	Experiment No : 4 Date :
Title	**Introduction to Shell Script – loops**
Aim	Write a shell script for the following a. Write shell script to find reverse of 5 digit number using while loop b. Write shell script to find factorial of number using while Loop c. Write shell script to generate Fibo series upto the limit entered by user(for and while) d. Write shell script to generate prime number between limit specified by user using for loop e. Write shell script to generate table of the number specified by the user using for in Loop f. Write shell script to generate even number between limit specified by user g. Write shell script to Generate sum of N numbers. Read N from user and until loop h. Write shell script to display 4x4 matrix and read data from user from keyboard. Use for Loop
Hardware Requirement	Personal Computer
Software Requirement	Linux Operating System(Ubuntu 16.04) , Shell-Interpreter Nano or Vi or Vim or gedit text editor
Theory	**Looping Statements in Shell Scripting:** There are total 3 looping statements which can be used in bash programming 1. while statement 2. for statement 3. until statement To **alter the flow of loop statements**, two commands are used they are, 1. break 2. continue Their descriptions and syntax are as follows: **<u>while statement</u>** Here command is evaluated and based on the result loop will executed, if

command raise to false then loop will be terminated

Syntax

```
            while [ condition ]
             do
                 command1
                 command2
             done
```

<u>for statement</u>

The for loop operate on lists of items. It repeats a set of commands for every item in a list.

Here var is the name of a variable and word1 to wordN are sequences of characters separated by spaces (words). Each time the for loop executes, the value of the variable var is set to the next word in the list of words, word1 to wordN.

Syntax

```
             for var in list
             do
                command 1
                command 2
             done
```

<u>until statement</u>

The until loop is executed as many as times the condition/command evaluates to false. The loop terminates when the condition/command becomes true.

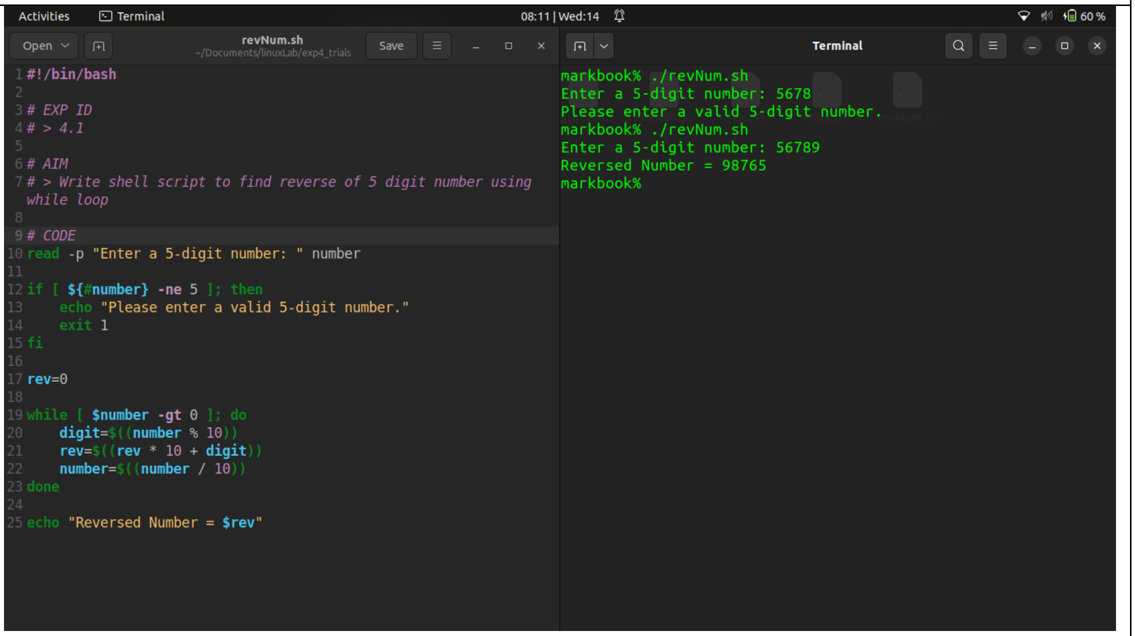
Syntax

```
             until [ conditional statement ]
              do
                  command1
                  command2
              done
```

