EXTRA MILE

Education & Training

Python is a Futuristic Programming Language

BE A PART OF IT

Default Parameterize

USER DEFINE FUNCTION

DEFINITION

HEADER | PROTOTYPE

```
def FN( ARGUMENT'S | PERIMETER ):
    return Statements
```

BODY | DEFINITION

CALLING

FN(Argument's | Values)

1

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FUNCTION | MODULE'S PROTOTYPE OR DEFINATION

None | Int | float | String | Tuple | List | Dictionary | Group Data

DEFINITION

NO ARGUMENT

KEY WORD

NAME BY USER

Header | Prototype

{ def Function Name (Argument's | Perimeter) : }

NAME OF VARIABLES

WHITE SPACE

BODY OF FUNCTION

(Input | Output | Process | Condition | Loop)

return Statements

ONE OR MORE THEN ONE

Body | Definition

Value | variable | Expression

1. PER DEFINE FUNCTIONS LIKE: len() | sum() | max() | min() | str()...
2. CREATE FUNCTION NAME LIKE A VARIABLE OR IDENTIFIER : FUN() | SUM() | CAL()
3. BODY OF A FUNCTION CALL ACCORDING TO FUNCTION CALL: loop | if else | input | output
4. IN CALLING NEED TO PASS VALUE OR IDENTIFIER: FUN(3,4) | FUN(A,B)
5. FUNCTION CAN RETURN ONE OR MORE THEN ONE VALUE AT A TIME, MULTIPLE VALUES ARE CONVERTED AS TUPLE AUTOMATICALLY
6. FUNCTION NAME SHOULD BE SAME IN DEFINITION OR IN CALLING

CALLING

Function Name (Argument's | Values)

EXAMPLE

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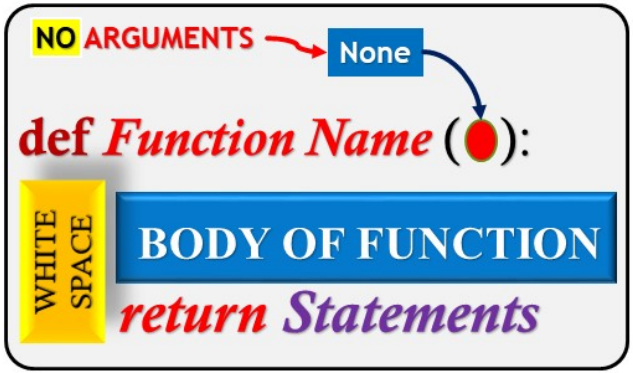
FUNCTION

DEFAULT



	DEFINITION	CALLING	OUTPUT
1.	def Display( ): print("Default")	Display( )	Default
2.	def Show( ): return " Hi "	print(Show( ))	Hi
3.	def MSG( ): print(" Hi! Ravi") print(" How are") print(" You now.")	MSG()	Hi! Ravi How are You now.

4.
```
def Menu( ):
    print("1. ADD")
    print("2. MUL")
    print("3. AVG")
```
Menu()

1. ADD
2. MUL
3. AVG

5.
```
def OPERATIONS( ):
    print("Create")
    print("DELETE")
    print("EDIT")
    print("MODIFY")
```
OPERATIONS()

Create
DELETE
EDIT
MODIFY

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FUNCTION

PARAMETERIZE

WITH ARGUMENTS

```
def Function Name ( Argument's ):
    BODY OF FUNCTION
    return Statements
```

WHITE SPACE

	DEFINITION	CALLING	OUTPUT
1.	def Sum(*a* , *b*): print((a + b))	Sum(*3,3*)	6
2.	def Mul(*n* , *m*): return n * m	print(Mul(*3,3*))	9
3.	def Sum(*a* , *b*): print(a**b)	Sum(*3,3*)	27
4.	def Sum(*x* , *y*): return **x+2, y+3**	print(Sum(*3,3*))	(5,6)

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FUNCTION AS A DEFAULT & PARAMETERIZE

DEFAULT

1.

DEFINITION	CALLING	OUTPUT
def Display(): print("Hi! Python")	Display()	Hi! Python

2.

DEFINITION	CALLING	OUTPUT
def Display(): print("Python") print("C++") print("Java")	Display()	Python C++") Java

PARAMETERIZE

3.

DEFINITION	CALLING	OUTPUT
def Sum(a , b): print((a + b))	Sum(3,7)	10

4.

DEFINITION	CALLING	OUTPUT
def Sum(a , b): print((a + b))	x , y=3,7 Sum(x,y)	10

```
R=Sum(3,7)
print(R)
```

5.

DEFINITION	CALLING	OUTPUT
def Sum(a , b): return a + b	print(Sum(3,7))	10

6.

DEFINITION	CALLING	OUTPUT
def Sum(a , b): return a + b	print(Sum('A','B'))	'AB'

7.

DEFINITION	CALLING	OUTPUT
def Sum(a , b): return a+2, b+3	print(Sum(3,7))	(5,10)

8.

DEFINITION	CALLING	OUTPUT
def Avg(a , b): return (a+b)/2	print(Sum(3,7))	5

9.

DEFINITION	CALLING	OUTPUT
def Mul(a , b): return a*b*3	print(Mul(3,7))	63

10.

DEFINITION	CALLING	OUTPUT
def POW(a , b): return a**b	print(Mul(3,3))	27

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FUNCTION BASED PROBLEMS

A FUNCTION IS A MECHANISM THAT GENERATE RESULT |OUTPUT ACCORDING TO ITS BODY

FUNCTION		OPERATION
1.	FUN(a)	= a**a
2.	FUN(X)	= X+2
3.	FUN(X,Y)	= X*2+Y*3
4.	FUN(X,Y)	= X*Y
5.	FUN(X,Y)	= X**Y
6.	FUN(X,Y)	= X+X*Y
7.	FUN(X,Y)	= X^Y
8.	FUN(X,Y)	= (X+Y)/2
9.	FUN(X,Y)	= $(X+Y)^2$
10.	FUN(X,Y)	= X^2+Y^2
11.	FUN(X,Y)	= X^2+Y^2+3
12.	FUN(X,Y,N)	= X^N+Y^N
13.	FUN(X,Y,N)	= $(X+Y)^N$
14.	FUN(X,Y,Z)	= (X+Y)/Z

Things Working Like Function

 # DEFINITION

#1
```
def FUN(a):
    print(a**a)
```

#2
```
def FUN(X):
    print(X+2)
X=int(input("Enter X:"))
FUN(X)
```

 # CALLING

CASE 1	CASE 2	CASE 3
FUN(5)	a=5 FUN(a)	a=int(input("Enter a:")) FUN(a)

I
```
X=int(input("Enter X:"))
Y=int(input("Enter Y:"))
FUN(X,Y)
```

x**y=pow(x,y)

