Data exploration and deterministic functions

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Contents

load packagues

```
library(here)
```

```
## Warning: package 'here' was built under R version 4.1.3
```

```
## here() starts at C:/Users/Pc/OneDrive - University of Massachusetts/Umass/Classes/Fall2022/DataAna/e
```

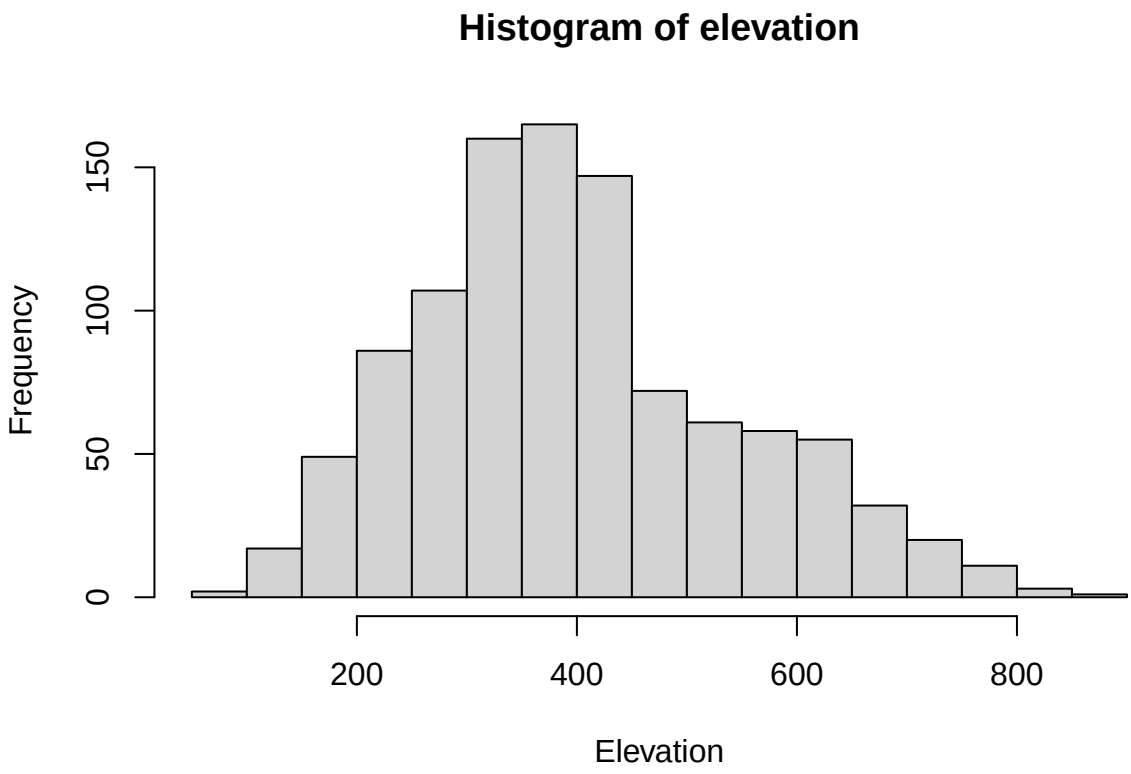
load data set

```
habitat <- read.csv(here("data", "hab.sta.csv"))
```

