

Lecture 3: Logic, Loops and Iterations

```
% 'A SCRIPT file is an external file that
% contains a sequence of MATLAB statements...
% SCRIPT files have a filename extension of ".m"
% and are often called "M-files"', [MATLAB 7.5.0].
help script

% Use 'emacs', 'vi', 'pico' or other text editor

% Steps to create m-file with MATLAB's 'edit'
1. Change to directory where you will save .m file
   Change in "location bar" at top of command
   window or use the 'cd' command
2. Type 'edit' or 'edit myFile.m'
3. Write code
4. Save it
5. Use 'ls' command to make sure the files you
   need are actually in current directory
6. Run it by typing 'myFile' (no .m here)
```

the file myFile.m

```
x = 3
the_sqaure_of_x_is = x^2
```

the file mySquare.m

```
x = input('x? ');
the_sqaure_of_x_is = x^2
```

```
% To make a SCRIPT file into a function
help function
```

```
% 'the new function must be put in a file whose
% name defines the name of the new function, with
% a filename extension of ".m"', [MATLAB, 7.5.0].
```

the file f.m

```
function f = f(x)
f = exp(x) + x/(2+x);
```

```
% Use your function
f(0:5)
```

```
% For loops repeat statements
```

```
sum=0
```

```
for j=1:5
```

```
    sum=sum+j
```

```
end
```

```
% Default incremental increase in counter is 1
```

```
for k=1:2:5
```

```
    disp(k)
```

```
end
```

```
% For loop counter can be given by row vector
```

```
sum=0
```

```
for j=[1 5 4]
```

```
    sum=sum+j
```

```
end
```

```
% If statements are conditional statements
help if
```

```
%      The general form of the IF statement is
%      IF expression
%      statements
%      ELSEIF expression
%      statements
%      ELSE
%      statements
%      END
```

```
% Relational and logical statements
== % help eq
>=
<
~= % help ne
& % help and
| % help or
```

```
% Simple IF statement
```

```
a=4 ;
```

```
b=5 ;
```

```
if a<b
```

```
    disp('b bigger than a');
```

```
end
```

```
% There are other kinds of loops and functions
```

```
while
```

```
switch
```

```
continue
```

```
break
```

```
% A function which uses a never ending while loop
```

```
the file mySquareInfinitely.m
```

```
while 0==0
```

```
    x = input('x? ');
```

```
    xSquared = x^2
```

```
end;
```

```
% A scientific computing algorithm for root finding
```

```
% 'The bisection method cuts the given interval  
% in half and determines if the root is on the  
% left or right side of the cut. Once this is  
% established, a new interval is chosen with the  
% mid point now becoming the left or right end  
% of the new domain...', [Kutz, 2005]
```

```
type bisection.m
```

```
edit bisection.m
```