Operating Systems Lab 4

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Introduction

This lab submission includes solutions to various shell script tasks along with their corresponding output images.

Tasks

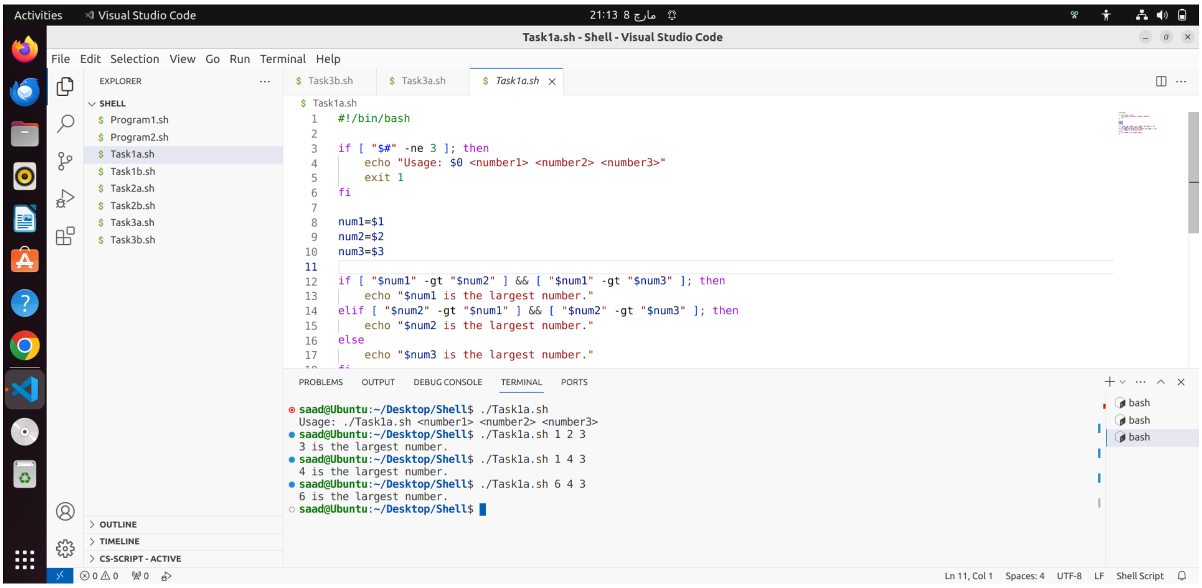
Task 1.1:

Task Description: Create a Bash script which will take 3 numbers as command line arguments. It will print to the screen the larger of the three numbers.

Solution:

```
#!/bin/bash

if [ "$#" -ne 3 ]; then
    echo "Usage: $0 <number1> <number2> <number3>"
    exit 1
fi

num1=$1
num2=$2
num3=$3

if [ "$num1" -gt "$num2" ] && [ "$num1" -gt "$num3" ]; then
    echo "$num1 is the largest number."
elif [ "$num2" -gt "$num1" ] && [ "$num2" -gt "$num3" ]; then
    echo "$num2 is the largest number."
else
    echo "$num3 is the largest number."
fi
```

Output Image:



```
#!/bin/bash

if [ "$#" -ne 3 ]; then
    echo "Usage: $0 <number1> <number2> <number3>"
    exit 1
fi

num1=$1
num2=$2
num3=$3

if [ "$num1" -gt "$num2" ] && [ "$num1" -gt "$num3" ]; then
    echo "$num1 is the largest number."
elif [ "$num2" -gt "$num1" ] && [ "$num2" -gt "$num3" ]; then
    echo "$num2 is the largest number."
else
    echo "$num3 is the largest number."
```

```
saad@Ubuntu:~/Desktop/Shell$ ./Task1a.sh
Usage: ./Task1a.sh <number1> <number2> <number3>
saad@Ubuntu:~/Desktop/Shell$ ./Task1a.sh 1 2 3
3 is the largest number.
saad@Ubuntu:~/Desktop/Shell$ ./Task1a.sh 1 4 3
4 is the largest number.
saad@Ubuntu:~/Desktop/Shell$ ./Task1a.sh 6 4 3
6 is the largest number.
saad@Ubuntu:~/Desktop/Shell$
```

