An introduction to LaTeX, as well as Bibtex, Beamer, Tikz, and all that (Part deux)

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Last week, we have covered, among other things:

- Conceptual considerations: text processors (WYSIWIG) vs text editors
- Installation and file types
- Syntax for commands, packages, special characters
- How to structure documents
- Main commands, environments, typesetting tricks
- Basics of math typesetting
- Debugging

Any questions, comments, suggestions?

For today, this will be the plan:

Why should you use Bibtex?

- After entering a bibliographic item **you reuse the same entry**. This is efficient; a reference needs only be entered once in this database.
- Only **one bibliography file** is required (but you can use several).
- The **style** of the bibliography or reference list is determined by a simple parameter.

In the text, you will use `\cite` to make reference. I recommend to use the package `natbib`. E.g.

```
I recommand \citet[p.~225]{Davey(2002)}.
I recommand another approach
\citep[see][p.~225][Davey(2002)].
I recommand \citealp[p.~225]{Davey(2002)} for another
 approach.
```

The result is:

I recommand Davey & Priestley (2002, p. 225).
I recommand another approach (see Davey & Priestley, 2002, p. 225).
I recommand Davey & Priestley, 2002, p. 225, for another approach.

LaTeX will print a title (References, Bibliography), followed by a list. Where you want it to be printed, you write, *e.g.*:

```
\singlespacing
\bibliographystyle{apa}
\bibliography{../../../../bibliography}
```

The standard styles distributed with BibTeX include:

- alpha: Sorted alphabetically. Labels are formed from name of author and year of publication.
- plain: Sorted alphabetically. Labels are numeric.
- abbrv: Like plain, but more compact labels.

Journals often distribute their own.

An entry in your .bib file will like like this:

```
@BOOK{Harper(1976),
editor = {Harper, William L. and Hooker, Clifford Alan},
title = {Foundations and {P}robability {T}heory},
series = {The University of Western Ontario series},
year = {1976},
pages = {309},
volume = {6},
publisher = {D. Reidel Publishing Company},
address = {Dordrecht-Holland}
}
```

There are many softwares to manage bibliographical entries. I don't use them though...

There is a nice option on Google scholar to get those.

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Also, you will find out that it's convenient to systematically organize your folders to take full advantage of this system!

You can use the class `slides`, but the result is "primitive".

I recommend to use the package `beamer` by Till Tantau. In the preamble, you include the following:

```
\documentclass{beamer}
\mode<presentation>
\usetheme{Warsaw} %I prefer Darmstadt
```

Other information is:

```
\author
\title
\subtitle
\institution
\date
```

Each page is called a `frame` and is enclosed in the frame environment:

```
\ begin{frame}
\frametitle{Conclusions}
The text on the page goes here.
\ end{frame}
```

You can have a special frame for your title page:

```
\ begin{frame}
\titlepage
\ end{frame}
```

Useful options for frame are:
`[fragile]`, `[allowframebreaks]`, `[shrink]`, `[squeeze]`.

The simplest, but not very flexible way to produce overlay is to issue the command \pause:

```
\begin{itemize}
\item Appears on all slides of the frame.\pause
\item Appears from the second slide onwards.\pause
\item Appears from the third slide onwards.
\end{itemize}
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More overlay power:

- The argument of `\only` is simply discarded on slides where it's not shown, i.e., it occupies no space.
- The argument of `\uncover` is either transparent or invisible outside slides for which it is not specified.

Using overlay specifications:

```
\only<1>{This line is shown only on slide 1.}\\
\only<2>{This line is shown only on slide 2.}\\
\uncover<2>{This line is occupied on 1 and shown on 2.}\\
\uncover<1-2>{This line is shown on slide 1 and 2.}\\
```

This line is shown only on slide 1.

This line is shown on slide 1 and 2.

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```

This line is shown only on slide 2.
This line is occupied on 1 and shown on 2.
This line is shown on slide 1 and 2.

Using overlays with environments

```
\ begin{frame}
\begin{block}{theorem}<2-> There exists an infinite
set. \end{block}
\begin{block}{proof}<3-> This follows from the axiom of
infinity. \end{block}
\ end{frame}
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theorem

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proof

This follows from the axiom of infinity.

