

Lab Assignment 2

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Semester: 8

Branch: Electrical Engineering

Due Date: Feb 4, 2025

The folder structure is as follows:



Q1.)

Code:

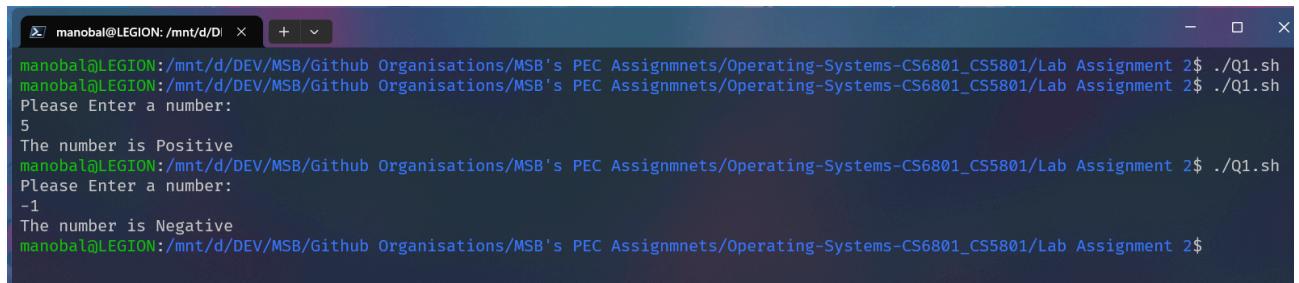
```
#!/bin/bash

# Question 1
# Program to check if a number is positive or negative

echo "Please Enter a number:"
read num

if [ $num -gt -1 ]; then
    echo "The number is Positive"
else
    echo "The number is Negative"
fi
```

Output:



A screenshot of a terminal window titled 'manobal@LEGION: /mnt/d/DI'. The window shows the execution of a shell script named 'Q1.sh'. The user is prompted to enter a number, and the script outputs whether it is positive or negative based on the input.

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q1.sh
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q1.sh
Please Enter a number:
5
The number is Positive
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q1.sh
Please Enter a number:
-1
The number is Negative
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$
```

Q2.)

Code:

```
#!/bin/bash

# Question 2
# To Find the largest and the smallest of 3 numbers

echo "Please enter the three numbers (space seperated)":
read num1 num2 num3

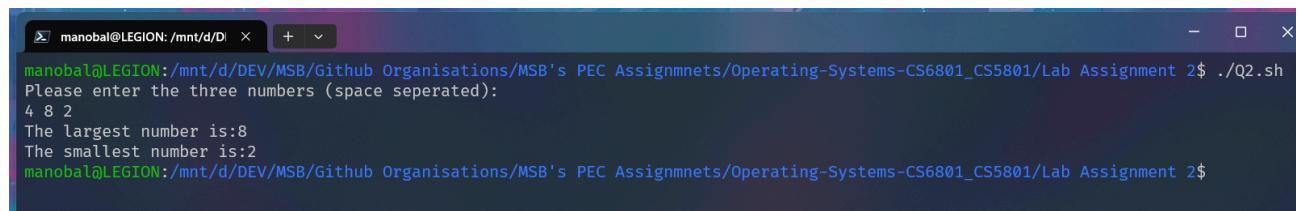
smallest=$num1
largest=$num1

if [ $num1 -gt $num2 ] && [ $num1 -gt $num3 ]; then
    largest=$num1
elif [ $num2 -gt $num1 ] && [ $num2 -gt $num3 ]; then
    largest=$num2
else
    largest=$num3
fi

if [ $num1 -lt $num2 ] && [ $num1 -lt $num3 ]; then
    smallest=$num1
elif [ $num2 -lt $num1 ] && [ $num2 -lt $num3 ]; then
    smallest=$num2
else
    smallest=$num3
fi

echo "The largest number is:$largest"
echo "The smallest number is:$smallest"
```

Output:



The screenshot shows a terminal window on a Linux system. The command entered is `./Q2.sh`. The terminal prompts the user to enter three numbers separated by spaces. The user inputs `4 8 2`. The script then outputs the largest number as `8` and the smallest number as `2`.

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q2.sh
Please enter the three numbers (space seperated):
4 8 2
The largest number is:8
The smallest number is:2
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$
```

Q3.)

