Assignment 1

Problem 1. Write an R program to plot the following function f for $\sigma = 1, 3, 7, 55$ in a single figure. Then use a proper legend to indicate the graphs in the figure.

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} \exp\left(-\frac{(x-\mu)^2}{2\sigma^2}\right), \ \mu = 0.$$

Problem 2. We define a function $\psi(n)$ on the set of natural numbers $\mathbb{N}$ which counts the number of integers in $\{1, 2, \ldots, n\}$ whose GCD with n is 1. Write an R program to calculate and print $\psi(2)$, $\psi(5)$, $\psi(100)$. Show through code that it is not an increasing function.

Problem 3. Create a vector in R which contains 20 random numbers in increasing order and takes value from $[-2, 2]$.

Problem 4. Create a data frame in R that contains the following data of 10 employees:

- First name (use names of your choice)
- Sex (five female and five male; indicate with F and M)
- Age (exactly five with above 25)
- Number of project completed (choose value from 1 to 10)
- Salary (use value between 4L to 10L)

Save the data frame in a '.csv' file. Now write a one line code to find the female employees with salary higher than 8L.

Instructions

- Submit exactly one '.r' file associated with each question (four in total).
- Use appropriate comments to describe the steps in the code. (Do not use more than 5 lines of comments for each question.)
- Each question contains 5 points.
- Those who are uploading from Mac, make sure there are no other hidden files.
- Do not discuss the solution with your friends; it increases the percentage of similarity. If found similar, both the copy will be entitled with zero points. Attaching a sample similarity report for your reference.