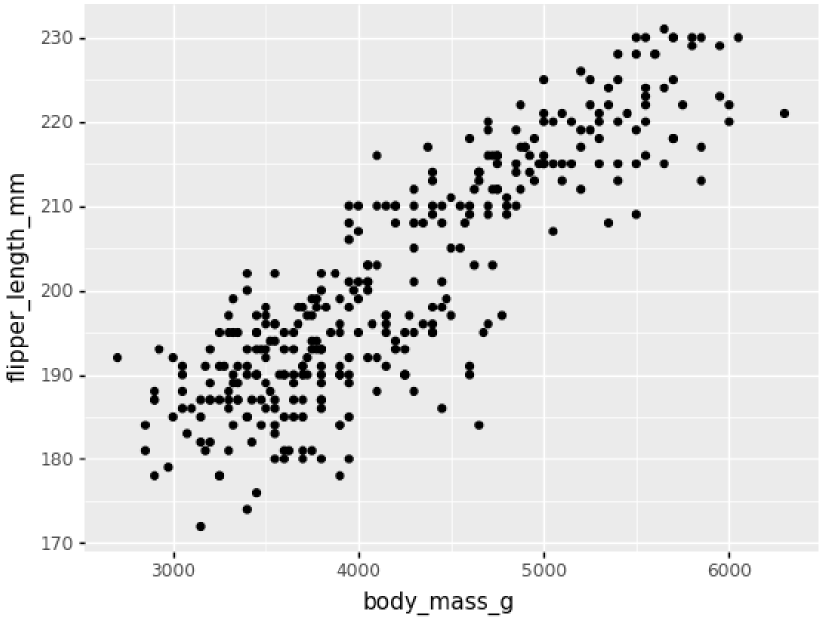
In [1]:
```
# import the necessary packages
import warnings
warnings.filterwarnings('ignore')

import pandas as pd
from plotnine import *
```

1. (4 pts) Using the Palmer Penguin data (`"https://raw.githubusercontent.com/cmparlettpelleriti/CPSC392ParlettPelleriti/master/Data/penguins.csv"`), make a plot that looks at whether the correlation between **body mass and flipper length** is the same between male and female penguins. Start with a default graph and change one thing (or one "class" of things, like getting rid of all gridlines) at a time, similar to how I did in the Class 6 lecture video. Again, make sure you're thinking about these concepts:
   - what visual elements can I get rid of because they distract from my message?
   - what visual elements can I add to support my message?
   - how can I make this visualizations more accessible?
2. (3 pts) In words (type this answer into a new cell and change the cell type to Markdown), explain your thought process for each step.
3. (3 pts) Recreate the graph cereal.png (in the Assignmnets folder on GH) using the cereal data set (`"https://raw.githubusercontent.com/cmparlettpelleriti/CPSC392ParlettPelleriti/master/Data/cereal.csv"`).

In [2]:
```
### YOUR CODE HERE ###
#1 make a plot that looks at whether the correlation between body mass and flipper length
#  is the same between male and female penguins. Start with a default graph and change one thing
#  (or one "class" of things, like getting rid of all gridlines)
#  at a time, similar to how I did in the Class 6 lecture video.

pg = pd.read_csv("https://raw.githubusercontent.com/cmparlettpelleriti/CPSC392ParlettPelleriti/master/Data/penguins.csv")
```

First, let's start with a simple dot plot with x = body mass and y = flipper length

