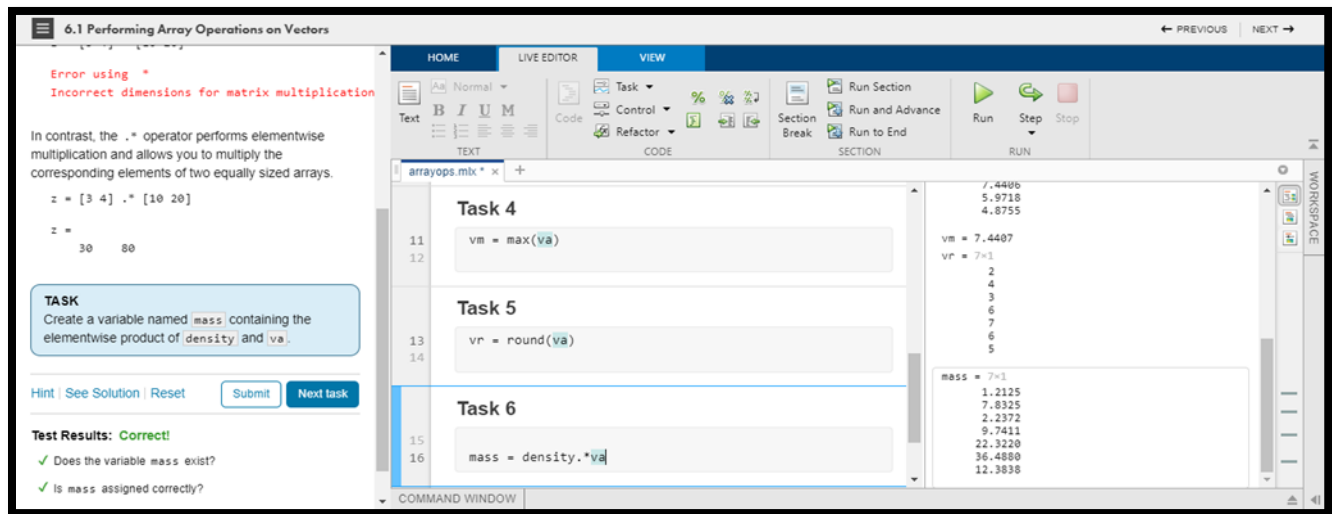


## DAILY ASSESSMENT

Date:	07-July-2020	Name:	Swastik R Gowda
Course:	MATLAB	USN:	4AL17EC091
Topic:	❖ Vectors and matrices ❖ Indexing into Arrays ❖ Performing Array Operations on Vectors	Semester & Section:	6 <sup>th</sup> Sem 'B' Sec
Github Repository:	swastik-gowda		

### FORENOON SESSION DETAILS

#### Image of session



**Report – Report can be typed or hand written for up to two pages.**

### Vectors and Matrices:

#### Creating Evenly-Spaced Vectors:

- A single number, called a scalar, is actually a 1-by-1 array, meaning it contains 1 row and 1 column. You can create arrays with multiple elements using square brackets.
- When you separate numbers by spaces (or commas) as shown in the previous task, MATLAB combines the numbers into a row vector, which is an array with one row and multiple columns (1-by-n). When you separate numbers by semicolons, MATLAB creates a column vector (n-by-1). EG:  $x = [1;3]$
- You can combine spaces and semicolons to create a matrix, which is an array with multiple rows and columns. MATLAB, you can perform calculations within the square brackets.  $x = [\text{abs}(-4) \ 4^2]$  then  $x = 4 \ 16$

## Controlling evenly spread arrays:

- It is common to create vectors containing evenly-spaced numbers, such as the vector below.  $y = [5 \ 6 \ 7 \ 8]$
- For long vectors, entering individual numbers is not practical. An alternative, shorthand method for creating evenly-spaced vectors is to use the `:` operator and specify only the start and end points.
- The `:` operator uses a default spacing of 1, however you can specify your own spacing, as shown below.
- If you know the number of elements you want in a vector (instead of the spacing between each element), you could instead use the `linspace` function
- Both `linspace` and the `:` operator create row vectors. However, you can convert a row vector into a column vector using the transpose operator (`'`).

