Tegnekurs i TikZ

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Om meg

Veronika Heimsbakk , utvikler i Acando.

- Utstudert fra Institutt for informatikk våren 2015.
- Forkjærlighet for LaTeX, Ti*k*Z, farger og fonter.
- Tidligere ansatt i Sonen ♡.

The Basics

Inkludere pakken:

```
\usepackage{tikz}
```

Opprette miljøet:

```
\begin{tikzpicture}
    <kode her>
\end{tikzpicture}
```

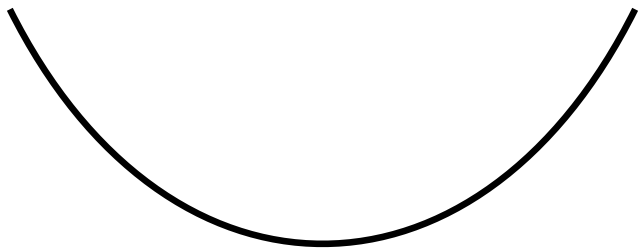
The Basics – tegne ei linje

- `\draw (0,0) -- (4,0);`

- `\draw (0em,0em) -- (4em,0em);`

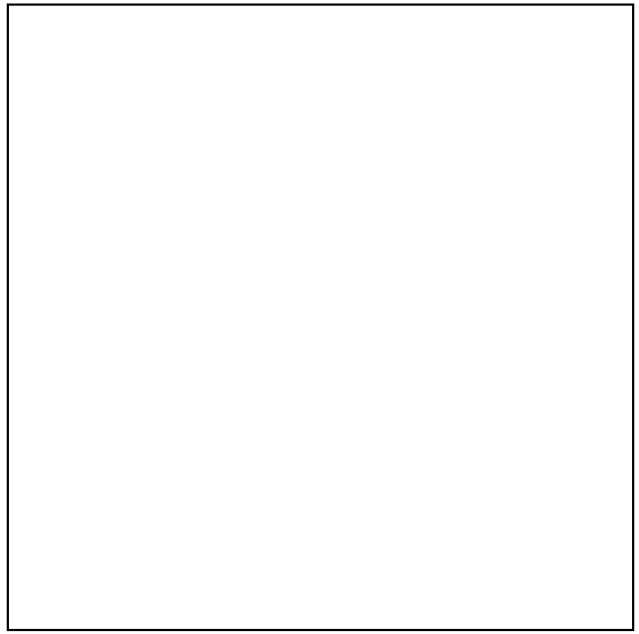
- `\draw (0pt,0pt) -- (4pt,0pt);`

The Basics – kvadrat



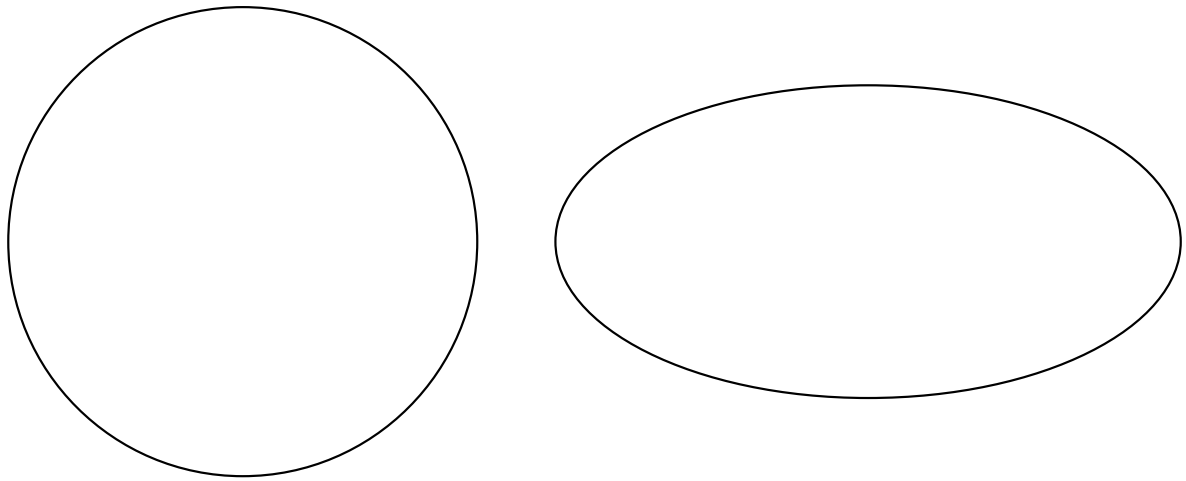
```
\draw (-2,2) .. controls (-1,0) and (1,0) .. (2,2);
```