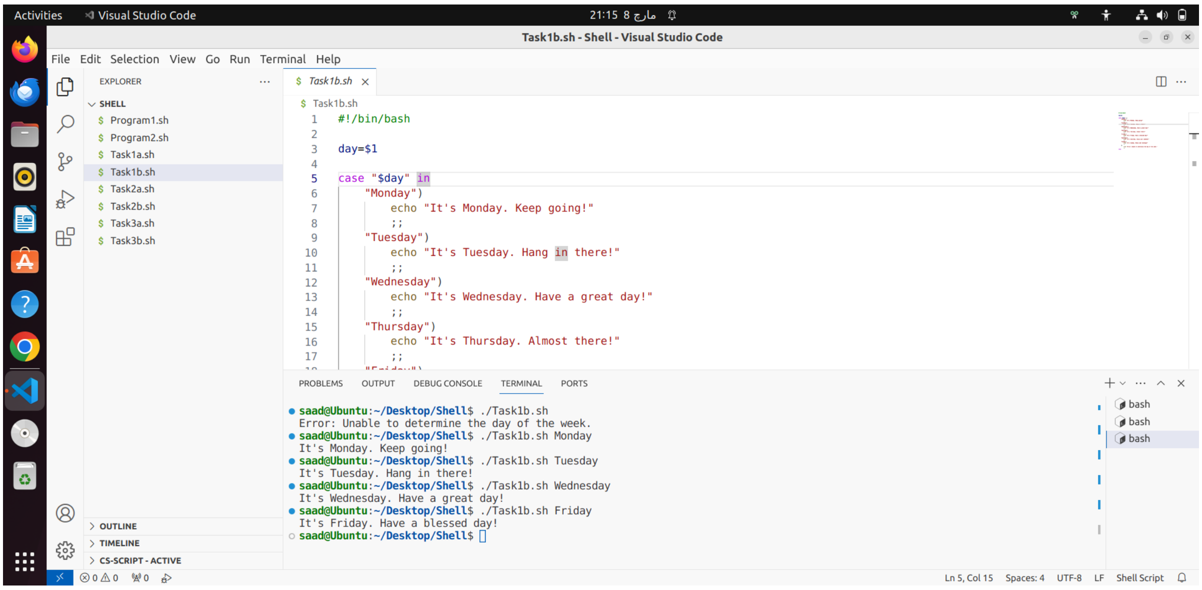
Task 1.2:

Task Description: Create a Bash script which will print a message based upon which day of the week it is (eg. 'Happy day' for Wednesday, 'blessed' for Friday etc) using switch statement.

Solution:

```
#!/bin/bash

day=$1

case "$day" in
    "Monday")
        echo "It's Monday. Keep going!"
        ;;
    "Tuesday")
        echo "It's Tuesday. Hang in there!"
        ;;
    "Wednesday")
        echo "It's Wednesday. Have a great day!"
        ;;
    "Thursday")
        echo "It's Thursday. Almost there!"
        ;;
    "Friday")
        echo "It's Friday. Have a blessed day!"
        ;;
    "Saturday")
        echo "It's Saturday. Enjoy your weekend!"
        ;;
    "Sunday")
        echo "It's Sunday. Relax and recharge!"
        ;;
    *)
        echo "Error: Unable to determine the day of the week."
        ;;
esac
```

