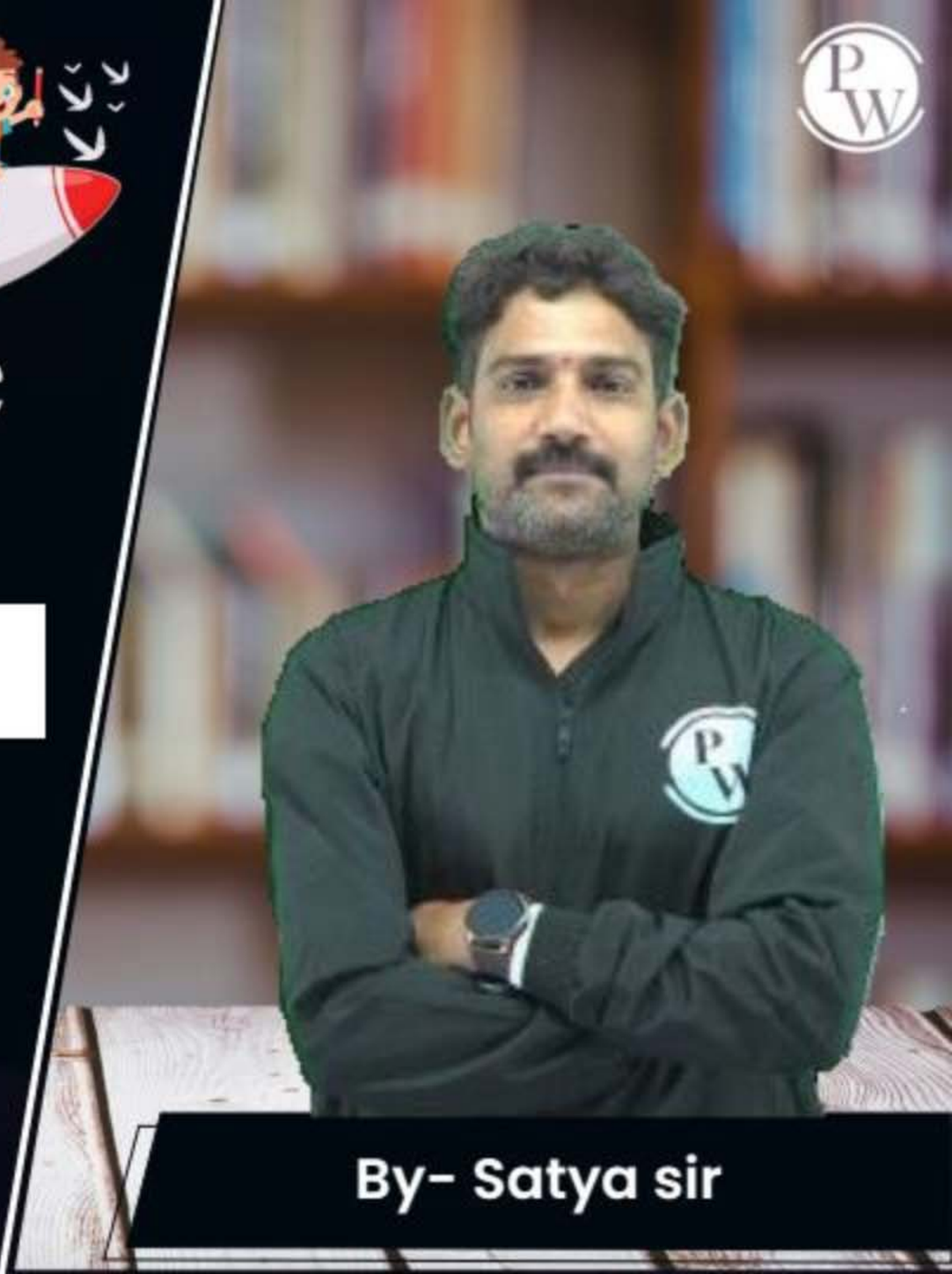
Data Science & Artificial Intelligence

Python For Data Science

Lecture No.- 07



By- Satya sir

Recap of Previous Lecture

- Functions

- Recursion

Topics to be Covered

- Recursion

SUPER 1500+ - CLASS – 6 - Homework Question - 1

#Q. Output Printed by below Code is 7

The output printed is _____

```
def foo(n: int, r: int):
    if n > 0:
        return (n % r) + foo(n // r, r)
    else:
        return 0
print(foo(317,3))
```

foo(317, 3)

