The \texttt{wheelchart} package

Draw wheelcharts with TikZ

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\textbf{Abstract}

This package is based on the package \texttt{tikz} (see [5]) and can be used to draw wheelcharts with TikZ. It provides several options to customize the wheelcharts. Other tools for creating wheelcharts or pie charts can be found in [2], [1], [4], [3] and [6].

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- \textbf{The \texttt{wheelchart} package}
1 Usage

The package \texttt{wheelchart} can be used by putting the following in the preamble.

\begin{verbatim}
\usepackage{wheelchart}
\end{verbatim}

The package \texttt{wheelchart} loads the package \texttt{tikz} and the \texttt{TikZ} library \texttt{calc}.

Many examples in this manual use colors which can be defined by giving \texttt{dvipsnames} as an option to \texttt{documentclass}.

2 The main macro

\wheelchart[\{options\}](\{wheelchart data\})

This command can be placed inside a \texttt{tikzpicture} environment. It draws a wheelchart with \texttt{wheelchart data}. The \texttt{wheelchart data} is a comma separated list. Each item in this list corresponds to one slice of the wheelchart and consists of data separated by a /.

The precise syntax of the \texttt{wheelchart data} will be explained below. The \texttt{options} can be given with the keys described in Section 4.

\begin{verbatim}
\exampleforthismanual
\end{verbatim}

To simplify the creation of examples in this manual, we define the \texttt{wheelchart data} below.

\begin{verbatim}
\gdef\exampleforthismanual{
14/Apricot/Apricot/{A, B, C, E, K}/{north east lines}/0/0/Gray,
40/LimeGreen/Lime/{B, C}/grid/0/15/Black,
20/Melon/Melon/{A, C}/0.5/0/none,
16/OliveGreen/Olive/{A, B, E, K}/dots/0/0/none,
28/Peach/Peach/{A, B, C, E, K}/fivepointed stars/0/0/Lavender,
32/Plum/Plum/{A, B, C, E, K}/bricks/0/-15/none,
50/WildStrawberry/Strawberry/{B, C, E, K}/1/0/DarkOrchid
}
\end{verbatim}

The default wheelchart with these data is shown below.
3 Additional macros

\texttt{\textbackslash WCcount}

This macro gives the current number of the slice in the \textit{wheelchart data}.

\texttt{\textbackslash WCdataangle}

This macro stores the sum of the value of the key \texttt{data angle shift} (taking into account the key \texttt{counterclockwise}) and the macro \texttt{\textbackslash WCmidangle} modulo 360.

\texttt{\textbackslash WCmidangle}

This macro gives the angle in degrees modulo 360 of the middle of the current slice.
This macro displays \texttt{\textbackslash WCpercentage} rounded up to the number of decimals determined by the key \texttt{perc precision} followed by a \% symbol.

If the package \texttt{siunitx} is loaded then the following code is used. The package \texttt{siunitx} can be loaded before or after the package \texttt{wheelchart}.

\begin{verbatim}
\qty[round-mode=places, round-precision=\pgfkeysvalueof{/wheelchart/perc precision}]{\texttt{\textbackslash WCpercentage}}{\%}
\end{verbatim}

If the package \texttt{siunitx} is not loaded then the following code is used.

\begin{verbatim}
\texttt{\textbackslash WCpercentagerounded}, \%
\end{verbatim}

\texttt{\textbackslash WCpercentage}  

This macro gives the percentage of the current slice where the total is computed with the values of the key \texttt{value}. Note that rounding errors can occur.
Apricot: 14

Lime: 40

Fruit
7 species
200 pieces

Strawberry: 50

Plum: 32

Melon: 20

Olive: 16

Peach: 28

Apricot 7%

Lime 20%

Melon 10%

Olive 8%

Peach 14%

Plum 16%

Strawberry 25%

This macro displays \WCpercentage rounded up to the number of decimals determined by the key perc precision.