Overlays can also be used for **highlighting**:

```
\ begin{frame}
\textbf{This line is bold on all three slides.}\\
\textbf<2>{This line is bold only on the second slide.}\\
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When you want to distribute your slides, you can use the option ‘handout’:

```
\documentclass[handout]{beamer}
```

It will simply compile the document and ignore all the pauses, onlys, uncovers, and such.

There are 5 types of themes.

Global Theme: It defines all aspects of your slides: fonts, colours, labels for itemized list, etc. Ex: Antibes, Goettingen, AnnArbor, Berlin

```
\usetheme{Marburg}
```

Colour themes: It defines the colours used. Ex: seahorse, albatross, beaver

```
\usecolortheme{seahorse}
```

Font themes: It defines the fonts used.

```
\usefonttheme{serif}
```

Inner themes: It only define elements "inside" of the frame, e.g. enumerations, itemize environments, block environments, theorem environments, or the table of contents.

```
\useinnertheme{rounded}
```

Outer themes: It only defines "outside" elements of the frame, e.g. headline, footline, or sidebars.

```
\useoutertheme{sidebar}
```

To use images, you simply use (as always) the

```
\includegraphics{filename}
```

You can use options such as

```
\includegraphics[width=.4\textwidth]{filename}
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or specify the size in inches, cms, or use the 'scale' option. You can specify the height instead.

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It requires the package `graphics`.

To manage my content well, I like to use the `textblock` environment.

```
\usepackage[absolute,overlay]{textpos}
```

Then, in the body:

```
\begin{textblock*}{108mm}(10mm,15mm)
content
\end{textblock*}
```

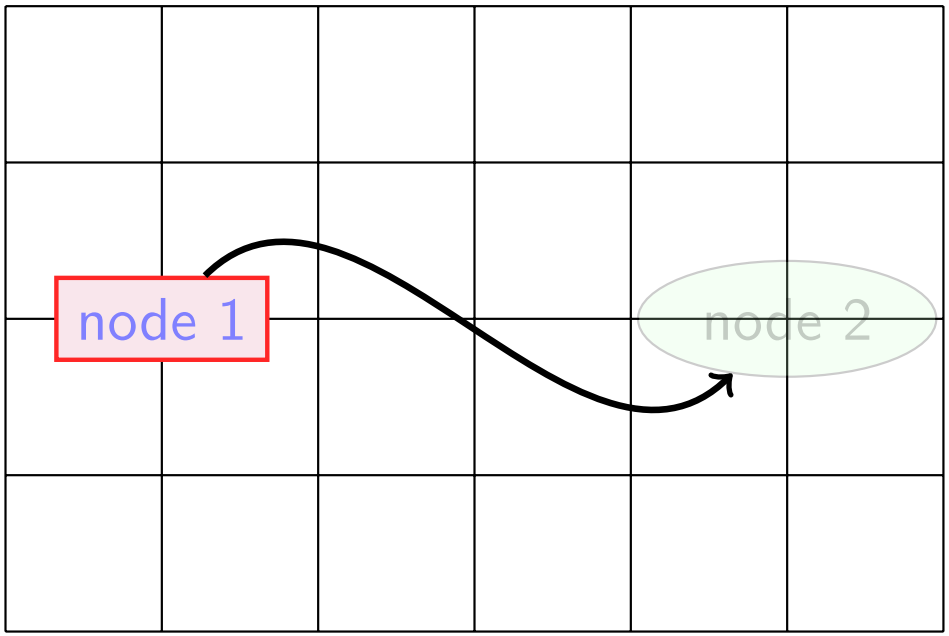
Default beamer slide is 128mm x 96mm, with (0,0) begin top left corner.

To really impress, you can use an awesome graphics package called TikZ.

A basic example is this:

```
\begin{tikzpicture}[scale=.8]
\draw (-1,-2) grid (5,2);
\draw (0,0) node[thick,blue!50,draw=red!85,fill=purple!10]
                                        (name1) {node 1};
\draw (4,0) node[draw,ellipse,fill=green!20,opacity=.2]
                                        (name2) {node 2};
\draw (name1) edge[out=45,in=225,very thick,->] (name2);
\end{tikzpicture}
```

The result of last slide's code is:



Two great sources are these:

- TikZ/PGF Manual (Google it); it's an extensive manual with many examples to use as a reference book.
- TikZ/PGF Gallery (Google it); it's a gallery of awesome things that can be done, with the code so you can replicate/adapt to your needs!

For anything else, Google it!