The Basics – kvadrat



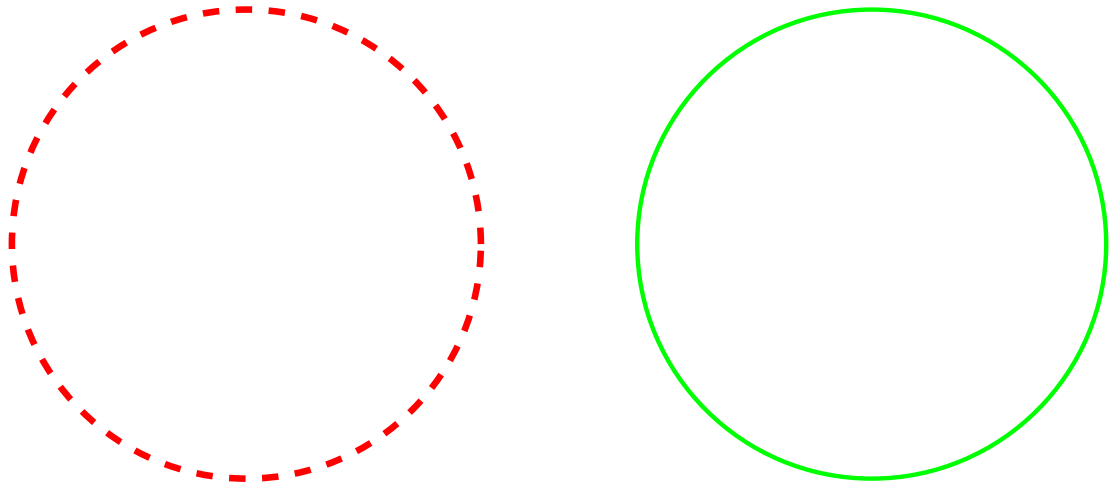
- `\draw (0,0) -- (4,0) -- (4,4) -- (0,4) -- (0,0);`
- `\draw (0,0) rectangle (4,4);`

The Basics – sirkel



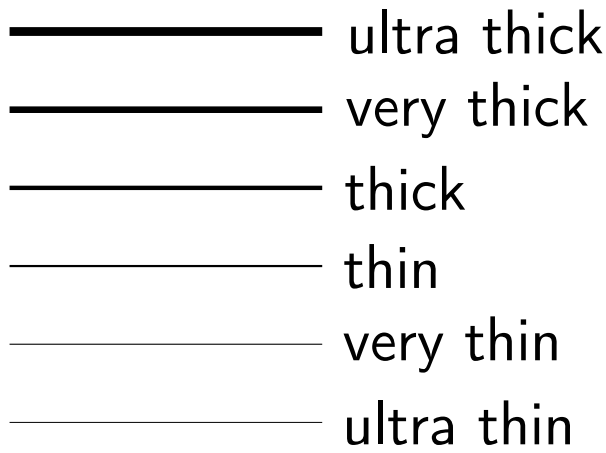
- `\draw (0,0) circle (1.5cm);`
- `\draw (0,0) ellipse (2cm and 1cm);`

The Basics – pynte litt



- `\draw[red, very thick, dashed] (0,0) circle (1.5cm);`
- `\draw[green, thick] (0,0) circle (1.5cm);`

The Basics – tykkelser

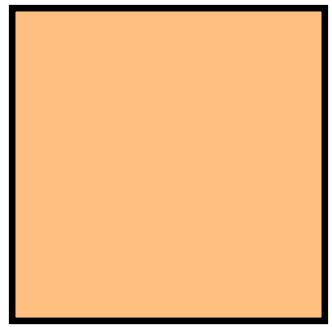


The Basics – farger

The Basics – fylle med farge

```
\fill[orange] (0,0) rectangle (2,2);
```

The Basics – fylle med farge og kant



```
\filldraw[orange!50, draw=black, very thick] (0,0) rectangle (2,2);
```

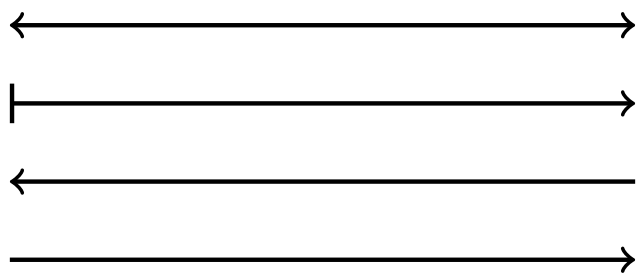
The Basics – fylle med gradient

```
\shade[left color=orange, right color=yellow] (0,0) rectangle (2,2);
\shade[top color=orange, bottom color=yellow] (3,0) rectangle (5,2);
\shade[inner color=orange, outer color=yellow] (6,0) rectangle (8,2);
```

