

MA2252 Introduction to Computing

Lecture 7: Branching Statements

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At the end of lecture, students will be able to understand and create

- If-Statements
- Switch statements

Branching Statements

Branching statements are used in programming to execute a section of code under specific conditions.

Examples:

- 1 If-Statements
- 2 Switch Statements

Branching statements
also called conditional
statements.

clc
clear all

code block 1 ($x > 0$) \rightarrow x is even

code block 2 ($x < 0$) \rightarrow x is odd

If-Statements

If statements can be constructed in different ways and they always end with **end** keyword.

- 1 Using **if** keyword

Construction:

if logical expression
 code block
end

Handwritten example:
if $x > 0$ ~~end~~ **||**
 []
end

If-Statements (contd.)

Example:

```
function [t] = total_marks(x,y)
if x<40 || y<40
    disp('FAIL')
end
t=x+y;
end
```

$x = 50, y = 80 \rightarrow \text{PASS}$
 x & y are marks in two subjects

$(x < 40 \text{ || } y < 40)$

displays
FAIL
in command window.

$x = 20$
 $y = 70$
 $x + y = 90$

If-Statements (contd.)

- ② Using `if` and `else` keywords

Construction:

```
if logical expression  
    code block 1  
else  
    code block 2  
end
```

if this expression is true
execute code block 1
otherwise execute code block 2

If-Statements (contd.)

Example:

```
function [t] = total_marks(x,y)
if x<40||y<40
    disp('FAIL')
else
    disp('PASS')
end
t=x+y;
end
```

$(x < 40) \parallel (y < 40)$
→ to be on safe side

calculates total
order of precedence
*, /
+, -
<, =, >, <=

$x \parallel y < 40$
 $(x \parallel y) < 40$

Demo

If-Statements (contd.)

- ③ Using **if**, **elseif** and **else** keywords

Construction:

if logical expression P

code block 1

elseif logical expression Q

code block 2

elseif logical expression R

code block 3

else

code block 4

end

Use **elseif** when you have more than 1 (logical) condition to check
if P is true
if P is false & Q is true
if both P & Q are false & R is true
when all of P, Q & R are false

If-Statements (contd.)

Example

```
function [t] = total_marks(x,y)
if x<0||y<0 → P
    disp('marks cannot be negative')
elseif x>100||y>100 → Q
    disp('marks cannot exceed 100')
elseif x<40||y<40 → R
    disp('FAIL')
else
    disp('PASS')
end
t=x+y; → calculating the total
end
```

$x = 200$
 $y = 30$
not legal marks

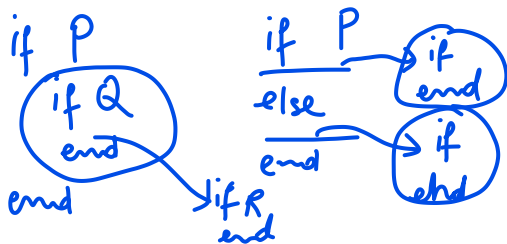
$x = -5, y = 10$
invalid marks

Demo

If-Statements (contd.)

Nested If-Statement

If-statement nested/contained within another if-statement.



Example:

```
function [t] = total_marks(x,y)
if x<0||y<0
    disp('marks cannot be negative')
    t=sprintf('cannot calculate total marks');
elseif x>100||y>100
    disp('marks cannot exceed 100')
    t=sprintf('cannot calculate total marks');
```

If-Statements (contd.)

```
else  
t=x+y;
```

```
if x<40||y<40  
    disp('FAIL')
```

```
else  
    disp('PASS')
```

```
end
```

```
end
```

```
end
```

total is calculated in the else part

this is nested inside the parent if statement

Demo

Activity

```
function [weight] = myweight(x)
if weight>70
    disp('Eat healthy') ✓
elseif weight>80
    disp('Exercise more')
elseif weight>100
    disp('Call the doctor')
else
    disp('Relax!')
end
```

110 > 70 True



are not checked by
MATLAB



if weight > 100
 call the doctor
elseif weight > 80
 weight > 70
else if

My weight is 110 kg. What suggestion this code will give? To answer, please go to mentimeter link in the chat.

Switch Statements

learn from the books S. Attaway & Otto-Denier

Switch statements are used to check if an expression is equal to one of possible values. Each value is called a case.

 $x = 1$
 $x = 2$
 \vdots
 $x = 10$

if $x == 1$ case 1
elseif $x == 2$ case 2
e

Switch Statements (contd.)

Construction:

switch expression

case value 1
code block 1

case value 2
code block 2

case value 3
code block 3

otherwise
code block 4

end

variable, string
 ~~$x < 40$ || $y < 40$~~

Switch x

case 1

case 2

$x == 1$

just like else
in if

Switch Statements (contd.)

Example:

function grade = mygrade_switch(x)
%this function calculates grade based on marks from 0 to 10 using switch

switch x

case 10

grade='A+'; %assign A+ if marks=10

case 9

grade='A';

case{7,8}

→ 7 or 8

grade='B';

otherwise

grade='C'

6, 5, 4, 3, 2, 1, 0

end

end

x is marks out of 10

use
if else
to state
the validity
of marks

Demo

If vs Switch

- 1 If-statements are useful when you deal with logical conditions in your code.

use if

- 2 Switch becomes handy when you deal with one expression taking multiple possible values.

→ just to check many values of a variable,

- 3 Switch statements can also be written using if-statements but vice-versa is not true in general.

string etc.

if-else can be used at any time

End of Lecture 7

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