## Array Creation Functions:

The screenshot displays the MATLAB Live Editor interface for a task titled "4.3 Array Creation Functions". The left sidebar contains task instructions and test results. The main workspace shows three tasks with their respective code snippets. The right sidebar displays the output of the code, including a 5x5 matrix, a 5x1 vector, and a 6x3 matrix of zeros.

**Task 1**

```
x = rand(5)
```

**Task 2**

```
x = rand(5,1)
```

**Task 3**

```
x = zeros(6,3)
```

**Test Results: Correct!**

- ✓ Does x have the correct size?
- ✓ Does x have the correct values?

**Further Practice**

## INDEXING INTO ARRAYS:

The screenshot displays the MATLAB Live Editor interface for a task titled "5.1 Indexing into Arrays: (2/2) Practice". The left sidebar contains task instructions and test results. The main workspace shows three tasks with their respective code snippets. The right sidebar displays the output of the code, including a 4x4 matrix and three scalar values.

**Task 1**

```
x = data(6,3)
```

**Task 2**

```
x = data(end,3)
```

**Task 3**

```
x = data(end-1,3)
```

**Test Results: Correct!**

- ✓ Is x assigned correctly?

**Further Practice**

### 5.2 Extracting Multiple Elements

**Task 1**

**Task 2**

**Task 3**

**Task 4**

A single range of index values can be used to reference a subset of vector elements. For example

```
x = v(3:end)
```

returns a subset of vector `v` containing the elements from 3 to the end.

**TASK**

Using a range of index values, create a vector named `p` containing the 2<sup>nd</sup> through 5<sup>th</sup> elements of `density`.

[Hint](#) | [See Solution](#) | [Reset](#)

Submit

Next task

**Test Results: Correct!**

✓ Is `p` assigned correctly?

HOME | LIVE EDITOR | VIEW

Text

Code

Task

Control

Refactor

Run Section

Run and Advance

Run to End

Section Break

Run

Step

Stop

extracting.mlx

2

density = data(:,2)

3

volumes = data(:,3:4)

4

p = density(6)

5

p = density(2:5)

