

# DATA VISUALIZATION WITH R

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J. Alexander Branham

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- We'll use `ggplot2` to visualize data in R. Make sure you have it installed (only the first time) and loaded (every time):

```
install.packages("ggplot2")
library(ggplot2)
```

We'll be working with the `diamonds` dataset, provided by `ggplot2`. Check out its documentation with `?diamonds`:

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1. How many diamonds are in the dataset?
2. What is the name of the variable for the weight of the diamond?
3. What is the code for the worst color of diamond?

## SCATTERPLOTS

```
ggplot(data = diamonds) +  
  geom_point(mapping = aes(x = carat, y = price))
```

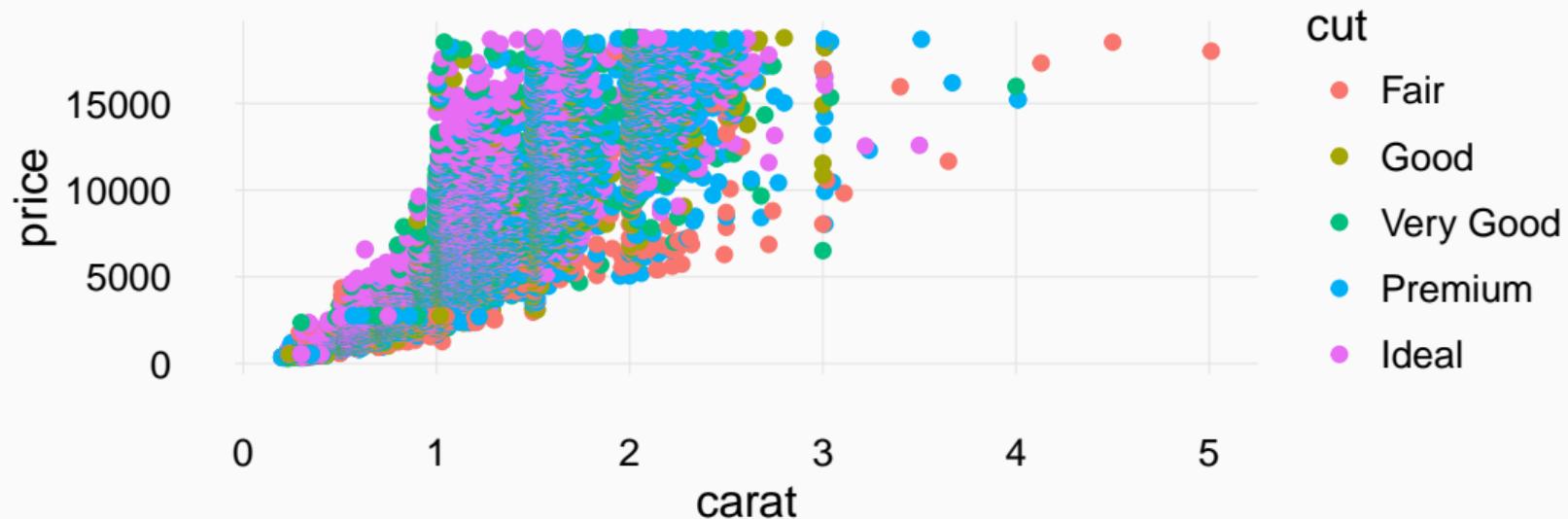


## AESTHETICS

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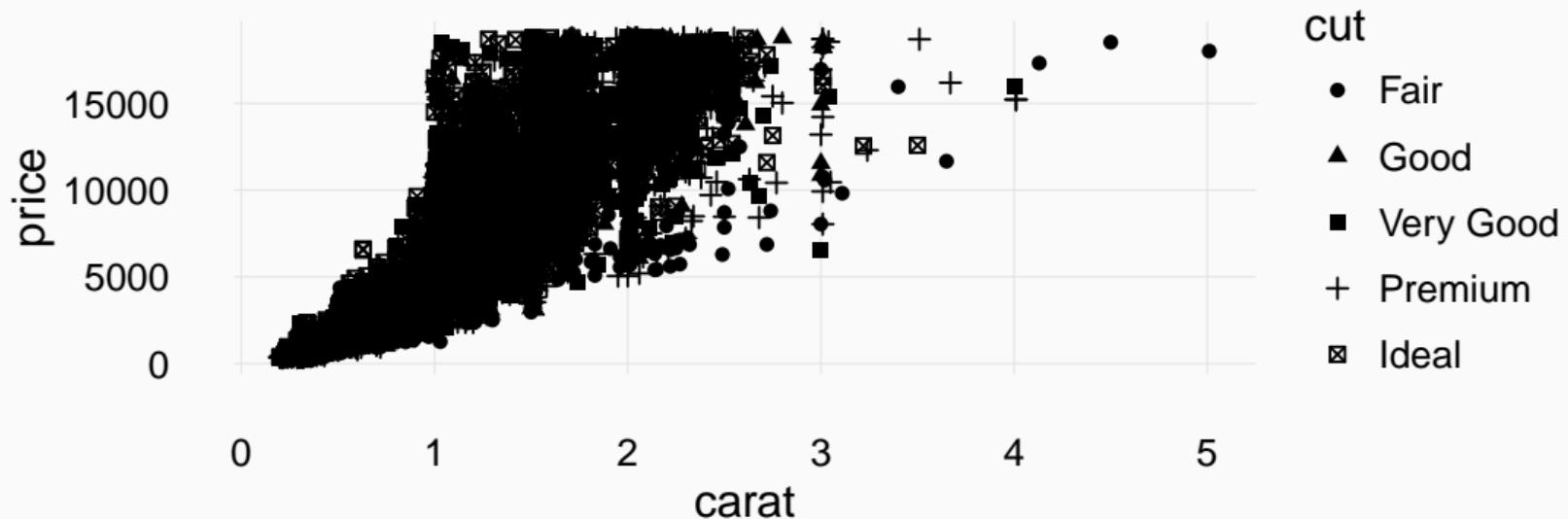
## COLOR

```
ggplot(data = diamonds) +  
  geom_point(mapping = aes(x = carat, y = price, color = cut))
```



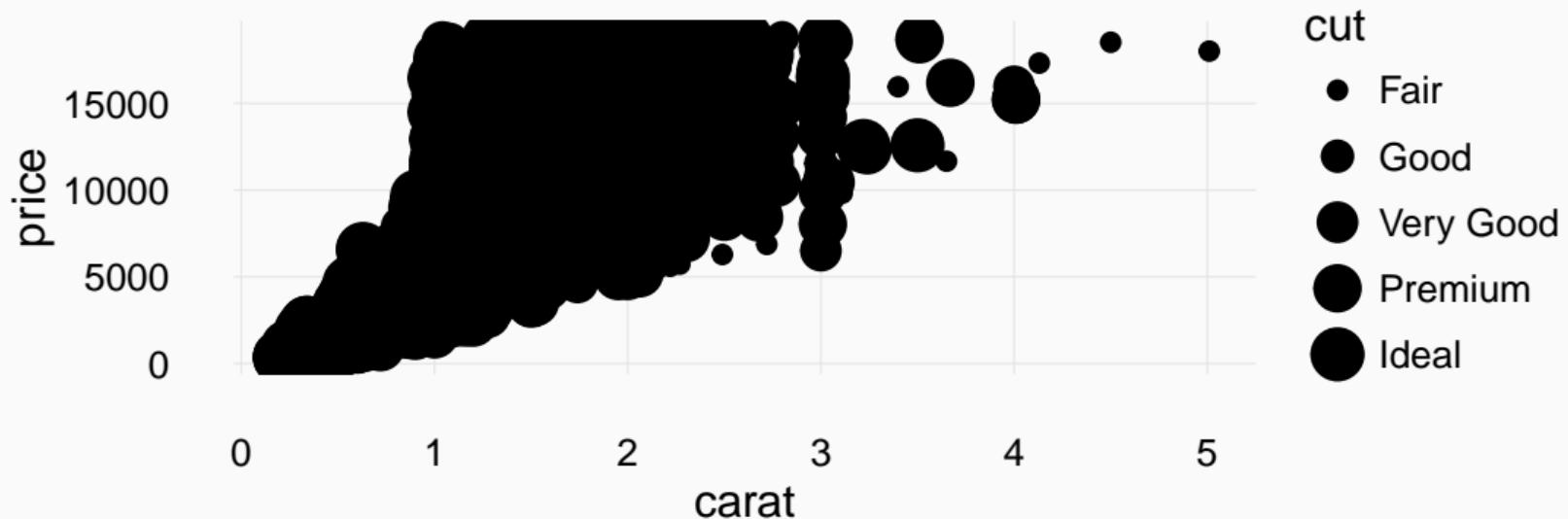
## SHAPE

```
ggplot(data = diamonds) +  
  geom_point(mapping = aes(x = carat, y = price, shape = cut))
```

