

The smartdiagram package*

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Abstract

This package provides a way to easily draw diagrams in documents and presentations from a list of items thanks to TikZ. The idea came out from [this question](#) on [TeX.StackExchange](#).

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*This document corresponds to smartdiagram v0.2, dated 2013/03/09; it is released under and subject to the [L^AT_EX Project Public License \(LPPL\)](#).

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1 Introduction and requirements

The aim of the package is to provide a way to draw diagrams starting from a list of items colored automatically. The diagrams created could be used in a simple document or in a presentation: in the latter case, while using the Beamer class, the user could decide if diagrams should be overlay-awared or not.

Automatically, the `smartdiagram` package loads:

- `TikZ`;
- `etoolbox`;
- `xparse`;
- `xstring` (from version 0.2).

Moreover, the package loads the following TikZ libraries:

- `backgrounds`;
- `calc`;
- `fadings`;
- `shadows`;
- `shapes.arrows`;
- `shapes.symbols` (from version 0.2).

and it sets a new layer called `smart diagram arrow back`.

The package could be loaded by means of `\usepackage{smartdiagram}`.

2 Basic Usage

`\smartdiagram` The basic command is `\smartdiagram[⟨type of diagram⟩]{⟨list of items⟩}`. The `{⟨list of items⟩}` should be comma-delimited: to insert, for example, a comma as part of the item label use `\smartdiagram[. . .]{elem1,{elem2,text},elem3}`.

The possible diagrams that could be created are:

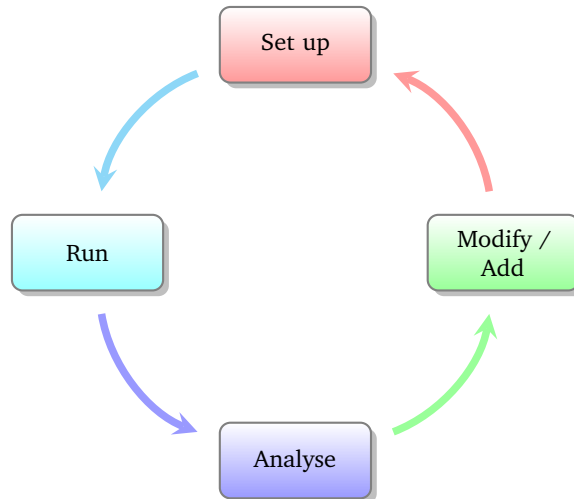
- **circular diagram**: the items in the list are displayed around a circle typically in counterclockwise order;
- **circular diagram:clockwise**: same as before, but now items are placed in clockwise order (no space between names and `:`);

- **flow diagram**: the items in the list are displayed as a flow chart;
- **flow diagram:horizontal**: the items in the list are displayed as an horizontal flow chart (no space between names and :);
- **descriptive diagram**: a diagram in which are displayed concepts and their description;
- **priority descriptive diagram**: a diagram in which the items are deployed based on their relevance;
- **bubble diagram**: each item is a bubble deployed around a bubble center, which is the first element in the list;
- **constellation diagram**: each item is a circle connected to the center, the first element in the list again;
- **connected constellation diagram**: each item is a circle and, a part from the first element in the list, the other ones are connected together;
- **sequence diagram**: the items in the list are displayed in sequence and each item points to the subsequent.

For example:

```
\begin{center}
\smartdiagram[circular diagram]{Set up,Run,Analyse,Modify~/ Add}
\end{center}
```

produces:



All diagrams could be customized in various ways, from the selection of the background colors to the font size, from the size of the items to the shape of the border. The keys necessary for this task will be analysed in detail in section 3.

For what concern the **bubble diagram**, the **constellation diagram** and the **connected constellation diagram**, they are a bit different from the rest of the diagrams, in the sense that the first item in the $\{\langle list\ of\ items \rangle\}$ is particular: called *bubble center* and *planet*, respectively, its aspect is different and it could be customized with dedicated keys.

From version 0.2 there is available also the `sequence diagram` which displays the $\{\langle list\ of\ items \rangle\}$ with a particular shape.

`\smartdiagramanimated`

Inside presentations, the user could select if the diagram should be displayed in a *persistent* way, or with an animation. The *persistent* way is achieved by exploiting, again, `\smartdiagram`, while to have the diagram *overlay-aware* the command is `\smartdiagramanimated[\langle type of diagram \rangle]\{\langle list of items \rangle\}`.

For diagrams like the `circular diagram` and the `flow diagram` the animation runs as follows: at the beginning the first item of the list is displayed, then each time appears an arrow connecting the previous element with the new one; at the end it is displayed the arrow connecting the last element with the first one. Considering instead the `descriptive diagram`, per couple description title-description, first it is shown the description title and subsequently the description. In the `priority descriptive diagram`, very simply, the list of items is deployed starting from the bottom, that is the less relevant item, to the top to progressively show much relevant items. For what concern the `bubble diagram`, the `constellation diagram` and the `connected constellation diagram`, at first it is always shown the *bubble center* and *planet*, respectively and later all the items subsequently. Finally, in the `sequence diagram`, the items are presented one at a time starting from the left one ending with the right one.

3 The options

3.1 Setting the options

`\smartdiagramset`

The options should be introduced similarly to what happens with `\tikzset` in TikZ: `\smartdiagramset\{\langle list of options \rangle\}`. Examples in which some options are used are shown in section 4.

3.2 Available options

Here follows the list of general available options.

3.2.1 General options

- `module minimum width` (initial: 2cm): this option sets the minimum width of the module;
- `module minimum height` (initial: 1cm): this option sets the minimum height of the module;
- `module y sep` (initial: 1.65): this option sets a vertical distance factor among the modules in a `flow diagram`;
- `module x sep` (initial: 2.75): this option sets an horizontal distance factor among the modules in a `flow diagram:horizontal`;
- `module shape` (initial: rectangle,rounded corners): this option should be used to change the shape of the module, but the user should load manually the proper TikZ library; for example, to user an ellipse, load `shapes.geometric` in the preamble;
- `text width` (initial: 1.75cm): this option sets the text width inside the module;
- `font` (initial: \small): this option sets the module font;

- `border color` (initial: `gray`): this option sets the border color of the module;
- `circular distance` (initial: `2.75cm`): this option sets the radius of circle around which the modules in a circular diagram;
- `arrow line width` (initial: `0.1cm`): this option sets the width of the connection arrows within two modules;
- `set color list` (initial: `none`): this option allows the user to define the list of colors usable in the diagram;
- `use predefined color list` (initial: `none`): this option allows the user to reuse the pre-defined colors whenever in a previous diagram they have been changed;
- `insert decoration` (initial: `none`): this option allows to decorate the border of the module; the user should declare properly a decoration style and load manually the libraries required, e.g. `decorations.pathmorphing`; some more hints are given in section 5;
- `arrow tip` (initial: `stealth`): this option allows to select the arrow tip; possible choices are described in the pgfmanual and for particular types it is recommended to load the library `arrows`.

3.2.2 Specific options

Here follows the list of specific available options per type of diagram.

For what concern the `circular diagram` and the `flow diagram`:

- `uniform arrow color` (initial: `false`): the option, set to `true` overrides the color list definition;
- `arrow color` (initial: `gray`): this option allows to specify the color valid for all arrows.

Considering just the `flow diagram`, there is a specific option to disable the back arrow going from the final module to the first one:

- `back arrow disabled` (initial: `false`): the option, set to `true` disables the back arrow.

For what concern the `descriptive diagram` and the `priority descriptive diagram`:

- `descriptive items y sep` (initial: `1.75`): this option sets a vertical distance factor among the descriptive items;
- `description title width` (initial: `1.5cm`): this option sets the minimum width of the description-title;
- `description title text width` (initial: `1.25cm`): this option sets the text width of the description-title;
- `description text width` (initial: `5cm`): this option sets the text width of the description;
- `description title font` (initial: `\small`): this option sets the font size of the description-title;
- `description font` (initial: `\small`): this option sets the font size of the description;
- `description width` (initial: `5.5cm`): this option sets the minimum width of the description;

- `priority arrow width` (initial: 1.5cm): this option sets the width of the vertical arrow;
- `priority arrow head extend` (initial: 0.15cm): this option sets the width of the arrow head extend;
- `priority tick size` (initial: 5pt): this option sets the size of the line denoting the relevance position of items in the vertical arrow;
- `priority arrow height advance` (initial: 2cm): this option specifies how much the vertical arrow is vertically extended above the most relevant item.

