

Computer Programming Laboratory

B.Tech. 1st Semester



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Faculty	Engineering & Technology
Programme	B. Tech. in Computer Science and Engineering
Year/Semester	1 st Year / 1 st Semester
Name of the Laboratory	Computer Programming Laboratory
Laboratory Code	18ESL109A

List of Experiments

1. Introduction to Python programming environment
2. Variables, data types, operators and expressions
3. Input output operations
4. Logic operations and decision making
5. Loop statements
6. Character and string operations
7. Functions
8. File handling
9. Data structures
10. Libraries

Index Sheet

No .	Lab Experiment	Performing the experiment (7)	Document (7)	Viva (6)	Total Marks (20)
1	Introduction to Python programming environment				
2	Variables, data types, operators and expressions				
3	Input output operations				
4	Logic operations and decision making				
5	Loop statements				
6	Character and string operations				
7	Functions				
8	File handling				
9	Data structures				
10	Libraries				
11	Lab Internal Test conducted along the lines of SEE and valued for 50 Marks and reduced for 20 Marks				
	Total Marks				

Lab Internal Marks =**Signature of the Staff In-charge**

Laboratory 5

Title of the Laboratory Exercise: Loop statements

1. Introduction and Purpose of Experiment

Loop statements are used to repeat a statement or set of statements multiple times. By solving the problems students will be able to apply iterative control statements to control the program execution.

2. Aim and Objectives

Aim

- To develop programs involving loops using appropriate control statements in Python

Objectives

At the end of this lab, the student will be able to

- Apply loop control statements such as *for* and *while* to repeat a block of code

3. Experimental Procedure

- Analyse the problem statement
- Design an algorithm for the given problem statement and develop a flowchart/pseudo-code
- Implement the algorithm in Python language
- Execute the Python program
- Test the implemented program
- Document the Results
- Analyse and discuss the outcomes of the experiment

4. Questions

- Write a program to accept an integer number and reverse the order of digits in the number
- Write a program to accept a list of integers and display the smallest and largest element in the list without using the built in function
- Write a program to perform addition and subtraction of two matrices

5. Calculations/Computations/Algorithms

5.1 Algorithm of program to accept an integer number and reverse the order of digits in the number

Step1: start

Step2: read an integer value, say n

Step3: now, while(n>0):

 remainder :=n%10

 reverse :=(reverse*10)+remainder

 n :=n//10

Step4: write reverse

Step5: stop

5.2 Algorithm of program to accept a list of integers and display the smallest and largest element in the list without using the built in function

Step1: start

Step2: read number of terms in the list, say n

Step3: declare an empty list l

Step4: read elements into the list

Step5: calculate the minimum number in the list by comparing every number with first element

Step6: calculate the maximum number in the list by comparing every number with first element

