Islamic University of Technology (IUT)

Organization of Islamic Cooperation (OIC)

Department of Electrical and Electronic Engineering (EEE)

EEE 4416 **Lab – 07**

*Exercise - 01

Table Data Type

Let's take a look at the table data type in MATLAB.

The following table contains the data of some students in IUT.

Name	ID	Gender	CGPA	Department
Ben Affleck	112	Male	3.7	EEE
Henry Cavil	170	Male	3.8	ME
Zack Snyder	214	Male	3.9	CSE
Severus Snape	311	Male	3.8	EEE
Hermione	120	Female	3.85	EEE
Lucy Pavensie	220	Female	3.65	CE

How can we represent this data properly?

Think of it like this way, all the students have these 4 attributes (ID, Gender, CGPA, Dep). So, to categorize this data properly, we can use a table.

Let’s see how to create a table first.

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First, create individual arrays (column vector) containing each category of data.

So, name= [“Ben Affleck”; “Henry Cavil”; “Zack Snyder”; “Severus Snape”; “Hermione”; “Lucy Pavensie”]

ID = [112;170;214;311;120;220]

And so on.

- data=table (ID, gender, cgpa, department, 'rownames', name)

This will create a table of size (6,4).

- Here, we used the name to define a row. If you write –

  data (“Zack Snyder”, :)

  you’ll be able to extract all the data of the student named “Zack Snyder”.

- You may not use the ‘rownames’ option. Try this –

  - data2 = table (name, ID, gender, cgpa, department)

  Now to access a particular student data, you can use –

  - data2(2,:)

  This will return the data of the student “Henry Cavil” :D

- Add new variable to the table –
  - data.year=[3,3,2,2,2,3]’

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Exercise - 02

Categorical Data type

- There is another datatype - named, “categorical array”.
  - data3=data2
  - data3.gender = categorical (data3.gender)

Now look at the table. You’ll see the gender column has changed. That array is no longer a string array. It has become a categorical array.

The benefit of this will become more apparent when you work with a huge amount of data. For now, try writing the following code –

- summary(data2)
- summary (data3)

Can you find the difference? The group of students has been classified into two categories: male and female.

Try to categorize the department column as well. Then you’ll be able to classify the students based on their department as well.

This will help you extract or summarize similar type of data much more efficiently.

If you have a very large dataset containing all the students of IUT since the beginning, categorized data can make it very easy to find out a particular group, e.g., students of batch 2014 or the students of the BTM department etc.

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Exercise - 03

Introduction to plotting

Say, you're given three points a= (3,5), b= (4,9), c= (-4,8).

You can think of the points as cartesian coordinates (x,y).

As you know, three points can create a triangle. So, you want to know if you connect those points, how the triangle might look like.

Similarly, you're given 4 points. You want to know how the quadrilateral might look like.

Or maybe 10 points or more. How the points are scattered in the xy plane.

How to visualize them?

- After visualization, you may also wonder, what is the area or perimeter of the triangle or any other polygonal object.
- We've been using the randi function for a while. But does it really create random integers. Is there any way to understand that?

Visualizing the points can be a good approach.

data= randi(100,2,500) – is going to create a 2-by-500 matrix with integers up to 100. Is the distribution really random?

Key Takeaway:

- Scatter plot
- Histogram plot
- Polyshape

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Exercise – 04

Problem statement:

Let's take a look at our university data again.

	BUET	RUET	KUET	CUET	IUT
CSE	120	120	100	80	40
EEE	180	120	150	80	80
ME	150	80	150	80	55
CIVIL	195	80	150	80	45
CE	40	nan	30	80	nan
Architecture	100	50	80	80	nan
Management	50	50	nan	80	30

Previously you saw, how to visualize data of a particular university or a department.

But now, say you want to compare all the varsity's data together. Instead of plotting the data one by one in separate window, one way would be much helpful, if we could just visualize all the data separately in a single window.

How can we do that?

Key Takeaway:

- Sub-plot
- Bar-plot
- Title, label, legend

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Exercise – 05

Problem Statement:

So far, we've worked with scattered data. But what if we want work with continuous data?

Say for example, if we want to plot a sine wave or cosine wave.

Additional Exercise:

- Try to create a square wave by yourself
- Try area(x,y)
- Create a polyshape object with 4 points, plot it and find out the area, perimeter etc.

Key Takeaway:

- Plot
- Hold on, hold off
- Figure
- Axis
- Grid on
- Linspace, logspace
- geoscatter plot

Exercise – 06

- Introduction to Live Script
- Importing data in MATLAB

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