



دانشگاه فرهنگیان

MATLAB

ابراهیم خلیل عباسی

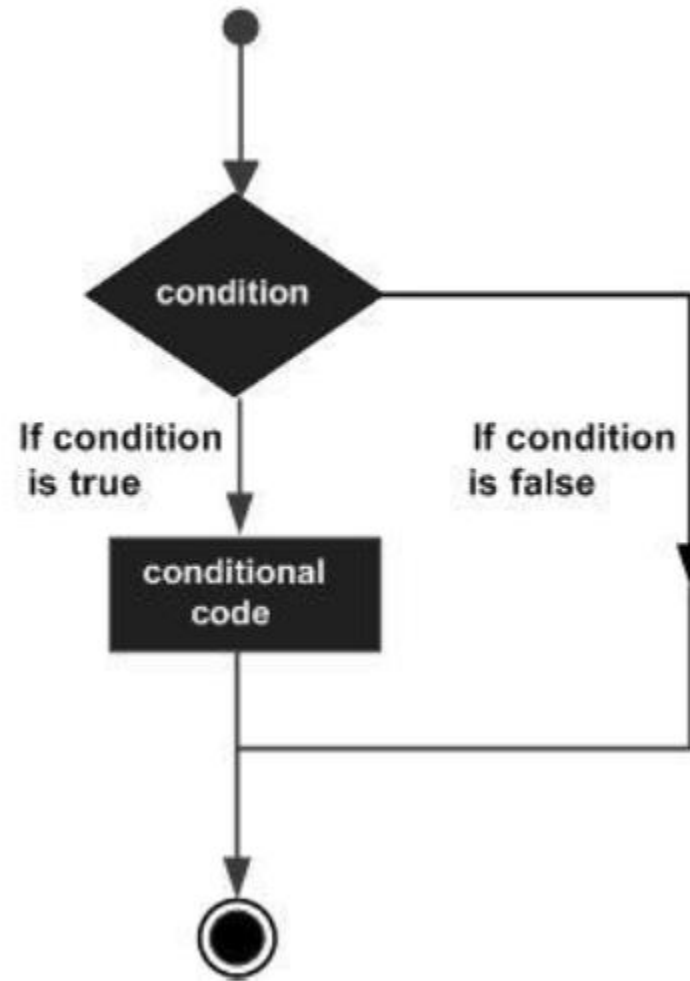


دانشگاه فرهنگیان

فصل ۷

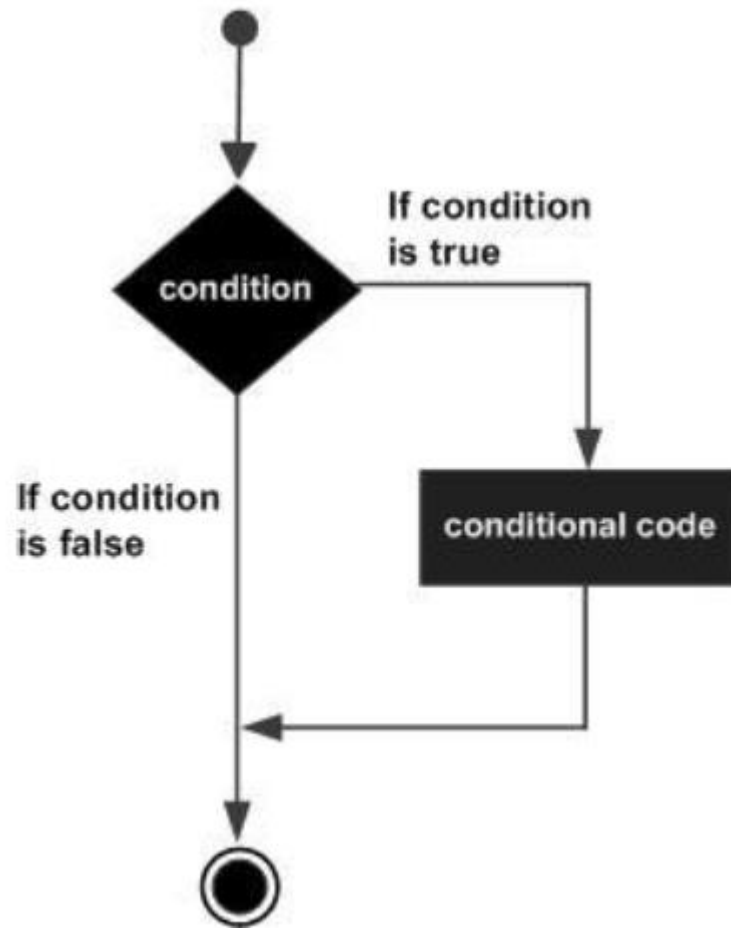
حلقه های تکرار و دستورات شرط-تصمیم گیری

Loop Types and Decision Making



if... end

```
if <expression>  
    % statement(s) will execute if the boolean expression is true  
    <statements>  
end
```



