Python

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→ What is python?
- Python is a general purpose and Powerful Programming language.
- Python is Considered as one of the most versatile programming language as it can be used to develop almost any kind of application including.
  → desktop Applications.
  → Web App.
  → IoT App.
  → AI, ML and Data Science app.
  and many more...

→ Who Created python?
- Developed by Guido van Rossum, a Dutch Scientist.
- Created at Centre for Mathematics and Research, Netherland.
- It is inspired by another programming language called ABC.

→ Why was python Created?
- Guido started python development as a hobby in 1989.
- But since then it has grown to become one of most polished languages of the Computing World.

→ How Python got it's name?
- The name Python is inspired from Guido's favourite Comedy TV Show Called "Monty Python's Flying Circus.
- Guido Wanted a name that was short, Unique and Slightly mysterious, so he decided to call the language Python.

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→ Who manages python today?
- From version 2.1 onwords, Python is managed by python Software foundation situated in Delaware, USA.
- It is a non-profit organization devoted to the growth and enhancement of python language.
- Their website is : http://www.Python.org.

→ Famous websites Developed using python :
→ NASA → Instagram → udemy → spotify
→ Mozilla → Dropbox and above all YouTube.
- There are many excellent python frameworks like Django, Flask for web application development.

→ Why should I learn python?
- 3rd should Popular Programming.
- Fastest growing language.
- Opens lots of doors.
- Big Corporates prefer python.
- Means, PYTHON IS THE FUTURE.

→ Features of python :
i) Simple
ii) Dynamically Typed
iii) Robust
iv) Supports multiple Programming paradigms.
v) Compiled as well as Interpreted.
vi) Cross Platform.
vii) extensible.
viii) Huge library.

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⇒ Multiparadigm

```
def add (a,b);
    return a+b
    result = add(3,5)
    Print (result)
```

⇒ Script Model/Programming

```
for number in range (1,6);
    Print(number)
```

O/P

```
1
2
3
4
5
```

⇒ Tokens in Python
- i) Keywords
- ii) identifiers (Names)
- iii) Literals
- iv) Operators
- v) punctuators

- These are also Known as reserve words.
- These are the words whose meaning is predefined by interpreter and Cannote be used like general purpose words.

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- This are basic building blocks ~~of~~ a program used to Construct instructions.
- Keywords Cannot be used as variable name ~~of~~ or function name or as a identifier.
- 36 Keyword in 3.12

- import Keyword
  Print (Keyword.Kwlist)
  ['False', 'None', 'True', 'and', 'as', 'if', 'for', 'try', 'while', 'else' etc.]

⇒ Identifiers
- User defined name
- Sequence of letters and digits.
- The First character must be a letter or _.
- Upper & lower-case letters are different.
- 0 to 9 Can't be the First letter of identifier.
- Must not be a Keyword.
- Cannot Contain any Special character except for _.
  MyFile ✓ My-File ✗

⇒ Literals (-Constant values)
- String
- Numeric
- Boolean
- Special Literal - None (value = None #None literal)

⇒ Key Points about python variables:
- Variable Declaration
- Naming Rules
- Reassing variables
- Dynamic Typing
- Multiple Assignment

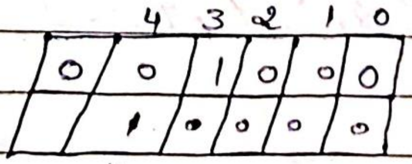
⇒ Operators
- Unary oper.
- Binary oper.
    - Arithmetic oper.
    - Bitwise oper.
    - Shift oper.
    - Identity oper.
    - Relational oper.
    - Logical oper.
    - Assignment oper.
    - Membership oper.

Shift Operators

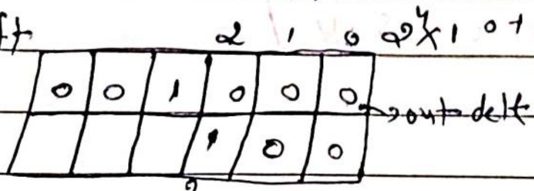
<< Shif left

Shift Right >>

Left Shift Example : (8)



Right Shift



$2^4 \times 1 + 0 + 0 + 0 + 0 = 16$

$2^2 \times 1 + 0 + 0$

$= 4$

index Num.

