Introduction to Visualizations Using ggplot2 in R

Betsy Cowdery

Creating a Plot

- Layers are used to create the objects that we perceive on the plot.
- A layer is composed of four parts:
  - data and aesthetic mapping
  - statistical transformation
  - geometric object
  - position adjustment

Data and Aesthetic Mapping

- **Data** must be a data frame:
  ```
  p <- ggplot(data)
  ```

- **Aesthetic mappings**:
  ```
  aes(x,y,...)
  ```

- Aesthetic mappings can be set when the plot is initialized or modified later
  ```
  p <- ggplot(data,aes(x,y,...))
  p <- ggplot(data) + aes(x,y,...)
  ```

Layers

- Definition of a Plot:

```
ggplot(data, mapping) +
layer(
geom, geom_params,
stat, stat_params,
data, mapping, position
)
```

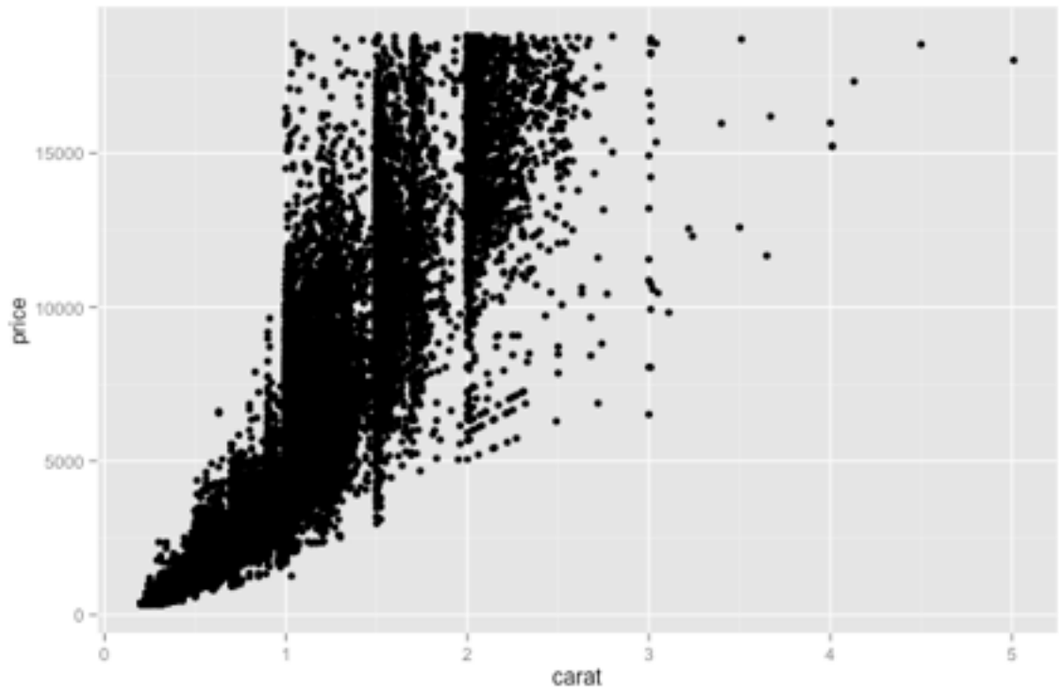
- Instead of writing out the full specification, use shortcuts:

```
geom_XXX(mapping, data, ..., geom, position)
stat_XXX(mapping, data, ..., stat, position)
```

- Every geom has a default statistic, and every statistic a default geom.