\WCtotalcount
This macro gives the total number of slices.

\WCtotalnum
This macro gives the sum of all values of the key value.
The \texttt{wheelchart} data in the command \texttt{wheelchart} is a comma separated list. Each item in this list corresponds to one slice of the wheelchart and consists of data separated by a / . These individual data are interpreted as \texttt{WCvarA/WCvarB/WCvarC/...} and can be accessed within the \texttt{(options)} of the command \texttt{wheelchart} by the macros \texttt{WCvar} till \texttt{WCvarZ} except within the keys \texttt{at, caption, caption left, caption left style, caption style, contour, counterclockwise, expand list, middle fill, name, start angle, start half, title, title left, title left style, title style, total angle and total count}. Thus up to 26 data can be given to each slice of the wheelchart.

Initially, only \texttt{WCvarA, WCvarB and WCvarC} are used for value=\texttt{WCvarA, slices style=WCvarB and data=WCvarC}. 
4 Keys

The keys in this Section can be given as \textit{options} to the command \texttt{\wheelchart}.

\begin{itemize}
  \item \texttt{/wheelchart/anchor xsep=\{angle\}} \quad \text{\small (no default, initially 5)}
  \item \texttt{/wheelchart/anchor ysep=\{angle\}} \quad \text{\small (no default, initially 5)}
\end{itemize}

These keys determine the default anchor of the key \texttt{data} in the case that \texttt{lines ext=0}.
\begin{table}
\begin{tabular}{|c|c|}
\hline
\textbf{WCdataangle} & \textbf{Anchor of the key data in the case that lines ext=0} \\
\hline
0 & west \\
90 & south \\
180 & east \\
270 & north \\
\hline
\end{tabular}

For other angles not in \{0, 90, 180, 270\}:
\begin{itemize}
\item [0, anchor ysep]
\item [anchor ysep, 90 – anchor xsep]
\item [90 – anchor xsep, 90 + anchor xsep]
\item [90 + anchor xsep, 180 – anchor ysep]
\item [180 – anchor ysep, 180 + anchor ysep]
\item [180 + anchor ysep, 270 – anchor xsep]
\item [270 – anchor xsep, 270 + anchor xsep]
\item [270 + anchor xsep, 360 – anchor ysep]
\item [360 – anchor ysep, 360]
\end{itemize}

Table 1: Anchor of the key data in the case that lines ext=0.
\usetikzlibrary{patterns}
\begin{tikzpicture}
\wheelchart[
inner data={$\WCvarA^\circ$},
inner data style={shift=({\WCmidangle}:{-0.1})},
inner data sep=0.3,
lines,
radius={3.4},
slices style={pattern=\WCvarD,pattern color=\WCvarB!70},
]
\node{10/Maroon/south/(north east lines),
70/TealBlue/(south west)/grid,
10/Maroon/west/(north east lines),
10/Maroon/west/(north east lines),
70/TealBlue/(north west)/grid,
10/Maroon/north/(north east lines),
10/Maroon/north/(north east lines),
70/TealBlue/(north east)/grid,
10/Maroon/east/(north east lines),
10/Maroon/east/(north east lines),
70/TealBlue/(south east)/grid,
10/Maroon/south/(north east lines)}
\end{tikzpicture}
The anchor of the key `data` can also be specified manually by using the key `data style`.
\usetikzlibrary{patterns}
\begin{tikzpicture}
\wheelchart[
    data style=(anchor=\WCvarC),
    inner data-\$\WCvarA^\circ\$},
    \$\text{inner data style=\{shift=((-\WCmidangle:0.1))\}}\$,
    inner data sep=0.2,
    lines,
    radius=(3)(4),
    slices style=\{\WCvarD,\WCvarB!70\},
]{10/Maroon/(south west)/(north east lines),
70/TealBlue/west/grid,
10/Maroon/north east lines),
70/TealBlue/north/grid,
10/Maroon/north east lines),
70/TealBlue/east/grid,
10/Maroon/(north east lines),
10/Maroon/east/(north east lines),
70/TealBlue/south/grid,
10/Maroon/south east lines)}
\end{tikzpicture}

