Practice #11

Do all problems in a single SAS program. Use line comments to separate and annotate the sections of the program for each of the problems below. Arrange the program so that the problems are in the same order as that assigned.

1. For the Stillwater Mesonet SAS data set created in Assignment 10 using one-dimensional array(s) and DO loop(s) convert each of the temperature measures in the SAS data set to Celsius. Recall: C = (5/9)(F - 32) where F = temperature in Fahrenheit. Label variables appropriately so that the two scales for temperature can be identified. Leave the original SAS data set intact. Create a new SAS data set in this step. Do not keep the Fahrenheit measures in this new SAS data set. Print the new Celcius SAS data set with labels. All variables that are not temperatures should still remain in the SAS data set.

2. Random number generators are for particular distributions, such as a standard normal or a uniform distribution on the (0, 1) interval. One may also need the following information to produce other distributions in the same family. For example, if X is the randomly generated number it could be modified in a DATA step by:
   $Y = X + \beta$ □ adds a constant β to each value X generated. This would change the mean of the distribution.
   $W = \alpha * X$; multiplies each randomly generated X by α. This would change the variance of the distribution of X by a factor of α^2.
   $U = \alpha * X + \beta$; changes both the mean and variance of the randomly generated X.

   Specify a seed value for each random number generator function you program.

   a. Using the uniform random number generator in a ***CALL routine*** and DO loop(s), generate 10 samples of size 15 where the value of the random variable is a number between 0 and 1. This SAS data set should have 150 observations. (Do NOT print this SAS data set!)
   Using the MEANS procedure, compute the mean, standard deviation, minimum, and maximum for each sample.

   b. Using the uniform random number generator in a ***CALL routine*** and DO loop(s), generate 10 samples of size 15 where the value of the random variable is a number between 5 and 6. This data table should have 150 observations. (Do NOT print this data table!)
   Using the MEANS procedure, compute the mean, standard deviation, minimum, and maximum for each sample.

   c. Using the uniform random number generator in a ***CALL routine*** and DO loop(s), generate 10 samples of size 15 where the value of the random variable is a number between 10 and 20. This SAS data set should have 150 observations. (Do NOT print this data table!)
   Using the MEANS procedure, compute the mean, standard deviation, minimum, and maximum for each sample.

3. a. Using a random generator ***function*** generate a standard normal random sample of size 100. Produce a high resolution vertical bar chart specifying the midpoints for 10 bars centered at the population mean.

   b. Using a random generator ***function*** generate a N(0, 8) random sample of size 100. Produce a high resolution vertical bar chart specifying the midpoints for 10 bars centered at the population mean.

   c. Using a random generator ***function*** generate a N(150, 8) random sample of size 100. Produce a high resolution vertical bar chart specifying the midpoints for 10 bars centered at the population mean.