Estimate computation time

```
% tic – start stopwatch timer
% toc – stop stopwatch timer
tic
A = rand(12000, 4400);
B = rand(12000, 4400);
toc
C = A'.*B';
toc
```

Programming in Matlab

If-operator

```
k=rand(2,1)
if k(1)<0.5
'one'
elseif k(1)>0.5
'two'
else
'three'
end;
```

For-loop

```
x=[10 20 30]
for i=1:3
x(i)/10
end
```

While-loop

```
k=0;
while k<10
k=k+1
end;
```

Function with One Output

Define a function average that accepts an input vector, calculates the average of the values, and returns a single result.

```
function y = average(x)
if ~isvector(x)
    error('Input must be a vector')
end
y = sum(x)/length(x);
end

%define z and call the function
z = 1:99;
average(z)
```

Note: a function can be either defined in a separate file named func_name.m or in your main file.

- In Matlab2022 all function definitions should be located **after** the function call. When the function definitions are located in the end of the file, they are separated by a section break
- In Matlab2024 and above all function definitions can be also located **before** the function call

```
%Matlab2022
A=randi(10,3)
max_diag=MaxDiag(A)
```

```
A = 3×3
     9     4     7
     3     2     5
    10     3     4

max_diag = 9
```

```
function m=MaxDiag(a)
m=max(diag(a));
end
```

```
%Matlab2024
function m=MaxDiag(a)
m=max(diag(a));
end
A=randi(10,3)
max_diag=MaxDiag(A)
```

```
A = 3×3
    10    10     2
     2     5     5
    10     9    10

max_diag = 10
```

Function with Multiple Outputs

Define a function in a file named stat.m that returns the mean and standard deviation of an input vector.

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

%call the function
values = [12.7, 45.4, 98.9, 26.6, 53.1];
[ave,stdev] = stat(values)
```