\wheelchart{at=\{\text{point}\}}
\text{This key defines the center of the wheelchart.}

\wheelchart{caption=\{\text{text}\}}
\text{This key contains the \{text\} which will be placed below the wheelchart. The \{text\} is placed in a node. The x coordinate of this node is the x coordinate of the center of the wheelchart, which is defined by the key at. In general, this is not the same as the x coordinate of the center of the local bounding box around the wheelchart. The y coordinate of this node is 0.5 below the south of the local bounding box around the wheelchart. The style of this node is given as follows. First, the options anchor=north,align=center are given. Thereafter, the style of the key caption style is added.}

\wheelchart{caption left=\{\text{text}\}}
\text{This key contains the \{text\} which will be placed below left of the wheelchart. The \{text\} is placed in a node. This node is placed 0.5 below the south west of the local bounding box around the wheelchart. The style of this node is given as follows. First, the options anchor=north west,align=left are given. Thereafter, the style of the key caption left style is added.}

\wheelchart{caption left style=\{\text{options}\}}
\text{This key accepts a list of keys which will be applied to the node where the contents of the key caption left is placed.}

\wheelchart{caption style=\{\text{options}\}}
\text{This key accepts a list of keys which will be applied to the node where the contents of the key caption is placed.}
\begin{tikzpicture}
\wheelchart[
  at={(5,2)},
  caption=Caption,
  caption style={font=\scshape},
  caption left=Caption left,
  caption left style={font=\sffamily},
  middle={textit{name=W\texttt{Cname}}},
  name=W\texttt{Cname},
  start half,
  title=Title,
  title style={font=\bfseries},
  title left=Title left,
  title left style={font=\em}
]
%
\wheelchart/contour={⟨options⟩} (style, no default, initially empty)
If this key is set then a contour with the style determined by this key will be drawn around the wheelchart.
\wheelchart/counterclockwise=⟨boolean⟩ (default true, initially false)
If true, the wheelchart will be drawn counterclockwise instead of clockwise.
This key contains the \langle text \rangle which will be placed at the outside of each slice of the wheelchart. This can be suppressed by using data=\{\}. The \langle text \rangle is placed in a node. The style of this node is given as follows. First, the anchor is set following Table 1 and Table 2. Then the option align=left is added. Thereafter, the style of the key data style is added.

The contents of the key data is placed at the angle \WCdataangle, which is the sum of the value of the key data angle shift in degrees (taking into account the key counterclockwise) and the macro \WCmidangle modulo 360.

If \text{lines}=0, this key defines the distance between the wheelchart and the contents of the key data. If \text{lines} > 0, this key defines the distance between the end of the lines and the contents of the key data.

This key accepts a list of keys which will be applied to the node where the contents of the key data is placed.

false In this case, the \langle wheelchart data \rangle of the command \wheelchart will not be expanded.

once In this case, the \langle wheelchart data \rangle of the command \wheelchart will be expanded once.

ture In this case, the \langle wheelchart data \rangle of the command \wheelchart will be fully expanded.

The following example illustrates the difference between the possible values of the key expand list.
The initial setting \texttt{expand list=once} works in most situations, even when commands such as \ref, \cite and \textbf are used such as in the example below.

In the following example, the \texttt{⟨wheelchart data⟩} from the previous example is stored in a macro. In this case, we have to use the initial setting \texttt{expand list=once}.

In the example below, we have to use \texttt{expand list=true}.
In the example below, we have to use `expand list=true` and the command \texttt{\textbackslash expandonce} from the package \texttt{etoolbox}.

