Module 01

Logic
If, else if & else

Data Science Developer

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Outline

- Expression
- Operator
  - Arithmetic Operators
  - Assignment Operators
  - Comparison Operators
  - Logical Operators
- Conditional expression :
  - if
  - if else
  - Chained conditional expression, if , else if, else if, …, else
  - Nested conditional expression (conditional expression in conditional expression)

Expression

- Any legal combination of symbols that represent a value.

  e.g. : `2 + 3, x + 5, x + y, x == 2`

- Expression can be consist of operand and operator
- Expression are evaluated to obtain a value
- If `x = 3` and `y = 4`

Expression	Operator	Operand	value
`2 x 3`	`x`	`2 and 3`	6
`x + 5`	`+`	`x and 5`	8
`x + y`	`+`	`x and y`	7
`x == 2`	`==`	`x and 2`	`False`

Operators Example

if – else	Conditional expression
or	Boolean OR
and	Boolean AND
not x	Boolean NOT
in, not in, is, is not, <, <=, >, >=, !=, ==	Comparisons, including membership tests and identity tests
|	Bitwise OR
^	Bitwise XOR
&	Bitwise AND
<<, >>	Shifts
+, -	Addition and subtraction
*, @, /, //, %	Multiplication, matrix multiplication division, remainder
+x, -x, ~x	Positive, negative, bitwise NOT
**	Exponentiation

What is Compound Assignment Operators ?

- Combine assignment operators with arithmetic operators
- e. g. :
  - `a = a + 1` Compound Assignment Operators will be : `a += 1`
  - `y = y * 1` Compound Assignment Operators will be : `y *= 1`
- Arithmetic operators that can be used : `+ , - , *, /, //, **, %`

Why do wee need Compound Assignment Operators ?

- To simplify the script
- Will be very useful in looping

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Compound Assignment Operators

```
usiaAndi = 40

usiaAndi *= 2
print(usiaAndi)
usiaAndi /= 2
print(usiaAndi)
usiaAndi += 2
print(usiaAndi)
usiaAndi -= 2
print(usiaAndi)
usiaAndi %= 2
print(usiaAndi)
```

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Comparison Operators

==	same value and same data type
>	greater than
<	less than
>=	greater than or equal
<=	less than or equal

Logical Operators

and	(if both expression are true , result will be TRUE)
or	(if one of the expression true, result will be TRUE)
not	(reverse boolean value TRUE/FALSE)

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Comparison Operators

```
x = 5
y = '5'

print(x == y)
print(x > int(y))
print(x >= int(y))
print(x < int(y))
print(x <= int(y))
```

Logical Operators

```
x = 5
y = '5'
z = 6

print(x==int(y) and int(y)<z)
print(x==int(y) or int(y)<z)
print(x==int(y) or int(y)<z and int(y)<z)
print(x==int(y) and int(y)<z or int(y)<z)
print(not(x==int(y) or int(y)<z))
```

Conditional Expression : If, else if & else

- Our program is executed line by line (statement by statement)
- **Conditional expression** is used to choose which line will be **executed** based on certain **condition**.
- **Condition** is an **expression**
- **executed program** called conditional **statement**

Why is Conditional Expression needed ?

- sometimes we want our program to do different actions depends on the conditions
- like example when we press add to cart on an e-commerce application and we aren't login yet, the program will redirect us to login page, but if we already login, it will add to cart successfully.

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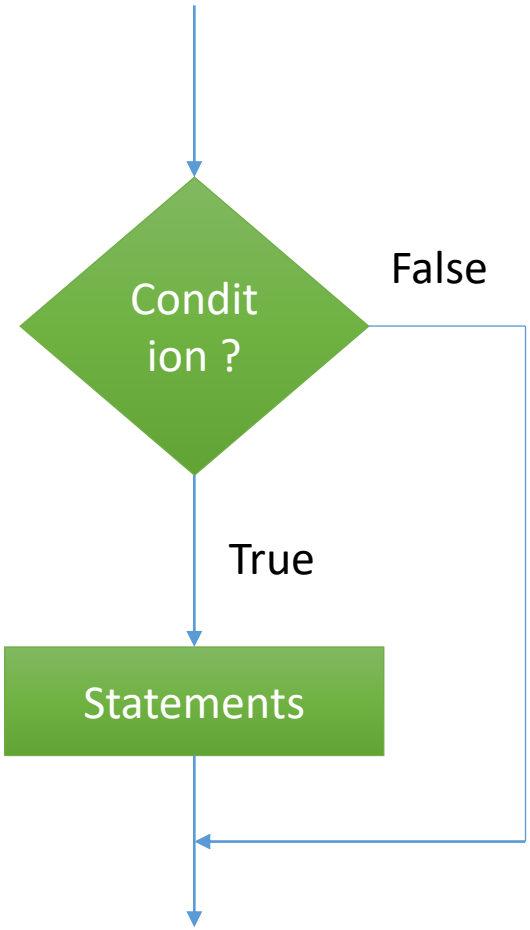
Type of Conditional Expression