For what concern the `bubble diagram`, the `constellation diagram` and the `connected constellation diagram`:

- `bubble center node size` (initial: 4cm): the option specifies the minimum size of the bubble center node;
- `bubble center node font` (initial: `\large`): this option sets the font size of the bubble center node;
- `bubble center node color` (initial: `lightgray!60`): this option allows to customize the background color of the bubble center node;
- `distance center/other bubbles` (initial: 0.8cm): this options specifies which is the distance among the bubble center node and the other bubbles; keep this value under controll to avoid that bubbles do not overlap anymore the bubble center node;
- `distance text center bubble` (initial: 0.5cm): this option sets the distance from the text to the border of the bubble center node;
- `bubble fill opacity` (initial: 0.5): this option sets the opacity at which the bubbles are shown;
- `bubble node size` (initial: 2.5cm): the option specifies the minimum size of the bubbles;
- `bubble text opacity` (initial: 0.8): this option sets the opacity at which the bubble text is shown;
- `bubble node font` (initial: `\normalfont`): this option sets the font size of the bubbles;
- `planet size` (initial: 2.5cm): the option specifies the minimum size of the planet;
- `planet color` (initial: `lightgray!60`): this option allows to customize the background color of the planet;
- `planet font` (initial: `\large`): this option sets the font size of the planet;
- `distance planet-connection` (initial: 0.1cm): this option sets the distance from the planet to the arrow directed to the satellites;
- `distance planet-text` (initial: 0.5cm): this option sets the distance from the text to the border of the planet;
- `planet text width` (initial: 1.75cm): this option sets the planet text width;
- `satellite size` (initial: 1.75cm): the option specifies the minimum size of the satellites;
- `satellite font` (initial: `\normalfont`): this option sets the font size of the satellites;

- `satellite fill opacity` (initial: 0.5): this option sets the opacity at which the satellites are shown;
- `satellite text opacity` (initial: 0.8): this option sets the opacity at which the satellite text is shown;
- `satellite text width` (initial: 1.5cm): this option sets the satellite text width;
- `distance satellite-connection` (initial: 0.075cm): this option sets the distance from the satellites to the arrows directed to the planet;
- `connection line width` (initial: 0.1cm): this option allows to customize the width of the connections from the planet to the satellites;
- `distance planet-satellite` (initial: 3.5cm): this option determine the distance among any pair of planet-satellite.

Considering just the the `constellation diagram` and the `connected constellation diagram`:

- `uniform connection color` (initial: false): the option, set to true overrides the color list definition;
- `connection color` (initial: gray): this option allows to specify the color valid for all the connections.

For what concern the `sequence diagram`:

- `sequence item height` (initial: 1cm): the option specifies the minimum height of the items;
- `sequence item width` (initial: 2cm): the option specifies the minimum width of the items;
- `sequence item border color` (initial: gray): sets the border line color;
- `sequence item border size` (initial: 1.65\pgflinewidth): sets the border line width;
- `sequence item font size` (initial: \normalfont): this option sets the font size of the items;
- `sequence item fill opacity` (initial: 1): sets the opacity at which the item is shown;
- `sequence item text opacity` (initial: 1): sets the opacity at which the item text is shown;
- `sequence item text width` (initial: 1.9cm): the option allows to select the item text width;
- `sequence item text color` (initial: black): the option allows to select the item text color;
- `uniform sequence color` (initial: false): the option, set to true overrides the color list definition;
- `sequence item uniform color` (initial: gray!60!black): this option allows to specify the color valid for all the items in the sequence.

4 Gallery of examples

Horizontal flow chart: Example of an horizontal flow chart with custom color list and back arrow disabled:

custom color list - no
back arrow

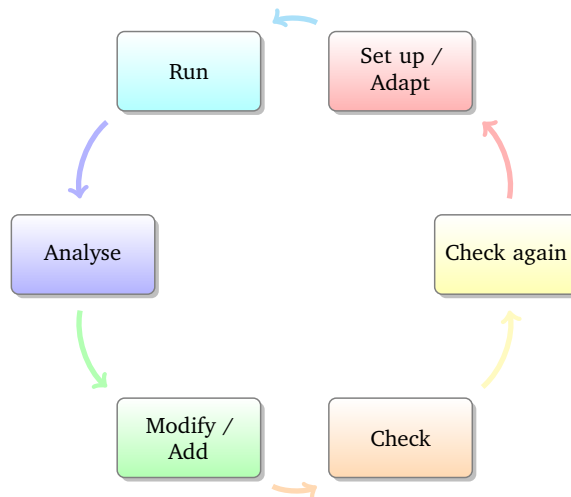
```
\begin{center}
\smartdiagramset{border color=none,
  set color list={blue!50!cyan,green!60!lime,
    orange!50!red,red!80!black},
  back arrow disabled=true}
\smartdiagram[flow diagram:horizontal]{Set up,Run,
  Analyse,Modify~/ Add}
\end{center}
```



Circular diagram with
custom options

Another example:

```
\begin{center}
\smartdiagramset{circular distance=4cm,
  font=\large, text width=2.5cm,
  module minimum width=2.5cm,
  module minimum height=1.5cm,
  arrow tip=to}
\smartdiagram[circular diagram]{Set up~/ Adapt,Run,
  Analyse,Modify~/ Add,Check,Check again}
\end{center}
```



Circular diagram with
custom shape

An example with a diamond shape:

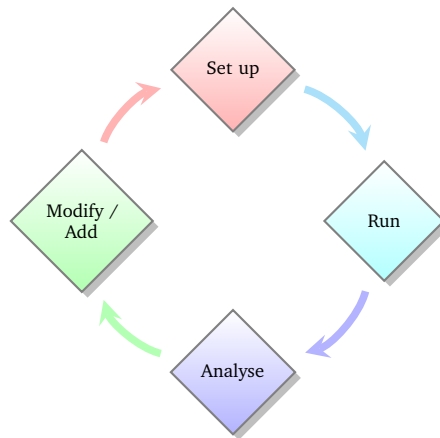
```
\begin{center}
\usetikzlibrary{shapes.geometric} % required in the preamble
```



```

\smartdiagramset{module shape=diamond,font=\scriptsize,
module minimum width=1cm,module minimum height=1cm,
text width=1cm,
circular distance=2cm}
\smartdiagram[circular diagram:clockwise]{Set up,Run,
Analyse,Modify~/ Add}
\end{center}

```



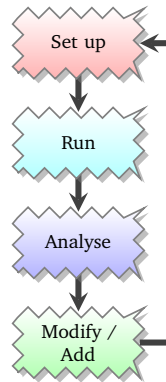
Flow diagram with
decorated border and
uniform arrow color

An example with a decorated shape and uniform arrow color:

```

\usetikzlibrary{decorations.pathmorphing} % required in the preamble
\begin{center}
\tikzset{my decoration/.style={
    decorate,
    decoration=zigzag
}}
\smartdiagramset{module shape=rectangle,
insert decoration={my decoration},
uniform arrow color=true, arrow color=gray!50!black,
}
\smartdiagram[flow diagram]{Set up,Run,Analyse,Modify~/ Add}
\end{center}

```

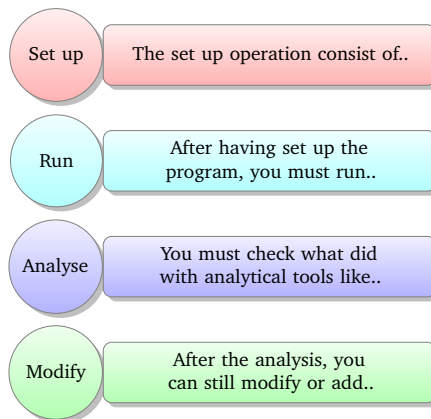


Descriptive diagram An example of descriptive diagram:

```

\begin{center}
\smartdiagram[descriptive diagram]{
{Set up,The set up operation consist of..},
{Run, {After having set up the program, you must run..}},
{Analyse, {You must check what did with analytical tools like..}},
{Modify, {After the analysis, you can still modify or add..}},
}
\end{center}