The Basics – blande farger

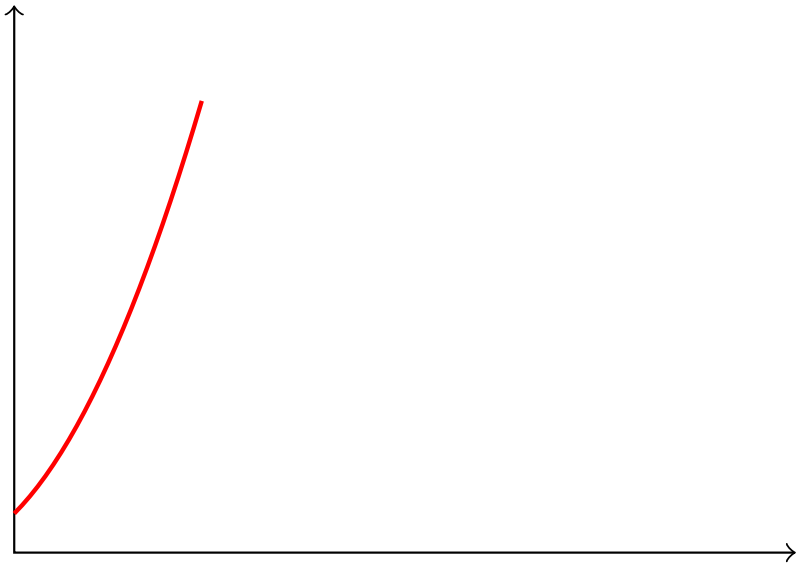
```
\fill[blue!50!orange] (0,0) rectangle (0,0);
```

Piler i TikZ



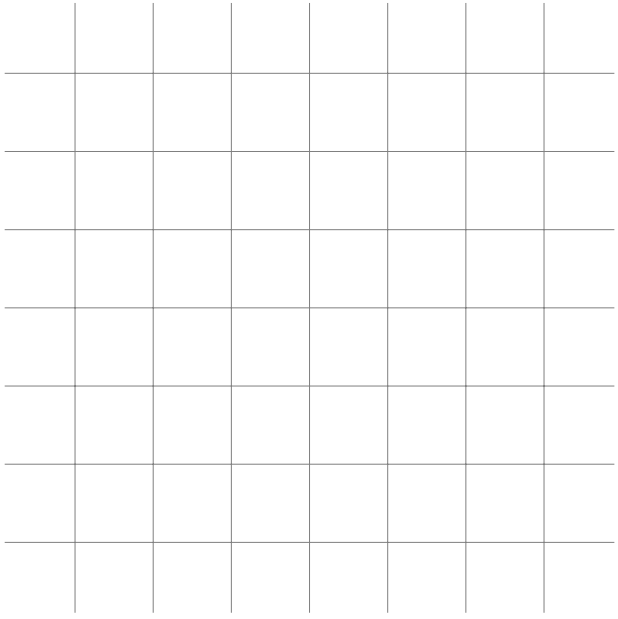
```
\draw[<->] (0,1.5) -- (4,1.5);
\draw[|->] (0,1) -- (4,1);
\draw[<-]  (0,0.5) -- (4,0.5);
\draw[->]  (0,0) -- (4,0);
```

Plotte funksjoner



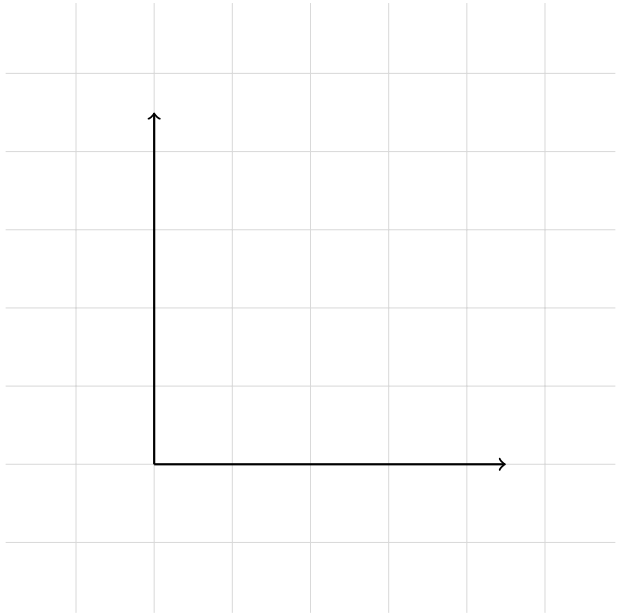
```
\begin{tikzpicture}
    \draw[<->] (0,3.5) -- (0,0) -- (5,0);
    \draw[red, thick, domain=0:1.2] plot (\x, {0.25+\x+\x*\x});
\end{tikzpicture}
```