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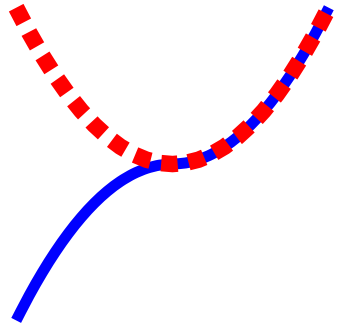
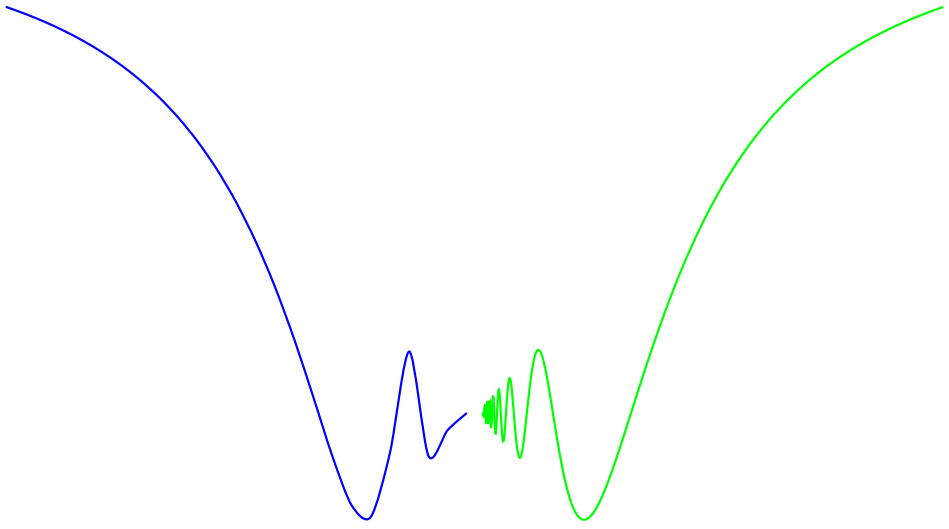
I suggest you look at this site:
`http://www.texample.net/tikz/examples/`



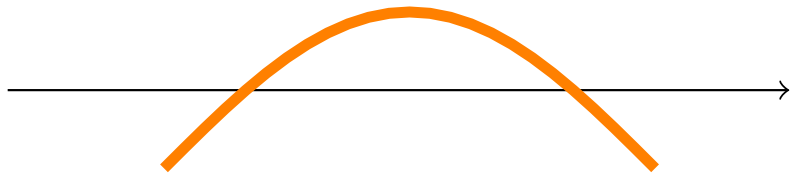
(Note: this uses 7-digit fixed-point arithmetic.)

```
\begin{tikzpicture}
\draw[domain=-1:1,blue,line width=2pt,smooth]
 plot ({\x},{\x^2});
\draw[domain=-1:1,red,dotted,line width=3pt]
 plot ({\x},{\x*\x});
\end{tikzpicture}
```



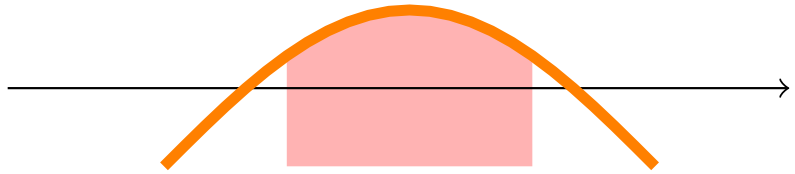
(Note: default trig angle is in degrees.)

```
\begin{tikzpicture}
\draw[domain=0.05:3,smooth,variable=\x,blue]
 plot ({-\x},{\x*sin(pi/\x r)});
\draw[domain=0.05:3,smooth,variable=\x,green,samples=500]
 plot ({\x},{\x*sin(pi/\x r)});
\end{tikzpicture}
```



(Note: you can use overlay in beamer.)

```
\begin{tikzpicture}
\uncover<2->{\fill[fill=red,opacity=.3] (pi/4,0) --
plot [domain=pi/4:3*pi/4] (\x,{sin(\x r)}) -- (3*pi/4,0)
 -- cycle;}
\draw[orange,domain=0:pi,line width=2pt]
plot (\x,{sin(\x r)});
\end{tikzpicture}
```



