

CHRIST THE KING BOYS MATRIC HR. SEC. SCHOOL, KUMBAKONAM – 612 001

UNIT – II

CORE PYTHON

CHAPTER – 5

PYTHON – VARIABLES AND OPERATORS

1. Define Python

- Python is a general purpose programming language created by Guido Van Rossum from CWI (Centrum Wiskunde & Informatica Institute).
- Python was released in 1991.
- Python supports both **Procedural** and **Object Oriented Programming**.

2. What are the Key Features of Python?

- It is a general purpose programming language which can be used for both scientific and non-scientific programming.
- It is a platform independent programming language.
- The programs written in Python are easily readable and understandable.

3. What are the two types of Programming in Python or How many ways that the Python shells can be used?

- In Python, programs can be written in two ways namely **interactive mode** and **Script mode**.
- The Interactive mode allows us to write codes in **Python command prompt (>>>)**
- In script mode programs can be written and stored as separate file with the extension **.py** and executed.
- Script mode is used to create and edit python source file.

4. What is meant by Interactive Mode Programming?

- In Interactive mode Python code can be directly typed and the interpreter displays the result(s) immediately.
- The Interactive mode can also be used as a **simple calculator**.

5. What is the use of Prompt in Python?

- The Prompt (>>>) indicates that Interpreter is ready to **accept the instructions**.
- Therefore the prompt on screen means **IDLE** is working in **Interactive Mode**.

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6. How to Invoke the Python IDLE window?

- Start → All Programs → Python 3.x → IDLE (Python 3.x)



- Click python Icon on the Desktop if available.
- The prompt (>>>) indicates that Interpreter is ready to **accept instructions**.
- Therefore, the prompt on screen means **IDLE** is working in **interactive mode**.
- Now let us try as a simple calculator by using simple mathematical expressions.

7. What is Script Mode Programming?

- Basically, a script is a text file containing the Python statements.
- Python Scripts are reusable code.
- Once the script is created, it can be executed again and again without retyping. The Scripts are editable.

8. How to Create Scripts in Python?

- Choose **File** → **New File** or press **Ctrl + N** in Python shell window.
- An **Untitled** blank script text editor will be displayed on screen
- Type the following code in Script editor

```
a=100
b=350
c=a+b
print("The Sum=",c)
```
- After typing the coding in the Script Editor, save the file and execute the file.

9. How to Save the Python Script?

- Choose **File** → **Save** or Press **Ctrl + S**
- Now, **Save As** dialog box appears on the screen
- In the **Save As** dialog box, select the location where you want to save your Python code, and type the file name in **File Name** box.
- Finally, click **Save** button to save your Python script.

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- Python files are by default saved with extension **.py**.

10. How to Execute the Python Script?

- Choose **Run** → **Run Module** or Press **F5**
- If your code has any error, it will be shown in **red** color and Python describes the type of error occurred.
- Correct the errors, save the file using **Ctrl + S** or **File** → **Save** and execute it again.
- For all error free code, the **Output** will appear in the IDLE window of Python

11. Define print()function in Python

- In Python, the **print()** function is used to **display result on the screen**.
- **Syntax:**
`print ("String to be displayed as output ", variable)`
- **Eg:** `>>> print ("Welcome to Python Programming")`
Welcome to Python Programming
- The `print ()` displays an entire statement which is specified within `print ()`.
- **Comma (,)** is used as a separator in **print ()** to print more than one item.
- **print()** evaluates the expression before printing.

12. Define input()function in Python

- In Python, **input()** function is used to **accept data as input at run time**.
- **Syntax:**
`Variable = input ("prompt string")`
- **prompt string** is a statement or message to the user, to know what input can be given.
- **Eg:** `>>> city=input ("Enter Your City: ")`
Enter Your City: Madurai

13. What are Comments in Python?

- Comments begin with hash symbol (**#**).
- The line that begins with **#** are considered as comments and ignored by the Python interpreter.
- Comments may be single line or multi-lines. The multiline comments should be enclosed within a set of **#** as given below.
- **Eg:**
It is Single line Comment

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It is multiline comment

which contains more than one line #

14. What is Indentation?

- Python programs get **structured** through **Indentation**.
- Python uses whitespace such as **spaces** and **tabs** to define program blocks.
- Languages like C, C++, java use curly braces { } to indicate blocks of codes for class, functions or body of the loops and block of selection command.
- The number of **whitespaces (spaces and tabs)** in the indentation is not fixed, but all statements within the block must be indented with same amount spaces.

15. Define Tokens and its Classification?

- Python breaks each logical line into a sequence of elementary lexical components known as **Tokens**.
- The token types are,
 - ⊕ Identifiers,
 - ⊕ Keywords,
 - ⊕ Operators,
 - ⊕ Delimiters and
 - ⊕ Literals.

