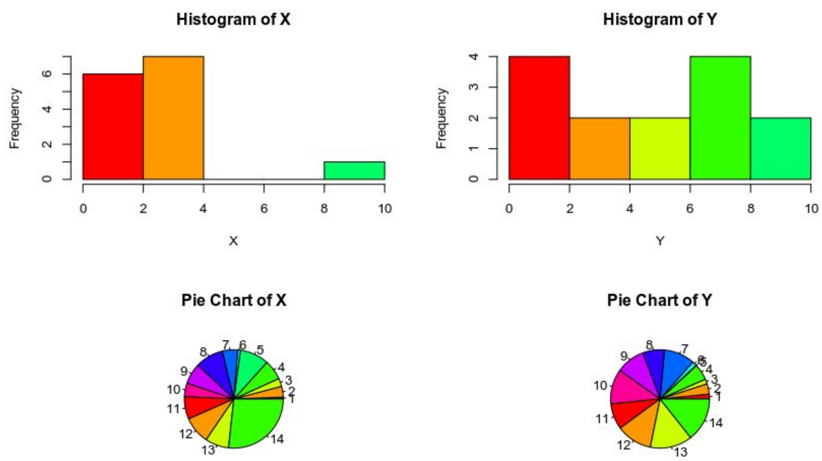
Alex Johnson
I pledge my honor that I have abided by the Stevens Honor System.

HW1

1.

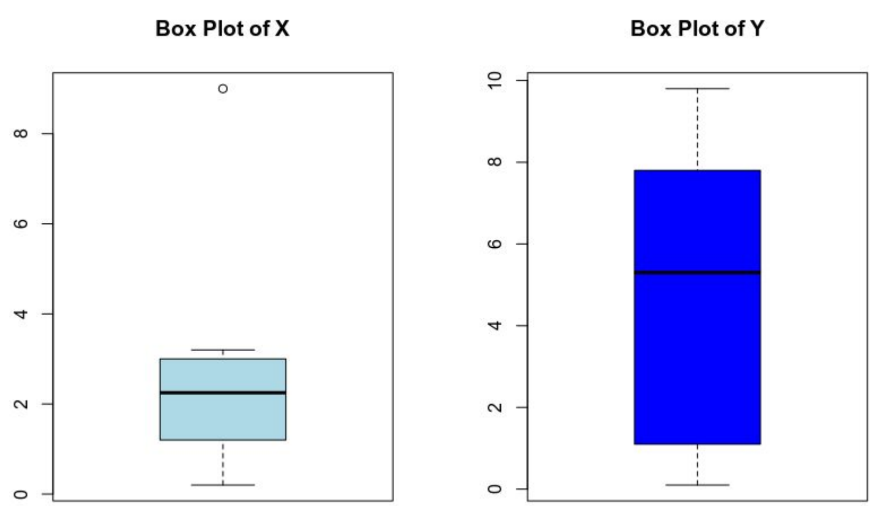


I.

A. **X:** The data is skewed to the right with one outlier to the left. The values are between 0 and 10. The mean is 2.407 and the median is 2.25.

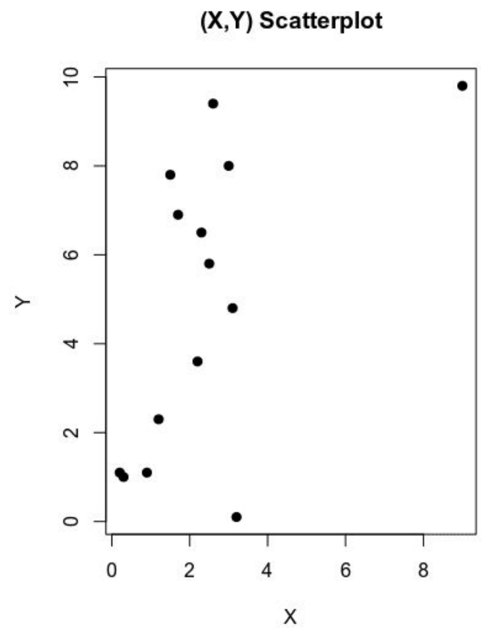
B. **Y**: The data is equally distributed. The values are between 0 and 10 with no outliers. The mean is 4.87 and the median is 5.3.

II. **X:** Outlier around 9. **Y:** No outlier



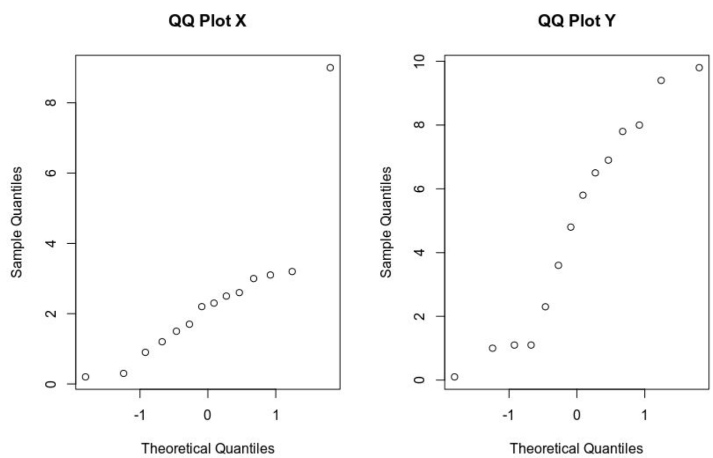
III. **Correlation Coefficient: 0.5679153**

A. This means that there is a moderate correlation. And is moving in a positive direction.



IV. Without outliers, the correlation coefficient is **0.4586256.**

V. Without the outlier, the correlation coefficient is much more accurate. The outlier was skewing the data to look like there was a greater change then there actually was.



VI.

A. With both plotted X looks to have a more normal distribution than Y. This is excluding the outlier.

2) $\sum_{i=1}^{n}(x_i - \bar{x})^2 = \sum_{i=1}^{n} x^2 - n\bar{x}^2$

Proof:

$$\sum_{i=1}^{n}(x_i - \bar{x})^2 = \sum_{i=1}^{n} x_i^2 - 2\bar{x}\sum_{i=1}^{n} x_i + \sum_{i=1}^{n} \bar{x}^2$$

$$= \sum_{i=1}^{n} x_i^2 - 2n\bar{x}^2 + n\bar{x}^2$$

$$\boxed{= \sum_{i=1}^{n} x_i^2 - n\bar{x}^2}$$

for $\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2$ the same steps are followed however the $1/n$ stays on the outside the entire time since it is not in the summation.