set_rescan:Nnn {NnV}

\prg_generate_conditional_variant:Nnn \str_if_eq:nn {en} {T, TF}
\prg_generate_conditional_variant:Nnn \regex_extract_once:NnN {NVN, cVN} {T, TF}
\prg_generate_conditional_variant:Nnn \regex_split:NnN {cVN} {T, TF}

\group_begin:
  \obeylines
  \tl_gset:Nn \g__codehigh_eol_tl {\^^M}
  \tl_gset:Nn \g__codehigh_eol_eol_tl {\^^M^^M}
\group_end:
```

2.2 Set CodeHigh Options

```

\bool_new:N \l__codehigh_lite_bool
\bool_new:N \l__codehigh_long_bool
\bool_new:N \l__codehigh_demo_bool

\NewDocumentCommand \CodeHigh {0{} m}
{
  \keys_set:nm {codehigh} {#2}
}

\keys_define:nm {codehigh}
{
  lite .bool_set:N = \l__codehigh_lite_bool,
  long .bool_set:N = \l__codehigh_long_bool,
  demo .bool_set:N = \l__codehigh_demo_bool,
}

```

2.3 Environments and Commands

%% Since every codehigh environment has an optional argument,
 %% we need to make `^^M` active first to keep the leading spaces in the first line

```

\NewDocumentCommand \NewCodeHighEnv {mm}
{
  \exp_args:Nc \NewDocumentCommand {#1} {}
  {
    %% it is ^^M but not ^^M
    \char_set_catcode_active:N ^^M
    \__codehigh_begin:nw {#2}
  }
  \exp_args:Nc \NewDocumentCommand {end#1} {}
  {
    \__codehigh_end:
  }
}

```

%% Now we need to replace each `^^M` with a space character

```

\NewDocumentCommand \__codehigh_begin:nw {m0{}}
{
  \char_set_catcode_end_line:N ^^M
  \tl_set:Nn \l_tmpa_tl {#1,#2}
  \__codehigh_replace_endlines:N \l_tmpa_tl
  \keys_set:nV {codehigh} \l_tmpa_tl
  \tl_set:Ne \__codehigh_collect_end_tl
  {
    \c_backslash_str end \c_left_brace_str \@currenvir \c_right_brace_str
  }
  \exp_last_unbraced:NNNNo
  \cs_set:Npn \__codehigh_collect:w ##1 \__codehigh_collect_end_tl
  {
    \__codehigh_store:n {##1}
    \exp_args:No \end \@currenvir
  }
  \group_begin:
  \__codehigh_do_specials:
  \__codehigh_collect:w
}

```



```

\cs_new_protected:Npn \__codehigh_end:
{
  \group_end:
  \__codehigh_typeset:
}

\group_begin:
\char_set_catcode_active:N \^^M
\cs_new_protected:Npn \__codehigh_replace_endlines:N #1
{
  \tl_replace_all:Nnn #1 {\^^M} {\~}
}
\group_end:

\cs_new_protected:Npn \__codehigh_do_specials:
{
  \cs_set_eq:NN \do \char_set_catcode_other:N
  \dospecials
  \obeylines
  \obeyspaces
}

\tl_new:N \g__codehigh_code_tl

\cs_new_protected:Npn \__codehigh_store:n #1
{
  \tl_gset:Nn \g__codehigh_code_tl { #1 }
  \__codehigh_tracing:nn {code} {\__codehigh_log:N \g__codehigh_code_tl}
}

\cs_new_protected:Npn \__codehigh_typeset:
{
  \bool_if:NTF \l__codehigh_demo_bool
  {\__codehigh_typeset_demo:} {\__codehigh_typeset_code:}
}

\NewCodeHighEnv {codehigh} {}
\NewCodeHighEnv {demohigh} {demo}

\tl_new:N \l__codehigh_input_tl
\seq_new:N \l__codehigh_input_seq

\NewDocumentCommand \NewCodeHighInput {mm}
{
  \NewDocumentCommand #1 {O{}m}
  {
    \group_begin:
    \keys_set:nn {codehigh} {#2, ##1}
    \CatchFileDef \l__codehigh_input_tl {##2} {\__codehigh_do_specials:}
    \setlength \parskip {0pt plus 1pt}
    \__codehigh_typeset_input:N \l__codehigh_input_tl
    \group_end:
  }
}

\cs_new_protected:Npn \__codehigh_typeset_input:N #1
{
  \seq_set_split:NVV \l__codehigh_input_seq \g__codehigh_eol_eol_tl #1
}

```