Rutenett med akser



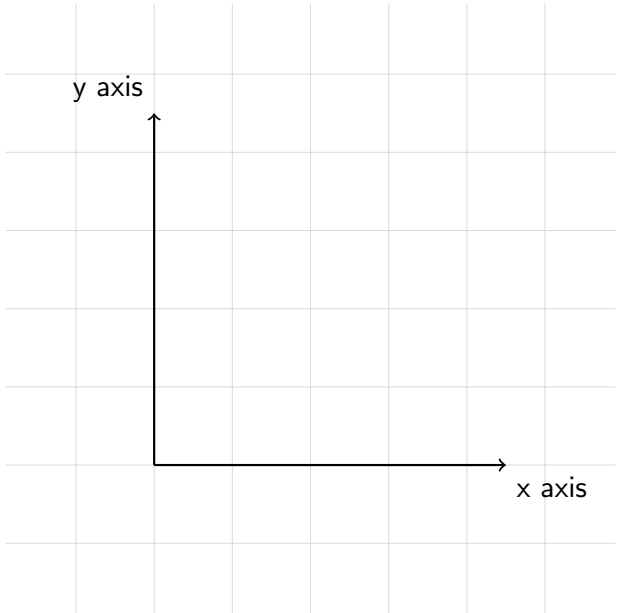
```
\draw[step=1cm,gray,very thin] (-1.9,-1.9) grid (5.9,5.9);
```

Rutenett med akser



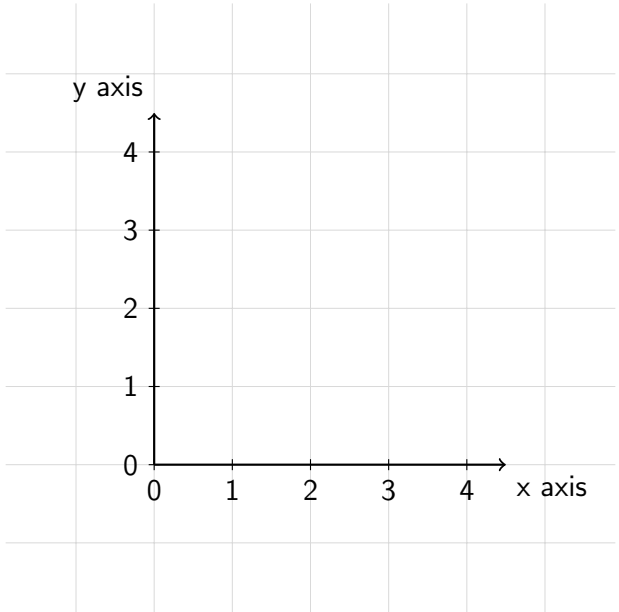
```
\draw[step=1cm,gray!30,very thin] (-1.9,-1.9) grid (5.9,5.9);
\draw[thick, ->] (0,0) -- (4.5,0);
\draw[thick, ->] (0,0) -- (0,4.5);
```

Rutenett med akser



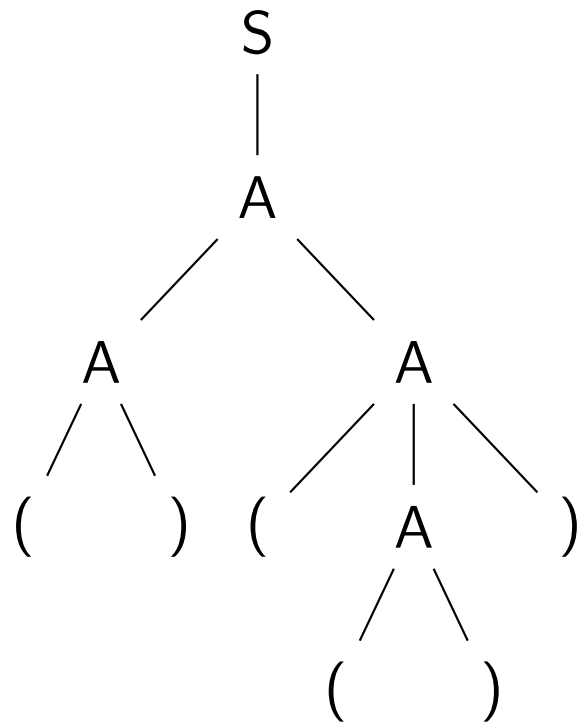

```
\draw[thick, ->] (0,0) -- (4.5,0) node[below right] {x axis};
\draw[thick, ->] (0,0) -- (0,4.5) node[above left]  {y axis};
```

