

function

Declare M-file function

Syntax

```
function [out1, out2, ...] = funname(in1, in2, ...)
```

Description

`function [out1, out2, ...] = funname(in1, in2, ...)` defines function `funname` that accepts inputs `in1`, `in2`, etc. and returns outputs `out1`, `out2`, etc.

You add new functions to the MATLAB vocabulary by expressing them in terms of existing functions. The existing commands and functions that compose the new function reside in a text file called an *M-file*.

M-files can be either *scripts* or *functions*. Scripts are simply files containing a sequence of MATLAB statements. Functions make use of their own local variables and accept input arguments.

The name of an M-file begins with an alphabetic character and has a filename extension of `.m`. The M-file name, less its extension, is what MATLAB searches for when you try to use the script or function.

A line at the top of a function M-file contains the syntax definition. The name of a function, as defined in the first line of the M-file, should be the same as the name of the file without the `.m` extension.

The variables within the body of the function are all local variables.

A *subfunction*, visible only to the other functions in the same file, is created by defining a new function with the `function` keyword after the body of the preceding function or subfunction. Subfunctions are not visible outside the file where they are defined.

You can terminate any function with an [end](#) statement but, in most cases, this is optional. `end` statements are required only in M-files that employ one or more nested functions. Within such an M-file, every function (including primary, nested, private, and subfunctions) must be terminated with an `end` statement. You can terminate any function type with `end`, but doing so is not required unless the M-file contains a nested function.

Functions normally return when the end of the function is reached. Use a `return` statement to force an early return.

When MATLAB does not recognize a function by name, it searches for a file of the same name on disk. If the function is found, MATLAB compiles it into memory for subsequent use. The section [Determining Which Function Is Called](#) in the MATLAB Programming documentation explains how MATLAB interprets variable and function names that you enter, and also covers the precedence used in function dispatching.

When you call an M-file function from the command line or from within another M-file, MATLAB parses the function and stores it in memory. The parsed function remains in memory until cleared with the `clear` command or you quit MATLAB. The `pcode` command performs the parsing step and stores the result on the disk as a P-file to be loaded later.

Examples

Example 1

The existence of a file on disk called `stat.m` containing this code defines a new function called `stat` that calculates the mean and standard deviation of a vector:

```
function [mean,stdev] = stat(x)
n = length(x);
mean = sum(x)/n;
stdev = sqrt(sum((x-mean).^2/n));
```

Example 2

`avg` is a subfunction within the file `stat.m`:

```
function [mean,stdev] = stat(x)
n = length(x);
mean = avg(x,n);
stdev = sqrt(sum((x-avg(x,n)).^2)/n);

function mean = avg(x,n)
mean = sum(x)/n;
```

See Also

[nargin](#), [nargout](#), [pcode](#), [varargin](#), [varargout](#), [what](#)

◀ func2str

function_handle (@) ▶

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