2 + foo(105, 3)

0 + foo(35, 3)

2 + foo(11, 3)

2 + foo(3, 3)

0 + foo(1, 3)

1 + foo(0, 3)

0

2+0+2+2+0+1+0

= 7

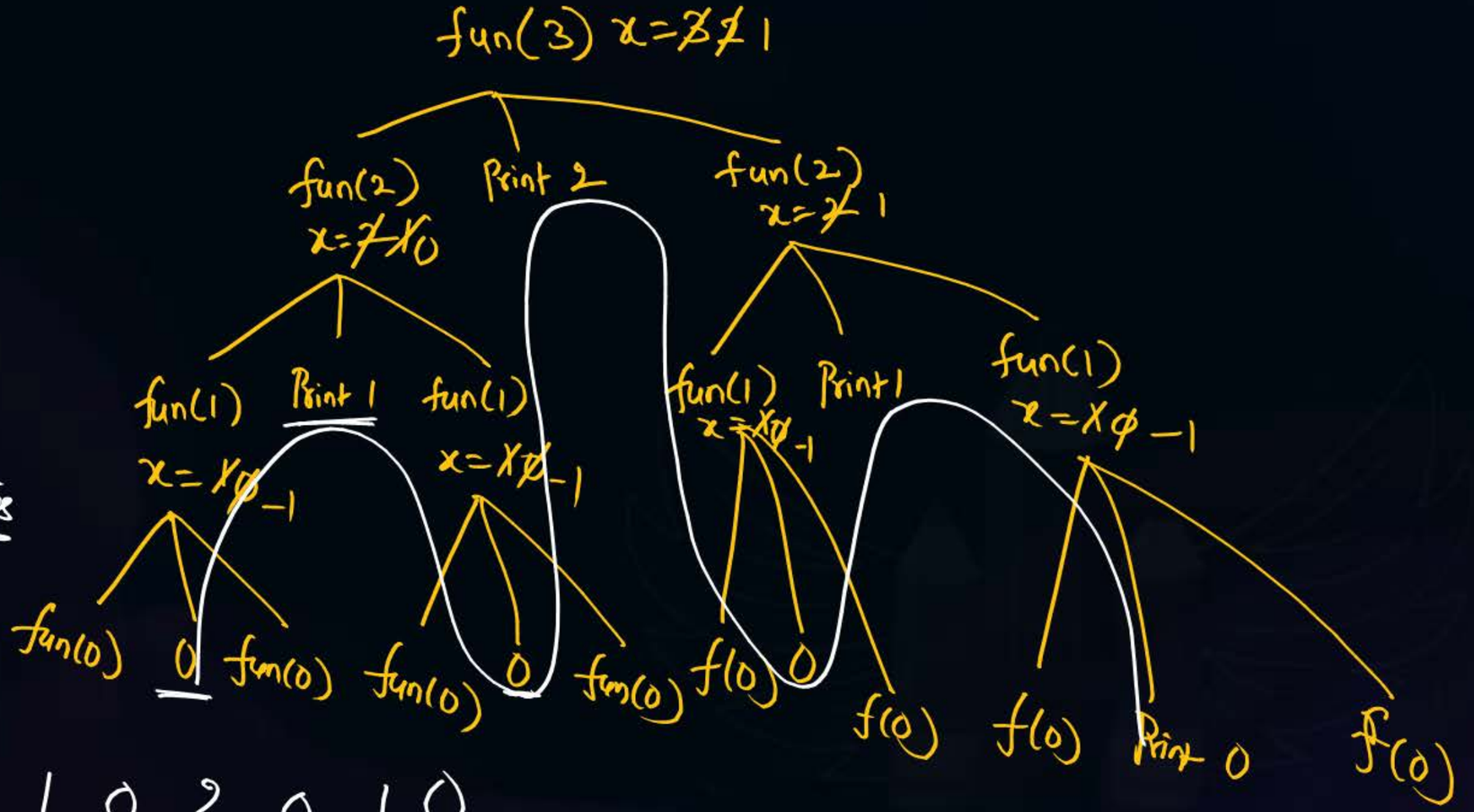
SUPER 1500+ - CLASS – 6 - Homework Question - 2

