

EE2021: Computer Tools for Electrical Engineering

Lab 2

Fall 2018

1 Introduction

In this lab session, you will start to write simple but functional MATLAB programs.

1. Create an array with variable name **A** which consists of the following elements:

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \\ 7 & 8 \\ 9 & 0 \\ -1 & -2 \\ 1 & 2 \\ -3 & -1 \end{bmatrix}$$

2. What is the size of **A**? Use MATLAB's `size` function to verify your answer.
3. Create one-dimensional arrays with variable names **b** and **c** which consist of the following elements:

$$\begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \end{bmatrix}$$

Use semicolons to create **b** and use transpose operator `'` to create **c**.

4. Use row and column indices to access the element 0 of the variable **A**.
5. Use a single subscript to access the element 0 of the variable **A**. (Hint: MATLAB stores all arrays as a column vector in the memory.)
6. Create a one-dimensional array with variable name **d** which consists of the following elements:

$$\begin{bmatrix} 2 \\ 5 \\ 8 \\ \vdots \\ 299 \end{bmatrix}$$

7. Create a one-dimensional array with variable name `e` with the following elements:

$$[100 \ 95 \ 90 \dots \ -105]$$

8. Using the variables created in Q1 and Q3, create an array with variable name `B` with the following elements

$$\begin{bmatrix} 1 & 8 & 2 \\ 3 & 7 & 4 \\ 5 & 6 & 6 \\ 7 & 5 & 8 \\ 9 & 4 & 0 \\ -1 & 3 & -2 \\ 1 & 2 & 2 \\ -3 & 1 & -1 \end{bmatrix}$$

9. Without entering its elements separately, create an array with variable name `C` which is formed by rotating `B` 90 degrees counter-clockwise.

10. Without entering its elements separately, create an array with variable name `D` which is formed by rotating `B` 90 degrees clockwise.

11. Modify your codes in Q9 and Q10 so that it works for matrices of any size.

12. For this question, you will use MATLAB's Editor window. Given its radius and height, your program will compute the volume of a cylinder and display the result to the user.

- Create a new MATLAB script.
- Use MATLAB's `input` function to ask the user for the value of the radius of the cylinder. Assign the value to a variable.
- Use MATLAB's `input` function to ask the user for the value of the height of the cylinder. Assign the value to a variable.
- Compute the volume of the cylinder and assign that value to a variable.
- Use MATLAB's `disp` function to display the result of your computation which should look like: `The volume of the cylinder is 9.123`
- Use MATLAB's `input` function to display the result of your computation which should look like: `The volume of the cylinder is 9.123`

Exercises

Complete the Exercises 2.1-2.20 in your textbook.