

TikzCD Notes

To start, first download and then import the TikzCD package. Importing can be done via

```
\usepackage{tikz-cd}
```

The basic outline for making a diagram is

```
\begin{tikzcd}[<options>]
  <stuff>
\end{tikzcd}
```

When using tikz-cd, you should think of the layout of the objects as a matrix. The code for tikz-cd is actually extremely similar to the matrices code. Each element corresponds to an entry within the matrix, and you can connect these entries via an "arrow." Let's first set up a diagram which is a triangle. In terms of matrices, we'll have

$$\begin{pmatrix} A & \\ B & C \end{pmatrix}$$

The code for the matrix is

```
\[
\begin{pmatrix}
  A & - \\
  B & C
\end{pmatrix}
\]
```

Notice that we had to wrap it with an equation environment. We will be doing the same for our tikz-cd diagram. Converting this to a commutative diagram, we have

```
\[
\begin{tikzcd}
  A & \\
  B & C
\end{tikzcd}
\]
```

which gives us

$$\begin{array}{ccc} & A & \\ & \downarrow & \\ B & & C \end{array}$$

We now need to start connecting things via arrows. The general format for an arrow is

```
\arrow[<options>]{direction}{labels}
```

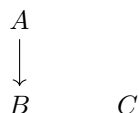
Direction, in this case, is a string consisting of one letter, and it is the start of the direction your arrow is going. So for example, if you wanted the arrow to go right, you would have direction be 'r' (no quotation). We'll first start by connecting the A and the B. We have

```

\begin{tikzcd}
A \arrow[d]{} \\
B & C
\end{tikzcd}

```

which outputs



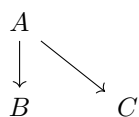
Next, if we want to connect the A and the C, we'll need to construct another arrow. The code is then

```

\begin{tikzcd}
A \arrow[d]{} \arrow[dr]{} \\
B & C
\end{tikzcd}

```

which gives



Notice that I used 'dr' to denote down then right. This is the location of the target relative to the cell that we are at. So, for example, if we had a D to the right of our C, and we wanted to connect A to D, we would use 'drr'. If there was a D below the C, we would use 'ddr'.

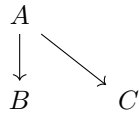
Let's actually construct this D. Just as in a matrix, we need to still account for the empty cell. Our code will be

```

\begin{tikzcd}
A \arrow[d]{} \arrow[dr]{} \\
B & C \\
& & D
\end{tikzcd}

```

This then outputs

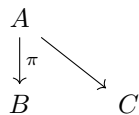


D

Let's now say that we wanted to the function from A to B as π . We would then need to utilize the labels format, as above. To do so, we simply attach a `\pi` at the end of our arrow command, as so

```
\[
\begin{tikzcd}
A \arrow[d]{\pi} \arrow[dr] \\
B & C \\
& D
\end{tikzcd}
\]
```

This will give us

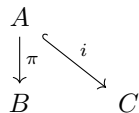


D

Some other things we may want to do is change the type of arrow. Let's say we have an injection i from A into C. We can change the label to i , and we can add a `hookrightarrow` in the options. This will look like

```
\[
\begin{tikzcd}
A \arrow[d]{\pi} \arrow[hookrightarrow, dr]{i} \\
B & C \\
& D
\end{tikzcd}
\]
```

Which outputs



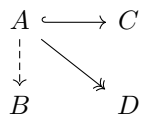
D

The most common options will probably be `'hookrightarrow'` for injection, `'twoheadrightarrow'` for surjection, and `'dashrightarrow'` for induced mapping. The following is an example of each of these.

```

\begin{tikzcd}
A \arrow[dashrightarrow]{d} \arrow[hookrightarrow]{r} \\
\arrow[twoheadrightarrow]{dr} & C \\
B & D
\end{tikzcd}

```



This covers most of the common commands involving `tikz-cd`. There are some more advanced methods you can use, like directing specifically how you want the arrows to go and bend, but for the most part I've never used these things. If you'd like to dig in more, you can find the documentation [here](#).