```

\seq_map_inline:Nn \l__codehigh_input_seq
{
  \tl_gset:Nn \g__codehigh_code_tl {##1}
  \__codehigh_typeset_comment:N \g__codehigh_code_tl
  \tl_if_blank:VF \g__codehigh_code_tl
  {
    \__codehigh_typeset_code:
    \par
    \medskip
  }
}
}

\regex_const:Nn \l__codehigh_comment_regex { ^ \% \% ( [\%>] ) ( [^\r]+ ) \r }
\tl_new:N \l__codehigh_comment_tl % comment lines that need to be typeset
\bool_new:N \l__codehigh_comment_bool

%% remove lines starting with %%, and typeset lines starting with %>
\cs_new_protected:Npn \__codehigh_typeset_comment:N #1
{
  \tl_set_eq:NN \l_tmpa_tl #1
  \tl_put_right:NV \l_tmpa_tl \g__codehigh_eol_tl
  \tl_clear:N \l__codehigh_comment_tl
  \bool_set_false:N \l__codehigh_comment_bool
  \bool_do_until:Nn \l__codehigh_comment_bool
  {
    %% Unfortunately we need both \regex_extract_once and \regex_replace_once
    \regex_extract_once:NVNTF \l__codehigh_comment_regex \l_tmpa_tl \l_tmpa_seq
    {
      \regex_replace_once:NnN \l__codehigh_comment_regex {} \l_tmpa_tl
      \str_if_eq:eNT { \seq_item:Nn \l_tmpa_seq {2} } {>}
      {
        \tl_put_right:Nx \l__codehigh_comment_tl
          { \seq_item:Nn \l_tmpa_seq {3} }
      }
    }
    { \bool_set_true:N \l__codehigh_comment_bool }
  }
  \exp_args:NV \scantokens \l__codehigh_comment_tl
  \tl_gset_eq:NN #1 \l_tmpa_tl
}

\NewCodeHighInput \dochighinput {long}

```

2.4 Typeset CodeHigh Code

```

\dim_new:N \l__codehigh_main_boxsep_dim

\keys_define:n {codehigh}
{
  boxsep .dim_set:N = \l__codehigh_main_boxsep_dim,
  boxsep .initial:n = 3pt,
}

\box_new:N \g__codehigh_code_box

\cs_new_protected:Npn \__codehigh_typeset_code:

```

```

{
  \par\addvspace{0.5em}\noindent
  \bool_if:NTF \l__codehigh_long_bool
    {\__codehigh_typeset_code_text:} {\__codehigh_typeset_code_box:}
  \par\addvspace{0.5em}
}

\cs_new_protected:Npn \__codehigh_typeset_code_text:
{
  \__codehigh_prepare_code:N \l_tmpa_tl
  \__codehigh_get_code_text:n \l_tmpa_tl
}

\cs_new_protected:Npn \__codehigh_typeset_code_box:
{
  \__codehigh_build_code:
  \__codehigh_put_code_box:
}

\cs_new_protected:Npn \__codehigh_build_code:
{
  \__codehigh_prepare_code:N \l_tmpa_tl
  \__codehigh_get_code_box:nN \l_tmpa_tl \g__codehigh_code_box
}

\cs_new_protected:Npn \__codehigh_prepare_code:N #1
{
  \tl_set_eq:NN #1 \g__codehigh_code_tl
  \regex_replace_once:nnN {^ \r} {} #1
  \regex_replace_once:nnN {\r $} {} #1
  \regex_replace_all:nnN { . } { \c{string} \0 } #1
  \tl_set:Nx #1 { #1 }
  \__codehigh_tracing:nn {code} {\__codehigh_log:N #1}
}

\cs_new_protected:Npn \__codehigh_put_code_box:
{
  \setlength \fboxsep {\l__codehigh_main_boxsep_dim}
  \GetCodeHighStyle{main}
  \colorbox{codehigh@bg}
  {
    \hbox_to_wd:nn {\linewidth-2\fboxsep}
    {
      \GetCodeHighStyle{code}
      \colorbox{codehigh@bg}
      {\box_use:N \g__codehigh_code_box}
    }
  }
}

%% #1: text to parse; #2: resulting box
\cs_new_protected:Npn \__codehigh_get_code_box:nN #1 #2
{
  \hbox_gset:Nn #2
  {
    \begin{varwidth}{\linewidth}
      \__codehigh_get_code_text:n {#1}
    \end{varwidth}
  }
}

```