```

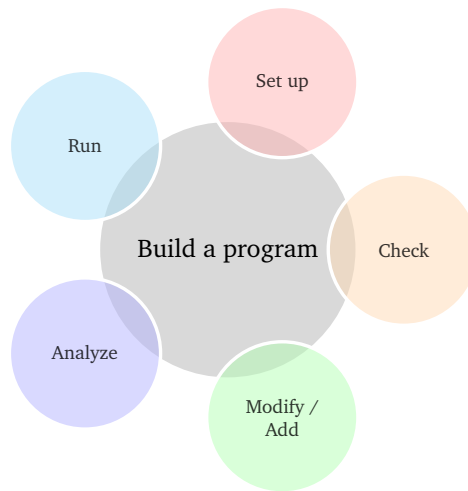


Bubble diagram An example of bubble diagram:

```

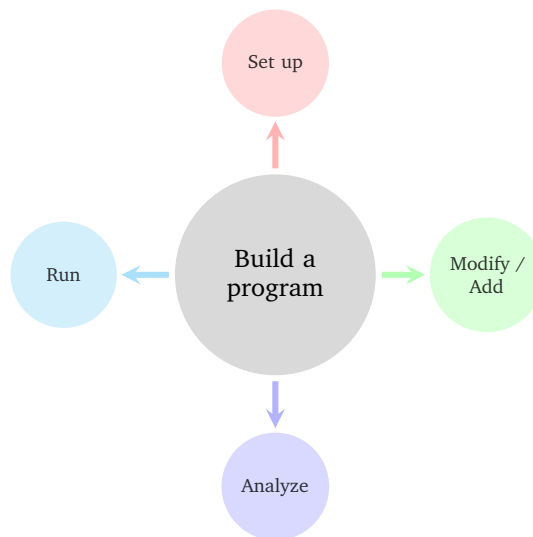
\begin{center}
\smartdiagram[bubble diagram]{Build a program,Set up,Run,
Analyse,Modify~/\ Add,Check}
\end{center}

```



Constellation diagram An example of constellation diagram:

```
\begin{center}
\smartdiagram[constellation diagram]{Build a program,
Set up,Run,Analyze,Modify~/\ Add}
\end{center}
```



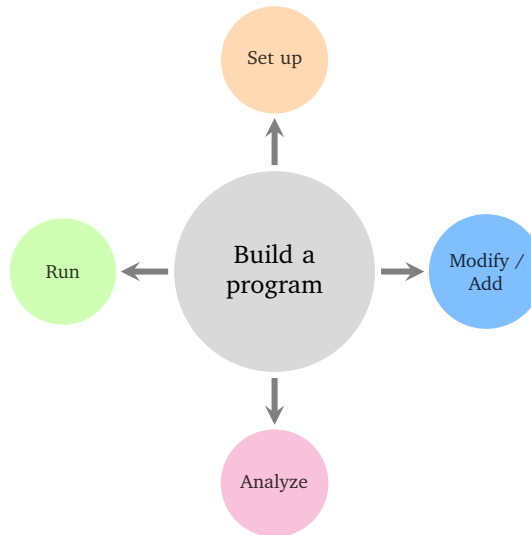
Constellation diagram with custom colors An example of constellation diagram with custom colors:

```
\begin{center}
\smartdiagramset{set color list={orange!60, green!50!lime!60,
magenta!60,blue!50!cyan},
uniform connection color=true}
\end{center}
```

```

\smartdiagram[constellation diagram]{Build a program,
Set up,Run,Analyze,Modify~/\ Add}
\end{center}

```



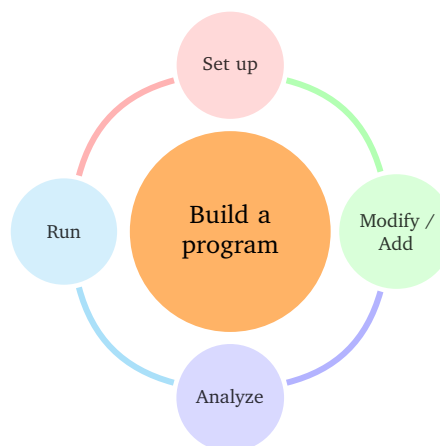
Connected constellation
diagram

An example of connected constellation diagram:

```

\begin{center}
\smartdiagramset{planet color=orange!60, distance planet-satellite=1cm}
\smartdiagram[connected constellation diagram]
{Build a program,Set up,Run,Analyze,Modify~/\ Add,Check}
\end{center}

```

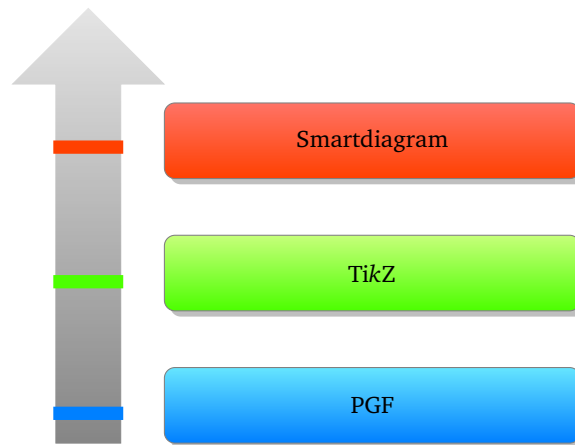


Priority descriptive
diagram

An example of priority descriptive diagram describing that TikZ is built on top of PGF and

Smartdiagram on top of TikZ:

```
\begin{center}
\smartdiagramset{set color list={blue!50!cyan,green!60!lime,
orange!50!red},
priority arrow width=2cm,priority arrow height advance=2.25cm}
\smartdiagram[priority descriptive diagram]{PGF,
Ti\textit{k}Z,Smartdiagram}
\end{center}
```



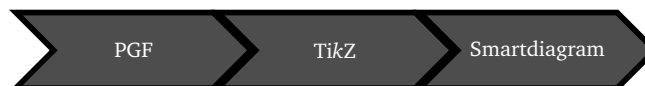
Sequence diagram The same previous example with a sequence diagram:

```
\begin{center}
\smartdiagram[sequence diagram]{PGF,Ti\textit{k}Z,Smartdiagram}
\end{center}
```



and with `uniform sequence color` set to true:

```
\begin{center}
\smartdiagramset{uniform sequence color=true,
sequence item border color=black,sequence item font size=\footnotesize,
sequence item text color=white
}
\smartdiagram[sequence diagram]{PGF,Ti\textit{k}Z,Smartdiagram}
\end{center}
```



5 Recommendations and known issues

5.1 Something about colors

As seen in the section 3, the colors could be customized by means of the key `set color list`. By default there are 10 predefined colors; in order: red!40 (red circle), cyan!40 (cyan circle), blue!40 (blue circle), green!40 (green circle), orange!40 (orange circle), yellow!40 (yellow circle), magenta!40 (magenta circle), brown!40 (brown circle), violet!40 (violet circle) and teal!40 (teal circle). This implies that, by default, it is not possible to have lists longer than 10 items. This, of course, could be avoided by declaring proper lists with, say, 20 colors and therefore develop diagrams with more than 10 items. In any case, it is always possible to reset custom color lists by means of:

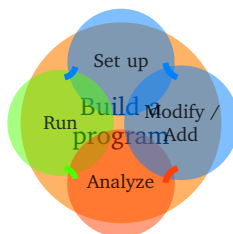
```
\smartdiagramset{use predefined color list}
```

5.2 Circular, bubble and constellation diagrams

For these type of diagrams, the number of items is relevant: too many items lead to overlapping satellites and bubbles besides any attempt to resize things by means of keys that reduce the radius.

Notice also that imposing a too short distance from the planet to satellites is bad and leads to something like:

```
\begin{center}
\smartdiagramset{planet color=orange!60, distance planet-satellite=1cm}
\smartdiagram[connected constellation diagram]
{Build a program,Set up,Run,Analyze,Modify~/\ Add,Check}
\end{center}
```



5.3 Descriptive diagrams

When the user has to build a **descriptive diagram**, simple or animated, the following rules have to be respected:

- each description title and description should be separated by a comma;
- to use a comma inside a description, enclose by { } the description;
- use a comma after the last couple description title-description.

A working example:

```
\smartdiagram[descriptive diagram]{
```

```
{Set up,The set up operation consist of..},
{Run, {After having set up the program, you must run..}},
{Analyze, You must check what did with analytical tools like..},
}
```

A non-working example:

```
\smartdiagram[descriptive diagram]{
{Set up,The set up operation consist of..},
{Run, {After having set up the program, you must run..}},
{Analyze, You must check what did with analytical tools like..}
}
```

The *mandatory* final comma is missing thus, as result, the last couple description title-description will be entirely treated as a description title.

Another suggestion regarding descriptive diagrams is about the description title: it should be short in order to avoid the size of the circle explode. To kept it under controll, the keys `description title width`, `description title text width` and `description title font` are of help.

5.4 Decorations

To decorate the border of modules, it is kindly recommended to first declare the decoration choosen by means of an apposite style and then apply the style. The procedure, in code, should be as follows:

```
\tikzset{my wonderful decoration/.style={decorate,decoration=bent}}
\smartdiagramset{insert decoration=my wonderful decoration,...}
```

where the dots represent the other options.

The insertion of decorations inside a `descriptive diagram` are problematic: only random steps, bent and coil do not raise errors. Other decorations, like snake, raise as error:

```
! Dimension too large.
```

but, after all, the decoration is deployed anyway.