- http://docs.ggplot2.org/current/

Scatter Plots

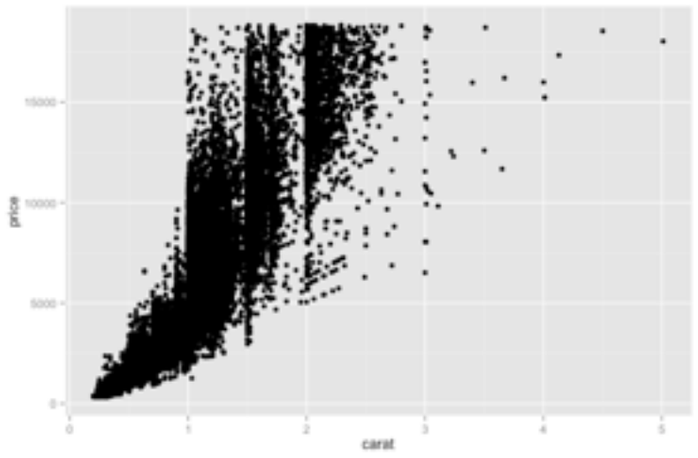



```
p <- ggplot(diamonds, aes(carat, price))
p + geom_point()

OR

p <- ggplot(diamonds)
p + geom_point(aes(carat, price))
```

Overplotting

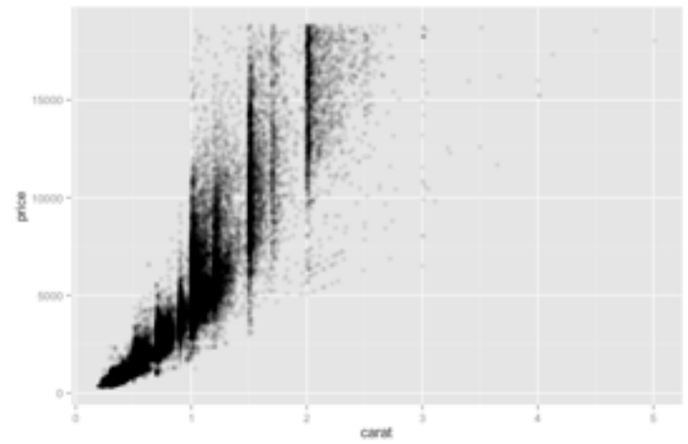
```
p <- ggplot(diamonds, aes(carat, price))
```