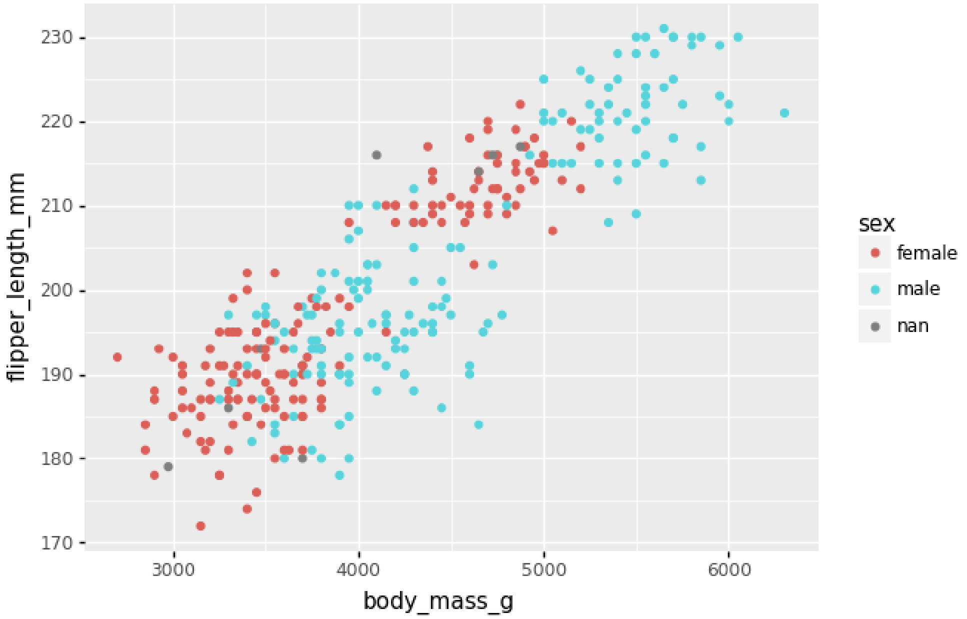
In [3]:
```
(ggplot( pg, aes(x = "body_mass_g", y = "flipper_length_mm")) + geom_point())
```



Out[3]:
```
<ggplot: (139136953013)>
```

Next, we need to differentiate between male and female penguins

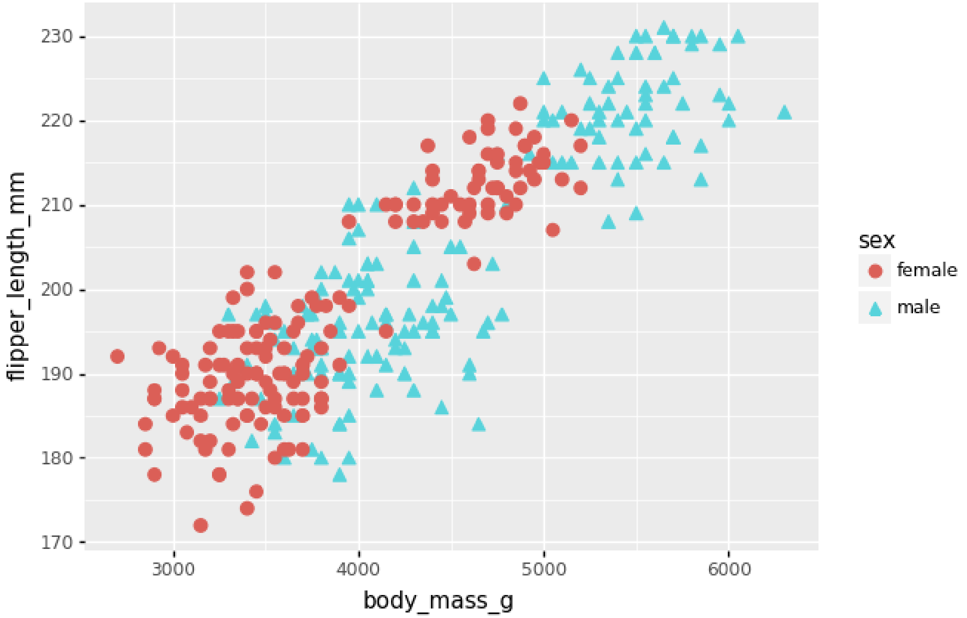
In [4]:
```
(ggplot( pg, aes(x = "body_mass_g", y = "flipper_length_mm", color = "sex")) + geom_point())
```



Out[4]:
```
<ggplot: (139139316038)>
```

There are some penguins lacking data, so let's prune the dataframe to make sure all the data is spick and span. Let's also throw in some shapes for the data points and make them bigger for good measure.