Rutenett med akser



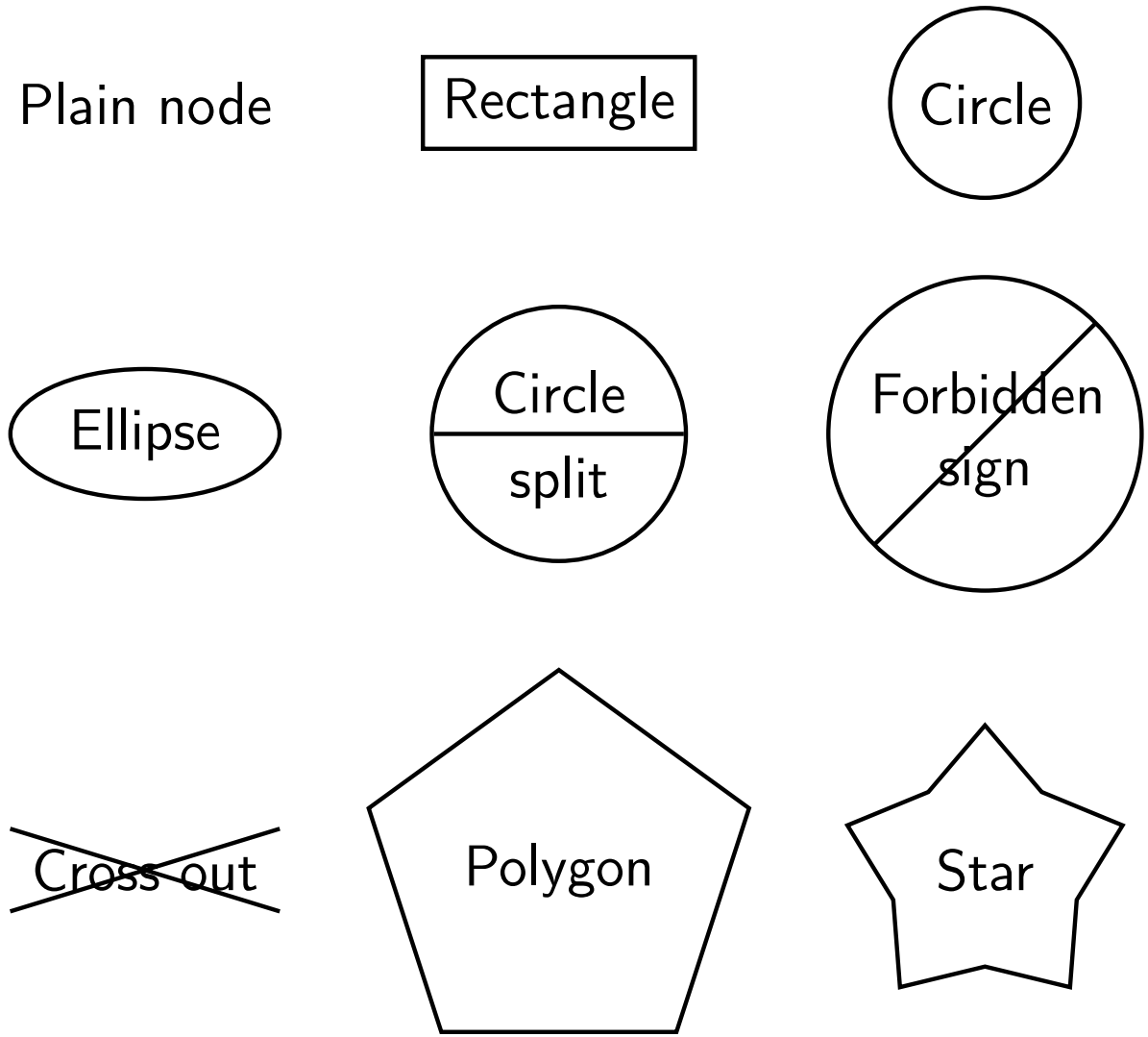

```
\foreach \x in {0,1,2,3,4}
  \draw (\x, 2pt) -- (\x, -2pt) node[below] {$\x$};
\foreach \y in {0,1,2,3,4}
  \draw (2pt, \y) -- (-2pt, \y) node[left]  {$\y$};
```

Trær



Noder – fasonger

\usetikzlibrary{shapes}

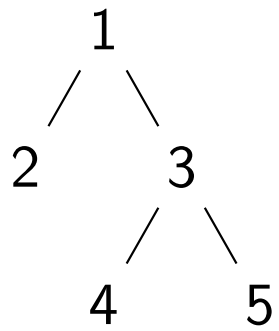


Trær – bygge et tre

Rot-noden:

```
\node {1};
```

Bygger videre:

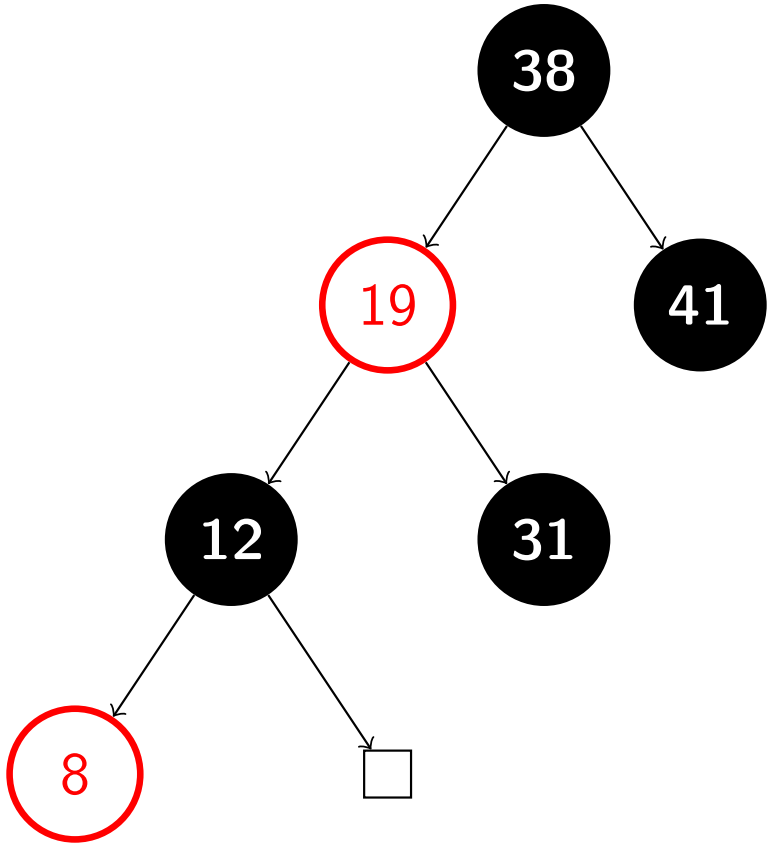



```
\node {1}
    child { node {2} }
    child { node {3}
        child { node {4} }
        child { node {5} }
    }
;
```

Trær

```
\begin{tikzpicture}[every node/.style={},
                    level 2/.style={sibling distance=20mm},
                    level 3/.style={sibling distance=10mm},
                    level distance=30pt]
\node {S}
    child { node{A}
        child { node {A}
            child { node {(} }
            child { node {)} }
        }
        child { node {A}
            child { node {(} }
            child { node {A}
                child { node {(} }
                child { node {)} }
            }
            child { node {)} }
        }
    }
;
\end{tikzpicture}
```

Rød-svarte trær



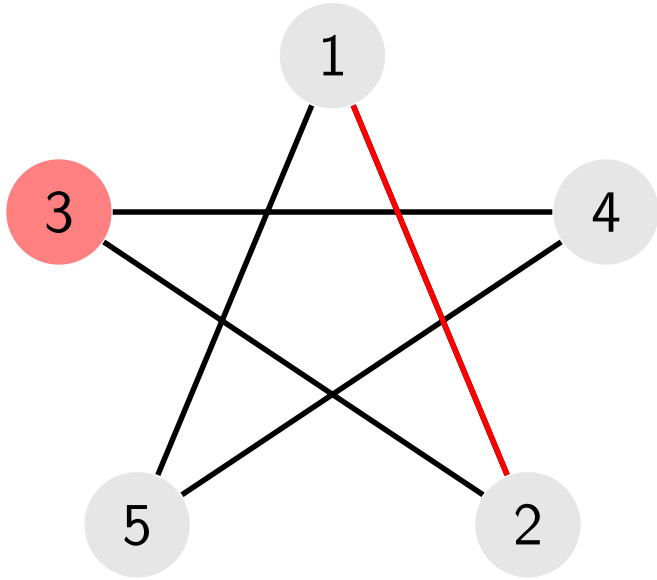
Trær

```
\tikzset{
   treenode/.style = {align=center},

   % Sorte noder
   node_black/.style = {treenode, circle, white,
                        font=\bfseries, draw=black,
                        fill=black, text width=0.8cm},
   % Røde noder
   node_red/.style = {treenode, circle, red, draw=red,
                       text width=0.8cm, very thick},
   % Null-pekere
   node_null/.style = {rectangle, draw=black,
                       minimum width=0.3cm,
                       minimum height=0.3cm}
}
```

Trær

```
\begin{tikzpicture}[->,level/.style={ sibling distance = 2cm,
                    level distance = 1.5cm }]

\node [node_black] {38}
    child {node [node_red] {19}
        child {node [node_black] {12}
            child {node [node_red] {8} }
            child {node [node_null] {} }
        }
        child {node [node_black] {31} }
    }
    child { node [node_black] {41} }
;
\end{tikzpicture}
```

Grafer



- Noder (`vertex`)
- Markerte noder (`selected vertex`)
- Kanter (`edge`)
- Markerte kanter (`selected edge`)

Grafer – noder

```
\node[circle,fill=black!10] (v1) at (0,0) {1};
\node[circle, fill=red!50] (v2) at (0.5,0) {2};
```

Grafer – noder med `tikzstyle`

```
\tikzstyle{vertex} = [circle,fill=black!10]
\tikzstyle{selected vertex} = [vertex, fill=red!50]

% Tegne nodene
\node[vertex]          (v1) at (0,0)   {1};
\node[selected vertex] (v2) at (0.5,0) {2};
```