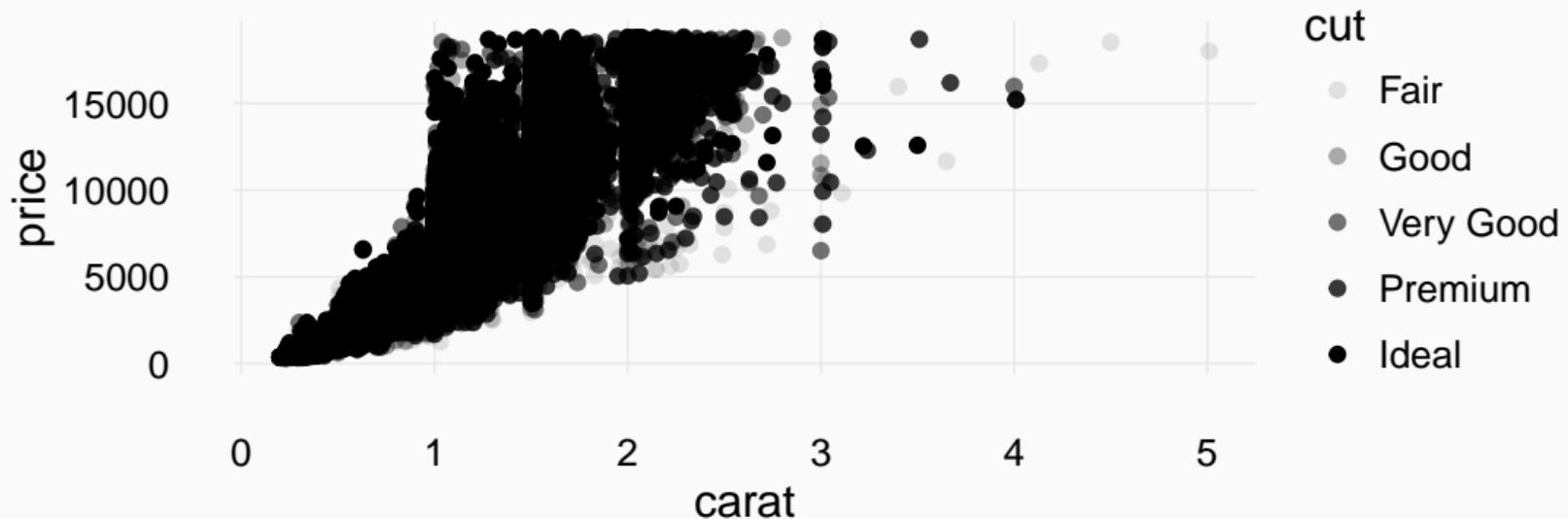


## SIZE

```
ggplot(data = diamonds) +  
  geom_point(mapping = aes(x = carat, y = price, size = cut))
```



```
ggplot(data = diamonds) +  
  geom_point(mapping = aes(x = carat, y = price, alpha= cut))
```



## YOU TRY!

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Use the `mpg` dataset from `ggplot2` to:

1. Make a scatterplot with `displ` on the x-axis and `hwy` on the y-axis

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Use the `mpg` dataset from `ggplot2` to:

1. Make a scatterplot with `displ` on the x-axis and `hwy` on the y-axis
2. Add color, size, and shape aesthetics

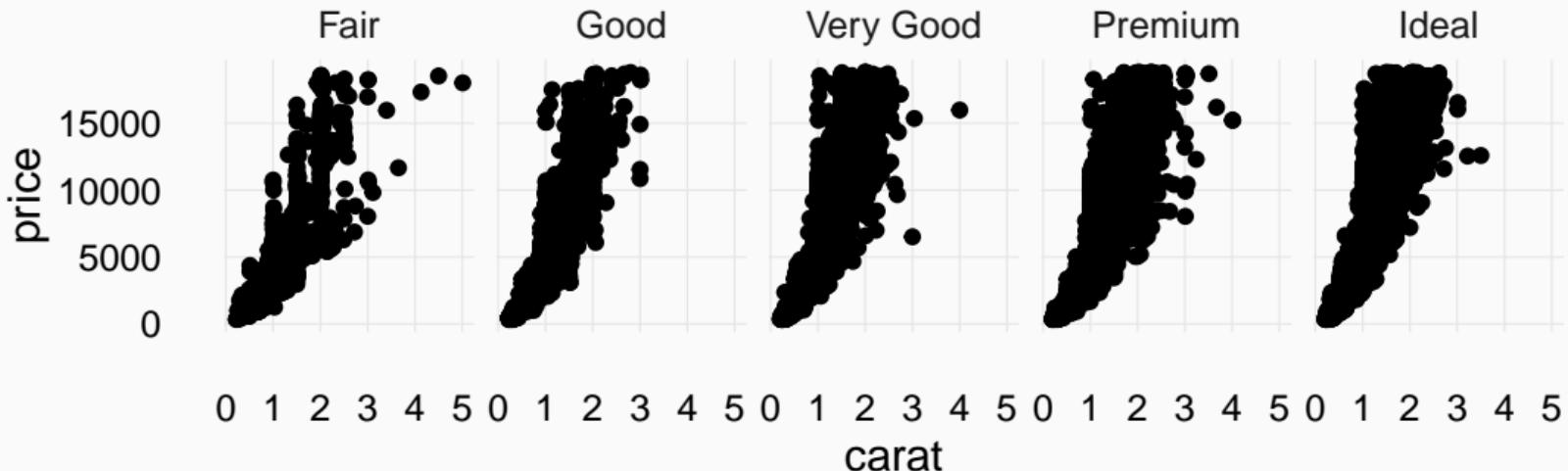
## FACETS

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## FACETS

Can make facets by adding `facet_grid`:

```
ggplot(data = diamonds) +  
  geom_point(mapping = aes(x = carat, y = price)) + facet_grid(. ~ cut)
```