#Q. The output of below python code segment is _____

```
def fun(x):
    if x > 0:
        x=x-1
        fun(x)
        print(x, end='')
        fun(x)
        x=x-1
fun(3)
```

2 Single Quotes

A) 0102010
B) 2012010
C) 1010202
D) 0101010



#0102010

SUPER 1500+ - CLASS – 6 - Homework Question - 3

#Q. Consider the below code:

```
def f(i):
    count=1
    if i<=0:
        return
    for x in range(i):
        k=count+g(x+1)
        count=count+x
    return k
```

```
def g(i):
    j=1
    if i<1:
        return i+1
    for x in range(i+1):
        j=j+x
    return j
```

f(4)

x=0 k=1+g(1)=1+2=3, Count=1+0=1

x=1 k=1+g(2)=1+4=5, Count=1+1=2

x=2 k=2+g(3)=2+7=9, Count=2+2=4

x=3 k=4+g(4)=4+11=15, Count=4+3=7

g(1): x=0 j=1+0; x=1 j=1+1=2

g(2): x=0 j=1+0=1; x=1 j=1+1=2; x=2 j=2+2=4

g(3): x=0 1+0=1; x=1 1+1=2; x=2 2+2=4; x=3 4+3=7

g(4): x=0,1,2,3,4; j=1, 2, 4, 7, 11

The return value of f(4) is _____

ANS: 15

SUPER 1500+ - CLASS – 6 - Homework Question - 4

#Q. The output printed by below code is _____

```
def fun(i,j):
    if i==j:
        print(i+j,end=" ")
    else:
        print(i-1,j,end=" ")
        fun(i-2,j+2)
fun(12,0)
```

A) 12 0 10 2 8 4 12

B) 11 1 9 3 7 5 12

C) 11 0 9 2 7 4 12

D) 12 1 10 3 8 5 12

fun(12, 0)

Print 11, 0

fun(10, 2)

Print 9, 2

fun(8, 4)

Print 7, 4

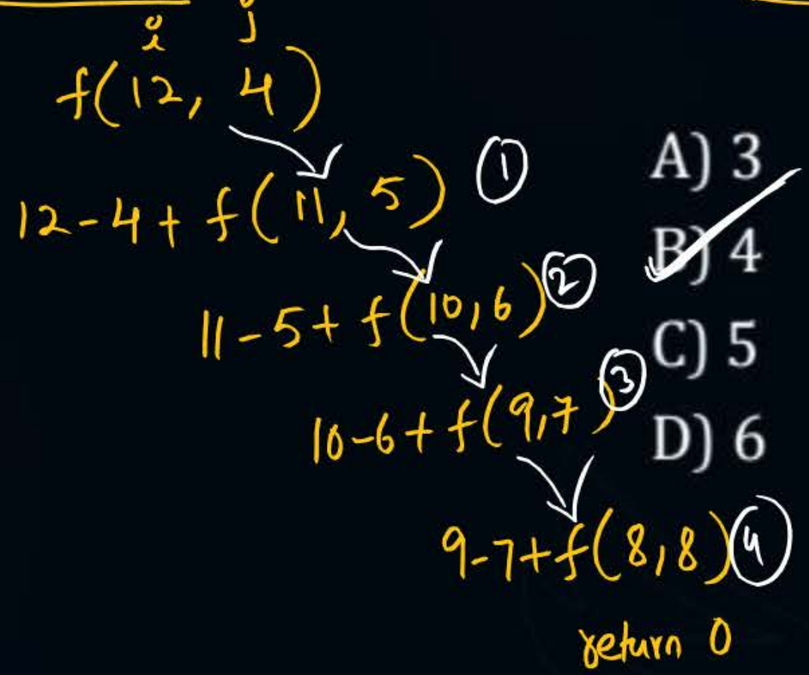
fun(6, 6)