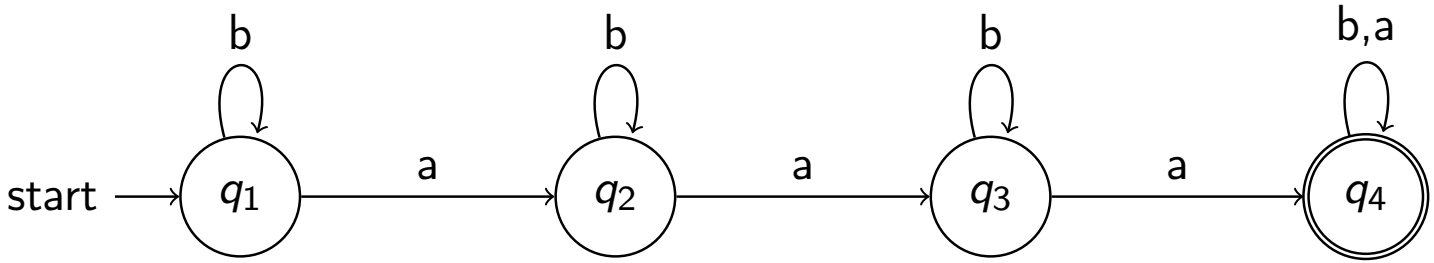
Grafer – kanter

```
\tikzstyle{edge} = [-, black, ultra thick]
\tikzstyle{selected edge} = [edge, red]

% Tegne nodene
\node[vertex] (v1) at (0,0)   {1};
\node[vertex] (v2) at (0.5,0) {2};
\node[vertex] (v3) at (1,0)   {3};

% Tegne kantene
\draw[edge]          (v1) -- (v2);
\draw[selected edge] (v2) -- (v3);
```

Grafer – kanter

```
\begin{tikzpicture}
  \tikzstyle{vertex} = [circle, fill=black!10]
  \tikzstyle{selected vertex} = [vertex, fill=red!50]

  \tikzstyle{edge} = [-, black, ultra thick]
  \tikzstyle{selected edge} = [edge, red]

  \node[vertex]          (v1) at (1.25,1.7) {1};
  \node[vertex]          (v2) at (1.5,1.1)  {2};
  \node[selected vertex] (v3) at (0.9,1.5)  {3};
  \node[vertex]          (v4) at (1.6,1.5)  {4};
  \node[vertex]          (v5) at (1,1.1)    {5};

  \draw[edge]          (v1)--(v2)--(v3)--(v4)--(v5)--(v1);
  \draw[selected edge] (v1)--(v2);
\end{tikzpicture}
```

Automater

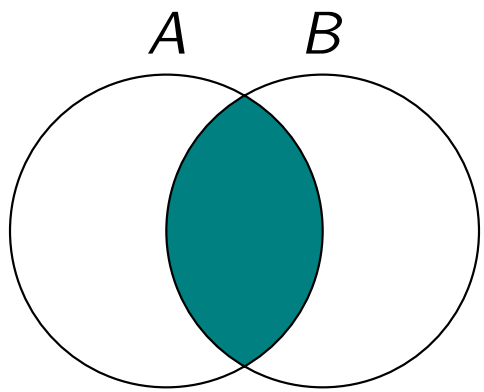


Må inkludere `\usetikzlibrary{automata}`.

Automater

```
\begin{tikzpicture}[->,auto,node distance=3cm,line width=0.2mm]
  \node[initial,state   (A) {$q_1$};
  \node[state] (B) [right of=A] {$q_2$};
  \node[state] (C) [right of=B] {$q_3$};
  \node[state,accepting](D) [right of=C] {$q_4$};

  \path (A) edge [loop above] node {b}   (A)
            edge node {a}   (B)
        (B) edge [loop above] node {b}   (B)
            edge node {a}   (C)
        (C) edge [loop above] node {b}   (C)
            edge node {a}   (D)
        (D) edge [loop above] node {b,a} (D);
\end{tikzpicture}
```

