Psych 240 Lab 1

The purpose of this assignment is to introduce you to the statistical package R and to the general structure that your lab assignments will follow this semester.

Setup Instructions (please complete these steps before the TA begins their presentation for the day)

1) Log on to your lab computer with your OIT username and password. Alert the TA if you have any trouble with this.

2) Go to the course Moodle page. In the "Labs" section, click on the file called "Lab1". In the dialog box that opens, select "Save File" and hit OK. If you are asked to select a directory, choose the "Downloads" folder. If you are not asked to select a directory, the file should automatically be saved in "Downloads".

3) On the Start Menu, select "All Programs" – "Statistics" – "R" – "R x64 3.1.0". You should see R launch on your computer screen.

4) In the R console, type the following text: setwd("C:/Users/*your-OIT-username*/Downloads"). For example, if your OIT username is "astudent", you would type in setwd("C:/Users/astudent/Downloads").

5) Next, enter this at the R console: source("Lab1.txt"). If all goes correctly, you should be asked to enter your student ID number. If you get a "file not found" message, then you either didn't save the Lab1 file from Moodle in the Downloads directory or didn't set R to your Downloads directory. You can get help from the TA or another student.

6) If you see a prompt that says "Student ID not found", check your ID number and try to enter it again. If it won't work after several tries, you can just enter 0 instead of your ID and the program will let you continue. If you do this, you will not get a completion code at the end of the assignment, so you have to show the TA your R screen after you complete the assignment and before you leave.

7) Wait for further instruction from the TA.

Lab Demonstration

The TA will guide you through this section. Please wait until you are asked to begin and follow along with the TA.

1) R is an open-source (in other words, FREE!) statistical program that can be used for plotting, data analysis, and pretty much any type of statistical test. The labs this semester will establish some basic skills using R.

2) You can use R to perform math functions…

+ is used for addition, of course. Type in "4+2" and hit ENTER.

- is used for subtraction. Type in "4-2" and hit ENTER.

* is used for multiplication. Type in "4*2" and hit ENTER.

/ is used for division. Type in "4/2" and hit ENTER.

^ is used for powers. Type in "4^2" and hit ENTER.

sqrt() is used to get square roots. Type in "sqrt(16)" and hit ENTER.

3) For multiple-component math expressions, R follows this order of operations: first it does anything you put in parentheses, then it does powers and roots, then it does multiplication and division, and finally it does addition and subtraction.

Type in (3 + 4)*2 and hit ENTER.

Type in 3 + 4 * 2 and hit ENTER.

For the first command, R first adds 3 and 4 because it is in parentheses, then multiplies the result by 2.

For the second command, R first multiplies 4 and 2 because nothing is in parentheses and multiplication is earlier in the order of operations then addition. Next, it adds 3 to this product.

4) R can also hold data in vectors or matrices. The "Lab1" file that you sourced already created a few of these for you. For example, "field" and "free" are vectors storing how many points each of the 12 players on a basketball team scored in a game from the field (during active play) and from the free-throw line in a basketball game. The order of the layers is the same in both vectors. Type in "field" and hit ENTER. You will see the points from the field for all of the players. Type in "free" and hit ENTER. You will see the points from the free throw line for all of the players.

5) You can do math operations on entire vectors. Type in "field + free" and hit ENTER. You see 12 numbers representing the total number of points scored by each player. That is, R added every element in the "field" vector to every element in the "free" vector and produced a vector of these 12 sums.

6) You can create new vectors or variables using "=" in R. For example, type in "total = field + free" and hit ENTER. You created a new vector called "total" that has each element of "field" added to each element of "free". Type in "total" and hit ENTER and you will see the values stored in this vector.

7) A convenient way to figure out how many scores are in a vector is to use the "length" function. Type in "length(field)" and hit ENTER. R returns 12, because "field" stores data from 12 players.

8) Now you will complete the lab assignment for this week. Every week, R will generate different data sets for each student, so the answers will also be different for each student. The lab files are set up so you can automatically check to see if you got the answer correct. For example, to check the first question, you would type in "q1(*your-answer-here*)" and hit ENTER; to check the second question you would type in "q2(*your-answer-here*)", etc. When you have entered correct answers for every question, you will get a completion code that the TA will use to make sure you get participation credit for the lab.

Lab Assignment

Complete this section on your own. You can ask the TA for help. Record all of your answers on a sheet of paper with your first and last name on the top. The correct answers are different for each student. R will tell you whether or not your answer is correct, as detailed below. When you enter all of the correct answers, R will tell you that you are finished and give you your completion code to write on your answer sheet. You can either leave when you are finished, or you can use any extra time to get help on your homework or the lecture content from the TA.

1) The "Lab1" file created a vector called "grads" that holds the number of graduate students supervised by each faculty member in a psychology department. How many graduate students are supervised by the second faculty member in this vector?

[Type in "q1(*your-answer-here*)" and hit ENTER to see if you are correct. For example, if you thought the answer was 12, you would type in "q1(12)".]

2) How many faculty members have their data stored in the "grads" vector?

[Type in "q2(*your-answer-here*)" and hit ENTER to see if you are correct.]

3) The "Lab1" file also created a vector called "ugrads" that holds the number of *undergraduate* students supervised by each faculty member in the same psychology department. The order of the faculty members is the same in "grads" and "ugrads". How many undergraduate students does the fourth faculty member in this vector have?

[Type in "q3(*your-answer-here*)" and hit ENTER to see if you are correct.]

4) Create a vector called “students” that stores the total number of students supervised by each faculty member (undergrads plus graduate students). What is the total number of students for the last faculty member in the vector?

[Type in “q4(*your-answer-here*)” and hit ENTER to see if you are correct.]