if... end

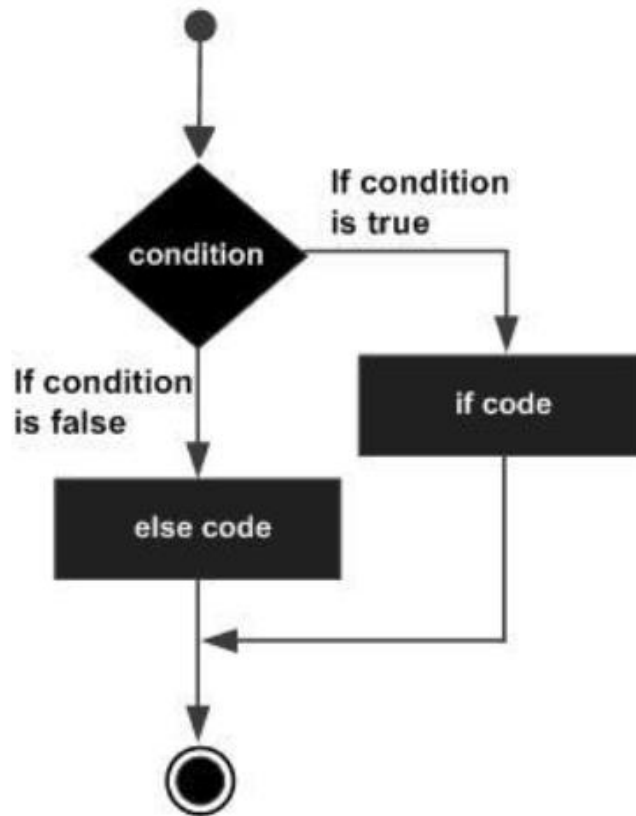
ifendstatement.m

```
a = 10;  
if a < 20  
    fprintf('a is less than 20\n' );  
end  
fprintf('value of a is : %d\n', a);
```

```
>> ifendstatement  
a is less than 20  
value of a is : 10
```

if...else...end

```
if <expression>  
    % statement(s) will execute if the boolean expression is true  
    <statement(s)>  
else  
    <statement(s)>  
    % statement(s) will execute if the boolean expression is false  
end
```



if...else...end

ifelseifstatement.m

```
a = 100;  
if a < 20  
    fprintf('a is less than 20\n' );  
else  
    fprintf('a is not less than 20\n' );  
end  
  
fprintf('value of a is : %d\n', a);
```

>> ifelseifstatement
a is not less than 20
value of a is : 100

if...elseif...elseif...else...end

```
if <expression 1>  
    % Executes when the expression 1 is true  
    <statement(s)>  
elseif <expression 2>  
    % Executes when the boolean expression 2 is true  
    <statement(s)>  
elseif <expression 3>  
    % Executes when the boolean expression 3 is true  
    <statement(s)>  
else  
    % executes when the none of the above condition is true  
    <statement(s)>  
end
```