Venn-diagram

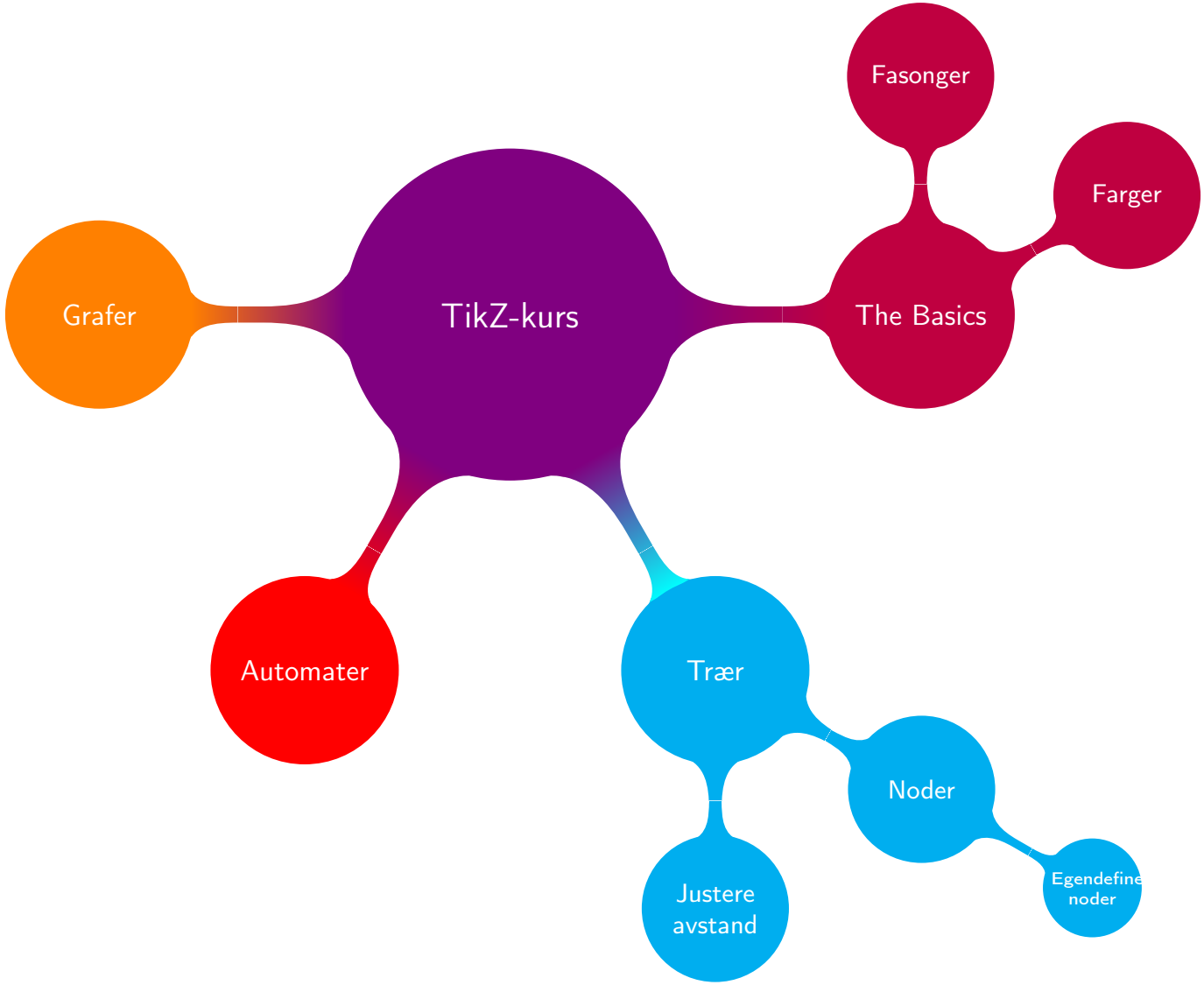


```
\begin{tikzpicture}[fill=teal]
\scope
\clip (1,0) circle (1);
\fill (0,0) circle (1);
\endscope

\scope
\clip (0,0) circle (1);
\fill (1,0) circle (1);
\endscope

\draw (0,0) circle (1) (0,1)  node [text=black,above] {$A$}
      (1,0) circle (1) (1,1)  node [text=black,above] {$B$};
\end{tikzpicture}
```

https://www.bu.edu/math/files/2013/08/tikzpgfmanual.pdf, p. 116

Andre TikZ-biblioteker

mindmap


Fasonger
Farger
Grafer
TikZ-kurs
The Basics
Automater
Trær
Noder
Justere avstand
Egendefine noder

mindmap

```
\begin{tikzpicture}
\path[mindmap,concept color=violet,text=white]
    node[concept] {TikZ-kurs}
    [clockwise from=0]
    child[concept color=purple] {
    node[concept] {The Basics} [clockwise from=90]
        child { node[concept] {Fasonger} }
        child { node[concept] {Farger} }
    }
    child[concept color=cyan] {
    node[concept] {Trær} [clockwise from=-20]
        child { node[concept] {Noder}
            child { node[concept] {Egendefinerte noder}}
        }
        child { node[concept] {Justere avstand} }
     }
    child[concept color=red] { node[concept] {Automater} }
    child[concept color=orange] { node[concept] {Grafer} };
\end{tikzpicture}
```

calendar

```
\begin{tikzpicture}[every day/.style={anchor=mid}]
\calendar (mycalendar) [dates=2018-10-01 to 2018-10-31,week list,
  month label above centered,
  month text=\textcolor{teal}{\%mt} \%y-]
  if (Sunday) [red]
  if (equals=2018-10-23) {\draw[red,thick] (0,0) circle (7pt);};
\end{tikzpicture}
```

«In line» Ti*k*Z

Her er noe tekst med en «in line» Ti*k*Z-figur , og her er noe tekst etterpå.

```
... \tikz{\draw[fill=cyan]  circle(0.2);} ...
```

Takk for meg!

Lære mer?

- TeXample.net
- Ti*k*Z and PGF manual