Print 12

SUPER 1500+ - CLASS – 6 - Homework Question - 5

#Q. The maximum recursion depth of below function excluding initial call is _____

```
def f(i,j):
    if i==j:
        return j-i
    elif i>j:
        return i-j+f(i-1,j+1)
    else:
        return i+f(i-1,j+1)
print(f(12,4))
```



A) 3
B) 4
C) 5
D) 6

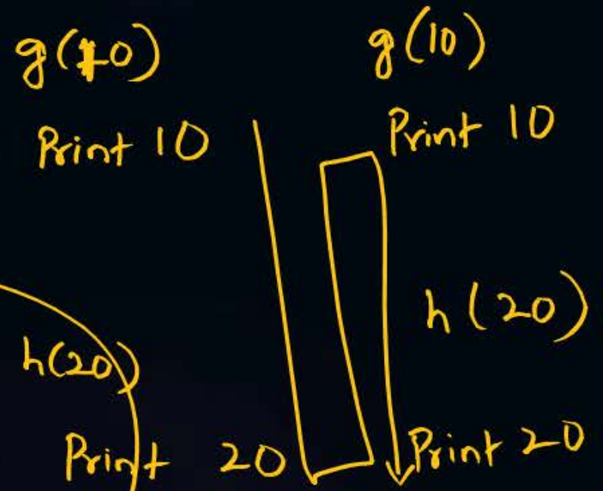
#Q. The Output will be _____?

```
def g(p):
    print(p,end=' ')
    return p

def h(q):
    print(q,end=' ')
    return q

def f(x, y):
    g(x)
    h(y)

if __name__ == "__main__":
    f(g(10), h(20))
```



f(10,20)

10,20,10,20

(A) 20 10 10 20
(B) 10 20 20 10
(C) 20 10 20 10
(D) 10 20 10 20

#Q. Consider the following C program. Assume parameters to a function are evaluated from right to left. The Output will be _____?

```
def g(p):
    print(p,end=' ')
    return p

def h(q):
    print(q,end=' ')
    return q

def f(x, y):
    g(x)
    h(y)

if __name__ == "__main__":
    f(g(10), h(20))
```

(A) 20 10 10 20
(B) 10 20 20 10
(C) 20 10 20 10
(D) 10 20 10 20

g(10) ② Print 10

h(20) ① Print 20

10 20

g(x) ③ Print 10

h(y) ④ Print 20

20 10 10 20

if __name__ == "__main__": f(g(10), h(20))