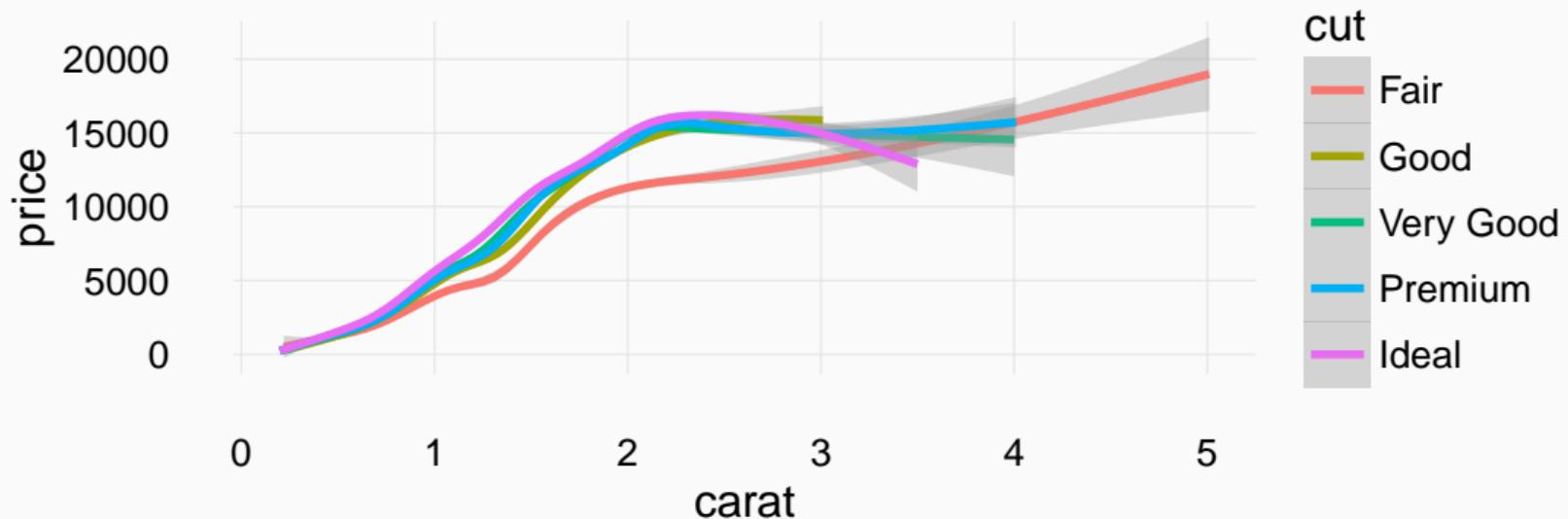
# GEOMS

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There are other kinds of graphs than scatterplots. `geom_` takes care of this for ggplot2 (“geometric object”):