#3
```
def FUN(X,Y):
    print(X*2+Y*3)
```

#5
```
def FUN(X,Y):
    print(X**Y)
```

#4
```
def FUN(X,Y):
    print(X*Y)
```

#6
```
def FUN(X,Y):
    print(X+X*Y)
```

#7
```
def FUN(X,Y):
    print(X**Y)
```

#8
```
def FUN(X,Y):
    print((X+Y)/2)
```

#9
```
def FUN(X,Y):
    print((X+Y)**2)
```

#10
```
def FUN(X,Y):
    print((X**2+Y**2))
```

#11
```
def FUN(X,Y):
    print((X*X+Y*Y+3))
```

#12
```
N=int(input("Enter N:"))
def FUN(X,Y,N):
    print(X**N+Y**N)
```

#13
```
N=int(input("Enter N:"))
def FUN(X,Y,N):
    print((X+Y)*N)
```

#14
```
Z=int(input("Enter Z:"))
def FUN(X,Y,Z):
    print((X+Y)/N)
```

#print((X*X+Y*Y))

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DIFFERENCE BETWEEN NORMAL & FUNCTION

A FUNCTION IS A MECHANISM THAT GENERATE RESULT |OUTPUT ACCORDING TO ITS BODY

Convert Normal Code Into Function

Direct

1.
```
print("Hi! Python")
```

Hi! Python

1.
```
def Display():
    print("Hi! Python")
Display()
```
DEFAULT / CALLING

Direct

2.
```
a , b=3,5
print((a + b))
```

8

2.
```
def Sum( a , b ):
    print((a + b))
a , b=3,5
Sum(a , b)
```
CALLING

PARAMETERIZE

Direct

3.
```
MSG= "Hi! Python"
print(MSG)
```

Hi! Python

3.
```
def Display( Str ):
    print(Str)
MSG= "Hi! Python"
Display(MSG)
```
CALLING

Things Working Like Function

4. Direct
```
a=int(input("Enter a: ")
b=int(input("Enter b: ")
print((a + b))
```

FUNCTION

4.
```
def Sum( a , b ):
    return a + b
a=int(input("Enter a: ")
b=int(input("Enter b: ")
print(Sum(a , b))
```
CALLING

Enter a: 2
Enter b: 4

6

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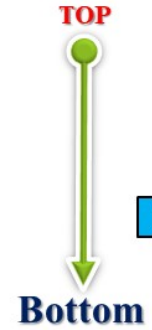
DIFFERENT KIND OF FUNCTION



1 Without Return

```
2 def Display():
3     print("Hi! Python")
1 Display()
```

OUTPUT: Hi! Python

2 Without Return

```
3 def Sum(a , b):        (3, 5)
4     print((a + b))
1 a , b=3,5
2 Sum(a , b)
```

OUTPUT: 8

3 Without Return — Hi! Python

```
3 def Display( Str ):
4     print(Str*2)
1 MSG= "Hi! Python"
2 Display(MSG)
```

OUTPUT: Hi! Python Hi! Python

4 With Return

```
3    def Sum(a , b):        (3, 5)
4        return a + b
1    a , b=3,5
2, 5 print(Sum(a , b))
```

2 → 5

OUTPUT: 8

5 With Return

```
4    def Sum(a , b):        (2, 4)
5        return a + b
1    a=int(input("Enter a: "))
2    b=int(input("Enter b: "))
3, 6 print(Sum(a , b))
```

3 → 6

OUTPUT:
Enter a: 12
Enter b: 23
SUM is 35

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USER DEFINE VALUE IN FUNCTION

LAB WORK 1

1

```
def Sum(a , b):          # 6 8
    return a + b
a =int(input("Enter a: "))   # Start 1
b =int(input("Enter b: "))   # 2
print("R:",Sum(a , b))       # 3,6
```

3

6

OUTPUT

```
Enter a: 4
Enter b: 9
R: 13
```

2 WRONG PROGRAM

CALLING BEFORE DEFINITION

```
Sum(a , b)        #Error
def Sum(a , b):
    print(a + b)
a =int(input("Enter a: ")
b =int(input("Enter b: ")
Sum(a , b)        # CALLING
```

OUTPUT

```
Enter a: 4
Enter b: 9
R: 13
```

3

```
def Sum(a , b):          # 6 8
    print("R:",a + b)
Sum(4 , 7)               # 1  <- I
Sum(12, 8)               # 2  <- II
a =int(input("Enter a: "))   # 3
b =int(input("Enter b: "))   # 4
Sum(a , b)               # 5  <- III
```

RIGHT

OUTPUT

```
I   R: 11
II  R: 20
    Enter a: 3
    Enter b: 9
III R: 12
```

4 MISSED STATEMENT

```
def Sum(a , b):          # 8 2
    print("A :" , a+b)   # 2
    print("B :" , a*b)   # 3
    return a**b          # 4
    print("C", a % b)    # 5  X
R=Sum(8 , 2)             # 1, 6
print("Result : " , R)   # 7
```

OUTPUT

```
A : 10
B : 16
Result : 64
```


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USER DEFINE VALUE IN FUNCTION

LAB WORK 2

SINGLE VALUE RETURN

```
5
4   def Sum(a , b):
5       return a + b
1   a=int(input("Enter a : "))
2   b=int(input("Enter b : "))
3, 6 Result= Sum(a , b)
7   print("R : ",Result)
```

Value 1 (2) (4)

OUTPUT

```
Enter a: 12
Enter b: 9
R :  21
```

MULTI VALUE RETURN AS TUPLE

```
6
4   def Sum(a , b):
5       return (a + 2), (b+3)
1   a=int(input("Enter a: "))
2   b=int(input("Enter b: "))
3, 6 Result= Sum(a , b)
7   print("R : ", Result)
```

Value 1, Value 2

OUTPUT

```
Enter a : 11
Enter b : 12
R : (13, 15)
```

OUTPUT

```
Enter a: 11
Enter b: 14
13  ,  17
R1 :  13
R2 :  17
```

```
7
3, 6 R1,R2= Sum(a , b)
7    print(R1," , ",R2)
8    print("R1 : ",R1)
9    print("R2 : ",R2)
```

```
8
3, 6 Result= Sum( a , b)
7    R1, R2 = Result
8    print(R1)
9    print(R2)
```

OUTPUT

```
Enter a: 11
Enter b: 15
R1 :  13
R2 :  18
```


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FIND OUTPUT 1

PROBLEM 1

```
                                  3  2  2
2   def SHOW1( a , b , c ):
3   I   return (a+b)**c, (a+b)*c
                                  3  2  2
4   def SHOW2( a , b , n ):
5   II  return a**n +b*n, a*b**n

1,4 print(SHOW1( 3 , 2 , 2 ))

3,6 print(SHOW2( 3 , 2 , 2 ))
```

OUTPUT

I (25, 10)
II (13, 12)

DISPLAY CODE 1

1. print(SHOW1(3,4,2))
2. print(SHOW1(2,2,3))
3. print(SHOW1(2,2,4))
4. print(SHOW1(3,3,3))
5. print(SHOW1(3,5,2))
6. print(SHOW1(4,4,2))
7. print(SHOW1(2,1,3))
8. print(SHOW1(2,3,2))

OUTPUT ?

DISPLAY CODE 2

1. print(SHOW2(3,4,2))
2. print(SHOW2(2,2,3))
3. print(SHOW2(2,2,4))
4. print(SHOW2(3,3,3))
5. print(SHOW2(3,5,2))
6. print(SHOW2(4,4,2))
7. print(SHOW2(2,1,3))
8. print(SHOW2(2,3,2))

OUTPUT ?