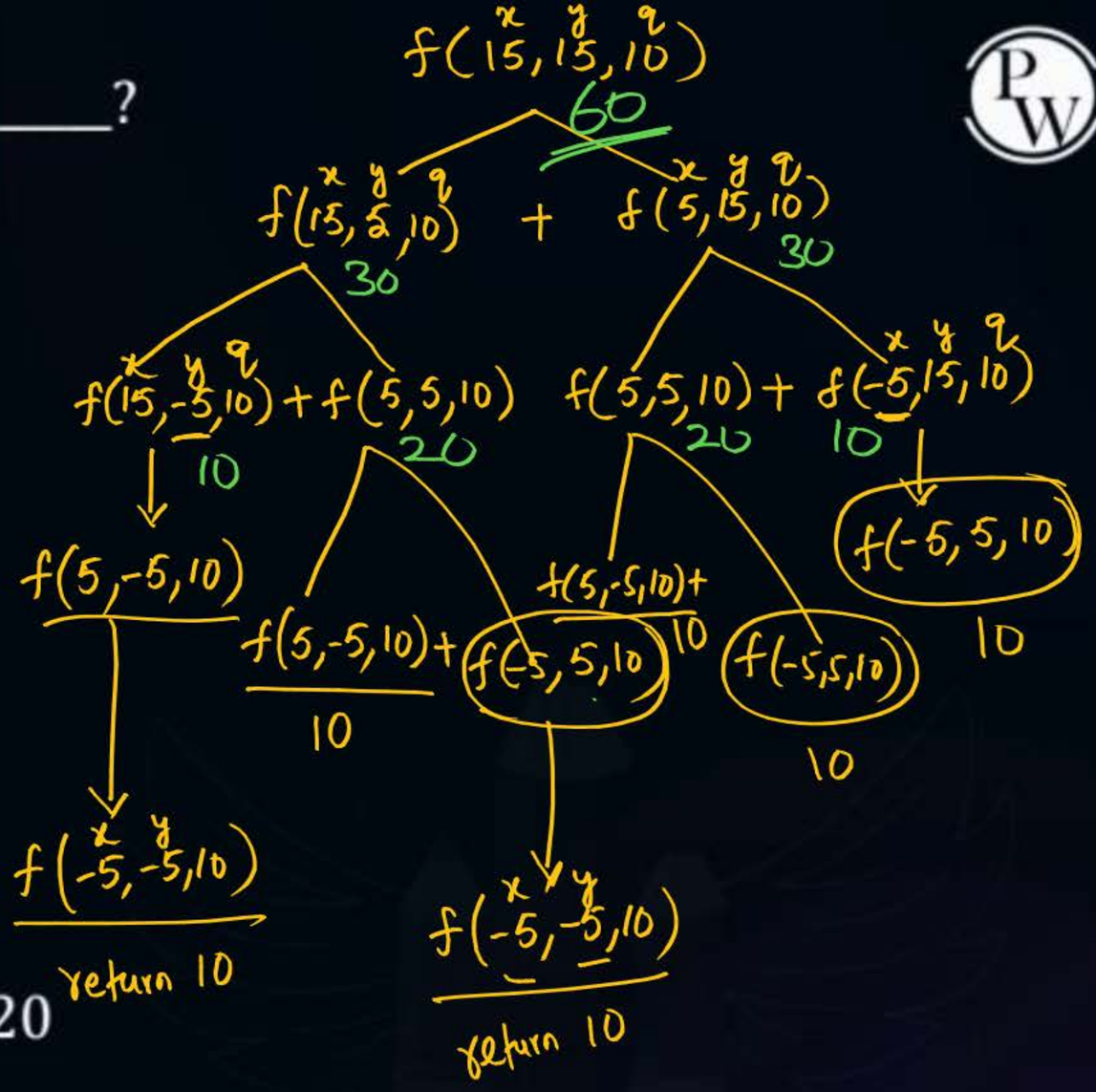
② ①

10 20

#Q. The value returned by foo(15, 15, 10) is _____?

