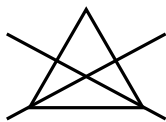


My setup for this presentation:

```
\usepackage{amssymb,mathtools,amsmath}  
\usepackage{alphalph,ifthen,intcalc,verbatim}  
\usepackage[dvipsnames,svgnames]{xcolor}  
  
\usepackage{tikz} \usepackage{tikz-among-us}  
\usetikzlibrary{positioning, patterns, calc,  
    decorations.pathmorphing,  
    decorations.pathreplacing, cd}  
\usepackage[linguistics]{forest}  
  
\usepackage{tcolorbox}  
\tcbuselibrary{listings}
```

GitHub repository:

<https://github.com/boris-a-zolotov/tikz-lesson>



```
\definecolor{stiralka}{RGB}{8,10,63}
```

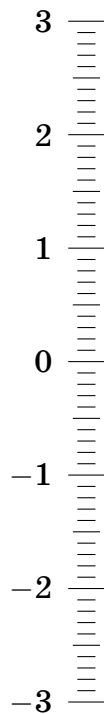
```
% Do not bleach
\begin{tikzpicture}[scale=1.5]
  \draw[very thick]
    (0,{sqrt(3)/2}) -- (-0.5,0)
    -- (0.5,0) -- cycle;
  \draw[very thick]
    (-0.7,0.65) -- ++(1.4,-0.75);
  \draw[very thick,xscale=-1]
    (-0.7,0.65) -- ++(1.4,-0.75);
\end{tikzpicture} \vspace{4cm}
```

```
% Tumble dry, no heat
\begin{tikzpicture}[scale=1.5]
  \fill[stiralka] (0,0) circle[radius=0.4cm];
  \draw[very thick] (-0.5,-0.5) rectangle (0.5,0.5);
\end{tikzpicture}
```



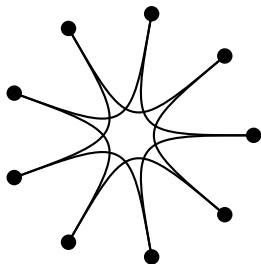
```
\begin{tikzpicture}[scale=1.5,very thick]
% Iron, high temperature
\begin{scope}[yshift=-1cm]
\draw (0.25,0.75) -- (0.85,0.75)
-- (1,0) coordinate[pos=0.4](a)
-- (0,0) to[out=70,in=170] (a);
\foreach \i in {0,1,2}
{\fill[black] (0.35+0.2*\i,0.22)
circle[radius=0.5mm];}
\end{scope}

% Water temperature 30 degrees
\begin{scope}[yshift=-5cm,xshift=0.5cm]
\draw (-0.5,0.75) -- (-0.35,0)
coordinate[pos=0.3333](a)
-- (0.35,0) -- (0.5,0.75)
coordinate[pos=0.6667](b);
\draw[decorate,decoration={coil,amplitude=0.75mm,
segment length=0.38cm,aspect=0}] (a) -- (b);
\draw (0,0.26) node{${\phantom{^{\circ}}30^{\circ}}$};
\end{scope}
\end{tikzpicture}
```

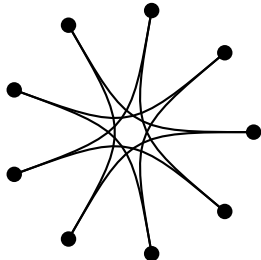


```
\draw
\foreach \c in {-3,...,2} {
  (0.16,\c) -- (-0.16,\c)
  node[left,inner sep=0.2cm]{\(\c\)}
  (0.12,\c+0.5) -- (-0.12,\c+0.5)
  \foreach \cc in {1,2,3,4,6,7,8,9}
    {(-0.08,\c + 0.1*\cc) -- ++(0.16,0)}
} (0.16,3) -- (-0.16,3)
node[left,inner sep=0.2cm]{\(\mathfrak{3}\)};
```

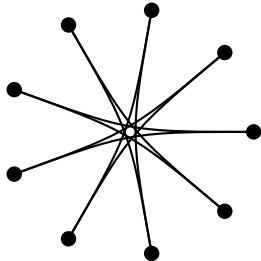
(9,2)



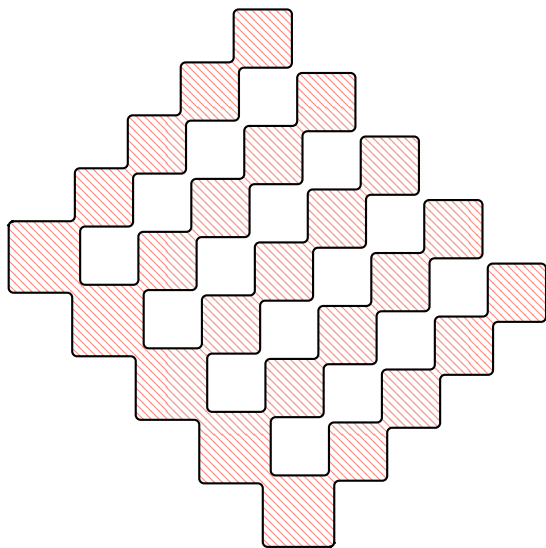
(9,3)



(9,4)



```
\foreach \j in {2,3,4} {  
  \begin{scope}[yshift=-4.3 * \j cm]  
    \draw (-1.6,1.4) node[left]{\(\ (9,\j) \)};  
  
    \foreach \i in {0,...,8} {  
  
      \fill[black] (360/9 * \i : 1.6cm)  
        circle[radius=1mm];  
  
      \draw[thick] (360/9 * \i : 1.6cm)  
        .. controls (0,0) ..  
        ({360/9 * (\i + \j)} : 1.6cm);  
  
    }  
  \end{scope}  
}
```



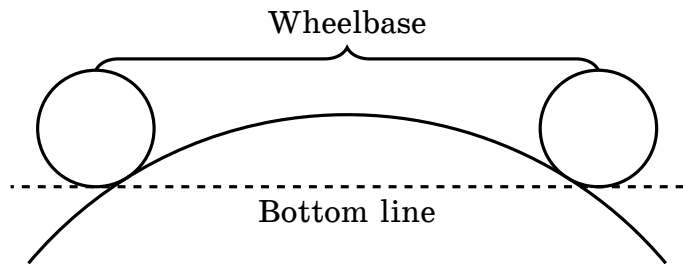
```
\newcommand{\sz}{4}
```

```
\draw[thick,rounded corners=0.65mm,
      pattern=north west lines,
      pattern color=Melon] (0,0)
\foreach \t in {0,...,\sz} {
  -- ++(0.55,0) -- ++(0,0.5)
  \foreach \i in {2,...,\sz} {
    {-- ++(0.5,0) -- ++(0,0.5)}
    -- ++(0.55,0) -- ++(0,-0.55)
    \foreach \i in {2,...,\sz} {
      {-- ++(-0.5,0) -- ++(0,-0.5)}
      -- ++(-0.5,0) -- ++(0,-0.55)
    }
  }

  -- ++(0,-0.075) -- ++(-0.075,0)

\foreach \t in {0,...,\sz} {
  {-- ++(-0.6,0) -- ++(0,0.6)}

  -- ++(0,0.075) -- cycle;
```

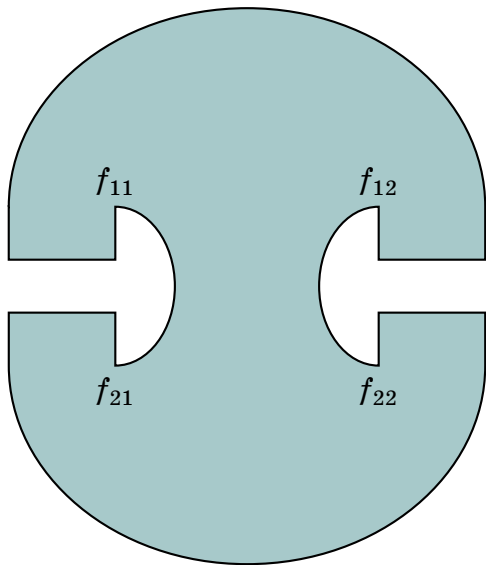


```
\begin{tikzpicture}[very thick,scale=0.55]
  \draw (40:10cm) arc (40:140:10cm);
  \draw (58:11.4cm) circle[radius=1.4cm]
        (122:11.4cm) circle[radius=1.4cm];

  \draw (58:11.4) ++(0,-1.4) coordinate(a);
  \draw (122:11.4) ++(0,-1.4) coordinate(b);

  \draw[dashed] (36:10cm |- a) -- (144:10cm |- b)
    node[midway,below]{Bottom line};

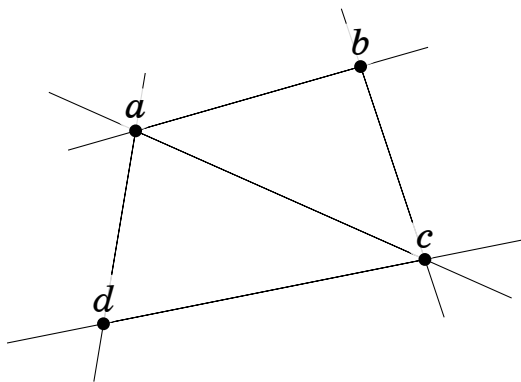
  \draw[decorate,decoration={brace,mirror,
    amplitude=3mm,raise=15.4mm}] (a) -- (b)
    node[midway,above,
      inner sep=20mm]{Wheelbase};
\end{tikzpicture}
```



```
% Penrose Unilluminable Room
```

```
\newcommand{\aaxis}{3}
\newcommand{\baxis}{2.5}
\newcommand{\offset}{1}
\newcommand{\focus}{\sqrt{\aaxis^2-\baxis^2}}

\filldraw[thick,draw=black,fill=CadetBlue,
          fill opacity=0.55,text opacity=1]
  (-\aaxis, \offset)
  arc(180:0:\aaxis cm and \baxis cm)
  -- ++(0, -\offset/1.5) -| ({\focus}, \offset)
  node[above]{$f_{12}$}
  arc(90:270:0.75*\offset cm and \offset cm)
  node[below]{$f_{22}$}
  -- ++(0, \offset/1.5) -| (\aaxis, -\offset)
  arc(0:-180:\aaxis cm and \baxis cm)
  -- ++(0, \offset/1.5) -| ({-\focus}, -\offset)
  node[below]{$f_{21}$}
  arc(-90:90:0.75*\offset cm and \offset cm)
  node[above]{$f_{11}$}
  -- ++(0, -\offset/1.5) -| cycle;
```

```

\newcommand{\namenode}[1]{
  \draw (#1) node[above,circle,fill=white,
    fill opacity=0.85,text opacity=1,
    inner sep=0.35ex][{\large $#1$}]
    node[circle,fill=black,inner sep=0.6mm](#1){ }; }

\newcommand{\lconnect}[2]{\draw (#1) -- (#2)
  coordinate[pos=-0.3](#1f#2)
  coordinate[pos=1.3](#2f#1)
  (#1f#2) -- (#2f#1); }

\coordinate (a) at (0.5,3); \coordinate (b) at (4,4);
\coordinate (c) at (5,1); \coordinate (d) at (0,0);

\lconnect{a}{b} \lconnect{b}{c} \lconnect{c}{d}
\lconnect{d}{a} \lconnect{a}{c}

\namenode{a} \namenode{b} \namenode{c} \namenode{d}

```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8 | | | | | | | |
| 7 | | | | | | | |
| 6 | | | | | | | |
| 5 | | | | | | | |
| 4 | | | | | | | |
| 3 | | | | | | | |
| 2 | | | | | | | |
| 1 | | | | | | | |
| | A | B | C | D | E | F | G |

```

\foreach \x in {0,...,7}
  \foreach \y in {0,...,7} {
    \ifthenelse{\intcalcMod{\x+\y}{2}=0}
      {\fill[RawSienna!55!white]}
      {\fill[RawSienna!5!white]}
      (\x,\y) rectangle ++(1,1);
  }

\foreach \i in {1,...,8} {
  \node (a\i) at (\i-0.5, -0.5) {\AlphAlph{\i}};
  \node (d\i) at (-0.5, \i-0.5) {\i};
}

\draw[step=1cm, black] (0,0) grid (8,8);

```

Aa ag

Aa ag

```
\draw (-2.5,0) -- (2.5,0);

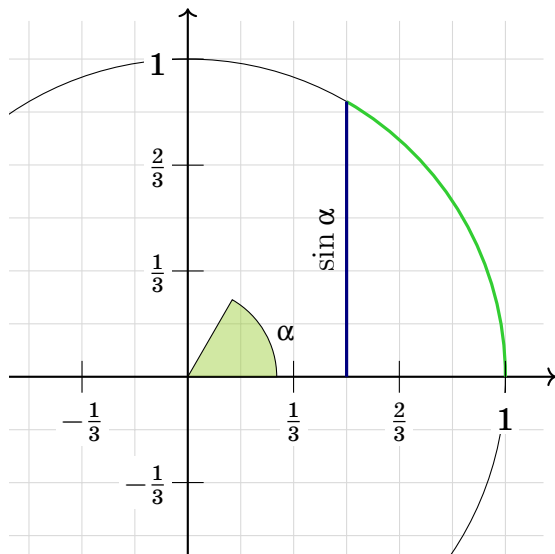
\draw (-0.08,0) node[Dandelion,fill=black,left,
    rectangle,inner xsep=0.6mm,inner ysep=2mm]{\Huge Aa};

\draw (0.08,0) node[Dandelion,fill=black,right,
    rectangle,inner xsep=0.6mm,inner ysep=2mm]{\Huge ag};

\draw (-2.5,-3.5) -- (2.5,-3.5);

\draw (-0.08,-3.5) node[Dandelion,fill=black,left,
    rectangle,inner xsep=0.6mm,inner ysep=2mm,
    text height=4ex,text depth=1ex]{\Huge Aa};

\draw (0.08,-3.5) node[Dandelion,fill=black,right,
    rectangle,inner xsep=0.6mm,inner ysep=2mm,
    text height=4ex,text depth=1ex]{\Huge ag};
```



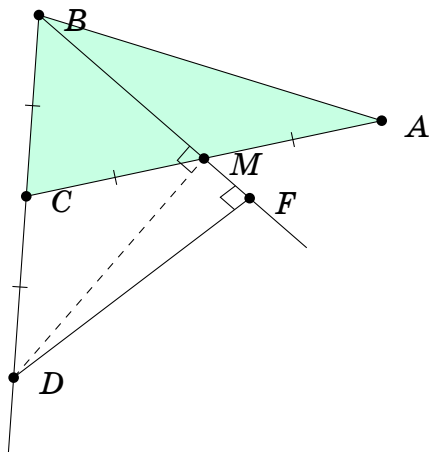
```
\clip (-0.56,-0.56) rectangle (1.16,1.16);
```

```
\foreach \x in {-6,...,6} {
  \draw[thin,black!15!white] (-1.12, \x/6) --
    (1.12, \x/6) (\x/6, -1.12) -- (\x/6, 1.12);}
\draw[thick,->] (-1.16,0)--(1.16,0);
\draw[thick,->] (0,-1.16)--(0,1.16);
\draw (0,0) circle[radius=1cm];
```

```
\draw[very thick,LimeGreen] (0:1cm) arc (0:60:1cm);
\draw[very thick,NavyBlue] (60:1cm) -- (60:1cm |- 0,0)
  node[black,midway,above,rotate=90] {\sin \alpha};
```

```
\filldraw[fill=YellowGreen,fill opacity=0.45,
  draw=black] (0,0) -- (0.28,0) arc (0:60:0.28)
  node[black,anchor=south west,inner sep=0.3ex,
  pos=0.35,text opacity=1]{\alpha} -- cycle;
```

```
\foreach \t / \ttext in {1, -1, 0.333 / \frac13,
  -0.333 / -\frac13, 0.666 / \frac23} {
  \draw (\t,0.05) -- (\t,-0.05) node[below,fill=white,
    inner sep=0.3ex,text height=2.2ex]{\ttext};
  \draw (0.05,\t) -- (-0.05,\t) node[left, fill=white,
    inner sep=0.3ex,text height=2.2ex]{\ttext};}
```



```

\newcommand{\midmark}[2]{\draw ($(#1)!0.5!(#2)!1mm!90:(#2)$)
-- ($(#1)!0.5!(#2)!1mm!270:(#2)$);}

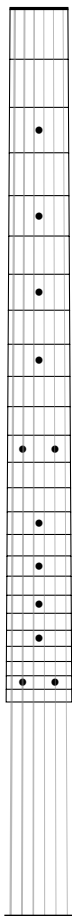
\newcommand{\perpmark}[3]{
\coordinate (#1#2) at ($(#2)!2.5mm!(#3)$);
\draw ($(#2)!2.5mm!(#1)$) -- +($(#1#2)-(#2)$) -- (#1#2);}

\coordinate (C) at (0,0); \coordinate (A) at (4.7,1);
\coordinate (B) at ($(C) ! 0.5 ! 74:(A)$);
\coordinate (M) at ($(C) ! 0.5 ! (A)$);
\coordinate (D) at ($(C) ! -1 ! (B)$);
\coordinate (F) at ($(M) ! -0.8cm ! (B)$);

\filldraw[fill=SpringGreen!22] (C)--(A)--(B)--cycle;
\draw (C) -- ($(D)!-1cm!(C)$) (B) -- ($(F)!-1cm!(B)$);
\draw[dashed] (D) -- ($(M)!(D)!(B)$); \draw (D)--(F);
\midmark{M}{A} \midmark{M}{C} \midmark{C}{B} \midmark{C}{D}
\perpmark{D}{M}{B} \perpmark{D}{F}{B}

\foreach \lbl in {A,B,C,D,M,F} {
\fill (\lbl) circle[radius=0.7mm]
++(-20:2mm) node[right]{\(\lbl\)};}}

```



```

\newcommand{\fr}[1]{pow(2, -1/12 * #1)}
\newcommand{\py}[1]{{16*\fr{#1}}}
\newcommand{\px}[1]{{ 0.6 cm - \fr{#1}*0.09 cm}}
\newcommand{\nx}[1]{{-0.6 cm + \fr{#1}*0.09 cm}}

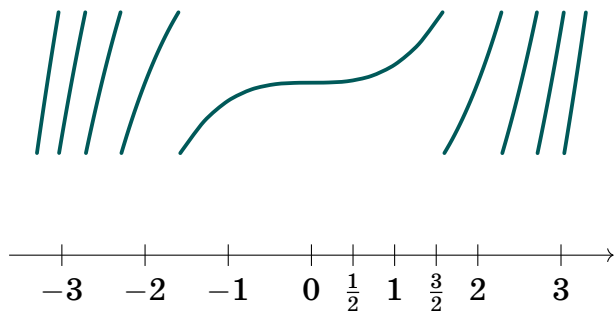
\newcommand{\lad}[2]{\node at
  ($(\0, \py{(#1-1)}) ! 0.5 ! (\0, \py{#1})$)
  {\Large #2}}

\foreach \t in {3,5,7,9,15,17,19,21} {\lad{\t}{.};}
\lad{12}{.\ .}; \lad{24}{.\ .};
\draw \foreach \t in {1,...,25} {
  (\nx{(\t-1)}, \py{(\t-1)}) -- (\nx{\t}, \py{\t}) --
  (\px{\t}, \py{\t}) -- (\px{(\t-1)}, \py{(\t-1)})
};

\foreach \t / \w in {0 / 0.08, 1 / 0.10, 2 / 0.14,
  3 / 0.22, 4 / 0.26, 5 / 0.3}
{\draw[line width=\w mm,color=gray,opacity=0.54]
  (0.5 - 0.2*\t, 0) -- (0.425 - 0.17*\t, 16);}

\draw[very thick] (-0.52, 16) -- (0.52,16)
  (-0.61,0) -- (0.61,0);

```



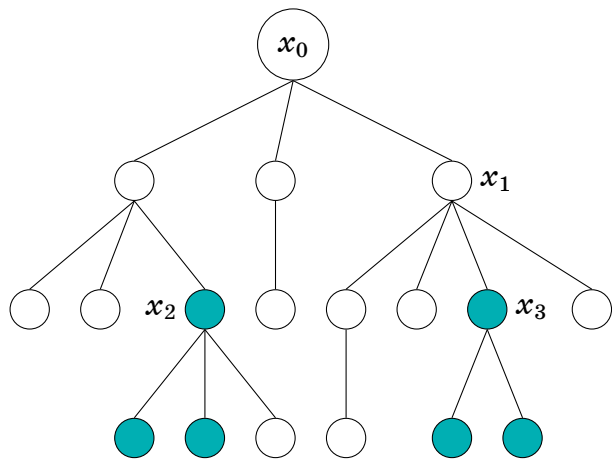
```
\begin{tikzpicture}[xscale=1.1,yscale=1.9,
  declare function={
    sdrob(\x) = Mod(\x+0.5, 1) - 0.5;
    main(\x) = (0.5 * \x)^3;
    invmain(\x) = \x^(1/3) * 2;}]

\draw[->] ({invmain(-6)}}, -1.2)
  -- ({invmain(6)}}, -1.2);

\foreach \x / \xtext in {0 / 0, -1 / -1,
  0.5 / \frac{1}{2}, 1.5 / \frac{3}{2},
  1 / 1, 2 / 2, 3 / 3, -2 / -2, -3 / -3}
{\draw (\x cm,-11.25 mm) -- (\x cm,-12.75 mm)
  node[below, text height=1.6ex]{\xtext}};

\foreach \t in {-4,...,4} {
  \draw[domain=invmain(\t-0.49):invmain(\t+0.49),
    variable=\x, samples=12, Cyan!35!black,
    line cap=round, line width=0.5mm,
    smooth] plot({\x}, {sdrob(main(\x))});
}
\end{tikzpicture}
```

A Tree:

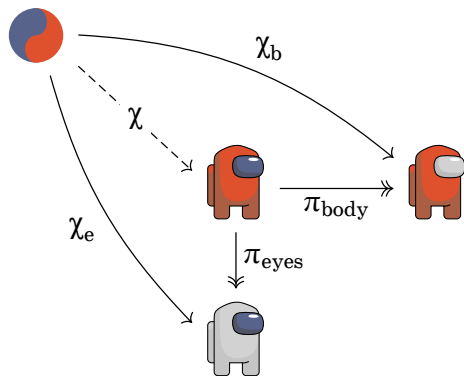


```

\newcommand{\tblue}{\fill=TealBlue}

\begin{forest} for tree={circle,draw,l=1.7cm,%
  s sep=4mm,minimum size=2.7ex,inner sep=0.5ex}
  [$x_0$,alias=ROOT
  [
    [ ,before drawing tree={x-=0.45cm}]
    [ ,before drawing tree={x-=0.45cm}]
    [ ,\tblue,alias=X2
      [ ,\tblue] [ ,\tblue] [ ]
    ] [ [ ]]
  ] ,alias=X1
  [ [ ]] [ ]
  [ ,\tblue,alias=X3
    [ ,\tblue] [ ,\tblue]]
  [ ,before drawing tree={x+=0.45cm}]
  ]
]
\node[left=-0.05cm of X2]{$x_2$};
\node[right=-0.05cm of X3]{$x_3$};
\node[right=-0.05cm of X1]{$x_1$};
\node[above=0.5cm of ROOT]{A Tree:};
\end{forest}

```

```

\colorlet{Body}{RedOrange!70!BrickRed}
\colorlet{Eyes}{Cerulean!45!Indigo!55!Navy}
\tikzcdset{every label/.append style = {font=\normalsize}}

\begin{tikzcd}[column sep=large] \tikz{
  \fill[Eyes] (0,0.36) arc(90:270:0.36);
  \fill[Body] (0,0.36) arc(90:-90:0.36);
  \fill[Eyes,xscale=0.8] (0, 0.18) circle [radius=0.18];
  \fill[Body,xscale=0.8] (0,-0.18) circle [radius=0.18];
}
  \ar[dr, "\chi" description, dashed]
  \ar[ddr, "\chi_{\text{e}}", bend right=14]
  \ar[dr, "\chi_{\text{b}}", bend left=18,
    start anchor={[yshift=-0.1cm]east},
    end anchor={[yshift=0.7cm]west}] \\

& \tikz{\amongUsI[scale=0.17]{Body}{Eyes}}
  \ar[d, "\pi_{\text{eyes}}", two heads]
  \ar[r, "\pi_{\text{body}}", two heads, shift left=2.75]
& \tikz{\amongUsI[scale=0.17]{Body}{gray!35}} \\

& \tikz{\amongUsI[scale=0.17]{gray!35}{Eyes}}
\end{tikzcd}

```