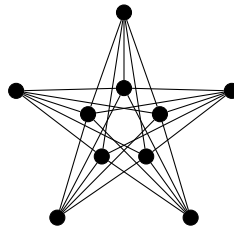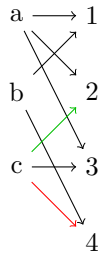# The *graphs* package in Ti*k*Z
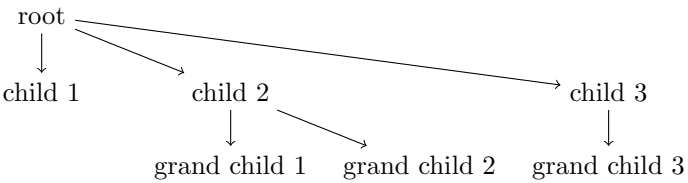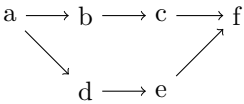
Gerald Todd

University of Montana

This is a list of examples of how to draw graphs using the *graphs* package in Ti*k*Z. Everything in this package can be achieved using only basic \node and \draw commands, but the *graphs* package automates an incredible amount of this, understanding complete graphs, complete bipartite 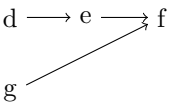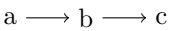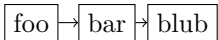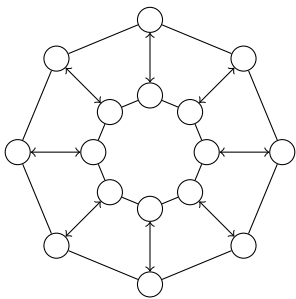graphs, cycles graphs, paths, node chains, and using complex algorithms to place the vertices in the best positions (most of the time).
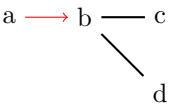
This document only makes sense when viewing the source code (Graphs.tex) at the same time as the figures. All explanations are comments in the code.
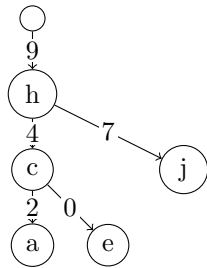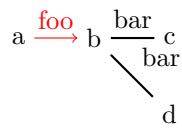
Here, we will only scratch the surface of what *tikz/graphs* can do. If you want a more intimate knowledge of how to use this a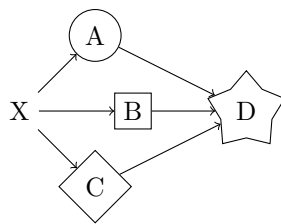nd how it works, see the documentation here: `http://ftp.math.purdue.edu/mirrors/ctan.org/ graphics/pgf/base/doc/pgfmanual.pdf`.

foo → bar → blub

$a \longrightarrow b \longrightarrow c$

$d \longrightarrow e \longrightarrow f$

g

$x_1 \longrightarrow x_2 \rightarrow x_3, x_4$

$a \longrightarrow b \longrightarrow c \longrightarrow f$

$d \longrightarrow e$

root

child 1   child 2   child 3

grand child 1   grand child 2   grand child 3

Edge Labels and Styles

$a \longrightarrow b$ — c

d

$$a \xrightarrow{\text{foo}} b \xrightarrow[\text{bar}]{\text{bar}} c$$

d

9

h

4   7

c   j

2   0

a   e
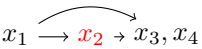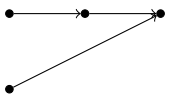
Node Sets: More Exact Placement

$$A \longrightarrow B \longrightarrow C$$
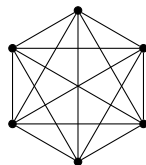
A

X ⟶ B ⟶ D

C

Macros! Beautiful, Wonderful Macros!
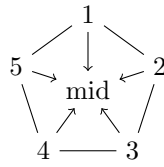
1

6   2

5   3

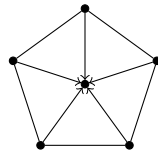4
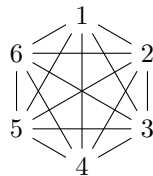
Drawn in 40 characters.
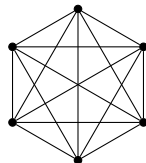
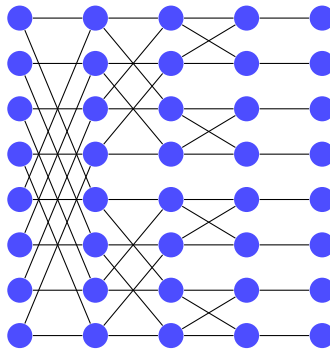*With regular vertices. Drawn in 90 characters. Improvement below.*

Drawn in 45 characters.

Drawn in 45 characters.

Drawn in 50 characters.

Butterfly connectors

A Closer Look at the Syntax of *graphs*

$$\text{out} \diagup \underset{\text{in in}}{1} \diagdown \text{out}$$

out — 1 — out

5   in in   2

in   in

out — 4 — in — 3 — out

out

(pentagon graph with nodes 1, 2, 3, 4, 5 labeled "in"/"out")

a ⟶ b ⟶ d

c
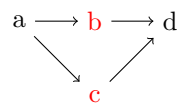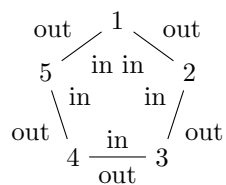
Setting options local to just one node group

$a \longrightarrow a_1 \longrightarrow x_1$

$\searrow y_1$

$a_2 \longrightarrow x_2$

$\searrow y_2$

$a_3 \longrightarrow x_3$

$\searrow y_3$

b
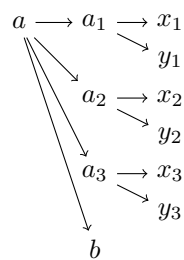
Result of using foreach in graphs

$1 \longrightarrow 2 \longrightarrow 3 \longrightarrow 4$

A chain of dynamic length