Code:

```
#!/bin/bash

# Question 3
# Program to sum and average of N numbers

echo "Please enter the number of elements:"
read n

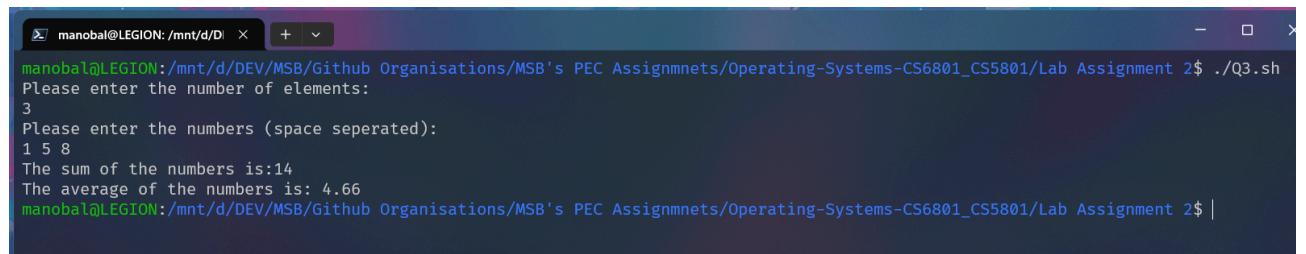
echo "Please enter the numbers (space separated):"
read -a arr

sum=0
for num in "${arr[@]}"; do
    sum=$((sum + num))
done

average=$(echo "scale=2; $sum/$n" | bc)

echo "The sum of the numbers is:$sum"
echo "The average of the numbers is: $average"
```

Output:



The screenshot shows a terminal window with the following session:

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignments/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q3.sh
Please enter the number of elements:
3
Please enter the numbers (space separated):
1 5 8
The sum of the numbers is:14
The average of the numbers is: 4.66
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignments/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ |
```

Q4.)

Code:

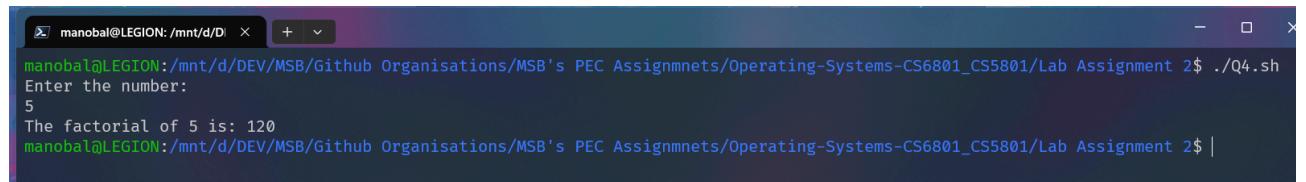
```
# Question 4
# Find Factorial of given number

echo Enter the number:
read n

factorial=1
for ((i = n; i > 1; i--)); do
    factorial=$((factorial * i))
done

echo The factorial of $n is: $factorial
```

Output:



A screenshot of a terminal window titled "manobal@LEGION: /mnt/d/D". The window shows the command "manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2\$./Q4.sh" followed by the output of the script. The output consists of the prompt "Enter the number:", the input "5", and the result "The factorial of 5 is: 120".

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q4.sh
Enter the number:
5
The factorial of 5 is: 120
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ |
```

Q5.)

Code:

```
#!/bin/bash

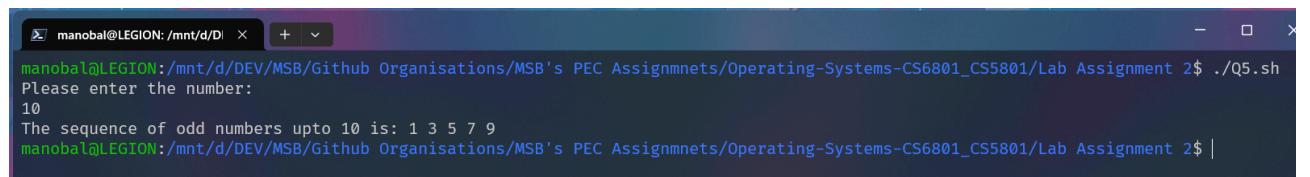
# Question 5
# Print the sequence of odd numbers upto N

echo "Please enter N:"
read n

arr=()
for i in $(seq 1 2 $n); do
    arr+=($i)
done

echo "The sequence of odd numbers upto $n is: ${arr[@]}"
```

Output:



```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q5.sh
Please enter the number:
10
The sequence of odd numbers upto 10 is: 1 3 5 7 9
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ |
```

Q6.)

