chapter-one-exercise

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Chapter one exercise

Package(s) & dataset(s) used in this exercise includes:

- tidyverse
- mpg data set

`mpg dataset` represent the Fuel economy data from the 1999 to 2008 for 38 popular models of cars

Question: Import the tidyverse package

Answer:

```
library(tidyverse)
```

Question: Run the ggplot(data=mpg). What do you see?

```
ggplot(data=mpg)
```


Answer:

The visual shows a blank output. This is because no mapping variables were specified

Question: What does the `drv` variable describe?

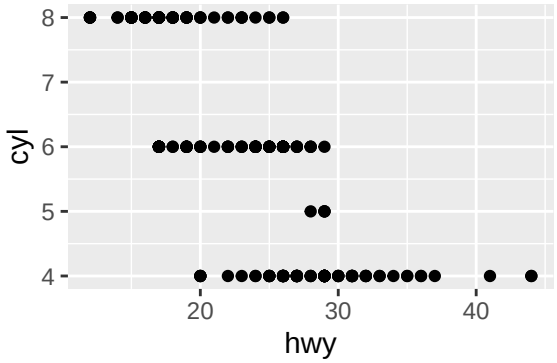
Answer:

This is the type of drive train, comprising f=front-wheel r=rear wheel drive,4=4wd. This is according to the documentation on executing `?mpg`

Question: Make a scatterplot of `hwy` versus `cyl`

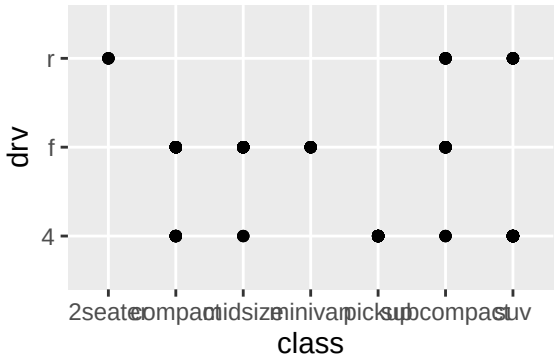
Answer:

```
ggplot(data = mpg)+
  geom_point(mapping = aes(x = hwy, y = cyl))
```



Question: What happens if you make a scatterplot of `class` versus `drv`? Why is the plot not useful?

```
ggplot(data=mpg)+
  geom_point(mapping=aes(x = class, y=drv))
```

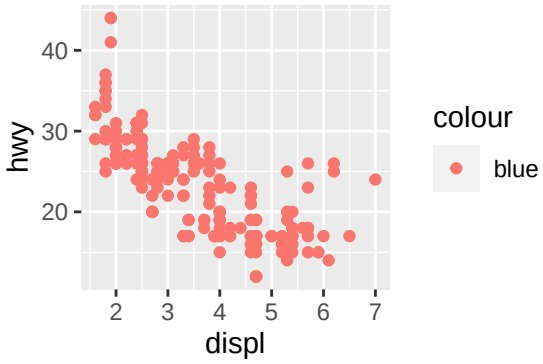


Answer:

Both `dr` & `class` are categorical variables taking small number of values. Hence the scatterplot is not useful

Question: What's wrong with this code? Why are the points not blue?

```
ggplot(data=mpg)+
  geom_point(mapping = aes(x = displ, y = hwy, color ="blue"))
```

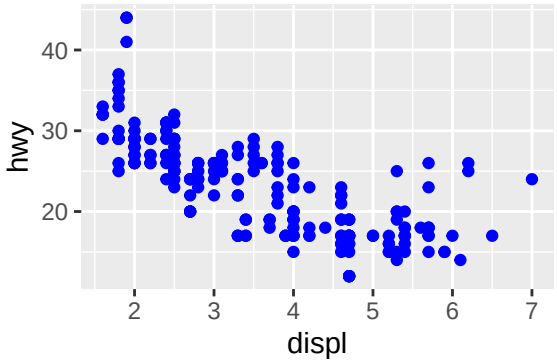


Answer:

The `variable` to the `color` argument as used here must be a known variable to the data set.

However, to make the points blue, the argument must be specified outside of `aes()` as shown below

```
ggplot(data = mpg)+
  geom_point(mapping = aes(x = displ, y = hwy), color="blue")
```



Question: Which variables in mpg are categorical? Which variables are continuous?

Answer:

Categorical variables are discrete variables that take limited amount of values(eg - yes/no, dead/alive, male/female/binary, etc.), while continuous variables take fairly large number of values(eg - cities in Eastern Nigeria, species of Penguins etc.)

By running the command `View(data=mpg)`, we can discover that `class,drv, fl, hwy, cyl` are all categorical variables while the variables `manufacturer, model, displ, year, cty, hwy` are continuous

Question: What happens if you facet on a continuous variable?

Answer:

The visualization results in a more sub visuals with each continuous variable converting to a discrete variable

Question: What do empty cells in a plot with "facet_grid(drv ~ cyl) mean? How do they relate to this plot?

```
ggplot(data = mpg)+
  geom_point(mapping = aes(x = drv, y =cyl))
```

Answer:

Empty cells in such as plot as this show points of no observations

Question: What geom would you use to draw a line a chat? A boxpplox? A histogram? An area chart?