In case the user wants to decorate a border with a decoration that involves random numbers, such as random steps or other custom-built decorations, it is preferable to set a seed for the animated diagram, to avoid that at each step the border of the same module changes. An example:

```
\begin{frame}
\begin{center}
\pgfmathsetseed{12354}
\tikzset{my decoration/.style={decorate,decoration=random steps}}
\smartdiagramset{insert decoration=my decoration}
\smartdiagramanimated[descriptive diagram]{
```

```

{Set up,The set up operation consist of..},
{Run, {After having set up the program, you must run..}},
{Analyze, You must check what did with analytical tools like..},
{Modify, {After the analysis, you can still modify or add..}},
}
\end{center}
\end{frame}

```

5.5 Priority descriptive diagrams

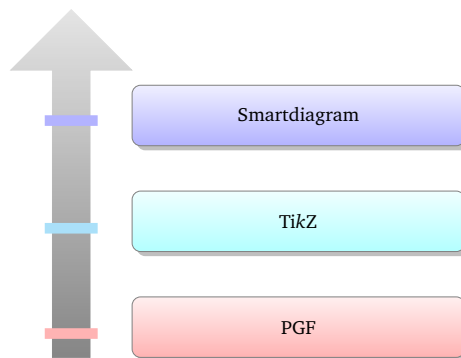
The vertical arrow is drawn in background with a fading effect: it may occur that under some pdf editor this effect is not shown (this happened to me with evince, but it perfectly worked with okular).

For what concern these diagrams there is a bug in displaying the tick line when the `priority arrow head extend` is set with a bigger size than the default; a minimal-non-working example:

```

\begin{center}
\smartdiagramset{priority arrow width=2cm,
priority arrow height advance=2.25cm,
priority arrow head extend=0.3cm}
\smartdiagram[priority descriptive diagram]{PGF,Ti\textit{k}Z,Smartdiagram}
\end{center}

```



6 Acknowledgements

I would like to acknowledge first of all [Alain Matthes](#) and [Mohsen](#) because the `bubble diagram` and the `constellation diagram` are based on [Alain's answer](#) while the `circular diagram` is based on [Mohsen's answer](#).

I would also like to thank [Enrico Gregorio](#) and [Ahmed Musa](#) for the courtesy of explaining me why my poor attempt in creating the `set color list` failed and for providing me valid solutions.

Last, but not least, I would like to thank prof. Ludger Humbert for suggesting and providing the code for the `circular diagram:clockwise` and André Hilbig for suggesting the key `back arrow disabled`.

7 Implementation

7.1 Initialization and Package Options

This subsection highlights which are the package loaded and the `tikzlibraries` needed.

```
1 \RequirePackage{tikz}
2
3 \RequirePackage{etoolbox}
4 \RequirePackage{xparse}
5 \RequirePackage{xstring}
6
7 \usetikzlibrary{backgrounds,
8   calc,
9   fadings,
10  shadows,
11  shapes.arrows,
12  shapes.symbols
13 }
14 \pgfdeclarelayer{smart diagram arrow back}
15 \pgfsetlayers{background,smart diagram arrow back,main}
```

7.2 Keys and color declaration

The predefined colors:

```
16 \@namedef{color@1}{red!40}
17 \@namedef{color@2}{cyan!40}
18 \@namedef{color@3}{blue!40}
19 \@namedef{color@4}{green!40}
20 \@namedef{color@5}{orange!40}
21 \@namedef{color@6}{yellow!40}
22 \@namedef{color@7}{magenta!40}
23 \@namedef{color@8}{brown!40}
24 \@namedef{color@9}{violet!40}
25 \@namedef{color@10}{teal!40}
```

Basic shape definition and function to compute the height of the **priority descriptive diagram**:

```
26 \tikzset{rnd rectangle/.style={rectangle,rounded corners}
27 }
28
29 \def\CalcHeight(#1,#2)#3{%
30 \pgfpointdiff{\pgfpointanchor{#1}{south west}}{\pgfpointanchor{#2}{north west}}
31 \pgfmathsetmacro{\myheight}{veclen(\pgf@x,\pgf@y)}
32 \global\expandafter\edef\csname #3\endcsname{\myheight}
33 }
```

The key definition and the functions to set them:

```
34 \pgfkeys{/smart diagram/.cd, module minimum width/.initial=2cm,
35   module minimum height/.initial={1cm},
36   module y sep/.initial={1.65},
```

```

37 module x sep/.initial={2.75},
38 descriptive items y sep/.initial={1.75},
39 text width/.initial={1.5cm},
40 description title width/.initial={1.5cm},
41 description text width/.initial={5cm},
42 description title text width/.initial={1.25cm},
43 description title font/.initial={\small},
44 description font/.initial={\small},
45 description width/.initial={5.5cm},
46 font/.initial={\small},
47 border color/.initial={gray},
48 circular distance/.initial={2.75cm},
49 arrow line width/.initial={0.1cm},
50 module shape/.initial={rnd rectangle},
51 insert decoration/.initial={},
52 arrow tip/.initial={stealth},
53 arrow color/.initial={gray},
54 bubble center node size/.initial={4cm},
55 bubble center node font/.initial={\large},
56 bubble center node color/.initial={lightgray!60},
57 distance center/other bubbles/.initial=0.8cm,
58 distance text center bubble/.initial={0.5cm},
59 bubble fill opacity/.initial={0.5},
60 bubble node size/.initial={2.5cm},
61 bubble text opacity/.initial={0.8},
62 bubble node font/.initial={\normalfont},
63 planet size/.initial={2.5cm},
64 planet color/.initial={lightgray!60},
65 planet font/.initial={\large},
66 distance planet-connection/.initial={0.1cm},
67 distance planet-text/.initial={0.5cm},
68 planet text width/.initial={1.75cm},
69 satellite size/.initial={1.75cm},
70 satellite font/.initial={\normalfont},
71 satellite fill opacity/.initial={0.5},
72 satellite text opacity/.initial={0.8},
73 satellite text width/.initial={1.5cm},
74 distance satellite-connection/.initial={0.075cm},
75 connection line width/.initial={0.1cm},
76 connection color/.initial={gray},
77 distance planet-satellite/.initial={3.5cm},
78 priority arrow width/.initial={1.5cm},
79 priority arrow head extend/.initial={0.15cm},
80 priority tick size/.initial={5pt},
81 priority arrow height advance/.initial={2cm},
82 sequence item height/.initial={1cm},
83 sequence item width/.initial={2cm},
84 sequence item border color/.initial={gray},
85 sequence item border size/.initial={1.75\pgflinewidth},
86 sequence item font size/.initial={\normalfont},

```

```

87 sequence item fill opacity/.initial={1},
88 sequence item text opacity/.initial={1},
89 sequence item text width/.initial={1.9cm},
90 sequence item text color/.initial={black},
91 sequence item uniform color/.initial={gray!60!black},
92 }%
93
94 \pgfkeys{/smart diagram/.cd, module minimum width/.get=\modulewidth,
95 module minimum height/.get=\moduleheight,
96 module y sep/.get=\moduleysep,
97 module x sep/.get=\modulexsep,
98 descriptive items y sep/.get=\descriptiveitemsysep,
99 text width/.get=\moduletextwidth,
100 description title width/.get=\descriptiontitlewidth,
101 description text width/.get=\descriptiontextwidth,
102 description title text width/.get=\descriptiontitletextwidth,
103 description title font/.get=\descriptiontitlefontsize,
104 description font/.get=\descriptionfontsize,
105 description width/.get=\descriptionwidth,
106 font/.get=\modulefontsize,
107 border color/.get=\bordercolor,
108 circular distance/.get=\circulardistance,
109 arrow line width/.get=\arrowlinewidth,
110 module shape/.get=\moduleshape,
111 insert decoration/.get=\borderdecoration,
112 arrow tip/.get=\arrowtip,
113 arrow color/.get=\arrowcolor,
114 bubble center node size/.get=\bubblecenternodesize,
115 bubble center node font/.get=\bubblecenternodefont,
116 bubble center node color/.get=\bubblecenternodecolor,
117 distance center/other bubbles/.get=\distancecenterotherbubbles,
118 distance text center bubble/.get=\distancetextcenterbubble,
119 bubble fill opacity/.get=\bubblefillopacity,
120 bubble node size/.get=\bubblenodesize,
121 bubble text opacity/.get=\bubbletextopacity,
122 bubble node font/.get=\bubblenodefont,
123 planet size/.get=\planetminimumsize,
124 planet color/.get=\planetcolor,
125 planet font/.get=\planetfont,
126 distance planet-connection/.get=\planetoutersep,
127 distance planet-text/.get=\planetinnersep,
128 planet text width/.get=\planettextwidth,
129 satellite size/.get=\satelliteminimumsize,
130 satellite font/.get=\satellitefont,
131 satellite fill opacity/.get=\satellitefillopacity,
132 satellite text opacity/.get=\satellitetextopacity,
133 satellite text width/.get=\satellitetextwidth,
134 distance satellite-connection/.get=\satelliteoutersep,
135 connection line width/.get=\connectionlinewidth,
136 connection color/.get=\connectioncolor,