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FIND OUTPUT 2

PROBLEM 2

```
def FUN1( a , b , c ):
    return (a+3)**c, (b+5)*c
def FUN2( a , b , n ):
    return a*n +b**n, a**b*n
print(FUN1( 3 , 2 , 2 ))
print(FUN2( 3 , 2 , 2 ))
```

OUTPUT

I (36, 14)
II (10, 18)

DISPLAY CODE

```
1. print(FUN1(3,4,2))
2. print(FUN1(2,2,3))
3. print(FUN1(2,2,4))
4. print(FUN1(3,3,3))
5. print(FUN1(3,5,2))
6. print(FUN1(4,4,2))
7. print(FUN1(2,1,3))
8. print(FUN1(2,3,2))
```

OUTPUT ?

DISPLAY CODE

```
1. print(FUN2(3,4,2))
2. print(FUN2(2,2,3))
3. print(FUN2(2,2,4))
4. print(FUN2(3,3,3))
5. print(FUN2(3,5,2))
6. print(FUN2(4,4,2))
7. print(FUN2(2,1,3))
8. print(FUN2(2,3,2))
```

OUTPUT ?

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FIND OUTPUT 3

Problem 3

```
4 def FUN( a , b ):
5     a+=2
6     b*=5
7     print(a, ":",b)
1 a, b=4 , 8
2 print(a, ":",b)
3 FUN( a , b )
8 print(a, ":",b)
```

(4, 8) (6, 40) (4, 8)

OUTPUT

I 4 : 8
II 6 : 40
III 4 : 8

Problem 4

```
def FUN( a , b ):
    a+=2
    b*=5
    print(a, ":",b)
a, b=4 , 8
print(a, ":",b)
FUN( a , a )
print(a, ":",b)
```

II 6 : 40
I 4 : 8
III 4 : 8

OUTPUT ?

Problem 5

```
def FUN( a , b ):
    a+=2
    b*=5
    print(a, ":",b)
a, b=4 , 8
print(a, ":",b)
FUN( b , b )
print(a, ":",b)
```

OUTPUT ?

Problem 6

```
def FUN( a , b ):
    a+=2
    b*=5
    print(a, ":",b)
a, b=4 , 8
print(a, ":",b)
FUN( b , a )
print(a, ":",b)
```

OUTPUT

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FIND OUTPUT 3

Problem 3

```
4 8
4 def FUN( a , b ):
5     a+=2 → 6
6     b*=5 → 40
7     print(a, ":",b)
1 a, b=4 , 8
2 print(a, ":",b)
4 8
3 FUN( a , b )
8 print(a, ":",b)
```

II 6 : 40

I 4 : 8

III 4 : 8

OUTPUT

I 4 : 8
II 6 : 40
III 4 : 8

Problem 4

```
4 4
def FUN( a , b ):
    a+=2 → 6
    b*=5 → 20
    print(a, ":",b)
a, b=4 , 8
print(a, ":",b)
FUN( a , a )
print(a, ":",b)
```

II

I

III

OUTPUT

I 4 : 8
II 6 : 20
III 4 : 8

Problem 5

```
8 8
def FUN( a , b ):
    a+=2 → 10
    b*=5 → 35
    print(a, ":",b)
a, b=4 , 8
print(a, ":",b)
FUN( b , b )
print(a, ":",b)
```

II

I

III

OUTPUT

I 4 : 8
II 10 : 40
III 4 : 8

Problem 6

```
8 4
def FUN( a , b ):
    a+=2 → 10
    b*=5 → 20
    print(a, ":",b)
a, b=4 , 8
print(a, ":",b)
FUN( b , a )
print(a, ":",b)
```

II

I

III

OUTPUT

I 4 : 8
II 10 : 20
III 4 : 8

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FUNCTION WITH DEFAULT VALUE

CODE 1

```
2,6,10 def DEFAULT( a=6 ):
3,7,11     a+=3
4,8,12     print(a)
1          DEFAULT(3)
5          DEFAULT(13)
9          DEFAULT()
```

6
16
9

CODE 2

```
2,6,10 def DEFAULT(a , b=6 ):
3,7,11     a+=3;b+=a
4,8,12     print(a,', ',b)
1          DEFAULT(4,3)
5          DEFAULT(5)
9          DEFAULT(7,8)
```

7 , 10
8 , 14
10 , 18

CODE 3

```
2,6,10 def DEFAULT( a=5 , b=6 ):
3,7,11     a+=3;b+=a
4,8,12     print(a,', ',b)
1          DEFAULT(4,3)
5          DEFAULT(5)
9          DEFAULT()
```

7 , 10
8 , 14
8 , 14

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FUNCTION WITH DEFAULT VALUE

Can't Use

X 1. def sum();
X 2. def sum(a=4 ,b=6 ,c):
X 3. def sum(a , b=6 ,c):
X 4. def sum(a=4 ,b ,c):
X 5. def sum(a=4 ,b ,c=5):

ASSIGNMENT OF DEFAULT VALUE FROM ➤ RIGHT TO LEFT ➤

Can Use

1. def sum() : ✓
2. def sum(a , b , c=3): ✓
3. def sum(a , b=5 ,c=3): ✓
4. def sum(a=4 ,b=5 ,c=3): ✓

Calling

1) sum() #DEFAULT FUNCTION
2) sum(4,6) # c=5 | sum(7,5,8)
3) sum(4) # b=5 ,c=3 | sum(7,5,8) | sum(7,5) # c=5
4) sum(7,5,8) | sum(7,5) # c=3 | sum(7) # b=5, c=3 | sum() # a=4 ,b=5 ,c=3

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FIND OUTPUT 4

PROBLEM 7

```
2     def SUM( a , b=7 , c=2 ):
3  I      print (a*b, " : ",b*c, " : ",b**c)
4  II     return (a+b)*c
1,5   print(SUM( 3 , 2 ))
```

(3) (2)

OUTPUT

Line I: 6 : 4 : 4
Line II: 10

CODE

```
1. print(SUM(2,3))
2. print(SUM(4,2,3))
3. print(SUM(2,2,2))
4. print(SUM(2,2))
5. print(SUM(2))
6. print(SUM(2,4))
7. print(SUM(3))
8. print(SUM(2,7))
9. print(SUM(1,2,3))
10.print(SUM(2,2,3))
11.print(SUM(5))
12.print(SUM(3,4))
13.print(SUM(1,3))
```

OUTPUT ?

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.

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FIND OUTPUT 5

PROBLEM 8

```
def FUN( a=2 , b=7 ):
    a+=2
    b*=5
    print (a, " @ ", b)
FUN( 3 , 2 )
```

OUTPUT

I [5 @ 10]

CODE

```
1. FUN( 3 , 4 )
2. FUN( 7 )
3. FUN( 16,10 )
4. FUN( 8 )
5. FUN( )
6. FUN( 3,3)
7. FUN( 6,6 )
8. FUN( 0,1 )
9. FUN( 16 )
10.FUN( 1,2 )
11.FUN( 4,"CD" )
12.FUN( 3, "A" )
13.FUN( 2, "Ravi" )
14.FUN( 3,1)
15.FUN( 1,1)
16.FUN(  0, len("SUMAN"))
17.FUN( -10,-11 )
18.FUN(len("LAN", len("MAN" )
19.FUN( 13,-3)
20.FUN(len("XYZ"), "XYZ" )
```

OUTPUT ?