Original



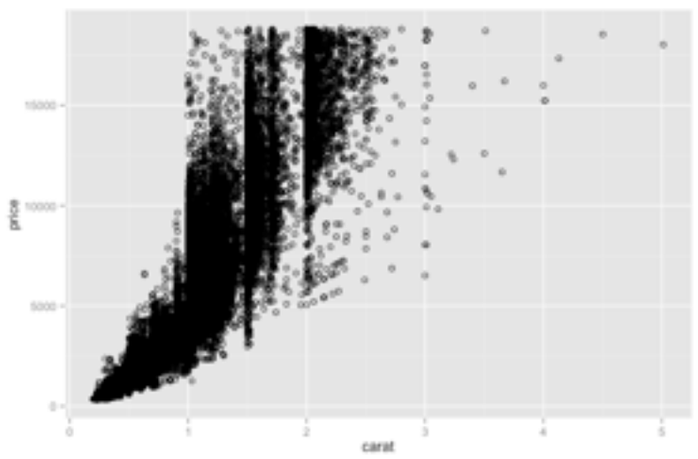

```
p + geom_point()
```

Change Alpha



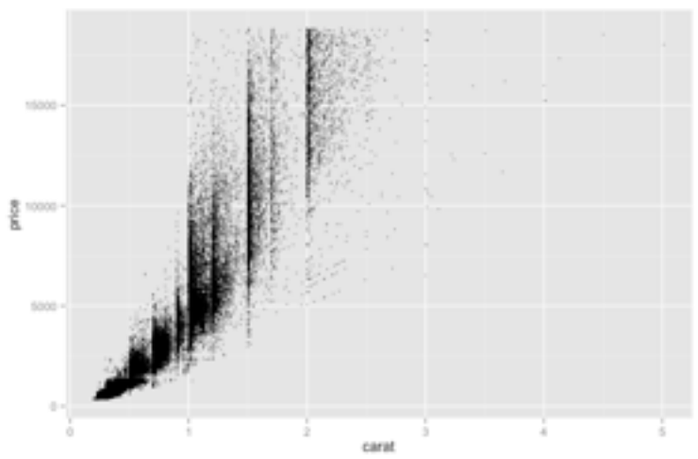

```
p + geom_point(alpha=1/10)
```

Change Shape




```
p+ geom_point(shape = 1 )
```

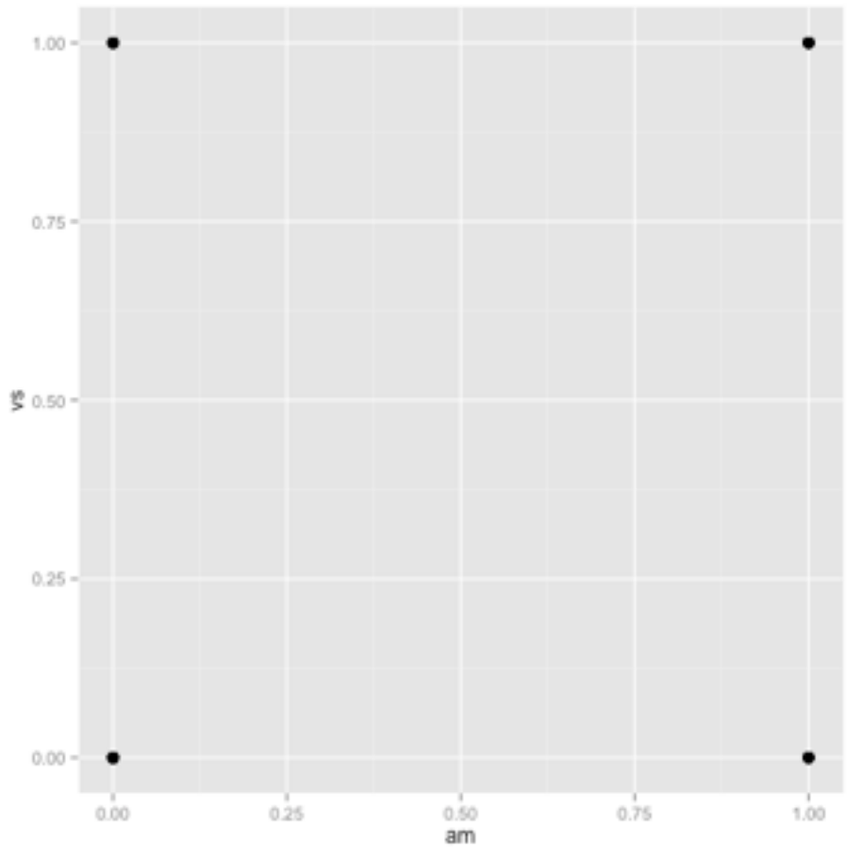
Change Size



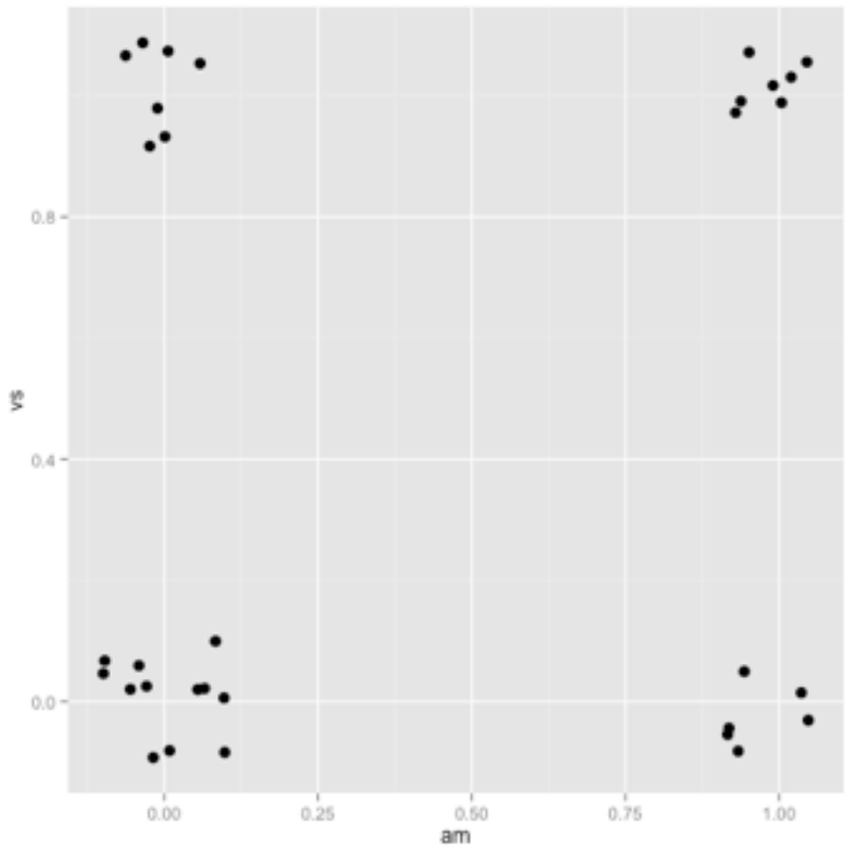

```
p + geom_point(size = .5 )