```

```

137 distance planet-satellite/.get=\distanceplanetsatellite,
138 priority arrow width/.get=\priorityarrowwidth,
139 priority arrow head extend/.get=\priorityarrowheadextend,
140 priority tick size/.get=\prioritytick,
141 priority arrow height advance/.get=\priorityarrowheightadvance,
142 sequence item height/.get=\seqitemheight,
143 sequence item width/.get=\seqitemwidth,
144 sequence item border color/.get=\seqitembordercolor,
145 sequence item border size/.get=\seqlinewidth,
146 sequence item font size/.get=\seqitemfont,
147 sequence item fill opacity/.get=\seqitemfillopacity,
148 sequence item text opacity/.get=\seqitemtextopacity,
149 sequence item text width/.get=\seqitemtextwidth,
150 sequence item text color/.get=\seqitemtextcolor,
151 sequence item uniform color/.get=\seqitemuniformcol,
152 }%
153

```

The specific key to set the list of colors:

```

154
155 \pgfkeys{/smart diagram/.cd, set color list/.code={
156     \foreach \listitem [count=\i] in {#1}{
157         \global\@namedef{color@i\expandafter}\expandafter{\listitem}
158     }
159 }
160 }
161
162 \pgfkeys{/smart diagram/.cd, use predefined color list/.code={
163     \@namedef{color@1}{red!30}
164     \@namedef{color@2}{cyan!30}
165     \@namedef{color@3}{blue!30}
166     \@namedef{color@4}{green!30}
167     \@namedef{color@5}{orange!30}
168     \@namedef{color@6}{yellow!30}
169     \@namedef{color@7}{magenta!30}
170     \@namedef{color@8}{brown!30}
171     \@namedef{color@9}{violet!30}
172     \@namedef{color@10}{teal!30}
173 }
174 }
175

```

The specific key to disable the back arrow in the flow diagram:

```

176
177 \newif\ifbackarrowdisabled
178 \pgfkeys{/smart diagram/.cd,
179 back arrow disabled/.is if=backarrowdisabled,
180 back arrow disabled=false,
181 }
182

```

The specific command to use within the document to use the keys:

```

183
184 \NewDocumentCommand{\smartdiagramset}{m}{%
185   \pgfkeys{/smart diagram/.cd,#1}%
186   \pgfkeys{/smart diagram/.cd, module minimum width/.get=\modulewidth,
187     module minimum height/.get=\moduleheight,
188     module y sep/.get=\moduleysep,
189     module x sep/.get=\modulexsep,
190     descriptive items y sep/.get=\descriptiveitemsysep,
191     text width/.get=\moduletextwidth,
192     description title width/.get=\descriptiontitlewidth,
193     description text width/.get=\descriptiontextwidth,
194     description title text width/.get=\descriptiontitletextwidth,
195     description title font/.get=\descriptiontitlefontsize,
196     description font/.get=\descriptionfontsize,
197     description width/.get=\descriptionwidth,
198     font/.get=\modulefontsize,
199     border color/.get=\bordercolor,
200     circular distance/.get=\circulardistance,
201     arrow line width/.get=\arrowlinewidth,
202     module shape/.get=\moduleshape,
203     insert decoration/.get=\borderdecoration,
204     arrow tip/.get=\arrowtip,
205     arrow color/.get=\arrowcolor,
206     bubble center node size/.get=\bubblecenternodesize,
207     bubble center node font/.get=\bubblecenternodefont,
208     bubble center node color/.get=\bubblecenternodecolor,
209     distance center/other bubbles/.get=\distancecenterotherbubbles,
210     distance text center bubble/.get=\distancetextcenterbubble,
211     bubble fill opacity/.get=\bubblefillopacity,
212     bubble node size/.get=\bubblenodesize,
213     bubble text opacity/.get=\bubbletextopacity,
214     bubble node font/.get=\bubblenodefont,
215     planet size/.get=\planetminimumsize,
216     planet color/.get=\planetcolor,
217     planet font/.get=\planetfont,
218     distance planet-connection/.get=\planetoutersep,
219     distance planet-text/.get=\planetinnersep,
220     planet text width/.get=\planettextwidth,
221     satellite size/.get=\satelliteminimumsize,
222     satellite font/.get=\satellitefont,
223     satellite fill opacity/.get=\satellitefillopacity,
224     satellite text opacity/.get=\satellitertextopacity,
225     satellite text width/.get=\satellitertextwidth,
226     distance satellite-connection/.get=\satelliteoutersep,
227     connection line width/.get=\connectionlinewidth,
228     connection color/.get=\connectioncolor,
229     distance planet-satellite/.get=\distanceplanetsatellite,
230     priority arrow width/.get=\priorityarrowwidth,

```

```

231 priority arrow head extend/.get=\priorityarrowheadextend,
232 priority tick size/.get=\prioritytick,
233 priority arrow height advance/.get=\priorityarrowheightadvance,
234 sequence item height/.get=\seqitemheight,
235 sequence item width/.get=\seqitemwidth,
236 sequence item border color/.get=\seqitembordercolor,
237 sequence item border size/.get=\seqlinewidth,
238 sequence item font size/.get=\seqitemfont,
239 sequence item fill opacity/.get=\seqitemfillopacity,
240 sequence item text opacity/.get=\seqitemtextopacity,
241 sequence item text width/.get=\seqitemtextwidth,
242 sequence item text color/.get=\seqitemtextcolor,
243 sequence item uniform color/.get=\seqitemuniformcol,
244 }%
245 }%

```

The fading style applied to the **priority descriptive diagram** and styles diagram definition:

```

246 \tikzfading[name=priorityarrowfading,
247   bottom color=transparent!5,
248   top color=transparent!80
249 ]
250 \tikzset{priority arrow fill/.style={
251   fill=gray,
252   path fading=priorityarrowfading
253   }
254 }
255
256 \tikzset{module/.style={
257   \pgfkeysvalueof{/smart diagram/module shape},
258   thick,
259   draw=\bordercolor,
260   top color=white,
261   bottom color=\col,
262   text width=\moduletextwidth,
263   minimum width=\modulewidth,
264   minimum height=\moduleheight,
265   font=\modulefontsize,
266   \borderdecoration
267 },
268 diagram arrow type/.style={
269   >=\arrowtip,line width=\arrowlinewidth,\col
270   },
271 }
272
273 % let the arrow color be uniform
274 \pgfkeys{/smart diagram/.cd,%
275   uniform arrow color/.is choice,%
276   uniform arrow color/true/.code={%
277     \tikzset{diagram arrow type/.append style={

```

```

278         \arrowcolor
279     },
280 }
281 },%
282     uniform arrow color/false/.style={diagram arrow type},%
283     uniform arrow color/.default=false,
284 }%
285
286
287 \tikzset{description title/.style={
288     circle,
289     draw=\bordercolor,
290     minimum width=\descriptiontitlewidth,
291     anchor=east,
292     bottom color=\col,
293     top color=white!80!\col,
294     font=\descriptiontitlefontsize,
295     text width=\descriptiontitletextwidth,
296     \borderdecoration,
297 },
298     description/.style={
299         \pgfkeysvalueof{/smart diagram/module shape},
300         text width=\descriptiontextwidth,
301         draw=\bordercolor,
302         anchor=west,
303         minimum height=\moduleheight,
304         minimum width=\descriptionwidth,
305         bottom color=\col,
306         top color=white!80!\col,
307         font=\descriptionfontsize,
308         \borderdecoration,
309     }
310 }
311 \tikzset{priority arrow/.style={
312     draw=\bordercolor,
313     single arrow,
314     minimum height=\distancemodules,
315     minimum width=\priorityarrowwidth,
316     priority arrow fill,
317     rotate=90,
318     single arrow head extend=\priorityarrowheadextend,
319     anchor=west,
320 }
321 }
322 \tikzset{bubble center node/.style={
323     minimum size=\bubblecenternodesize,
324     circle,
325     fill=\bubblecenternodecolor,
326     font=\bubblecenternodefont,
327     outer sep=\distancecenterotherbubbles,