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FIND OUTPUT 6

PROBLEM 9

```
def FUN( X , Y=7 , Z=2):
    X+=Y
    Y*=Z
    Z=X+Y
    print (X, " # ", Y, " @ ", Z )
FUN( 3 , 2, 4 )
```

OUTPUT

I [5 # 8 @ 13]

CODE

1. FUN(7 , 8, 4)
2. FUN(2 , 3, 4)
3. FUN(0 , 1, 4)
4. FUN(2 , 3, 4)
5. FUN(1 , 2, 4)
6. FUN(2)
7. FUN( )
8. FUN(2 , 2, 2)
9. FUN(2 , 2)
10. FUN(7 , 2, 1)
11. FUN(1 , 10, 2)
12. FUN(1 , 1, 1)
13. FUN(1 , 0, 0)
14. FUN(0 , 11, 2)
15. FUN(7 , 1)
16. FUN(11 , 2, 8)
17. FUN(4 , 3, 7)
18. FUN(2 ,4, 6)
19. FUN(5, 5, 5)
20. FUN(10, 6, 1)

OUTPUT ?

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.
19.
20.

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Find Output Set 3

Function Arguments as default value

Arguments as default

Problem 1

```
4 def FUN(a, b):
5     a+=2
6     b*=5
7     print(a, ":",b)
1 a, b=4 , 8
2 print(a, ":",b)
3 FUN(a , b)
8 print(a, ":",b)
```

II

I

III

OUTPUT

I 4 : 8
II 6 : 40
III 4 : 8

Problem 2

```
x=2
def FUN(a=5):
    global x
    a+=2
    x+=1
    b=a + x
    print(a," : ", b," : ", x)
a= 4
FUN(a); FUN(3)
FUN(); FUN(4)
print("x= ",x)
```

OUTPUT ?

I 6 : 9 : 3
II 5 : 9 : 4
III 7 : 12 : 5
IV 6 : 12 : 6
x= 6

Problem 3

```
def FUN(a,  b=7  ):
    a+=2
    b*=5
    print(a, ":", b)
a, b = 4 , 8
print(a, ":", b)
FUN(a, b)
print(a , ":", b)
FUN(a)
FUN(b)
```

OUTPUT ?

I 4:8
II 6:40
III 4:8
IV 6:35
V 10:35

Problem 4

```
def FUN ( a=5  ,  b=7):
    a+=2
    b*=5
    print(a, ":", b)
a, b=4,8
print(a, ":",b)
FUN(a, b)
FUN(a)
FUN(b)
FUN()
```

OUTPUT ?

I 4:8
II 6:40
III 6:35
IV 10:35
V 7:35

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Find Output Set 3 with output

Function Arguments as default value

Arguments as default

Problem 1

```
4 def FUN(a, b):
5     a+=2
6     b*=5
7     print(a, ":",b)
1 a, b=4 , 8
2 print(a, ":",b)
3 FUN(a , b)
8 print(a, ":",b)
```

II I III

4 , 10 ,15
5 ,11, 16
6, 12, 17
7, 13, 18
1
2
3
8
9
14
19

OUTPUT

I 4 : 8
II 6 : 40
III 4 : 8

Problem 2

```
def FUN(a, b=7 ):
    a+=2
    b*=5
    print(a, ":", b)
a, b = 4 , 8
print(a, ":", b)
FUN(a, b)
print(a , ":", b)
FUN(a)
FUN(b)
print(" DONE ")
```

II IV V I III

OUTPUT

I 4:8
II 6:40
III 4:8
IV 6:35
V 10:35
DONE

Problem 3

```
def FUN ( a=5 , b=7 ):
    a+=2
    b*=5
    print(a, ":", b)
a, b=4,8
print(a, ":",b)
FUN(a, b)
FUN(a)
FUN(b)
FUN()
```

II III IV V I

OUTPUT

I 4:8
II 6:40
III 6:35
IV 10:35
V 7:35

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Find Output Set 4

Problem 1

```
4,10,16,22  def s( a=6 , b=7 ):
5,11,17,23      a+=2
6,12,18,24      b*=5
7,13,19,25      print(a, ":", b)
1           a, b=4,8
2           print(a, ":",b)
3           s(a, b)
8           print(a, ":",b)
9           s(a)
14          print(a, ":",b)
15          s(b)
20          print(a, ":",b)
21          s()
26          print(a , ":", b)
```

```
4 : 8
6 : 40
4 : 8
6 : 35
4 : 8
8 : 35
4 : 8
8 :35
4: 8
```

Problem 2

```
4     def func ( x, y=10 ):
5 False if x%y==0 :
            return x+2
6         else:
7             return y-1
1     p , q=20,23;
2     print(p ,",", q)
3     q= func (p , q)
8     print(p ,",", q)
```

```
20 , 23
20 , 22
```

Problem 3

```
def FUN(a, b=10 ):
    print(a , ",", b)
a, b=4,13
print(a, ", " ,b)
FUN(a , b)
FUN(a)
FUN(b)
FUN(b , a)
```

```
4 , 13
4 , 13
4 , 10
13 , 10
13 , 4
```

Problem 4

```
4     def func ( x , y ):
5 False if x[0]%y[0]==0 :
            return x[0]+2
6         else:
7             return y[0]-1
1     p, q=[20],[23];
2     print(p, ",", q)
3     q= func (p ,q)
8     print(p, ",",q)
```

```
[20] , [23]
[20] , 22
```

PASSING LIST AS ARGUMENT

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Find Output 7

Problem 1

Single Arguments as LIST

```
def FUN (a, b):
    a+=2
    b[0]=b[0]+5
    print(a, ":",b)
a, b=4,[8]
print(a, ":",b)
FUN(a , b)
print(a, ":",b)
```

OUTPUT

I 4 : [8]
II 6 : [13]
III 4 : [13]

LIST a= [4] b= [8]

Problem 2

Both Arguments as LIST

```
def FUN (a, b):
    a[0]+=2
    b[0]+=5
    print(a , ":",b)
a , b= [4] , [8]
print(a, ":",b)
FUN(a , b)
print(a , ":",b)
```

OUTPUT

I [4] : [8]
II [6] : [13]
III [6] : [13]

Function Arguments as default value

Arguments as default

Problem 3

```
def FUN ( a , b=7 ):
    a+=2
    b*=5
    print(a, ":", b)
a, b= 4, 8
print(a, ":",b)
FUN(a, b)
print(a, ":",b)
FUN(a)
print(a, ":",b)
```

OUTPUT

I 4 : 8
II 6 : 40
III 4 : 8
IV 6 : 35
V 4 : 8

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Find Output 7 Process

LIST a= [4] b= [8]

Problem 1

Single Arguments as LIST

```
4 def FUN (a, b):
5     a+=2
6     b[0]=b[0]+5
7     print(a, ":",b)
1 a, b=4,[8]
2 print(a, ":",b)
3 FUN(a , b)
8 print(a, ":",b)
```

II, I, III

OUTPUT

I: 4 : [8]
II: 6 : [13]
III: 4 : [13]

Problem 2

Both Arguments as LIST

```
4 def FUN (a, b):
5     a[0]+=2
6     b[0]+=5
7     print(a , ":",b)
1 a , b= [4] , [8]
2 print(a, ":",b)
3 FUN(a , b)
8 print(a , ":",b)
```

