Note: Please e-mail me your R program *only* (arthur.x.li@me.com) by the due date. Write *Assignment 1* and `your name` on the subject line of the e-mail.

Assignment Format: Extra credit 1 point

Please read *AssignmentFormat.pdf* file for correct assignment format. You will be awarded with 1 point extra credit if you follow all the requirements in the *AssignmentFormat.pdf* file.

Problem 1: 10 points

1. Generate the following vectors. Using the `seq` function to create vector `a` and `b`. Using the `rep` to create `d` and `e`.
   - Vector `a`: 2, 3, 4, ..., 10
   - Vector `b`: 15, 12, 9, 6, 3
   - Vector `d`: repeating vector `a` twice
   - Vector `e`: repeat the first element of vector `b` 5 times, the second element of `b` 4 times, the third element 3 times, the fourth element twice, and the last element once
2. Write R commands to answer the following questions (using the vectors that you created in previous problem).
   - How many numbers in vector d are equal to 5?
   - Are any elements of vector e < 1?
   - How many numbers are greater than 9 in both vectors a and b combined?
   - How many missing values are in vector f?
     `f = c(1, 4, 5, 9, -1, NA, 2, NA, 3, NA, 9, 3)`
   - Calculate the sum of `f` (Hint: use the `na.rm` option).

Problem 2: 10 points

To generate a random number that follows standard normal distribution, we can use the `rnorm` function. For example, to generate 5 random numbers, simply type `rnorm(5)`.

- Create a 4 by 5 matrix containing 20 randomly generated numbers that follow standard normal distribution. Use two ways to create this matrix. One matrix will be called `x1`, the other one `x2`.
- Create a matrix, `smallx`, by taking the last three rows and first and last columns of `x1`.
- Write R commands to answer the following questions:
  - What is the dimension of `smallx`?
  - How would one change `smallx` to a vector?

Problem 3: 10 points

Consider the following data set:

Name	Sex	Age	Height	Weight	Smoke
Alfred	M	23	72	160.3	TRUE
Barbara	F	35	61	125.4	NA
John	M	25	NA	175.0	FALSE
Kerry	F	19	66	130.2	FALSE

- Create 6 vectors, `name`, `sex`, `age`, `height`, `weight`, and `smoke`, one for each of the variables above.
- Add the `names` attribute for the `age` vector by using the `name` vector.
- Write an R command to find out whose weight is over 150 pounds?
- Create a list, `example.list`, based on these 6 vectors. Use the names of the vector as the names of component of the list.
- Create a vector, `bmi`, based on vectors `weight` and `height`, according to the following formula: $bmi = 100 weight/height^2$. Then concatenate `bmi` to `example.list`. Make sure `bmi` is a list before you concatenate it.
- Create a list, named `small.list`, based on `example.list` that only contains the `name` and `sex` components.
- Convert `example.list` to a data frame, named `example.data`.
- Create a data frame, `female`, based on the data frame `example.data` by only keeping the female subjects. When you create this data frame, only keep variables `name`, `sex` and `age`.
- Change the variable names of the `female` data set from `name`, `sex` and `age` to `f.name`, `f.sex`, and `f.age`.
- Change the default row names of `female` to `A01`, `A02`.