Code:

```
#!/bin/bash

# Question 6
# Program to find sum of series S=1^2+2^2+3^2+...+n^2

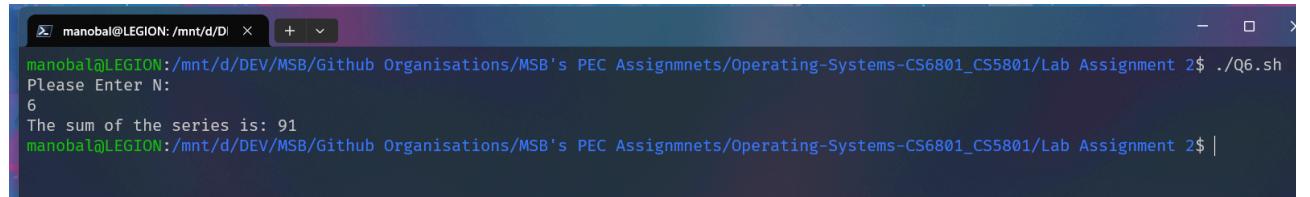
echo Please Enter N:
read n

sum=0

for i in $(seq 1 $n); do
    sum=$((sum + i * i))
done

echo The sum of the series is: $sum
```

Output:



The screenshot shows a terminal window with the following content:

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignments/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q6.sh
Please Enter N:
6
The sum of the series is: 91
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignments/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ |
```

Q7.)

Code:

```
#!/bin/bash

# Question 7
# Program to perform the arithmetic operation using switch case

echo "Please enter the first number:"
read num1

echo "Please enter the second number:"
read num2

echo "Please enter the operation to be performed (+, -, *, /):"
read operation

case $operation in
    "+")
        result=$((num1 + num2))
        echo "The sum of $num1 and $num2 is: $result"
        ;;
    "-")
        result=$((num1 - num2))
        echo "The difference of $num1 and $num2 is: $result"
        ;;
    "*")
        result=$((num1 * num2))
        echo "The product of $num1 and $num2 is: $result"
        ;;
    "/")
        result=$(echo "scale=2; $num1/$num2" | bc)
        echo "The division of $num1 and $num2 is: $result"
        ;;
    *)
        echo "Invalid operation"
        ;;
esac
```

Output:

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q7.sh
Please enter the first number:
4
Please enter the second number:
3
Please enter the operation to be performed (+, -, *, /):
+
The sum of 4 and 3 is: 7
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q7.sh
Please enter the first number:
4
Please enter the second number:
3
Please enter the operation to be performed (+, -, *, /):
-
The difference of 4 and 3 is: 1
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q7.sh
Please enter the first number:
4
Please enter the second number:
3
Please enter the operation to be performed (+, -, *, /):
*
The product of 4 and 3 is: 12
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$
```

Q8.)

Code:

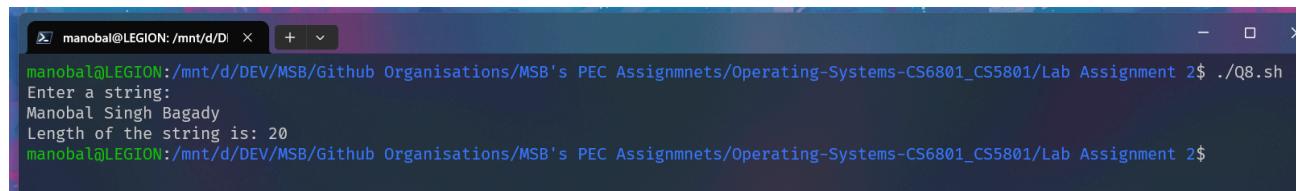
```
#!/bin/bash

# Question 8
# Program to find length of a string

echo "Enter a string: "
read str

echo "Length of the string is: ${#str}"
```

Output:



A screenshot of a terminal window titled "manobal@LEGION: /mnt/d/D1". The window shows the command "../Q8.sh" being run, followed by the prompt "Enter a string:", the input "Manobal Singh Bagady", and the output "Length of the string is: 20". The terminal has a dark blue background with white text.