```

Jitter

```
p <- ggplot(mtcars, aes(x = am, y = vs))
```




```
p + geom_point(size=3)
```

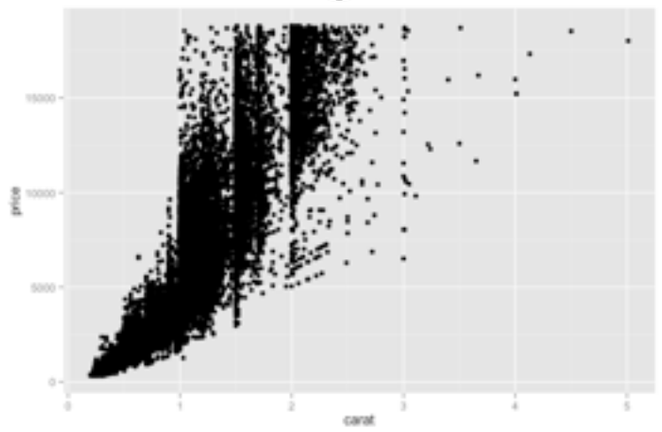



```
p + geom_point(
 position = position_jitter(
   w = 0.1, h = 0.1
 ),size=3)
```

Setting vs. Mapping

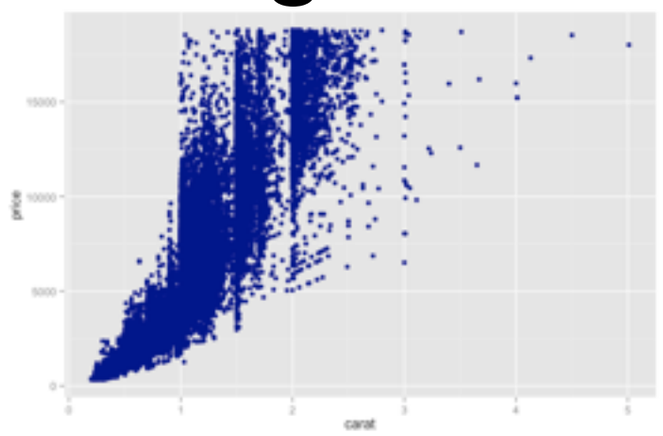
```
p <- ggplot(diamonds, aes(carat, price))
```