Task 2

Task 3

Task 4

COMMAND WINDOW

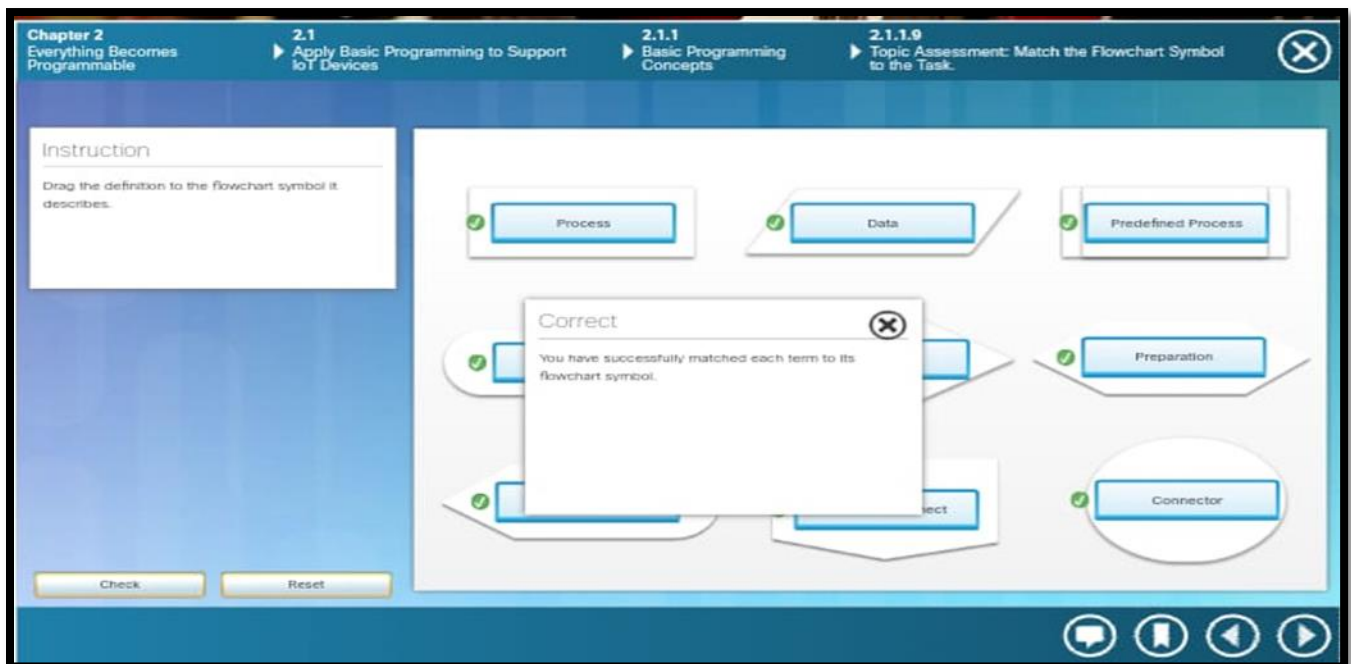
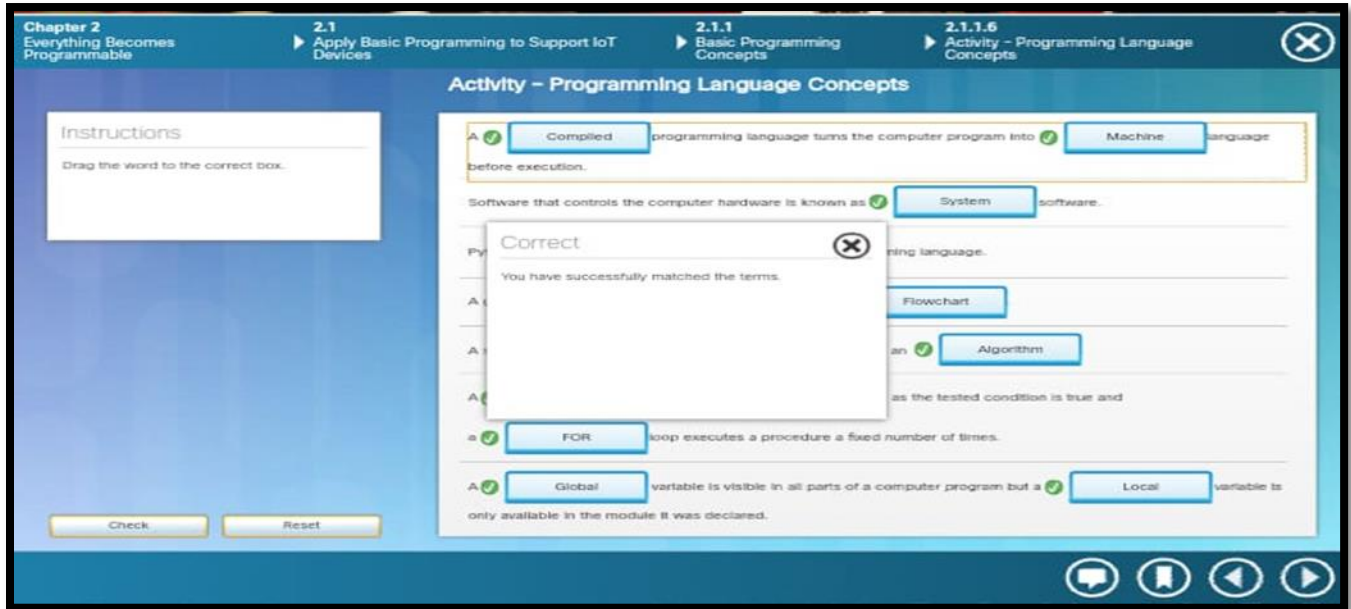
## Performing Array Operations on Vectors:

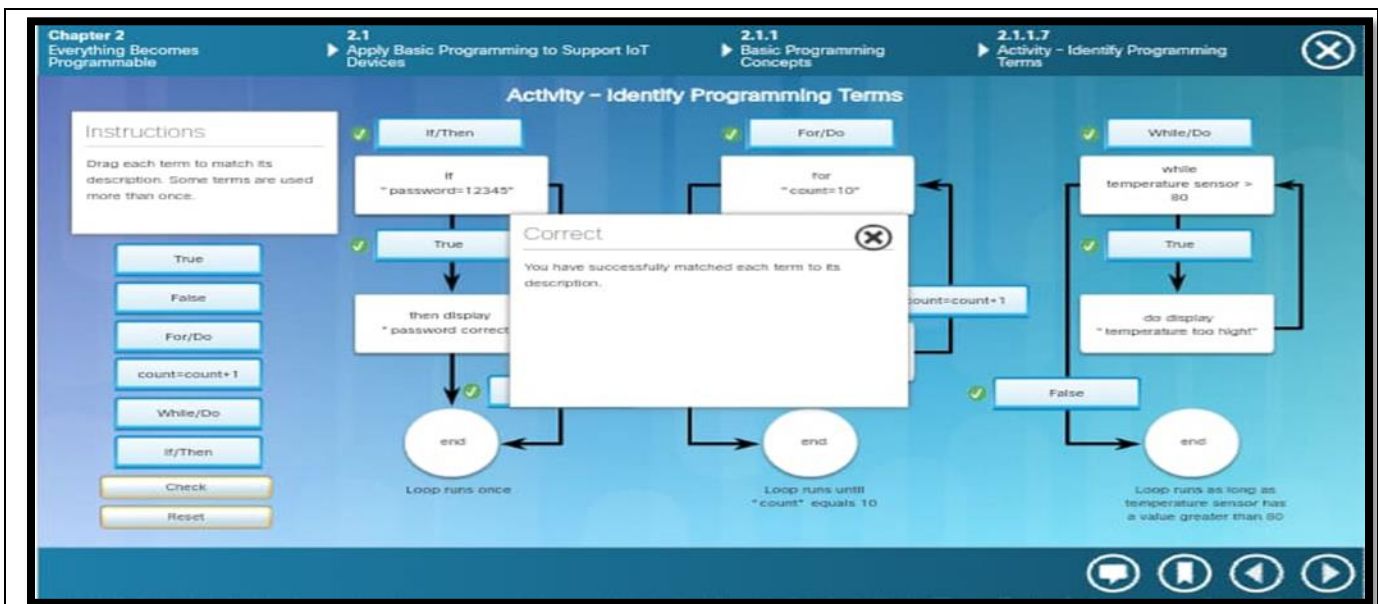
- MATLAB is designed to work naturally with arrays. For example, you can add a scalar value to all the elements of an array.
- You can add together any two arrays of the same size.
- You can multiply or divide all of the elements of an array by a scalar.
- Basic statistical functions in MATLAB can be applied to a vector to produce a single output. The maximum value of a vector can be determined using the `max` function. `xMax = max(x)`
- MATLAB has functions that perform mathematical operations on an entire vector or array of values in a single command. `xSqrt = sqrt(x)`
- The `*` operator performs matrix multiplication. So, if you use `*` to multiply two equally sized vectors, since the inner dimensions do not agree, you will get an error message. `z = [3 4] * [10 20]`

