STAT 7365
HW_01 (Total Points: 50)

Please make sure to submit the homework with the codes. All plots should be well labelled with legends whenever possible.

1. Read the iris dataset from R package datasets and produce the following graphs.

   A) Create a scatter plot of Sepal Width and Sepal Length.
   B) Create a bar plot of Species.
   C) Create a boxplot of Species by Sepal Width (X-axis - Species, Y-axis sepal width).
   D) Create a histogram of Sepal Length. Try using fill= Species statement.
   E) Create a histogram of Sepal Length by setting the number of bins=20.
   F) Create a KDE plot of Sepal Length. Use color= Species.
   G) Create s stacked KDE plot of Sepal Length.

2. Read the Chick Weight data from R package datasets and produce the following graphs.

   A) Create a line plot for weight of all chicks (Hint: x= Time, y= weight, color=chicks).
   B) Create a grid of line plots of weight of chicks by diets. (Hint: create 4 plots in a single grid with x= Time, Y= Weight)

3. Consider a study on weight loss. In that study, women were interviewed and weighted the first week and enrolled in the study at the second week. At weeks 1, 2, 3 and 6 their weights were taken at the clinic. At weeks 4, 5, 7 and 8 the researchers called the participants at home and asked them to weigh themselves on their home scales and report the measurements.

   A) Draw spaghetti plots (profile plots) for the weight loss data. Interpret the characteristics of the plots.
   B) Draw spaghetti plots for the subjects using within-subject residuals instead of the original data. Is there any advantage to residual profiles as compared to (a) above?
   C) Suppose now you subtract off the baseline measurement (first observation) from the original measurements (i.e. $d_{ij} = Y_{ij}-Y_{i1}$). Draw the profile plots (trajectory plots) using d_{ij}. Interpret the characteristics of the plots.
   D) Calculate the sample means and variances of the weight loss at each week.
   E) Draw a time profile plot of the mean weight loss versus time (in weeks). Describe the nature of the time trend.
   F) Draw a time profile plot of the variances of weight loss versus time (in weeks). Describe the nature of the time trend.
   G) Calculate the correlation matrix of the weight loss data. Describe your conclusions about the structure of the correlations.