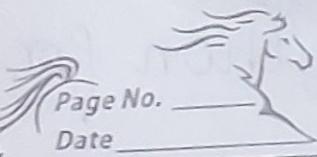


# Python for Everybody



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## Course 1: Getting Started with Python

### Module 1: Why we Program

- ① Computers are built for one purpose - to do things for us [users]
- ② The job of a programmer is to be an <sup>be an</sup> intermediate between the hardware and the end user.
- ③ By giving some sets of instructions we can make a computer do some action.
- ④ These instructions should be precise as for the computer to run properly or to do a task properly.
- ⑤ **Hardware** - Computer hardware refers to the physical components of a computer system that can be seen and touched, example → CPU, RAM, hard drive, SSD, etc.
- ⑥ **Python as a language** → (Module 3)
  - Python was invented by Guido van Rossum in year 1991.
  - Python was named after monty Python's Flying Circus.
  - Python is a powerful programming language.
  - Python is an versatile language.
  - Python is a light-weight language.
  - We can write python program either on cmd or as in a file.
  - CMD is an interactive way for writing python.
  - And we can also write script of python program to execute on an ide.

## Module 4 → Expression & Variables

- ① Constants → These are fixed numbers, string, letters that do not change.  
For example → "Hello world" is a string constant.
- ② Numeric Constant are the unchanging numeric value used directly in code, unlike variables, their values are not assigned and cannot be modified during execution.
- ③ Reserved words → Reserved words are the words in python that have special meanings and functionalities within the language. Reserved words are never used as identifier, variable or function names.
- ④ Variables → A variable is a named place in a memory where we can store data value and can retrieve later by using the name.  
 $\text{In } \rightarrow \quad x = 12.2$
- ⑤ Rules for writing Variable name →
  - must start with letter or underscore.
  - consists of numbers, letter, ~~and~~ underscore.
  - Case sensitive. →  $\text{In } SPAM \neq spam$ .
- ⑥ Mnemonic words → This refers to the descriptive and ~~memorable~~ names
- ⑦ Mnemonic names → This refers to using of descriptive and memorable names for variable and functions in code to improve readability.
  - ⑧ Instead of ugly  $n=5$ , use  $age=5$ .
- ⑨ Numeric Expression → The expression that contain numeric data along with operators
- ⑩ Operators are used on the basis of precedence and associativity. [Arithmetic Operators]

### Main Readings

- ① Remainder/modulus operator is used for getting remainder of the division.  
 (Ex)  $5 \% 2 = \boxed{1}$
- ② Order of Evaluation: when we string operators together - Python must know which one to do first that is referred as "operator precedence".
- ③ Precedence of associativity is used while solving string of numeric expression.
- ④ Precedence → Parenthesis ↑ Power  
 Increase multiplication, Division & Remainder  
 ↓ Addition & Subtraction
- ⑤ Associativity for the above mentioned precedence operator is "left to right"
- ⑥ "Type": In python variables, literals & constant have a "type"
- ⑦ Python has a function called "type()" function that allows us to get the type of the variable, constant or literals.
- ⑧ To a character string we can't get do add a number. When we try do so, we might get a traceback error (traceback error is an syntax error).
   
 (Ex) `eee = 'Hello' + 'there'`  
`eee = eee + 1 // traceback error`
- ⑨ Numbers have two main types →
  - ① Integers → integers are whole numbers with no fractional part. (Ex) +2, -2, etc
  - ② Floating Point → floating point numbers consists of fractional part (Ex) +4.02, -2.5, etc

- ① Floating point numbers have more range but less precision than integer numbers.
- ② Type conversion → Type conversion is a technique to convert the type of data value from one to another like int to float or float to int or string to int, etc.  
→ We can do the type conversion of data value by using two functions → int() & float().  
Ex) float(99) → 99.0
- ③ Integer division → Integer Division is different in Python 2 & Python 3.  
→ Integer Division return integer in Python 2.  
→ In Python 3, it automatically converts division to floating point.
- ④ String conversions →  
→ We can use int() or float() to convert string into an integer & floating number.  
→ But string conversion is only possible that string is an numeric string otherwise, you will get traceback error.
- Ex) `sval = '123' or sval = 'Hello'`  
`sival = int(sval) sival = int(sval)`  
`type(sval) : // int type(sival) // traceback`
- ⑤ Input function :+  
→ Input function is a special python function used for taking input from user.  
→ The parameter of input function is called as prompt.  
→ When input function is executed python instruct the program to pause and wait to read data from user using the input().  
→ Input function always takes input as string.