```

}

\cs_new_protected:Npn \__codehigh_get_code_text:n #1
{
  \group_begin:
  \setlength \parindent {0pt}
  \linespread {1}
  \ttfamily
  \bool_if:NTF \l__codehigh_lite_bool
  {\__codehigh_parse_code_lite:N #1}
  {\__codehigh_parse_code:VN \l__codehigh_language_name_tl #1}
  \group_end:
}

```

2.5 Typeset CodeHigh Demo

```

\box_new:N \g__codehigh_demo_box

\cs_new_protected:Npn \__codehigh_typeset_demo:
{
  \__codehigh_build_code:
  \__codehigh_build_demo:
  \dim_set:Nn \l_tmpa_dim { \box_wd:N \g__codehigh_code_box }
  \dim_set:Nn \l_tmpb_dim { \box_wd:N \g__codehigh_demo_box }
  \__codehigh_tracing:nn {demo}
  { \tl_log:x { \dim_use:N \l_tmpa_dim + \dim_use:N \l_tmpb_dim } }
  \par\addvspace{0.5em}\noindent
  \setlength \fboxsep {\l__codehigh_main_boxsep_dim}
  \GetCodeHighStyle{main}
  \colorbox{codehigh@bg}
  {
    \dim_compare:nNnTF {\l_tmpa_dim + \l_tmpb_dim + 6\fboxsep} > {\linewidth}
    {
      \vbox:n
      {
        \dim_set:Nn \hsize {\linewidth-2\fboxsep}
        \noindent\GetCodeHighStyle{code}
        \colorbox{codehigh@bg}{\box_use:N \g__codehigh_code_box}
        \par
        \noindent\GetCodeHighStyle{demo}
        \colorbox{codehigh@bg}{\box_use:N \g__codehigh_demo_box}
      }
    }
  }
  \hbox_to_wd:nn {\linewidth-2\fboxsep}
  {
    \GetCodeHighStyle{code}
    \colorbox{codehigh@bg}{\box_use:N \g__codehigh_code_box}
    \hfill
    \GetCodeHighStyle{demo}
    \colorbox{codehigh@bg}{\box_use:N \g__codehigh_demo_box}
  }
}
\par\addvspace{0.5em}
}

\cs_new_protected:Npn \__codehigh_build_demo:

```

```

{
  \tl_set_eq:NN \l_tmpb_tl \g__codehigh_code_tl
  \tl_set_rescan:NnV \l_tmpb_tl
  {
    \catcode `\<% = 14 \relax
    \catcode `\<^M = 10 \relax
  }
  \l_tmpb_tl
  \__codehigh_tracing:nn {demo} { \tl_log:N \l_tmpb_tl }
  \__codehigh_get_demo_box:nN \l_tmpb_tl \g__codehigh_demo_box
}

%% #1: text to typeset; #2: resulting box
\cs_new_protected:Npn \__codehigh_get_demo_box:nN #1 #2
{
  \hbox_gset:Nn #2
  {
    \dim_set:Nn \linewidth {\linewidth-4\l__codehigh_main_boxsep_dim}
    \begin{varwidth}{\linewidth}
      \setlength { \parindent } { 0pt }
      \linespread {1}
      \tl_use:N #1
    \end{varwidth}
  }
}

```

2.6 Add CodeHigh Languages

```

\keys_define:nn {codehigh}
{
  language .tl_set:N = \l__codehigh_language_name_tl,
  language .initial:n = latex,
}

%% #1: language name; #2: rule type; #3: rule name; #4: rule regex
\NewDocumentCommand \AddCodeHighRule {0{latex} m m m}
{
  \int_if_exist:cF {l__codehigh_#1_rule_count_int}
  {\int_new:c {l__codehigh_#1_rule_count_int}}
  \int_incr:c {l__codehigh_#1_rule_count_int}
  \tl_set:cn
  {l__codehigh_#1_ \int_use:c {l__codehigh_#1_rule_count_int} _type_tl} {#2}
  \tl_set:cn
  {l__codehigh_#1_ \int_use:c {l__codehigh_#1_rule_count_int} _name_tl} {#3}
  \regex_set:cn
  {l__codehigh_#1_ \int_use:c {l__codehigh_#1_rule_count_int} _regex} {#4}
}

