Data Science & Artificial Intelligence

Python For Data Science

Lecture No.- 01

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Python Programming

- Tokens

- Fundamental Data Types
    - bool *
    - int
    - String
    - float
    - complex
    - None

#Q. The Output of below Expression if executed on a Python Interpreter is ____

Result = 15 & 12 ^ 19 + 34 // 3 - 2 * 4 | 11 << 2 + 4 >> 3

print(Result)

A) 62

B) 90

C) 91

D) 92

A	B	A ∧ B
0	0	0
0	1	1
1	0	1
1	1	0

12
22
88

Arithmetic > Shift > Bitwise > Assignment

$(*, //) > (+, -) > (<<, >>) > (\&) > (\wedge) > (|) > =$

$34 // 3 = 11$

$2 * 4 = 8$

$19 + 11 = 30$

$36 - 8 = 22$

$2 + 4 = 6$

$11 << 6 = 11 * 2^6$

$(11 * 2^6) >> 3 = (11 * 2^6) / 2^3 = 88$

26

$15 \& 12 =$ 0000 1111
        0000 1100

        0000 1100 = 12

12 ∧ 22   0001 0110
          0001 0110

          0001 1010 = 26

26 | 88   0101 1000
          0101 1000

          0101 1010 = 90

Result = 90

#Q. The Output of below Expression if executed on a Python Interpreter is (PW)

_____

$$b // a = \frac{-15 // 12}{} = -2 \qquad b \%. d = -15 \%. \underline{6} = 3$$

$$d / c = 6 / -3 = -2.0 \qquad a \%. c = 12 \%. -3 = 0$$

a=12

b=-15

c=-3

d=6

x= b//a + d/c $-2 + (-2.0) = -4.0$

y= b%d - a%c $3 - 0 = 3$

print(x,y) $-4.0, 3$

$$\begin{array}{r} \boxed{1.25} \Longrightarrow 2 \\ 12 \overline{\smash{\big)} -15} \\ \underline{12} \\ 30 \\ \underline{24} \\ 60 \\ \underline{60} \\ \boxed{0} \end{array}$$

A) -3.0 3

B) -3 3

C) -4.0 3 ✓

D) -4.0 3.0 $D) -4.0, 3.0$

#Q. The Output of below Expression if executed on a Python Interpreter is

_____

a=print('GATE',end=' ') $\Rightarrow$ GATE

b=a

print(a,b)

A) GATE 4 4

B) GATE None 4

C) None None

D) GATE None None

#Q. The Output of below Expression if executed on a Python Interpreter is _____

$$and > or > =$$

a=-2

b=0

c=1

x=a and b or c

y=a or b and c

print(x,y)

1 -2

A) True True

B) True False

C) -2 1

D) 1 -2

(-2 and 0) or 1

(True and False) or 1

False or 1

b and c

(0 and 1)

a or 0

-2 or 0

#Q. The Output of below Expression if executed on a Python Interpreter is

a=-2

b=0

c=1

x=a+2 and b+1 or c-1

y=a-2 or b-1 and c+1

print(x,y)

A) 0 -4

B) 1 -4

C) -2 1

D) 0 -2

#Q. Arrange the below operators in python in the ascending order of precedence.

Low to high

1. – (sign minus)   2. ^   3. **   4. in   5. not

A) 3, 1, 2, 4, 5

B) 1, 3, 2, 4, 5

C) 5, 4, 2, 1, 3

D) 4, 5, 2, 1, 3

$$5 \quad 4 \quad 2 \quad 1 \quad 3$$

$$\text{not} < \text{in} < \wedge < - < **$$

#Q. Consider the below Expression:

1) ＊＊,   2) ＊   3) //   4) <<   5) ∧   6) =

Exp = a << b * c ^ d ** e // f

The order in which the above operators are evaluated is _____

A) *, //, **, ^, <<, =
B) **, *, //, <<, ^, =
C) **, *, //, ^, <<, =
D) **, //, *, <<, ^, =

#Q. The Output of below Expression if executed on a Python Interpreter is   (PW)

_____

$$\& > \wedge > | > =$$

a=12

b=17

c=19

i = a ^ b & c | a $i = 29$

j = b & c | a & b $17 | 0 = 17$

print(i-j)

$$29 - 17 = 12$$

$b \& c \Rightarrow$

$b = 17 = 0001\ 0001$

$c = 19 = 0001\ 0011$

$b \& c\ \overline{0001\ 0001} = 17$

$a = 12\ \ 0000\ 1100$

$\wedge\ \overline{0001\ 1101} = 29$

$a = 0000\ 1100$

$|\ \overline{0001\ 1101} = 29$

$b \& c = 17$

$a = 0000\ 1100$

$b = 0001\ 0001$

$\overline{0000\ 0000} = 0$

#Q. The Output of below Expression if executed on a Python Interpreter is (PW)