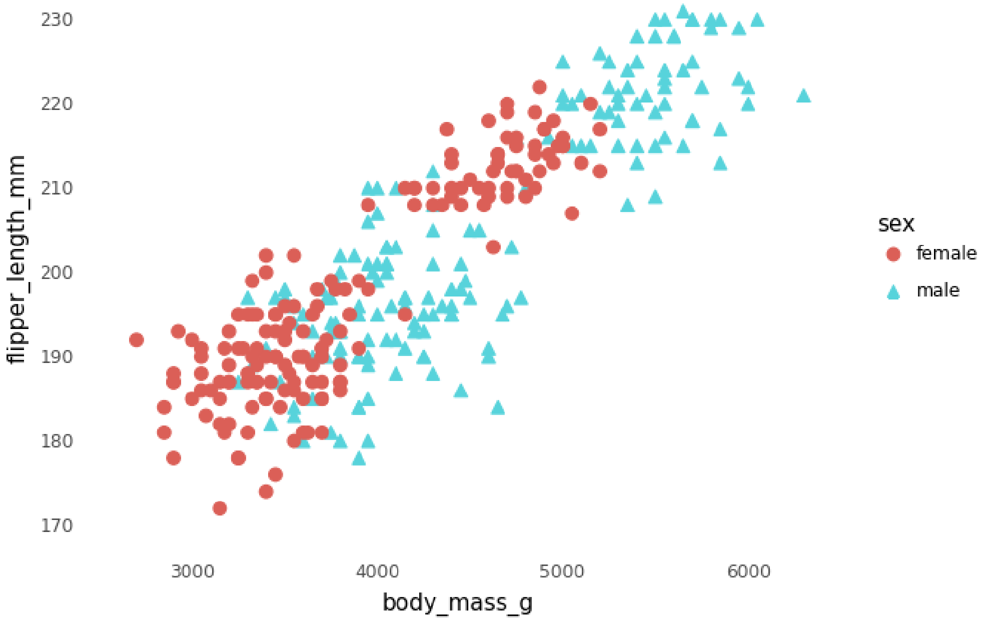
In [5]:
```
isCleanData = (pg['sex'] == "male" ) | (pg['sex'] == "female")

pg = pg.loc[isCleanData]

(ggplot( pg, aes(x = "body_mass_g", y = "flipper_length_mm", color = "sex")) + geom_point(aes(shape = "sex"), size = 3))
```



Out[5]:
```
<ggplot: (139117911655)>
```

Ahhhhhh much better! Now let's clean up the theme and those gridlines. Since we are only looking at correlation, we don't need them at all!

In [6]:
```
(ggplot( pg, aes(x = "body_mass_g", y = "flipper_length_mm", color = "sex")) +
 geom_point(aes(shape = "sex"), size = 3) +
 theme_minimal() +
 theme(panel_grid_major = element_blank(),
       panel_grid_minor = element_blank()
 ))
```

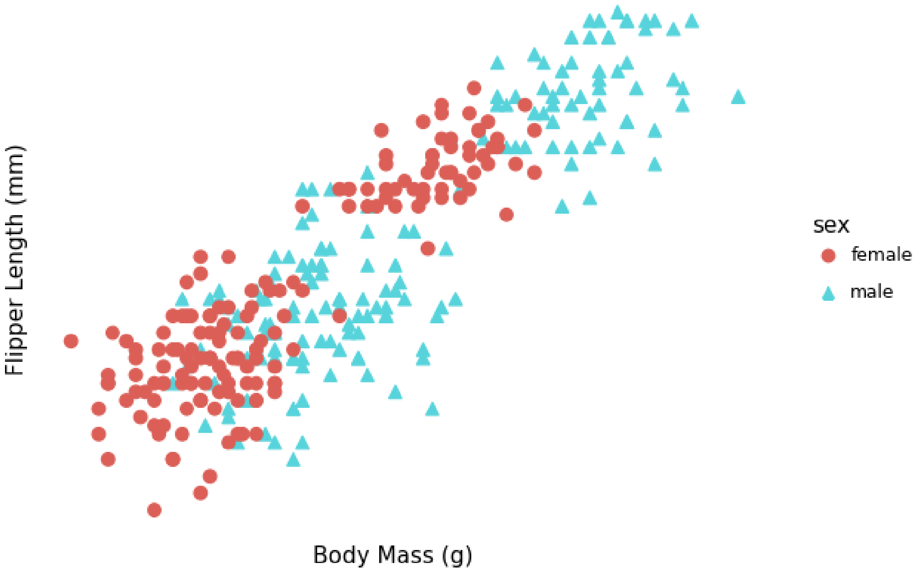


```
Out[6]: <ggplot: (139136953016)>
```