This key will shift the slices of the wheelchart with \texttt{(value)} with respect to the center of the wheelchart.
The \langle value \rangle of this key defines half the distance between two slices of the wheelchart. The following example illustrates the behaviour of the key gap when a slice has 360 degrees.

\begin{tikzpicture}
\foreach \gap [count=\m] in {0,1}{
  \foreach \pie [count=\n] in {false,true}{
    \wheelchart[
      at={(\m,\n)},
      data={},
      gap=\gap,
      middle={gap=\gap\pie},
      middle style={font=\ttfamily},
      pie=\pie,
      radius={1.5}{2},
      slices style=Bittersweet,
      total count=1,
      value=1
    ]{()}
  }
}\end{tikzpicture}

The \langle value \rangle of this key defines half the polar gap in degrees between two slices of the wheelchart. Note the difference between the keys explode, gap and gap polar. This is illustrated in the examples below.

\begin{tikzpicture}
\foreach \gap [count=\m] in {0,1}{
  \foreach \pie [count=\n] in {false,true}{
    \wheelchart[
      explode=N,\n      pie=\pie,
      explode=\gap,
      pie=\pie,
      explode=\gap,\n      pie=\pie
    ]{()}
  }
}\end{tikzpicture}
This key contains the \textit{text} which will be placed at the inside of each slice of the wheelchart. The \textit{text} is placed in a node. The style of this node is given as follows. First, the option align=left is given. Thereafter, the style of the key inner data style is added.
/wheelchart/inner_data_sep={⟨value⟩}  \hspace{1cm} \text{(no default, initially 0.2)}

This key defines the distance between the wheelchart and the contents of the key inner data.

/wheelchart/inner_data_style={⟨options⟩}  \hspace{1cm} \text{(style, no default, initially empty)}

This key accepts a list of keys which will be applied to the node where the contents of the key inner data is placed.

/wheelchart/inner_radius={⟨value⟩}  \hspace{1cm} \text{(no default, initially 2)}

The ⟨value⟩ of this key defines the inner radius of the wheelchart.

/wheelchart/legend={⟨code⟩}  \hspace{1cm} \text{(no default)}

If this key is set then the ⟨code⟩ given to this key will be executed at the end of the command \wheelchart.

/wheelchart/legend_entry={⟨code⟩}  \hspace{1cm} \text{(no default)}

If this key is set then the ⟨code⟩ given to this key will be executed for each slice of the wheelchart.

---

```
\usepackage{etoolbox}
\begin{tikzpicture}
\def\WClegend{}
\def\WClegendrow#1#2#3#4#5\{\tikz\fill[#1](0,0) rectangle (0.3,0.3); & #2 & $#3$ & #4 & #5\}
\wheelchart[
data=\{
\gappto\WClegend\{\WClegendrow\\\n\\%
\xappto\WClegend{\{\WCvarB\}\{\WCvarC\}\{\WCvarA\}\{\WCperc\}\{\WCvarD\}\\n\\%
\end{tikzpicture}
```

---

/wheelchart/lines={⟨value⟩}  \hspace{1cm} \text{(default 1, initially 0)}

This key will draw lines of length ⟨value⟩ between the wheelchart and the contents of the key data.

---

```
\end{tikzpicture}
```

---

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Value</th>
<th>Percentage</th>
<th>Vitamines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apricot</td>
<td>14</td>
<td>7%</td>
<td>A, B, C, E, K</td>
</tr>
<tr>
<td>Lime</td>
<td>40</td>
<td>20%</td>
<td>B, C</td>
</tr>
<tr>
<td>Melon</td>
<td>20</td>
<td>10%</td>
<td>A, C</td>
</tr>
<tr>
<td>Olive</td>
<td>16</td>
<td>8%</td>
<td>A, B, E, K</td>
</tr>
<tr>
<td>Peach</td>
<td>28</td>
<td>14%</td>
<td>A, B, C, E, K</td>
</tr>
<tr>
<td>Plum</td>
<td>32</td>
<td>16%</td>
<td>A, B, C, E, K</td>
</tr>
<tr>
<td>Strawberry</td>
<td>50</td>
<td>25%</td>
<td>B, C, E, K</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
\begin{tikzpicture}
\def\WCtest#1#2{
    \ifdim\WCpercentage pt>10 pt\#1\else\#2\fi
}
\wheelchart[
    data={ \WCtest{} \WCperc },
    lines={ 1-max(sign(\WCpercentage-10),0) },
    lines style={dotted,thick},
    pie,
    wheel data={ \WCtest{ \WCperc } {} }
]\exampleforthismanual
\end{tikzpicture}