$2^4 \times 1$

binary Base

Binary digit

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Logical op.

Both condition TRUE

Logical AND (Both Condition chock

Logical OR (one condition chock

when one condition True then ok and Second False / TRue OK. (Min. One condition TRUE

Assignment op.

= Assignment

Ex: a = 5

$\uparrow$ assignment

*= 5+= 2 a= 7

%= a+ =b / a= a+b

-= Value ~~e~~assign left side varible automatic.

** =

// =

Membership op.

in Whether varible in Sequence

not in Whether not in

2 in [2, 5, 6, 7, 8]

TRue

5 in [2, 5, 7, 8, 9]

TRue

6 not in [7, 8, 6, 5, 4]

False

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Identity operator

is   is the identity Same?
isnot   is the identity not same?
i) a is b
= False
ii) b is b
True

→ for output
ex: name = "Sahil"
age = 20
Print("my Name is {name} Age is {age}.")
output my name is Sahil Age is 20.

Ex: a = 2;
b = 3;
Sum = a+b;
Print (F"Sum of two number is: {Sum}")

O/P Sum of two number is: 5

→ for input
i) name = input("enter your name:")
Print (name)

output enter your name: Sahil
Sahil

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ii) num =

iii) Print ('what is your name:')
name = input ()
Print("hello ", name)

<u>output</u>
```
what is your name:
Sahil Kumawat
hello Sahil Kumawat
```

iv) Print('Sahil' , 'Kumawat')
↑
Space

<u>output</u> Sahil Kumawat

v) Print('Sahil', Kumawat', end = '##')
Print ('by', 'Sahil', Sep = '@')
Print ('with sep', 'and end', Sep = '', end = '\n')

<u>output:</u>
```
Sahil Kumawat##by@Sahil
with sepand end
```

Print ('1', '+', '2', '=', '3') // 1+2=3
Print(1+2, 3/2) // 3 1.5
Print ("a", "b", "c", "d", Sep = ",") // a,b, c,d
Print ("a" "b" "c" "d", Sep = ",") // abcd
↳ Sep don't work because ,(Coumo) is not avelible in code.

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→ Data type and operators:

- 16 / 52
  // 0.3076923076923077

- Print ('%.f '%.(16/52))
  // 0.307692 (Show six digit /Point Value.)

- Print ("%.2f" %(16/52))
  // 0.31

Real Imaginary

- (3+3j) + (2+2j)
  // (5+5j)

- x = '''Sahil ← Three Time Semicolon use for multi line
  Kumawat'''
  Print (x) // Sahil
  Kumowat

- x = 'one line'
  Print (x, x) // one line one line

- x = 'one line'
  Print (x+x) // one Lineone Line

- x = 'one line'
  Print ("my answer is", 3 * "No!") // my answer is No! No! No!

- n = int (input ())
  Print (n * "Python") // 3
  PythonPythonPython

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0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
- name = "Python Programming"
Print(name [0], name [7], len (name)) // P P 18

This is unmutable → ~~ython[x]~~ not valid
- name [0] = "c" (in Python not work Replacement)

(Reverse)
- Print (name [-1], name [-11], name [-len(name)])
// g P P

→ Slice   starting value, ending but skip it.

First = name [1:5]
Second = name [7: len (name)]
Print(First, Second, Sep=", ")

// ython, Programming

- First = name [:6]
Second = name [7:]
Print (First, Second, Sep = " ")
name = Second + " " + First;
Print (name)
// Python Programming
Programming Python

- First = name [:6]
Second = name [7:]
Print (Frist, Second, Sep = " ")
name = Second + " " + First;
Print (name)
// Python Programming
Programming Python

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Starting end but skip step count

- Print (name [1 : : 2]) // Yhnpormig
  name [4 : -3] // on Programm
  name [-3 : -4] // No Answer print because not count value
  name [3 : -1] // hon Programmin
  name [-3 : -1] // in
  name [-1 : 3] // No Ans.