II, I, III

OUTPUT

I: [4] : [8]
II: [6] : [13]
III: [6] : [13]

Function Arguments as default value

Problem 3

Arguments as default

```
4,10 def FUN ( a , b=7 ):
5,11     a+=2
6,12     b*=5
7,13     print(a, ":", b)
1        a, b= 4, 8
2        print(a, ":",b)
3        FUN(a, b)
8        print(a, ":",b)
9        FUN(a)
14       print(a, ":",b)
```

II, IV, I, III, V

OUTPUT

I: 4 : 8
II: 6 : 40
III: 4 : 8
IV: 6 : 35
V: 4 : 8

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Find Output Set 5 Examples

Problem 1

```
4          11
5 F,       12 F,
  NO         NO
6 T,       13 T
7          14
1
2
3,8
9
10,        15
           16
```

```
def func(x, y=10):
    if x%y==0 :
        return x+2
    else:
        return y-1
p , q=20,23;
print(p ,",",q)
q=func(p , q)
print(p ,",",q)
p=func(q)
print(p ,",", q)
```

```
20 , 23
20 , 22
9 , 22
```

Problem 2

```
4,11,18
5 F, 12 F,19 F
  NO  NO   NO
6 T ,13 T,20 T
7   ,14  21
1
2
3,8
9
10,15
16
17,22
23
```

```
def func(x, y=10):
    if x%y==0:
        return x+2
    else:
        return y-1
p , q=20,23;
print(p ,",",q)
q=func(p , q)
print(p ,",",q)
p=func(q)
print(p ,",",q)
q=func(p)
print(p , ",", q)
```

```
20 , 23
20 , 22
9 , 22
9 , 9
```


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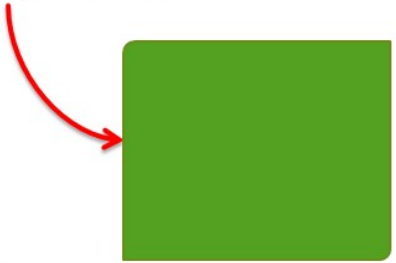
Find Output Set 6 Problems

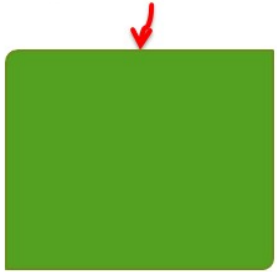
Problem 1

```
def execute(x , y=200 ):
    temp =x + y
    x+=temp
    if(y!=200):
        print(temp ,",", x , ",", y)
a , b =50,20
execute(b)
print(a ,",", b)
execute(a , b)
print(a ,",", b)
```



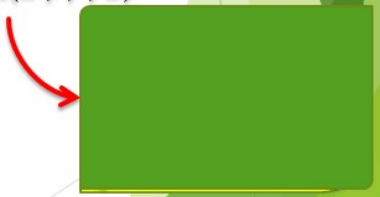
Problem 2

```
def execute(x , y=15 ):
    temp=x + y
    x+=temp
    if(y<=20):
        print(temp ,",", x , ",", y)
a , b =50,20
execute(b)
print(a ,",", b)
execute(a , b)
print(a ,",", b)
```



Problem 3

```
def execute(x , y=20  ):
    temp=x*y
    x+=temp
    if(y>=20):
        print(temp ,",", x , ",", y)
a , b =50,20
execute(b)
print(a ,",", b)
execute(a , b)
print(a ,",", b)
```



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Find Output Set 6 PROCESS

Problem 1

```
3,10    def execute(x , y=200 ):
4,11        temp =x + y
5,12        x+=temp
6 T,13 F    if(y!=200):
  7   NO        print(temp ,",", x , ",", y)
1           a , b =50,20
2           execute(b)
8           print(a ,",", b)
9           execute(a , b)
14          print(a ,",", b)
```

```
50 , 20
70 , 120 , 20
50 , 20
```

Problem 2

```
3,10    def execute(x , y=15 ):
4,11        temp=x + y
5,12        x+=temp
6 T,13 T    if(y<=20):
7   14          print(temp ,",", x , ",", y)
1           a , b =50,20
2           execute(b)
8           print(a ,",", b)
9           execute(a , b)
15          print(a ,",", b)
```

```
35 , 55 , 15
50 , 20
35 , 55 , 15
50 , 20
```

Problem 3

```
3,10    def execute(x , y=20 ):
4,11        temp=x*y
5,12        x+=temp
6 T,13 T    if(y>=20):
7   14          print(temp ,",", x , ",", y)
1           a , b =50,20
2           execute(b)
8           print(a ,",", b)
9           execute(a , b)
15          print(a ,",", b)
```

```
400 , 420 , 20
50 , 20
1000 , 1050 , 20
50 , 20
```


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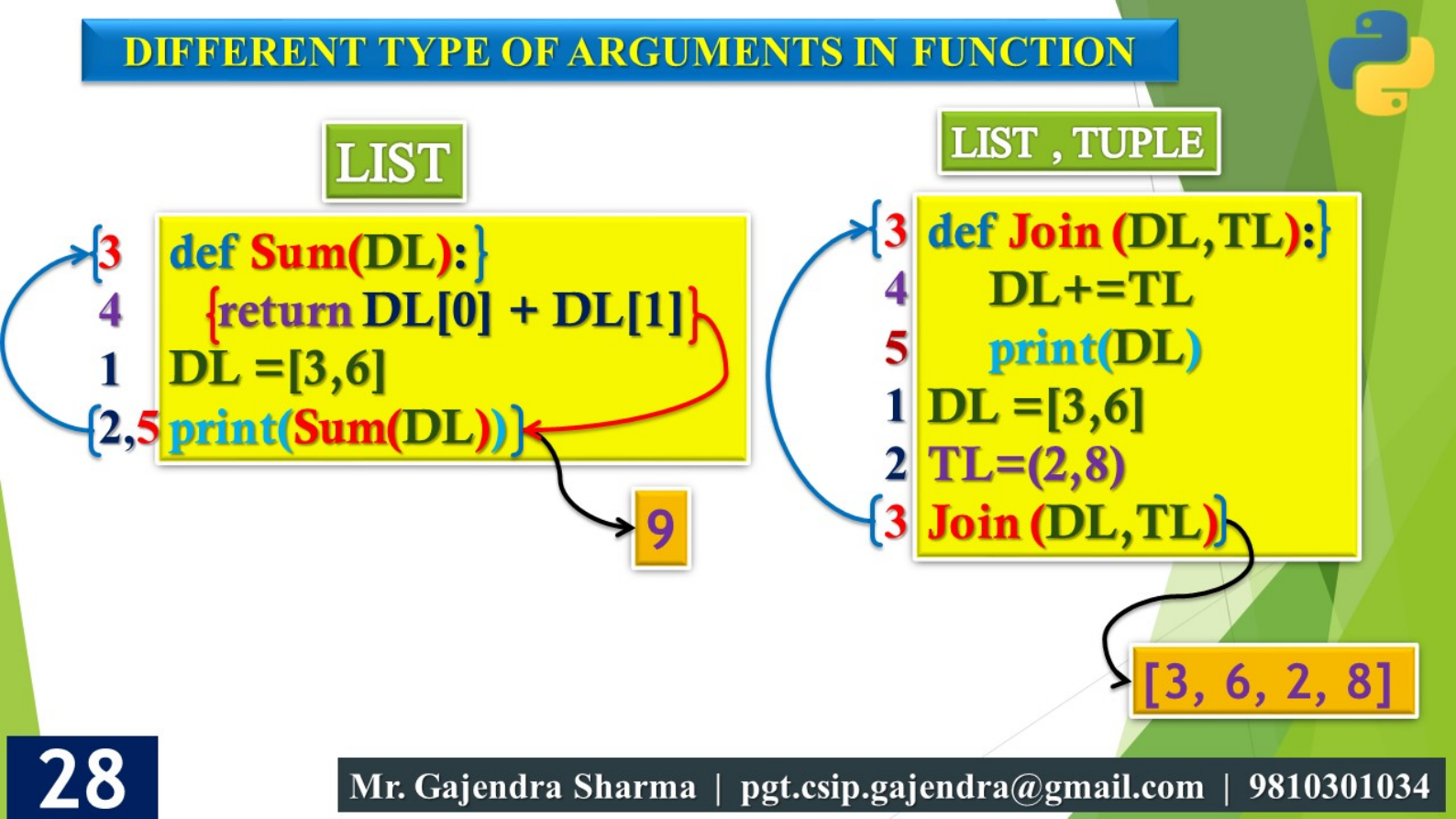
DIFFERENT TYPE OF ARGUMENTS IN FUNCTION



