CS614 – Prof. Berardi
Homework #1
Due: **September 5, 2018 (11:59 PM)**

This assignment is meant to get you in the R frame-of-mind and give you practice using the assignment template. If you are having trouble with the R syntax, Sections 2 and 6 of the "Introduction to R" document posted in the Files section of the Blackboard page are pertinent resources.

1. Consider the following matrix of the first 12 prime numbers:

$$\begin{pmatrix} 2 & 3 & 5 \\ 7 & 11 & 13 \\ 17 & 19 & 23 \\ 29 & 31 & 37 \end{pmatrix}$$

Enter this matrix into the workspace, but make sure you <u>do not</u> show this step in your .html printout. Write a function that takes a vector and standardizes it, that is makes the mean 0 and the standard deviation 1. Then use this function to standardize each column of the matrix. Perform this procedure twice, once with a `for` loop and once using the `apply` command.

2. Load the CO2 data frame into memory by entering `data("CO2")`. This data frame describes carbon dioxide uptake in various grass plants. The `Type` variable indicates the type of plant, the `conc` variable indicates the ambient CO_2 concentration, and the `uptake` variable indicates the amount of CO_2 that was absorbed into the plant.

   a) Create a scatter plot of the `conc` versus `uptake` with `conc` on the x-axis. Provide a brief interpretation of this figure.

   b) Create a new variable, called `percabs`, that captures the percentage of the ambient concentration that is absorbed into the plant.

   c) Calculate the mean and standard deviation of `percabs` separately for each of the two plant types. Summarize your findings in a few sentences.

   d) Create a histogram of the `percabs` variable (using the `hist` command). <u>Do not</u> show the code for this step in your .html printout.