\wheelchart/lines ext={⟨value⟩} (default 0.5, initially 0)
If the ⟨value⟩ of this key is > 0 then the lines between the wheelchart and the contents of the key data
will be extended horizontally with a length defined by ⟨value⟩.

\wheelchart/lines ext bottom dir=left|right (no default, initially right)
This key applies when WCdataangle ∈ [270 − lines ext dirsep, 270 + lines ext dirsep]. In this
case, this key defines the direction in which the lines between the wheelchart and the contents of the key
data will be extended horizontally and in this case, this key also determines the anchor of the key data.
left In this case, the lines between the wheelchart and the contents of the key data will be extended horizontally to the left and the anchor of the key data is the value of the key lines ext left anchor.
right In this case, the lines between the wheelchart and the contents of the key data will be extended horizontally to the right and the anchor of the key data is the value of the key lines ext right anchor.

\wheelchart/lines ext dirsep={⟨angle⟩} (no default, initially 0)
This key determines half the angle in degrees of the segment to which the keys lines ext bottom dir
and lines ext top dir apply.

\wheelchart/lines ext fixed=(boolean) (default true, initially false)
If true, all lines between the wheelchart and the contents of the key data will be extended horizontally
till the same x coordinate at the left and till the same x coordinate at the right.

\wheelchart/lines ext left anchor={⟨anchor⟩} (no default, initially mid east)
This key defines the anchor of the key data when the lines between the wheelchart and the contents of the key data are extended horizontally to the left.

\wheelchart/lines ext right anchor={⟨anchor⟩} (no default, initially mid west)
This key defines the anchor of the key data when the lines between the wheelchart and the contents of the key data are extended horizontally to the right.

\wheelchart/lines ext top dir=left|right (no default, initially right)
This key applies when WCdataangle ∈ [90 − lines ext dirsep, 90 + lines ext dirsep]. In this case,
this key defines the direction in which the lines between the wheelchart and the contents of the key data
will be extended horizontally and in this case, this key also determines the anchor of the key data.
In this case, the lines between the wheel chart and the contents of the key data will be extended horizontally to the left and the anchor of the key data is the value of the key lines ext left anchor. In this case, the lines between the wheel chart and the contents of the key data will be extended horizontally to the right and the anchor of the key data is the value of the key lines ext right anchor.

Anchor of the key data

<table>
<thead>
<tr>
<th>\WCdataangle</th>
<th>in the case that lines ext &gt; 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0, 90 − lines ext dirsep]</td>
<td>value of the key lines ext right anchor</td>
</tr>
<tr>
<td>[90 − lines ext dirsep, 90 + lines ext dirsep]</td>
<td>value of the key lines ext left anchor</td>
</tr>
<tr>
<td>if lines ext top dir=left</td>
<td>if lines ext top dir=right</td>
</tr>
<tr>
<td>value of the key lines ext right anchor</td>
<td>value of the key lines ext left anchor</td>
</tr>
<tr>
<td>if lines ext bottom dir=left</td>
<td>if lines ext bottom dir=right</td>
</tr>
<tr>
<td>value of the key lines ext right anchor</td>
<td>value of the key lines ext left anchor</td>
</tr>
<tr>
<td>[90 + lines ext dirsep, 270 − lines ext dirsep]</td>
<td>value of the key lines ext right anchor</td>
</tr>
<tr>
<td>[270 − lines ext dirsep, 270 + lines ext dirsep]</td>
<td>value of the key lines ext left anchor</td>
</tr>
<tr>
<td>if lines ext bottom dir=left</td>
<td>if lines ext bottom dir=right</td>
</tr>
<tr>
<td>value of the key lines ext right anchor</td>
<td>value of the key lines ext left anchor</td>
</tr>
<tr>
<td>[270 + lines ext dirsep, 360]</td>
<td>value of the key lines ext right anchor</td>
</tr>
</tbody>
</table>