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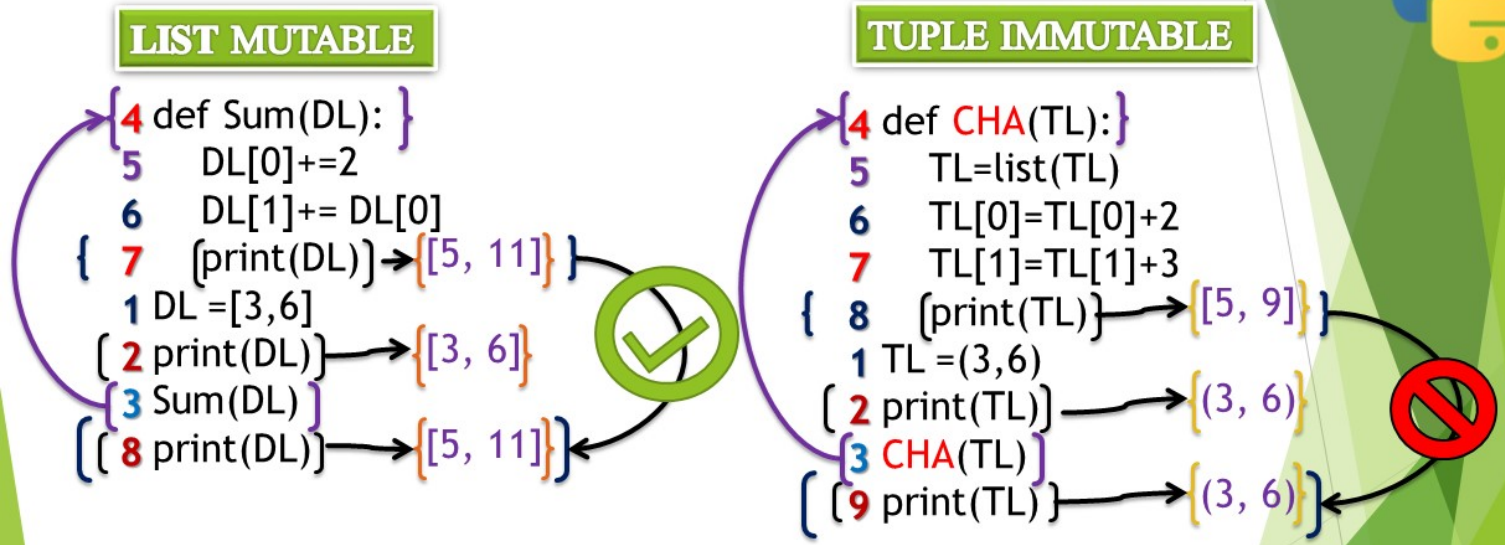
DIFFERENT TYPE OF ARGUMENTS IN FUNCTION



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DIFFERENT TYPE OF ARGUMENTS IN FUNCTION

```
def SELECT_CLASS(REC):
    if REC['AGE']>=15 and REC['AGE']<17:
        REC['CLASS']="10 A"
    elif REC['AGE']>=12 and REC['AGE']<15:
        REC['CLASS']="9 A"
    else:
        REC['CLASS']="Wait"
    print(REC)
STU1={'AGE':14,'NAME':'KAMAL','CLASS':'**'}
STU2={'AGE':16,'NAME':'KUNAL','CLASS':'**'}
STU3={'AGE':10,'NAME':'KARAN','CLASS':'**'}
print("Before Calling:")
print(STU1)
print(STU2)
print(STU3)
print("In Function:")
SELECT_CLASS(STU1)
SELECT_CLASS(STU2)
SELECT_CLASS(STU3)
print("After Function:")
print(STU1)
print(STU2)
print(STU3)
```

```
Before Calling:
{'AGE': 14, 'NAME': 'KAMAL', 'CLASS': '**'}
{'AGE': 16, 'NAME': 'KUNAL', 'CLASS': '**'}
{'AGE': 10, 'NAME': 'KARAN', 'CLASS': '**'}
In Function:
{'AGE': 14, 'NAME': 'KAMAL', 'CLASS': '9 A'}
{'AGE': 16, 'NAME': 'KUNAL', 'CLASS': '10 A'}
{'AGE': 10, 'NAME': 'KARAN', 'CLASS': 'Wait'}
After Function:
{'AGE': 14, 'NAME': 'KAMAL', 'CLASS': '9 A'}
{'AGE': 16, 'NAME': 'KUNAL', 'CLASS': '10 A'}
{'AGE': 10, 'NAME': 'KARAN', 'CLASS': 'Wait'}
```