- IF : Use if to specify a block of code to be executed, if a specified condition is true
- ELSE : Use else to specify a block of code to be executed, if the same condition is false
- ELSE IF : Use else if to specify a new condition to test, if the first condition is false

Conditional Expression : if




```
if condition :
    statement 1
    statement 2
```

Statements that will be executed when condition is True

indentation

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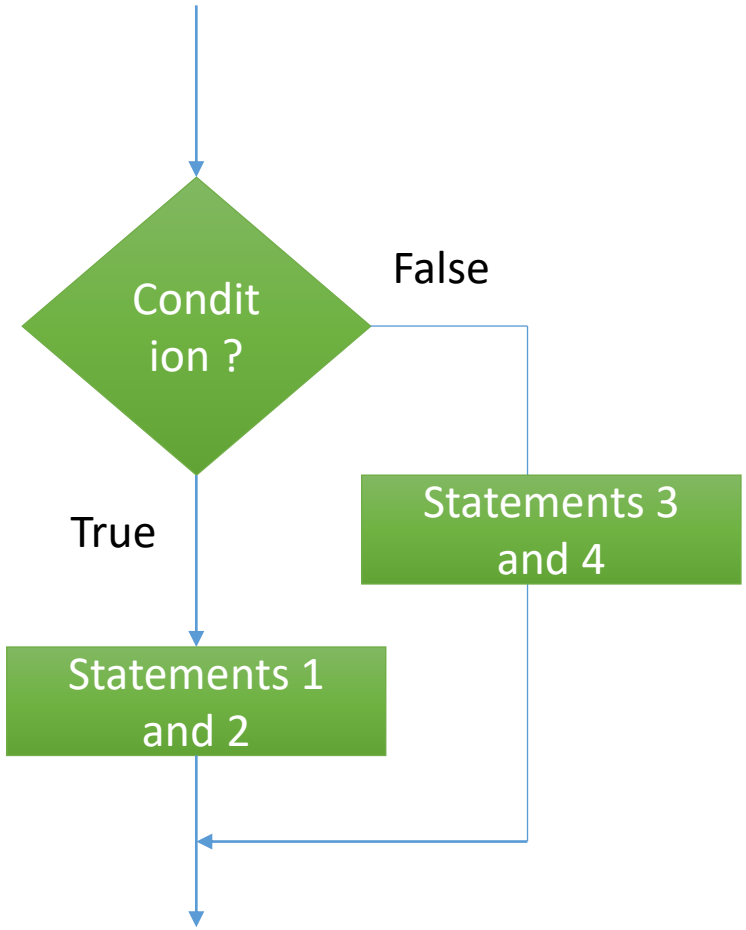
If example

```
a,b = input('input two numbers :').split()
a = int(a)
b = int(b)

if a < b :
    difference = b-a
    print(difference)
    print('b is greater than a')

if b < a :
    difference = a-b
    print(difference)
    print('a is greater than b')
```