```

```

328     inner sep=\distancetextcenterbubble,
329 },
330 bubble node/.style={
331     minimum size=\bubblenodesize,
332     circle,
333     ultra thick,
334     font=\bubblenodefont,
335     draw=white,
336     fill opacity=\bubblefillopacity,
337     fill=\col,
338     text opacity=\bubbletextopacity,
339 }
340 }
341 \tikzset{planet/.style={
342     minimum size=\planetminimumsize,
343     circle,
344     fill=\planetcolor,
345     font=\planetfont,
346     outer sep=\planetoutersep,
347     inner sep=\planetinnersep,
348     text width=\planettextwidth,
349 },
350 satellite/.style={
351     minimum size=\satelliteminimumsize,
352     circle,
353     font=\satellitefont,
354     fill opacity=\satellitefillopacity,
355     fill=\col,
356     text opacity=\satellitetextopacity,
357     text width=\satellitetextwidth,
358     outer sep=\satelliteoutersep,
359 },
360 connection planet satellite/.style={
361     line width=\connectionlinewidth,
362     >=\arrowtip,
363     \col,
364 }
365 }
366
367 \tikzset{sequence item/.style={
368     minimum height=\seqitemheight,
369     minimum width=\seqitemwidth,
370     signal,
371     signal from=west,
372     signal to=east,
373     draw=\seqitembordercolor,
374     line width=\seqlinewidth,
375     font=\seqitemfont,
376     fill opacity=\seqitemfillopacity,
377     fill=\col,

```



```

378     text opacity=\seqitemtextopacity,
379     text width=\seqitemtextwidth,
380     text=\seqitemtextcolor,
381 }
382 }
383
384 % let the sequence color be uniform
385 \pgfkeys{/smart diagram/.cd,%
386     uniform sequence color/.is choice,%
387     uniform sequence color/true/.code={%
388         \tikzset{sequence item/.append style={
389             fill=\seqitemuniformcol,
390         },
391     }
392 },%
393     uniform sequence color/false/.style={sequence item},%
394     uniform sequence color/.default=false,
395 }%
396
397 % let the connection planet satellite color be uniform
398 \pgfkeys{/smart diagram/.cd,%
399     uniform connection color/.is choice,%
400     uniform connection color/true/.code={%
401         \tikzset{connection planet satellite/.append style={
402             \connectioncolor
403         },
404     }
405 },%
406     uniform connection color/false/.style={connection planet satellite},%
407     uniform connection color/.default=false,
408 }%

```

7.3 Commands

Definition of the two commands. The diagrams:

```

409 \NewDocumentCommand{\smartdiagram}{r[] m}{%
410     \StrCut{#1}{:}\diagramtype\option
411     \IfNoValueTF{#1}{% true-no value 1
412         \PackageError{smartdiagram}%
413             {Type of the diagram not inserted. Please insert it}%
414             {Example: \protect\smartdiagram[flow diagram]}}
415     {%false-no value 1
416     \IfStrEq{\diagramtype}{}%
417         \PackageError{smartdiagram}{Type of the diagram not inserted. Please insert it}
418         {Example: \protect\smartdiagram[flow diagram]}
419     }{}
420     \IfStrEq{\diagramtype}{circular diagram}{% true-circular diagram
421     \begin{tikzpicture}[every node/.style={align=center}]
422

```

```

423 \foreach \smitem [count=\xi] in {#2} {\global\let\maxsmitem\xi}
424
425 \foreach \smitem [count=\xi] in {#2}{%
426 \IfStrEq{\option}{clockwise}{% true-clockwise-circular diagram
427 \pgfmathtruncatemacro{\angle}{180+360/\maxsmitem*\xi}
428 }{% false-clockwise-circular diagram
429 \pgfmathtruncatemacro{\angle}{360/\maxsmitem*\xi}
430 }
431 \edef\col{\@nameuse{color@\xi}}
432 \IfStrEq{\option}{clockwise}{% true-clockwise-circular diagram
433 \node[module,drop shadow] (module\xi)
434 at (-\angle:\circulardistance) {\smitem };
435 }{% false-clockwise-circular diagram
436 \node[module,drop shadow] (module\xi)
437 at (\angle:\circulardistance) {\smitem };
438 }
439 }%
440
441 \foreach \smitem [count=\xi] in {#2}{%
442 \pgfmathtruncatemacro{\xj}{mod(\xi, \maxsmitem) + 1)}
443 \edef\col{\@nameuse{color@\xj}}
444 \IfStrEq{\option}{clockwise}{% true-clockwise-circular diagram
445 \draw[<-,diagram arrow type,shorten <=0.3cm,shorten >=0.3cm]
446 (module\xj) to[bend right] (module\xi);
447 }{% false-clockwise-circular diagram
448 \draw[<-,diagram arrow type,shorten <=0.3cm,shorten >=0.3cm]
449 (module\xj) to[bend left] (module\xi);
450 }
451 }%
452 \end{tikzpicture}
453 }}% end-circular diagram
454 \IfStrEq{\diagramtype}{flow diagram}{% true-flow diagram
455 \begin{tikzpicture}[every node/.style={align=center}]
456
457 \foreach \smitem [count=\xi] in {#2} {\global\let\maxsmitem\xi}
458
459 \foreach \smitem [count=\xi] in {#2}{%
460 \edef\col{\@nameuse{color@\xi}}
461 \IfStrEq{\option}{horizontal}{% true-horizontal-flow diagram
462 \path let \n1 = {int(0-\xi)}, \n2={0+\xi*\modulexsep} in
463 node[module,drop shadow] (module\xi) at +(\n2,0) {\smitem};
464 }{% false-horizontal-flow diagram
465 \path let \n1 = {int(0-\xi)}, \n2={0-\xi*\moduleysep} in
466 node[module,drop shadow] (module\xi) at +(0,\n2) {\smitem};
467 }
468 }%
469
470 \foreach \smitem [count=\xi] in {#2}{%
471 \pgfmathtruncatemacro{\xj}{mod(\xi, \maxsmitem) + 1)}
472 \edef\col{\@nameuse{color@\xj}}

```

```

473 \ifnum\xi<\maxsmitem
474 \begin{pgfonlayer}{smart diagram arrow back}
475 \draw[<-,diagram arrow type] (module\xj) -- (module\xi);
476 \end{pgfonlayer}
477 \fi
478 % last arrow - not display it in background - check if disabled
479 \ifbackarrowdisabled
480 \relax
481 \else
482 \ifnum\xi=\maxsmitem
483 \IfStrEq{\option}{horizontal}{% true-horizontal-flow diagram
484 \tikzset{square arrow/.style={
485 to path={-- ++(0,0.5) |- (\tikztotarget)}
486 }
487 }
488 \draw[<-,diagram arrow type, square arrow]
489 (module\xj.north) to (module\xi.north);
490 }{% false-horizontal-flow diagram
491 \tikzset{square arrow/.style={
492 to path={-- ++(0.5,0) |- (\tikztotarget)}
493 }
494 }
495 \draw[<-,diagram arrow type,square arrow]
496 (module\xj.east) to (module\xi);
497 }
498 \fi
499 \fi
500 }%
501 \end{tikzpicture}
502 }{}% end-flow diagram
503 \IfStrEq{diagramtype}{descriptive diagram}{% true-descr. diagram
504 \begin{tikzpicture}[every node/.style={align=center}]
505 \foreach \smitem [count=\xi] in {#2}{%
506 \edef\col{\@nameuse{color@\xi}}
507 \foreach \subitem [count=\xii] in \smitem{%
508 \ifnumequal{\xii}{1}{% true
509 \node[description title,drop shadow]
510 (module-title\xi) at (0,0-\xi*\descriptiveitemsysep) {\subitem};
511 }{}
512 \ifnumequal{\xii}{2}{% true
513 \node[description,drop shadow](module\xi)
514 at (0,0-\xi*\descriptiveitemsysep) {\subitem};
515 }{}
516 }%
517 }%
518 \end{tikzpicture}
519 }{}% end-descr. diagram
520 \IfStrEq{diagramtype}{bubble diagram}{% true-bubble diagram
521 \begin{tikzpicture}[every node/.style={align=center}]
522 \foreach \smitem [count=\xi] in {#2}{\global\let\maxsmitem\xi}