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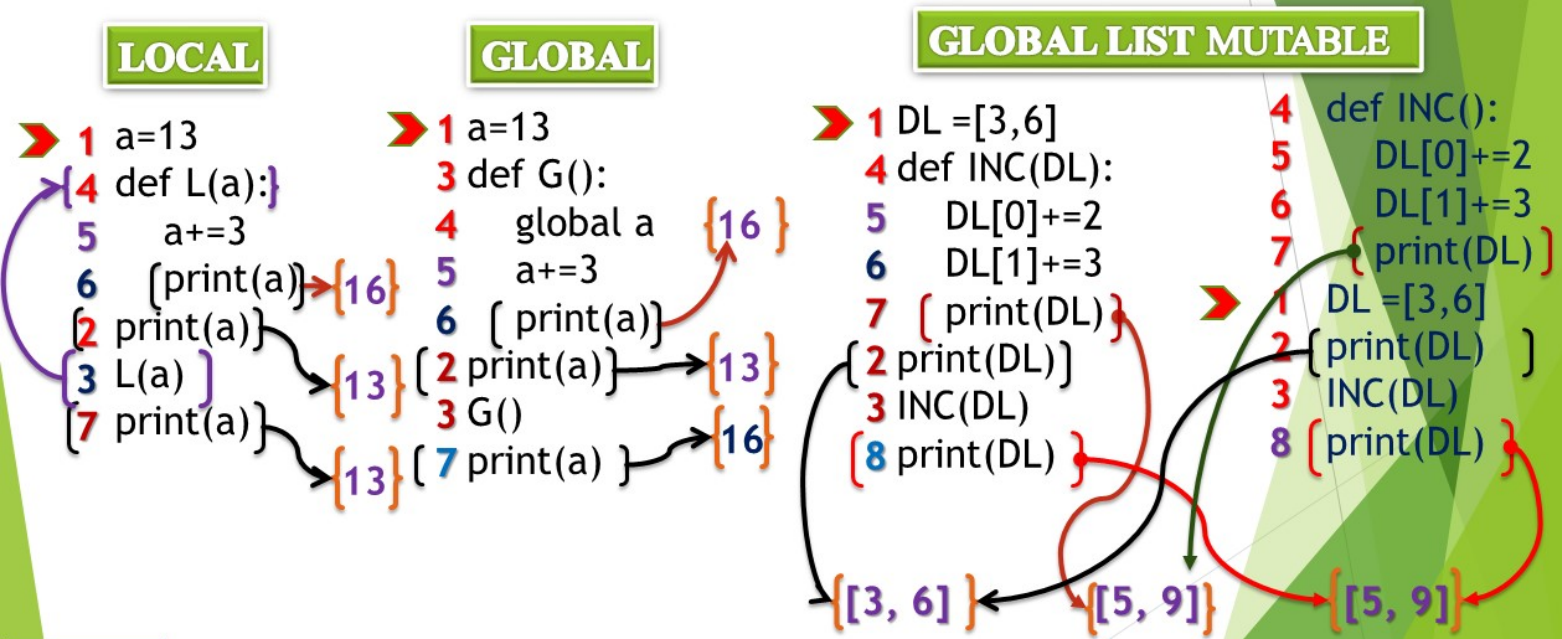
GLOBAL AND LOCAL VARIABLE

Normally, when you create a variable inside a function, that variable is local, and can only be used inside that function. To create a global variable inside a function, you can use the global keyword.



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GROUP DATA ARGUMENTS IN FUNCTION

Crate Tuple By Default

```
4  def Group(*T):
5      print(T)
1  a , b , c=12,23,21
2  print(a, ",", b,"," , c)
3  Group(a , b , c)
```

12 , 23 , 21

(12, 23, 21)

```
3,6  def Group(*T):
4,7      print(T)
1    a , b , c=12,23,21
2    Group(a , b, c)
5    Group(12,"Pawan","10 A",17)
```

(12, 23, 21)

(12, ' Pawan ' ,'10 A', 17)

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GROUP DATA ARGUMENTS IN FUNCTION

Crate Tuple By Default

```
4,7 def Group(Roll,*T):
5,8     print(Roll , T)
1   Group(1,22,333)
2   Roll=11
3   Group(Roll,"Naman","10 B",16)
6   Group(12,"Pawan","10 A",17)
```

```
1 (22, 333)
11 (' Naman ', '10 B', 16)
12 ('Pawan', '10 A', 17)
```

Crate Dictionary

```
2 def Group(**Dic):
3     print( Dic )
1 Group(Name="Naman", Class="10 B", Age= 16)
```

```
{'Name': ' Naman', 'Class': '10 B', 'Age': 16}
```

Multi Arguments

```
3 def Group(Roll,**Dic):
4     print("Roll: ",Roll ,"\n Stu Info: ", Dic)
1 Roll=11
2 Group(Roll , Name="Naman", Class="10 B", Age= 16)
```

```
Roll: 11
{'Name': ' Naman', 'Class': '10 B', 'Age': 16}
```


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GROUP DATA ARGUMENTS IN FUNCTION

Example: Dictionary

```
2     def Group(**Dic):
3         print("------------")
4         print("Column  Info")
5         print("------------")
6,8,10    for Column,Info in Dic.items():
7,9,11        print(Column,":",Info)
12        print("------------")
1     Group(Name="Naman", Class="10 B", Age= 16)
```

```
------------
Column  Info
------------
Name : Naman
Class : 10 B
Age : 16
------------
```

Dic.items()

KEYS: Name, Class, Age

VALUES: Naman, 10 B, 16

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Programs

FUNCTION

1. WAP TO ADD 2 NUMBERS.
2. WAP TO MUL 3 NUMBERS.
3. WAP TO DISPLAY AVG OF 5 NUMBERS.
4. WAPF TO CALCULATE SIMPLE INTEREST.
5. WAP TO FIND NUMBER IS -VE OR +VE.
6. WAPF TO FIND GRATER NO IN X AND Y.
7. WAPF TO FACTORIAL OF A GIVEN NO.
8. WAP TO FIND GIVEN NUMBER IS PRIME OR NOT.
9. WAPF TO DISPLAY RESULT X^N.
10. WAPF TO DISPLAY RESULT X^(N-1).
11. WAPF TO DISPLAY NUMBER FROM 1 TO N.
12. WAPF TO DISPLAY NUMBER FROM N TO M.
13. WAPF to Display Even/Odd numbers from 1 to N.
14. Write a menu driven program to calculate Area:
    1 Area of circle [A=πr^2] (Where π can be consider as 3.14)
    2 Area of squire [A=a*a]
    3 Area of rectangle [A=l*b]
    4 Area of Cylinder [A=2πrh + 2πr^2] (Where π can be consider as 3.14)
    5 Area of Triangle [A=(B*H)/2]
15. WAP to calculate Volume as follows:
    1 Volume of cube [V=s^3]
    2 Volume of sphere [V=4/3πr^3] (Where π can be consider as 3.14)
    3 Volume of cuboid [V=l*b*h]
    4 Volume of Cylinder [V=πr^2h] (Where π can be consider as 3.14)
16. WAP to print the discount in rupees for a salesman. The discount is based on the following conditions

SALES	DIS RATE (%)
Upto ₹5000	5
₹5001 to ₹10000	8
Above ₹10000	10

#2. multiply 3 numbers

```
def mul (a , b, c):
    return a*b*c
a=int(input("Enter a: "))
b=int(input("Enter b: "))
c=int(input("Enter c: "))
Result= mul (a , b, c)
print(Result)
```

```
Enter a: 3
Enter b: 2
Enter c: 3
18
```

#3.average 5 numbers

```
def Avg(a , b, c, d, e):
    return (a+ b+ c+ d+ e)/5
a=int(input("Enter a: "))
b=int(input("Enter b: "))
c=int(input("Enter c: "))
d=int(input("Enter d: "))
e=int(input("Enter e: "))
Result= Avg(a, b, c, d, e)
print(Result)
```

```
Enter a: 2
Enter b: 3
Enter c: 4
Enter d: 5
Enter e: 1
3.0
```

#5. number is -ve or +ve

```
def check(a):
    if a<0:
        print("-ve")
    else:
        print("+ve")
a=int(input("Enter a: "))
check(a)
```

```
Enter a: -9
-ve
```

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Assignments Class XII - Working with functions

1.
```
def Fun1():
    print('Python, let's fun with functions')
Fun1()
```

2.
```
def add(i):
    if(i*3%2==0):
        i*=i
    else:
        i*=4
    return i
a=add(10)
print(a)
```

