Learning MATLAB: Script Files

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Overview

References:

[1] Desmond J. Higham and Nicholas J. Higham, MATLAB Guide, 2nd ed. Society for Industrial and Applied Mathematics, 2005.

[2] Amos Gilat, MATLAB An Introduction with Applications. John Wiley & Sons Inc., 2004.

Notes About Script Files

- A script file is a sequence of MATLAB commands, also called a program.
- When a script file runs, MATLAB executes the commands in the order they are written just as if they were typed in the Command Window.
- When a script file has a command that generates an output (e.g. assignment of a value to a variable without semicolon at the end), the output is displayed in the Command Window.
- Using a script file is convenient because it can be edited (corrected and/or changed) and executed many times.
- Script files can be typed and edited in any text editor and then pasted into the MATLAB edit
- Script files are also called M-files because the extension .m is used when they are saved.

Global Variables

- Global variables are variables that, once created in one part of MATLAB, are recognised in other parts of MATLAB.
- This is the case for variables in the Command Window and script files since both operate on variables in the workspace.
- When a variable is defined in the Command Window, it is also recognised and can be used in a script file. In the same way, if a variable is defined in a script file it is also recognised and can be used in the Command Window.
- In other words, once the variable is created, it exists, can be used, and can be reassigned a new value in both the Command Window and a script file.

Input to a Script File

- The variable is defined and assigned value in the script file
  - The script file is executed by typing the name of the file
- The variable is defined and assigned value in the Command Window
- The variable is defined in the script file, but a specific value is entered in the Command Window when the script file is executed

```
Variable_name = input ('string with a message that is displayed in the Command Window')
```

Example1

Write a MATLAB script file that computes the factorial of a number N.

Solution:

```
% This script file computes the factorial of a given number N
%   Input: N
%   Output: fact = factorial(N)
f = 1;
for n = N:-1:1
   f = f*n;
end
fact = f
```

Example2

Explain how the following MATLAB script file works.

```
clc; clear
Score = input('Enter a vector of student scores between 0 and 100   ');
N = length(Score);
for i = 1:N
   if Score(i)>=90, Grade(i) = 'A';
   elseif Score(i)>=80 && Score(i)<90, Grade(i) = 'B';
   elseif Score(i)>=70 && Score(i)<80, Grade(i) = 'C';
   elseif Score(i)>=60 && Score(i)<70, Grade(i) = 'D';
   else Grade(i) = 'F';
   end
end
Grade.'
```

Solution: This m-file computes the student grades of a given vector of student scores between 0 & 100. The grades have specified letters marked as 'A', 'B', 'C', 'D', or 'F' according to the criteria given in the if-statement.

Exercises

- **EX. 1:** Write a MATLAB script file to prove that the max-area shape given a fixed circumference is the circle. Hint, compare between square and rectangle.
- **EX. 2:** Write a MATLAB script file to prove that the max-volume shape given a fixed surface area is the sphere. Hint, compare among cube, rectangular prism, and cylinder.

Conclusion

Concluding remarks

- Script files is introduced
- Some script files tips are highlighted
- Some examples & exercises are given