→ Complex Num

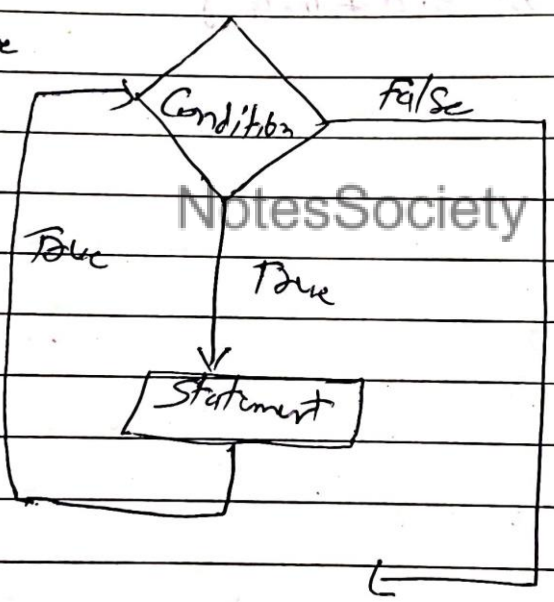
- Z = 3 + 4j
  Print (Z.real, '+', Z.imag, 'j')
  // 3.0 + 4.0 j

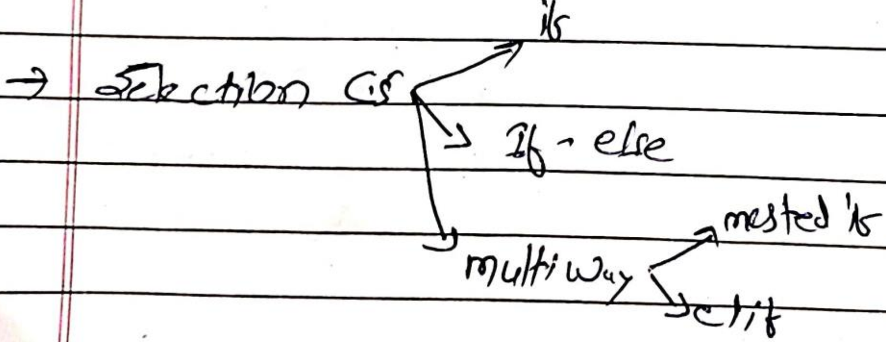
Control Structures

- Sequential C.S
- Selection C.S (If else)
- Iterative C.S

```
Print ("Hellow world")
Print ("This is our World")
name = Input ();
Print ("I m Kaib");
Print ("Thank you")
```

Iterative





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```
if <condition>:
        <Statement(s)>
        else:
              <Statement()>
```

→ Indition is very important.

```
n = int(input("Enter a num"))
if n< =10:
    Print ("value is:", n)
    Print ("Thankyou")
```

multiway:

elif

```
    if (n<=10):
        Print ("Grade A")  <Condition one is Print becouse
    elif (n<=20):                Starting Top to bottom where
          point ("Grade B")      find condition Stop there.
    elif (n<=30):
          print("Grade C")
    else:
          Print("You have not Cleared the exam.")
```

→ Even odd

```
n = int(input("Enter a num"))
  if ~~n~~ (n % 2 ==0)
        Print ("Number is even");
  else
        Print ("Number is odd").
```

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```
→ if (n <= 40):
    Print("Fail")
  elif (n <= 50):
    Print("Pass")
  elif (n <= 60):
    Print("First div")
  elif (n <= 80):
    Print("good!")
  else:
    Print(" Enter value 1 to 80")
```

⇒ nested if

```
College = "PCU"          { if in if is Nested if
Course = "MCA"

if College == "PCU":
    if Course == "MCA":
        print("He/She is MCA Student")
```

Looping

```
n = 1
→ While n < 10:        { Print 1 to 9 but you can Print
    Print(n)             10 out of Program but not Print
    n = n+1              bcas condition n < 10.
```

~~ppr~~

output

```
1 2 3 4 5 6 7 8 9
```

Program) very important

```
While m<10:
    Print(n)
    n=n+1
    if m==5:
      break
else:
    print ("n is ~~greater~~ equal than 10")
```

{You can use in python while loop if else statement.

output

```
1 2 3 4
```

→ for loop

```
    L = [2, 5, 7, 8]
    for num in L:
        Print(num)
      // print("Hello python")
```

for <var> in <Seq.>

→ range ( )

```
    for n in range (1, 11)
        print (n)
```

{you can use (2, 101, 2) Slicing according run/Step 50 times.