16. Define Identifiers and its Rules?

- An Identifier is a name used to **identify a variable, function, class, module or object**.
- An identifier must start with an alphabet (**A..Z or a..z**) or **underscore (_)**.
- Identifiers may contain digits (**0....9**)
- Python identifiers are case sensitive i.e. **uppercase** and **lowercase** letters are distinct.
- Identifiers must not be a **python** keyword.
- Python does not allow punctuation character such as %, \$, @ etc., within identifiers.
- **Eg: Valid:** sum **Invalid:** 12sum

17. What are Keywords in Python?

- Keywords are special words used by Python interpreter to recognize the structure of program.
- They have specific meaning for interpreter.
- They cannot be used for any other purpose.

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➤ **Eg:**

True, False

18. Define Operators and Operands in Python

- **Operators** are special symbols which represent computations, conditional matching etc. The value of an operator used is called **Operands**.
- **Operators** are categorized as Arithmetic, Relational, Logical, Assignment etc. Value and variables when used with **Operator** are known as **Operands**.
- **Eg:** a+b #Here a and b are **Operands**. '+' is a **Operator**.

19. List the Arithmetic Operators in Python?

- An arithmetic operator is a mathematical operator that takes two operands and performs a calculation on them.
- Most computer languages contain a set of such operators that can be used within equations to perform different types of sequential calculations.
- Python supports the following Arithmetic operators.

OPERATOR – OPERATION	EXAMPLES	RESULT
Assume a=100 and b=10. Evaluate the following expressions		
+ (Addition)	>>> a + b	110
- (Subtraction)	>>>a – b	90
* (Multiplication)	>>> a*b	1000
/ (Division)	>>> a / b	10.0
% (Modulus)	>>> a % 30	10
** (Exponent)	>>> a ** 2	10000
// (Floor Division)	>>> a//30 (Integer Division)	3

20. What are Relational or Comparative Operators in Python or List the Comparative Operators?

Mention them?

OPERATOR – OPERATION	EXAMPLES	RESULT
Assume the value of a=100 and b=35. Evaluate the following expressions.		
== (is Equal)	>>> a==b	False
> (Greater than)	>>> a > b	True
< (Less than)	>>> a < b	False

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>= (Greater than or Equal to)	>>> a >= b	True
<= (Less than or Equal to)	>>> a <= b	False
!= (Not equal to)	>>> a != b	True

21. What are Relational Operators in Python or What are Comparative Operators in Python and mention them?

- A Relational operator is also called as **Comparative** operator which checks the relationship between two operands.
- If the relation is true, it returns **True**; otherwise it returns **False**.

OPERATOR – OPERATION	EXAMPLES	RESULT
Assume the value of a=100 and b=35. Evaluate the following expressions.		
== (is Equal)	>>> a==b	False
> (Greater than)	>>> a > b	True
< (Less than)	>>> a < b	False
>= (Greater than or Equal to)	>>> a >= b	True
<= (Less than or Equal to)	>>> a <= b	False
!= (Not equal to)	>>> a != b	True

22. What are the Logical Operators in Python and mention them?

- In python, Logical operators are used to perform logical operations on the given relational expressions.
- There are three logical operators they are **and**, **or** and **not**.

OPERATOR	EXAMPLE	RESULT
Assume a = 97 and b = 35, Evaluate the following Logical expressions		
or	>>> a>b or a==b	True
and	>>> a>b and a==b	False
not	>>> not a>b	False i.e. Not True

23. Define Assignment Operator

- In Python, = is a simple assignment operator to assign values to variable.
- Let **a = 5** and **b = 10** assigns the value 5 to **a** and 10 to **b** these two assignment statement can also be given as **a,b=5,10** that assigns the value 5 and 10 on the right to the variables a and b respectively.

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- There are various compound operators in Python like +=, -=, *=, /=, %=, **= and //= are also available.

24. What are the Compound Operators in Python?

- There are various compound operators in Python like +=, -=, *=, /=, %=, **= and //= are also available.

