Note: For this and all future assignments, please use good programming style. Comment your code. Use meaningful variable names. Use variables whenever a value is not simply a fixed constant in an equation. Separate logical sections of your code using %%s. Also, try using the Matlab debugging techniques we discussed in class, especially if they were new to you. And I trust that folks will not search online for web-published algorithms that solve some of these problems.

**Q1.** Draw 1000 random samples from a standard normal distribution with a mean of 0 and a standard deviation of 1 (i.e., using the randn() function). Your code should be flexible enough so that I can change the nsamples from 1000 to some other value and all of the parts of your answer to this question will still work (which means that you might want to check that your code works for other values of nsamples too).

a) Calculate the mean and standard deviation of your 1000 random samples “the long way”, without using any built-in statistical functions in Matlab (e.g., don’t use the mean() or std() functions).

b) Create a histogram and plot it using the bar() plotting command in Matlab. The hard part here is actually calculating the histogram because I want you to do it “the long way” without using any built-in functions. Just use control flow operators like for loops or if then statements or while loops; don’t use the hist() function or anything like that. Your code should allow me to flexibly change things like the width of each bin of the histogram along the x axis or the maximum and minimum x value to plot the histogram (which means that you should check that your code allows this too).

**Q2.** Imagine you need to randomize nlevels of an independent variable. In other words, if nlevels = 5, then one randomization would be 5 1 2 4 3 and another would be 4 1 5 3 2. Write Matlab code that creates a randomization using only rand() or randi() and control flow operators like if statement, for loops, or while loops. In other words, do not use a built-in Matlab function like randperm().

**Q3.** Now imagine you have multiple blocks in an experiment, that within each block you have a randomization of nlevels of an independent variable, but that you need to make sure that the same level never repeats. In other words, if you had nblocks = 3 and nlevels = 3, then the following sequence of levels would be valid: 3 1 2 1 2 3 2 1 3. The following sequence of levels would be invalid because there are repeats: 1 3 2 2 1 3 3 1 2. Write Matlab code that creates this randomization, again using only rand() or randi() and control flow operators.

*Unexcused late assignments will be penalized 10% for every 24 hours late, starting from the time class ends, for a maximum of two days, after which they will earn a 0.*