GATE

CRASH COURSE

Data Science & AI

Subject

Python - For Data Science
Fundamentals of Python

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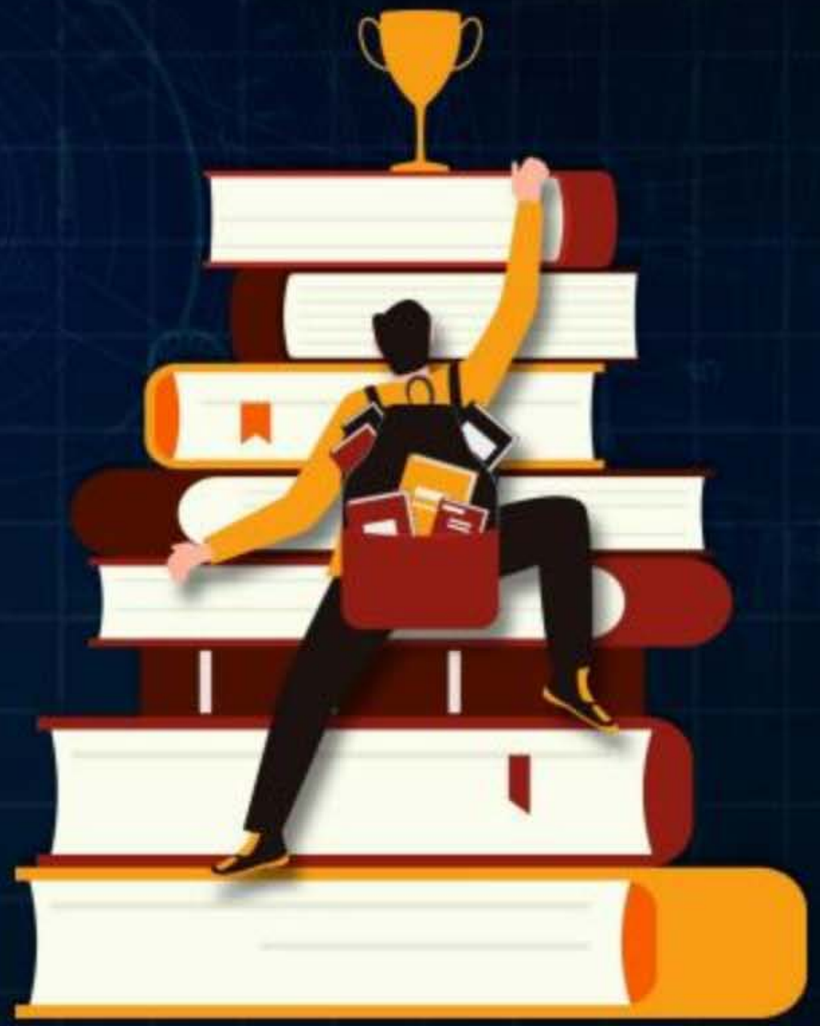
Topics to be covered

1. Python History, Features
2. Python Datatypes
3. Input() and print() Functions
4. Examples



Python History

- Python is written by GVR (Guido Von Rossum)

- In 1991

  - Name is given after the name of Comedy show "The Monty's Python Circus"

- Python advantages : 1) open source
  2) Simple, Easy to learn, write, apply
  3) Scalable

Python Features

Python Features | Characteristics

1) Case - Sensitive
2) Large Community Support
3) Platform - Independant (S/w Compatibility) | Architecture - Neutral (H/w Compatibility)
4) object - oriented
5) Interpreted, High level

Languages
- Low-level: Machine level, Assembly
- High-level

6) GUI Support
7) Database Support
8) Dynamically typed
9) Simple, flexible
10) Robust, Portable
11) free, Open-Source

Python Datatypes

Datatype : It describes 1) Nature of data

2) Operations valid or Invalid

Python DataTypes : 1) Primary (or) Primitive (or) Basic (or) Fundamental DataTypes :

- int, float, bool, Str, complex, None

2) Secondary (or) Derived (or) Non-Primitive DataTypes (or) Collection types

- lists, tuples, sets, Dictionaries

Python Datatypes

NOTE: Capital Letters
- True
- False
- None

type( )

a = 17	<class 'int'>
b = 14.0	<class 'float'>
c = 3+4j	<class 'complex'>
d = "GATE"	<class 'str'>
e = None	<class 'None'>
f = True	<class 'bool'>

g = [10, 20, 'EXAM', 4.37] <class 'list'>

h = (11, 22, 'x', 'y', 1.34, 7+5j) <class 'tuple'>

i = {11, 22, 33, 44} <class 'set'>

j = {'A': 5, 'B': 7, 'C': 9}
Key Value
<class 'dict'>

Python Datatypes

	Mutable / Changeable ?	duplicates allowed Y/N	Ordered
List	✓	✓	✓
Set	✓	✗	✗
tuple	✗	✓	✓
Dictionary	✓ (values are Modifiable)	duplicate values Permitted but Not keys (✓)	✓

Input() and print() Functions

function : function(object(s))

method : object • method()

Print( ) Syntax

Print(object(s), 'message', sep='delimiter', end='delimiter')

default = space default = '\n'

- It Process the object values and/or message to the o/p console and returns None.