Table of 2.

```
→ for n in range (2, 11, 2)
      print (n)
```

→ Print table any num.

```
num = int(input ("Enter a number:"))
for ~~num~~ in (1, 11)
T = num x n
  print (T)
```

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⇒ User ~~&~~ giving value Print Table.

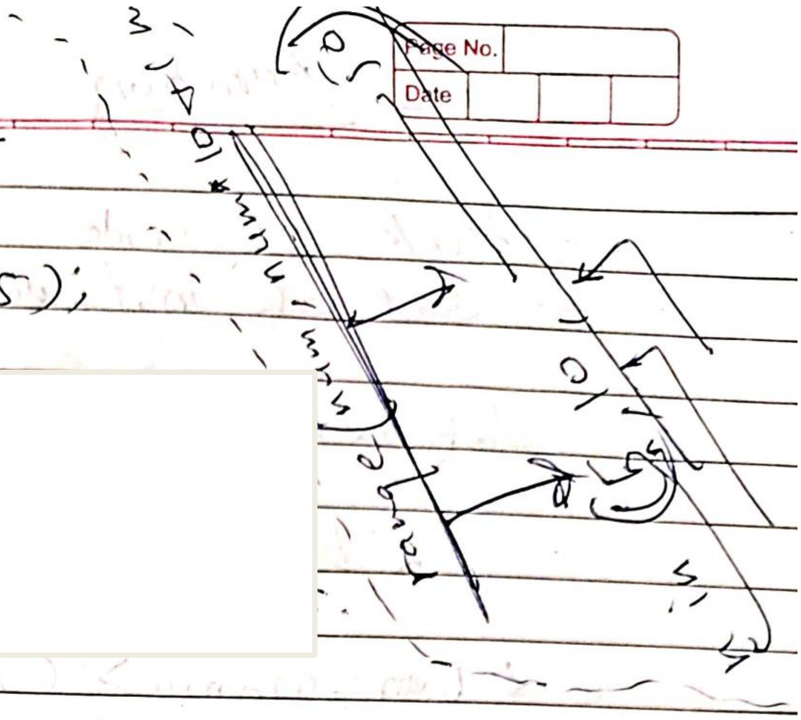
```
→ no = int(input("enter no to get table"))
  ran = int(input("enter a num"))

  for n in range(1, ran+1)          (1, no*n, ran+1)
                                    (1, no* = n, ran+1)
     table = no*n
     print(table)
           print(f" {no} x {n} : {table}")
```

5
+
1, no * 10,

9-10-24

```
for n in range(5):          | output
                            | 1
   # if n==3:               | 2
      print(n)              | 3
                            | 4
```

```
for n in range(5):          | output
                            | 0
      if n==3               | 1
          break:            | 2
      print(n)              | Thank you
   print("Thank you")
```



```
=> for n in range (5);
       if n = = 3
       Continue
       Print(n)
```

output

```
0
1
2
4
```

```
-> for n in range(5):
       if n = = 3
          Pass
          Point (n)
```

output

```
0
1
2
3
4
```

```
-> i=0
   Sum=0
   While i<10
   n=input ( )
      sum = Sum + n
          if n<0
             break
             i =i+1
   else print (" Successfully run")
```

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Function

-> block of Code
-> Set of instruction

```
def <fun_name> ():

    <body>

<fun_name> ()
```

=> Two type
i) User define
ii) bultin fun / Pridef.

```
-> def addition ():  (a,b)       //def add (a+b)    Positiona
       Sum = a+b                                   Paramete
         Print(Sum)
   addition ()                    add(2, 4)
```

=> Four Parameters :

-) Positional parameter

2) Default "
3) Keyword "
4.) Arbitrary "

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Default Par.

```
                     Default
def disp(name, age=22)
    Print(f"my Name is {Name} and age is {age}")
    disp("Sahil", 23) {current time Print 23 but age not
                      give So Default value automatic
                      bach age 22.

def add.(a=5, b, c=6)
    sum = a+b+c

    (a, b=5, c=6) ✓    { We can give First value
    (a=5, b=5, c) X      So give Error.
    (a, b, c=6) ✓
    (a=5, b, c) X

• def add (a=5, b=6): / (a=5, b) {Show Error
    sum = a+b
      Print(sum)
    add (7, 8)
      add (7)
      add()
```

