NYC Data Science Bootcamp

Introduction to R Part II

***** Save all your code to *yourname*.R and push it to the homework Github repository.

Note: you may need to pull from origin before you push it to Github.

Question #1:

Each new term in the Fibonacci sequence is generated by adding the previous two terms. Starting with 1 and 2, the first 10 Fibonacci numbers are:

1, 2, 3, 5, 8, 13, 21, 34, 55, 89,...

Consider all the Fibonacci numbers whose values do not exceed four million. Find the sum of even-valued terms among them.

Question #2:

Write your own codes to implement the multiplication between a matrix and a vector. In case you forget it, here's the definition of matrix multiplication. For an m×n matrix A and an n-dimensional vector x, y = Ax is an m-dimensional vector, where

$$y[i] = \sum_{j=1}^{n} A[i,j]\, x[j] \quad for\ i = 1, 2, 3 ... m$$

Question #3:

Write your function that calculates the median absolute deviation (MAD) of a numeric vector. The median absolute deviation is a robust alternative to standard deviation as a measure of dispersion. It is defined as a vector X as

$$MAD = median(|X_i - median(X)|)$$

Question #4:

Suppose we have a character vector as follows: Names <- "John Andrew Thomas”

Write some R code to obtain the following output:

"John@gmail.com; Andrew@gmail.com; Thomas@gmail.com"

Question #5:

Write some R code to generate a vector with the following elements, **without using loops**.

"aa" "ba" "ca" "da" "ea" "ab" "bb" "cb" "db" "eb" "ac" "bc" "cc" "dc" "ec"

"ad" "bd" "cd" "dd" "ed" "ae" "be" "ce" "de" "ee"