```

```

523 \pgfmathtruncatemacro\actualnumitem{\maxsmitem-1}
524 \foreach \smitem [count=\xi] in {#2}{%
525 \ifnumequal{\xi}{1}{ %true
526 \node[bubble center node](center bubble){\smitem};
527 }{%false
528 \pgfmathtruncatemacro{xj}{\xi-1}
529 \pgfmathtruncatemacro{angle}{360/\actualnumitem*xj}
530 \edef\col{\@nameuse{color@xj}}
531 \node[bubble node] (module\xi)
532 at (center bubble.\angle) {\smitem };
533 }%
534 }%
535 \end{tikzpicture}
536 }{%end-bubble diagram
537 \IfStrEq{diagramtype}{constellation diagram}{% true-const diagram
538 \begin{tikzpicture}[every node/.style={align=center}]
539 \foreach \smitem [count=\xi] in {#2}{\global\let\maxsmitem\xi}
540 \pgfmathtruncatemacro\actualnumitem{\maxsmitem-1}
541 \foreach \smitem [count=\xi] in {#2}{%
542 \ifnumequal{\xi}{1}{ %true
543 \node[planet](planet){\smitem};
544 }{%false
545 \pgfmathtruncatemacro{xj}{\xi-1}
546 \pgfmathtruncatemacro{angle}{360/\actualnumitem*xj}
547 \edef\col{\@nameuse{color@xj}}
548 \node[satellite] (satellite\xi)
549 at (\angle:\distanceplanetsatellite) {\smitem };
550 \draw[->,connection planet satellite] (planet) -- (satellite\xi);
551 }%
552 }%
553 \end{tikzpicture}
554 }{%end-const diagram
555 \IfStrEq{diagramtype}{connected constellation diagram}{% true-conn const diagram
556 \begin{tikzpicture}[every node/.style={align=center}]
557 \foreach \smitem [count=\xi] in {#2}{\global\let\maxsmitem\xi}
558 \pgfmathtruncatemacro\actualnumitem{\maxsmitem-1}
559 \foreach \smitem [count=\xi] in {#2}{%
560 \ifnumequal{\xi}{1}{ %true
561 \node[planet](planet){\smitem};
562 }{%false
563 \pgfmathtruncatemacro{xj}{\xi-1}
564 \pgfmathtruncatemacro{angle}{360/\actualnumitem*xj}
565 \edef\col{\@nameuse{color@xj}}
566 \node[satellite] (satellite\xj)
567 at (\angle:\distanceplanetsatellite) {\smitem };
568 }%
569 }%
570 \foreach \smitem [count=\xi] in {#2}{%
571 \ifnumgreater{\xi}{1}{ %true
572 \pgfmathtruncatemacro{xj}{\xi-1}

```

```

573     \edef\col{\@nameuse{color@\xj}}
574     \pgfmathtruncatemacro{\xk}{mod(\xj,\actualnumitem) +1}
575     \path[connection planet satellite]
576         (satellite\xj) edge[bend right] (satellite\xk);
577 }{}
578 }%
579 \end{tikzpicture}
580 }{}%end-connected constellation diagram
581 \IfStrEq{\diagramtype}{priority descriptive diagram}{% true-priority descriptive diagram
582 \pgfmathparse{subtract(\priorityarrowwidth,\priorityarrowheadextend)}
583 \pgfmathsetmacro\priorityticksizetwo{\pgfmathresult/2}
584 \pgfmathsetmacro\arrowtickxshift{(\priorityarrowwidth-\priorityticksizetwo)/2}
585 \begin{tikzpicture}[every node/.style={align=center}]
586 \foreach \smitem [count=\xi] in {#2}{\global\let\maxsmitem\xi}
587 \foreach \smitem [count=\xi] in {#2}{%
588 \edef\col{\@nameuse{color@\xi}}
589 \node[description,drop shadow](module\xi)
590 at (0,0+\xi*\descriptivitemsysep) {\smitem};
591 \draw[line width=\prioritytick,\col]
592 ([xshift=-\arrowtickxshift pt]module\xi.base west)--
593 ($([xshift=-\arrowtickxshift pt]module\xi.base west)-(\priorityticksizetwo pt,0)$);
594 }%
595 \coordinate (A) at (module1);
596 \coordinate (B) at (module\maxsmitem);
597 \CalcHeight(A,B){heightmodules}
598 \pgfmathadd{\heightmodules}{\priorityarrowheightadvance}
599 \pgfmathsetmacro{\distancemodules}{\pgfmathresult}
600 \pgfmathsetmacro\arrowxshift{\priorityarrowwidth/2}
601 \begin{pgfonlayer}{background}
602 \node[priority arrow] at ([xshift=-\arrowxshift pt]module1.south west){};
603 \end{pgfonlayer}
604 \end{tikzpicture}
605 }{}% end-priority descriptive diagram
606 \IfStrEq{\diagramtype}{sequence diagram}{% true-sequence diagram
607 \begin{tikzpicture}[every node/.style={align=center}]
608 \foreach \x[count=\xi, count=\prevx from 0] in {#2}{%
609 \edef\col{\@nameuse{color@\xi}}
610 \ifnum\xi=1
611 \node[sequence item] (x-\xi) {\x};
612 \else
613 \node[sequence item,anchor=west] (x-\xi) at (x-\prevx.east) {\x};
614 \fi
615 }
616 \end{tikzpicture}
617 }{}% end-sequence diagram
618 }% end-no value 1
619 }% end-command

```

Definition of the style for making visible elements and command definition for animations:

```

620 \tikzset{

```

```

621   sminvisible/.style={opacity=0,text opacity=0},
622   smvisible on/.style={smalt=#1}{sminvisible}},
623   smalt/.code args={<#1>#2#3}{%
624     \alt<#1>{\pgfkeysalso{#2}}{\pgfkeysalso{#3}}
625   },
626 }
627
628
629 \NewDocumentCommand{\smartdiagramanimated}{r[] m}{%
630   \StrCut{#1}{:}\diagramtype\option
631   \IfNoValueTF{#1}{% true-no value 1
632     \PackageError{smartdiagram}{Type of the diagram not inserted. Please insert it}
633     {Example: \protect\smartdiagram[flow diagram]}}
634   {%false-no value 1
635   \IfStrEq{\diagramtype}{%
636     \PackageError{smartdiagram}{Type of the diagram not inserted. Please insert it}
637     {Example: \protect\smartdiagram[flow diagram]}}
638   {}
639   \IfStrEq{\diagramtype}{circular diagram}{% true-circular diagram
640     \begin{tikzpicture}[every node/.style={align=center}]
641     \foreach \smitem [count=\xi] in {#2} {\global\let\maxsmitem\xi}
642     \foreach \smitem [count=\xi] in {#2}{%
643       \IfStrEq{\option}{clockwise}{% true-clockwise-circular diagram
644         \pgfmathtruncatemacro{\angle}{180+360/\maxsmitem*\xi}
645       }{% false-clockwise-circular diagram
646         \pgfmathtruncatemacro{\angle}{360/\maxsmitem*\xi}
647       }
648       \edef\col{\@nameuse{color@\xi}}
649       \IfStrEq{\option}{clockwise}{% true-clockwise-circular diagram
650         \node[module,
651           drop shadow={smvisible on=<\xi->},
652           smvisible on=<\xi->] (module\xi)
653           at (-\angle:\circulardistance) {\smitem};
654       }{% false-clockwise-circular diagram
655         \node[module,
656           drop shadow={smvisible on=<\xi->},
657           smvisible on=<\xi->] (module\xi)
658           at (\angle:\circulardistance) {\smitem};
659       }
660     }%
661     \foreach \smitem [count=\xi] in {#2}
662     {%
663       \pgfmathtruncatemacro{\xj}{mod(\xi, \maxsmitem) + 1)}
664       \pgfmathtruncatemacro{\adv}{\xi + 1)}
665       \edef\col{\@nameuse{color@\xi}}
666       \IfStrEq{\option}{clockwise}{% true-clockwise-circular diagram
667         \draw[<-,diagram arrow type,shorten <=0.3cm,shorten >=0.3cm,
668           smvisible on=<\adv->] (module\xj) to[bend right] (module\xi);
669       }{% false-clockwise-circular diagram
670         \draw[<-,diagram arrow type,shorten <=0.3cm,shorten >=0.3cm,