Table 2: Anchor of the key data in the case that lines ext > 0.

The number of columns in the legend in the example below can be specified with \WClegendcolumns.
\begin{tikzpicture}
\wheelchart[
  data style={
    inner sep=0pt,
    shift={(0,0.1)}
  },
  lines,
  lines ext=1.2,
  lines ext bottom dir=right,
  lines ext dir sep=1,
  \% lines ext fixed,
  lines ext left anchor=(base west),
  lines ext right anchor=(base east),
  lines ext top dir=left,
  lines sep=-0.5,
  \% lines style=\WCvarB,
  start angle=331.2
]{\exampleforthismanual}
\end{tikzpicture}

\usetikzlibrary{decorations.markings}
\begin{tikzpicture}
\wheelchart[
  data={\WCvarC: \WCvarA},
  data angle shift=\WCvarG,
  data style={draw=\WCvarB,fill=\WCvarB!20},
  lines=1.5,
  lines ext=1,
  lines sep=1,
  lines style={
    Black,
    postaction=decorate,
    decoration={
      markings,
      mark=at position 0 with {
        \fill[Black] (0,0) circle[radius=0.15];
      }
    },
  },
  pie,
  start angle=331.2
]{\exampleforthismanual}
\end{tikzpicture}

/wheelchart/lines sep={⟨value⟩} (no default, initially 0.2)
This key defines the distance between the wheelchart and the start of the lines.

\[\text{/wheelchart/lines style=⟨\{options\}⟩} \]  
(style, no default, initially empty)

This key accepts a list of keys which will be applied to the lines drawn by the key \text{lines}.

\[\text{/wheelchart/middle=⟨\{text\}⟩} \]  
(no default)

This key contains the \{text\} which will be placed at the center of the wheelchart. The \{text\} is placed in a node. The style of this node is given as follows. First, the option align=center is given. Thereafter, the style of the key \text{middle style} is added.

\[\text{/wheelchart/middle fill=⟨\{options\}⟩} \]  
(style, no default, initially empty)

If this key is set then the middle of the wheelchart will be filled with this style.

\[\begin{tikzpicture} \wheelchart[  \text{counterclockwise},  \data=⟨\{}\rangle,  \middle fill=⟨\{}\rangle,  \text{Green},  \text{draw=Red},  \text{ultra thick },  \text{radius=}⟨\{0.8∗\WCcount\rangle \{0.4+0.8∗\WCcount\},  \text{slices style=}⟨\{}\rangle,  \text{draw=}Blue,  \text{fill=}none,  \text{ultra thick },  \text{start angle=}0,  \text{total angle=}300,  \text{total count=}4,  \text{value=}1 \}⟩\{}\end{tikzpicture} \]

\[\text{/wheelchart/middle style=⟨\{options\}⟩} \]  
(style, no default, initially empty)

This key accepts a list of keys which will be applied to the node where the contents of the key \text{middle} is placed.

\[\text{/wheelchart/name=⟨\{name\}⟩} \]  
(no default, initially wheelchart@name)

This key defines the \{name\} of the local bounding box around the wheelchart.

\[\text{/wheelchart/outer radius=⟨\{value\}⟩} \]  
(no default, initially 3)

The \{value\} of this key defines the outer radius of the wheelchart.

\[\text{/wheelchart/perc precision=⟨\{number\}⟩} \]  
(no default, initially 0)

