codeanatomy – Draw Code Anatomy*

Reference

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Released 2023/01/24

Contents

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 Dependenies

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

Load necsessary Ti*k*Z libraries.

```
\usetikzlibrary{
```

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

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```
    tikzmark
   ,fit
   ,arrows.meta
   ,bending
   ,shapes
   ,chains
   ,backgrounds
   ,scopes
   ,decorations
   ,decorations.pathmorphing
}
```

2.2 Setup styles

2.2.1 Colors

Define colors which are used in codeanatomy

annotationcolor

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

bgcmdcolor

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

2.2.2 Ti*k*Z styles for code in a Code Anatomy

anatomy

Ti*k*Z style for annotation labels:
`\tikz{\node(code) [anatomy] at (0,0) {code line 1\\code line 2}; }`
code line 1
yields code line 2

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

code part

Ti*k*Z style to mark a piece of code in an anatomy:
`\tikz{\node(code) [code part] at (0,0) {let a = 12;};}`
yields let a = 12;

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

ignored code part

Ti*k*Z style to make a pice of code in an anatomy as not important in currently talking context `\tikz{\node(ignore code) [ignored code part] at (0,0) {/*some comment*/} }`
yields /*some comment*/

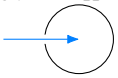
```
\tikzset{ignored code part/.style={%
    code part,%
    draw=none,color=bgcmdcolor,%
    inner sep=0.75pt
  }
}
```

`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 

```
\tikzset{fit extrem/.style={%
      rectangle,%
      draw=annotationcolor,%
      align=left,%
      minimum height=1.175em,%
      inner sep=1.75pt,%
      outer sep=0.1pt,%
      font=\ttfamily
    }
}
```

`annotation` TikZ style of arrows from annotation labels to code parts:
`\tikz{\draw[] (1,0) circle(3ex); \draw[->,annotation] (0,0) -- (1,0);}`

yields 

```
\tikzset{annotation/.style={%
      preaction={
          draw=white,%
          line width=3.5pt,%
          arrows={-Triangle Cap[]},%
      },%
      draw=annotationcolor,%
      arrows={-Latex[%
          round,%
          color=annotationcolor,
          fill=annotationcolor
        ]
      },
      shorten >=0.25pt
    }
}
```

`code annotation` TikZ style for a annotation label function name

```
\tikzset{code annotation/.style={%
      inner sep=2pt,%
      text=annotationcolor,%
      align=center,%
      font=\sffamily\small
    }
}
```

`code grid debug` TikZ style to draw debug grid on the background of anatomy

```
\tikzset{code grid debug/.style={%
      step=1.0,%
      draw=gray!20,%
      very thin,%
      on background layer
    }
}
```

2.3 Command used to set code and code anatomy

`\codeBlock` `{`⟨*code*⟩`}`

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.

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

`\cPart` `[`⟨*style*⟩`]` `{`⟨*node name*⟩`}{`⟨*piece of code*⟩`}`

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

- `[`⟨*style*⟩`]` a defined Ti*k*Z style to be applied to this node, the style `code part` is applied to the node per default.
- `{`⟨*node name*⟩`}` is a unique Ti*k*Z node name in the `tikzpicture`
- `{`⟨*piece of code*⟩`}` is a single code part to be marked.

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

`\iPart` `{`⟨*node name*⟩`}{`⟨*piece of code*⟩`}`

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

- `[`⟨*style*⟩`]` a defined Ti*k*Z style to be applied to this node, the style `ignored code part` is applied to the node per default.
- `{`⟨*node name*⟩`}` is a unique Ti*k*Z node name in the `tikzpicture`
- `{`⟨*piece of code*⟩`}` is a single code part to be marked.

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

`\mtPoint` `{`⟨*node name*⟩`}`

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

```
\NewDocumentCommand{\mtPoint}{m}
    {\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.

```
\NewDocumentCommand{\hmtPoint}{m}
    {\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.

```
\NewDocumentCommand{\mbPoint}{m}
    {\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.

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

`\extremPoint` `{`⟨*node name*⟩`}[`⟨*yshift*⟩`][`⟨*xshift*⟩`][`⟨*style*⟩`]`

Create a Ti*k*Z Node as reference point for later use in `\fitExtrem`.

- `{`⟨*node name*⟩`}` is the Ti*k*Z 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.
- `[`⟨*xshift*⟩`]` same as `[`⟨*yshift*⟩`]` but for horizontal direction.
- `[`⟨*style*⟩`]` is a Ti*k*Z style (may be defined by user).

For example:

```
\begin{tikzpicture}[remember picture]
\node(code) [anatomy] at (0,0) {
   \extremPoint{tl}[2ex]Line with some text\extremPoint{br}[-1ex]\\
   \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

```
\NewDocumentCommand{\extremPoint}{m O{0ex} O{0.1ex} O{} }
    {\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 Ti*k*Z node name in the current anatomy
- `{`⟨*extrem points*⟩`}` is a list of Ti*k*Z 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
```

```
\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` 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` `{`⟨*node name*⟩`}(`⟨*coordinate*⟩`){`⟨*label text*⟩`}`
Typeset Annotation labels for a code part.

- `{`⟨*node name*⟩`}` is a unique Ti*k*Z node name in the `tikzpicture`,
- `(`⟨*coordinate*⟩`)` is the coordinate of the annotation label, surrounded by a `()`,
- `{`⟨*label text*⟩`}` 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

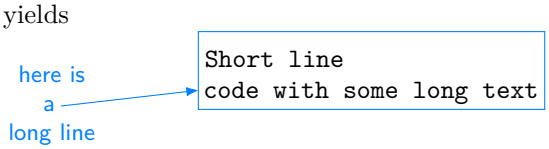
```
\NewDocumentCommand{\codeAnnotation}{m r() m } %
    { \node(#1)[code annotation] at (#2) {#3}; }
```

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



Index

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.

Change History