DATA 106 - Lab 1

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August 30, 2019

General rules

- For some questions, the needed methods may not have been covered in class. For them, please do some research to solve them.
- You must show your work in order to get points. Providing correct answers without supporting codes or intermediate steps does not receive full credit.
- You must submit both the R file as a .R file and the Assignment file as a PDF. For the Assignment file include the code, the output and explanations (if necesssary).

Questions

1. a. Create a vector $a = (1, 3, 5, 7, 9)$ using both the concatenation `c` and `seq` command, respectively.
   b. Create a vector $b = (1, 1, 1, 1, 1)$ using both the `c` and `rep` command, respectively.
   c. Find the entrywise difference between a and b. Find the sum of the last entry of a and that of b.
2. Use `rep` command to create a vector whose first 4 entries are all 1's, second 4 entries are all 2's, and last 4 entries are all 3's.
3. a. Combine a and b (given/created above) into a matrix A by taking them as rows.
   b. Combine a and b into a matrix B by taking them as columns.
   c. Create column and row names of A.
   d. Show the first row of A.
   e. Show the $(2, 2)$-entry of A.
   f. Find the sum of all entries of A.
   g. Find the entrywise sum of the rows of A.
   h. Find the sum of entries for each row of A.
4. a. Turn the matrix A created above into a data frame.
   b. Find the dimension of A.
   c. Append the vector $q = (\text{“}A\text{”}, \text{“}B\text{”})$ as the 6-th column of A and name the new data frame as C.
   d. What happens when C is transposed?
   e. Provide 2 methods to access the 6-th column of C.
5. a. Refer to C created above. Print C
   b. Replace the first 5 entries of the 2nd row of C by 0's.
   c. Delete the last column of C. Name the new dataframe $C1$
6. Create the following 5-by-5 diagonal matrix:

```
##      [,1] [,2] [,3] [,4] [,5] [,6] [,7]
## [1,]    1    0    0    0    0    0    0
## [2,]    0    3    0    0    0    0    0
## [3,]    0    0    5    0    0    0    0
## [4,]    0    0    0    7    0    0    0
## [5,]    0    0    0    0    9    0    0
```

```
## [6,]    0    0    0    0    0   11    0
## [7,]    0    0    0    0    0    0   13
```

7. Summarize the difference and similarity between a matrix and a data frame.