Homework 1: (take less than 6 hours, 5 questions, 2 points each) Assign 9/11/17 Due 9/18/17 11:59:00 pm

1.1 Prime number (Use VBA/OpenOffice Basic to do it). Create the list of the prime number for the range of 2 to 20,000 (including 2 and 20000). Show these prime numbers in column A. Show the 10 largest prime numbers calculated previously in column B. The number in column B must be in the descending order (high to low). On cell C2, show the total prime number in the range of 2 to 20000.

No direct input into the worksheet is allowed (any number or string must be created from the VBA/OOB source code). To grade this homework, every cells for 1.1 will be deleted first, then the code will be executed to generate the result for 1.1. The data that are not generated properly, are not considered as the answer.

1.2 Solver calculation (use Solver in Excel/LibreOffice Calc to do this question). From the given value of x and y, find A and B such that the function f(x) fit best with the given data. f(x) is defined as

$$y = f(x) = A (1 - Exp(-B * x))$$

x	y
0	0
1	0.403
2	0.603
3	0.702
4	0.751
5	0.776
6	0.788
7	0.794
8	0.797
9	0.799
10	0.799

1.3 Write VBA/OpenOffice Basic code (with for loop) to calculate matrix x^3 where x is the input from the Excel/Calc worksheet. This code must be run from the worksheet directly by using F2+ctrl+shift+enter (for Excel or shift+ctrl+enter for Calc). The name of this function must be "**mcube**". **This function must work for any square matrix with the size less than 10 x 10**. Show the test of the function by putting the following input (below) in cells A1:C3 and run the function from cell A5.

	A	B	C
1	1	2	3
2	-1	1	-1
3	-5	-4	-3
4			
5	=mcube(A1:C3)		

Compare the calculation result with Excel/Calc MMULT function. The result from MMULT function should be in cell A10:C12

1.4 Find x_1, x_2, x_3, x_4 such that $\begin{bmatrix} x_1 & x_2 \\ x_2 & x_4 \end{bmatrix}^3 = \begin{bmatrix} 20 & 30 \\ 40 & 50 \end{bmatrix}$, use Excel/Calc worksheet and solver to solve this question. Answers must be in scientific format with 6 digits after the decimal place, e.g. 1.123456 x 10^7

1.5 Print the matrix M (shown below) in Excel/Calc worksheet and in a text file
(the file name must be m_out.txt)

  Size of M is 100 rows by 100 columns. Use for-loop / if-statement for printing this matrix.

$$M = \begin{bmatrix} 1 & 0 & 2 & 0 & 3 & 0 & \cdots \\ 0 & 2 & 0 & 3 & 0 & 4 & \cdots \\ 2 & 0 & 3 & 0 & 4 & 0 & \cdots \\ 0 & 3 & 0 & 4 & 0 & 5 & \cdots \\ 3 & 0 & 4 & 0 & 5 & 0 & \cdots \\ 0 & 4 & 0 & 5 & 0 & 6 & \cdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \ddots \end{bmatrix}$$

Submission requirement:
1) Submit Excel/Calc files
2) Submit report in pdf format explaining about
    2.1 what you have done
    2.2 summary of your approach
    2.3 the screen-shot of the results.

Without the explanation in **pdf** format (**not** .doc, not .docx format), you will at most get **5 out of 10**, if everything is correct.