1.16- Tracing Python Programs

1. Tracing the values of all variables in the following program and show the corresponding output.

Python Code:

```
#get input from user

num=int(input("Enter the number of multiplication table: \n"))

i=1;

step=10;

while i ≤ step:

     print(i,'x',num, '=',i*num)

     i+=1

print('End of the Program')
```

Starting of the program		
Reading the variable 'num' from user. Assume, users enters 'num' =10 i=1 (initialization) step=3 (initialization)		Enter the number for multiplication table: 10
Iteration 1	num=10 i=1 step = 3 while condition (i ≤ step) i.e. while condition (1 ≤ 3): True print(i,'x',num,'=',i*num) i.e. 1 'x' 10 '=' (1x10) '=' 10 i=i+1 so i=1+1 i.e. i=2	Output Enter the number for multiplication table: 10 1 x 10 = 10
Iteration 2	num=10 i=2 step = 3 while condition (i ≤ step) i.e. while condition (2 ≤ 3): True print(i,'x',num,'=',i*num) i.e. 2 'x' 10 '=' (2x10) '=' 20 i=i+1 so i=2+1 i.e. i=3	Output Enter the number for multiplication table: 10 1 x 10 = 10 2 x 10 = 20
Iteration 3	num=10 i=3 step = 3	Output Enter the number for multiplication table:

	while condition (i ≤ step) i.e. while condition (3 ≤ 3): True print(i,'x',num,'=',i*num) i.e. 3 'x' 10 '=' (3x10) '=' 30 i=i+1 so i=3+1 i.e. i=4	10 1 x 10 = 10 2 x 10 = 20 3 x 10 = 30
Iteration 4	num=10 i=4 step = 3 while condition (i ≤ step) i.e. while condition (4 ≤ 3):False ~~print(i,'x',num,'=',i*num)~~ ~~i.e. 4 'x' 10 '=' (3x10) '=' 30~~ ~~i=i+1~~ ~~so i=4+1 i.e. i=5~~	Output Enter the number for multiplication table: 10 1 x 10 = 10 2 x 10 = 10 3 x 10 = 30
End of the program		Output Enter the number for multiplication table: 10 1 x 10 = 10 2 x 10 = 10 3 x 10 = 30 End of the Program

2. Trace the values of all variables in the following program and show the corresponding output.

Python Code:

```
i = 1

while i < 6:

     print(i)

     if i == 3:

          a=5

          break

     i  +=1
```

Starting of the program		
i=1 (initialization) step=6 (initialization)		

Iteration 1	i=1
	step=6
	while condition (i < step):
	i.e. while condition (1 < 6): True
	print(i)
	i.e. 1
	if i == 3:
	i.e. 1 == 3: False
	~~a=5~~
	~~break~~
	i = i+1
	so i=1+1 i.e. i=2
		Output
		
		1

Iteration 2	i=2
	step=6
	while condition (i < step):
	i.e. while condition (2 < 6): True
	print(i)
	i.e. 2
	if i == 3:
	i.e. 2 == 3: False
	~~a=5~~
	~~break~~
	i = i+1
	so i=2+1 i.e. i=3
		Output
		
		1
		2

Iteration 3	i=3
	step=6
	while condition (i < step):
	i.e. while condition (3 < 6): True
	print(i)
	i.e. 3
	if i == 3:
	i.e. 3 == 3: True
	a=5
	break
	~~i=i+1~~
		Output
		
		1
		2
		3

End of the program		Output 1 2 3

3. Trace the values of all variables in the following program and show the corresponding output.

Python Code:

```
i = 0

while i < 6:

     i=i+1

     if i == 3:

          a=5

     continue

print(i)
```

Starting of the program		
i = 0 (initialization) step = 6 (initialization)		
Iteration 1	i = 0 step = 6 while condition (i < step) i.e. while condition (0<6): True i = i+1 i.e. i = 0+1 = 1 if i==3: i.e. 1==3: False ~~a=5~~ ~~continue~~ print(i) i.e. i=1	Output 1
Iteration 2	i = 1 step = 6 while condition (i < step) i.e. while condition (1<6): True i = i+1 i.e. i = 1+1 = 2 if i==3: i.e. 2==3: False ~~a=5~~ ~~continue~~ print(i) i.e. i=2	Output 1 2
Iteration 3	i = 2 step = 6 while condition (i < step) i.e. while condition (2<6): True i = i+1 i.e. i = 2+1 = 3 if i==3:	Output 1 2