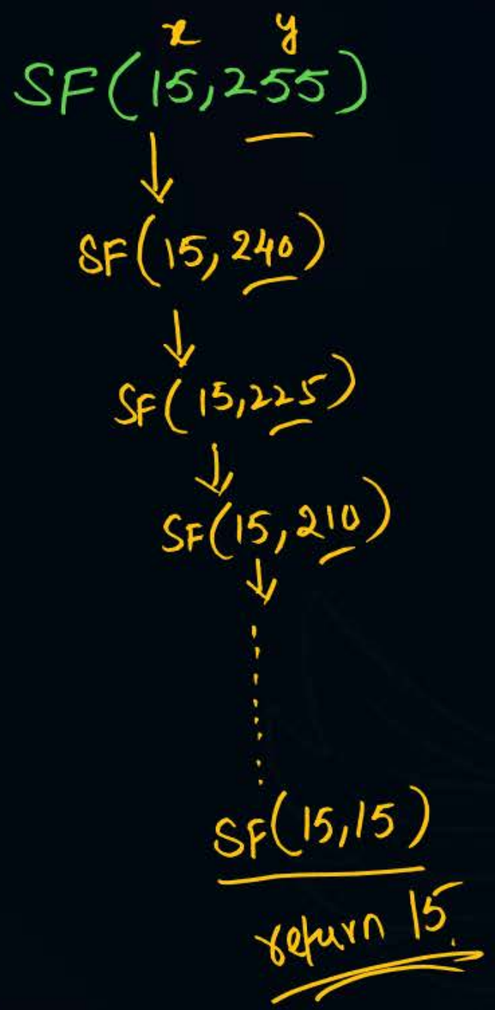
```
def foo(x, y, q):
    if x <= 0 and y <= 0:
        return q
    if x <= 0:
        return foo(x, y - q, q)
    if y <= 0:
        return foo(x - q, y, q)
    return foo(x, y - q, q) + foo(x - q, y, q)
```

A) 10 B) 60 C) 180 D) 220



#Q. The value returned by SomeFunction(15, 255) will be 15

```
def SomeFunction(x, y):
    if x == 1 or y == 1:
        return 1
    if x == y:
        return x
    if x > y:
        return SomeFunction(x - y, y)
    if y > x:
        return SomeFunction(x, y - x)
```



#Q. Which one of the following will happen when the function convert is called with any positive integer n as argument?

```
def convert(n):
    if n < 0:
        print(n, end='')
    else:
        convert(n // 2)
        print(n % 2, end='')
```

Let n=31

Convert(31) → Convert(15) → Convert(7) → Convert(3) → Convert(1)

Convert(0)

Convert(0)

Convert(0)

Python #1023 times ⇒ Infinite times

A. It will print the binary representation of n in the reverse order and terminate.

B. It will print the binary representation of n but will not terminate

C. It will not print anything and will not terminate.

D. It will print the binary representation of n and terminate.

#Q. The output printed will be ____?

```
def jumble(x, y):
    x = 2 * x + y
    return x

def F():
    x = 2
    y = 5
    y = jumble(y, x)
    x = jumble(y, x)
    print(x)
F()
```

jumble(5, 2)
x = 2*5 + 2
= 12
return 12

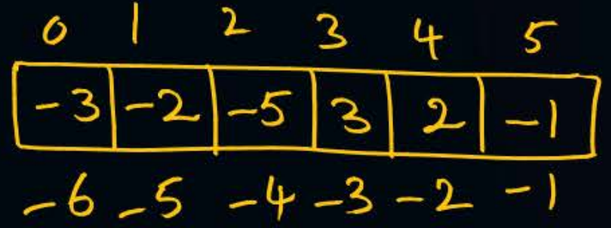
jumble(12, 2)
x = 2*12 + 2
= 26
return 26

x = 26
y = 12
y = jumble(5, 2) → y = 12
x = jumble(12, 2) → x = 26
#26

A) 2 B) 5 C) 13 D) 26

#Q. What will be final list arr1?

```
def fun():
    arr=[-3,-2,-5,3,2,-1]
    arr1=[]
    for i in range(len(arr)):
        if arr[i]<0:
            arr1.append(arr[i-2]+i)
        elif arr[i]<= -1:
            arr1.append(i-arr[i+1])
        else:
            arr1.append(arr[i])
    print(arr1)
fun()
```



arr1

2	0	-1	3	2	8

A) [2, -2, -5, 3, 2, -2]