(Note: you can use overlay in beamer.)

```
\begin{tikzpicture}
\uncover<2->{\fill[fill=red,opacity=.3] (pi/4,0) --
plot [domain=pi/4:3*pi/4] (\x,{sin(\x r)}) -- (3*pi/4,0)
 -- cycle;}
\draw[orange,domain=0:pi,line width=2pt]
plot (\x,{sin(\x r)});
\end{tikzpicture}
```

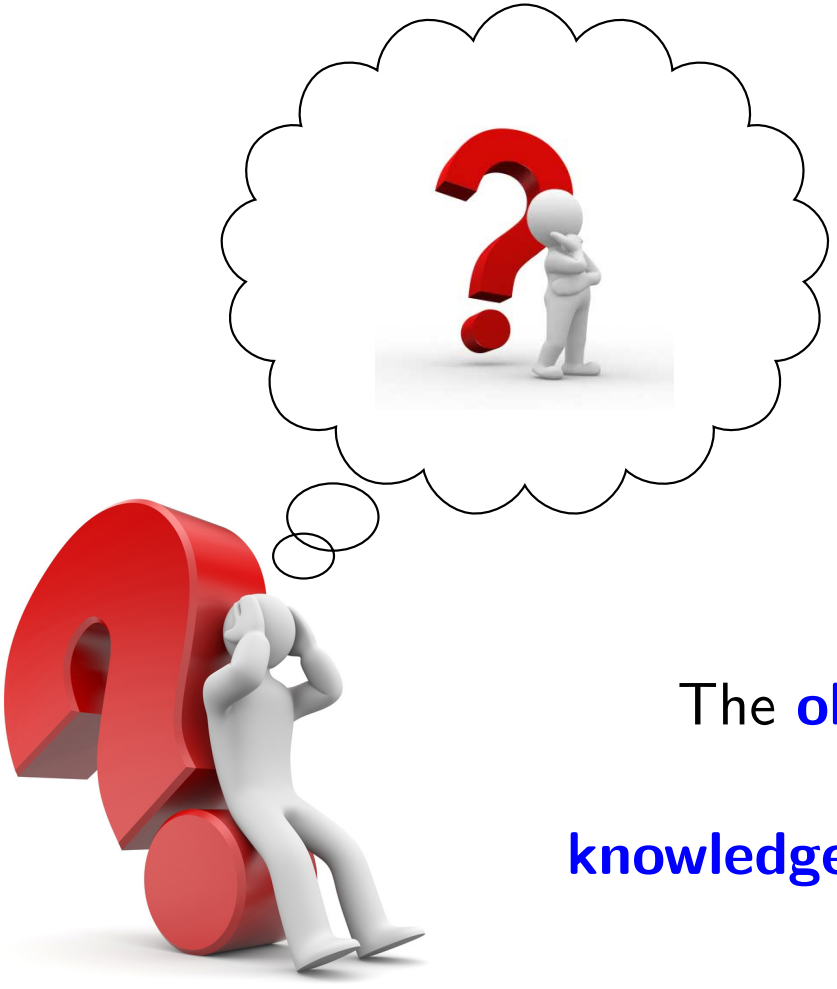
You can use TikZ to improve your slides in many ways! I often use it with textblock to arrange the content efficiently.

I'll show you an example from a talk I gave recently. It has textblocks, tikz, and overlays combined.

Improving your slides with TikZ

Improving your slides with TikZ

This is when **epistemology** comes into play!



This is when **epistemology** comes into play!

The **objective** of epistemology is to characterize what is **genuine knowledge**, rather than opinion or mere belief.

Here's another, simpler example, drawn from a lecture on the nature of mind.

What the nature of mind is has important consequences for epistemology, metaphysics, ethics, religion, science, *etc*.

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Take a human. What is it?