This key defines the number of decimals up to which the percentage in the macros \text{\WCperc} and \text{\WCpercentagerounded} are rounded.

\[\text{/wheelchart/pie=⟨\{boolean\}⟩} \]  
(default true, initially false)

If true, the inner radius of the wheelchart is set to 0.

\[\text{/wheelchart/radius=⟨\{inner radius\}⟩⟨\{outer radius\}⟩} \]  
(no default)

This key defines the inner and outer radius of the wheelchart.
If this key is set then the shape of the slices of the wheelchart is defined by \textit{path}.

\begin{tikzpicture}
\wheelchart[
  data=(),
  radius=(0.5/\WCcount),
  slices style=\WCvarA,
  start angle=180,
  total angle=180,
  value=2,
  wheel lines=(\WCvarA!50,ultra thick)
](Yellow,Orange,Red,Blue)
\end{tikzpicture}
This key sets both \texttt{slices end arc} and \texttt{slices start arc}. The effect of \texttt{⟨value 1⟩} and \texttt{⟨value 2⟩} is shown in the table below.

\begin{tabular}{|c|c|c|}
\hline
\texttt{⟨value 1⟩} & \texttt{⟨value 2⟩} = −0.5 & \texttt{⟨value 2⟩} = 0 & \texttt{⟨value 2⟩} = 0.5 \\
\hline
2 & \includegraphics[width=0.3\textwidth]{example1.png} & \includegraphics[width=0.3\textwidth]{example2.png} & \includegraphics[width=0.3\textwidth]{example3.png} \\
1 & \includegraphics[width=0.3\textwidth]{example4.png} & \includegraphics[width=0.3\textwidth]{example5.png} & \includegraphics[width=0.3\textwidth]{example6.png} \\
−1 & \includegraphics[width=0.3\textwidth]{example7.png} & \includegraphics[width=0.3\textwidth]{example8.png} & \includegraphics[width=0.3\textwidth]{example9.png} \\
−2 & \includegraphics[width=0.3\textwidth]{example10.png} & \includegraphics[width=0.3\textwidth]{example11.png} & \includegraphics[width=0.3\textwidth]{example12.png} \\
\hline
\end{tabular}
\begin{tikzpicture}
\wheelchart[
  slices arc={1}{0}
]{
\exampleforthismanual}
\end{tikzpicture}

\begin{tikzpicture}
\wheelchart[
  data={},
  radius={1}{4.5},
  slices arc={1}{0.66},
  slices style=\WCvarA,
  start half, 
  value=1, 
  wheel data={
    \textbf{Number \WCcount}\% \\
    \WCvarB
  },
  wheel data pos=0.5,
  wheel data style=White
]{
Yellow/{Some text A},
Orange/{Some text B},
Red/{Some text C},
Green/{Some text D},
Blue/{Some text E}
}
\end{tikzpicture}

\texttt{/wheelchart/slices arrow=\{value 1\}\{value 2\}}
This key is similar to the key \texttt{slices arc}.

(no default)
/wheelchart/slices end arc={⟨value 1⟩}{⟨value 2⟩}  
This key is similar to the key slices arc but only sets the end of the slice.

/wheelchart/slices end arrow={⟨value 1⟩}{⟨value 2⟩}  
This key is similar to the key slices arrow but only sets the end of the slice.

/wheelchart/slices start arc={⟨value 1⟩}{⟨value 2⟩}  
This key is similar to the key slices arc but only sets the start of the slice.

/wheelchart/slices start arrow={⟨value 1⟩}{⟨value 2⟩}  
This key is similar to the key slices arrow but only sets the start of the slice.

/wheelchart/slices style={⟨options⟩}  
This key defines the style of the slices of the wheelchart.

/wheelchart/start angle={⟨angle⟩}  
This key defines the ⟨angle⟩ in degrees at which the first slice of the wheelchart starts.
If this key is set then the middle of the first slice of the wheelchart is positioned at \langle angle \rangle in degrees.

