INTRODUCTION TO

Python

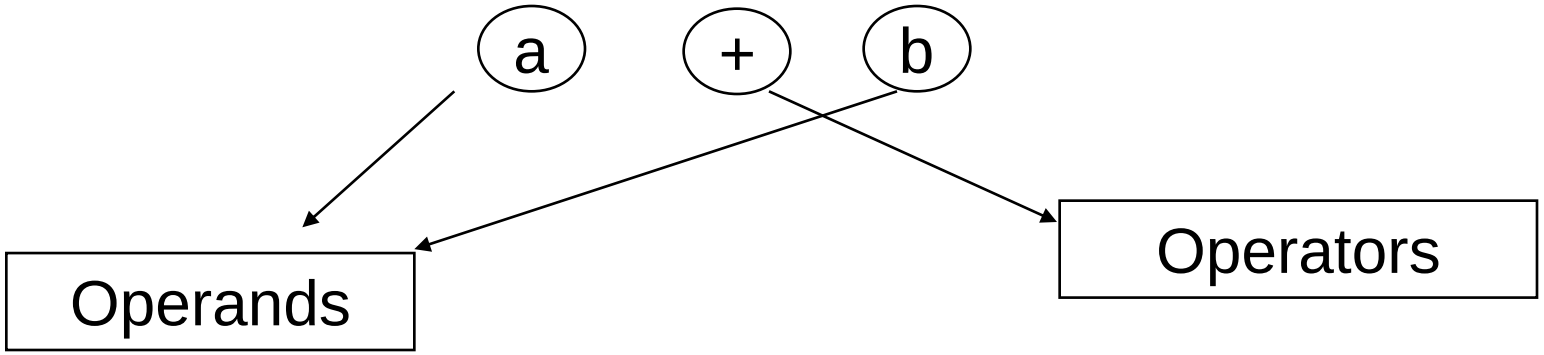
Part 2

At the end of this lecture, you should learn:

- Aritmetic operators
- Comparison operators
- Logical operators

Introduction of expression

- Operators are special symbols in Python that carry out certain computation activities.
- The value that the operator operates on is called the operand.



Introduction of expression

- There are 4 kinds of Python operators:
  - **Arithmetic:** The math symbols we're all familiar with as well as some less-well known ones.
  - **Comparison:** These operators tell you which of several things is bigger.
  - **Logical or Boolean:** These operators test whether things are true or false.
  - **Conditional:** This operator allows you to choose one of two values based on a logical test.

Arithmetic Operators

- What it arithmetic operators?
  - Mathematics basic operators
- Why we need it?
  - Program can perform mathematical calculation
- Can you give example of the arithmetic operators?

Expressions

- **expression**: A data value or set of operations to compute a value.

  Examples:
  ```
  1 + 4 * 3
  42
  ```

- Arithmetic operators we will use:

`+ -`	addition, subtraction/negation,
`* /`	multiplication, division
`%`	modulus, a.k.a. remainder
`**`	exponentiation (10**2 =10 to the power 2)

Expressions

- **precedence**: Order in which operations are computed.
  - `* / % **` have a higher precedence than `+ –`

    `1 + 3 * 4` is `13`

  - Parentheses can be used to force a certain order of evaluation.

    `(1 + 3) * 4` is `16`

Integer division

- When we divide integers with `/` , the quotient is also an integer.

```
    3
4 ) 14
    12
    --
     2
```

```
     52
27 ) 1425
     135
     ---
      75
      54
      --
      21
```

  - More examples:
    - `35 / 5` is `7`
    - `84 / 10` is `8`
    - `156 / 100` is `1`

Integer division

- The `%` operator computes the remainder from a division of integers.

```
      3
  ----
4 ) 14
    12
    --
     2
```

```
      43
  -----
5 ) 218
    20
    --
     18
     15
     --
      3
```

Sample Code

```
print ("************************")
print ("Aturcara tambah, tolak , dan darab dua integer ")
print ("************************")
no1 = float(input ("Masukkan nombor pertama : "))
no2 = float(input ("Masukkan nombor kedua : "))
nilaitambah = no1 + no2
nilaitolak = no1 - no2
nilaidarab = no1 * no2
nilaibahagi = no1 / no2
print ("Hasil tambah dua nombor ialah : " ,nilaitambah)
print ("Hasil tolak dua nombor ialah : " ,nilaitolak)
print ("Hasil darab dua nombor ialah : " ,nilaidarab)
print ("Hasil bahagi dua nombor ialah : " ,nilaibahagi)
```

Sample Code

```
print ("*************************")
print ("Aturcara darab dan modulus dua integer ")
print ("*************************")
no1 = float(input ("Masukkan nombor pertama : "))
no2 = float(input ("Masukkan nombor kedua : "))
nilaibahagi = no1 / no2
print ("Hasil bahagi dua nombor ialah : " ,nilaibahagi)
modulus = no1 % no2
print ("Baki Hasil bahagi dua nombor ialah : " ,modulus)
```

Sample Code

```
print ("*************************")
print ("Aturcara exponential (power) dua integer ")
print ("*************************")
no1 = float(input ("Masukkan nombor pertama : "))
no2 = float(input ("Masukkan nombor kedua : "))
nilaikuasa = no1 ** no2
print (“Nombor pertama kuasa nombor kedua : " ,nilaikuasa)
```

