

# 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

```
1 \RequirePackage{expl3}
2 \RequirePackage{xparse}
3 \RequirePackage{tikz}
```

Load necessary TikZ libraries.

```
4 \usetikzlibrary{
```

---

\*This file describes v0.2-Alpha, last revised 2019/07/10.

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```

5     tikzmark
6     ,fit
7     ,arrows.meta
8     ,bending
9     ,shapes
10    ,chains
11    ,backgrounds
12    ,scopes
13    ,decorations
14    ,decorations.pathmorphing
15 }



```

## 2.2 Setup styles

### 2.2.1 Colors

Define colors which are used in codeanatomy

```

annotationcolor 
16 \definecolor{annotationcolor}
17         {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 let a = 12;
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)}} {}; }
```

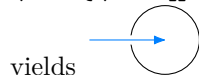


yields

```
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 TikZ 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 TikZ 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 style 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`  $\{\langle code \rangle\}$

Complete code listing of a Code Anatomy figure is typeset by this command. 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` `{<node name>}{<piece of code>}`

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

- `{<node name>}` is a unique TikZ node name in the `tikzpicture`
- `{<piece of code>}` is a single code part to be marked.

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

`\iPart` `{<node name>}{<piece of code>}`

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 pice of code as `\cPart` does.

- `{<node name>}` is a unique TikZ node name in the `tikzpicture`
- `{<piece of code>}` 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` `{<node name>}`

Marks a point as a **m**ost **t**op in a Code Block.

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

`\hmtPoint` `{<node name>}`

Marks a point as a **h**eigher **m**ost **t**op point in a Code Block.

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

`\mbPoint` `{<node name>}`

Marks a point as a **d**eeper **m**ost **b**ottom point in a Code Block.

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

`\dmbPoint` `{<node name>}`

Marks a point as a **d**eeper **m**ost **b**ottom point in a Code Block.

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

`\extremPoint` `{<node name>}[<yshift>][<xshift>][<style>]`

Create a TikZ Node as reference point for later use in `\fitExtrem`.

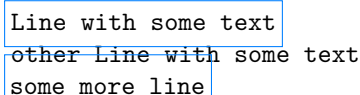
- `{<node name>}` is the TikZ node name which is used in `\fitExtrem` to reference to this point
- `[<yshift>]` a length, default 0ex which places this markpoint on the base line, shift this mark point vertical, for positive value over base line, negative value under base line.

- [ $\langle xshift \rangle$ ] 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



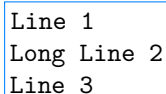
```
87 \NewDocumentCommand{\extremPoint}{m O{0ex} O{0.1ex} O{}} {
88   {\tikzmarknode[#4]{#1}{\phantom{\rule[#2]{#3}{0.1ex}}}}
\fitExtrem {(\node name)}{(\extrem points)}
Create a rectangle box over given extrem points defined by \*Point{}
```

- {(\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



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

`\bgcode`  $\{\langle piece\ of\ code\rangle\}$   
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` 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`  
`\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

a := 12 + 13  
↗  
assignment

```
94 \NewDocumentCommand{\codeAnnotation}{m r() m } %
95 { \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{1}{(a) (b)}
\codeAnnotation{n} (-2,0){here is\\a\extremPoint{point}\\long line}
\draw[->, annotation] (point) -- (1);
\end{tikzpicture}
```

yields

here is  
a ↗ Short line  
code with some long text  
long line

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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 1