MA2252 Introduction to Computing
Lecture 5: Functions

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Learning outcomes

- Basic understanding of functions

- Create your own functions

- Using Comments in programming

- Understand Function Workspace

Function definition

A function in MATLAB is a sequence of instructions that takes some input and gives the desired output.

Some familiar examples:

- sin(x)
- sqrt(x)
- linspace(a,b,n)

Note: Unlike in Mathematics, a function in MATLAB can have multiple outputs!

Building a function

A function's code is written in the EDITOR window.

The code is built in three parts:

- Header
- Body
- End statement

Header

Construction:

function [output variables] = function_name(input variables)

Header includes:

- name of function
- lists of input variables
- lists of output variables

Building a function (contd.)

Header examples:

- function [sum] = myfun1(n)

- function [sum]= myfun2(a,d,n)

- function [sum,a_n] = myfun3(a,d,n)

Note: Function name must start with a letter, contain alphanumeric characters or underscore.

Body

Group of statements or lines of code written to perform the desired task.

Body examples:

- sum=n*(n+1)/2;

- sum=(n/2)*(2*a + (n-1)*d);

- sum=(n/2)*(2*a + (n-1)*d);
  a_n=a+(n-1)*d;

End statement

The end statement is written using end keyword which

- denotes end of function

- is placed after the body

Building a function (contd.)

A sample function:

```
function [sum,a_n] = myfun3(a,d,n)

sum=(n/2)*(2*a + (n-1)*d);
a_n=a+(n-1)*d;

end
```

Demo

Saving a function file

- Use 'Ctrl+S' or 'Save' button in EDITOR menu to save the function file.

- Always save the function file with the function name.

- If using MATLAB online, save your function in the current directory.

- Function files are saved as .m file files.

Calling a function

- To call/use the function, type

  [output variables] = function_name(input variables' values)

  in the command window and press 'Enter'.

- Example:

  [SUM,A_N] = myfun3(2,2,10)

Demo

Comments

Comments are text in the .m file that MATLAB doesn't execute.

Comments are used

- to help you and others understand your code.
- to add additional information e.g. author name, date, notes.

To comment: Use % symbol or press 'Ctrl + r'.
To uncomment: Use 'Ctrl + Shift + r'.

Demo

Function Workspace

A function workspace contains variables which were used to create that function.

Example: The function workspace of myfun3() contains the variables sum, a_n,a,d and n.

Note: A function workspace does not share variables with command window workspace and vice-versa.

Activity 1

Define the function myfun3() as mentioned before. Type the following in MATLAB command window:

```
>> a=3;
>> d=4;
>> n=7;
>> [SUM,A_N]=myfun3(1,1,10);
```

What should be the final values of a,d and n?

Activity 2

Clear all the stored variables. Now, type the following in MATLAB command window:

```
>> sum=1;
>> a_n=1;
>> [SUM,A_N]=myfun3(1,1,10);
```

What should be the final values of sum and a_n?

End of Lecture 5

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