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q8.sh
Enter a string:
Manobal Singh Bagady
Length of the string is: 20
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$
```

Q9.)

Code:

```
#!/bin/bash

# Question 9
# Program to perform various pattern search using file

#!/bin/bash

# Function to search for a pattern in the file
search_pattern() {
    pattern=$1
    filename=$2
    echo "Searching for pattern '$pattern' in $filename..."

    # Search for the pattern and display matching lines
    grep "$pattern" "$filename"
}

# Function to count the occurrences of a pattern
count_occurrences() {
    pattern=$1
    filename=$2
    echo "Counting occurrences of pattern '$pattern' in $filename..."

    # Count occurrences of the pattern
    grep -o "$pattern" "$filename" | wc -l
}

# Function to find lines with a pattern (case-insensitive)
find_case_insensitive() {
    pattern=$1
    filename=$2
    echo "Searching for pattern '$pattern' (case insensitive) in
$filename..."

    # Case-insensitive search for the pattern
    grep -i "$pattern" "$filename"
}

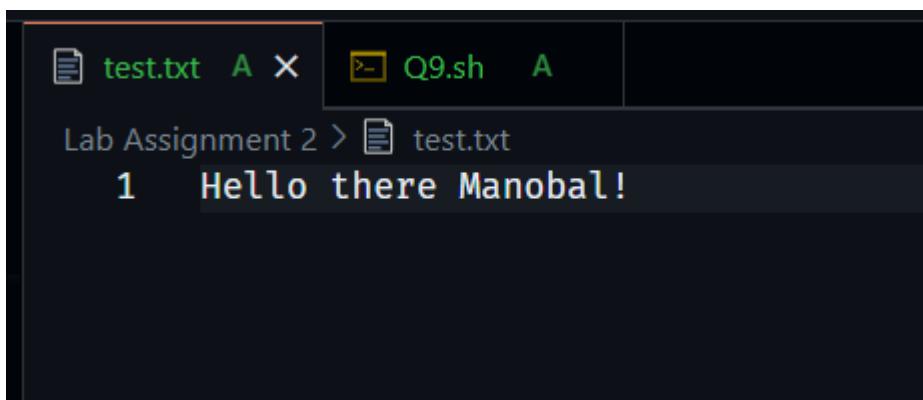
echo "Enter the pattern to search:"
read pattern
```

```
echo "Enter the file name to search in:"  
read filename  
  
if [[ ! -f "$filename" ]]; then  
    echo "File not found!"  
    exit 1  
fi  
  
# Main menu for user to choose options  
echo "Select an option:"  
echo "1. Search for the pattern"  
echo "2. Count occurrences of a pattern"  
echo "3. Find the pattern case-insensitively"  
echo "4. Exit"  
read choice  
  
case $choice in  
1)  
    search_pattern "$pattern" "$filename"  
    ;;  
2)  
    count_occurrences "$pattern" "$filename"  
    ;;  
3)  
    find_case_insensitive "$pattern" "$filename"  
    ;;  
4)  
    echo "Exiting program."  
    exit 0  
    ;;  
*)  
    echo "Invalid option. Please try again."  
    ;;  
esac
```

Output:

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignments/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q9.sh
Enter the pattern to search:
Hello
Enter the file name to search in:
test.txt
Select an option:
1. Search for the pattern
2. Count occurrences of a pattern
3. Find the pattern case-insensitively
4. Exit
1
Searching for pattern 'Hello' in test.txt ...
Hello there Manobal!
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignments/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q9.sh
Enter the pattern to search:
hello
Enter the file name to search in:
test.txt
Select an option:
1. Search for the pattern
2. Count occurrences of a pattern
3. Find the pattern case-insensitively
4. Exit
3
Searching for pattern 'hello' (case insensitive) in test.txt ...
Hello there Manobal!
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignments/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q9.sh
Enter the pattern to search:
Hello
Enter the file name to search in:
test.txt
Select an option:
1. Search for the pattern
2. Count occurrences of a pattern
3. Find the pattern case-insensitively
4. Exit
2
Counting occurrences of pattern 'Hello' in test.txt ...
1
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignments/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ |
```

test.txt file:



