WQD7004 Programming for Data Science
Lab 4 Flow Control

1. Write R scripts using the selection flow control for each of the following.
    a. Determine the biggest number among three numbers.
    b. A switch statement that displays Sunday, Monday, …, Saturday, if the number is 0, 1, ... 6.
    c. Determine whether the year is a leap year. A leap year is divisible by 4 but not by 100. A leap year is also divisible by 400.

2. Write R scripts using the ifelse() function for each of the following.
    a. Determine the positive and negative number in the vector.
    b. Determine whether a character in the vector is uppercase or lowercase letter.
    c. Compare the numbers from two vectors to determine whether a number is larger than, smaller than or equal to another number.

3. Create an R file named **calculator.r** that stimulates a simple calculator. It reads two numbers and an operator. If the operator is +, the sum is printed; if it is -, the difference is printed; if it is x, the multiplication is printed; if it is /, the quotient is printed.

    Example Output:
    ```
    Enter two numbers : 12.5 23.9
    Enter operator : +
    [1] "12.5 + 23.9 = 36.4"
    ```

4. Create an R file named **circle.r**. The script will ask user to enter the radius of a circle and a coordinate point (x, y). Determine whether the point is inside or outside the circle centered at (0, 0).

    Example Output:
    ```
    Enter radius of a circle : 5
    Enter coordinate x and y : 2 3
    [1] "( 2 , 3 ) is in the circle"
    ```

5. Write R statements using loop flow control for each of the following
    a. Find the largest integer n so that n^3 is less than 2000.
    b. Compute the sum of the series: 1/25+2/24+3/23 … + 25/1 in two decimal places.
    c. Display the first ten values of the Fibonacci sequence. Given the formula f1 = 1, f2 =1, fn = fn-1 + fn-2.

6. Create an R file named **score.r**. The script will calculate the minimum, maximum, average and standard deviation (s) of the exam score in a subject. The program will accept the score and quit if negative score is entered.

    Example Output:

```
Enter a score [negative score to quit] : 75
Enter a score [negative score to quit] : 37
Enter a score [negative score to quit] : 57
Enter a score [negative score to quit] : 12
Enter a score [negative score to quit] : 96
Enter a score [negative score to quit] : -1
[1] "Minimum Score 12"
[1] "Maxmimum Score 96"
[1] "Average Score 55.4"
[1] "Standard Deviation 32.62"
```

7. Create an R file named **matrix.r**. The script will ask user to enter M and N. Create a matrix with M rows and N columns with random numbers 1-50. Display the matrix and then count the number of odd and even numbers in the matrix.

   Example Output:

```
Enter M and N : 2 4
     [,1] [,2] [,3] [,4]
[1,]    9   40   13    7
[2,]   49   13   31   24
[1] "Number of odd numbers in the matrix is 6"
[1] "Number of even numbers in the matrix is 2"
```