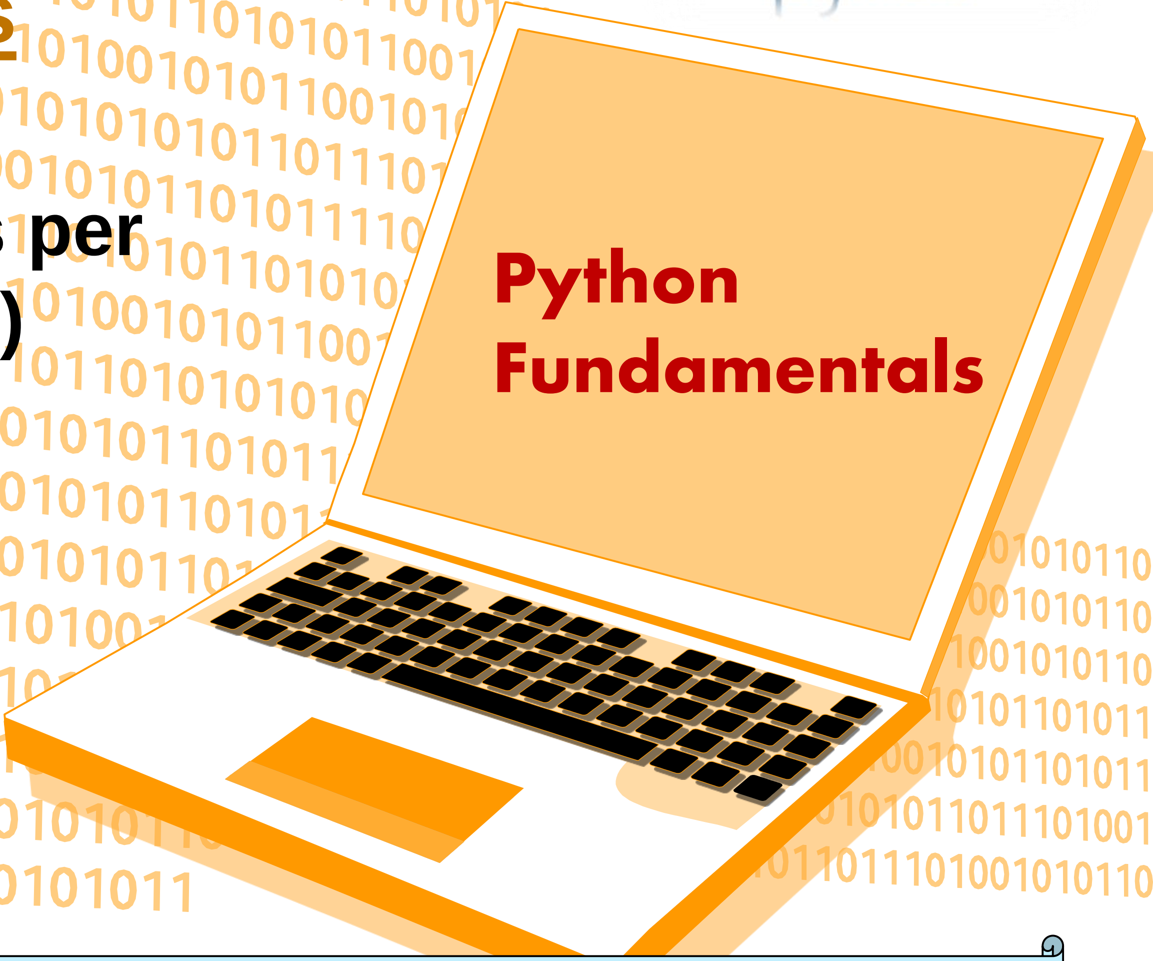
Chapter 4 :

Informatics Practices

Class XI (As per CBSE Board)



New
Syllabus
2019-20

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Introduction

Python 3.0 was released in 2008. Although this version is supposed to be backward incompatibles, later on many of its important features have been back ported to be compatible with version 2.7

Python Character Set

A set of valid characters recognized by python. Python uses the traditional ASCII character set. The latest version recognizes the Unicode character set. The ASCII character set is a subset of the Unicode character set

Letters :– A-Z,a-z
Digits :– 0-9
Special symbols :– Special symbol available over keyboard
White spaces:– blank space,tab,carriage return,new line, form feed
Other characters:- Unicode

Input and Output

```
var1='Computer Science'
var2='Informatics Practices'
print(var1,' and ',var2,' )
```

Output :-

```
            Computer Science and Informatics Practices
```

raw_input() Function In Python allows a user to give input to a program from a keyboard but in the form of string.