\AddCodeHighRule[latex]{1}{Package} {\(\(documentclass|usepackage)}
\AddCodeHighRule[latex]{6}{NewCommand}{\(\newcommand}
\AddCodeHighRule[latex]{3}{SetCommand}{\(\set[A-Za-z]+}
\AddCodeHighRule[latex]{4}{BeginEnd} {\(\(begin|end)}
\AddCodeHighRule[latex]{5}{Section} {\(\(part|chapter|section|subsection)}
\AddCodeHighRule[latex]{2}{Command} {\(\[A-Za-z]+}
\AddCodeHighRule[latex]{7}{Brace} {\([\{\}]}
\AddCodeHighRule[latex]{8}{MathMode} {\(\$}
\AddCodeHighRule[latex]{9}{Comment} {\(\%.*?\r}

```

```

\AddCodeHighRule[latex/math]{6}{LeftRight} {\(\left|right)}
\AddCodeHighRule[latex/math]{2}{Command} {\\[A-Za-z]+}
\AddCodeHighRule[latex/math]{8}{MathMode} {\$}
\AddCodeHighRule[latex/math]{4}{Script} {[\_\\~]}
\AddCodeHighRule[latex/math]{5}{Number} {\d+}
\AddCodeHighRule[latex/math]{1}{Brace} {[\\{\\}] }
\AddCodeHighRule[latex/math]{7}{Bracket} {[\\[\\]} }
\AddCodeHighRule[latex/math]{3}{Parenthesis}{[\\(\\)] }
\AddCodeHighRule[latex/math]{9}{Comment} {\%.*?\r}

\AddCodeHighRule[latex/table]{8}{Newline} {\\\\}
\AddCodeHighRule[latex/table]{1}{Alignment}{\&}
\AddCodeHighRule[latex/table]{6}{BeginEnd} {\(\begin|end)}
\AddCodeHighRule[latex/table]{4}{Command} {\\[A-Za-z]+}
\AddCodeHighRule[latex/table]{2}{Brace} {[\\{\\}] }
\AddCodeHighRule[latex/table]{3}{Bracket} {[\\[\\]} }
\AddCodeHighRule[latex/table]{9}{Comment} {\%.*?\r}

\AddCodeHighRule[latex/latex2]{1}{Argument} {\#+\d}
\AddCodeHighRule[latex/latex2]{6}{NewCommand}{\(|e|g|x)def}
\AddCodeHighRule[latex/latex2]{5}{SetCommand}{\set[A-Za-z]+}
\AddCodeHighRule[latex/latex2]{4}{PrivateCmd}{\[A-Za-z@]*@[A-Za-z@]*}
\AddCodeHighRule[latex/latex2]{3}{Command} {\\[A-Za-z]+}
\AddCodeHighRule[latex/latex2]{2}{Brace} {[\\{\\}] }
\AddCodeHighRule[latex/latex2]{7}{Bracket} {[\\[\\]} }
\AddCodeHighRule[latex/latex2]{9}{Comment} {\%.*?\r}

\AddCodeHighRule[latex/latex3]{1}{Argument} {\#+\d}
\AddCodeHighRule[latex/latex3]{2}{PrivateVar}{\[cgl]__[A-Za-z_:@]+}
\AddCodeHighRule[latex/latex3]{5}{PrivateFun}{\[cgl]__[A-Za-z_:@]+}
\AddCodeHighRule[latex/latex3]{4}{PublicVar} {\[cgl]_[A-Za-z_:@]+}
\AddCodeHighRule[latex/latex3]{6}{PublicFun} {\[A-Za-z_:@]+}
\AddCodeHighRule[latex/latex3]{8}{Brace} {[\\{\\}] }
\AddCodeHighRule[latex/latex3]{3}{Bracket} {[\\[\\]} }
\AddCodeHighRule[latex/latex3]{9}{Comment} {\%.*?\r}

```

2.7 Add CodeHigh Themes

```

\keys_define:nn {codehigh}
{
  theme .tl_set:N = \l__codehigh_theme_name_tl,
  theme .initial:n = default,
  style/main .code:n = \SetCodeHighStyle{main}{#1},
  style/code .code:n = \SetCodeHighStyle{code}{#1},
  style/demo .code:n = \SetCodeHighStyle{demo}{#1},
}

%% #1: theme name; #2: rule type; #3: styles
\NewDocumentCommand \SetCodeHighStyle {0{default} m m}
{
  \tl_set:cn {l__codehigh_style_#1_#2_tl} {#3}
}

\NewDocumentCommand \GetCodeHighStyle {0{default} m}
{
  \colorlet{codehigh@bg}{\tl_use:c {l__codehigh_style_#1_#2_tl}}
}

```