Script Statement	Write shell script to find reverse of 5 digit number using while loop
Script Code	#!/bin/bash

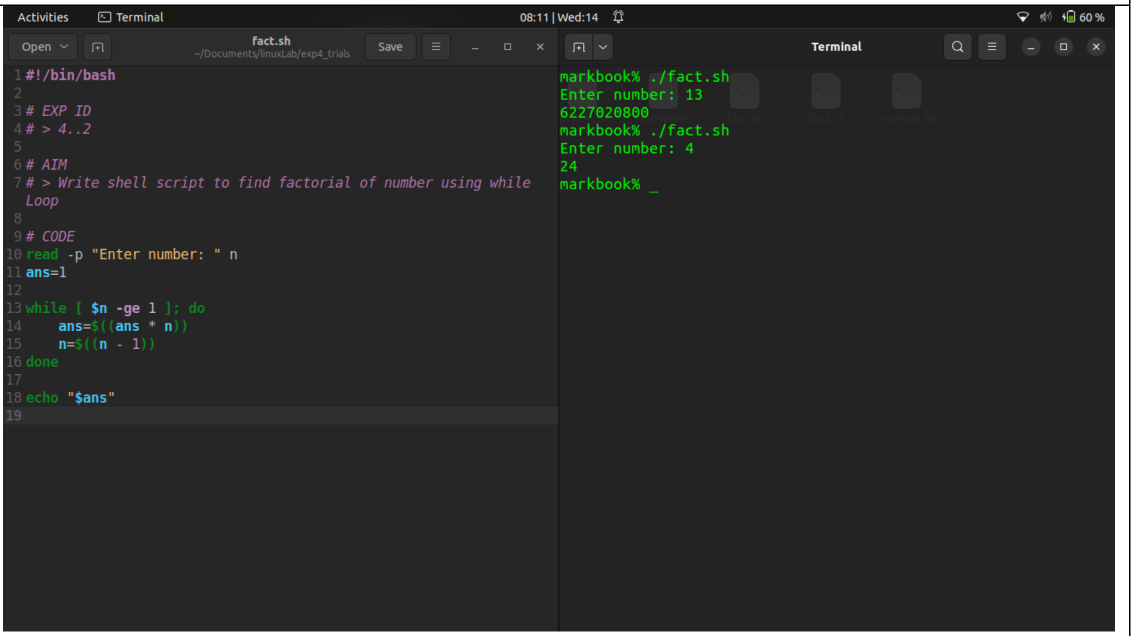
```
# EXP ID
# > 4.1

# AIM
# > Write shell script to find reverse of 5 digit number using while loop

# CODE
read -p "Enter a 5-digit number: " number

if [ ${#number} -ne 5 ]; then
    echo "Please enter a valid 5-digit number."
    exit 1
fi

rev=0

while [ $number -gt 0 ]; do
    digit=$((number % 10))
    rev=$((rev * 10 + digit))
    number=$((number / 10))
done

echo "Reversed Number = $rev"
```

Output



```
#!/bin/bash

# EXP ID
# > 4.1

# AIM
# > Write shell script to find reverse of 5 digit number using
while loop

# CODE
read -p "Enter a 5-digit number: " number

if [ ${#number} -ne 5 ]; then
    echo "Please enter a valid 5-digit number."
    exit 1
fi

rev=0

while [ $number -gt 0 ]; do
    digit=$((number % 10))
    rev=$((rev * 10 + digit))
    number=$((number / 10))
done

echo "Reversed Number = $rev"
```