Original



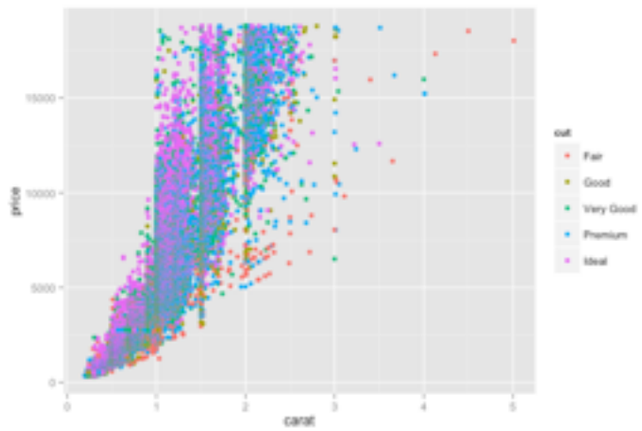

```
p + geom_point()
```

Setting Colour



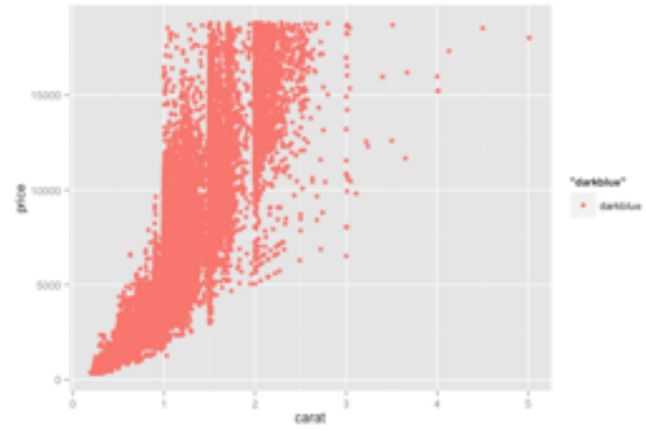

```
p + geom_point(colour = "darkblue")
```