Now it's time to fix the labels. We don't need any exact data points and we do need more simple axis titles

In [7]:

```
(ggplot( pg, aes(x = "body_mass_g", y = "flipper_length_mm", color = "sex")) +
 geom_point(aes(shape = "sex"), size = 3) +
 theme_minimal() +
 labs(x = "Body Mass (g)", y = "Flipper Length (mm)") +
 theme(panel_grid_major = element_blank(),
       panel_grid_minor = element_blank(),
       axis_text = element_blank()
 ))
```

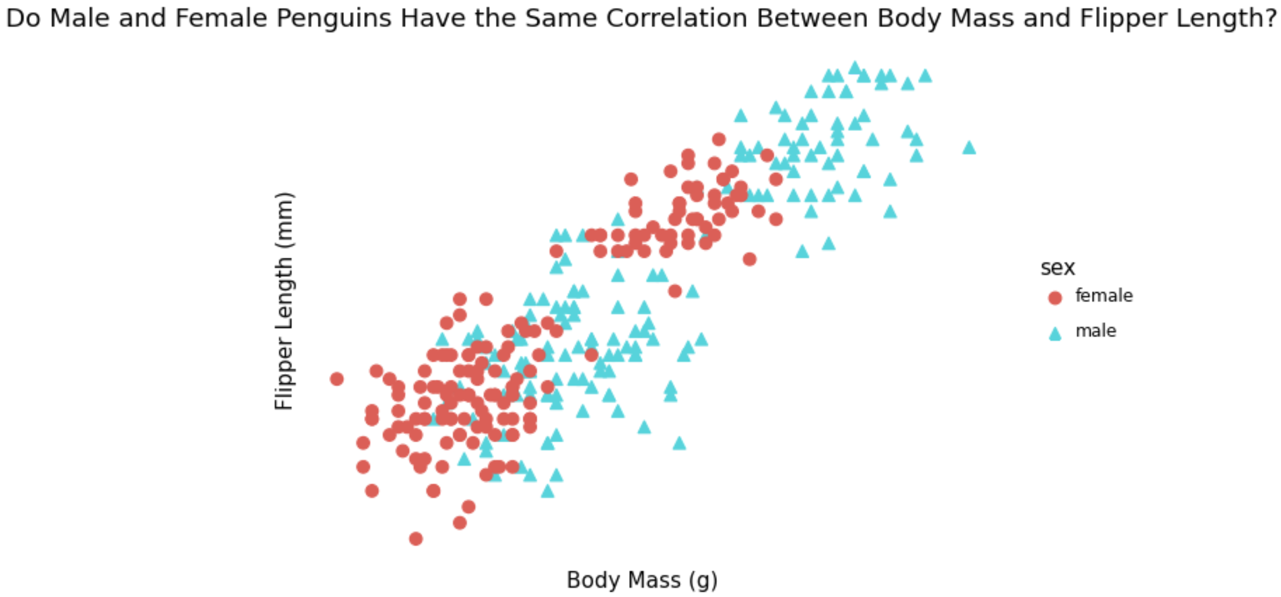


```
Out[7]: <ggplot: (139139484609)>
```

We also need a title for the whole graph!

In [8]:

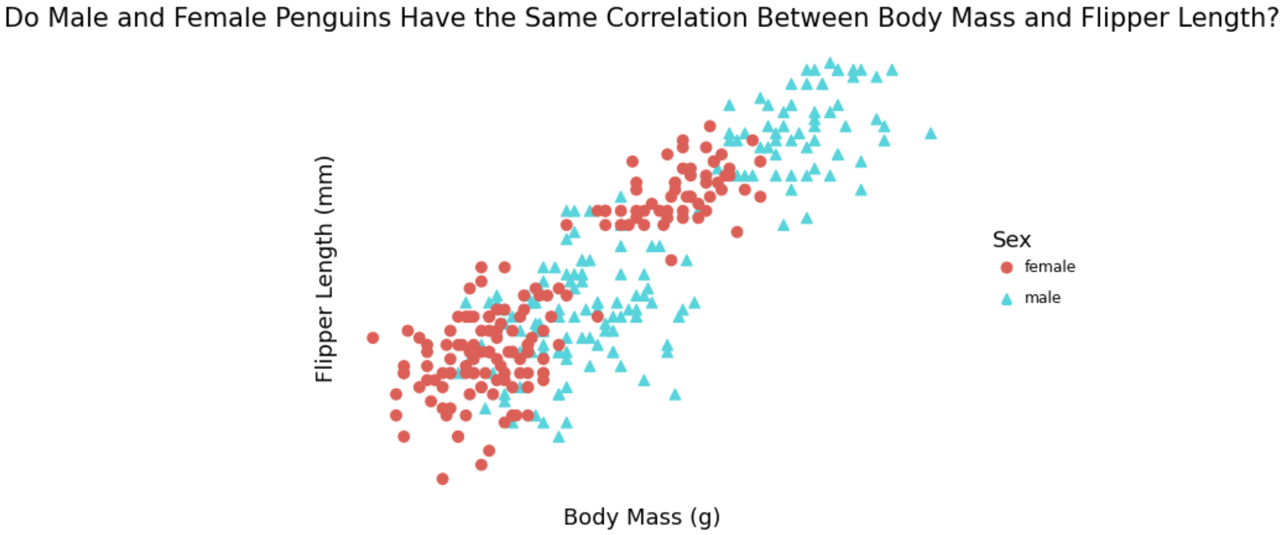
```
(ggplot( pg, aes(x = "body_mass_g", y = "flipper_length_mm", color = "sex")) +
 geom_point(aes(shape = "sex"), size = 3) +
 theme_minimal() +
 ggtitle("Do Male and Female Penguins Have the Same Correlation Between Body Mass and Flipper Length?") +
 labs(x = "Body Mass (g)", y = "Flipper Length (mm)") +
 theme(panel_grid_major = element_blank(),
       panel_grid_minor = element_blank(),
        axis_text = element_blank()
 ))
```



```
Out[8]: <ggplot: (139139576137)>
```

Now let's make things a bit bigger

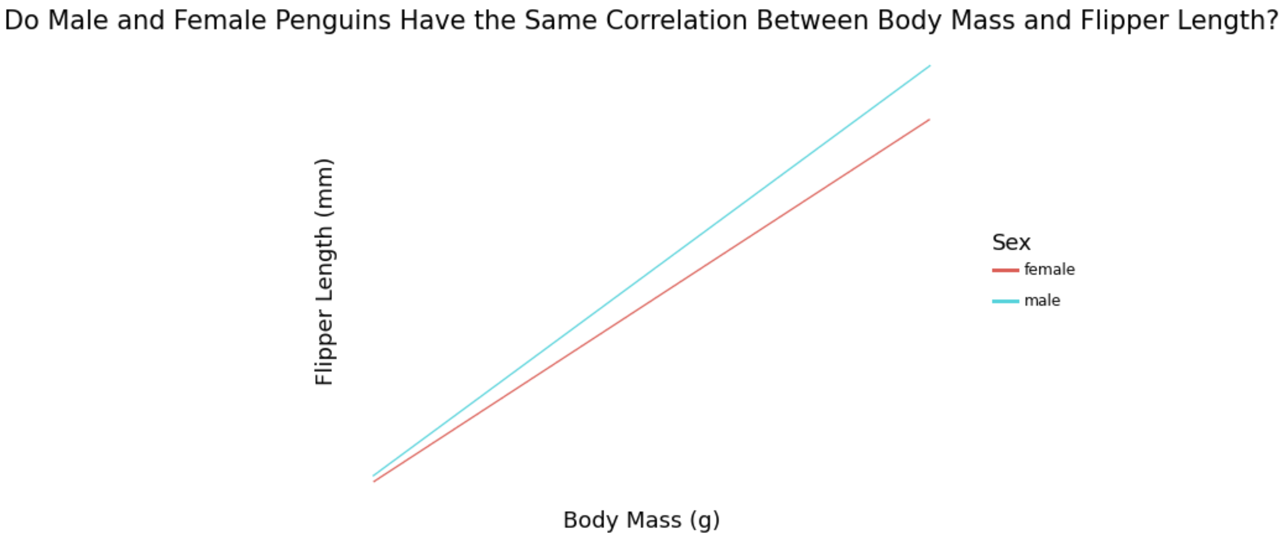
```
In [9]:
(ggplot( pg, aes(x = "body_mass_g", y = "flipper_length_mm", color = "sex")) +
 geom_point(aes(shape = "sex"), size = 3) +
 theme_minimal() +
 ggtitle("Do Male and Female Penguins Have the Same Correlation Between Body Mass and Flipper Length?") +
 labs(x = "Body Mass (g)", y = "Flipper Length (mm)") +
 theme(panel_grid_major = element_blank(),
       panel_grid_minor = element_blank(),
       axis_text = element_blank(),
       axis_title = element_text(size = 13),
       plot_title = element_text(size = 15),
       legend_title = element_text(size = 13, text = "Sex")
 ))
```



```
Out[9]: <ggplot: (139139605709)>
```