`geom_line(), geom_boxplot(), geom_histogram and geom_area`

Will these two graphs look different? why/why not?

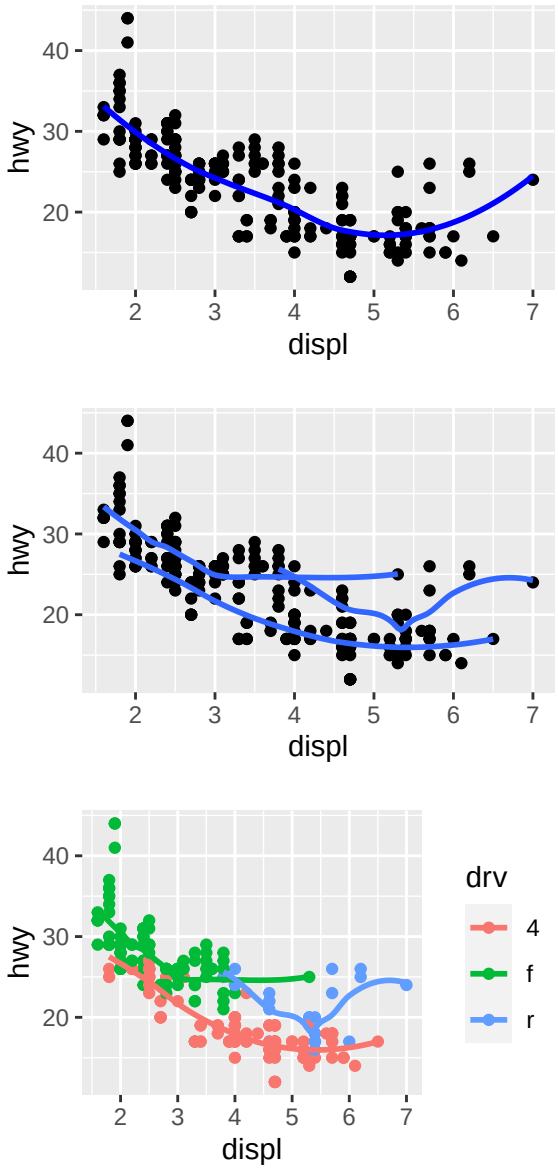
```
ggplot(data = mpg, mapping = aes(x = displ, y = hwy))+
  geom_point()+
  geom_smooth()
```

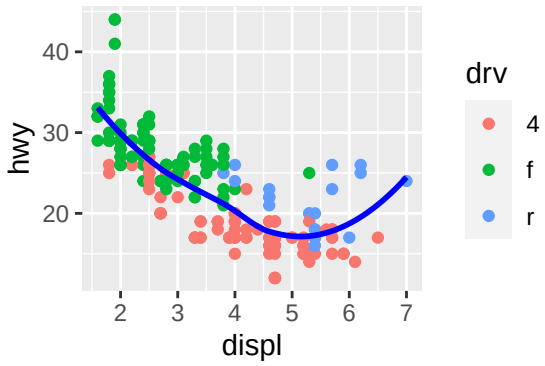
```
ggplot()+
  geom_point(data = mpg, mapping = aes(x = displ, y = hwy))+
  geom_smooth(data = mpg, mapping = aes(x = displ, y = hwy))
```

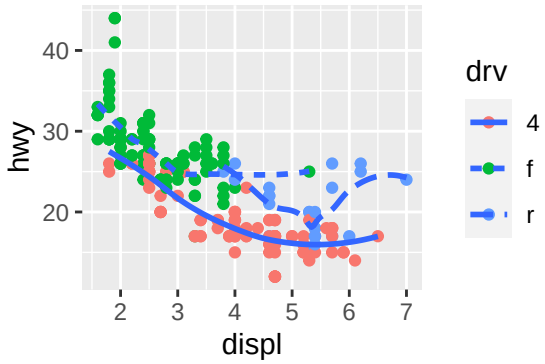
Answer:

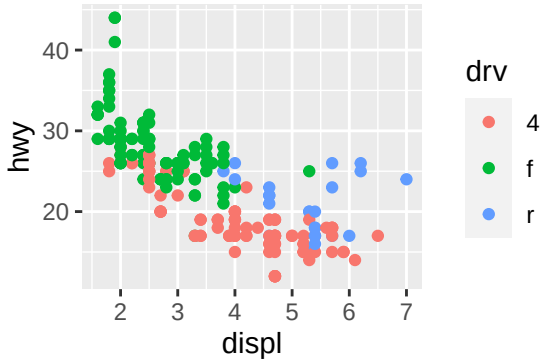
The both plots will not look different. In the first plot, the mapping and variables were made global so each of the `geoms` has access to the same data. However, in the second plot, the same mapping and variables were made local to the respective `geoms`