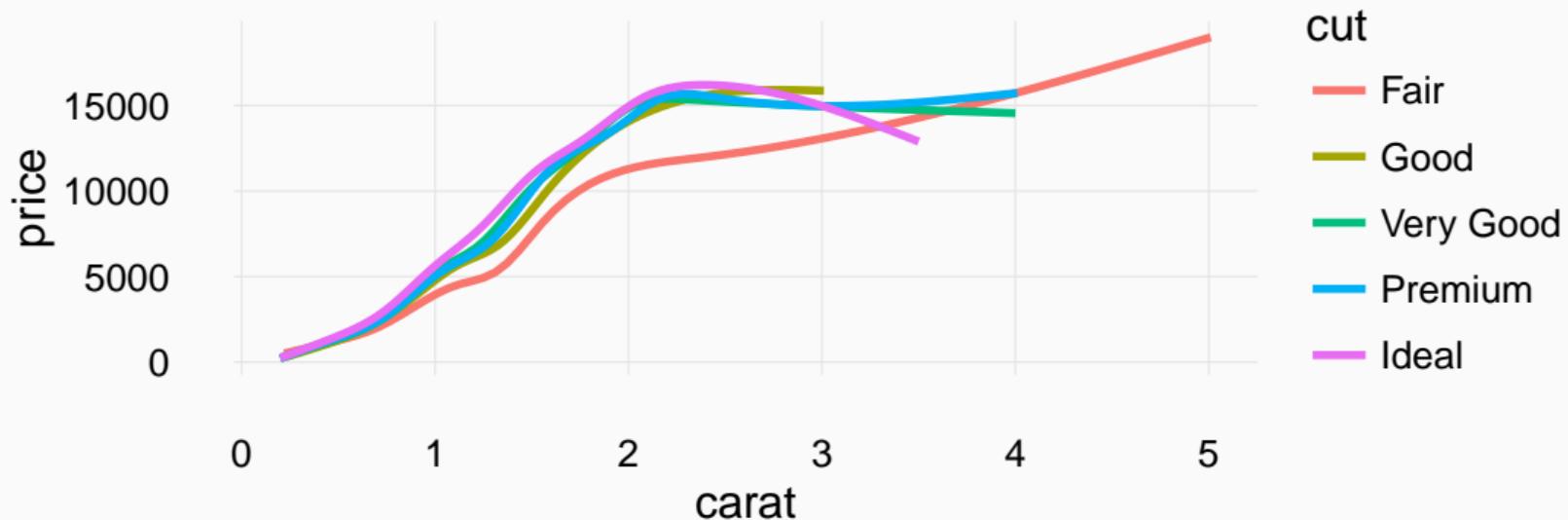
## SMOOTH

```
ggplot(data = diamonds, mapping = aes(x = carat, y = price, color = cut))  
  geom_smooth()
```



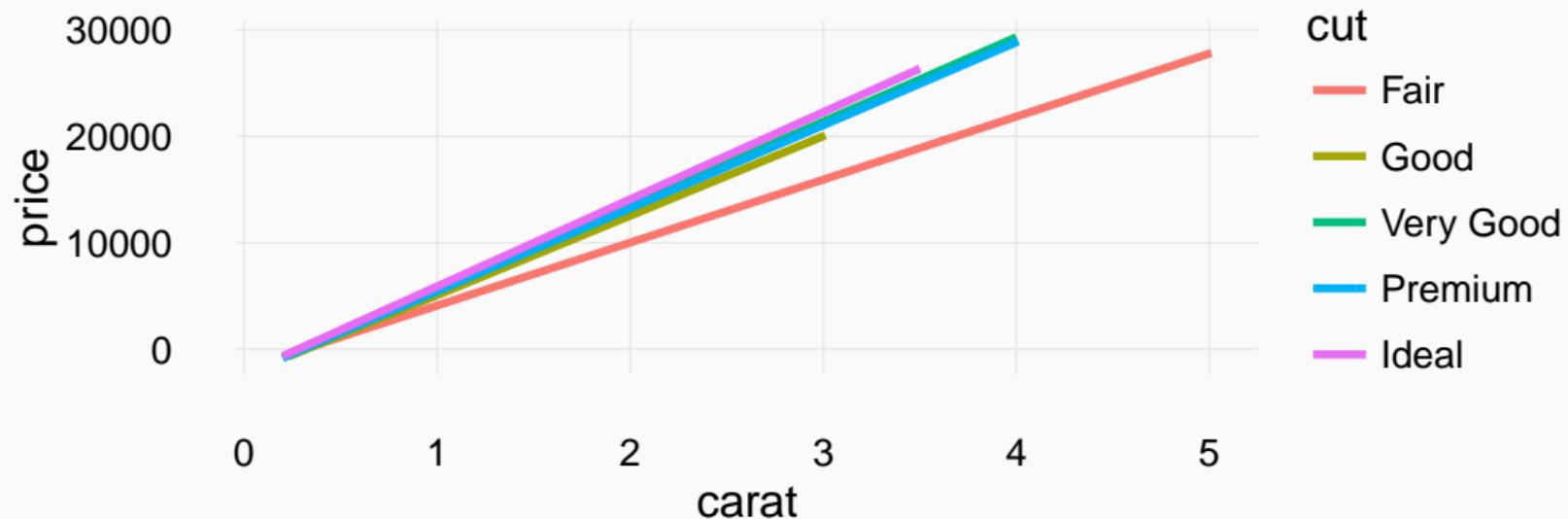
## SMOOTH - SE's

```
ggplot(data = diamonds, mapping = aes(x = carat, y = price, color = cut))  
  geom_smooth(se = FALSE)
```