```

\SetCodeHighStyle[default]{main}{gray9}
\SetCodeHighStyle[default]{code}{gray9}
\SetCodeHighStyle[default]{demo}{white}

\SetCodeHighStyle[default]{0}{black}
\SetCodeHighStyle[default]{1}{brown3}
\SetCodeHighStyle[default]{2}{yellow3}
\SetCodeHighStyle[default]{3}{olive3}
\SetCodeHighStyle[default]{4}{teal3}
\SetCodeHighStyle[default]{5}{azure3}
\SetCodeHighStyle[default]{6}{blue3}
\SetCodeHighStyle[default]{7}{violet3}
\SetCodeHighStyle[default]{8}{purple3}
\SetCodeHighStyle[default]{9}{gray3}

```

2.8 Parse and Highlight Code

```

\int_new:N \l__codehigh_item_count_int
\tl_new:N \l__codehigh_code_to_parse_tl
\tl_new:N \l__codehigh_regex_match_type_tl
\tl_new:N \l__codehigh_regex_match_text_tl
\tl_new:N \l__codehigh_regex_before_text_tl

\cs_new_protected:Npn \__codehigh_parse_code:nN #1 #2
{
  \legacy_if:nTF {LuaTeX}
    { \__codehigh_parse_code luatex:nN {#1} #2 }
    { \__codehigh_parse_code normal:nN {#1} #2 }
}

\cs_generate_variant:Nn \__codehigh_parse_code:nN {VN}

\cs_new_protected:Npn \__codehigh_parse_code_normal:nN #1 #2
{
  \tl_set_eq:NN \l__codehigh_code_to_parse_tl #2
  \bool_do_until:nm {\tl_if_empty_p:N \l__codehigh_code_to_parse_tl}
  {
    \__codehigh_parse_code_once:nN {#1} \l__codehigh_code_to_parse_tl
    \int_compare:nNnTF {\l__codehigh_item_count_int} = {-1}
    {
      \__codehigh_typeset_text:nN {0} \l__codehigh_code_to_parse_tl
      \tl_clear:N \l__codehigh_code_to_parse_tl
    }
    {
      \tl_concat:NNN \l__codehigh_a_tl
        \l__codehigh_regex_before_text_tl \l__codehigh_regex_match_text_tl
      \str_remove_once:NV \l__codehigh_code_to_parse_tl \l__codehigh_a_tl
      \__codehigh_tracing:nm {parser}
        {\tl_log:N \l__codehigh_code_to_parse_tl}
      \__codehigh_typeset_text:nN {0}
        \l__codehigh_regex_before_text_tl
      \__codehigh_typeset_text:VN \l__codehigh_regex_match_type_tl
        \l__codehigh_regex_match_text_tl
    }
  }
}

\cs_new_protected:Npn \__codehigh_parse_code_once:nN #1 #2
{

```

```

\int_set:Nn \l__codehigh_item_count_int { -1 }
\tl_clear:N \l__codehigh_regex_match_text_tl
\tl_clear:N \l__codehigh_regex_before_text_tl
\int_step_inline:nn {\cs:w l__codehigh_#1_rule_count_int \cs_end:}
{
  \regex_extract_once:cVNT {l__codehigh_#1_#1_regex} #2 \l_tmpa_seq
  {
    \seq_get:NN \l_tmpa_seq \l__codehigh_m_tl
    \regex_split:cVNT { l__codehigh_#1_#1_regex } #2 \l_tmpb_seq
    {
      \seq_get:NN \l_tmpb_seq \l__codehigh_b_tl
      \tl_set:Nx \l__codehigh_c_tl {\str_count:N \l__codehigh_b_tl}
      \bool_lazy_or:nnT
      { \int_compare_p:nNn {\l__codehigh_item_count_int} = {-1} }
      {
        \int_compare_p:nNn
          {\l__codehigh_item_count_int} > {\l__codehigh_c_tl}
      }
    }
    \int_set:Nn \l__codehigh_item_count_int {\l__codehigh_c_tl}
    \tl_set_eq:NN \l__codehigh_regex_before_text_tl
      \l__codehigh_b_tl
    \tl_set_eq:NN \l__codehigh_regex_match_text_tl
      \l__codehigh_m_tl
    \tl_set_eq:Nc \l__codehigh_regex_match_type_tl
      {l__codehigh_#1_#1_type_tl}
  }
}
}
}
}