OPERATOR	DESCRIPTION	EXAMPLE
Assume x=10		
=	Assigns right side operands to left variable	>>> x=10 >>> b="Computer"
+=	Added and assign back the result to left operand i.e. x=30	>>> x+=20 # x=x+20
-=	Subtracted and assign back the result to left operand i.e. x=25	>>> x-=5 # x=x-5
=	Multiplied and assign back the result to left operand i.e. x=125	>>> x=5 # x=x*5
/=	Divided and assign back the result to left operand i.e. x=62.5	>>> x/=2 # x=x/2
%=	Taken modulus(Remainder) using two operands and assign the result to left operand i.e. x=2.5	>>> x%=3 # x=x%3
=	Performed exponential (power) calculation on operators and assign value to the left operand i.e. x=6.25	>>> x=2 # x=x**2

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//=	Performed floor division on operators and assign value to the left operand i.e. x=2.0	>>> x//=3
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25. Define Conditional Operator

- Ternary operator is also known as **Conditional Operator**.
- It evaluates something based on a condition being true or false.
- It simply allows testing a condition in a single line replacing the multiline if-else making the code compact.
- **Syntax:**
Variable Name = [on_true] if [Test expression] else [on_false]
- **Eg:**
min= 50 if 49<50 else 70 # min = 50
min= 50 if 49>50 else 70 # min = 70

26. What is Delimiters?

- Python uses the symbols and symbol combinations as delimiters in expressions, lists, dictionaries and strings.
- **Eg:**
(), { }, []

27. What is Literal? What are the types of Literals in Python?

- Literal is a raw data given in a **variable or constant**.
- There are **3** types of literals in Python. They are,
 - ⊕ Numeric,
 - ⊕ String, &
 - ⊕ Boolean.

28. What are Numeric Literals?

- Numeric Literals consists of digits and are immutable (unchangeable).
- Numeric literals can belong to 3 different numerical types Integer, Float and Complex.
- **Eg:**

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a = 0b1010 *#Binary Literals*

b = 100 *#Decimal Literal*

c = 0o310 *#Octal Literal*

d = 0x12c *#Hexadecimal Literal*

29. What are String Literals?

- A string literal is a sequence of characters surrounded by quotes.
- Python supports single, double and triple quotes for a string.
- A character literal is a single character surrounded by single or double quotes.
- The value with **triple-quote** `''' '''` is used to give **multi-line string literal**.
- **Eg:**

```
strings = "This is Python"
```

```
char = "C"
```

```
multiline_str = """This is a multiline string with more than one line code. This is a multiline string with more than one line code."""
```

30. What are Boolean Literals?

- Boolean literals can have any of the 2 values True or False.
- **Eg:**

```
B1=True
```

```
B2=False
```

```
print("Boolean Value1:",B1)
```

```
print("Boolean Value2:",B2)
```

- **Output:**

```
Boolean Value1: True
```

```
Boolean Value1: False
```

31. What are Escape Sequences with Example?

- In Python strings, the backslash `"\"` is a special character, also called the **"Escape"** character.
- It is used in representing certain whitespace characters: `"\t"` is a tab, `"\n"` is a newline, and `"\r"` is a carriage return.
- **Eg:** To print the message "It's raining", the Python command is
- **Eg:**

```
>>> print ("It\'s raining")
```

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It's raining

32. List some Escape Sequence Characters with Example?

ESCAPE SEQUENCE CHARACTER	DESCRIPTION	EXAMPLE	OUTPUT
\\	Backslash	>>> print("\\test")	\test
\'	Single-quote	>>> print("Doesn't")	Doesn't
\"	Double-quote	>>> print("\"Python\"")	"Python"
\n	New line	print("Python", "\n", "Lang..")	Python Lang..
\t	Tab	print("Python", "\t", "Lang..")	Python Lang..

33. What are the Python Data Types?

- All the data values in Python are Objects and each Object or value has type.
- Python has built – in or Fundamental Data Types such as Number, String, Boolean, Tuples, Lists and Dictionaries.

34. What is the Number Data Type?

- The Built – in number object in Python supports integers, floating point numbers and complex numbers.

35. Define the Following Data Types

a) Integer

b) Floating Point

a) Integer

- Integer Data can be decimal, octal or hexadecimal.
- Octal integer use **O** (both upper and lower case) to denote octal digits
- Hexadecimal integer use **OX** (both upper and lower case) and **L** (only upper case) to denote long integer.

b) Floating Point

- A floating point data is represented by a sequence of decimal digits that includes a decimal point.
- An Exponent data contains decimal digit part, decimal point, exponent part followed by one or more digits.

36. Define the Following Data Types

a) Boolean

b) String

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a) Boolean

- Boolean data can have any of the 2 values True or False.

- **Eg:**

```
B1=True
```

```
B2=False
```

```
print("Boolean Value1:",B1)
```

```
print("Boolean Value2:",B2)
```

- **Output:**

```
Boolean Value1: True
```

```
Boolean Value1: False
```

b) String

- String data can be enclosed with **single** quote or **double** quote or **triple** quote.

- **Eg:**

```
Char_data = 'A'
```

```
String_data= "Computer Science"
```

```
Multiline_data= '''String data can be enclosed with single quote or double quote or triple  
quote.'''
```