Do we *really* need all those points? NO!
Since we're only looking at the correlation, we just need some trend lines.

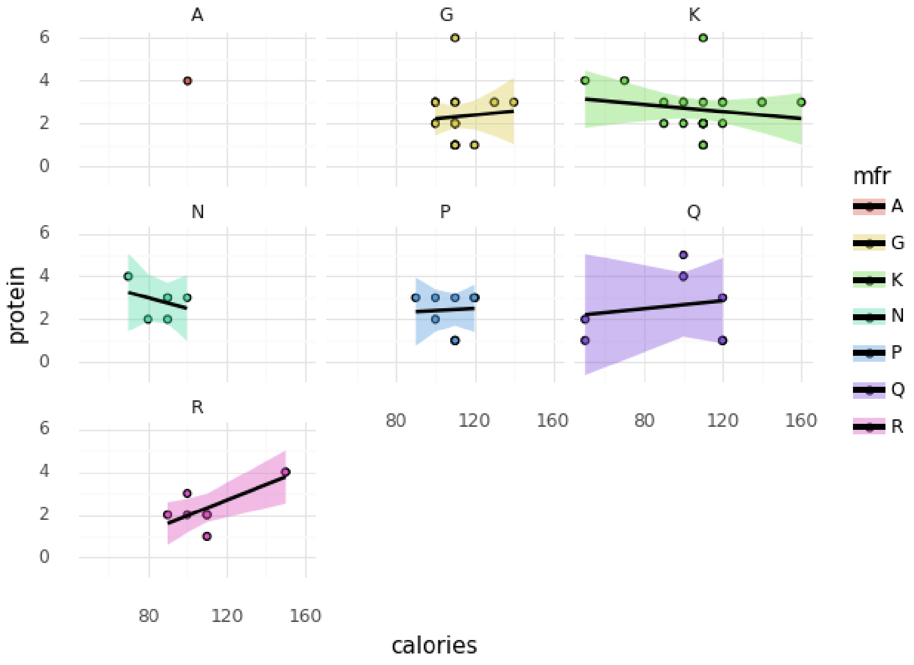
```
In [10]:
isMale = (pg['sex'] == "male")
(ggplot( pg.loc[isMale], aes(x = "body_mass_g", y = "flipper_length_mm", color = "sex")) +
 #geom_point(aes(shape = "sex"), size = 3) +
 geom_qq_line(pg, aes(sample = "flipper_length_mm", group = "sex", x = "body_mass_g")) +
 theme_minimal() +
 ggtitle("Do Male and Female Penguins Have the Same Correlation Between Body Mass and Flipper Length?") +
 labs(x = "Body Mass (g)", y = "Flipper Length (mm)") +
 theme(panel_grid_major = element_blank(),
       panel_grid_minor = element_blank(),
       axis_text = element_blank(),
       axis_title = element_text(size = 13),
       plot_title = element_text(size = 15),
       legend_title = element_text(size = 13, text = "Sex")
 ))
```



Out[10]: <ggplot: (139139574077)>

In [11]:

```
#3 Recreate the graph cereal.png (in the Assignmnets folder on GH) using the cereal data set

cereal = pd.read_csv("https://raw.githubusercontent.com/cmparlettpelleriti/CPSC392ParlettPelleriti/master/Data/cereal.csv")

(ggplot(cereal, aes(x = "calories", y = "protein", fill = "mfr")) +
 facet_wrap('mfr') + #https://plotnine.readthedocs.io/en/stable/generated/plotnine.facets.facet_wrap.html
 geom_point() +
 stat_smooth(method = "lm" ) +
 theme_minimal())
```



Out[11]: <ggplot: (139139907407)>