Mapping Colour




```
p + geom_point(aes(colour = cut))
```

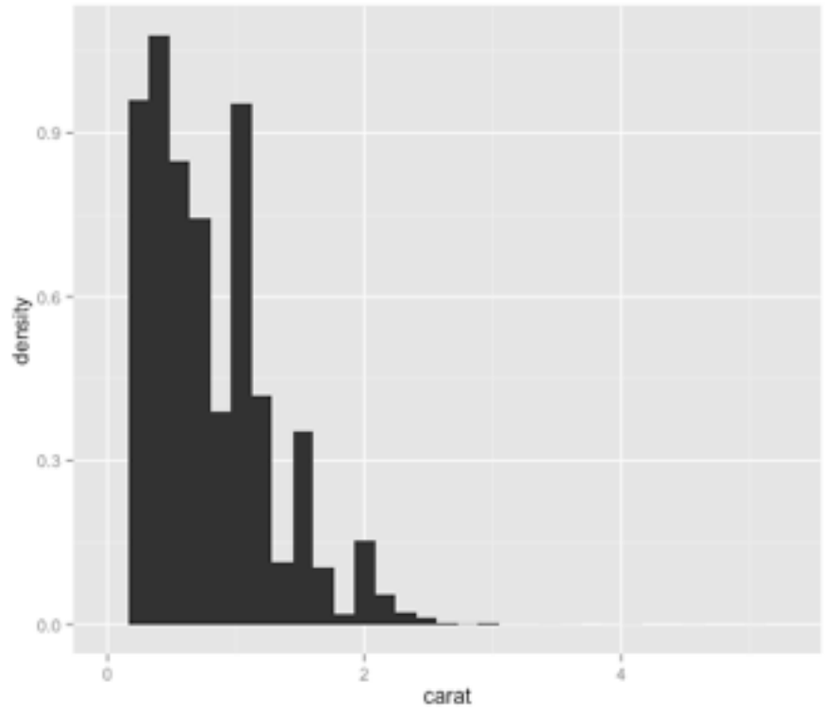
Neither

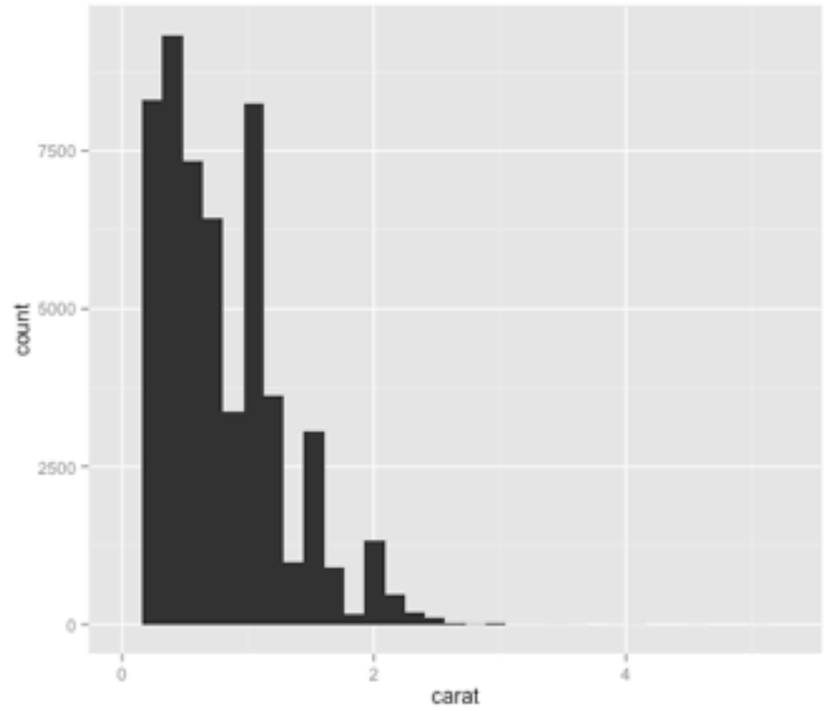



```
p + geom_point(aes(colour = "darkblue"))
```

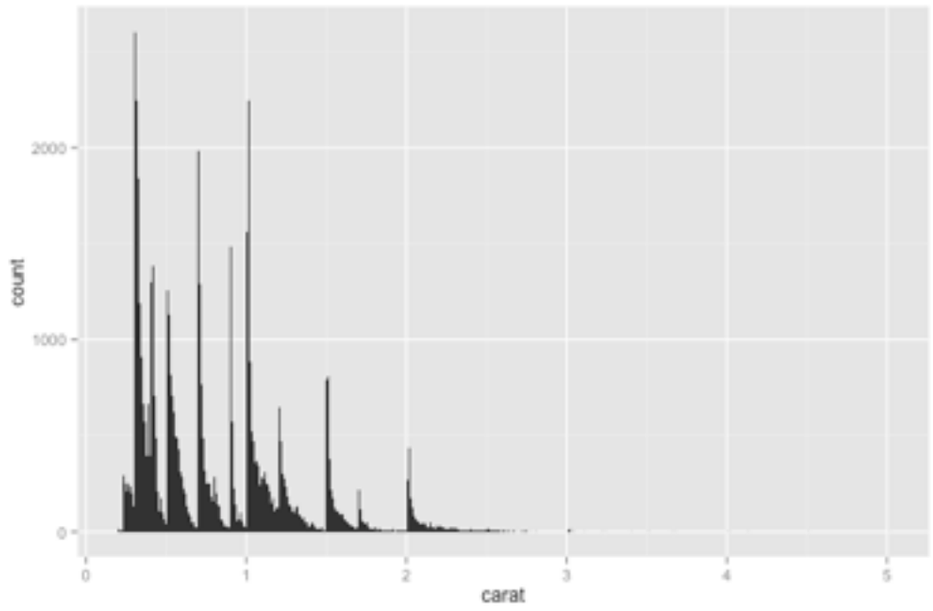
```
p + aes(colour = "darkblue") + geom_point()
```

