PNI Intro to Matlab 2025
Week 4 Problem Set

Make a new MATLAB script (.m file) and code your answers to each question as a separate section (use %% to designate a new section).

1) Write a loop that starts at `iter = 20` and decreases by steps of 3 until `iter` is equal to -1. It should print the value of `iter` at each iteration. Would this be better to write as a for loop or a while loop? Why or why not?

2) Write a for loop that goes through the first (n-1) elements of a n-element array and prints the current element of the array multiplied by the next element in the array. If the product of the current and next elements happens to be 20, the loop should continue and not print the product. Try your code out with the array 1:9.

3) Write a for loop that goes through each element of an array and prints the cumulative sum (i.e. the sum of all of the elements of the array up until the current element). Once the cumulative sum gets larger than 25, the loop should stop. Try it with a random array of 10 integers with a maximum value of 10.

4) Generate two random arrays, each consisting of 10 integers ranging from -5 to 5. Plot a scatter plot with one of these random arrays as the x-coordinates and the other as the y-coordinates. Add a title and change the color of the points.

5) You're a TA that's responsible for showing your professor the distribution of grades that your students got on the last exam. Generate a random array named `grades` that consists of 24 integers ranging from 0 to 100. Plot a histogram of these values. Add a title, label axes, and a vertical line in red showing the average grade in the class.

6) You're now the professor of the class, and you're worried if your TA is doing a bad job answering questions in office hours. You want to compare the grades on the last exam to the grades for the previous 2 TAs of this class. Generate two more random arrays, named `grades_2` and `grades_3`, that each consist of 20 integers ranging from 30 to 80. Plot a series of boxplots to summarize the grades for each of the three TAs (your figure should have the TAs on the x-axis, and one box per TA to summarize their grades).

7) You're now a student in the class, and you want to show your mom that your scores on the last 5 exams are improving more quickly than your brother's so that you can be the favorite child. Generate the following two arrays: `my_exam_grades = [50 67 78 82 85]` and `brothers_exam_grades = [70 72 77 81 83]`. Plot two lines, one for you and one for your brother, with the exam number on the x-axis and the grade on the y-axis. Be sure to add axis labels, a title, and a legend so we know which line is which.