B) [2, 0, -1, 3, 2, 8]

C) [2, 2, -5, 3, 2, 2]

D) [2, 0, 1, 3, -2, 8]

i=0 -3<0 True arr[0-2]+0 = 2+0 = 2

i=1 -2<0 True arr[1-2]+1 = -1+1 = 0

i=2 -5<0 True arr[2-2]+2 = -3+2 = -1

i=3 3<0 False arr[3] = 3

i=4 2<0 False arr[4]

i=5 -1<0 True arr[5-2]+5 = 3+5 = 8

#Q. The output printed by below code is _____

```
def f(s):
    i=1
    if len(s)==0 :
        return
    else:
        print(s[i-len(s)])
        f(s[2:])
string="GATE EXAM"
f(string)
```

S : String

0	1	2	3	4	5	6	7	8
G	A	T	E	' '	E	x	A	M
-9	-8	-7	-6	-5	-4	-3	-2	-1

A) M X T G
B) A E E A
C) A E E A M
D) A E X A M

Print(S[1-9]) ⇒ Print(S[-8]) ⇒ 'A'

f("TE EXAM")

0	1	2	3	4	5	6
T	E	' '	E	x	A	M
-7	-6	-5	-4	-3	-2	-1

Print(S[1-7]) ⇒ Print(S[-6]) = 'E'

f(" EXAM")

0	1	2	3	4
' '	E	x	A	M
-5	-4	-3	-2	-1

Print(S[1-5]) ⇒ Print(S[-4]) = 'E'

0	1	2
x	A	M
-3	-2	-1

Print(S[1-3]) ⇒ Print(S[-2]) = 'A'

0
M
-1

Print(S[1-1]) = Print(S[0]) = 'M'

SUPER 1500+ - CLASS – 7 - Homework Question - 1

#Q. The return value would be _____

```
def f(L):
   i=1
   if len(L)==0 :
      return 1
   else:
      return i+L[-1]
      f(L[:-1])
List=[10,13,-12,34,67,15,22]
print(f(List[:-2]))
```

SUPER 1500+ - CLASS – 7 - Homework Question - 2

#Q. The output printed by below code is _____

```
def f(s):
   i=1
   if len(s)==0 :
      return
   else:
      print(s[len(s)-i], end=' ')
      f(s[2:])
string="GATE EXAM"
f(string)
```

A) M M M M

B) M M M M M

C) M M M M M M M

D) M M M M M M M M M

SUPER 1500+ - CLASS – 7 - Homework Question - 3

#Q. Consider the below code:

```
def f(i):
    count=1
    if i<=0:
        return
    for x in range(i):
        k=count+g(x+1)
        count=count+x
    return k
```

```
def g(i):
    j=1
    if i<1:
        return i+1
    for x in range(i+1):
        j=j+x
    return j
```

The return value of f(4) is _____

SUPER 1500+ - CLASS – 7 - Homework Question - 4

#Q. The output printed by below code is _____

```
def f(T):
    if len(T)==0 :
        return 0
    else:
        a,b,*c=T
        return a+b+f(T[2:])
t=(1,2,3,1,2,3,1,2,3,4)
print(f(t))
```

SUPER 1500+ - CLASS – 7 - Homework Question - 5

#Q. The output is _____

```
def fun(s1,s2):
    if s1 is None or s2 is None :
        return -1
    else:
        i=len(s1.union(s2)) + len(s2.difference(s1))
        return i+fun((s1.intersection_update(s2)),s2.difference_update(s1))
s1={1,2,3,4,2,5,1,2,6,4}
s2={1,2,2,1,1,2,1}
print(fun(s1,s2))
```

A) 3
B) 4
C) 5
D) 6

2 mins Summary

- Recursion

NEXT CLASS TOPIC: Miscellaneous Topics: Lamda, fliter(), enum(), zip(), OOPS concepts ....


t:\\ Satya sir Pw
THANK - YOU