Histograms



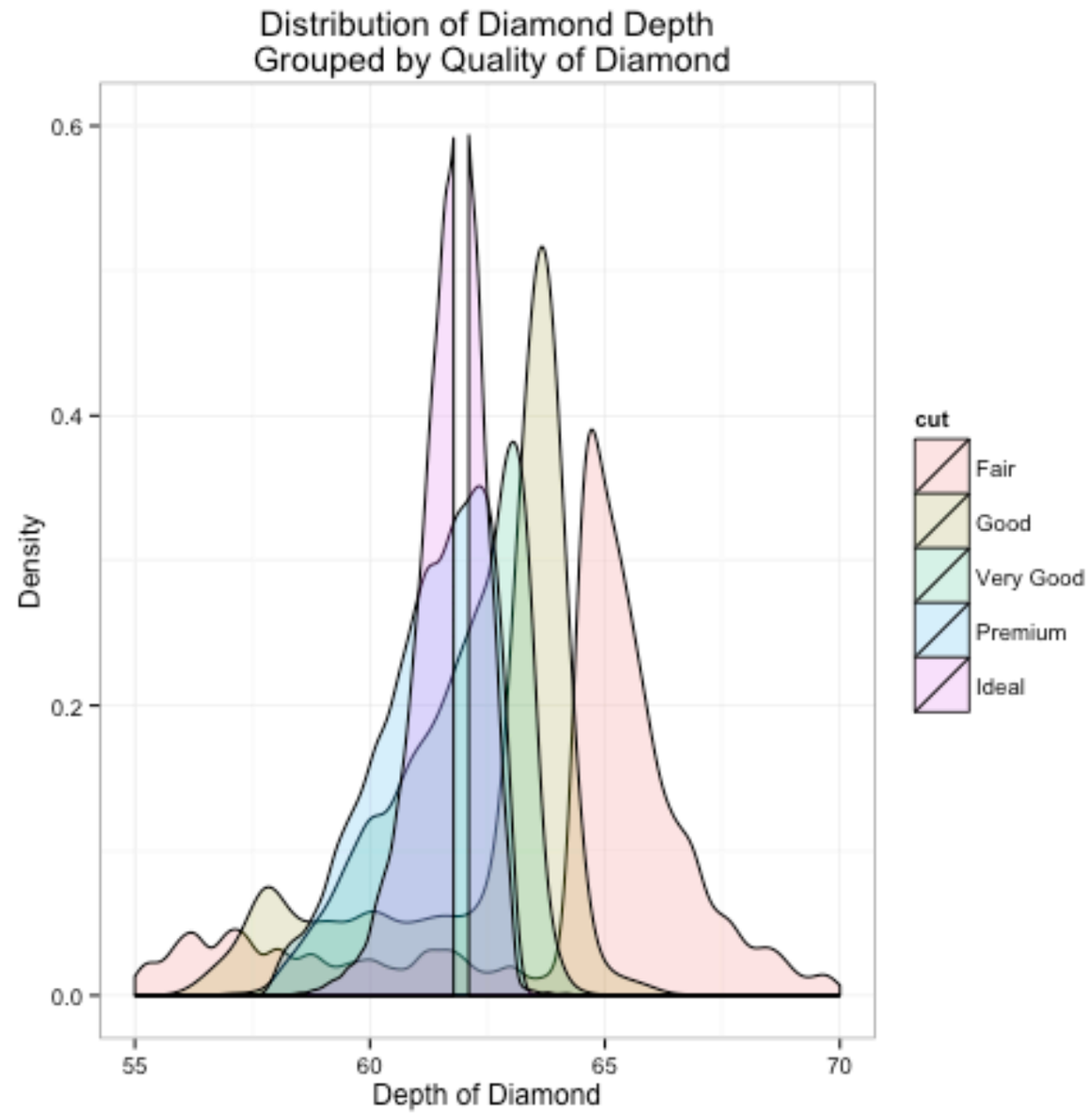



```
p <- ggplot(diamonds, aes(x=carat))

p + geom_histogram(aes(y = ..density..))
p + geom_histogram(aes(y = ..count..))


p + geom_histogram(binwidth=.01)
```



Labels & Themes

```
ggplot(diamonds, aes(depth, fill = cut))
+ geom_density(alpha = 0.2)
+ xlim(55, 70) + ylim(0,.6)
+ labs(
   x="Depth of Diamond",
   y="Density",
   title="Distribution of Diamond Depth\n
     Grouped by Cut of Diamond"
   )
+theme_bw()
```



Exporting Your Images

```
getwd()
setwd()

png(filename = "image.png", width = 600, height = 400, units = "px")

ggplot(diamonds, aes(depth, fill = cut)) + geom_density(alpha =
0.2)+theme_bw()

dev.off()
```

MORE SEXY THINGS