Question: Re-create the R code necessary to generate the following graphs









Answers:

```
ggplot(data = mpg, mapping = aes(x = displ, y = hwy))+
  geom_point()+
  geom_smooth(se = FALSE,color = "blue")
```

```
ggplot(data = mpg, mapping = aes(x = displ, y = hwy))+
  geom_point()+
geom_smooth(se = FALSE, mapping = aes(x = displ, y = hwy, group_by =drv), show.legend = FALSE)
```

```
ggplot(data = mpg, mapping = aes(x = displ, y = hwy, color = drv))+
  geom_point()+
  geom_smooth(se = FALSE)
```

```
ggplot(data = mpg)+
  geom_point(mapping = aes(x = displ, y = hwy, color = drv))+
  geom_smooth(mapping = aes(x = displ, y = hwy),color = "blue", se = FALSE)
```

```
ggplot(data = mpg, mapping = aes(x = displ, y = hwy))+
  geom_point(mapping = aes(color = drv))+
  geom_smooth(mapping = aes(linetype = drv), se = FALSE)
```

```
ggplot(data = mpg, mapping = aes(x = displ, y = hwy))+
  geom_point(mapping = aes(color = drv))
```

Question: What is the default geom associated with `stat_summary`?

Answer:

`geom_point`

Question: What does `geom_col()` do? How is it different from `geom_bar()`?

Answer:

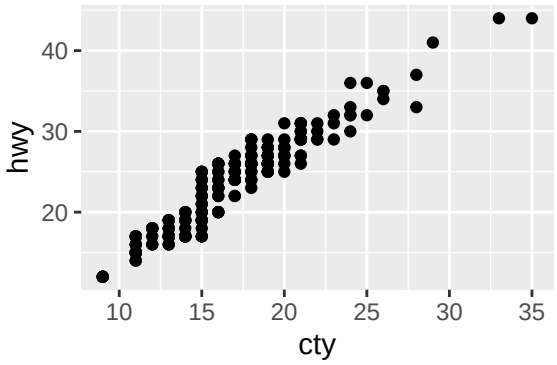
`geom_col` represents the heights of the bars with the values in the data set while geom_bar() makes the height of the bar proportional to the number of cases(that is occurrences) in each group

Question: What variables do stat_smooth() compute?

Answer: The predicted value, lower value of confidence interval and upper value confidence interval

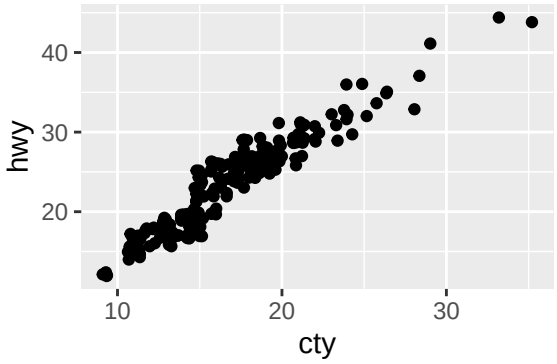
Question: What is the problem with this plot? How could you improve it?

```
ggplot(data = mpg, mapping = aes(x = cty, y = hwy))+
  geom_point()
```



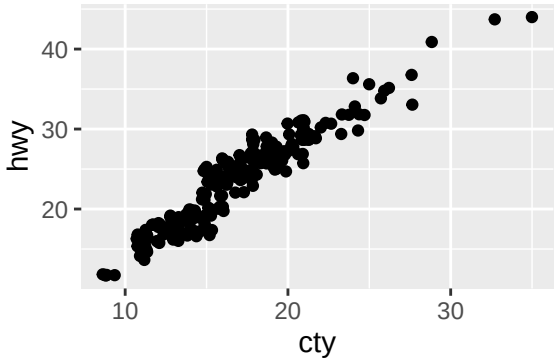
Answer: The outcome shows there is over-plotting on the visual due to the discreteness in smaller datasets. To improve this plot, the argument `position = jitter` should be supplied to the `geom_point()` to add random variations to the location of each point in the over-plotted visual as shown below

```
ggplot(data = mpg, mapping = aes(x = cty, y = hwy))+
  geom_point(position = "jitter")
```



Alternative metod: **Use geom_jitter() instead of geom_point()**

```
ggplot(data = mpg, mapping = aes(x = cty, y = hwy))+
  geom_jitter()
```



What parameters in `geom_jitter` control the amount of jittering?

Answer: **The `width` which controls the amount of horizontal displacement and the `height` which controls the amount of vertical displacement**

Compare and contrast `geom_jitter` and `geom_count`

Answer:

- `geom_jitter` is a convenient variation of `geom_point` which adds a random variation to the locations of each points in the dataset, useful in handling over-plotting
- `geom_count` is a variant of `geom_point` that counts the number of observations at each location, then maps the count to point area.
- Both `geom_jitter` and `geom_count` declare equal aesthetics arguments
- Both geom variants can declare `position` argument to override the defaults locations of datasets on the plots

To know more execute the commands: `?geom_jitter` and `?geom_count`