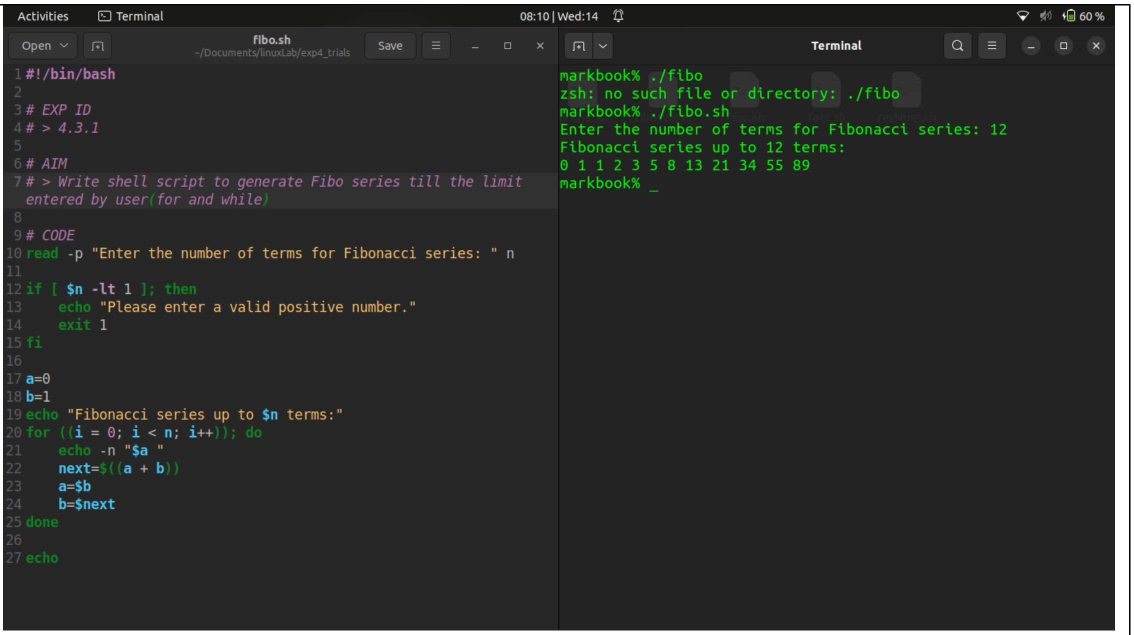
```
markbook% ./revNum.sh
Enter a 5-digit number: 5678
Please enter a valid 5-digit number.
markbook% ./revNum.sh
Enter a 5-digit number: 56789
Reversed Number = 98765
markbook%
```

Script Statement	Write shell script to find factorial of number using while Loop
Script Code	#!/bin/bash # EXP ID # > 4..2 # AIM # > Write shell script to find factorial of number using while Loop # CODE read -p "Enter number: " n ans=1 while [$n -ge 1]; do ans=$((ans * n)) n=$((n - 1)) done echo "$ans"
Output	 Activities Terminal 08:11 | Wed:14 60 % Open fact.sh ~/Documents/linuxLab/exp4_trials Save Terminal #!/bin/bash # EXP ID # > 4..2 # AIM # > Write shell script to find factorial of number using while Loop # CODE read -p "Enter number: " n ans=1 while [$n -ge 1]; do ans=$((ans * n)) n=$((n - 1)) done echo "$ans" markbook% ./fact.sh Enter number: 13 6227020800 markbook% ./fact.sh Enter number: 4 24 markbook% _
Script Statement	Write shell script to generate Fibo series upto the limit entered by user(for)

Script Code

```
#!/bin/bash

# EXP ID
# > 4.3.1

# AIM
# > Write shell script to generate Fibo series till the limit entered by user(for and
while)

# CODE
read -p "Enter the number of terms for Fibonacci series: " n

if [ $n -lt 1 ]; then
    echo "Please enter a valid positive number."
    exit 1
fi

a=0
b=1
echo "Fibonacci series up to $n terms:"
for ((i = 0; i < n; i++)); do
    echo -n "$a "
    next=$((a + b))
    a=$b
    b=$next
done

echo
```

Output



```
#!/bin/bash

# EXP ID
# > 4.3.1

# AIM
# > Write shell script to generate Fibo series till the limit entered by user(for and while)

# CODE
read -p "Enter the number of terms for Fibonacci series: " n

if [ $n -lt 1 ]; then
    echo "Please enter a valid positive number."
    exit 1
fi

a=0
b=1
echo "Fibonacci series up to $n terms:"
for ((i = 0; i < n; i++)); do
    echo -n "$a "
    next=$((a + b))
    a=$b
    b=$next
done

echo
```

```
markbook% ./fibo
zsh: no such file or directory: ./fibo
markbook% ./fibo.sh
Enter the number of terms for Fibonacci series: 12
Fibonacci series up to 12 terms:
0 1 1 2 3 5 8 13 21 34 55 89
markbook% _
```

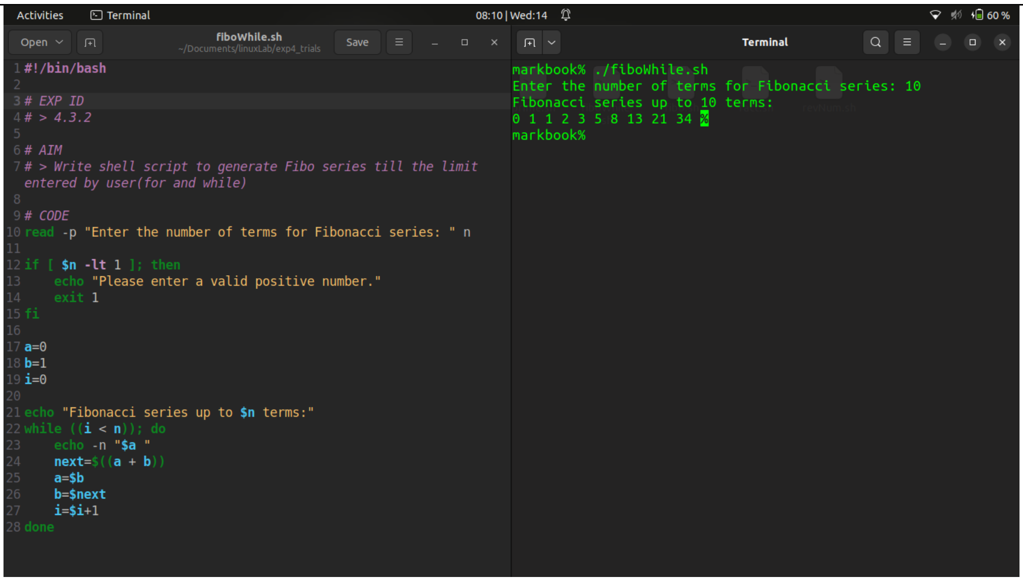
Script Statement

Write shell script to generate Fibo series upto the limit entered by user(while)

Script Code

```
#!/bin/bash

# EXP ID
# > 4.3.2

# AIM
# > Write shell script to generate Fibo series till the limit entered by user(for and while)

# CODE
read -p "Enter the number of terms for Fibonacci series: " n

if [ $n -lt 1 ]; then
    echo "Please enter a valid positive number."
    exit 1
fi

a=0
b=1
i=0
```

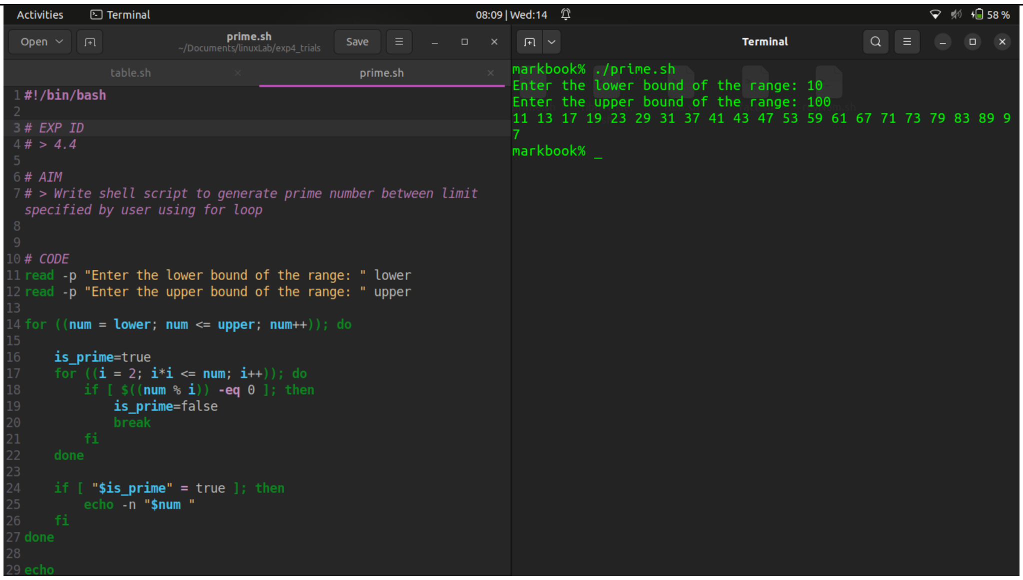
	echo "Fibonacci series up to $n terms:"
	while ((i < n)); do
	    echo -n "$a "
	    next=$((a + b))
	    a=$b
	    b=$next
	    i=$i+1
	done

Output	
	`#!/bin/bash`
	
	`# EXP ID`
	`# > 4.3.2`
	
	`# AIM`
	`# > Write shell script to generate Fibo series till the limit entered by user(for and while)`
	
	`# CODE`
	`read -p "Enter the number of terms for Fibonacci series: " n`
	
	`if [ $n -lt 1 ]; then`
	`    echo "Please enter a valid positive number."`
	`    exit 1`
	`fi`
	
	`a=0`
	`b=1`
	`i=0`
	
	`echo "Fibonacci series up to $n terms:"`
	`while ((i < n)); do`
	`    echo -n "$a "`
	`    next=$((a + b))`
	`    a=$b`
	`    b=$next`
	`    i=$i+1`
	`done`
	
	`markbook% ./fiboWhile.sh`
	`Enter the number of terms for Fibonacci series: 10`
	`Fibonacci series up to 10 terms:`
	`0 1 1 2 3 5 8 13 21 34 %`
	`markbook%`

Script Statement	Write shell script to generate prime number between limit specified by user using for loop
Script Code	#!/bin/bash # EXP ID # > 4.4 # AIM # > Write shell script to generate prime number between limit specified by user using for loop # CODE read -p "Enter the lower bound of the range: " lower read -p "Enter the upper bound of the range: " upper for ((num = lower; num <= upper; num++)); do

```
        is_prime=true
        for ((i = 2; i*i <= num; i++)); do
            if [ $((num % i)) -eq 0 ]; then
                is_prime=false
                break
            fi
        done

        if [ "$is_prime" = true ]; then
            echo -n "$num "
        fi
    done

    echo
```

Output



```
#!/bin/bash

# EXP ID
# > 4.4

# AIM
# > Write shell script to generate prime number between limit specified by user using for loop


# CODE
read -p "Enter the lower bound of the range: " lower
read -p "Enter the upper bound of the range: " upper

for ((num = lower; num <= upper; num++)); do

    is_prime=true
    for ((i = 2; i*i <= num; i++)); do
        if [ $((num % i)) -eq 0 ]; then
            is_prime=false
            break
        fi
    done

    if [ "$is_prime" = true ]; then
        echo -n "$num "
    fi
done

echo
```

```
markbook% ./prime.sh
Enter the lower bound of the range: 10
Enter the upper bound of the range: 100
11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 9
7
markbook% _
```

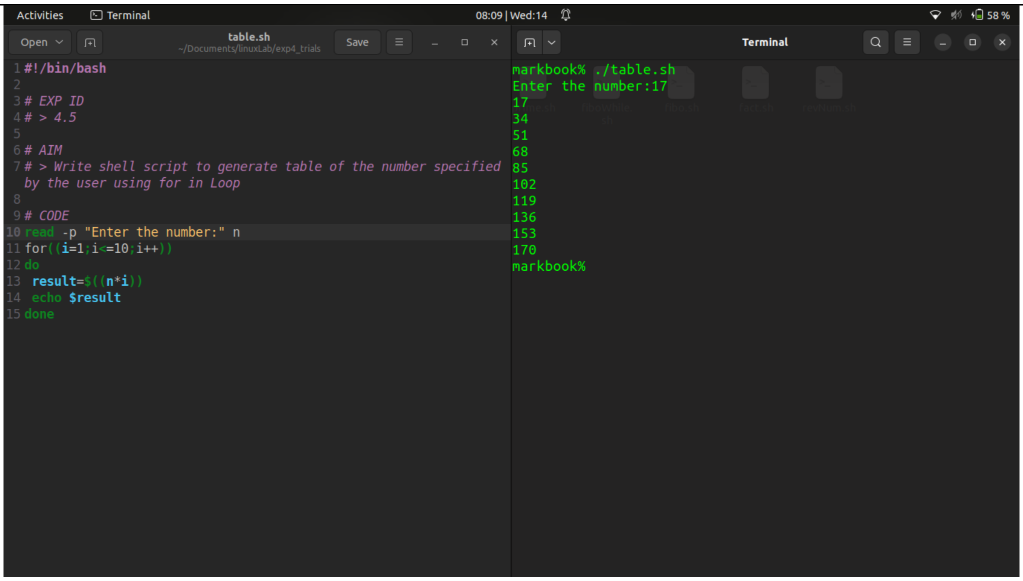
Script Statement

Write shell script to generate table of the number specified by the user using for in Loop

Script Code

```
#!/bin/bash

# EXP ID
# > 4.5

# AIM
# > Write shell script to generate table of the number specified by the user using for in Loop
# CODE
read -p "Enter the number:" n
for((i=1;i<=10;i++))
do
 result=$((n*i))
 echo $result
done
```

Output



```
#!/bin/bash

# EXP ID
# > 4.5

# AIM
# > Write shell script to generate table of the number specified
by the user using for in Loop

# CODE
read -p "Enter the number:" n
for((i=1;i<=10;i++))
do
 result=$((n*i))
 echo $result
done
```

```
markbook% ./table.sh
Enter the number:17
17
34
51
68
85
102
119
136
153
170
markbook%
```

Script Statement

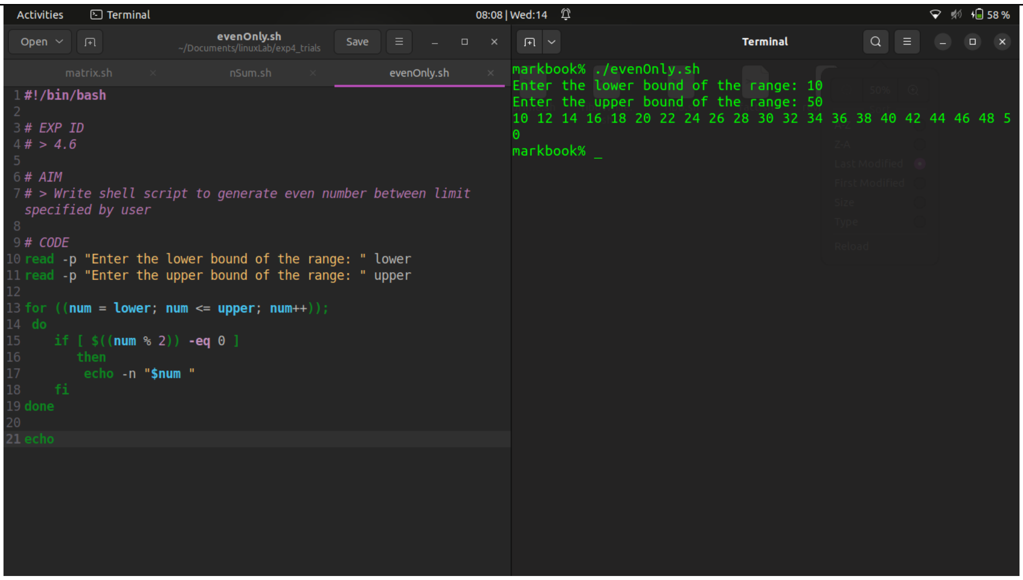
Write shell script to generate even number between limit specified by user

