The M Files

MATLAB allows writing two kinds of program files –

•Scripts – script files are program files with .m extension. In these files, you write series of commands, which you want to execute together. Scripts do not accept inputs and do not return any outputs. They operate on data in the workspace.

•Functions – functions files are also program files with .m extension. Functions can accept inputs and return outputs. Internal variables are local to the function.

You can use the MATLAB editor or any other text editor to create your .m files. . You can run a script by typing its name at the command line.

Creating and Running Script File

To create scripts files, you need to use a text editor. You can open the MATLAB editor in two ways −

1. Using the command prompt
2. Using the IDE

If you are using the command prompt, type **edit** in the command prompt. This will open the editor. You can directly type **edit** and then the filename (with .m extension)

Syntax

Edit <file name>

After creating and saving the file, you can run it in two ways −

Clicking the **Run** button on the editor window or

Just typing the filename (without extension) in the command prompt: >>

Creating and Running Script File or m file

Using the command prompt

Editor - C:\Users\layth\Documents\MATLAB\example1.m

example1.m

```
1
2 -     A=[1 2 3;4 5 6;7 8 9];
3 -   for i=1:3
4 -   for j=1:3
5 -     if i==j
6 -     disp(A(i,j))
7 -     end
8 -     end
9 -     end
```

Command Window

New to MATLAB? See resources for Getting Started.

```
>> edit example1.m
>> example1
     1

     5

     9
```

For loops statement

for index = values, statements, end executes a group of statements in a loop for a specified number of times. values has one of the following forms:

1. initVal:endVal — Increment the index variable from initVal toendVal by 1, and repeat execution of statements until index is greater than endVal.
2. initVal:step:endVal — Increment index by the value step on each iteration, or decrements index when step is negative.

Example

- For k = 1:10
  end

```
•For k= 1:0.5:10
 end                          % increment 0.5 from 1 to 10
for k= 10:-0.5:1              % decrement
disp(k)
•end
```

For loops example

```
scores = [76,45,98,97];
count = 0;
%length return the number of elements of scores vector here is 4
for k=1:length(scores)
if scores(k)>90
count = count + 1;
end
end
disp(count)
```

اسئلة عامة

- Compute the total mass of the components shown in Table 10.3 , using a dot
- Table 10.3 Component Properties

Component	Density, g/cm^3	Volume, cm^3
Propellant	1.2	700
Steel	7.8	200
Aluminum	2.7	300

Bomb calorimeters are used to determine the energy released during chemical reactions. The total heat capacity of a bomb calorimeter is defined as the sum of the products of the mass of each component and the specific heat capacity of each component, or

where **CP** $= \sum_1^n mi * ci$

mi = mass of component i, g
Ci = heat capacity of component, i, J/g K

CP= total heat capacity, J/K

Find the total heat capacity of a bomb calorimeter, using the thermal data in Table 10.5 .

Table 10.5 Thermal Data

Component	Mass, g	Heat Capacity, J/gK
Steel	250	0.45
Water	100	4.2
Aluminum	10	0.90

Organic compounds are composed primarily of carbon, hydrogen, and oxygen and for that reason are often called hydrocarbons. The molecular weight (MW) of any compound is the sum of the products of the number of atoms of each element (Z) and the atomic weight (AW) of each element present in the compound.

$$MW=\sum_{i=1}^{n} AW_i * Zi$$

The atomic weights of carbon, hydrogen, and oxygen are approximately 12, 1, and 16, respectively. Use a dot product to determine the molecular weight of ethanol, which has two carbon, one oxygen, and six hydrogen atoms. $C_2H_5OH_2$