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STAT 3010

Xia

Assignment 1

All screenshots that are included are from my own R Script file that is included in my Canvas submission.

1. The data includes the following values from the stem and leaf plot: 0.31, 0.356678, 0.4000112222234, 0.45667888, 0.5144, 0.558, 0.62, 0.6678, 0.7, and 0.7. To obtain the 5-number summary for this data, we can use the summary() function:

```
> source("~/Documents/Spring 2024 Classes/Statistics for Engineers & Scientists/Assignments/Assignment 1/Assignment1.R")
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
 0.3100  0.4142  0.5362  0.5284  0.6559  0.7000 
> 
```

As you can see by the screenshot above, the 5-number summary for this data is:

- Minimum: 0.31
- 1st Quartile: 0.4142
- Median: 0.5362
- Mean: 0.5284
- 3rd Quartile: 0.6559
- Maximum: 0.7

2.

(a). The conclusions derived from studying the rats does not directly translate to humans. This is because although rats and humans be very similar as the article claims, rats are not humans. Rats and humans exhibit different behaviors and cognitive functions. The manifestation and progression of Alzheimer's disease may differ between the two species, impacting the relevance of study results to human conditions. Also, the amount and duration of exercise that is effective in rats might not be directly applicable to humans. Factors such as the intensity, frequency, and duration of exercise can vary significantly between species.

(b). There are several factors that can influence the results of this kind of study. Some of these factors include: differences in rat-human genetic variability, nutrition, physical environment,

gender differences, experimental design (control groups, outcome measures, etc.), duration and intensity of the exercise, stress levels, etc.

3.

(a). To obtain a proportion, I will use the below equation:

$$\text{relative frequency of a value} = \frac{\text{number of times the value occurs}}{\text{number of observations in the data set}}$$

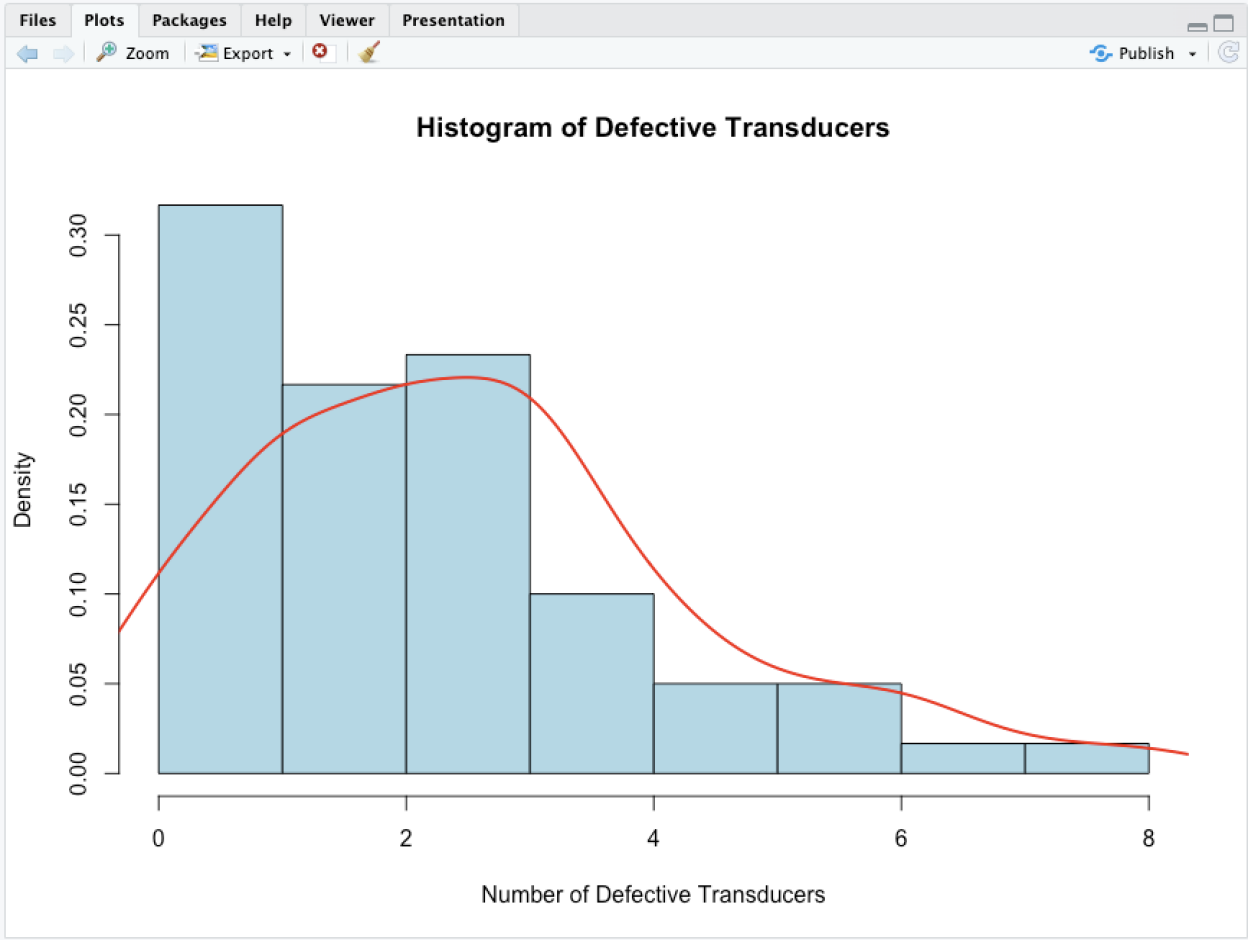
So, in this scenario, I will take the number of times a value is ≤ 5 and divide it by 60. There is 5 batches of defective transducers that are more than 5, therefore, there are 55 batches that had at most 5 defective transducers.

Therefore:

Proportion of Batches that have ≤ 5 Defective Transducers = 55/60 = 0.916…

```
> source("~/Documents/Spring 2024 Classes/Statistics for Engineers & Scientists/Assignments/Assignment 1/Assignment1.R")
        0         1         2         3         4         5
0.1166667 0.3166667 0.5333333 0.7666667 0.8666667 0.9166667
>
```

(b).



As you can tell by the screenshot above, the histogram of the data using density on the vertical scale is rightly skewed. This means that the frequency of the lower numbers is higher than the larger numbers. The red line indicates the density along the histogram.