\legacy_if:nT {LuaTeX} { \directlua{require("codehigh.lua")} }

\cs_new_protected:Npn \__codehigh_parse_code luatex:nN #1 #2
{
  \directlua{ParseCode(token.scan_argument(), token.scan_argument())}{#1}{#2}
  \__codehigh_tracing:nn {parser}
  {\tl_log:N \l__codehigh_parse_code_count_tl}
  \int_step_inline:nn {\l__codehigh_parse_code_count_tl}
  {
    \__codehigh_typeset_text:vc
    {l__codehigh_parse_style_#1_tl} {l__codehigh_parse_code_#1_tl}
  }
}

%% #1: rule type, #2: text
\cs_new_protected:Npn \__codehigh_typeset_text:nN #1 #2
{
  \__codehigh_tracing:nn {parser} { \tl_log:e { type: #1; ~ text: #2 } }
  \group_begin:
  \regex_replace_all:nnN { \r } { \c{par} \c{leavevmode} } #2
  \legacy_if:nF {LuaTeX}
  { \regex_replace_all:nnN { \ } { \c{leavevmode} \c{space} } #2 }
  \color{\tl_use:c {l__codehigh_style_ \l__codehigh_theme_name_tl _#1_tl}}
  %\obeyspaces
  #2
  \group_end:
}
\cs_generate_variant:Nn \__codehigh_typeset_text:nN { VN, vc }

```


2.9 Don't Highlight Code

```
\cs_new_protected:Npn \__codehigh_parse_code_lite:N #1
{
  \regex_replace_all:nnN { \r } { \c{par} \c{leavevmode} } #1
  \regex_replace_all:nnN { \ } { \c{relax} \c{space} } #1
  \tl_use:N #1
}
```

2.10 Fake Verbatim Command

```
\tl_const:Nn \c__codehigh_fake_escape_tl { \\{\}\#\^\ \% }

\NewDocumentCommand \fakeverb { +m }
{
  \group_begin:
  \group_align_safe_begin:
  \ttfamily \frenchspacing
  \tl_analysis_map_inline:nn {#1}
  {
    \int_compare:nNnTF {##2} = { -1 }
    {
      \exp_args:NNo \tl_if_in:NnTF \c__codehigh_fake_escape_tl {##1}
      { \exp_after:wN \cs_to_str:N ##1 }
      { \exp_after:wN \token_to_str:N ##1 }
    }
    { \exp_after:wN \token_to_str:N ##1 }
  }
  \group_align_safe_end:
  \group_end:
}
```

2.11 Tracing CodeHigh

```
\NewDocumentCommand \SetCodeHighTracing { m }
{
  \keys_set:nn { codehigh-set-tracing } {#1}
}

\bool_new:N \g__codehigh_tracing_code_bool
\bool_new:N \g__codehigh_tracing_demo_bool
\bool_new:N \g__codehigh_tracing_parser_bool

\keys_define:nn { codehigh-set-tracing }
{
  +code .code:n = \bool_gset_true:N \g__codehigh_tracing_code_bool,
  -code .code:n = \bool_gset_false:N \g__codehigh_tracing_code_bool,
  +demo .code:n = \bool_gset_true:N \g__codehigh_tracing_demo_bool,
  -demo .code:n = \bool_gset_false:N \g__codehigh_tracing_demo_bool,
  +parser .code:n = \bool_gset_true:N \g__codehigh_tracing_parser_bool,
  -parser .code:n = \bool_gset_false:N \g__codehigh_tracing_parser_bool,
  all .code:n = \__codehigh_enable_all_tracings:,
  none .code:n = \__codehigh_disable_all_tracings:,
}

\cs_new_protected_nopar:Npn \__codehigh_enable_all_tracings:
{
```

```
\bool_gset_true:N \g__codehigh_tracing_code_bool
\bool_gset_true:N \g__codehigh_tracing_demo_bool
\bool_gset_true:N \g__codehigh_tracing_parser_bool
}

\cs_new_protected_nopar:Npn \__codehigh_disable_all_tracings:
{
  \bool_gset_false:N \g__codehigh_tracing_code_bool
  \bool_gset_false:N \g__codehigh_tracing_demo_bool
  \bool_gset_false:N \g__codehigh_tracing_parser_bool
}

\cs_new_protected:Npn \__codehigh_tracing:nn #1 #2
{
  \bool_if:cT { g__codehigh_tracing_ #1 _bool } {#2}
}

\group_begin:
  \char_set_catcode_active:N \^^M
  \cs_new_protected:Npn \__codehigh_log:N #1
  {
    \tl_replace_all:Nnn #1 {\^^M} {\^^J}
    \tl_log:N #1
  }
\group_end:
```