Script Code

```
#!/bin/bash

# EXP ID
# > 4.6

# AIM
# > Write shell script to generate even number between limit specified
by user

# CODE
read -p "Enter the lower bound of the range: " lower
read -p "Enter the upper bound of the range: " upper

for ((num = lower; num <= upper; num++));
 do
```

```
    if [ $((num % 2)) -eq 0 ]
       then
        echo -n "$num "
    fi
done

echo
```

Output



```
#!/bin/bash

# EXP ID
# > 4.6

# AIM
# > Write shell script to generate even number between limit
specified by user

# CODE
read -p "Enter the lower bound of the range: " lower
read -p "Enter the upper bound of the range: " upper

for ((num = lower; num <= upper; num++));
 do
    if [ $((num % 2)) -eq 0 ]
       then
        echo -n "$num "
    fi
done

echo
```

```
markbook% ./evenOnly.sh
Enter the lower bound of the range: 10
Enter the upper bound of the range: 50
10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 5
0
markbook% _
```

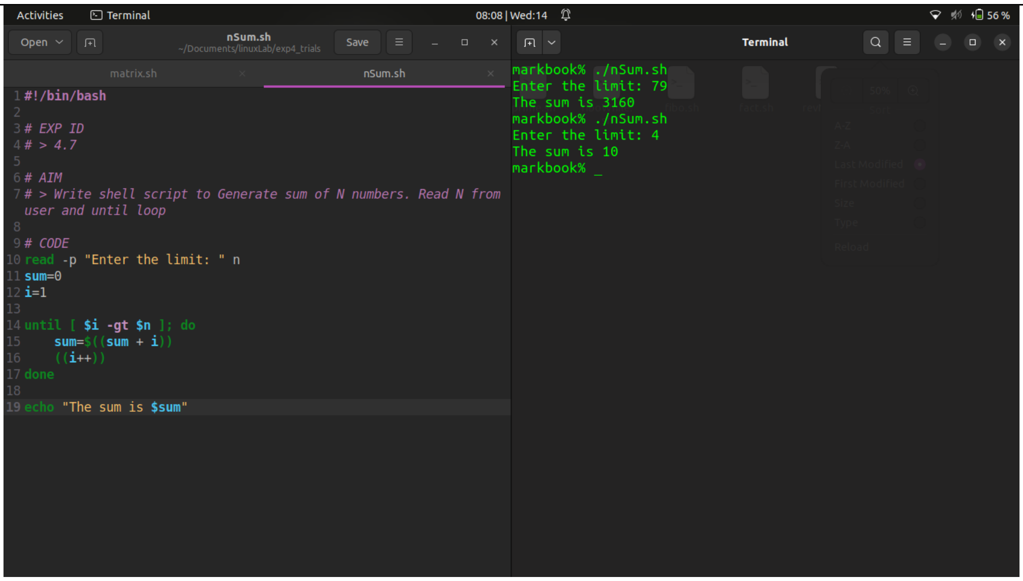
Script Statement

Write shell script to Generate sum of N numbers. Read N from user and until loop

Script Code

```
#!/bin/bash

# EXP ID
# > 4.7

# AIM
# > Write shell script to Generate sum of N numbers. Read N from user
and until loop

# CODE
read -p "Enter the limit: " n
sum=0
i=1

until [ $i -gt $n ]; do
    sum=$((sum + i))
    ((i++))
done

echo "The sum is $sum"
```

Output



```
#!/bin/bash

# EXP ID
# > 4.7

# AIM
# > Write shell script to Generate sum of N numbers. Read N from user and until loop

# CODE
read -p "Enter the limit: " n
sum=0
i=1

until [ $i -gt $n ]; do
    sum=$((sum + i))
    ((i++))
done

echo "The sum is $sum"
```

```
markbook% ./nSum.sh
Enter the limit: 79
The sum is 3160
markbook% ./nSum.sh
Enter the limit: 4
The sum is 10
markbook% _
```

