

Intro to ggraph

Your name here

`tidygraph` is the package we've been using to manipulate network objects—doing filtering, mutating, etc. The companion package to `tidygraph` is `ggraph`, which is designed to let you visualize networks. `ggraph` is a set of tools based on `ggplot2`. The key idea behind both `ggraph` and `ggplot2` is that you can build a plot by adding layers according to a “[grammar of graphics](#)”. Each layer lets you add to and change things about the plot.

`ggraph` includes tons of really cool types of plots but for this tutorial I am going to focus on standard plots that show nodes as circles and edges as lines. There are three key components that should be part of any of these plots:

- edges
- nodes
- layout

Edges

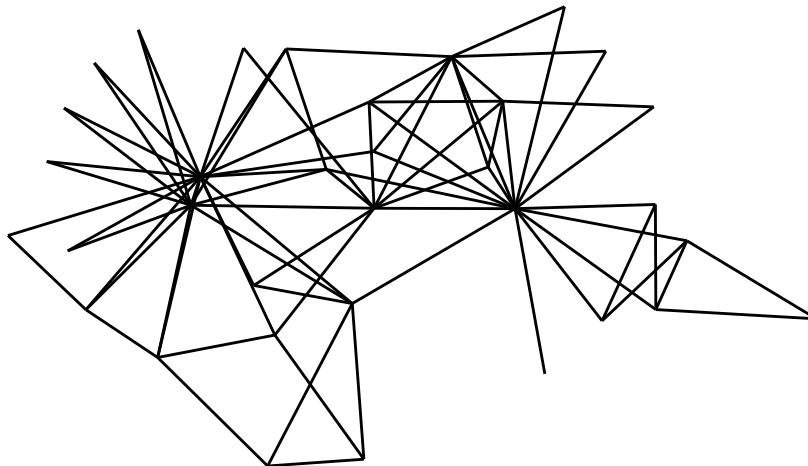
By this point, you *should* know what edges are. `ggraph` has a number of different options for how to draw edges. Let's start with the simplest possible network visualization. This shows the Zachary karate network with straight line edges.

The `ggraph()` command tells R to make a `ggraph` visualization from a network.

`geom_edge_fan()` draws the edges.

```
create_notable('zachary') |>
  ggraph() +
  geom_edge_fan()
```

Using "stress" as default layout



Note that there aren't any nodes in this picture—it's just the edges.

All of the different edge options start with `geom_edge_`, so if you start typing that then R's autocomplete will show you the options, and you can play around by changing them around.

Exercise

Make a visualization of the Zachary karate network, this time using `geom_edge_diagonal`

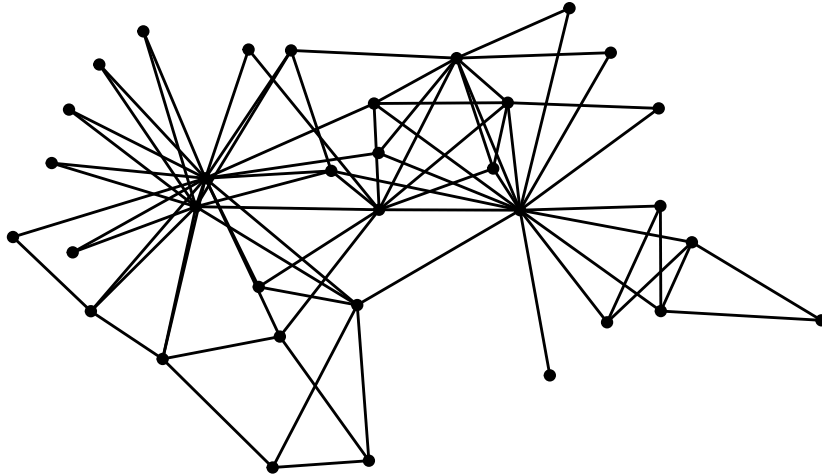
```
# Your Code here
```

Nodes

Next, we'll add the nodes. This is where `ggraph` gets really cool. We can treat the nodes like just another layer of the plot. We use the plus symbol (+) at the end of each line to tell R that we want to add another layer.

```
create_notable('zachary') |>  
  ggraph() +  
  geom_edge_fan() +  
  geom_node_point()
```

Using "stress" as default layout



While there are quite a few different options for nodes (start typing `geom_node_` to see them all), most of them are designed for different types of plots. We will typically just use `geom_node_point`.

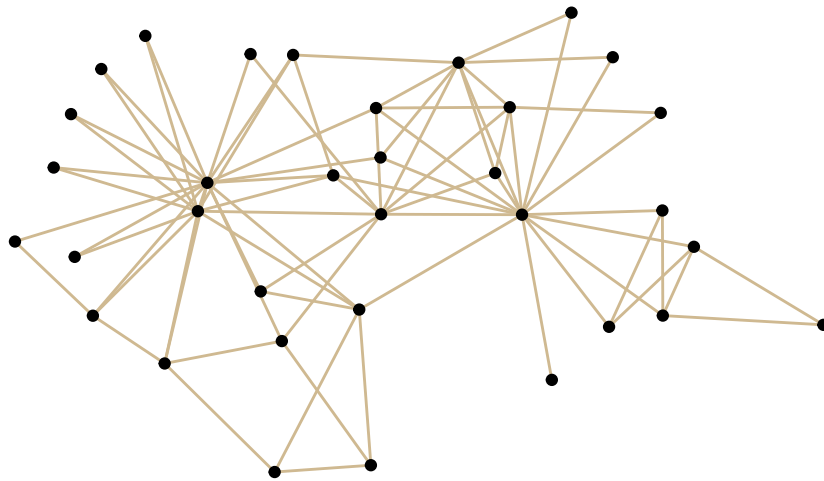
Aesthetic parameters

Now is a good time to introduce the idea of parameters. `geom_edge_` and `geom_node_` functions take parameters, so that you can adjust how the visualization looks.