Ex:
```
x = Print('HELLO')
Print(x)
```
(None)

o/p:
```
HELLO
None
```

Ex:
```
a = 2
b = 3
c = 4
Print(a, b, c, sep=':', end='\t')
```
o/p: 2:3:4

Input() and print() Functions

Object = input('Prompt Message')

Ex: a = input('Enter a value:')

input( ) function

- input( ) function, accepts input characters entered by user and Process them as String always.

Ex:
```
x = input( )
Print(type(x))
```

i/p: 1481 # accepts as set of characters '1', '4', '8', '1'

o/p: <class, 'str'>

---

i/p: 1.273 # '1', '.', '2', '7', '3'

o/p: <class, 'str'>

---

i/p: 3+4j # '3', '+', '4', 'j'

o/p: <class 'str'>

---

i/p: @

o/p: <class 'str'>

Input() and print() Functions

Integers : A Number without fractional Part (or) Precision (or) decimal Point

↳ It is by default signed Integer(±ve)

Ex: 0, 1, 5, 9, 121, 4173 ...

			In Decimal
Decimal Integer	: value (by default)	100	100
Octal Integer [0,1,2,...7]	: 0o value	0o100	$64\left[1\times8^{2}+0\times8^{1}+0\times8^{0}\right]$
Binary Integer [1/0]	: 0b value	0b100	$4\left[1\times2^{2}+0\times2^{1}+0\times2^{0}\right]$
Hexa Decimal Integer [0,1,2,...9,A,B,C,D,E,F]	: 0x value	0x100	$256\left[1\times16^{2}+0\times16^{1}+0\times16^{0}\right]$

Question

#Q. a = 43

b = hex(a)

c = bin(b)

d = oct(c)

Print(a, b, c, d, sep=', ')

o/p = _____

#0x2b ⇒ 0010 1011 ⇒ #0b101011

#0053

$(43)_{10} = (2B)_H$

16 | 43

2 – 11

B

$(43)_{10} = (53)_8$

8 | 43

5 – 3

(OR)

1010 11

5 3

43, 0x2b, 0b101011, 0053

Question

ANS: 1093

NOTE: All Numbers Need to be Converted into Decimal for any Calculation.

#Q.
What will be 'i' value ?

```
i = 67 + 0b1101111 + 0x2AE + 0o345

Print(i)
```

i Value = 67 + 111 + 686 + 229 = 1093

$(1101111)_2 = 1\times2^0 + 1\times2^1 + 1\times2^2 + 1\times2^3 + 0\times2^4 + 1\times2^5 + 1\times2^6$

$= 1 + 2 + 4 + 8 + 32 + 64$

$= (111)_{10}$

$(2AE)_{16} = (676)_{10}$

$2\times16^2 + A\times16^1 + E\times16^0$

$= 2\times256 + 10\times16 + E$

$= 512 + 160 + 14$

$= 686$

$(345)_8 = (229)_{10}$

$3\times8^2 + 4\times8^1 + 5\times8^0$

$= 3\times64 + 32 + 5$

$= 192 + 32 + 5$

$= 229$

Question

Python Supports Unicode format. : For Every character, Python assigns unique value.

['A' = 65, 'a' = 97, space = 32, '0' = 48]

ord( ) function

It returns unicode value of respective character.

Ex: ord('A') # 65
ord('d') # 100
ord('3') # 51

chr( ) function

It returns Unicode character of given value.

Ex: chr(65) # A
chr(100) # d
chr(51) # 3

#Q:
Print(ord('T') - ord('7') + ord('e'))

o/p= ____

84 - 55 + 101

= 185 - 55

= 130.

Question

#Q. $x = [10, 20, 10]$ # len(x) = 3

$y = (5, 7, 9, 7, 5)$ # len(y) = 5

$z = \{11, 22, 11, 22, 33, 11\} \Rightarrow \{11, 22, 33\}$ # len(z) = 3

$a = \{'A' : 1, 'B' : 7, 'C' : 1\}$ # len(a) = 3

$j = "GATE\ \ EXAM"$ # len(j) = 9

Print(len(x) + len(y) + len(j) − len(z) − len(a))

o/p = 3 + 5 + 9 − 3 − 3

= 3 + 5 + 3

= 11

Summary

For DPP Join Telegram

TG: Satyasirpw

Python Fundamentals

- history
- features
- Fundamental datatypes, collection types.
- Types of integers
- len(), type(), chr(), ord()

To be contd...


Thank
THANK
Keep Hustling!