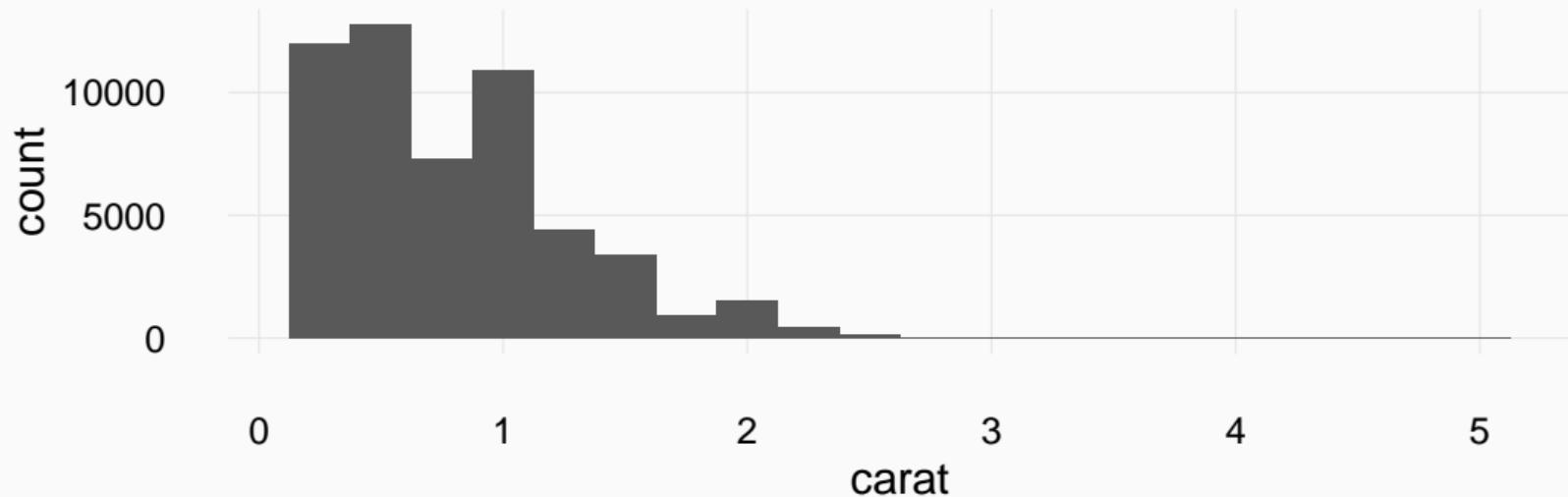
## SMOOTH - OLS

```
ggplot(data = diamonds, mapping = aes(x = carat, y = price, color = cut))  
  geom_smooth(se = FALSE, method = "lm")
```



## HISTOGRAM

```
ggplot(data = diamonds, mapping = aes(x = carat)) +  
  geom_histogram(binwidth = .25)
```



## BAR CHARTS

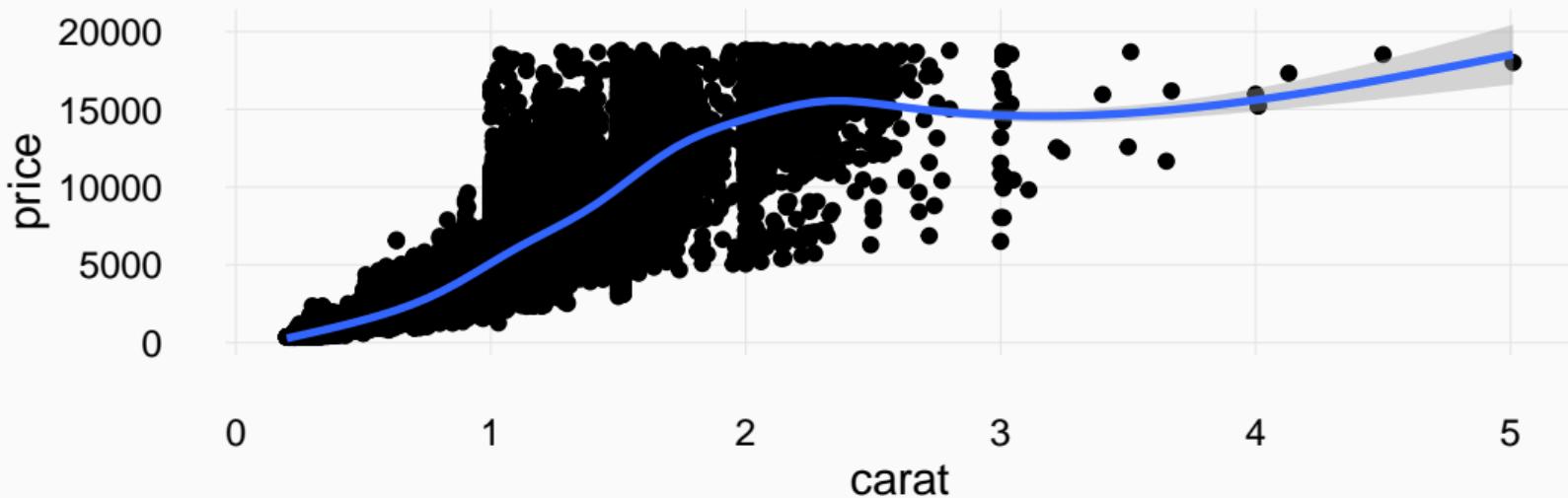
```
ggplot(data = diamonds, mapping = aes(x = cut)) +  
  geom_bar()
```



