KING SAUD UNIVERSITY

College of Engineering

GE 209
Introduction to Computer Programming

Laboratory 4

VECTORS, MATRICES
(ARRAYS IN MATLAB CONTINUED)

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Laboratory 3

LABORATORY OBJECTIVES

This lab work is intended to apply what has been covered in the lectures concerning vectors and matrices using the commands window.

The work is organized in two parts :
- Part 1 : guided work, where the students can work through the examples or procedures seen during the lectures
- Part 2 : graded tasks through which the students demonstrate ability to apply what they learned independently.

PART 1 : GUIDED TASKS

1. Example 1 : find desired values and their indexes within a vector or matrix
1. Define the following vector : vec = (1 5 3 9 7)
2. Get the minimum value and its index ?
3. Get the maximum value and its index ?
4. Find the indices of the following :
    → of the vector element having the value 9
    → of the vector elements which values are > 2 and < 6)

Answer :
1. >> vec = ………………………..;
2. >> [minVal,minInd] = …………..
3. >> [maxVal,maxInd] = ………….
4. >> index1 = ……………
   >> index2 = ……………

2. Example 2 : evaluate and manipulate a function
1. Evaluate a sine wave (y=sin(x)) at 1,000 points between 0 and 2π.
2. What's the value of the 55th element of y ?
3. What are the values of y for indices 100 through 110 ?
4. Find the index of the minimum value of y ?
5. Find the index of the maximum value of y ?
6. Find indices for the values of y between -0.001 and 0.001 ?

Answers :
»   x =………………………;
»   y=……………;
»   x55=…………
»   y_range=………………
»   [………..,………….]=min(…..)
»   [maxVal,maxInd]=………(…..)
»   inds=find(………………..)

PART 2 : GRADED TASKS

Exercise 2.1 : more on matrices manipulations

1. Create a matrix $A = \begin{pmatrix} 1 & 12 & 1 \\ 3 & 15 & 0 \\ 5 & 25 & 0 \\ 9 & 38 & -1 \end{pmatrix}$

2. What are the diemensions of the matrix A ? is it a square matrix ?

3. Give the command that gives the maximum value of the elements of A and its location ?

4. Find the indexes of all 0's of A ?

5. Create a matrix B based on A containing rows from 3 to 4 and columns from 2 to end ?

6. Create a matrix C based on A containing rows 1 and 3 ?

7. Give two commands that transforms the elements of column 1 of A to 0's ? and the final column to 1's ?

Exercice 2.2 : compute function values for a given x range

a. Define the function $y = 1 + \cos(2t) \cdot e^{-0.2t}$ for t∈ $[0,2\pi]$ using 101 t-values

b. Display the 7th element of y ?

c. Display all elements of y from indexes 15 to 20 ?

d. Display the max and min values of y and their corresponding indexes ?

e. Display all indexes of y values 0.5<y<0.6 and their corresponding times ?