The screenshot shows a terminal window with the following content:

```
test.txt A X Q9.sh A
Lab Assignment 2 > test.txt
1 Hello there Manobal!
```

The terminal window has tabs for "test.txt" and "Q9.sh". The current tab is "test.txt". The output shows the command "Lab Assignment 2 > test.txt" followed by the content of the file: "1 Hello there Manobal!".

Q10.)

Code:

```
#!/bin/bash

# Question 10
# Perform sum of series using switch case

#!/bin/bash

# Function to calculate the sum of an arithmetic progression
arithmetic_progression() {
    echo "Enter the first term (a):"
    read a
    echo "Enter the common difference (d):"
    read d
    echo "Enter the number of terms (n):"
    read n

    sum=$((n / 2 * (2 * a + (n - 1) * d)))
    echo "Sum of the arithmetic series: $sum"
}

# Function to calculate the sum of a geometric progression
geometric_progression() {
    echo "Enter the first term (a):"
    read a
    echo "Enter the common ratio (r):"
    read r
    echo "Enter the number of terms (n):"
    read n

    if [ "$r" -eq 1 ]; then
        echo "Common ratio cannot be 1 for geometric series."
        exit 1
    fi

    sum=$(echo "$a * ((1 - ${r}^$n) / (1 - $r))" | bc -l)
    echo "Sum of the geometric series: $sum"
}

# Function to calculate the sum of the first n natural numbers
sum_natural_numbers() {
```

```
echo "Enter the number of terms (n):"
read n
sum=$((n * (n + 1) / 2))
echo "Sum of the first $n natural numbers: $sum"
}

# Main menu
echo "Select the type of series:"
echo "1. Arithmetic Progression"
echo "2. Geometric Progression"
echo "3. Sum of First N Natural Numbers"
echo "4. Exit"
read choice

case $choice in
1)
    arithmetic_progression
    ;;
2)
    geometric_progression
    ;;
3)
    sum_natural_numbers
    ;;
4)
    echo "Exiting program."
    exit 0
    ;;
*)
    echo "Invalid option. Please try again."
    ;;
esac
```

Output:

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q10.sh
Select the type of series:
1. Arithmetic Progression
2. Geometric Progression
3. Sum of First N Natural Numbers
4. Exit
2
Enter the first term (a):
1
Enter the common ratio (r):
2
Enter the number of terms (n):
5
Sum of the geometric series: 31.000000000000000000000000000000
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q10.sh
Select the type of series:
1. Arithmetic Progression
2. Geometric Progression
3. Sum of First N Natural Numbers
4. Exit
1
Enter the first term (a):
1
Enter the common difference (d):
3
Enter the number of terms (n):
5
Sum of the arithmetic series: 28
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q10.sh
Select the type of series:
1. Arithmetic Progression
2. Geometric Progression
3. Sum of First N Natural Numbers
4. Exit
3
Enter the number of terms (n):
10
Sum of the first 10 natural numbers: 55
```

Q11.)

Code:

```
#!/bin/bash

# Question 11
# Program to check palindrome number

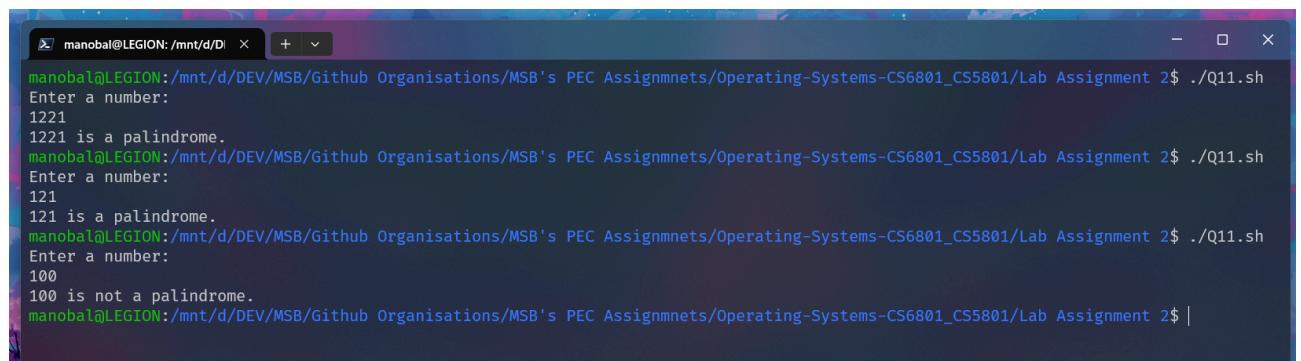
echo "Enter a number:"
read num

# Store the original number
original=$num

# Reverse the number
reverse=0
while [ $num -gt 0 ]; do
    remainder=$((num % 10))
    reverse=$((reverse * 10 + remainder))
    num=$((num / 10))
done

# Check if the number is a palindrome
if [ $original -eq $reverse ]; then
    echo "$original is a palindrome."
else
    echo "$original is not a palindrome."
fi
```

Output:



The screenshot shows a terminal window titled 'manobal@LEGION: /mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2\$'. The user runs the script 'Q11.sh' and enters two numbers: '1221' and '121'. The script correctly identifies '1221' as a palindrome and '121' as a palindrome. However, when the user enters '100', the script outputs '100 is not a palindrome.', which is incorrect as '100' is a palindrome.

```
manobal@LEGION: /mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q11.sh
Enter a number:
1221
1221 is a palindrome.
manobal@LEGION: /mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q11.sh
Enter a number:
121
121 is a palindrome.
manobal@LEGION: /mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q11.sh
Enter a number:
100
100 is not a palindrome.
manobal@LEGION: /mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ |
```

Q12.)

Code:

```
#!/bin/bash

# Question 12
# Program to check whether a login is connected or not

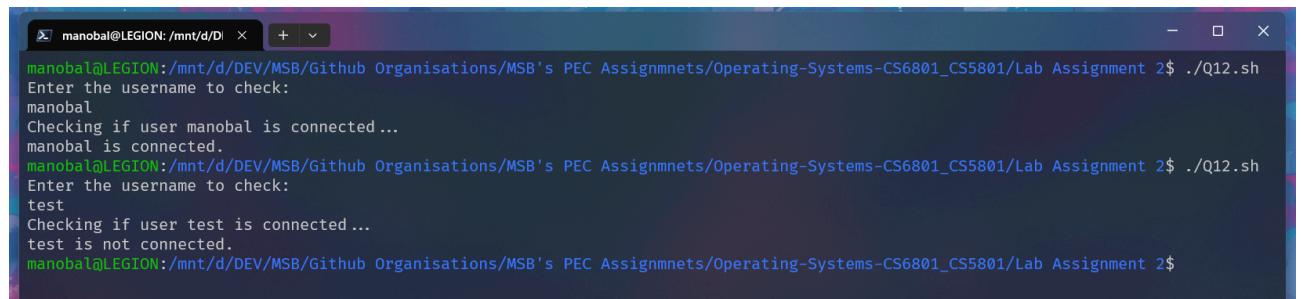
# Function to check if a user is connected
check_user_connected() {
    user=$1
    echo "Checking if user $user is connected..."

    # Check if the user is connected
    who | grep -q "^$user " && echo "$user is connected." || echo
"$user is not connected."
}

echo "Enter the username to check:"
read username

check_user_connected "$username"
```

Output:



The screenshot shows a terminal window titled 'manobal@LEGION: /mnt/d/D' with a single tab. The command entered is `./Q12.sh`. The terminal output is as follows:

```
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q12.sh
Enter the username to check:
manobal
Checking if user manobal is connected...
manobal is connected.
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$ ./Q12.sh
Enter the username to check:
test
Checking if user test is connected...
test is not connected.
manobal@LEGION:/mnt/d/DEV/MSB/Github Organisations/MSB's PEC Assignmnets/Operating-Systems-CS6801_CS5801/Lab Assignment 2$
```