Conditional Expression : if else




```
if condition :
    statement 1
    statement 2
else :
    statement 3
    statement 4
```

indentation

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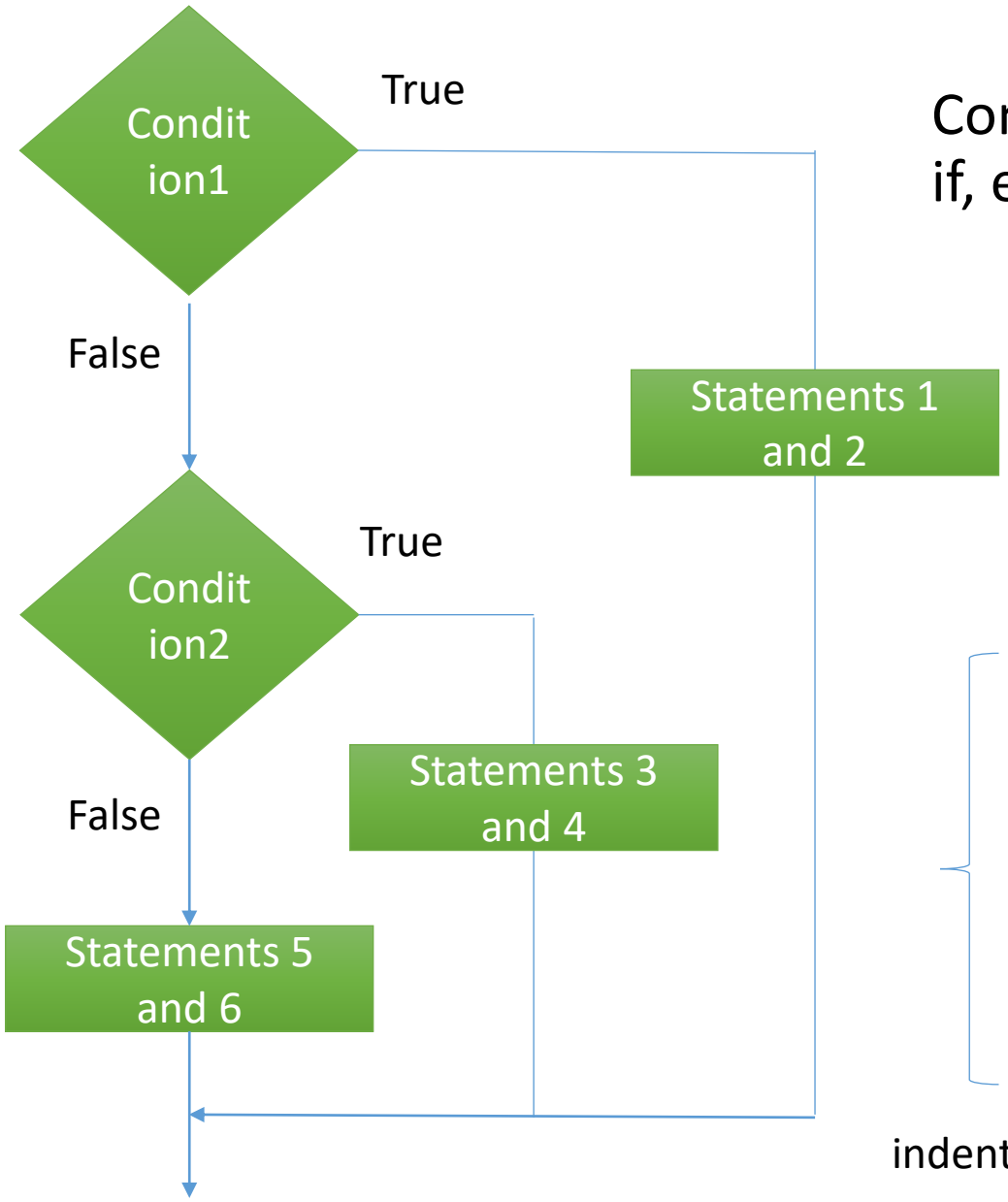
if, else example

```
jomblo = True

if (jomblo) :
    print('Masih jomblo!')
else :
    print('Udah taken!')
```