NOTE : raw_input() function is deprecated in python 3

e.g.

```
age = int(raw_input('enter your age'))
percentage = float(raw_input('enter percentage'))
```

input() Function In Python allows a user to give input to a program from a keyboard but returns the value accordingly.

e.g.

```
age = int(input('enter your age'))
C = age+2 #will not produce any error
```

NOTE : input() function always enter string value in python 3.so on need int(),float() function can be used for data conversion.

Token

Smallest individual unit in a program is known as token.

1. Keywords
2. Identifiers
3. Literals
4. Operators
5. punctuators

Keywords

Reserve word of the compiler/interpreter which can't be used as identifier.

and	exec	not
as	finally	or
assert	for	pass
break	from	print
class	global	raise
continue	if	return
def	import	try
del	in	while
elif	is	with
else	lambda	yield
except		

Identifiers

A Python identifier is a name used to identify a variable, function, class, module or other object.

* An identifier starts with a letter A to Z or a to z or an underscore (_) followed by zero or more letters, underscores and digits (0 to 9).

* Python does not allow special characters

* Identifier must not be a keyword of Python.

* Python is a case sensitive programming language.

Thus, **Rollnumber** and rollnumber are two different identifiers in Python.

Some valid identifiers : Mybook, file123, z2td, date_2, _no

Some invalid identifier : 2rno,break,my.book,data-cs

Identifiers-continue

Some additional naming conventions

1. Class names start with an uppercase letter. All other identifiers start with a lowercase letter.

2. Starting an identifier with a single leading underscore indicates that the identifier is private.

3. Starting an identifier with two leading underscores indicates a strong private identifier.

4. If the identifier also ends with two trailing underscores, the identifier is a language-defined special name.

Literals

Literals in Python can be defined as number, text, or other data that represent values to be stored in variables.

Example of String Literals in Python

name = ‘Johni’   ,   fname =“johny”

Example of Integer Literals in Python(numeric literal)

age = 22

Example of Float Literals in Python(numeric literal)

height = 6.2

Example of Special Literals in Python

name = None

Literals

Escape sequence

Escape Sequence	Description
\	Backslash (\)
\'	Single quote (')
\"	Double quote (")
\a	ASCII Bell (BEL)
\b	ASCII Backspace (BS)
\f	ASCII Formfeed (FF)
\n	ASCII Linefeed (LF)
\r	ASCII Carriage Return (CR)
\t	ASCII Horizontal Tab (TAB)
\v	ASCII Vertical Tab (VT)
\ooo	Character with octal value ooo
\xhh	Character with hex value hh

Operators

Operators can be defined as symbols that are used to perform operations on operands.

Types of Operators

1. Arithmetic Operators.
2. Relational Operators.
3. Assignment Operators.
4. Logical Operators.
5. Bitwise Operators
6. Membership Operators
7. Identity Operators

Operators continue

1. Arithmetic Operators

Arithmetic Operators are used to perform arithmetic operations like addition, multiplication, division etc.

Operators	Description	Example
+	perform addition of two number	a+b
-	perform subtraction of two number	a-b
/	perform division of two number	a/b
*	perform multiplication of two number	a*b
%	Modulus = returns remainder	a%b
//	Floor Division = remove digits after the decimal point	a//b
**	Exponent = perform raise to power	a**b

Operators continue

2. Relational Operators
Relational Operators are used to compare the values.

Operators	Description	Example
==	Equal to, return true if a equals to b	a == b
!=	Not equal, return true if a is not equals to b	a != b
>	Greater than, return true if a is greater than b	a > b
>=	Greater than or equal to , return true if a is greater than b or a is equals to b	a >= b
<	Less than, return true if a is less than b	a < b
<=	Less than or equal to , return true if a is less than b or a is equals to b	a <= b

Operators continue

3. Assignment Operators
Used to assign values to the variables.

Operators	**Description**	**Example**
=	Assigns values from right side operands to left side operand	a=b
+=	Add 2 numbers and assigns the result to left operand.	a+=b
/=	Divides 2 numbers and assigns the result to left operand.	a/=b
***=**	Multiply 2 numbers and assigns the result to left operand.	A*=b
-=	Subtracts 2 numbers and assigns the result to left operand.	A-=b
%=	modulus 2 numbers and assigns the result to left operand.	a%=b
//=	Perform floor division on 2 numbers and assigns the result to left operand.	a//=b
****=**	calculate power on operators and assigns the result to left operand.	a**=b

Operators continue

4. Logical Operators
Logical Operators are used to perform logical operations on the given two variables or values.

Operators	**Description**	**Example**
and	return true if both condition are true	x and y
or	return true if either or both condition are true	x or y
not	reverse the condition	not(a>b)

```
a=30
b=20
if(a==30 and b==20):
   print('hello')
```

Output :-

```
hello
```

Operators continue

6. Membership Operators
The membership operators in Python are used to validate whether a value is found within a sequence such as such as strings, lists, or tuples.