_____

octal

a=0o237 #$(159)_{10}$

b=0x2ca #Hexa $(714)_{10}$

c=0b10110111 # Binary $(183)_{10}$

i=(a+b)&c $159+714=873$ & $183=33$

j=b^(c-a) $(183-159)=24 \Rightarrow b \wedge 24$

print(j-i) $=722$

$722-33$ $2|873$

$=689$ $2|436-1$

            $2|218-0$

            $2|109-0$

            $2|54-1$

            $2|27-0$

            $2|13-1$

            $6-1$

$(237)_8 =$

2	3	7

$7 \times 8^0 + 3 \times 8^1 + 2 \times 8^2$

$= 7 + 24 + 128$

$= 31 + 128$

$= \underline{159}$

$(10110111)_2 =$

1	0	1	1	0	1	1	1

$1*2^0 + 1*2^1 + 1*2^2 + 1*2^4 +$

$1*2^5 + 1*2^7$

$= 1+2+4+16+32+128$

$= 183$

$2|6$

$2|3 - 0$

$1 - 1$

$(2ca)_H =$

2	c	a

$a*16^0 + c*16^1 + 2*16^2$

$= a + 12*16 + 2*256$

$= 10 + 192 + 512$

$= 202 + 512$

$= \underline{714}$

$\begin{array}{r} 159 \\ \cancel{8} \\ 873 \end{array}$

b= 1 1 0 1 1 0 1 0 0 1
c= 0 0 1 0 1 1 0 1 1 1
_____
0 0 0 0 1 0 0 0 0 1 = 33

$$(714)_{10} = \quad 1\ 0\ 1\ 1\ \ 0\ 0\ 1\ \ 0\ 1\ 0$$

$$(24) = \quad \underline{0\ 0\ 0\ 0\ \ 0\ 1\ 1\ \ 0\ \ 0\ 0}$$

$$1\ 0\ 1\ 1\ 0\ 1\ 0\ 0\ 1\ 0$$

$$
\begin{array}{r|l}
2 & 714 \\
2 & 357 - 0 \\
2 & 178 - 1 \\
2 & 89 - 0 \\
2 & 44 - 1 \\
2 & 22 - 0 \\
2 & 11 - 0 \\
2 & 5 - 1 \\
2 & 2 - 1 \\
 & 1 - 0
\end{array}
$$

$$
\begin{array}{r}
②\quad 2 \\
16 \\
①\quad 64 \\
128 \\
51\ 2 \\
\hline
722
\end{array}
$$

#Q. The Output of below Expression if executed on a Python Interpreter is $\quad$ (PW)
_____

a=0x10

$(10)_H = 1 \times 16^1 + 0$

$= 16$

b=0o6

c=0b10111101 $= (188)_{10}$ $1 \times 2^7 + 1 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1$

d=3

$= 128 + 32 + 16 + 8 + 4 + 1 = 189$

i=a<<d $\quad 16 \times 2^3$

$= 128$

j=i>>b $\quad \rightarrow 128 >> 6$

k=j+c $\quad 2+189$ $\quad = 128 / 2^6$

print(k) $\quad = 128 / 64$

$=191$ $\quad = 2$

#Q. The Output of below Expression is _____

$a=0x10 \quad = (16)_{10}$

$b=16$

$c=0b00010000 \quad =(16)_{10}$

$d=0o20 \quad =(16)_{10}$

$i=a==c \quad$ True

$j=b!=d \quad$ False

print(i,j)

A) True True

B) True False

C) False True

D) False False

#Q. The x and y values will be equivalent to _____ , _____

i= None

j= "none" String

k="True" String

l=False

x=i and k or l   None or l

y=j or l and i   False

"none" or l

A)   l, i

B)   False, None

C)   l, j

D)   False, i

#Q. The output printed by below code if the input values for i, j, k are 23, 45 and 67, respectively is _____

$$8 \overline{|23}$$
$$2 - 7$$

23
i=oct(int(input())) #(23)₁₀

j=bin(int(input())) #(45)₁₀

k=hex(int(input())) #(67)₁₀

→ i = 0o27   Octal String

x=i+j+k

print(len(x))

45 = 0b101101 = Binary String

→ 67 = 0x43 = Hexa String

A) 10

B) 12

$$16 \overline{|67}$$
$$4 - 3$$

C) 14

D) 16

x = 0o27 0b101101 0x43

len( ) = 16

#Q. The output printed by below code is _____

i='GATE' $len(i) = 4$
1 2 3 4 5 6 7 8 9
j='EXAM\n2025' $len(j) = 9$

k=len(j)-len(i) = 5

x=i*k   x= GATEGATEGATEGATEGATE

print(len(x)-k)
         $20 - 5 = 15$

A)   18

B)   20

C)   22

D)   Error, * operator not valid on Strings

E) 15

#Q. The output printed by below code is _____

$H/W-4$

```
x = float(1)
y = int(2.8)
z = complex(3)
i=x+y+z
print(i,type(i))
```

A) 6, <class, int>

B) 6.0, <class, float>

C) 6+0j, <class, complex>

D) Compiler Error

#Q.   The output printed by below code is _____

```
i=0x21
j=0o36
k=i<<2
x=j>>3
y=i+x
z=k-j
print(z-y)
```

#Q.   The output printed by below code is _____

```
a=ord('a')
b=ord('E')
c=x^y
d=b|a
e=c&d
print(e)
```

#Q.   The output printed by below code is _____

```
x=ord('2') + (21>>2) * (41&23) - (11 ^ 20) // 2 ** 3
print(x)
```

- Tokens

- DataTypes

THANK - YOU