Step7: write maximum and minimum element on the list

Step8: stop

5.3 Algorithm of program to perform addition and subtraction of two matrices

Step1: start

Step2: read values of matrix A and matrix B

Step3: perform addition and subtraction by following syntax

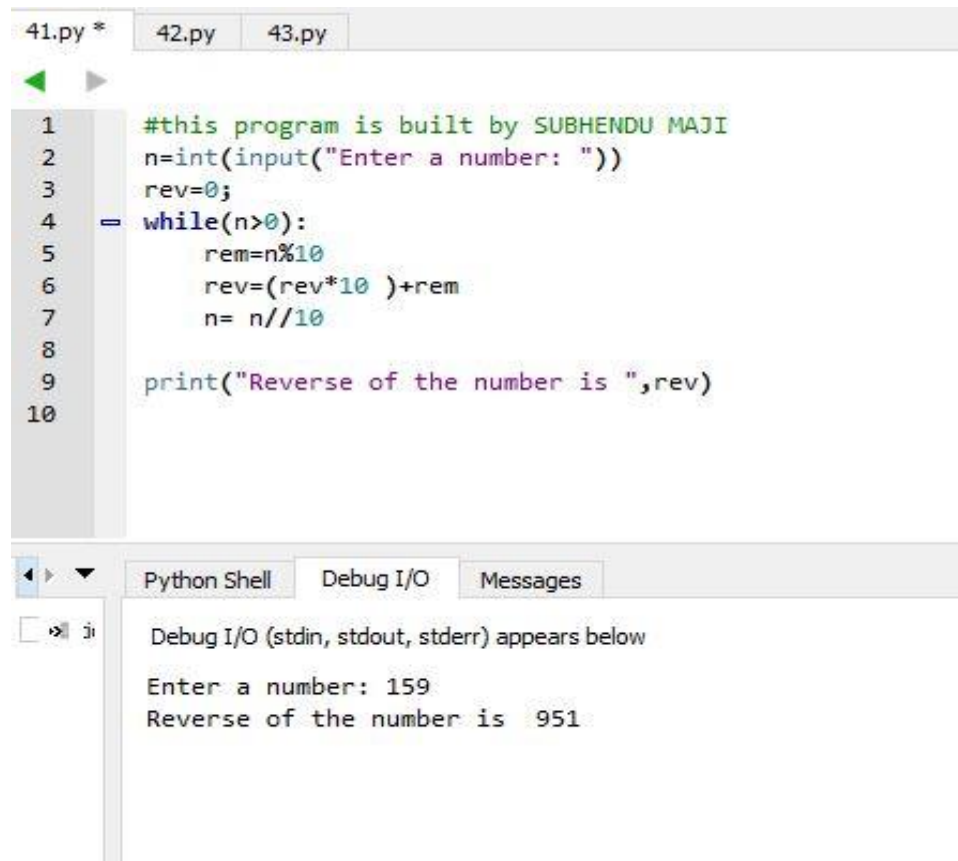
$\text{sum}[i][j] = a[i][j] + b[i][j]$

$\text{dif}[i][j] = b[i][j] - a[i][j]$

step4: write sum[i][j] and dif[i][j]

step5: stop

6. Presentation of Results



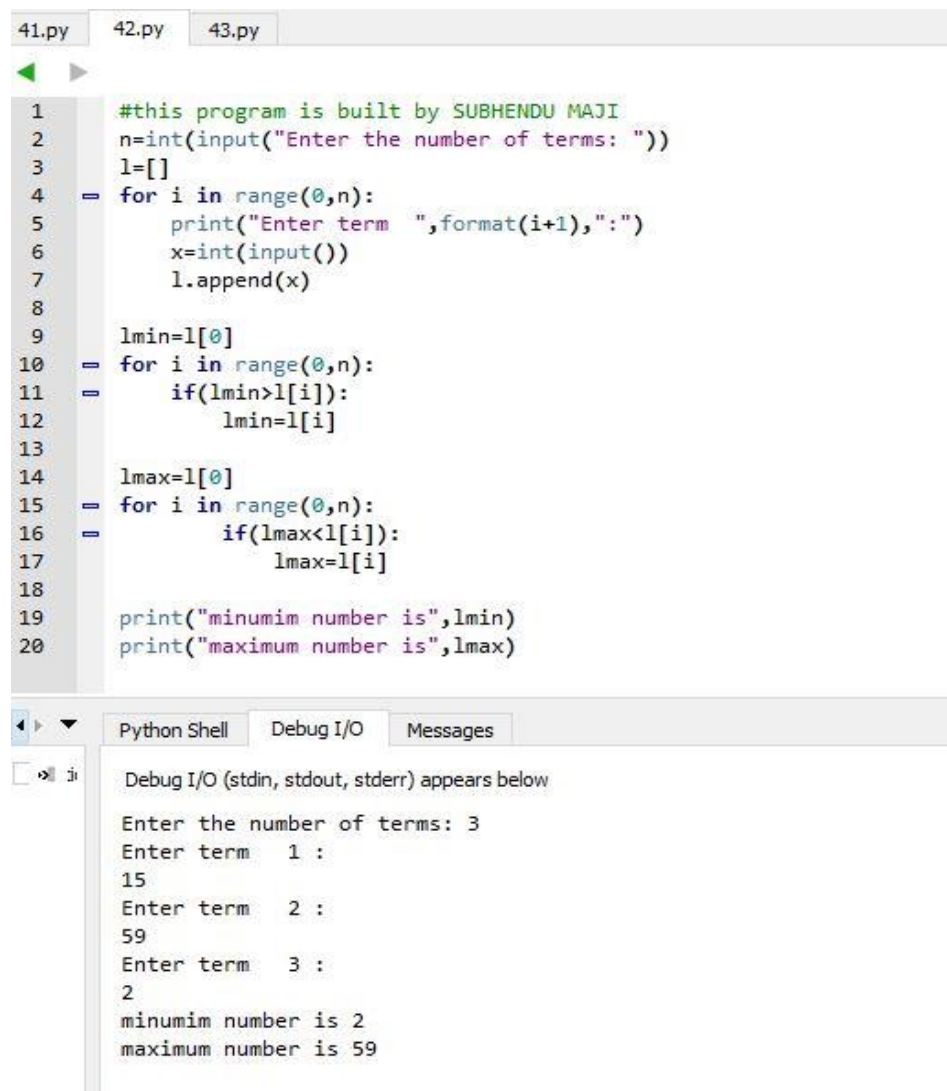
The screenshot displays a Python IDE with a file explorer at the top showing '41.py *', '42.py', and '43.py'. The main editor window contains a Python script for reversing a number. The script is as follows:

```
1 #this program is built by SUBHENDU MAJI
2 n=int(input("Enter a number: "))
3 rev=0;
4 while(n>0):
5     rem=n%10
6     rev=(rev*10)+rem
7     n= n//10
8
9 print("Reverse of the number is ",rev)
10
```

Below the editor, the 'Python Shell' tab is active, showing the program's execution output:

```
Debug I/O (stdin, stdout, stderr) appears below
Enter a number: 159
Reverse of the number is  951
```

figure 6. 1 output of program to accept an integer number and reverse the order of digits in the number



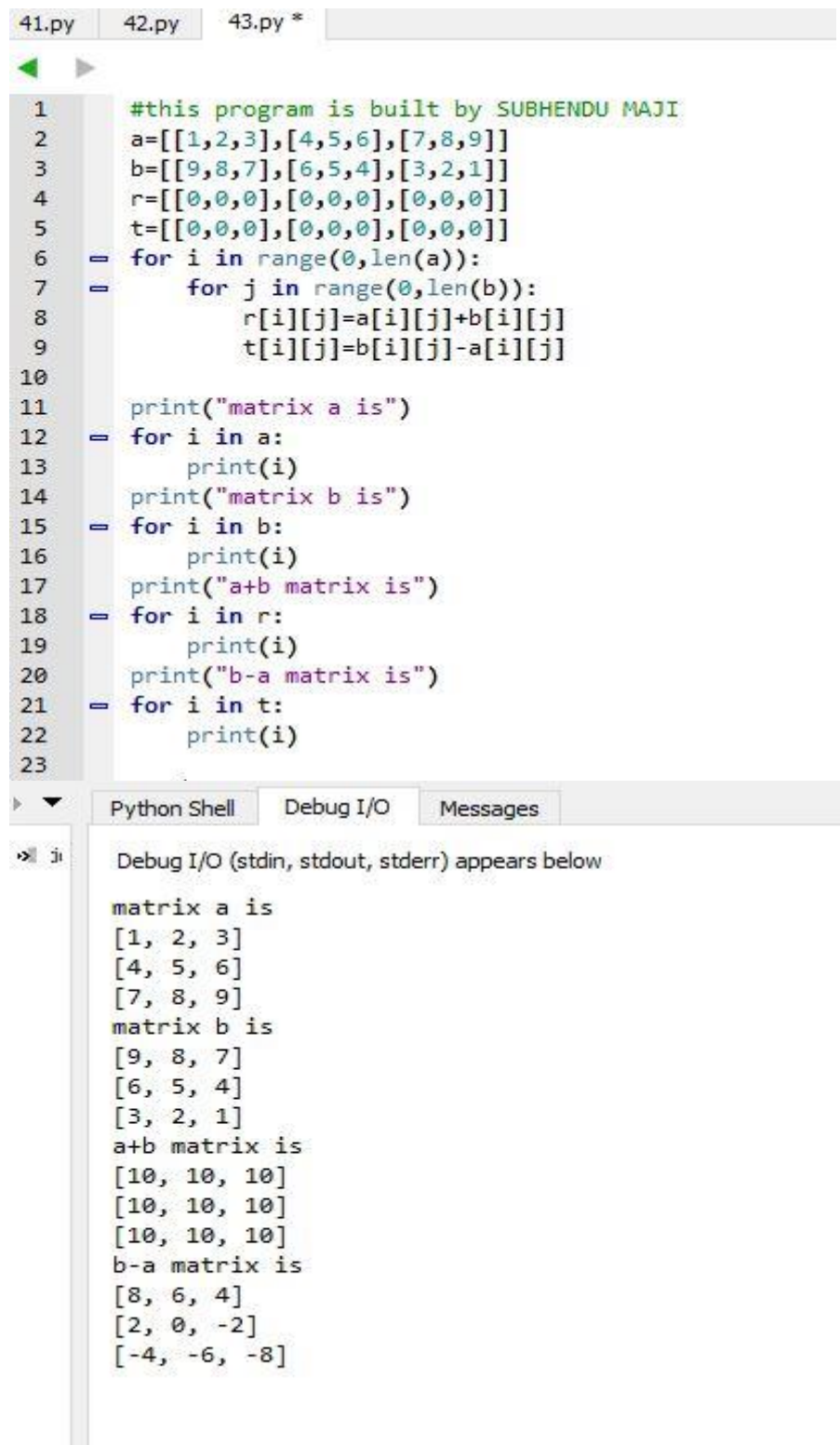
The screenshot shows a Python IDE with three tabs: 41.py, 42.py, and 43.py. The code in 41.py is as follows:

```
1 #this program is built by SUBHENDU MAJI
2 n=int(input("Enter the number of terms: "))
3 l=[]
4 for i in range(0,n):
5     print("Enter term ",format(i+1),":")
6     x=int(input())
7     l.append(x)
8
9     lmin=l[0]
10    for i in range(0,n):
11        if(lmin>l[i]):
12            lmin=l[i]
13
14    lmax=l[0]
15    for i in range(0,n):
16        if(lmax<l[i]):
17            lmax=l[i]
18
19    print("minumim number is",lmin)
20    print("maximum number is",lmax)
```

Below the code editor, there is a 'Python Shell' tab and a 'Debug I/O' tab. The 'Debug I/O' tab is active, showing the following output:

```
Debug I/O (stdin, stdout, stderr) appears below
Enter the number of terms: 3
Enter term 1 :
15
Enter term 2 :
59
Enter term 3 :
2
minumim number is 2
maximum number is 59
```

figure 6. 2 output of program to accept a list of integers and display the smallest and largest element in the list without using the built in function



```
41.py 42.py 43.py *
1      #this program is built by SUBHENDU MAJI
2      a=[[1,2,3],[4,5,6],[7,8,9]]
3      b=[[9,8,7],[6,5,4],[3,2,1]]
4      r=[[0,0,0],[0,0,0],[0,0,0]]
5      t=[[0,0,0],[0,0,0],[0,0,0]]
6      for i in range(0,len(a)):
7          for j in range(0,len(b)):
8              r[i][j]=a[i][j]+b[i][j]
9              t[i][j]=b[i][j]-a[i][j]
10
11      print("matrix a is")
12      for i in a:
13          print(i)
14      print("matrix b is")
15      for i in b:
16          print(i)
17      print("a+b matrix is")
18      for i in r:
19          print(i)
20      print("b-a matrix is")
21      for i in t:
22          print(i)
23
```

Python Shell Debug I/O Messages

Debug I/O (stdin, stdout, stderr) appears below

```
matrix a is
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
matrix b is
[9, 8, 7]
[6, 5, 4]
[3, 2, 1]
a+b matrix is
[10, 10, 10]
[10, 10, 10]
[10, 10, 10]
b-a matrix is
[8, 6, 4]
[2, 0, -2]
[-4, -6, -8]
```

figure 6. 3 output of program to perform addition and subtraction of two matrices

7. Analysis and Discussions

7.1 Program to accept an integer number and reverse the order of digits in the number

The program takes inputs an integer value from the user. Then it calculates the reverse of the number by mathematical operation, and prints it.

7.2 Program to accept a list of integers and display the smallest and largest element in the list without using the built in function

First, the program inputs the elements in an empty list. Then it, calculates the minimum and maximum element by comparing each element with first element. At last, prints it.

7.3 Program to perform addition and subtraction of two matrices

This program just adds and subtracts the given matrices and stores it in a third matrix. And then it prints them.

8. Conclusions

It can be concluded that use of nested for loop has been learnt.

9. Comments

1.Limitations of Result

9.1.1 Program to accept an integer number and reverse the order of digits in the number

In this program, the user can get reverse of numbers only, reverse of words is not possible using this logic.

9.1.2 Program to accept a list of integers and display the smallest and largest element in the list without using the built in function

In this program, user can input only integer value in the list.

9.1.3 Program to perform addition and subtraction of two matrices

In this program user cannot input his desired value in matrix A and matrix B after compiling.