

## Introduction to Programming

### Tirgul 2 – Variables

Open a new code file and name it: **arrayPractice.m**. In this script, do the following:

#### A. Creating arrays

1. Create the variables:

- rowVec = [ 9 8 7 6 5 4 3 ]

- colVec =  $\begin{bmatrix} 3 \\ 7 \\ 6 \\ 9 \\ 2 \end{bmatrix}$

- myMat =  $\begin{bmatrix} 5 & -1 & 2 \\ 3 & 4 & 9 \\ 11 & 6 & -7 \\ 8 & 12 & 1 \end{bmatrix}$

#### 2. Retrieval

I. Use index writing to retrieve the following variables **from 'rowVec'**

(i.e., use the format: varRow1 = rowVec(\_\_\_\_) ):

- varRow1 = [7]
- varRow2 = [8 4]
- varRow3 = [7 6 5 4]

II. Use index writing to retrieve the following variables **from 'colVec'**

(i.e., use the format: varRow1 = colVec(\_\_\_\_) ):

varCol1 =  $\begin{bmatrix} 7 \\ 6 \end{bmatrix}$       varCol2 =  $\begin{bmatrix} 2 \\ 7 \\ 9 \end{bmatrix}$       varCol3 =  $\begin{bmatrix} 7 \\ 7 \\ 6 \\ 3 \end{bmatrix}$

III. Use index writing to retrieve the following variables **from 'myMat'**

(i.e., use the format: varRow1 = myMat(\_\_\_\_) ):

- varMat1 = 9
- varMat2 = [11 6 -7]
- varMat3 =  $\begin{bmatrix} 3 \\ 11 \\ 8 \end{bmatrix}$

$$\begin{aligned}
 - \text{ varMat4} &= \begin{bmatrix} 5 & 2 \\ 3 & 9 \\ 11 & -7 \end{bmatrix} \\
 - \text{ varMat5} &= \begin{bmatrix} 12 & 1 & 8 \\ -1 & 2 & 5 \end{bmatrix} \text{ (bonus!)}
 \end{aligned}$$

### 3. Assignment

- I. Replace the element in the 4<sup>th</sup> row, 3<sup>rd</sup> column of **myMat** with the scalar [ 111 ]
- II. Replace the elements in the 2<sup>nd</sup> column of **myMat** with the vector  $\begin{bmatrix} 22 \\ 23 \\ 24 \\ 25 \end{bmatrix}$
- III. Replace the elements in the 1<sup>st</sup> and 3<sup>rd</sup> rows, 1<sup>st</sup> and 2<sup>nd</sup> columns of **myMat** with the matrix:  $\begin{bmatrix} 1 & 1 \\ 5 & 3 \end{bmatrix}$
- IV. Assign the values of *myMat* to a new variable called **newMat1**. After assignment, delete the 2<sup>nd</sup> row of **newMat1**.
- V. Assign the values of *rowVec* to a new variable called **newRow1**. After assignment, delete the 2<sup>nd</sup> 5<sup>th</sup> and 7<sup>th</sup> elements of **newRow1**.

### 4. Concatenation

- I. Create the variable **conMat1** by concatenation of *myMat* with the **column** vector [1; 1; 1; 1]
- II. Create the variable **conMat2** by concatenation of *myMat* with the matrix  $\begin{bmatrix} 99 & 98 & 97 \\ 61 & 62 & 63 \end{bmatrix}$ .

### B. Arithmetic operations

- I. Create the variable **tenVec** = multiplication of *rowVec* by 10.
- II. Create the variable **factorVec** = the square root of *tenVec*.
- III. Create the variable **powerVec** = *colVec* raised to the power of 2.
- IV. Create the variable **divMat** = division of the elements in the 2<sup>nd</sup> and 3<sup>rd</sup> rows of *myMat* by the matrix  $\begin{bmatrix} 2 & 4 & 8 \\ 3 & 6 & 9 \end{bmatrix}$ .

### C. Special Matrices

- I. Create a 5X10 matrix of 5's, using the 'zeros' command.
- II. Create a 12X6 matrix of 9's, using the 'ones' command
- III. Create a 4X5 matrix of random numbers between 6 and 10.
- IV. Create a 5X5 matrix of random integers (round numbers) between -5 and 5.