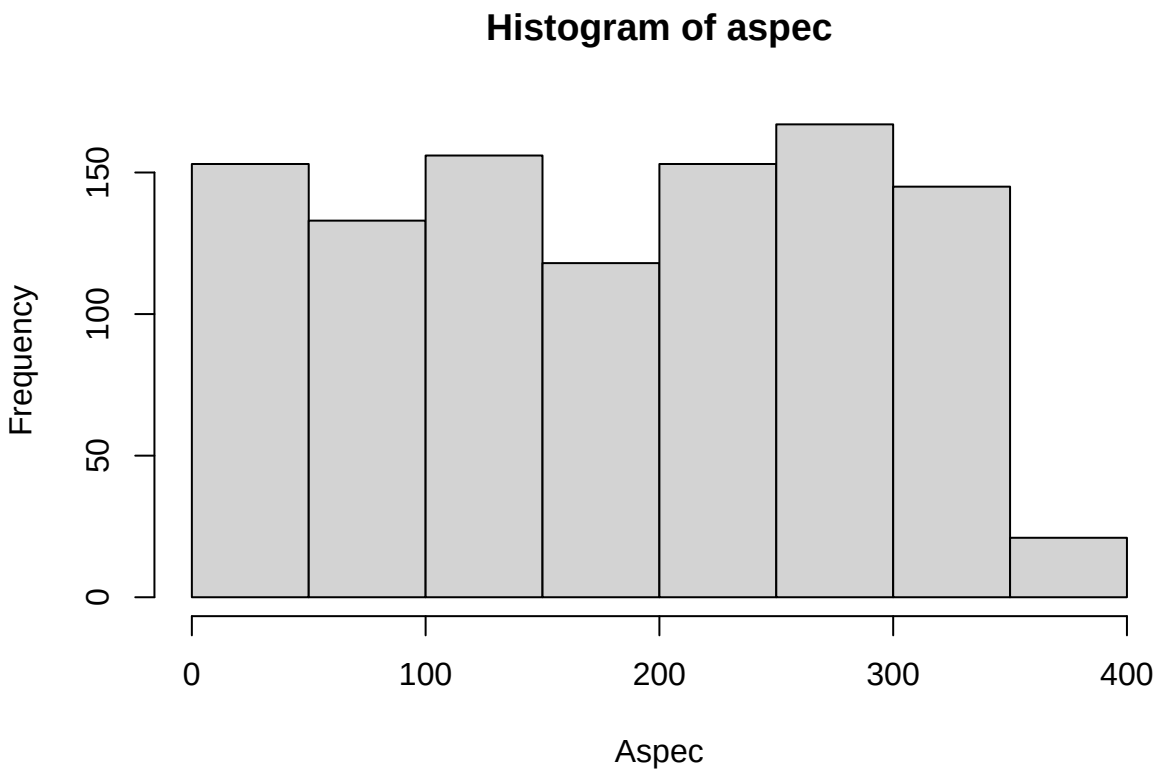
Examine histograms of the three terrain variables.

Plot histograms of the following terrain variables: elevation aspect slope

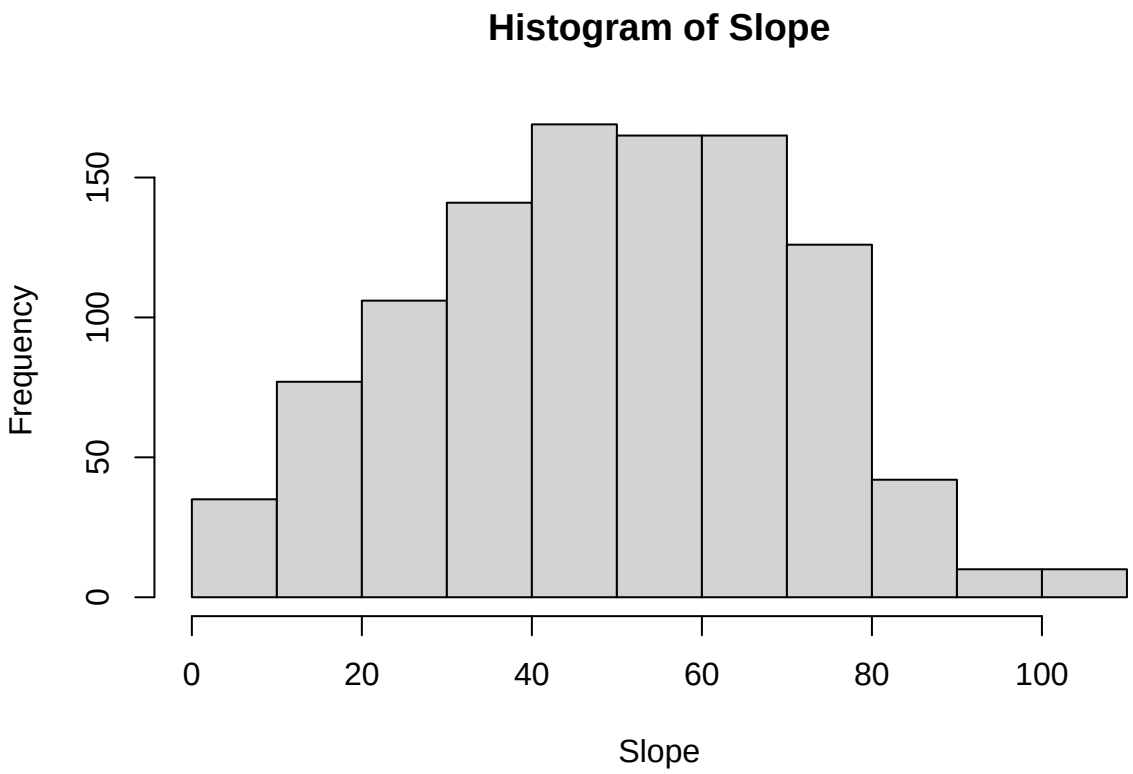
```
hist(habitat$elev, main = "Histogram of elevation",
     xlab= "Elevation")
```




```
hist(habitat$aspect, main = "Histogram of aspec",
     xlab= "Aspec")
```




```
hist(habitat$slope, main = "Histogram of Slope",
     xlab= "Slope")
```



1. Create scatterplots of total basal area and the terrain variables (consult the metadata file to see which column(s) you need).

