**Using R in Financial Statistics (spring 2019)  
Assignment 1**

Due time: Apr. 7 (Sunday), 24:00

1. Define three vectors with numbers, characters and logical values, respectively. Pick one vector to show its length and how to refer to its first, the third and the last elements.

2. Define a matrix with row names and column names as you specify, and show its dimensions and how to refer to its elements, for example, its (i,j)-th element, and the i-th row and the j-th column.

3. Define a four-dimensional array with dimension names as you specify, and show how to refer to its elements.

4. Define a data frame with five variables: name, birthday, gender, age and salary. The data frame has 15 rows and 5 columns. Transform the variable birthday as the date variable in R. Show the structure information and the summary statistics of the data frame. Select a subset of data such that the age is between 30 and 50, and the gender is male.

5. Define a list with five components, and name its second and the third components as age and salary, respectively. Show how to refer to the last component.

6. Define a factor with five levels, with and without order.

7. Create two numeric variables of length 100 and calculate their means, medians, interquartile ranges (Q3-Q1), standard deviations and variances, respectively. Also calculate their covariance and correlation coefficient.

8. Generate 10,000 random samples from t distribution with degrees of freedom 3, 10 and 20, respectively. Calculate their means and variances and compare the results with those of the standard normal distribution.

9. Create a matrix with 100 rows and 50 columns, whose elements are independent samples from normal distribution with mean -2 and variance 3. First, calculate the sum of those variables that are between -1 and 1. Next, transform the matrix such that if the element is between -1 and 1, retain it, otherwise set it as 0.

10. Create a function whose arguments are two numeric vectors. If the lengths of the two variables are equal, then return their means, variances, and covariance, otherwise the function stops and returns a message “The lengths of the two arguments are not equal.”

**Submission**

Save the source code as **assign1.R**

Save the running results as **assign1.pdf**(Use source() command. You can copy the results into MS-Word and then save in PDF format.)

**[Important]** Send the above two files together to email: hjpszu@163.com, with email title  
RFS\_Assignment1\_studentID\_name  
E.g.: RFS\_Assignment1\_2018123456\_张三

You will receive an auto-reply only if your email is with a correct title.