## COMBINING GEOMS

We can layer multiple geoms on top of each other:

```
ggplot(data = diamonds, mapping = aes(x = carat, y = price)) +  
  geom_point() + geom_smooth()
```



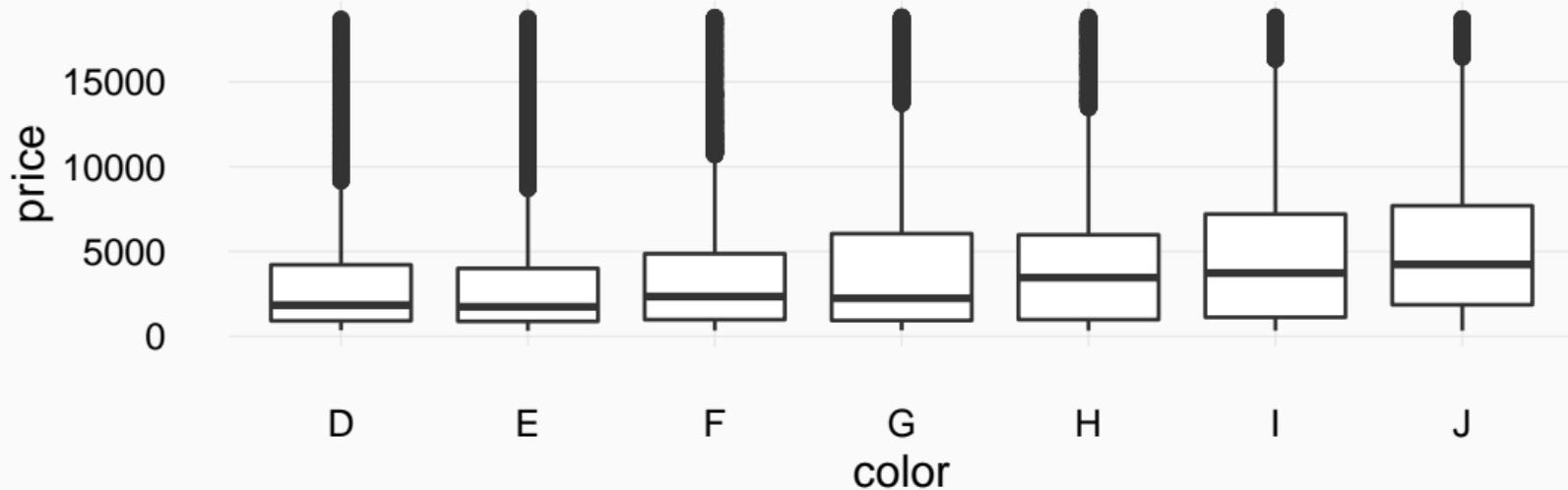
YOU TRY!

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Make a boxplot with color on the x-axis and price on the y-axis