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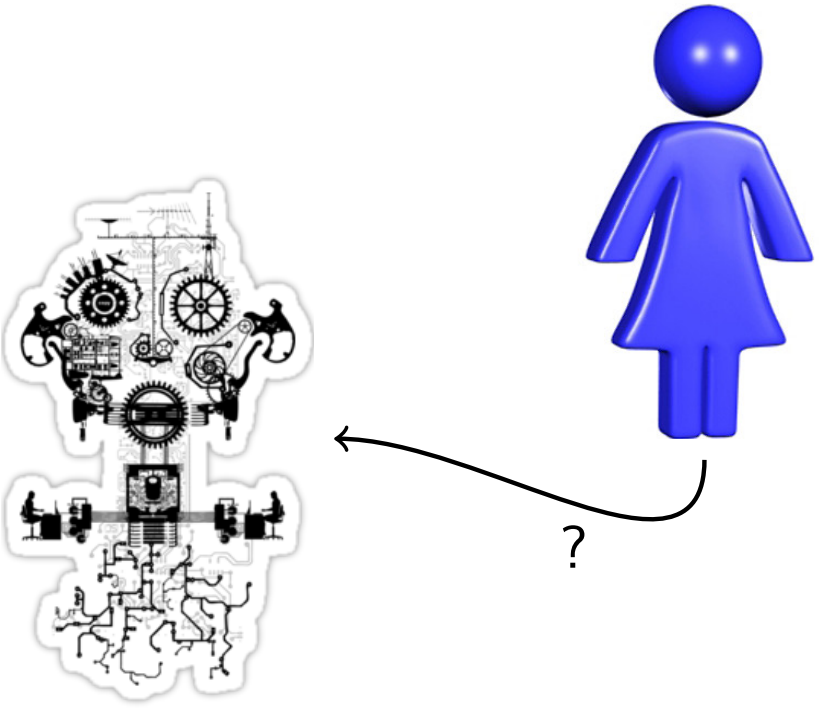
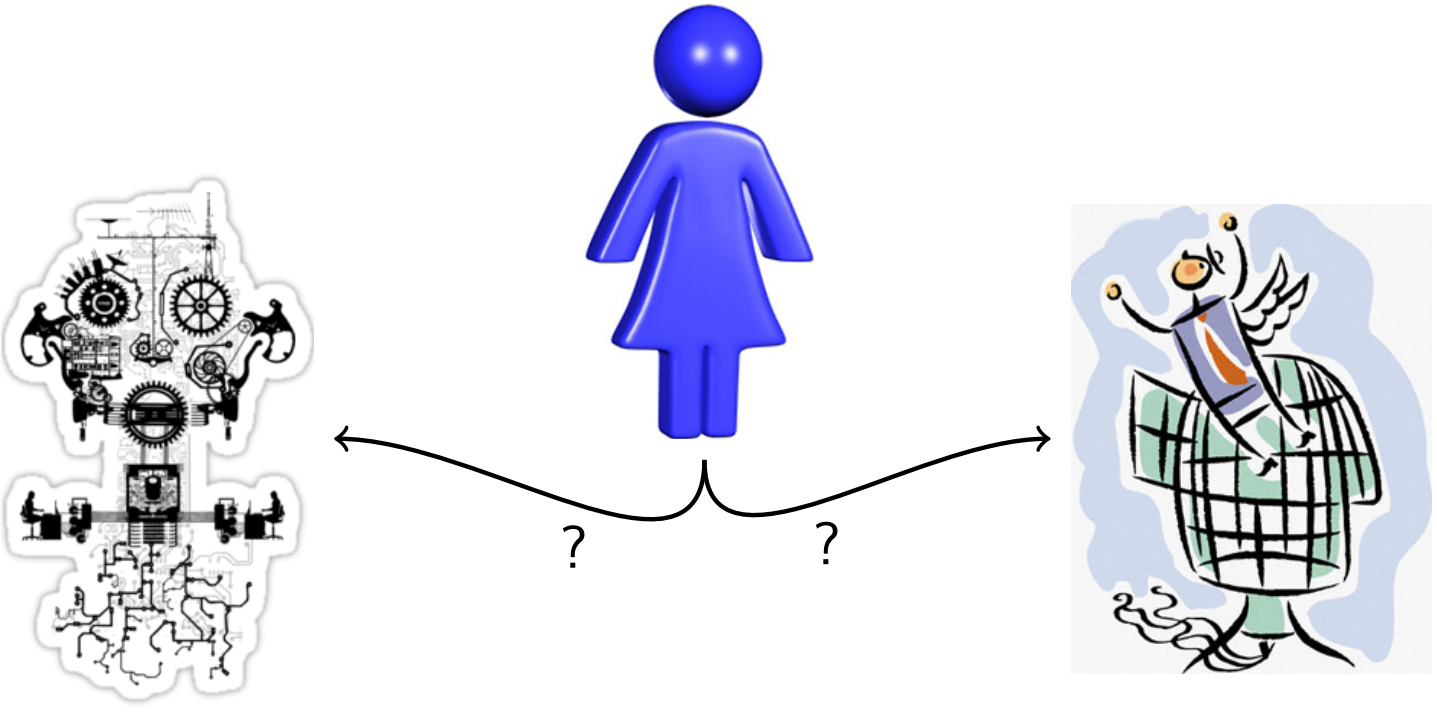


Take a human. What is it? Is it just a body, a mechanism?

