

Ticking the TikZ Box

Creating Diagrams with PGF/TikZ

Andrew Mundy

andrew.mundy@cs.man.ac.uk

Installing TikZ

Not necessary for *new* TeXLive installs...

Sadly, this does not include School of CS Machines!

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3. Extract the package in `.../texmf/`

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1. Create a `texmf` directory
2. Download the PGF/TikZ package
3. Extract the package in `.../texmf/`
4. Run `texhash`

Using TikZ

- Include `\usepackage{tikz}` in your *preamble*
- Place TikZ commands in the `tikzpicture` environment

```
% ...  
\usepackage{tikz}  
% ...  
\begin{document}  
  % ...  
  \begin{tikzpicture}  
    % TikZ Commands go here  
  \end{tikzpicture}  
  % ...  
\end{document}
```

Drawing Primitives

TikZ provides three drawing primitives:

1. `\path [options] co-ordinates ;`
2. `\draw [options] co-ordinates ;`
3. `\fill [options] co-ordinates ;`

And three co-ordinate systems:

Cartesian (*x units, y units*)

Polar (angle in degrees:magnitude *units*)

Named (predefined arbitrary name)

Shapes and Lines


We've seen the syntax for drawing rectangles, there's more...

Rectangle `rectangle (corner)` 

Circle `circle [options]` 

Ellipse `ellipse [options]` 

Curved Lines `.. controls (-) and (-) ..` 

Arcs `arc [options]` 

Nodes and Text

Amongst other things, nodes provide a way of adding text to a diagram.

```
\node at (...) [options] (name) {content};
```

Hello, Node!

```
\begin{tikzpicture}  
  \node {Hello, Node!};  
\end{tikzpicture}
```

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\begin{tikzpicture}  
  \node [draw] {Hello, Node!};  
\end{tikzpicture}
```

Nodes and Text

Amongst other things, nodes provide a way of adding text to a diagram.

```
\node at (...) [options] (name) {content};
```



Hello, Node!

```
\begin{tikzpicture}
  \node [draw, thick, fill=yellow] {Hello, Node!};
\end{tikzpicture}
```

Nodes and Text

Amongst other things, nodes provide a way of adding text to a diagram.

```
\node at (...) [options] (name) {content};
```

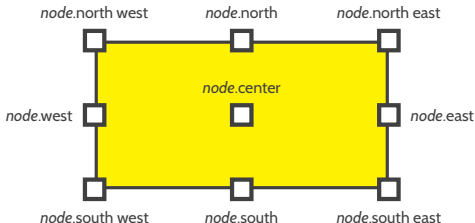


Hello, Node!