```

```

671 smvisible on=<\adv->] (module\xj) to[bend left] (module\xi);
672 }
673 }%
674 \end{tikzpicture}
675 }{}% end-circular diagram
676 \IfStrEq{\diagramtype}{flow diagram}{% true-flow diagram
677 \begin{tikzpicture}[every node/.style={align=center}]
678
679 \foreach \smitem [count=\xi] in {\#2} {\global\let\maxsmitem\xi}
680
681 \foreach \smitem [count=\xi] in {\#2}{%
682 \edef\col{\@nameuse{color@\xi}}
683 \IfStrEq{\option}{horizontal}{% true-horizontal-flow diagram
684 \path let \n1 = {int(0-\xi)}, \n2={0+\xi*\modulexsep}
685 in node[module,drop shadow={smvisible on=<\xi->},
686 smvisible on=<\xi->] (module\xi) at +(\n2,0) {\smitem};
687 }{% false-horizontal-flow diagram
688 \path let \n1 = {int(0-\xi)}, \n2={0-\xi*\moduleysep}
689 in node[module,drop shadow={smvisible on=<\xi->},
690 smvisible on=<\xi->] (module\xi) at +(0,\n2) {\smitem};
691 }
692 }%
693
694 \foreach \smitem [count=\xi] in {\#2}{%
695 \pgfmathtruncatemacro{\xj}{mod(\xi, \maxsmitem) + 1}}
696 \edef\col{\@nameuse{color@\xj}}
697 \ifnum\xi<\maxsmitem
698 \begin{pgfonlayer}{smart diagram arrow back}
699 \draw[<-,diagram arrow type,smvisible on=<\xi->]
700 (module\xj) -- (module\xi);
701 \end{pgfonlayer}
702 \fi
703 % last arrow - not display it in background - check if disabled
704 \ifbackarrowdisabled
705 \relax
706 \else
707 \ifnum\xi=\maxsmitem
708 \IfStrEq{\option}{horizontal}{% true-horizontal-flow diagram
709 \tikzset{square arrow/.style={
710 to path={-- ++(0,0.5) -| (\tikztotarget)}}
711 }
712 }
713 \draw[<-,diagram arrow type, square arrow,smvisible on=<\xi->]
714 (module\xj.north) to (module\xi.north);
715 }{% false-horizontal-flow diagram
716 \tikzset{square arrow/.style={
717 to path={-- ++(0.5,0) |- (\tikztotarget)}}
718 }
719 }
720 \draw[<-,diagram arrow type,square arrow,smvisible on=<\xi->]

```

```

721         (module\xj.east) to (module\xi);
722     }
723     \fi
724 \fi
725 }%
726 \end{tikzpicture}
727 }{}% end-flow diagram
728 \IfStrEq{\diagramtype}{descriptive diagram}{% true-descriptive diagram
729 \begin{tikzpicture}[every node/.style={align=center}]
730 \foreach \smitem [count=\xi] in {\#2}{%
731 \edef\col{\@nameuse{color@\xi}}
732
733 \foreach \subitem [count=\xii] in \smitem{%
734 \pgfmathtruncatemacro\subitemvisible{\xi}
735 \ifnumequal{\xii}{1}{% true
736 \node[description title,drop shadow, smvisible on=<\subitemvisible->]
737 (module-title\xi) at (0,0-\xi*\descriptiveitemsysep) {\subitem};\pause
738 }{}
739 \ifnumequal{\xii}{2}{% true
740 \node[description,drop shadow,smvisible on=<\subitemvisible->]
741 (module\xi)at (0,0-\xi*\descriptiveitemsysep) {\subitem};\pause
742 }{}
743 }%
744 }%
745 \end{tikzpicture}
746 }{}% end-descriptive diagram
747 \IfStrEq{\diagramtype}{bubble diagram}{% true-bubble diagram
748 \begin{tikzpicture}[every node/.style={align=center}]
749 \foreach \smitem [count=\xi] in {\#2}{\global\let\maxsmitem\xi}
750 \pgfmathtruncatemacro\actualnumitem{\maxsmitem-1}
751 \foreach \smitem [count=\xi] in {\#2}{%
752 \ifnumequal{\xi}{1}{% %true
753 \node[bubble center node, smvisible on=<\xi->](center bubble){\smitem};
754 }{%false
755 \pgfmathtruncatemacro{\xj}{\xi-1}
756 \pgfmathtruncatemacro{\angle}{360/\actualnumitem*\xj}
757 \edef\col{\@nameuse{color@\xj}}
758 \node[bubble node, smvisible on=<\xi->](module\xi)
759 at (center bubble.\angle) {\smitem };
760 }%
761 }%
762 \end{tikzpicture}
763 }{}%end-bubble diagram
764 \IfStrEq{\diagramtype}{constellation diagram}{% true-const diagram
765 \begin{tikzpicture}[every node/.style={align=center}]
766 \foreach \smitem [count=\xi] in {\#2}{\global\let\maxsmitem\xi}
767 \pgfmathtruncatemacro\actualnumitem{\maxsmitem-1}
768 \foreach \smitem [count=\xi] in {\#2}{%
769 \ifnumequal{\xi}{1}{% %true
770 \node[planet, smvisible on=<\xi->](planet){\smitem};

```



```

771 }{%false
772 \pgfmathtruncatemacro{\xj}{\xi-1}
773 \pgfmathtruncatemacro{\angle}{360/\actualnumitem*\xj}
774 \edef\col{\@nameuse{color@\xj}}
775 \node[satellite, smvisible on=<\xi->] (satellite\xi)
776 at (\angle:\distanceplanetsatellite) {\smitem };
777 \draw[->,connection planet satellite, smvisible on=<\xi->]
778 (planet) -- (satellite\xi);
779 }%
780 }%
781 \end{tikzpicture}
782 }{%end-constellation diagram
783 \IfStrEq{\diagramtype}{connected constellation diagram}{% true-conn const diagram
784 \begin{tikzpicture}[every node/.style={align=center}]
785 \foreach \smitem [count=\xi] in {#2}{\global\let\maxsmitem\xi}
786 \pgfmathtruncatemacro{\actualnumitem}{\maxsmitem-1}
787 \foreach \smitem [count=\xi] in {#2}{%
788 \ifnumequal{\xi}{1}{ %true
789 \node[planet,smvisible on=<\xi->] (planet){\smitem};
790 }{%false
791 \pgfmathtruncatemacro{\xj}{\xi-1}
792 \pgfmathtruncatemacro{\angle}{360/\actualnumitem*\xj}
793 \edef\col{\@nameuse{color@\xj}}
794 \node[satellite,smvisible on=<\xi->] (satellite\xj)
795 at (\angle:\distanceplanetsatellite) {\smitem };
796 }%
797 }%
798 \foreach \smitem [count=\xi] in {#2}{%
799 \ifnumgreater{\xi}{1}{ %true
800 \pgfmathtruncatemacro{\xj}{\xi-1}
801 \edef\col{\@nameuse{color@\xj}}
802 \pgfmathtruncatemacro{\xk}{mod(\xj,\actualnumitem) +1}
803 \pgfmathtruncatemacro{\smvisible}{\xi+1}
804 \path[connection planet satellite,smvisible on=<\smvisible->]
805 (satellite\xj) edge[bend right] (satellite\xk);
806 }{}
807 }%
808 \end{tikzpicture}
809 }{%end-connected constellation diagram
810 \IfStrEq{\diagramtype}{priority descriptive diagram}{% true-priority descriptive diagram
811 \pgfmathparse{subtract(\priorityarrowwidth,\priorityarrowheadextend)}
812 \pgfmathsetmacro\priorityticksize{\pgfmathresult/2}
813 \pgfmathsetmacro\arrowsickxshift{(\priorityarrowwidth-\priorityticksize)/2}
814 \begin{tikzpicture}[every node/.style={align=center}]
815 \foreach \smitem [count=\xi] in {#2}{\global\let\maxsmitem\xi}
816 \foreach \smitem [count=\xi] in {#2}{%
817 \edef\col{\@nameuse{color@\xi}}
818 \pgfmathtruncatemacro{\smvisible}{\xi+1}
819 \node[description,drop shadow={\smvisible on=<\smvisible->},smvisible on=<\smvisible->]
820 (module\xi) at (0,0+\xi*\descriptiveitemsysep) {\smitem};

```

```

821 \draw[line width=\prioritytick,\col,smvisible on=<\smvisible->]
822 ([xshift=-\arrowskip pt]module\xi.base west)--
823 ($([xshift=-\arrowskip pt]module\xi.base west)-(\priorityticksize pt,0)$);
824 }%
825 \coordinate (A) at (module1);
826 \coordinate (B) at (module\maxsmitem);
827 \CalcHeight(A,B){heightmodules}
828 \pgfmathadd{\heightmodules}{\priorityarrowheightadvance}
829 \pgfmathsetmacro{\distancemodules}{\pgfmathresult}
830 \pgfmathsetmacro\arrowxshift{\priorityarrowwidth/2}
831 \begin{pgfonlayer}{background}
832 \node[priority arrow] at ([xshift=-\arrowxshift pt]module1.south west){};
833 \end{pgfonlayer}
834 \end{tikzpicture}
835 }{}% end-priority descriptive diagram
836 \IfStrEq{\diagramtype}{sequence diagram}{% true-sequence diagram
837 \begin{tikzpicture}[every node/.style={align=center}]
838 \foreach \x[count=\xi, count=\prevx from 0] in {\#2}{%
839 \edef\col{\@nameuse{color@\xi}}
840 \ifnum\x=1
841 \node[sequence item,smvisible on=<\xi->] (x-\xi) {\x};
842 \else
843 \node[sequence item,anchor=west,smvisible on=<\xi->]
844 (x-\xi) at (x-\prevx.east) {\x};
845 \fi
846 }
847 \end{tikzpicture}
848 }{}% end-sequence diagram
849 }% end-no value 1
850 }% end-command

```