Exercises on MATLAB 2

Ex1. Scripts

a. Write a script to calculate the following function:

$$h(T) = \begin{cases} T - 10 & if\ 0 < T < 100 \\ 0.45T + 900 & if\ T \geq 100 \end{cases}$$

b. Generate a random integer vector with 1.000.000 elements. Write a script to calculate sum of square of its elements using for loop.

c. Suppose that we invest to a fund with initial balance is a. The annual interest is 10% of the accumulated amount. Write a script to find number of years that the amount is double the initial balance.

d. Write a script to find max value of n so that the expression $1^2 + 2^2 + 3^2 + \cdots + n^2$ less than 1000.

Ex2. Strings, Cells and Files

a. Write a primitive Chat Bot. The conversation will start with: "Hello, what are you saying?" displayed in the Command Window. It then progresses taking a sentence from the user and displaying the last word in a question: "Really, <last word>?"

For example, if the user inputs "It is hot today.", your program should print "Really, today?"

b. Count the number of words in a string, excluding the article (a, an, the), regardless of capitalization. Demonstrate the working of your code with an example string.

Ex3. Plots and Graphs

a. Plot $y = \sin(x)$ in the range $[0; 2\pi]$

b. Plot $y = \tan(\sin(x)) - \sin(\tan(x))$ in the range $[-\pi; \pi]$

c. Plot 4 graphs in a same figure: $t = [0; \pi]$; $[x, y] = meshgrid(t)$;

   - $\sin(t), \cos(t)$
   - $\sin(x) + \cos(y)$
   - $\sin(x) * \cos(y)$
   - $\sin^2(x) - \cos^2(y)$