The following practice problems all deal with a data set that's near and dear to our hearts, the Palmer `penguins` data frame. This data frame can be found in the `stat20` package. *(Like always, make sure you start your analysis by loading in each of the libraries/packages you'll need!)*

The code below builds a scatter plot using some of the variables in the data frame. Copy this into your session, as you'll be modifying it shortly.

```
ggplot(penguins, aes(x = bill_length_mm,
                     y = bill_depth_mm,
                     color = species)) +
    geom_point() +
    lims(x = c(30, 60),
         y = c(12, 23))
```

Question 1

part a

Extract a data frame from `penguins` that excludes the Adelie penguins *without using* a data pipeline. Copy the code you used here.

part b

Now, *use a data pipeline* to extract a data frame that excludes the Adelie penguins. Save it into a new object! Copy the code you used here.

part c

Modify the scatter plot code to use the data frame you just created in **part b**. You do not need to copy the code here. Instead, explain how the plot changed from before.

Question 2

part a

Extract a data frame that excludes the Adelie penguins and retains penguins with bill lengths between 40 and 50 mm. Save the result into a new object. Copy the code you used here.

part b

Modify the scatter plot code to use the data frame you just created in **part b**. You do not need to copy the code here. Instead, explain how the plot changed from the previous question.

Question 3

Sort the data frame from **Question 2** in decreasing order by bill length. Copy the code you used here.

Question 4

Calculate the mean bill length and bill depth *for each of the three species of penguins*. Copy the code you used here. Do those statistics line up with what you see in the penguins plot provided by the (original) code given?

Question 5

Consider a new metric called `bill_size` that's the sum of the length and depth. What is the average bill size and its standard deviation among each species, broken out among each of the island? Sort your resulting data structure in decreasing order by average bill size. Copy the code you used here.

Question 6

What are the total number of penguins in the data set belonging to each species-island combination?

Question 7

What is the proportion of penguins for each species having a body mass greater than 4000 grams? Copy the code you used here. *Hint: use a logical variable!*