Operators	Description	Example
in	return true if value exists in the sequence, else false.	a in list
not in	return true if value does not exists in the sequence, else false.	a not in list

E.g.

```
a = 22
list = [22,99,27,31]
In_Ans = a in list
NotIn_Ans = a not in list
print(In_Ans)
print(NotIn_Ans)
```

Output :-

```
True
False
```

Operators continue

7. Identity Operators

Identity operators in Python compare the memory locations of two objects.

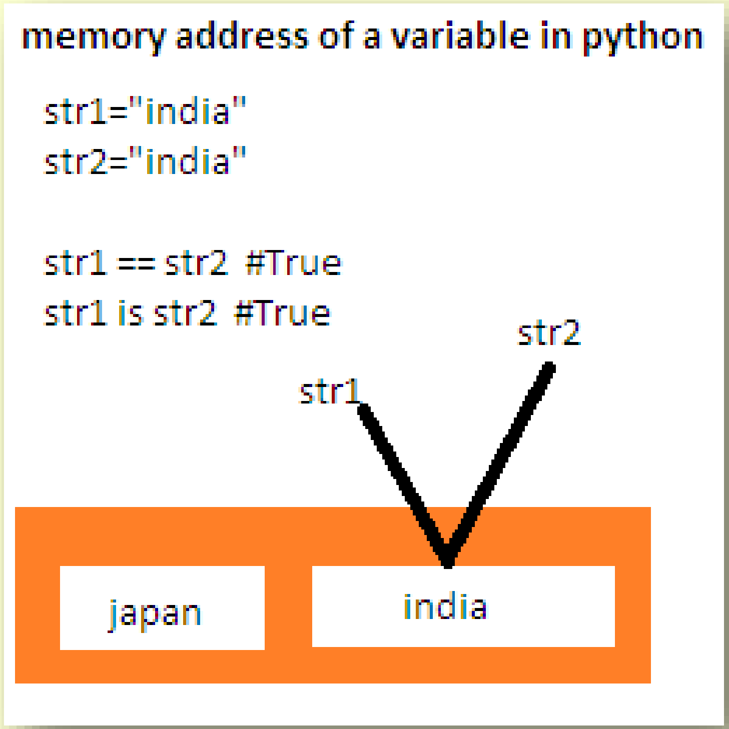
Operators	Description	Example
is	returns true if two variables point the same object, else false	a is b
is not	returns true if two variables point the different object, else false	a is not b

e.g.

```
a = 34
b=34
if (a is b):
    print('both a and b has same identity')
else:
    print('a and b has different identity')
b=99
if (a is b):
    print('both a and b has same identity')
else:
    print('a and b has different identity')
```