For example, maybe we think that the edges are too thick, and that they should be Boilermaker Gold instead (the hex code for the color—`#CFB991`—is from <https://marcom.purdue.edu/our-brand/visual-language-guideline/>):

```
create_notable('zachary') |>
  ggraph() +
  geom_edge_fan(width=.5, color='#CFB991') +
  geom_node_point()
```

Using "stress" as default layout



While there are other parameters for edges, color and width are the ones we'll use most often.

Exercise

We can also give parameters for the nodes. Create a visualization that keeps our gold edges, but changes the color of the nodes to anything you want, and increases their size (hint: you'll want the `size` parameter).

```
# Your code here
```

Layout

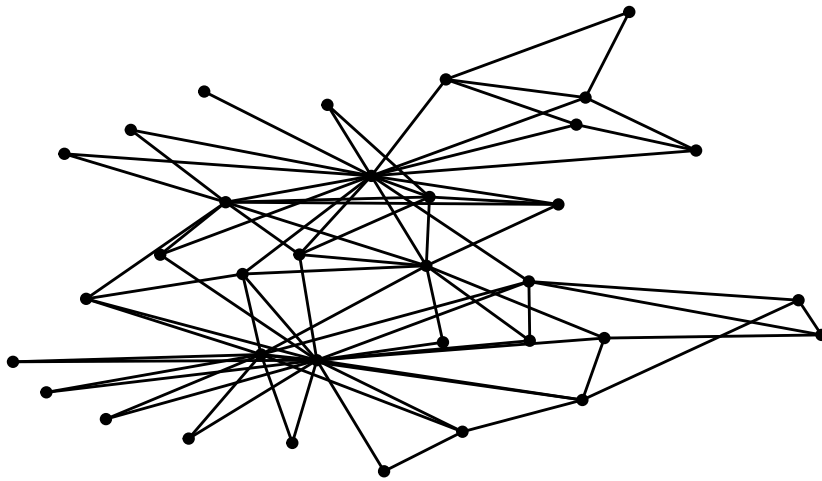
The layout is where nodes appear on a graph. There are lots of different algorithms that can be used; some of them are very basic—like putting the nodes in a circle or just scattering them randomly. Most of the layouts we will use are based on algorithms that try to keep nodes which are connected to each other close together and unconnected nodes far apart from each other.

You can let `ggraph` choose a layout for you or you can look through some [here](#) and [here](#).

We actually don't add a new layer for the layout: layouts are defined inside the `ggraph()` function, which has to be called before making any plot. The code below makes a tidy graph

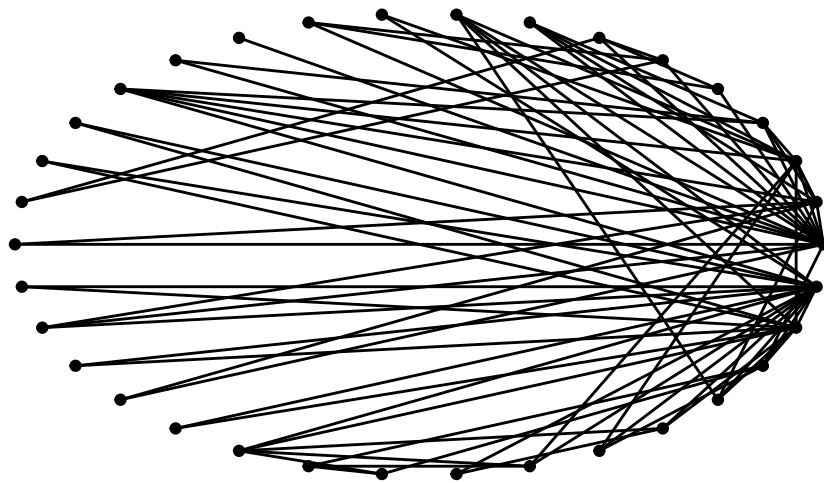
of the Zachary karate network using `create_notable('zachary')`. It then sets 'kk' as the layout, and adds a simple layer for the nodes and a layer for the edges.

```
create_notable('zachary') |>  
  ggraph(layout = 'kk') +  
  geom_node_point() +  
  geom_edge_fan()
```



The following plot shows the nodes in a circle. This shows how changes the layout can really change the look and the interpretation of the plot. These all show the same data.

```
create_notable('zachary') |>  
  ggraph(layout = 'circle') +  
  geom_node_point() +  
  geom_edge_fan()
```



Exercise

Change the layout to `randomly`. How does this change what you are able to see in the plot?

```
# Your code here
```

Hopefully this has been a pretty painless introduction to `ggraph`. Next time we'll talk about some different options for making your graphs look beautiful and using aesthetics to convey information about the network.