Assignment 1
Assigned Wednesday Jan. 15, 2014
Due Friday Jan. 24, 2014
report necessary

The objective of this lab is to familiarize yourself with the use of vectors in R. This includes constructions of vectors, use of variables, basic selection of vector elements, and solution of simple problems.

Every task requires only one or two lines. Please put all the lines necessary to solve this lab into a single file (using the R editor), and email me this file. Dan Smith will help you do this if you are having difficulties. You should also store this file and your work inside a directory called lab1 (or something similar), which itself is under the directory `comp_psych_labs` (using `getwd()` and `setwd()` as necessary.

Task 1
Given the vector of 10 weights:

$$grades = c(150, 140, 165, 187, 210, 57, 223, 190, 175, 182)$$

extract the following subsets (you are to use shortcuts). In other words, the answer c(150,187, 223, 190) is *not* acceptable.

1. the 1st, 4th, 7th, and 8th elements
2. all the elements, except the 3rd, the 7th, and the 8th.
3. the 1st, 3rd, 5th, 7th, 9th elements. Use the `seq` function.

Task 2
Random numbers are generated in many ways. The command to generate n random numbers, normally distributed with mean 0 and standard deviation 1 is `rnorm(n)`. In other words, `rnorm(7)` will generate a vector of 7 random numbers normally distributed.

Generate a vector of 100 random numbers and assign this vector to the variable named `rand100`. Using the function `length(rand100)`, which returns the number of elements in the vector, perform the following tasks:

1. Create a new vector that contains the first half of the original vector.
2. Create a new vector that only contains every third element of the original vector. Define a variable to store this vector.
3. Use the `head` and `tail` functions to print out the first and last 10 elements of this vector. Look up the use of `head` and `tail` using help (?) or using the web (google).

Task 3
Repeat task 2 but with 10,000 random numbers.

Task 4
Create two vectors with 10 random numbers each. Add them together to crete a new vector with 10 random numbers, where each vector element is the sum of the corresponding elements of the first two vectors. For example, given the vectors $x = c(3, -2, 10)$ and $y = c(5, 2, 3)$, the vectors can be added together just as if you were adding two numbers. Thus, $y = x + y$. So add the two vectors with 10 random numbers each, and then divide the resulting vector by 2. Print out the vectors x, y, the sum and the sum after division by 2. (Once you know how to add two vectors, you subtract, multiply and divide in a similar way. Division of a vector x by a number 5 is simply $x/5$.

Task 5
Create a vector of $10,000$ random numbers. Extract the first and last 25 percent of these elements and store them in a new vector (provide names (variables) for all these vectors). Use the commands `head` and `tail` to show first and last 30 elements of this vector. Do the same for your original vector of $10,000$ elements.

Task 6
Construct a vector starting that contains all the numbers divisible by 3, starting from 12, and going no higher than 2371. How many elements are there in this vector. Use the appropriate R functions to get the answer.

Task 6

1. Construct a vector of 20,000 random numbers. Call this vector x. Sum up all these random numbers (use the web or the help in R) to find out how to do this, and calculate the mean of these random numbers.

2. Multiply x by itself, call this new vector $x2$, and calculate its mean.