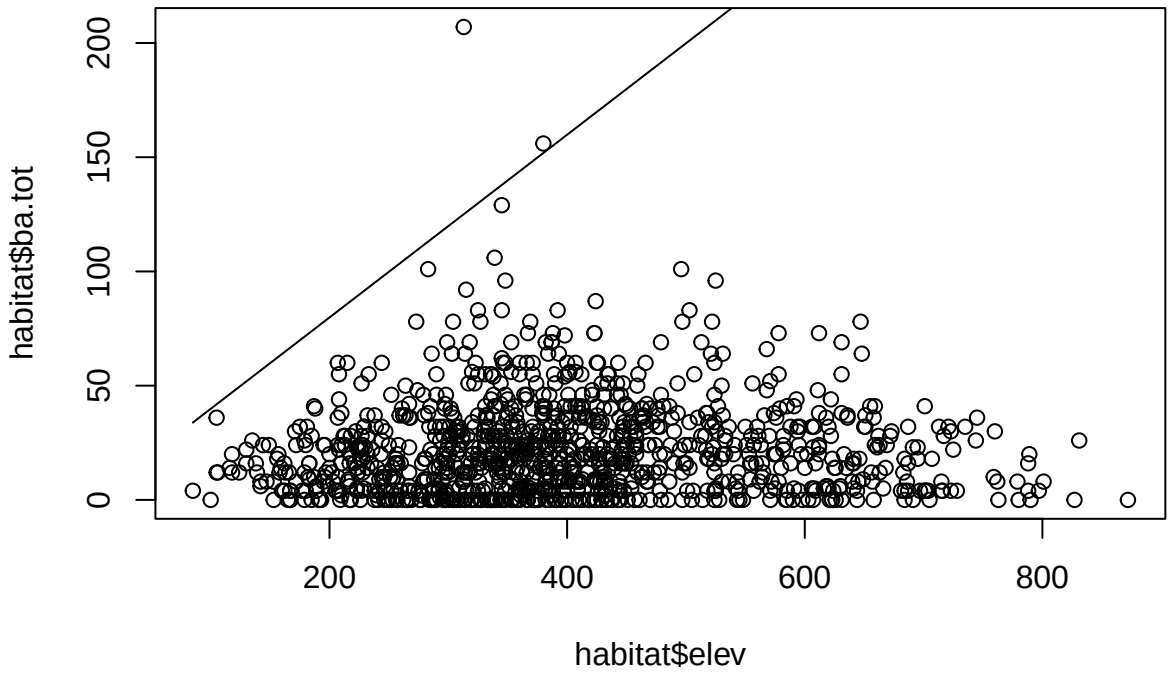
Basal area should be on the y-axis.

Visually inspect the plots and fit a linear function to each of the scatterplots using the parameterization functions provided above.

