



# **Computer since**

second Stage

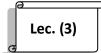
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**Control flow** 

Ms.C Mortada Sabri

Ms.C Lubna Ali

Ms.C Esraa Hussein



#### **Control flow**

MATLAB has four control flow structures: the if statement, the for loop, the while loop, and the switch statement.

The "if...end" structure MATLAB supports the variants of "if" construct.

```
if ......end
if .....else .....end
if .....else .....end
```

### **Syntax**

```
if expression
statements
elseif expression
statements
else
statements
end
```

## **Example**

```
if .....end
discr = 5;
if discr < 0
    disp('Warning: discriminant is negative, roots are imaginary');
end</pre>
```

```
if ......else .....end
   discr = 5;
   if discr < 0
      disp('Warning: discriminant is negative, roots are imaginary');
   else
      disp('Roots are real, but may be repeated')
   end

if .....elseif .....else....end
   discr = 5;
   if discr < 0
      disp('Warning: discriminant is negative, roots are imaginary');
   elseif discr == 0
      disp('Discriminant is zero, roots are repeated')
   else disp('Roots are real')
   end
</pre>
```

#### It should be noted that:

- elseif has no space between else and if (one word)
- no semicolon (;) is needed at the end of lines containing if, else, end
- Indentation of if block is not required, but facilitate the reading.
- the end statement is required

#### Relational and logical operators

A relational operator compares two numbers by determining whether a comparison is true or false



OPERATOR	DESCRIPTION
>	Greater than
<	Less than
>=	Greater than or equal to
>= <=	Less than or equal to
==	Equal to
~=	Not equal to
&	AND operator
	OR operator
~	NOT operator

Note that the "equal to" relational operator consists of two equal signs (==) (with no space between them), since = is reserved for the assignment operator.

#### **Loop types**

A loop statement allows us to execute a statement or group of statements multiple times. The drawing shows the general form of a loop statement for most programming languages.

#### For loop

A for loop is a repetition control structure that allows you to efficiently write a loop that needs to execute a specific number of times.

The syntax of a for loop in MATLAB is as following:

When the code above is executed, the result will be

```
value of a: 10
value of a: 11
value of a: 12
value of a: 13
value of a: 14
value of a: 15
value of a: 16
value of a: 17
value of a: 18
value of a: 19
value of a: 20
```

#### The "while...end" loop

This loop is used when the number of passes is not specified. The looping continues until a stated condition is satisfied. The while loop has the form:

```
while expression
```

statements

end

end

The statements are executed as long as expression is true.

```
x = 1
while x \le 10
x = 3*x
```

# **The Nested Loops**

Matlab also allows to use one loop inside another loop. The syntax for a nested for loop statement in MATLAB is as follows:

It is important to note that if the condition inside the looping is not well defined, the looping will continue indefinitely. If this happens, we can stop the execution by pressing <u>Ctrl-C</u>.

#### **Example**

We can use a nested for loop to display all the prime numbers from 1 to 100.

2 is prime	
3 is prime	
5 is prime	
7 is prime	
11 is prime	
13 is prime	
17 is prime	
19 is prime	
23 is prime	
29 is prime	
31 is prime	
37 is prime	
41 is prime	
43 is prime	
47 is prime	
53 is prime	
59 is prime	
61 is prime	
67 is prime	
71 is prime	
73 is prime	
79 is prime	
83 is prime	
89 is prime	
97 is prime	