Keyword:

```
        def disp(name, age):
    Print(f"my name is {name} and age is {age}").

disp(age=22, name='Sahil')
```

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Arbitrary

~~Fit~~ (**args)

```
def addi(*args)   { we can use when we don
for i in args:    { Know range of value.

addi(2, 3, 4, 5, 6)
```

* Sum two num:

```
def add(a,b):
    return a+b
result = add (2, 3)
Print(result)
```

16-10

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Anonymous function :

Lambda :

i) Lambda functions have no Name.
ii) Lambda can take any number arguments.
iii) " Can return Just one value in the form of an Expression
iv) lambda function def. doesn't have an explicit return, but it can always contain expression.
v) " are one-line version of a function and hance can't multiple expression.
vi) They can't access varible other then.
vii) " Can't ~~g~~ access global varible.

Syntax

$\boxed{\text{lambda arguments : expression}}$

```
// lambda x,y : x+y
// lambda : print("Hello Python")

// add (x,y,z):
       s = x+y+z;
   return s

// res = lambda x,y : x*y
   res(5,3) -> This method only for lambda fun.

Print ("using lambda")
L = [lambda x: x**2, lambda x: x**3, lambda x: x**4]
  Print ("Lambda list:")
   For F in L
    Print(F(2))
```

```
| o/p
| 4
| 8
| 16
```

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fun. (using def)

```
Print("using def:")

  def f1(x):
        return x**2
  def f2 (x):
        return x**3
  def f3 (x)'
        return x**4
     l = [f1, f2, f3]
    for f in l
        Print ( f(2))
```

```
using def:
4
8
16
```

Lambda with map()

The map() fun. is a built-in fun. in Python that applies a given fun. to all items in an input iterable.

- returns a map object, which is an iterator.

```
// num = [1, 2,3,4]
  def Sqr (num):
      return num**2

l num = [1, 2,3,4]
Sqr_res = map(Sqr,num)
Print(list(sqr_res))

//  numbers = [1, 2, 3,4]
    Squares = list (map (lambda num : num ** 2, numbers)
      Print (Squares)
```

output

```
[1, 4,9,16]
```

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```
// list_num = [1, 2, 3, 4]
list_num = map(lambda x: x*10, list num)
  For num in list_num:
      Print(num, end=" ")        /output
                                  10 20 30 40
```

```
// list_num=[1,2,3,4]
list_num = map(lambda X: X*10, list_num)
print(list_num)          output
                   // <map object at 0x105313dc0>
```

```
// list_numbers = [1,2,3,4]
list_numbers = map(lambda X: X*10, list_numbers)
  # L=List(List_numbers)
  # Print (L)
   print (next(list_numbers))
   print(next(list_numbers))
                              /output
                                10
                                20
```

```
   Define two num lists
//  num1=[1,2,3,4]
    num2= [10,20, 30,40]
       # map with lambda fun add.
  result = map (lambda x, y: x+y, num1, num2)
  print (list(result)) # Convert map obj to List
                            output
                          [11, 22, 33,44]
```

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filter(fun , iterable)

```
Lnum = [1,2,3,4]
even_n =list(filter(lambda x : x%2 ==0 ,Lnum))
  print(even_n)
```

/output
[2,4]

Unit III

24-10

Regular Expression (Reg Ex , RE)

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-> import re
-> Specifies a Pattern

* matching Characters

```
import re
pattern = 'N....a'
test_string = 'Namita is my name!'
result = re.Match(Pattern, test_string)
Print (result)
if result:
    Print('Search successful')
else:
    Print('Search Unsuccessful')
```

(Namita starting hona chahiye / Check begning)

O/P
Search Succesful

-> method

Match()	-> Determine if the RE matches at the beginning of str
Search()	-> looking of any location where this RE matches.
Findall()	-> RE matches, and returns them as a list.
Finditer()	

findall > Search() > Match()

-> [abc] [cb] -> Mach
-> [a-e] is the Same as [abcde] (- to mean a to e Print)
-> [0-39] is the Same as [1239]

```
import re
Pattern = '[0-9]'
Str = "Hi my Passwords are 123 and 5abc"
```

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^ - Caret

→ String Ke Starting me Hi search Krega.

→ $ - Dollar

→ String Ke last word Ko Search करने ~~[illegible]~~ Ke liye.