What the nature of mind is has important consequences for epistemology, metaphysics, ethics, religion, science, *etc*.



Take a human. What is it? Is it just a body, a mechanism?
Is there something else, a different type of 'substance'?

For this last example, here's the code:

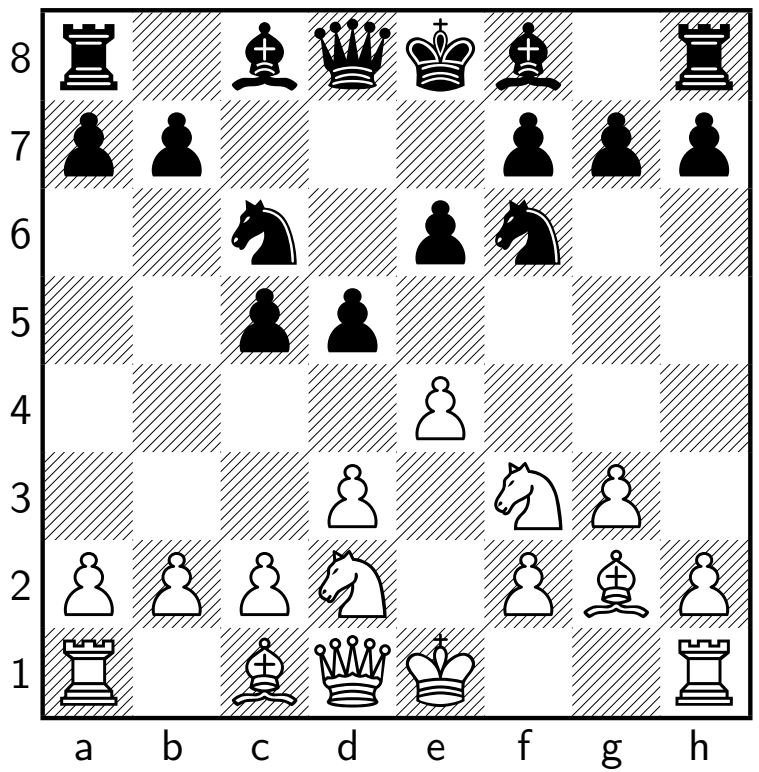
```
\ begin{frame}
\bb{What the nature of mind is has important consequences}
 for epistemology, metaphysics, ethics, religion, science, \emph{etc}.
\begin{center}
\begin{tikzpicture}
\uncover<2->{\draw (0,0) node (human) {
\includegraphics[height=3cm,trim=30mm 40mm 60mm 20mm,clip]{womanicon.jpg}};}
\uncover<3->{\draw (-3.5,-1.5) node (mech) {
\includegraphics[height=3.5cm,trim=30mm 0mm 30mm 0mm,clip]{human.png}};
\draw[thick] (human.south) edge[->,out=-90,in=0] node[below] {?} (mech.east);}
\uncover<4->{\draw (3.5,-1.5) node (soul) {
\includegraphics[height=3cm]{soul.jpg}};
\draw[thick] (human.south) edge[->,out=-90,in=180] node[below] {?} (soul.west);
\end{tikzpicture}
\end{center}%\vspace{-1cm}
\uncover<2->{Take a human. What is it?} \uncover<3->{Is it just a body,
a mechanism?}\\ \uncover<4->{ Is there something else, a different type
 of 'substance'?}
\ end{frame}
```

A final freebie for the chess players in the room:

```
\usepackage{skak}
\fenboard{r1bqkb1r/pp3ppp/2n1pn2/2pp4/4P3/3P1NP1/PPPN1PBP
/R1BQK2R
b - - 2 6}
\scalebox{0.8}{\showboard}
```

Let's see the result on the next slide...

And we get a beautiful King's Indian Attack:



There's so much more to say...

But now, you're on your way! You know what to look for, and how to get it!

While you're on your way with LaTeX, you're never on your own! Ask if you have questions!