STAT 539 Graph tricks with Pstricks

... and a word about Beamer

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What is Pstricks?

- **pstricks** is a very powerful, versatile package for including graphics in LaTeX documents
- usage `\usepackage{pstricks}` or `\usepackage{pstcol,pst-node}` (matrices only)\(^1\)

- Drawback: you must provide absolute coordinates
- Remedy: the package `pst-rel-points` lets you provide relative coordinates

- The part that I found more useful is `pst-node` the matrix drawing package
  - simple syntax
  - aligns “nodes” in rows and columns automatically (no need to calculate coordinates)
  - with connectors and node labels you can draw many useful “pictures” easily

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\(^1\)I’ll return to matrices in a few slides
Example - a DAG drawn with `pspicture`

\begin{pspicture}(-1,-2)(21,14)
\rput(1.5,1){\ovalnode{X}{X-ray}}
\rput(12.5,1){\ovalnode{D}{Dyspnoea}}
\rput(3,7){\ovalnode{T}{Tuberculosis}}
\rput(8,7){\ovalnode{L}{Lung cancer}}
\rput(13,7){\ovalnode{B}{Bronchitis}}
\rput(3,11.5){\ovalnode{A}{Asia}}
\rput(8,11.5){\ovalnode{S}{Smoker}}
\ncline{->}{A}{T}
\ncline{->}{S}{L}
\ncline{->}{T}{X}
\ncline{->}{L}{D}
\ncline{->}{T}{D}
\ncline{->}{B}{D}
\end{pspicture}
Same DAG drawn with \texttt{pst-node}

\begin{psmatrix}[mnode=oval,colsep=.3cm, rowsep=.3cm]
\[\text{name=A}\] Asia & \[\text{name=S}\] Smoker \\
\[\text{name=T}\] T & \[\text{name=L}\] L & \[\text{name=B}\] B \\
\[\text{name=X}\] X & & \[\text{name=D}\] D
\end{psmatrix}

\psset{linewidth=1pt,arcangle=-30}
\begin{psmatrix}

\ncline{->}{A}{T}
\ncline{->}{S}{L}
\ncline{->}{T}{X}
\ncline{->}{L}{X}
\ncline{->}{T}{D}
\ncline{->}{L}{D}
\ncline{->}{B}{D}
\end{psmatrix}

- alignment is done automatically
- using the optional node labels allows for moving the nodes around
Same DAG drawn with \texttt{pst-node}, no node labels

with no node labels, one needs to provide absolute matrix coordinates
Adding colors, changing line styles, arcs

\psset{linewidth=1pt,arcangle=-30}
\begin{psmatrix}[mnode=oval,colsep=.3cm, rowsep=.7cm]
[\text{name=A}] \text{Asia} & [\text{name=S}, \text{fillstyle=solid, fillcolor=red}] \text{Smoker} \\%
[\text{name=T}] \text{T} & [\text{name=L}] \text{L} & [\text{name=B}] \text{B} \\%
[\text{name=X}, \text{fillcolor=blue, fillstyle=solid}] \text{X} & & [\text{name=D}] \text{D} \\%
\ncline{->}{A}{T}
\ncline{->}{S}{L}
\ncline{->}{T}{X}
\ncline{->}{L}{X}
\ncline{->}{T}{D}
\ncline{->}{L}{D}
\ncline{->}{B}{D}
\ncline{-}{T}{L}
\ncline[-]{-}{B}{L}
\ncarc{-}{T}{B}
\end{psmatrix}
Package quirks

\texttt{pstricks} doesn't work with \texttt{pdflatex}

\texttt{latex} \texttt{12-pstricks.tex}
\texttt{dvips -o 12-pstricks.ps 12-pstricks.dvi}
\texttt{ps2pdf 12-pstricks.ps 12-pstricks.pdf}

\texttt{matrix environment \texttt{pst-node} is fragile in Beamer}

See the Beamer section.
Why Beamer? (or why not?)

Why use Beamer to make slides?

- looks professional
- makes reusable slides/notes/handouts/papers
  - the `handout` option suppresses overlays (& saves paper)
    \documentclass[8pt,handout]{beamer}
  - allows the usage of other latex tools
    - toc
    - index
    - bib files
- powerful
  - overlays
  - hyperlinks
  - multimedia (?)

Why NOT use Beamer?

- making talks is SLOW
the `psmatrix` environment is **fragile**

\begin{frame}[fragile]{Same DAG drawn with \texttt{pst-node}}

the short version of \texttt{verbatim} is fragile

e.g. \begin{frame}[fragile]{Package quirks with Beamer}

\texttt{pstcol} is automatically loaded by Beamer

error if you include it with \texttt{usepackage}