3.
```
import math
def area(r):
    return math.pi*r*r
a=int(area(10))
print(a)
```

4.
```
def fun1(x, y):
    x = x + y
    y = x - y
    x = x - y
    print('a=',x)
    print('b=',y)
a = 5
b = 3
fun1(a,b)
```

5.
```
def div5(n):
    if n%5==0:
        return n*5
    else:
        return n+5
def output(m=5):
    for i in range(0,m):
        print(div5(i),'@',end=" ")
    print('n')
output(7)
output()
output(3)
```

6.
```
def sum(*n):
    total=0
    for i in n:
        total+=i
        print('Sum=', total)
sum();    sum(5);    sum(10,20,30)
```

7.
```
def func(b):
    global x
    print('Global x=', x)
    y = x + b
    x = 7
    z = x - b
    print('Local x = ',x)
    print('y = ',y)
    print('z = ',z)
x=5
func(10)
```

8.
```
def func(x,y=100):
    temp = x + y
    x += temp
    if(y!=200):
        print(temp,x,x)
a=20
b=10
func(b)
print(a,b)
func(a,b)
print(a,b)
```

9.
```
def get(x,y,z):
    x+=y
    y-=1
    z*=(x-y)
    print(x,'#',y,'#',z)
def put(z,y,x):
    x*=y
    y+=1
    z*=(x+y)
    print(x,'$',y,'$',z)
a=10
b=20
c=5
put(a,c,b)
get(b,c,a)
put(a,b,c)
get(a,c,b)
```

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ERROR BASED QUESTIONS:

1.
```
def in(x,y):
    x=x + y
    print(x.y)
    x*=y
    print(x**y)
```
2.
```
void get(x=10,y):
  x = x + y
  print(x,n,y)
```
3.
```
// Program to compute result
  def res():
    eng = 56
    math = 40
    sci = 60
    if eng<=35 || math<=35 ||
      sci=35
      print('Not Qualified')
      else:
        print("Qualified")
```
4.
```
a=5, b=10
  def swap(x,y):
    x = a + b
    y = x - y
    x = x - y
  swap(a)
  swap(15,34)
  swap(b)
  swap(a,b)
```
5.
```
def cal_dis(qty,rate=50,dis_rate): #discount rate = 5%
    bil_amt = (qty*rate)*dis_rate
    print(bil_amt)
  caldis(10)
  cal_dis(10,50,0.05)
```

Theory-based questions:

1. What is a function?
2. Why programmers need functions in python programming?
3. How to create a function in python? Explain in detail.
4. What are the parts of functions? Explain with suitable example.
5. How to call a function? Write steps.
6. What are the comments? What are the role comments in the program? How to write a single line comments and multi-line comments?
7. Explain the physical line structure of a program. Illustrate with an example.
8. Illustrate the flow of execution in the function call statement.
9. Write and explain the types of functions supported by python.
10. Write the ways of import module in the python program.
11. Differentiate between parameters and arguments.
12. What are the arguments supported by python? Explain each of them with a suitable example.
13. What is local variable and global variable? Explain with example.

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```
mylist = [1, 4, -5, 10, -7, 2, 3, -1]
x=[n for n in mylist if n > 0]
print(x)#[1, 4, 10, 2, 3]
x=[n for n in mylist if n < 0]
print(x)#[-5, -7, -1]
x = (n for n in mylist if n > 0)
print(x)
for e in x :print(e)
values = ['1', '2', '-3', '-', '4', 'N/A', '5']
def is_int(val):
    try:
        x = int(val)
        return True
    except ValueError:
        return False
ivals = list(filter(is_int, values))
print(ivals)
```

Worksheet

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FUNCTION

```
def fun(a,b=10):
    if a%b==0:
        return a+2
    else:
        return a+b
```

1. p,q =10,20
2. p,q =15,10
3. p,q =20,15
4. p,q =5,10
5. p,q =11,12
6. p,q =12,15

```
p=fun(p , q)
print(p," : ",q)
q=fun(p , p)
print(p," : ",q)
```


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FUNCTION

```
def fun(a=20,b=10):
    if a%3==0:
        return a+2
    elif a%5==0:
        return b+3
    elif a%7==0:
        return a+b
    else:
        return a-b+5
```

1. p,q=10,22
2. p,q =15,11
3. p,q =28,13
4. p,q =16,10
5. p,q =9,9
6. p,q =12,13
7. p,q =10,9

```
I   p=fun(p , q)
    print(p," : ",q)
II  q=fun(p , p)
    print(p," : ",q)
III p=fun(q , q)
    print(p," : ",q)
VI  p=fun(q)
    print(p," : ",q)
V   q=fun(p)
    print(p," : ",q)
VI  p=fun() #a=20,b=10
    print(p," : ",q)
```

1:
25 : 22
25 : 28
56 : 28
38 : 28
38 : 33
13 : 33

2:
17 : 11
17 : 5
8 : 5
13 : 5
13 : 8
13 : 8

3:
41 : 13
41 : 5
8 : 5
13 : 5
13 : 8
13 : 8

4:
11 : 10
11 : 5
8 : 5
13 : 5
13 : 8
13 : 8

5:
11 : 9
11 : 5
8 : 5
13 : 5
13 : 8
13 : 8

6:
14 : 13
14 : 28
56 : 28
38 : 28
38 : 33
13 : 33

7:
12 : 9
12 : 14
28 : 14
24 : 14
24 : 26
13 : 26

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Find Error in Declaration:

1. def A(a, b , c=5) :print(a, b, c)
2. def A(a,b=4,c=5) :print(a, b, c)
3. def A(a=3,b,c=5) :print(a, b, c)
4. def A(a=3,b=4,c) :print(a, b, c)
5. def A(a=3,b,c) :print(a, b, c)
6. def A(a,b=4,c) :print(a, b, c)
7. def A(a=3,b=4,c=5) :print(a, b, c)

Values after Calling:

```
def A(a=3,b=7,c=10):
    print(a , b, c)
```

A()	: a=	,b=	,c=
A(13)	: a=	,b=	,c=
A(13,4)	: a=	,b=	,c=
A(2,3)	: a=	,b=	,c=
A(2)	: a=	,b=	,c=
A(2,3,4)	: a=	,b=	,c=
A(4,6)	: a=	,b=	,c=
A(6)	: a=	,b=	,c=
A(3,7,9)	: a=	,b=	,c=

```
def Result(a,b,c):
    if a%2==0:
        return a+b
    elif b%3==0:
        return b*c
    elif c%5==0:
        return c*a
    else:
        return a+b+c
print(Result(2,3,4))      5
print(Result(3,4,6))      13
print(Result(5,7,10))     50
print(Result(9,6,8))      48
print(Result(17,11,9))    37
print(Result(12,10,8))    22
print(Result(11,13,14))   38
```

```
def Result(a,b,c):
    if a%2==0:
        return a+b
    if b%3==0:
        return b*c
    if c%5==0:
        return c*a
    else:
        return a+b+c
print(Result(2,3,4))      5
print(Result(3,4,6))      13
print(Result(5,7,10))     50
print(Result(9,6,8))      48
print(Result(17,11,9))    37
print(Result(12,10,8))    22
print(Result(11,13,14))   38
```

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