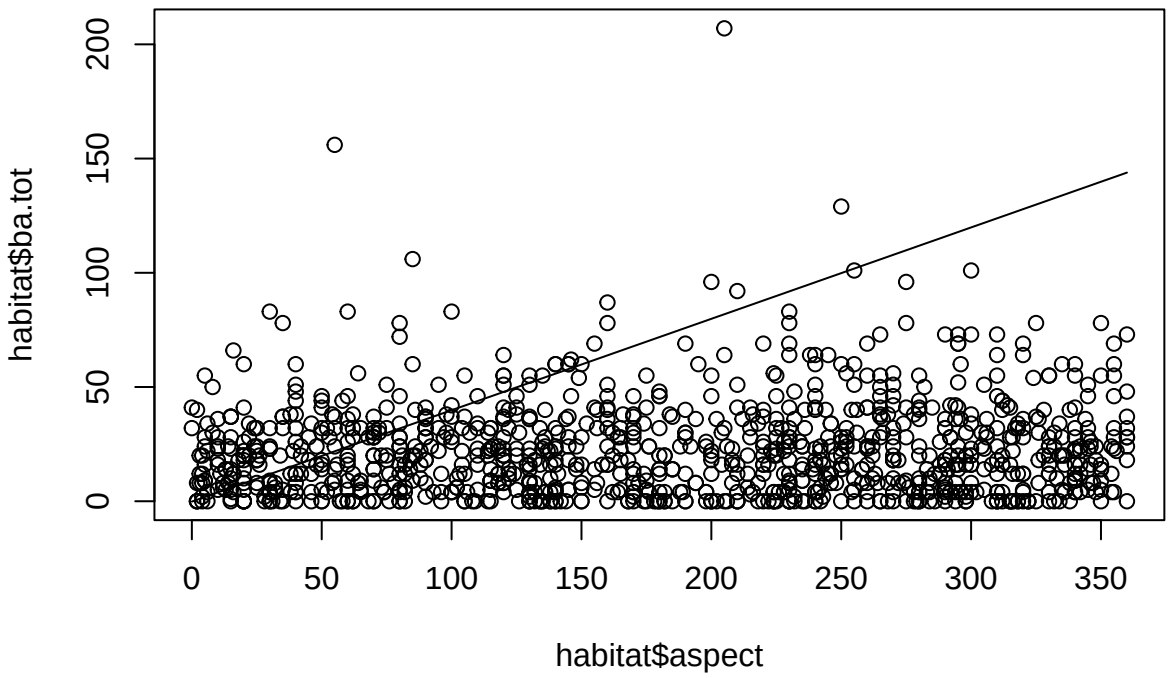
You'll need this fitted model for the assignment questions.

```
# Calculates the value of y for a linear function, given the coordinates
# of a known point (x1, y1) and the slope of the line.
line_point_slope = function(x, x1, y1, slope)
{
  get_y_intercept =
    function(x1, y1, slope)
      return(-(x1 * slope) + y1)

  linear =
    function(x, yint, slope)
      return(yint + x * slope)

  return(linear(x, get_y_intercept(x1, y1, slope), slope))
}
```

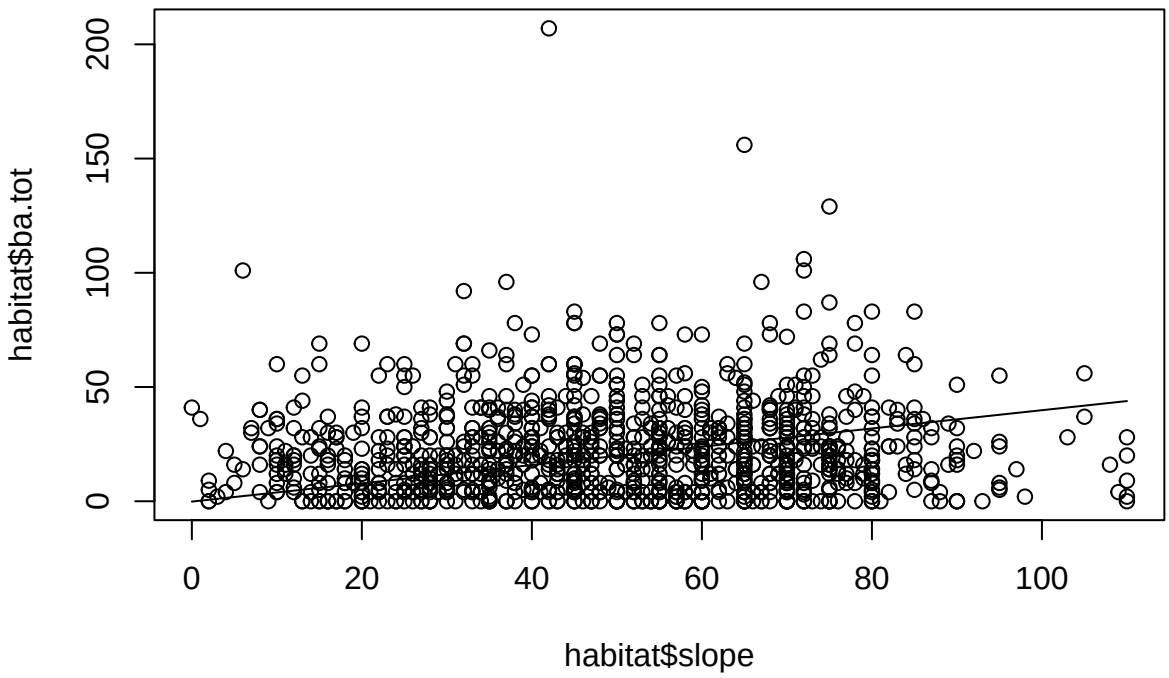
```
plot(habitat$elev, habitat$ba.tot)
curve(line_point_slope(x, x1 = 3.5, y1 = 1.25, slope = 0.4), add = TRUE)
```




```
plot(habitat$aspect, habitat$ba.tot)
curve(line_point_slope(x, x1 = 3.5, y1 = 1.25, slope = 0.4), add = TRUE)
```




```
plot(habitat$slope, habitat$ba.tot)
curve(line_point_slope(x, x1 = 3.5, y1 = 1.25, slope = 0.4), add = TRUE)
```