	i.e. 3==3: True a=5 continue ~~print(i)~~	
Iteration 4	i = 3 step = 6 while condition (i < step) i.e. while condition (3<6): True i = i+1 i.e. i = 3+1 = 4 if i==3: i.e. 4==3: False ~~a=5~~ ~~continue~~ print(i) i.e. i=4	Output 1 2 4
Iteration 5	i = 4 step = 6 while condition (i < step) i.e. while condition (4<6): True i = i+1 i.e. i = 4+1 = 5 if i==3: i.e. 5==3: False ~~a=5~~ ~~continue~~ print(i) i.e. i=5	Output 1 2 4 5
Iteration 6	i = 5 step = 6 while condition (i < step) i.e. while condition (5<6): True i = i+1 i.e. i = 5+1 = 6 if i==3: i.e. 6==3: False ~~a=5~~ ~~continue~~ print(i) i.e. i=6	Output 1 2 4 5 6
Iteration 7	i = 6 step = 6 while condition (i < step) i.e. while condition (6<6): False ~~i = i+1~~ ~~if i==3:~~ ~~a=5~~ ~~continue~~ ~~print(i)~~	Output 1 2 4 5 6
End of the program		

4. Trace the values of all variables in the following program and show the correspoonding output.

Python Code:

```
print("Program-1")

i=1

while i<=3:

    j=1

    print("\n")

    while j<=5:

        print('*')

        j=j+1

    i=i+1
```

Start of the program		
Printing ("Program-1") i=1(initialization) j=1 (initilization)		Output Program-1

Iteration 1	Print("Program-1")
	i = 1
	while i ≤ 3:
	i.e. while 1 ≤ 3: True
	j=1
	print("\n")
	while j ≤ 5:
	i.e. while 1 ≤ 5: True
	print('*')
	j = j+1
	i.e j= 1+1 = 2
	i = i+1
	i.e. i = 1+1 =2
		Output
		
		Program-1
		
		*
		*
		*
		*
		*

Iteration 2	Print("Program-1")
	i = 2
	while i ≤ 3:
	i.e. while 2 ≤ 3: True
	j=2
	print("\n")
	while j ≤ 5:
	i.e. while 2 ≤ 5: True
	print('*')
	j = j+1
	i.e j= 2+1 = 3
	i = i+1
	i.e. i = 2+1 =3
		Output
		
		Program-1
		
		*
		*
		*
		*
		*
		
		*
		*
		*

		* *

Iteration 3	Print("Program-1")
	i = 3
	while i ≤ 3:
	i.e. while 3 ≤ 3: True
	j=3
	print("\n")
	while j ≤ 5:
	i.e. while 3 ≤ 5: True
	print('*')
	j = j+1
	i.e j= 3+1 = 4
	i = i+1
	i.e. i = 3+1 =4
		Output
		
		Program-1
		
		*
		*
		*
		*
		*
		
		*
		*
		*
		*
		*
		
		*
		*
		*
		*
		*

Iteration 4	Print("Program-1") i = 3 while i ≤ 3: i.e. while 4 ≤ 3: False **End of the program**	Output Program-1 * * * * * * * * * * * * * * *

5. Trace the values of all variables in the following program and show the correspoonding output.

```
i=1
while i<=3:
    j=1
    print("\n")
    while j<=5:
        print(j,end="-")
        j=j+1
    i=i+1
```

i = 1 (initialization) j =1 (initialisation)		

Iteration 1	i = 1
	while i ≤ 3:
	i.e. 1 ≤ 3: True
	j=1
	print("\n")
	while j≤5:
	i.e. 1≤5: True
	print(j,end="-")
	j=j+1 #added till j=5
	i=i+1
	i.e. i=1+1=2
		Output:
		
		1-2-3-4-5-

Iteration 2	i = 2
	while i ≤ 3:
	i.e. 2 ≤ 3: True
	j=1
	print("\n")
	while j≤5:
	i.e. 1≤5: True
	print(j,end="-")
	j=j+1 #added till j=5
	i=i+1
	i.e. i=2+1=3
		Output:
		
		1-2-3-4-5-
		
		1-2-3-4-5-

Iteration 3	i = 3
	while i ≤ 3:
	i.e. 3 ≤ 3: True
	j=1
	print("\n")
	while j ≤ 5:
	i.e. 1 ≤ 5: True
	print(j,end="-")
	j=j+1 #added till j=5
	i=i+1
		Output:
		
		1-2-3-4-5-
		
		1-2-3-4-5-
		
		1-2-3-4-5-

	i.e. i=2+1=4	
Iteration 4	i = 4 while i ≤ 6: i.e. 4 ≤ 6: False ~~j=1~~ ~~print("\n")~~ ~~while j ≤ 5:~~ ~~print(j,end="-")~~ ~~j=j+1~~ ~~i=i+1~~ **End of the program**	Output: 1-2-3-4-5- 1-2-3-4-5- 1-2-3-4-5-

THE END

This Presentation is created by Akshat Kumar [20MIS0183] under guidance of Mr. Shunmuga Perumal Sir.

THANK YOU !!!!!