
The assignment is to be sent using the link provided in canvas. Please generate your report using R Markdown, as presented in class (all relevant code needs to be visible).

Reading assignment Before solving the following questions, you need to read chapter 2 from "Introductory Statistics With R, Peter Dalgaard". It is about basic R that you need to know in this course. We checked Stevens library, and the E-Book is available.

Problem 1. (15 points)

- **Create vectors**
 - Create a vector **v1** using `c()`, which contains all odd numbers between 0 and 20.
 - Create a vector **v2** using `seq()`, which contains all even numbers between 0 and 20.
- **Explicit conversion**
 - Convert **v2** to character and assign to **v2**.
 - Convert **v1** to logical and assign to **v3**.
- **Matrix and List**
 - Create a 2 by 5 matrix using **v1**, arrange the elements by row sequence.
 - Create a list **myFirstList**, using **v1**, **v2**, **v3** as the elements.
 - Use "Number", "Character" and "Logical" as column names.

Problem 2. Loops (25 points) 2520 is the smallest number that can be divided by each of the numbers from 1 to 10 without any remainder. Use a loop to find out what is the smallest positive number that is divisible (we mean the remainder should be 0) by all of the numbers from 1 to 20?

Problem 3.: "apply" function (25 points) Download *JPM.csv* from canvas and read this table in R using command. For this table, name it as *JPM2018* and do following things:

- Create a sub-table which only contains Open, High, Low and Close
- Using "sapply" function to calculate mean value for each column and save it as a vector
- Using "apply" function to calculate mean value for each row and save it as a 3 by 5 matrix, the data should be assigned by row.

Problem 4. A gotcha game (35 Points) Gotcha game is a popular game mode for mobile games. In this game, you need to pay real money and draw some prizes from a pool. Assume that you are playing a gotcha game with the following settings:

Prize level	Probability
A	20%
B	80%

Based on the table, you have 20% to obtain a level A prize for each draw.

1. How many draws in average you need to have one level A prize? To do this, please generate 1000 games and use a vector to record the number of draws.
2. What's the probability to obtain the a level A prize within 5 draws? Calculate the theoretical value.
3. Assuming you won't stop until you obtain 5 level A prizes. Every time when you draw from this pool, the probability will be changed as following:
 - If you obtain a level A prize, the probability to obtain a level A prize goes down 3% for the next draw
 - If you obtain a level B prize, the probability to obtain a level A prize goes up 1% for the next draw

Make a line chart to present the probability dynamic for level A prize (You only need to simulate once)

4. (Bonus: 10 points) Repeat step 3 and write it as a function, the input of this function should be the number of A prize. The output of this function should be a plot.