Script Statement

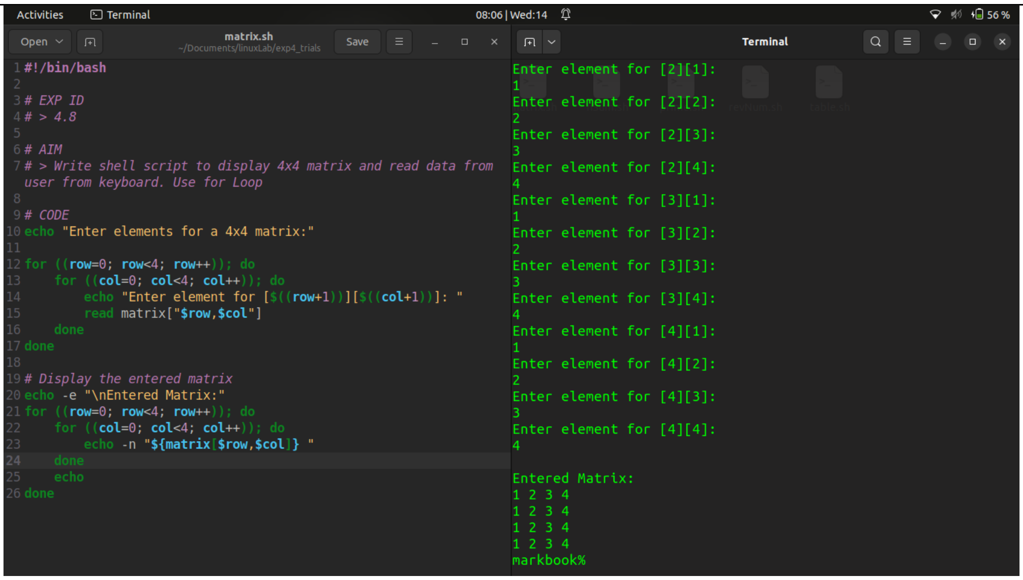
Write shell script to display 4x4 matrix and read data from user from keyboard. Use for Loop

Script Code

```
#!/bin/bash

# EXP ID
# > 4.8

# AIM
# > Write shell script to display 4x4 matrix and read data from user from keyboard. Use for Loop

# CODE
echo "Enter elements for a 4x4 matrix:"

for ((row=0; row<4; row++)); do
    for ((col=0; col<4; col++)); do
        echo "Enter element for [$((row+1))][$((col+1))]: "
        read matrix["$row,$col"]
    done
done

# Display the entered matrix
```

```
echo -e "\nEntered Matrix:"
for ((row=0; row<4; row++)); do
    for ((col=0; col<4; col++)); do
        echo -n "${matrix[$row,$col]} "
    done
    echo
done
```

Output



```
#!/bin/bash

# EXP ID
# > 4.8

# AIM
# > Write shell script to display 4x4 matrix and read data from user from keyboard. Use for Loop

# CODE
echo "Enter elements for a 4x4 matrix:"

for ((row=0; row<4; row++)); do
    for ((col=0; col<4; col++)); do
        echo "Enter element for [$((row+1))][$((col+1))]: "
        read matrix["$row,$col"]
    done
done

# Display the entered matrix
echo -e "\nEntered Matrix:"
for ((row=0; row<4; row++)); do
    for ((col=0; col<4; col++)); do
        echo -n "${matrix[$row,$col]} "
    done
    echo
done
```

```
Enter element for [2][1]:
1
Enter element for [2][2]:
2
Enter element for [2][3]:
3
Enter element for [2][4]:
4
Enter element for [3][1]:
1
Enter element for [3][2]:
2
Enter element for [3][3]:
3
Enter element for [3][4]:
4
Enter element for [4][1]:
1
Enter element for [4][2]:
2
Enter element for [4][3]:
3
Enter element for [4][4]:
4

Entered Matrix:
1 2 3 4
1 2 3 4
1 2 3 4
1 2 3 4
markbook%
```

Conclusion	Practiced loop statements in bash scripting.
Signature	
Grade	
Date	