Comparison Operators

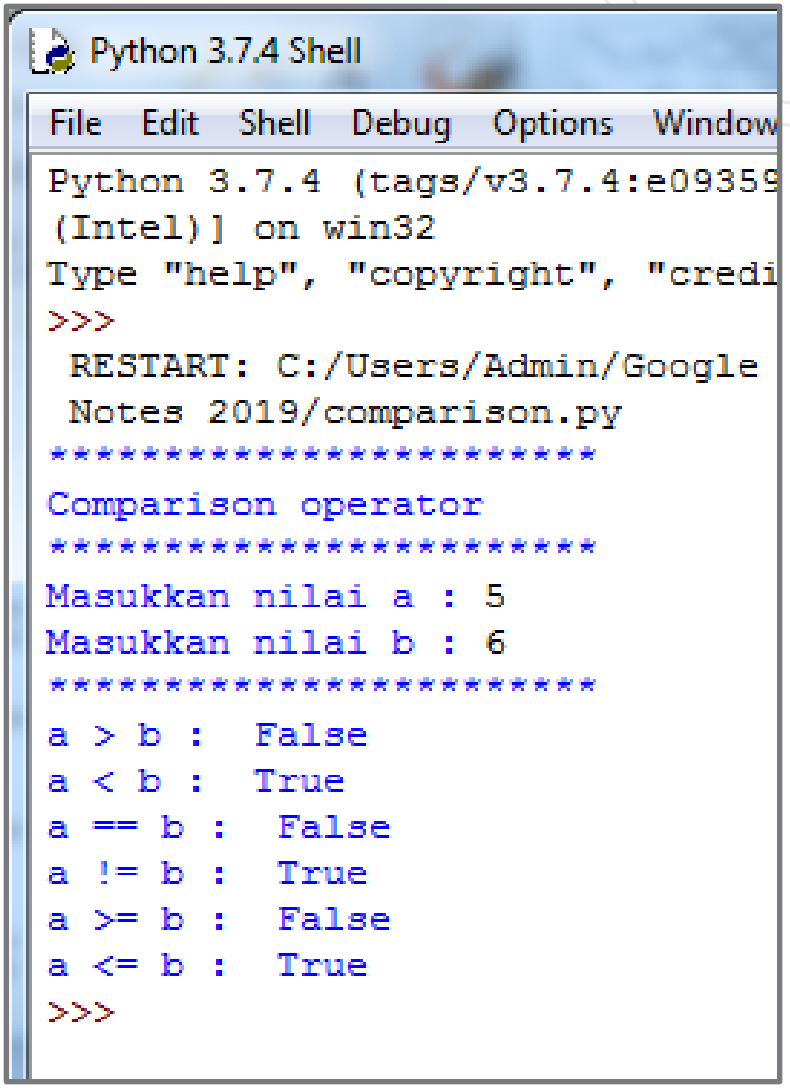
- What it comparison operators?
  - Operators use in decision making.
- Why we need it?
  - For logical structure (e.g. If, if-else etc)
- Condition in if structures can be formed by using comparison operators.
- Can you give example of comparison operators?

Comparison Operators

Operator	Description	Example
==	If the values of two operands are equal, then the condition becomes true.	(a == b) is not true.
!=	If values of two operands are not equal, then condition becomes true.	(a != b) is true.
<>	If values of two operands are not equal, then condition becomes true.	(a <> b) is true. This is similar to != operator.
>	If the value of left operand is greater than the value of right operand, then condition becomes true.	(a > b) is not true.
<	If the value of left operand is less than the value of right operand, then condition becomes true.	(a < b) is true.
>=	If the value of left operand is greater than or equal to the value of right operand, then condition becomes true.	(a >= b) is not true.
<=	If the value of left operand is less than or equal to the value of right operand, then condition becomes true.	(a <= b) is true.

Comparison Operators

```
print ("************************")
print ("Comparison operator ")
print ("************************")
a=input("Masukkan nilai a : ")
b=input("Masukkan nilai b : ")
print ("************************")
print("a > b : ", a>b)
print("a < b : ", a<b)
print("a == b : ", a==b)
print("a != b : ", a!=b)
print("a >= b : ", a>=b)
print("a <= b : ", a<=b)
```



Logical Operators

- What it logical operators?
  - Is it also use in decision making
- Can you give example of logical operators?

Logical Operators

Operator	Description	Example
and Logical AND	If both the operands are true then condition becomes true.	(a and b) is true.
or Logical OR	If any of the two operands are non-zero then condition becomes true.	(a or b) is true.
not Logical NOT	Used to reverse the logical state of its operand.	Not(a and b) is false.

Truth Table

A	B		A && B	A || B	!A
0	0		0	0	1
0	1		0	1	1
1	0		0	1	0
1	1		1	1	0

Logical Operators

```
print ("************************")
print (“Logical operator ")
print ("************************")
a=input("Masukkan nilai a : ")
b=input("Masukkan nilai b : ")
c=input("Masukkan nilai c : ")
print ("************************")
print("a > b AND a > c: ", a>b and a>c)
print("a > b OR a > c: ", a>b or a>c)
print("a < b AND a < c: ", a<b and a<c)
print("a < b OR a < c: ", a<b or a<c)
print("not(a > b) AND a > c: ", not(a>b) and a>c)
```

Let us do this together

- An online retailer sells 2 products: widgets and gizmos. Each widget weighs 75 grams. Each gizmo weighs 112 grams. Write a program that reads the number of widgets and the number of gizmos from the user. Then your program should compute and display the **total weight** of the parts.

Exercise

- Write the program that asks the user to enter the width and length of a room. Once these values have been read, your program should compute and display the **area of the room**.

Exercise

The program that you create for this exercise will begin by reading the cost of a meal ordered at a restaurant from the user. Then your program will compute the service tax and the tip for the meal. (service tax = 6%). Compute the tip as 18 percent of the meal amount (without tax). The output from your program should include the tax amount, the tip amount, and the grand total for the meal including both tax and the tip.

Format the output so that all the values are displayed using two decimal places.

That’s all