codeanatomy – Draw Code Anatomy*

Reference

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1 Hints

Usage of this Package can be found in codeanatomy.usage.pdf and codeanatomy.lstlisting.pdf. This document show only generated reference of commands in this Package.

2 Implementation

2.1 Package Dependencies

\RequirePackage{expl3}
\RequirePackage{xparse}
\RequirePackage{tikz}

Load necessary TikZ libraries.
\usetikzlibrary{

*This file describes v0.4-Beta, last revised 2023/01/24.
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2.2 Setup styles

2.2.1 Colors

Define colors which are used in \texttt{codeanatomy}
\begin{verbatim}
\definecolor{annotationcolor}{rgb}{0,0.50002,1} % Blue
\colorlet{bgcmdcolor}{gray} % Grey
\end{verbatim}

2.2.2 \texttt{TikZ} styles for code in a Code Anatomy

\texttt{TikZ} style for annotation labels:
\begin{verbatim}
\texttt{tikz}\{\node[code \{\texttt{anatomy}\}] at (0,0) \{code line 1\code line 2\}; \}
code line 1
yields code line 2
\end{verbatim}

\begin{verbatim}
\tikzset{anatomy/.style={%
  anchor=south west,%
  inner sep=0,%
  align=left,%
  font=\ttfamily
}}
\end{verbatim}

\texttt{TikZ} style to mark a piece of code in an anatomy:
\begin{verbatim}
\texttt{tikz}\{\node[code \{\texttt{code part}\}] at (0,0) \{let a = 12;\};\}
yields \texttt{let a = 12;}
\end{verbatim}

\begin{verbatim}
\tikzset{code part/.style={%
  rectangle,%
  draw=annotationcolor,%
  align=left,%
  minimum height=1.175em,%
  inner sep=1.75pt,%
  outer sep=0.1pt,%
  font=\ttfamily
}}
\end{verbatim}

\texttt{TikZ} style to make a piece of code in an anatomy as not important in currently talking context:
\begin{verbatim}
\texttt{tikz}\{\node[ignore code \{\texttt{ignored code part}\}] at (0,0) \{/*some comment*/\} \}
yields /*some comment*/
\end{verbatim}
\tikzset{\texttt{ignored code part/.style=\{}}\n\texttt{code part,}}\n\texttt{draw=none, color=bgcmdcolor,}}\n\texttt{inner sep=0.75pt}}\n\texttt{\}}\n\texttt{\}}\n
\texttt{\texttt{fit extrem} }\texttt{TikZ style to mark a piece of multiple line code in an anatomy:} \n\tikz{\texttt{\node(c)[fit extrem, fit=\{(0,0) (0.5,0.975) (1,0)\}] \{\}; }\n\texttt{yields} \n\tikzset{\texttt{fit extrem/.style=\{}}\n\texttt{rectangle,}}\n\texttt{draw=annotationcolor,}}\n\texttt{align=left,}}\n\texttt{minimum height=1.175em,}}\n\texttt{inner sep=1.75pt,}}\n\texttt{outer sep=0.1pt,}}\n\texttt{font=\ttfamily}}\n\texttt{\}}\n\texttt{\}}\n
\texttt{\texttt{annotation} }\texttt{TikZ style of arrows from annotation labels to code parts:} \n\tikz{\texttt{\draw[->, annotation] (0,0) -- (1,0);}} \n\texttt{yields} \n\tikzset{\texttt{annotation/.style=\{}}\n\texttt{preaction=\{}}\n\texttt{draw=white,}}\n\texttt{line width=3.5pt,}}\n\texttt{arrows={{-Triangle Cap[]},}}\n\texttt{\}},}}\n\texttt{draw=annotationcolor,}}\n\texttt{arrows={{-Latex[round,}}\n\texttt{color=annotationcolor,}}\n\texttt{fill=annotationcolor}}\n\texttt{\}}\n\texttt{,}}\n\texttt{shorten >=0.25pt}}\n\texttt{\}}\n\texttt{\}}\n
\texttt{\texttt{code annotation} }\texttt{TikZ style for a annotation label} \texttt{function name} \n\tikzset{\texttt{code annotation/.style=\{}}\n\texttt{inner sep=2pt,}}\n\texttt{text=annotationcolor,}}\n\texttt{align=center,}}\n\texttt{font=\sffamily\small}}\n\texttt{\}}\n\texttt{\}}\n
\texttt{\texttt{code grid debug} }\texttt{TikZ style to draw debug grid on the background of anatomy}
2.3 Command used to set code and code anatomy

`\codeBlock{\langle code \rangle}`

Complete code listing of a Code Anatomy figure is typeset by this command. Whereas `\langle code \rangle` is the formatted code listing. This command can be used if there are no other packages to typeset code listing in use.

`\NewDocumentCommand{\codeBlock}{m}%
\{\node(code) [anatomy] at (0,0) (#1);\}%`

`\cPart{\langle style \rangle}{\langle node name \rangle}{\langle piece of code \rangle}`

Assign a piece of typeset code –typical in one line– to a TiKZ Node, so that it can be annotated.

- `\langle style \rangle` a defined TiKZ style to be applied to this node, the style code part is applied to the node per default.
- `\langle node name \rangle` is a unique TiKZ node name in the tikzpicture
- `\langle piece of code \rangle` is a single code part to be marked.

`\NewDocumentCommand{\cPart}{O{code part}mm}%
\{\tikzmarknode[#1]{#2}{#3}\}%`

`\iPart{\langle node name \rangle}{\langle piece of code \rangle}`

Assign a piece of typeset code –typical in one line– to a TiKZ Node, so that it can be annotated. It does not plot border around the piece of code as `\cPart` does.

- `\langle style \rangle` a defined TiKZ style to be applied to this node, the style ignored code part is applied to the node per default.
- `\langle node name \rangle` is a unique TiKZ node name in the tikzpicture
- `\langle piece of code \rangle` is a single code part to be marked.

`\NewDocumentCommand{\iPart}{O{ignored code part}mm}%
\{\tikzmarknode[#1]{#2}{#3}\}%`

`\mtPoint{\langle node name \rangle}`

Marks a point as a most top in a Code Block.

`\NewDocumentCommand{\mtPoint}{m}%
\{\tikzmarknode[#1]\phantom{\rule[1.8ex]{0.1ex}{0.1ex}}\}%`

`\hmtPoint{\langle node name \rangle}`

Marks a point as a higher most top point in a Code Block.

`\NewDocumentCommand{\hmtPoint}{m}%
\{\tikzmarknode[#1]\phantom{\rule[2.5ex]{0.1ex}{0.1ex}}\}%`
\mbPoint \langle node name \rangle
Marks a point as a deeper most bottom point in a Code Block.

\dmbPoint \langle node name \rangle
Marks a point as a deeper most bottom point in a Code Block.

\extremPoint \langle node name \rangle \langle yshift \rangle \langle xshift \rangle \langle style \rangle
Create a Ti\kZ{} Node as reference point for later use in \fitExtrem.  

- \langle node name \rangle is the Ti\kZ{} node name which is used in \fitExtrem to reference to this point.
- \langle yshift \rangle a length, default 0ex which places this markpoint on the base line, shift this mark point vertical, for positive value over base line, negative value under base line.
- \langle xshift \rangle same as \langle yshift \rangle but for horizontal direction.
- \langle style \rangle is a Ti\kZ{} style (may be defined by user).