## YOU TRY (ANSWERS)

```
ggplot(data = diamonds, mapping = aes(x = color, y = price)) +  
  geom_boxplot()
```



## BAR CHARTS (EXTENDED)

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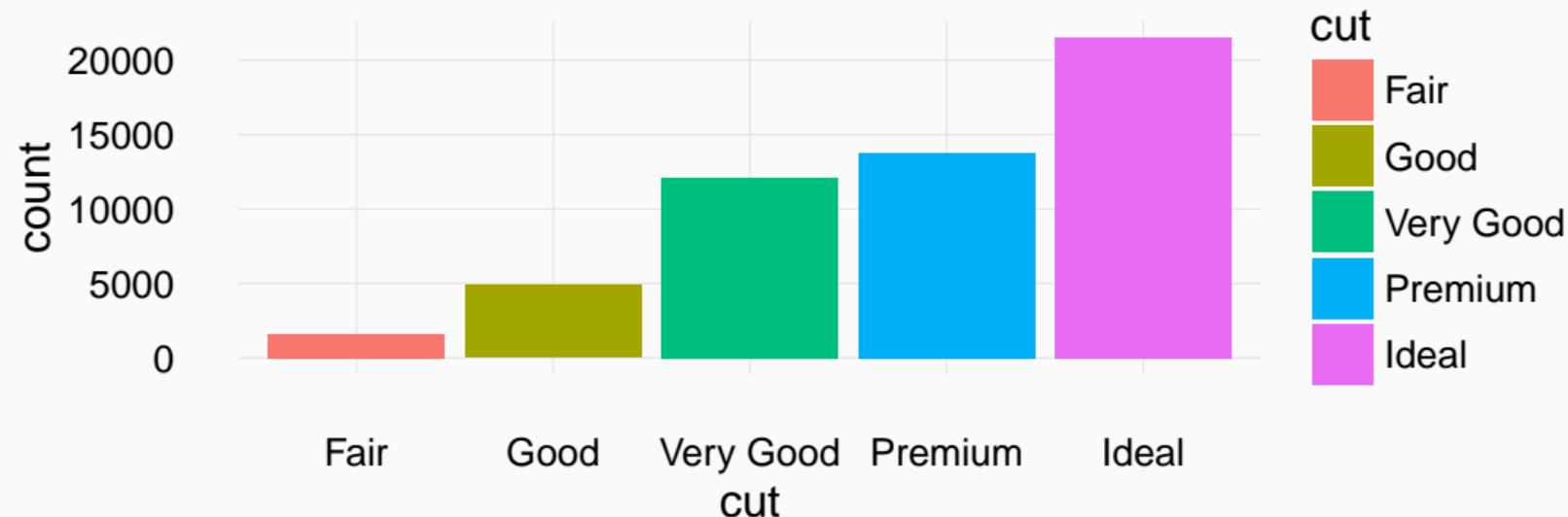
Fill vs color

What do you expect this to do:

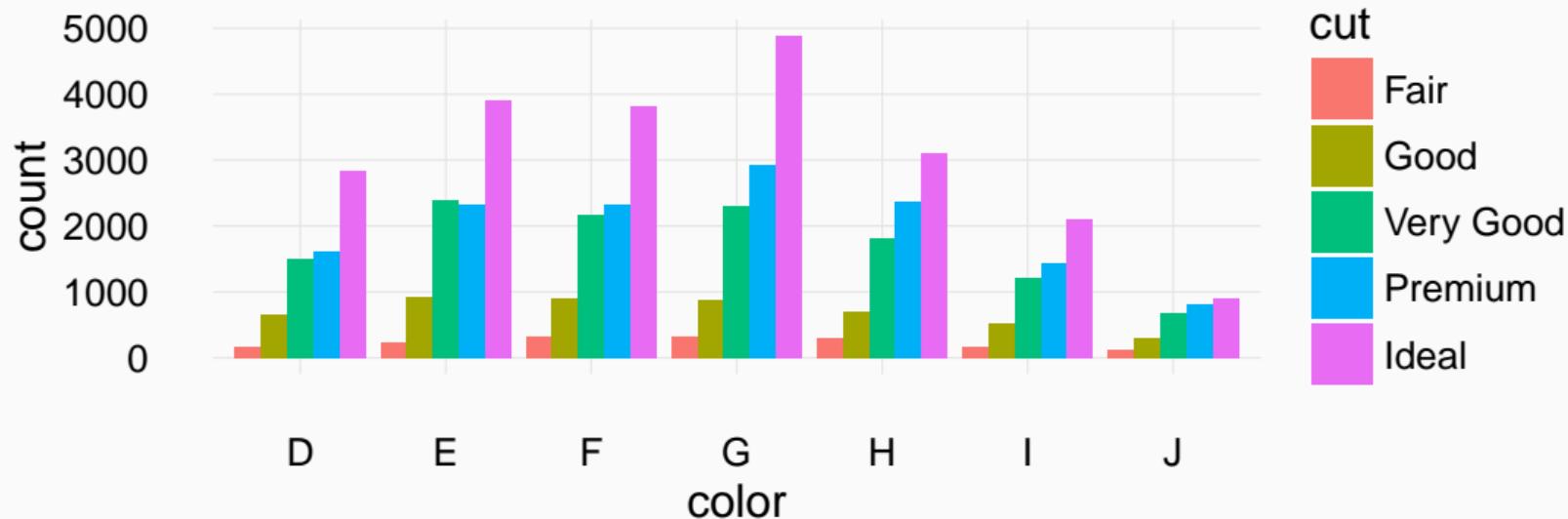
```
ggplot(data = diamonds, mapping = aes(x = cut, color = cut)) +  
  geom_bar()
```

## USE FILL FOR BAR CHARTS

```
ggplot(data = diamonds, mapping = aes(x = cut, fill = cut)) +  
  geom_bar()
```



Try to make this plot



## POSITIONS

```
ggplot(data = diamonds, mapping = aes(x = color, fill = cut)) +  
  geom_bar(position = "dodge")
```

There's "stack", "dodge", "identity", "fill" - try them all out!