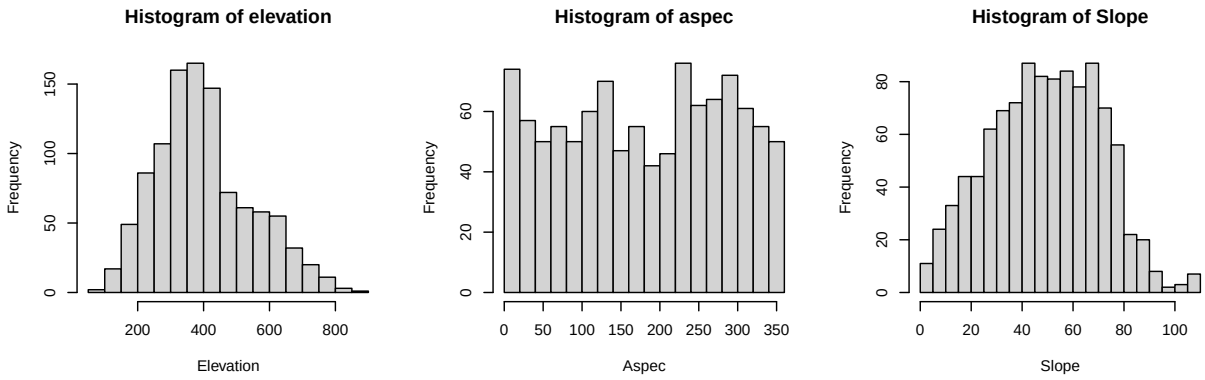
Question

1. Terrain Histogram

Instructions:

Create histograms for the three terrain variables: elevation, slope, and aspect. Plot all three histograms in one figure and include it in your report.

```
par(mfrow = c(1, 3))

hist(habitat$elev, main = "Histogram of elevation",
     xlab= "Elevation", breaks = 20)

hist(habitat$aspect, main = "Histogram of aspec",
     xlab= "Aspec", breaks = 20)

hist(habitat$slope, main = "Histogram of Slope",
     xlab= "Slope", breaks = 20)
```



2. Elevation Histograma Interpretation

Consider the distribution of elevations at the bird census sample sites.

Interpret the shape of the elevation histogram in non-technical language that a non-scientist audience would understand. Some points to consider: Are there more high- or low-elevation sampling sites? Is there an even distribution of sampling site elevation? Your answer should be 1-2 short paragraphs in length.

Answer: For the elevation histogram, will can see that between 350m to 400m is the value more commun, also elevation could have normal distribution

3. Slope units

What are the units of slope in this data set?

Answer: Percentage

4. Slope Histogram Interpretation

Consider the distribution of slopes at the bird census sample sites.

Interpret the shape of the slope histogram in non-technical language that a non-scientist audience would understand. Some points to consider:

Are most sample sites flat? Is there an even mixture of steep and shallow slopes? Your answer should be 1-2 short paragraphs in length.

Answer:

5. Aspect

Briefly define aspect, describing the units used in this dataset.

Answer:

6. Aspect Histogram Interpretation

Consider the distribution of aspect at the bird census sample sites.

Interpret the shape of the aspect histogram in non-technical language that a non-scientist audience would understand. Some points to consider: Do the sampling sites tend to be on north-facing slopes? South-facing? Evenly distributed? Your answer should be 1-2 short paragraphs in length.

Answer:

7. Terrain/Basal Area Linear Model

Instructions:

Create scatterplots of total basal area and each of the the terrain variables: elevation, slope, and aspect. Basal area should be on the y-axis. Visually inspect the plots and fit a linear function to each terrain variable. Review the linear model parameterization section of the assignment walkthrough if needed.

Answer:

8. Terrain/Basal Model Interpretation

For each terrain variable (elevation, slope, aspect), describe the relationship you observe and your model fit. You should consider

Is there a noticeable association? If so, is it linear? Based on a visual assessment, is your linear model a good fit for the data, why or why not?

Answer: