

codeanatomy – Draw Code Anatomy*

Reference

Hồng-Phúc Bùi†

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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

```
1 \RequirePackage{expl3}
2 \RequirePackage{xparse}
3 \RequirePackage[rgb]{xcolor}
4 \RequirePackage{tikz}

   Load necsessary TikZ libraries.
5 \usetikzlibrary{
6   tikzmark
7   ,fit
8   ,arrows.meta
9   ,bending
```

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†E-mail: [hong-phuc.bui \(at\) htwsaar dot de](mailto:hong-phuc.bui@htwsaar.de)

```

10 ,shapes
11 ,chains
12 ,backgrounds
13 ,scopes
14 ,decorations
15 ,decorations.pathmorphing
16 }


```


2.2 Setup styles

2.2.1 Colors

Define colors which are used in codeanatomy

```

annotationcolor 
17 \definecolor{annotationcolor}{rgb}{0,0.50002,1} % Blue

bgcmdcolor 
18 \colorlet{bgcmdcolor}{gray} % Grey

```

2.2.2 TikZ styles for code in a Code Anatomy

anatomy TikZ style for annotation labels:

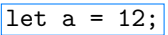
```

\tikz{\node(code) [anatomy] at (0,0) {code line 1\code line 2}; }
code line 1
yields code line 2
19 \tikzset{anatomy/.style={%
20     anchor=south west,%
21     inner sep=0,%
22     align=left,%
23     font=\ttfamily
24 }
25 }

```

code part TikZ style to marce a piece of code in an anatomy:


```

\tikz{\node(code) [code part] at (0,0) {\let a = 12;};}
yields 
26 \tikzset{code part/.style={%
27     rectangle,%
28     draw=annotationcolor,%
29     align=left,%
30     minimum height=1.175em,%
31     inner sep=1.75pt,%
32     outer sep=0.1pt,%
33     font=\ttfamily
34 }
35 }

```

fit extrem TikZ style to mark a piece of multiple line code in an anatomy:

```

\tikz{ \node(c)[fit extrem, fit={{(0,0) (0.5,0.975) (1,0)}} {};}
yields 
36 \tikzset{fit extrem/.style={%
37     rectangle,%
38     draw=annotationcolor,%

```

```

39     align=left,%
40     minimum height=1.175em,%
41     inner sep=1.75pt,%
42     outer sep=0.1pt,%
43     font=\ttfamily
44 }
45 }
annotation      setup style of arrows from annotation labels to code parts:
\tikz{\draw[] (1,0) circle(3ex); \draw[->,annotation] (0,0) -- (1,0);}
yields

46 \tikzset{annotation/.style={%
47     preaction={
48         draw=white,%
49         line width=3.5pt,%
50         arrows={-Triangle Cap[]},%
51     },%
52     draw=annotationcolor,%
53     arrows={-Latex[%
54         round,%
55         color=annotationcolor]
56     }
57 }
58 }
code annotation  setup style for a annotation label function name
59 \tikzset{code annotation/.style={%
60     inner sep=2pt,%
61     text=annotationcolor,%
62     align=center,%
63     font=\sffamily\small
64 }
65 }
code grid debug  TikZ styles to draw debug grid on the background of anatomy
66 \tikzset{code grid debug/.style={%
67     step=1.0,%
68     draw=gray!20,%
69     very thin,%
70     on background layer
71 }
72 }

```

2.3 Command used to set code and code anatomy

`\codeBlock` Complete code listing of a Code Anatomy figure is typeset by this command. Syntax `\codeBlock {\code}`, whereas `{\code}` is the *formatted* code listing. This command can be used if there are no other packages to typeset code listing in use.

```

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

```

`\cPart` Assign a piece of typeset code –typical in one line– to a TikZ Node, so that it can be annotated. Syntax: `\cPart {\node name} {\piece of code}` whereas `{\node name}`

is a unique TikZ node name in the `tikzpicture` and $\{\langle piece\ of\ code \rangle\}$ is a single code part to be marked.

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

\iPart Assign a piece of typeset code –typical in one line– to a TikZ Node, so that it can be annotated. Syntax: `\cPart` $\{\langle node\ name \rangle\}$ $\{\langle piece\ of\ code \rangle\}$ whereas $\{\langle node\ name \rangle\}$ is a unique TikZ node name in the `tikzpicture` and $\{\langle piece\ of\ code \rangle\}$ is a single code part to be marked.

```
77 \NewDocumentCommand{\iPart}{mm} %
78   {\tikzmarknode[code part,draw=none,inner sep=0.75pt]{#1}{#2}}
```

\mtPoint Marks a point as a **most top** in a Code Block.

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

\hmtPoint Marks a point as a **heigher most top** point in a Code Block.

```
81 \NewDocumentCommand{\hmtPoint}{m}
82   {\tikzmarknode{#1}{\phantom{\rule[2.5ex]{0.1ex}{0.1ex}}}}
```

\mbPoint Marks a point as a **deeper most bottom** point in a Code Block.

```
83 \NewDocumentCommand{\mbPoint}{m}
84   {\tikzmarknode{#1}{\phantom{\rule[-0.55ex]{0.1ex}{0.1ex}}}}
```

\dmbPoint Marks a point as a **deeper most bottom** point in a Code Block.

```
85 \NewDocumentCommand{\dmbPoint}{m}
86   {\tikzmarknode{#1}{\phantom{\rule[-2ex]{0.1ex}{0.1ex}}}}
```

\extremPoint Create a TikZ Node as reference point for later use in `\fitExtrem`. Syntax:
`\extremPoint` $\{\langle node\ name \rangle\}$ $[\langle yshift \rangle]$ $[\langle xshift \rangle]$ $[\langle style \rangle]$ whereas

- $\{\langle node\ name \rangle\}$ is the TikZ 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 TikZ style (may be defined by user).

For example:

```
\begin{tikzpicture}[remember picture]
\node(code) [anatomy] at (0,0) {
  \extremPoint{t1}[2ex]Line with some text\extremPoint{br}[-1ex]\\
  \extremPoint{t12}other Line with some text\\
  some more line\extremPoint{br2}\\
};
\fitExtrem{box1}{(t1) (br)}
\fitExtrem{box2}{(t12) (br2)}
\end{tikzpicture}
```

yields

Line with some text
~~other Line with some text~~
 some more line

```
87 \NewDocumentCommand{\extremPoint}{m O{0ex} O{0.1ex} O{}} {  
88   {\tikzmarknode[#4]{#1}{\phantom{\rule[#2]{#3}{0.1ex}}}}
```

\fitExtrem Create a rectangle box over given extrem points defined by `*Point{}`. Syntax:
`\fitExtrem {<node name>} {<extrem points>}`
 whereas

- `{<node name>}` is a unique TikZ node name in the current anatomy
- `{<extrem points>}` is a list of TikZ 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

Line 1
 Long Line 2
 Line 3

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

\bgcode Typeset a piece of code in color `bgcmdcolor`. Syntax:
`\bgcode {<piece of code>}`
 for example: `\tikz{\codeBlock{let a := 12\bgcode{;}}}`
 yields `let a := 12;`

```
91 \NewDocumentCommand{\bgcode}{m}{\textcolor{bgcmdcolor}{#1}}
```

\ptab Produce a horizontal space of 4 small characters `h` respective 1 small character `h`
\phspace for example: `\tikz{\codeBlock{a\ptab{b}}` yields `a b`

```
92 \NewDocumentCommand{\ptab}{-}{\phantom{hhhh}}
```

```
93 \NewDocumentCommand{\phspace}{-}{\phantom{h}}
```

\codeAnnotation Typeset Annotation labels for a code Part. Syntax:
`\codeAnnotation {<node name>} (<coordinate>) {<label text>}`
 whereas


- `{<node name>}` is a unique TikZ node name in the `tikzpicture`,
- `(<coordinate>)` is the coordinate of the annotation label, surrounded by a `()`,
- `{<label text>}` text content to be typeset.

```

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

```

yields

a  12 + 13
assignment

```

94 \NewDocumentCommand{\codeAnnotation}{m r() m } %
95 {
96   \node(#1)[code annotation] at (#2) {#3} ;
97 }

```

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