This key contains the \langle text \rangle which will be placed above the wheelchart. The \langle text \rangle is placed in a node. The \( x \) coordinate of this node is the \( x \) coordinate of the center of the wheelchart, which is defined by the key at. In general, this is not the same as the \( x \) coordinate of the center of the local bounding box around the wheelchart. The \( y \) coordinate of this node is 0.5 above the north of the local bounding box around the wheelchart. The style of this node is given as follows. First, the options anchor=south,align=center are given. Thereafter, the style of the key title style is added.

This key contains the \langle text \rangle which will be placed above left of the wheelchart. The \langle text \rangle is placed in a node. This node is placed 0.5 above the north west of the local bounding box around the wheelchart. The style of this node is given as follows. First, the options anchor=south west,align=left are given. Thereafter, the style of the key title left style is added.

This key accepts a list of keys which will be applied to the node where the contents of the key title left is placed.

This key accepts a list of keys which will be applied to the node where the contents of the key title is placed.

This key defines the total \langle angle \rangle in degrees of the wheelchart.

If this key is set then the number of slices of the wheelchart is determined by \langle number \rangle.
An ode to the “Grothendieck prime”

\begin{tikzpicture}
\def\n{57}
\wheelchart[
data={},
gap=0.015,
middle={\
\text{An ode to the}\
“Grothendieck prime”},
slices style={
/utils/exec={
\ifnum\WCcount>\n
\def\WCcolor{Gray}
\else
\def\WCcolor{Cyan}
\fi
},
\WCcolor},
total count=100,
value=1]
\end{tikzpicture}

/wheelchart/value=\{\text{value}\}
(no default, initially \WCvarA)
This key defines the \text{value} which corresponds to the size of each slice of the wheelchart.

/wheelchart/wheel data=\{\text{text}\}
(no default)
This key contains the \text{text} which will be placed on top of each slice of the wheelchart. The \text{text} is placed in a node. The style of this node is given as follows. First, the option align=left is given. Thereafter, the style of the key wheel data style is added.

/wheelchart/wheel data pos=\{\text{value}\}
(no default, initially 0.66)
The radius of the polar coordinate at which the contents of the key wheel data is placed is given by the convex combination wheel data pos \cdot outer radius + (1 − wheel data pos) \cdot inner radius.

/wheelchart/wheel data style=\{\text{options}\}
(style, no default, initially empty)
This key accepts a list of keys which will be applied to the node where the contents of the key wheel data is placed.

/wheelchart/wheel lines=\{\text{options}\}
(style, no default, initially empty)
If this key is set then lines with the style determined by this key will be drawn inside the slices of the wheelchart. The number of these lines depends on the value of the key value.

Below is the example from [5, Subsection 7.6] recreated with the package wheelchart.

\begin{tikzpicture}
\def\n{57}
\wheelchart[
data={},
gap=0.015,
middle={\
\text{An ode to the}\
“Grothendieck prime”},
slices style={
/utils/exec={
\ifnum\WCcount>\n
\def\WCcolor{Gray}
\else
\def\WCcolor{Cyan}
\fi
},
\WCcolor},
total count=100,
value=1]
\end{tikzpicture}
\begin{tikzpicture}
\colorlet{good}{green!75!black}
\colorlet{bad}{red}
\colorlet{neutral}{black!60}
\colorlet{none}{white}
\wheelchart[
  anchor xsep=15,
  contour=gray,
  data={"\WCvarC": \WCvarA{} (\WCperc)},
  middle={Ratings given by\pgfmathprintnumber{\WCtotalnum}\hspace{2em}participants},
  radius={1.8}{2.2},
  start half=270,
  wheel lines={black!15,thick}]
  %
  10/neutral/ok,
  9/good!60!white/good,
  3/good/{very good},
  20/none/none,
  0/bad/{very bad},
  8/bad!60!white/bad
\end{tikzpicture}

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