if...elseif...elseif...else...end

ifelseifelseifelsestatement.m

```
a = 100;
if a == 10
    fprintf('Value of a is 10\n' );
elseif( a == 20 )
    fprintf('Value of a is 20\n' );
elseif a == 30
    fprintf('Value of a is 30\n' );
else
    fprintf('None of the values are matching\n');

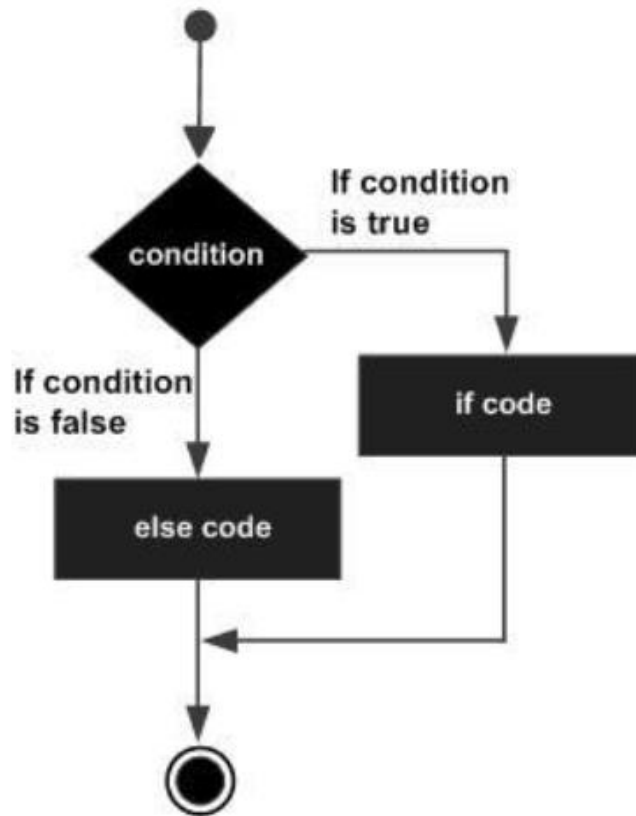
fprintf('Exact value of a is: %d\n', a );

end
```

» ifelseifelseifelsestatement
None of the values are matching
Exact value of a is: 100

if...else...end

```
if <expression>  
  % statement(s) will execute if the boolean expression is true  
  <statement(s)>  
else  
  <statement(s)>  
  % statement(s) will execute if the boolean expression is false  
end
```



The Nested if

دستورات تصمیم گیری

```
if <expression 1>  
    % Executes when the boolean expression 1 is true  
    if <expression 2>  
        % Executes when the boolean expression 2 is true  
    end  
end
```

The Nested if

nestedif.m

```
a = 100;  
b = 200;  
if( a == 100 )  
    if( b == 200 )  
        fprintf('Value of a is 100 and b is 200\n' );  
    end  
end  
fprintf('Exact value of a is : %d\n', a );  
fprintf('Exact value of b is : %d\n', b );
```

```
>> nestedif  
Value of a is 100 and b is 200  
Exact value of a is : 100  
Exact value of b is : 200
```

switch

دستورات تصمیم گیری

```
switch <switch_expression>
  case <case_expression>
    <statements>
  case <case_expression>
    <statements>
  ...
  otherwise
    <statements>
end
```

scalar / string

scalar / string
یا آرایه ای از آنها

switch

switchstatement1.m

```
grade = 'B';  
switch (grade)  
    case 'A'  
        fprintf('Excellent!\n' );  
    case 'B'  
        fprintf('Well done\n' );  
    case 'C'  
        fprintf('Well done\n' );  
    case 'D'  
        fprintf('You passed\n' );  
    case 'F'  
        fprintf('Better try again\n' );  
    otherwise  
        fprintf('Invalid grade\n' );  
end
```

```
>> switchstatement1  
Well done
```

switch

switchstatement2.m

```
d = floor (10* rand);  
switch d  
    case {2,4,6,8}  
        disp ('Even');  
    case {1,3,5,7,9}  
        disp ('Odd');  
    otherwise  
        disp ('Zero');  
end
```

```
>> switchstatement2  
Even
```

