MATH 324 Computer Project 1

Due date: Thursday, September 13, 2018 (online)  
  
**Purpose**

More practice on the computing component of this class.

**Exercise 1:** An engineer is studying the formulation of a Portland cement mortar. He has

added a polymer latex emulsion during mixing to determine if this impacts tension bond

strength of the mortar. The experimenter prepared 10 samples of the original formulation

and 10 samples of the modified formulation. The tension bond strength data from this

experiment are shown in the following table.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Modified Mortar | 16.85 | 16.4 | 17.21 | 16.35 | 16.52 | 17.04 | 16.96 | 17.15 | 16.59 | 16.57 |
| Unmodified Mortar | 16.62 | 16.75 | 17.37 | 17.12 | 16.98 | 16.87 | 17.34 | 17.02 | 17.08 | 17.27 |

(a) Use c() to generate two datasets.

(b) Use mean() and median() to calculate the mean and median of each dataset.

(c) Use sd(), var() and IQR() to calculate the sample standard deviation, sample variance

and IQR of each dataset.

(d) Construct the histograms for the two datasets and make comments about the shapes.

(e) Construct comparative box-plots for the two groups and make comments about the

similarity and difference.

**Exercise 2:** A survey was conducted in a class where 30 students are enrolled. The survey

question is: how many courses is the student currently taking this semester? The

response data are shown in the data file “P1\_Classes.csv”.

(a) Construct the frequency table using table().  
  
(b) Construct bar-plot using barplot(). Add a title to the plot. You get a bonus point if you can add colors.  
  
(c) Using R functions to count, how many students are taking more than three courses?  
  
(d) Are there any outliers in this data? If so, what numbers are they? Use IQR and quartile().

**Exercise 3:**

(a) Use seq() to generate a sequence 2, 4, … 24.

(b) Use log() to generate a new sequence where each element is log-transformed from the

sequence in (a).

(c) Remove the second to fifth elements in the resulting sequence in (b).

(d) Use length() to obtain the length of the resulting sequence in (c).

(e) Sort the resulting sequence in (c) from high to low using sort().