```
\begin{tikzpicture}  
  \node [draw, thick, fill=yellow, font=\it] (Hello, Node!);  
\end{tikzpicture}
```

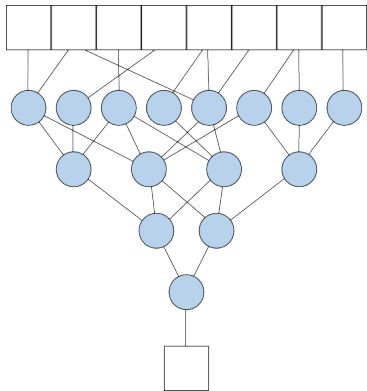
Nodes, Anchors and Co-ordinates

Nodes also provide our arbitrary co-ordinates/points.



Putting it all Together

Let's try to recreate this diagram:

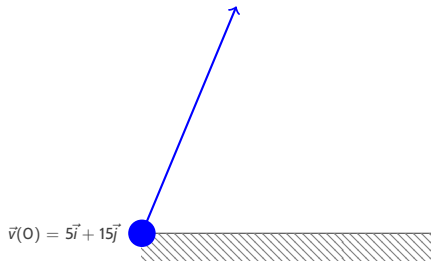


Assume structure is constant,
but connections variable.

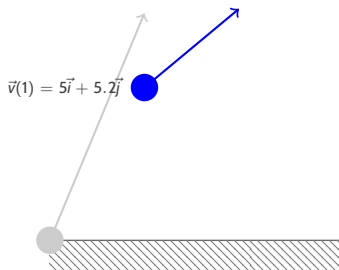
How do we:

- **position nodes?**
- **place edges?**

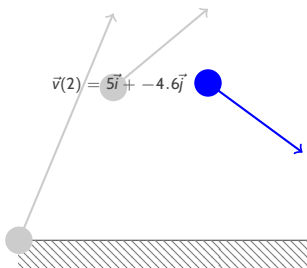
Animating a Diagram – Free Body Projection



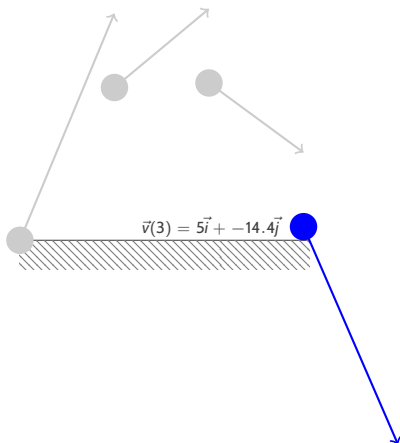
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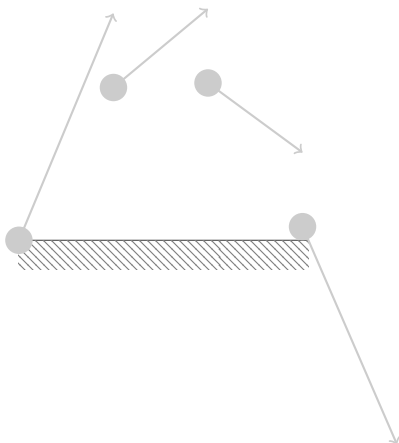
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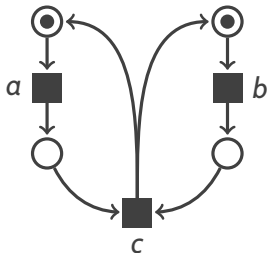
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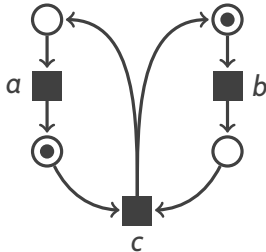
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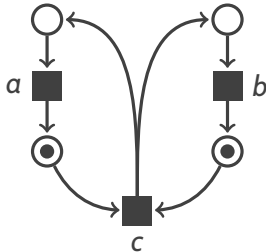
Petri Nets, Illustrating Chains and Matrices



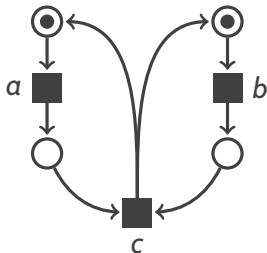
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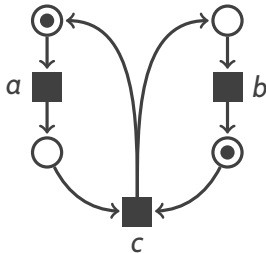
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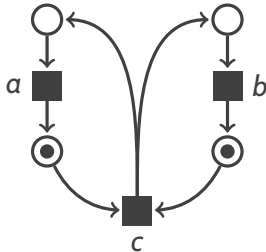
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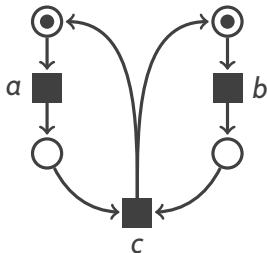
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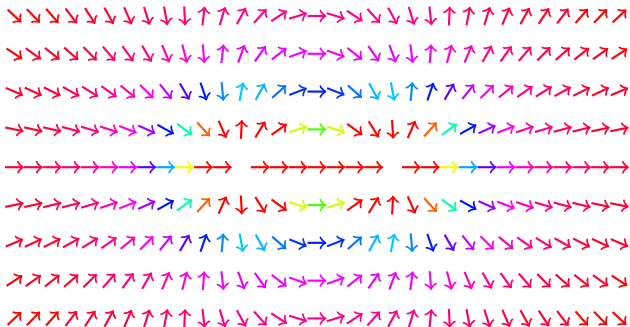
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Vector Fields (Charged Particles)



Useful Resources

- <http://texample.net> - Examples
- The PGF Manual (Sourceforge)

Slides <http://amundy.co.uk/documents/tikzbox-beamer.pdf>

Handout <http://amundy.co.uk/documents/tikzbox-article.pdf>

Sources <https://github.com/AndrewMundy/tikz-box>