Output :-

```
both a and b has same identity
a and b has different identity
```

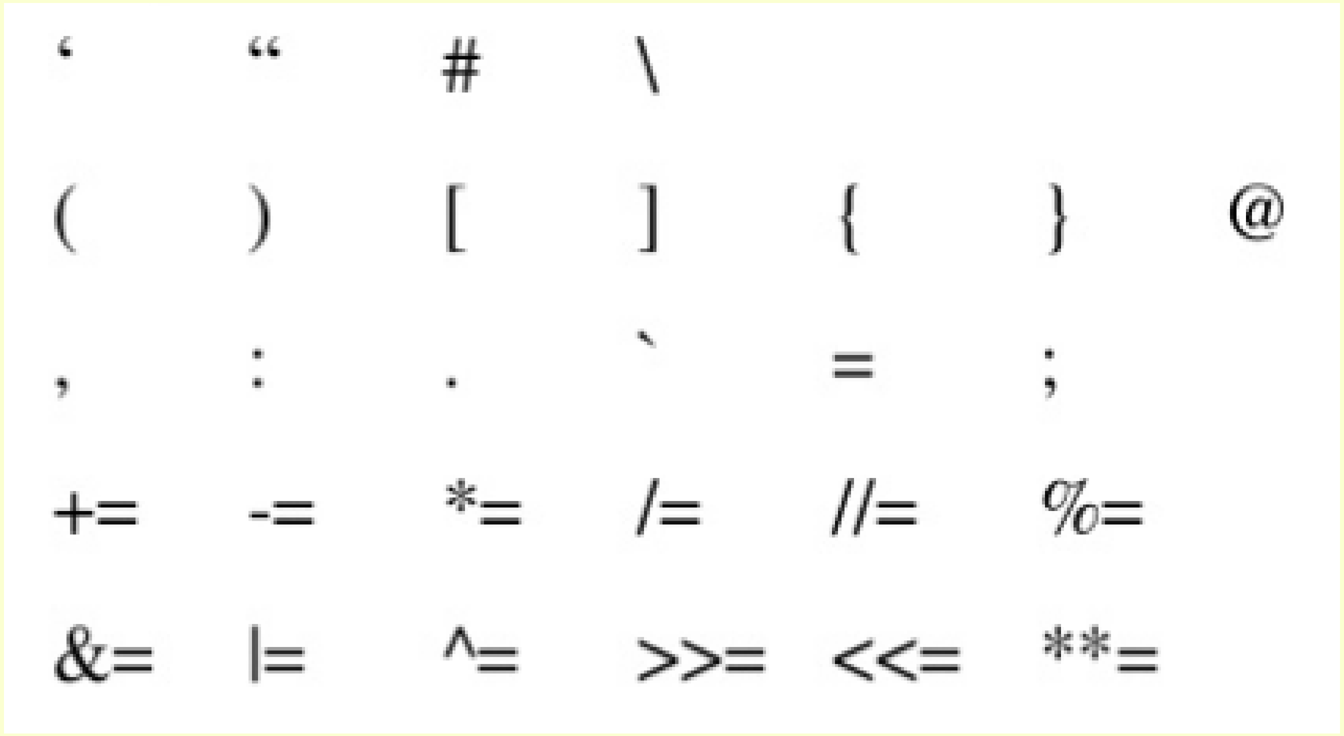

memory address of a variable in python

```
str1="india"
str2="india"

str1 == str2  #True
str1 is str2  #True
```

Punctuators

Used to implement the grammatical and structure of a Syntax.Following are the python punctuators.



‘	“	#	\			
(	)	[	]	{	}	@
,	:	.	`	=	;	
+=	-=	*=	/=	//=	%=	
&=	|=	^=	>>=	<<=	**=	

Barebone of a python program

```
#function definition        comment
def keyArgFunc(empname, emprole):
        print ("Emp Name: ", empname)      Function
        print ("Emp Role: ", emprole)                          indentation
        return;
A = 20                           expression
print("Calling in proper sequence")
keyArgFunc(empname = "Nick",emprole = "Manager" )
print("Calling in opposite sequence")                          statements
keyArgFunc(emprole = "Manager",empname = "Nick")
```

A python program contain the following components

a. Expression
b. Statement
c. Comments
d. Function
e. Block &n indentation

Barebone of a python program

a. Expression : - which is evaluated and produce result. E.g. (20 + 4) / 4

b. Statement :- instruction that does something.

```
e.g
a = 20
print("Calling in proper sequence")
```

c. Comments : which is readable for programmer but ignored by python interpreter

i. Single line comment: Which begins with # sign.

ii. Multi line comment (docstring): either write multiple line beginning with # sign or use triple quoted multiple line. E.g.

```
‘’’this is my
  first
 python multiline comment
‘’’
```

d. Function

a code that has some name and it can be reused.e.g. **keyArgFunc** in above program

d. Block & indentation : group of statements is block.indentation at same level create a block.e.g. all 3 statement of **keyArgFunc function**

Variables

Variable is a name given to a memory location. A variable can consider as a container which holds value. Python is a type infer language that means you don't need to specify the datatype of variable.Python automatically get variable datatype depending upon the value assigned to the variable.

Assigning Values To Variable

```
name = ‘python' # String Data Type
sum = None  # a variable without value
a = 23              # Integer
b = 6.2        # Float
sum = a + b
print (sum)
```

Multiple Assignment: assign a single value to many variables

```
a = b = c = 1 # single value to multiple variable
a,b = 1,2 # multiple value to multiple variable
a,b = b,a # value of a and b is swaped
```

Variables

Variable Scope And Lifetime in Python Program

1. Local Variable

```
def fun():
        x=8
        print(x)

fun()
print(x) #error will be shown
```

2. Global Variable

```
x = 8
def fun():
        print(x) # Calling variable ‘x’ inside fun()

fun()
print(x) # Calling variable ‘x’ outside fun()
```

Dynamic typing

Data type of a variable depend/change upon the value assigned to a variable on each next statement.

```
X = 25                # integer type
X = “python”          # x variable data type change to string on just next line
```

Now programmer should be aware that not to write like this:

```
Y = X / 5  # error !! String cannot be devided
```

Input and Output

print() Function In Python is used to print output on the screen.

Syntax of Print Function

```
        print(expression/variable)
```

e.g.

```
print(122)
```

Output :-

```
        122
```

```
print('hello India')
```

Output :-

```
        hello India
```

```
print(‘Computer',‘Science')
print(‘Computer',‘Science',sep=' & ')
print(‘Computer',‘Science',sep=' & ',end='.')
```

Output :-

```
        Computer Science
        Computer & Science
        Computer & Science.
```