The Nested Switch

nestedswitch.m

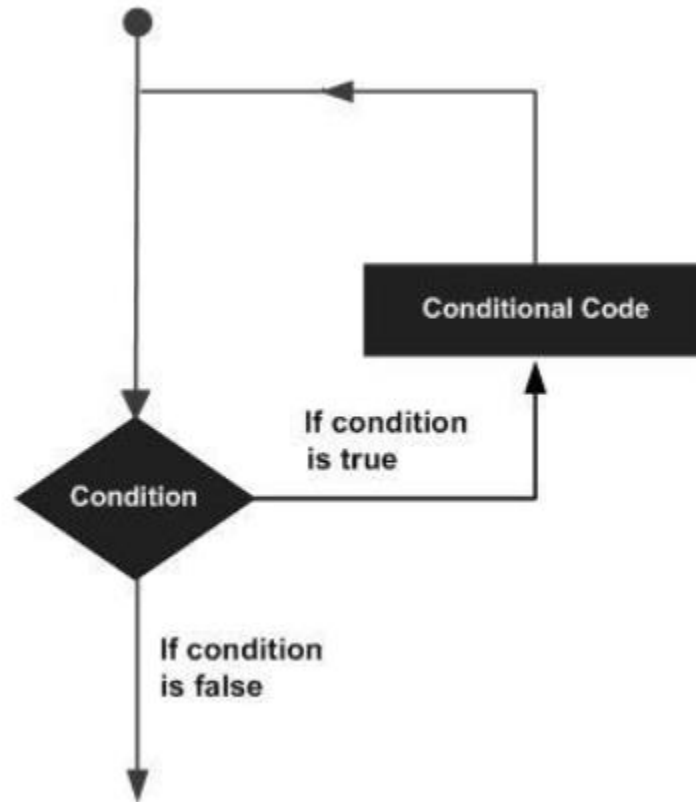
```
a = 100;
b = 200;
switch(a)
    case 100
        fprintf('This is part of outer switch %d\n', a );
        switch(b)
            case 200
                fprintf('This is part of inner switch %d\n', a );
            end
        end
    end
fprintf('Exact value of a is : %d\n', a );
fprintf('Exact value of b is : %d\n', b );
```

```
>> nestedswitch
This is part of outer switch 100
This is part of inner switch 100
Exact value of a is : 100
Exact value of b is : 200
```

دستورات تکرار

دستورات تصمیم گیری

دستورات تکرار



while

دستورات تصمیم گیری

دستورات تکرار

```
while <expression>  
<statements>  
end
```

While_statement.m

```
a = 10;  
while( a < 20 )  
    fprintf('value of a: %d\n', a);  
    a = a + 1;  
end
```

```
>> while_statement  
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
```

for

```
for index = values  
    <program statements>  
    ...  
end
```

for_statement1.m

```
for a = 10:20  
    fprintf('value of a: %d\n', a);  
end
```

```
>> for_statement1  
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
```

دستورات تصمیم گیری

دستورات تکرار

for

```
for index = values  
    <program statements>  
    ...  
end
```

for_statement1.m

```
for a = 10:20  
    fprintf('value of a: %d\n', a);  
end
```

```
>> for_statement1  
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
```

دستورات تصمیم گیری

دستورات تکرار

for

دستورات تصمیم گیری

دستورات تکرار

for_statement2.m

```
for a = 1.0: -0.1: 0.0  
    disp(a)  
end
```

» for_statement2

```
1  
0.9000  
0.8000  
0.7000  
0.6000  
0.5000  
0.4000  
0.3000  
0.2000  
0.1000  
0
```

for

دستورات تصمیم گیری

دستورات تکرار

for_statement2.m

```
for a = 1.0: -0.1: 0.0  
    disp(a)  
end
```

» for_statement2

1

0.9000

0.8000

0.7000

0.6000

0.5000

0.4000

0.3000

0.2000

0.1000

0

for

دستورات تصمیم گیری

دستورات تکرار

for_statement3.m

```
for a = [24,18,17,23,28]
    disp(a)
end
```

```
>> for_statement3
24
```

18

17

23

28

Nested Loops

```
for m = 1:j
    for n = 1:k
        <statements>;
    end
end
```

```
while <expression1>
    while <expression2>
        <statements>
    end
end
```

دستورات تصمیم گیری

دستورات تکرار

Nested Loops

دستورات تصمیم گیری

دستورات تکرار

printprimes.m

```
for i=2:20
    for j=2:20
        if(~mod(i,j))
            break; % if factor found, not prime
        end
    end
    if(j > (i/j))
        fprintf('%d is prime\n', i);
    end
end
```

```
>> printprimes
2 is prime
3 is prime
5 is prime
7 is prime
11 is prime
13 is prime
17 is prime
19 is prime
```

break

break_statement.m

```
a = 10;
while (a < 20 )
    fprintf('value of a: %d\n', a);
    a = a+1;
    if( a > 15)
        break;
    end
end
```

```
>> break_statement
value of a: 10
value of a: 11
value of a: 12
value of a: 13
value of a: 14
value of a: 15
```

دستورات تصمیم گیری

دستورات تکرار

continue

continue_statement.m

```
a = 10;
while a < 20
    if a == 15
        a = a + 1;
        continue;
    end
    fprintf('value of a: %d\n', a);
    a = a + 1;
end
```

```
>> continue_statement
value of a: 10
value of a: 11
value of a: 12
value of a: 13
value of a: 14
value of a: 16
value of a: 17
value of a: 18
value of a: 19
```

دستورات تصمیم گیری

دستورات تکرار