Conditional Expression : if, else if, else if , … else

```
if condition :
    statement 1
    statement 2
else if condition:
    statement 3
    statement 4
else :
    statement 5
    statement 6
```

indentation

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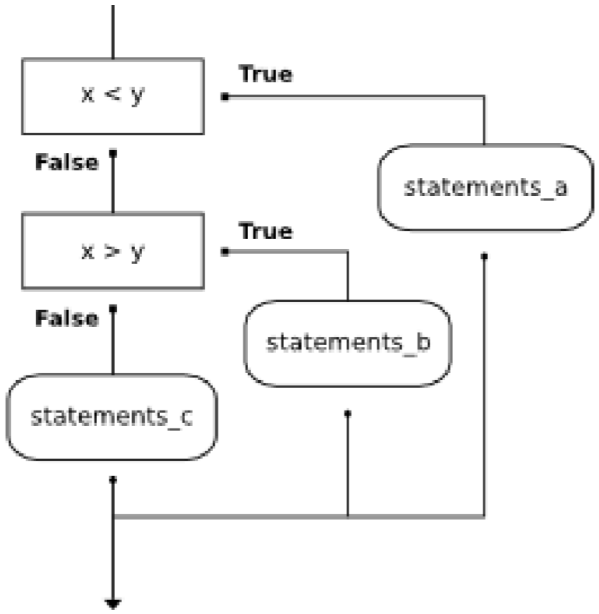
If, else if & else Example

```
x = int(input('input x'))
y = int(input('input y'))

if (x < y) :
    # statement_a
    difference = y - x
    result = 'x is less than y'
elif (x > y) :
    # statement_b
    difference = x - y
    result = 'x is greater than y'
else :
    # statement_c
    difference = 0
    result = 'x and y must be equal'

print(difference)
print(result)
```



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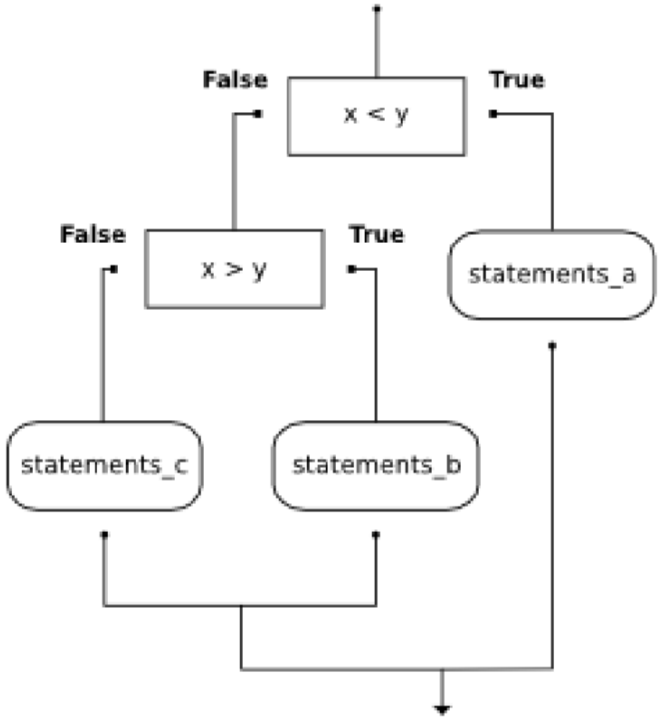
Nested Conditional Expression

```
x = int(input('input x'))
y = int(input('input y'))

if (x < y):
    # statement_a
    difference = y - x
    result = 'x is less than y'
else :
    if (x > y):
        # statement_b
        difference = x - y
        result = 'x is greater than y'
    else:
        # statement_c
        difference = 0
        result = 'x and y must be equal'

print(difference)
print(result)
```



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Solve it! #1

```
PS D:\Purwadhika\Purwadhika\Python Fundamental> python fundamental.py
Masukkan angka : 7
Angka 7 tergolong bilangan GANJIL!
PS D:\Purwadhika\Purwadhika\Python Fundamental> python fundamental.py
Masukkan angka : 6
Angka 6 tergolong bilangan GENAP!
```

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Solve it! #2

IMT = massa(kg) / tinggi(meter)^2

a. IMT < 18.5 artinya berat badan kurang,

b. 18.5 - 24.9 artinya berat badan ideal,

c. 25.0 - 29.9 artinya BB berlebih,

d. 30.0 - 39.9 artinya BB sangat berlebih,

e. IMT > 39.9 artinya obesitas.

```
Masukkan Massa(kg) : 67
Masukkan Tinggi(cm) : 178
Massa 67 kg & tinggi 1.78 m
IMT = 21.146319909102385, BERAT BADAN IDEAL!
```

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