## ① Comments →

- Comments are a way to add text in your code for documentation purpose.
- Comments are generally ignored by python during executing the code.
- We can add comments by using '#' symbol before it.
- Comments gives a little idea of what going on in code, making it readable and understandable.

## ②

## modules → conditional statements

- ③ Conditional statements are the statements where you will check some conditions & responds to them correspondingly.

- ④ If, else, elif are some common conditional statements.

- ⑤ During executing an conditional statement the important thing is indentation notation that starts with colon.

- ⑥ Indenting is done by 4 spaces.

- ⑦ Indented notion is used for specifying the code to be executed if some condition is true otherwise, we tend to skip it.

## ⑧ Comparison operators →

- Comparison operators are used for comparing values.

- Comparison operators are generally used for within conditional statement for checking conditions.

- Comparison operators works at variables but do not change the value.

- Comparison operator tends to return boolean value either true or false or Yes/No

- ① In python indenting notation is very meaningful.
- ② In other programming language indenting is not a meaningful notation instead they use ({ }) but for python indentation is very important while using conditional statements, looping and defining functions.
- ③ In text editors indentation is added automatically.
- ④ Once a scope ends we can de-indent.

#### ⑤ Nested statements →

- Nested statements are the statements that have statement within statement.
- Example → if within an if.
- Nested conditional statements are statements or conditional statements that checks another condition within itself.

#### ⑥ Multiway if :→

- When we had to work with multiple condition than we use something called elif.
- It is a short term of "else if" and is used for checking multiple conditions sequentially.
- By using elif we can chain multiple condition together after an initial if condition.

#### ⑦ Try and Except :→

- In python try and except method is used for error handling, which allows a program to manage and handle errors efficiently.
- Try and except method is used to avoid/catch traceback method. Or to eliminate traceback.
- Try executes first, if exception occurs in try, then except handles it.

## Module 6 → Functions

- ① Functions are used for store and reuse.
- ② "def" is a keyword that is used for defining keyword.
- ③ Function is a named block of code where we write the code that can be reused again, and this piece of code perform some specific task.
- ④ Function execution does not happen on its own, we generally have to invoke or call function.
- ⑤ One function is called and execution is done function knows where to return back.
- ⑥ Python has already given us some build-in function.

(i) input(), max(), min().

- ⑦ Input function is used for taking input from user. etc.

### Building functions →

- "def" keyword is used for defining a function.
- and def doesn't actually runs the code, it just stores the code and later we can execute the code by invoking or calling the function.
- To run the code, we have to invoke the function by calling it.

### Arguments →

- Arguments are the values that pass into a function as an input when we call a function.
- Arguments are used for making function produce different output when you are calling it different times.
- We generally give arguments in the parentheses after the name of the function.
- Argument within in function parenthesis is called parameters.

## ① Parameter:-

- Parameter is a variable which we used in the function definition within parenthesis.
- Parameters are given as alias for whatever argument function is going to use when function is invoked.

## ② Return Statement :-

- Return statements in Functions is used for two things.
- ① It sends the value back to the part of the code that called the function or you can say that it determines the residual value.
- ② Return statements stop the function.
- ③ We can have multiple parameters/ Arguments in the function definition.
- ④ Whenever calling/ invoking always match the number of arguments & parameters.

## Module 7 → Loops & iteration.

- ① Loops → a piece of code that is repeated for indefinite/definite times.
- ② Indefinite Loops → Loops that are executed for indefinite number of times, or you can say the code that is repeated for unknown number of times.
- ③ while →
  - While is an Indefinite loop.
  - While loop execute the code as long as the specified condition is true.
  - After every looping cycle you check the while condition if it is true or not, if it is true then it loops again otherwise it comes out of while and does not execute the loop again.

① Iteration variable → the variable that changes during the execution of the loop.

→ It is an temporary variable used within the loop to hold the current item of the iterable object during execution.

→ And iteration variables tends to change everytime we loop, if it does not change then the code might end up in infinite loop.

② zero trip loop; The loop that never execute.

③ Break →

→ Break statements helps to end the current loops and jumps to the statement immediately following the loop.

④ Continue →

→ continue statement ends the current iteration and jumps back to the top of loop and starts the next iteration.

⑤ Definite loops → loops that executes for finite number of times. Eg: for.

⑥ for →

→ for is a definite loop, since we execute it for number of times.

→ for loop is usually used with list of elements, or when we known how many elements are there and how many times we need to execute the loop.

⑦ Any Definite loop has explicit iteration variable that each time through a loop. These iteration variable move through the sequence or set.