Date:	07-July-2020	Name:	Swastik R Gowda
Course:	Course by CISCO	USN:	4AL17EC091
Topic:	Chapter 2	Semester & Section:	6 <sup>th</sup> Sem 'B' Sec

### AFTERNOON SESSION DETAILS

#### Image of session





**Report – Report can be typed or hand written for up to two pages.**

### CHAPTER 2:

#### Flowcharts:

- Flowcharts are used in many industries including engineering, physical sciences, and computer programming where a complete understanding of processes or workflows is required. Flowcharts are diagrams that are used to represent these processes or workflows.
- Flowcharts illustrate how a process should work. Flowcharts should not require complex, industry-specific terminology or symbols. A flowchart should be easy to understand without having to be an expert in the chosen field.
- Flowcharts should show input states, any decisions made, and the results of those decisions. It is important to show the steps that should be taken when the result of a decision is either yes or no.

#### System Software, Application Software, and Computer Languages:

- There are two common types of computer software: system software and application software.
- Application software programs are created to accomplish a certain task or collection of tasks.
- For example, Cisco Packet Tracer is a network simulation program that allows users to model complex networks and ask "what if" questions about network behavior.
- System software works between the computer hardware and the application program. It is the system software that controls the computer hardware and allows the application programs to function. Common examples of system software include Linux, Apple OSX, and Microsoft Windows

#### Programming Variables:

- Programming languages utilize variables as dynamic buckets to hold phrases, numbers, or other important information that can be used in coding. Instead of repeating specific values in numerous places throughout the code, a variable can be used. Variables can hold the result of a calculation, the result of a database query, or some other value. This means that the same code will function using different pieces of data without having to be rewritten.

### **Basic Program Structures:**

- People impart logic to computers through programs. Using specific logic structures, a programmer can prepare a computer to make decisions

### **What is Blockly?**

- Blockly is a visual programming tool created to help beginners understand the concepts of programming. By using a number of block types, Blockly allows a user to create a program without entering any lines of code. This is shown in Figure 1.
- Blockly implements visual programming by assigning different programming structures to colored blocks.
- The blocks also contain slots and spaces to allow programmers to enter values required by the structure.
- Programmers can connect programming structures together by dragging and attaching the appropriate blocks. Programming structures such as conditionals, loops, and variables are all available for use.

### **Blockly Games:**

- Google provides a series of free and open source educational games that can help you learn programming. The series is called Blockly Games.
- To learn more about Blockly Games, or to try it yourself, [click here](#).
- There are a number of levels to complete to help you get started.
- Blockly may look like a toy, but it is a great tool to improve your logical thinking skills, which is one of the building blocks of computer programming

### **What is Python?**

- Python is a very popular language that is designed to be easy to read and write. Python's developer community adds value to the language by creating all types of modules and making them available to other programmers.
- The core philosophy of the language is summarized by the document The Zen of Python:

-Beautiful is better than ugly  
-Explicit is better than implicit  
-Simple is better than complex  
-Complex is better than complicated  
-Readability counts

### **The Python Interpreter:**

- Python is an interpreted language; therefore, an interpreter is required to parse and execute Python code.
- The Python interpreter understands and executes Python code. Python code can be created in any text editor and Python interpreters are available for many operating systems.
- Python developers can create and deploy Python programs in practically any operating system.
- Third party tools such as Py2exe and Pyinstaller can also be used to package the Python source code into an executable file, eliminating the need for the Python interpreter when running Python code

**Summary:**

- This chapter began by discussing how to apply basic programming to support IoT devices. Flowcharts are diagrams that are used to represent processes. There are two common types of computer software: system software and application software. Application software programs are created to accomplish a certain task. System software works between the computer hardware and the application program. Programming variables can be classified into two categories:
- Local Variables - These are variables that are within the scope of a program / function / procedure.

Global Variables - These are variables that are in the scope for the time of the program's execution. They can be retrieved by any part of the program.