For example:
\begin{tikzpicture}[remember picture]
\node[code] \langle anatomy \rangle at (0,0) {
\extremPoint{tl}\langle 2ex \rangle Line with some text\extremPoint{br}\langle -1ex \rangle \\
\extremPoint{tl2} other Line with some text \\
    some more line\extremPoint{br2} \\
};
\fitExtrem{box1}{(tl) (br)}
\fitExtrem{box2}{(tl2) (br2)}
\end{tikzpicture}
yields

- Line with some text
- other Line with some text
- some more line

\fitExtrem \langle node name \rangle \langle extrem points \rangle
Create a rectangle box over given extrem points defined by \*Point{}.

- \langle node name \rangle is a unique Ti\kZ{} node name in the current anatomy
- \langle extrem points \rangle is a list of Ti\kZ{} node name created by \*Point, each name is surrounded by ().
Example:
\begin{tikzpicture}[remember picture]
\node(code) [anatomy] at (0,0) {
\mtPoint{left}Line 1\
Long Line 2\extremPoint{right}\
Line 3\mbPoint{bottom}
};
\fitExtrem{box} { (left) (bottom) (right) }
\end{tikzpicture}

yields

<table>
<thead>
<tr>
<th>Line 1</th>
<th>Long Line 2</th>
<th>Line 3</th>
</tr>
</thead>
</table>

\NewDocumentCommand{\fitExtrem}{mm}{\node(#1)[fit extrem,fit={#2}]{};}

\bgcode (piece of code)
Typeset a piece of code in color bgcmdcolor. For example
\tikz{\codeBlock{let a := 12\bgcode{;}}}
yields let a := 12;
\NewDocumentCommand{\bgcode}{m}{\textcolor{bgcmdcolor}{#1}}

\ptab Horizontal space
\phspace for example:
\tikz{\codeBlock{a\ptab{}b}}
yields a \ b
\NewDocumentCommand{\ptab}{}{\phantom{hhhh}}
\NewDocumentCommand{\phspace}{}{\phantom{h}}

\codeAnnotation{\langle node name\rangle}{\langle coordinate\rangle}{\langle label text\rangle}
Typeset Annotation labels for a code part.
- \langle node name\rangle is a unique TikZ node name in the tikzpicture,
- \langle coordinate\rangle is the coordinate of the annotation label, surrounded by a ()
- \langle label text\rangle text content to be typeset.

For example:
\begin{tikzpicture}[remember picture]
\codeBlock{a \cPart{a}:= 12 + 13}
\codeAnnotation{codeLabel}{(1,-0.5)}{assignment}
\draw[->,annotation] (codeLabel) -- (a);
\end{tikzpicture}

yields
\begin{tikzpicture}[remember picture]
\node(code) [anatomy] at (0,0) {
\mtPoint{left}a \cPart{a}:= 12 + 13\assignment\
\extremPoint{right}\text{assignment}\n\mbPoint{bottom}
};
\newcommand{\codeAnnotation}{\langle node name\rangle}{\langle coordinate\rangle}{\langle label text\rangle}
\codeAnnotation{m r() m }{\langle node(#1)[code annotation] at (#2) \{#3\};}
3 Known Bugs

**Arrows color** Arrows appear in some cases with mysterious color. I don’t know why!

For example:

```
\begin{tikzpicture}[remember picture]
node(code) [anatomy] at (0,0) {
  \hmtPoint{a}Short line\\code with some long text\extremPoint{b}[-0.5ex]
};
\fitExtrem{l}{(a) (b)}
\codeAnnotation{n} (-2,0){here is a\extremPoint{point}[0.75ex][0.5ex]
  long line}
\draw[->, annotation] (point) -- (l);
\end{tikzpicture}
```

yields

Short line
code with some long text

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The italic numbers denote the pages where the corresponding entry is described, numbers
underlined point to the definition, all others indicate the places where it is used.

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Change History

v0.2-Alpha
General: This package does not load xcolor anymore. It relies on tikz, that tikz loads xcolor in a way that codeanatomy can define RGB color

v0.4-Alpha
General: Set fill to annotationcolor

v0.4-Beta
General: Add new TikZ Style ignored code part
Add option [(style)] to cPart
Add option [(style)] to iPart