



# Functions in MATLAB - Further Details - 1

## Lecture 10

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## Functions Declaration in MATLAB:



As common for all programming languages, we need to follow some rules while creating functions in MATLAB:

- ▶ `function [output1, output2, ...]= functionName(input1, input2, ...)`.
- ▶ We had some syntactic rules while defining variable names, same applies to function names.
- ▶ Although not a must, the function name should be the same as the file name of the function (`functionName.m`). If they are different, MATLAB just considers the name of the `.m` file.
- ▶ The function declaration must be at the first line. Only exceptions are the comments.
- ▶ Avoid using the same names as MATLAB built-in functions for your functions. If you do, MATLAB will execute your function (if exists in its path) than the built-in function.



## Invalid Number of Inputs:

How can we be sure that users enter correct number of inputs to our functions?

There are built-in MATLAB functions to check the number of input arguments, output arguments, and minimum and maximum number of input arguments.



## nargin, nargsout, narginchk(min, max):

**nargin**: checks the number of input arguments to the function.

**nargsout**: the output argument version of the nargin.

**narginchk(min, max)**: is used to return an error message in case the number of input arguments is smaller than min or larger than max numbers.



## Comments After the Function Declaration:

For user-defined functions, the comments just after function declaration will be displayed when users type help command with the function name in the Command Window.



## Arbitrary Number of Input/Output Arguments:

If we expect not fixed but arbitrary number of input/output arguments, we can use `varargin` and `varargout` built-in functions in MATLAB:

```
function arbitrary_input(varargin)
for i = 1:nargin
    disp(['Input ', num2str(i), ': ', num2str(varargin{i})]);
end
```



## Output of the Function:

```
>> arbitrary_input( 1, 2 ,3, 4, 5)
```

```
Input 1: 1
```

```
Input 2: 2
```

```
Input 3: 3
```

```
Input 4: 4
```

```
Input 5: 5
```



## Variable Types in MATLAB:

Until now, we learned about two types of variables:

Local variables

Global variables





## Local variable:

```
function local_variable_example
x = 5;

sub_function()

disp(['x: ', num2str(x)]);

function sub_function
x = 1;
```

```
>> local_variable_example
x: 5
fx >>
```



## Global variable:

```
function global_variable_example
global x;

x = 5;

sub_function()

disp(['x: ', num2str(x)]);

function sub_function
global x;

x = 1;
```

```
>> global_variable_example
x: 1
fx >>
```