Output Image:



```
#!/bin/bash

day=$1

case "$day" in
    "Monday")
        echo "It's Monday. Keep going!"
        ;;
    "Tuesday")
        echo "It's Tuesday. Hang in there!"
        ;;
    "Wednesday")
        echo "It's Wednesday. Have a great day!"
        ;;
    "Thursday")
        echo "It's Thursday. Almost there!"
        ;;
```

```
saad@Ubuntu:~/Desktop/Shell$ ./Task1b.sh
Error: Unable to determine the day of the week.
saad@Ubuntu:~/Desktop/Shell$ ./Task1b.sh Monday
It's Monday. Keep going!
saad@Ubuntu:~/Desktop/Shell$ ./Task1b.sh Tuesday
It's Tuesday. Hang in there!
saad@Ubuntu:~/Desktop/Shell$ ./Task1b.sh Wednesday
It's Wednesday. Have a great day!
saad@Ubuntu:~/Desktop/Shell$ ./Task1b.sh Friday
It's Friday. Have a blessed day!
saad@Ubuntu:~/Desktop/Shell$ 
```

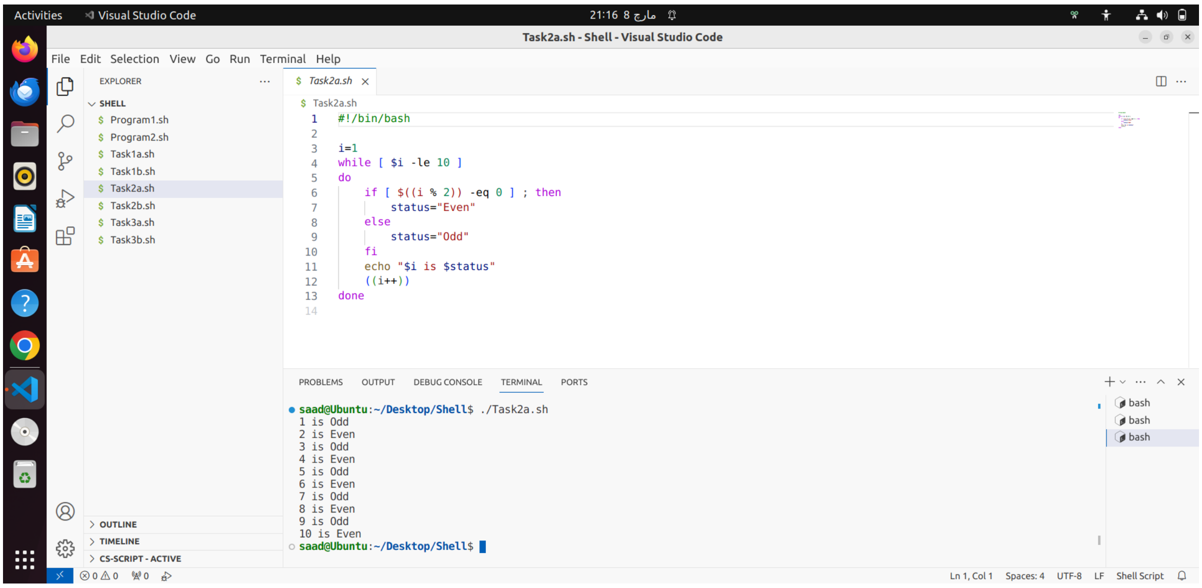
Task 2.1:

Task Description: Create a simple script which will print the numbers 1 - 10 (each on a separate line) and whether they are even or odd.

Solution:

```
#!/bin/bash

i=1
while [ $i -le 10 ]
do
    if [ $((i % 2)) -eq 0 ] ; then
        status="Even"
    else
        status="Odd"
    fi
    echo "$i is $status"
    ((i++))
done
```

Output Image:


Activities
Visual Studio Code
Task2a.sh - Shell - Visual Studio Code
File Edit Selection View Go Run Terminal Help
EXPLORER
SHELL
Program1.sh
Program2.sh
Task1a.sh
Task1b.sh
Task2a.sh
Task2b.sh
Task3a.sh
Task3b.sh
OUTLINE
TIMELINE
CS-SCRIPT - ACTIVE
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
bash
bash
bash
Ln 1, Col 1 Spaces: 4 UTF-8 LF Shell Script

```
#!/bin/bash

i=1
while [ $i -le 10 ]
do
    if [ $((i % 2)) -eq 0 ] ; then
        status="Even"
    else
        status="Odd"
    fi
    echo "$i is $status"
    ((i++))
done
```

```
saad@Ubuntu:~/Desktop/Shell$ ./Task2a.sh
1 is Odd
2 is Even
3 is Odd
4 is Even
5 is Odd
6 is Even
7 is Odd
8 is Even
9 is Odd
10 is Even
saad@Ubuntu:~/Desktop/Shell$
```

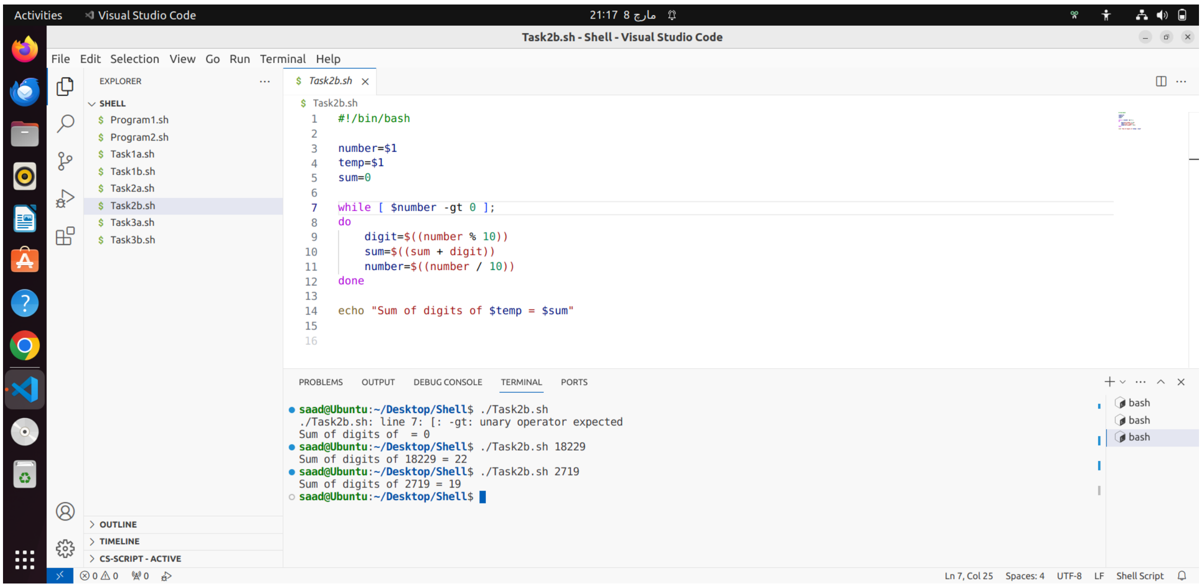
Task 2.2:

Task Description: Write a program that read number as input, calculate, and return the summation of the all digits of the number. Example: If given number: 745 Then result will be: (7+4+5) = 16

Solution:

```
#!/bin/bash

number=$1
temp=$1
sum=0

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

echo "Sum of digits of $temp = $sum"
```

Output Image:



```bash
#!/bin/bash

number=$1
temp=$1
sum=0

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

echo "Sum of digits of $temp = $sum"
```

```
saad@Ubuntu:~/Desktop/Shell$ ./Task2b.sh
./Task2b.sh: line 7: [: -gt: unary operator expected
Sum of digits of  = 0
saad@Ubuntu:~/Desktop/Shell$ ./Task2b.sh 18229
Sum of digits of 18229 = 22
saad@Ubuntu:~/Desktop/Shell$ ./Task2b.sh 2719
Sum of digits of 2719 = 19
saad@Ubuntu:~/Desktop/Shell$
```

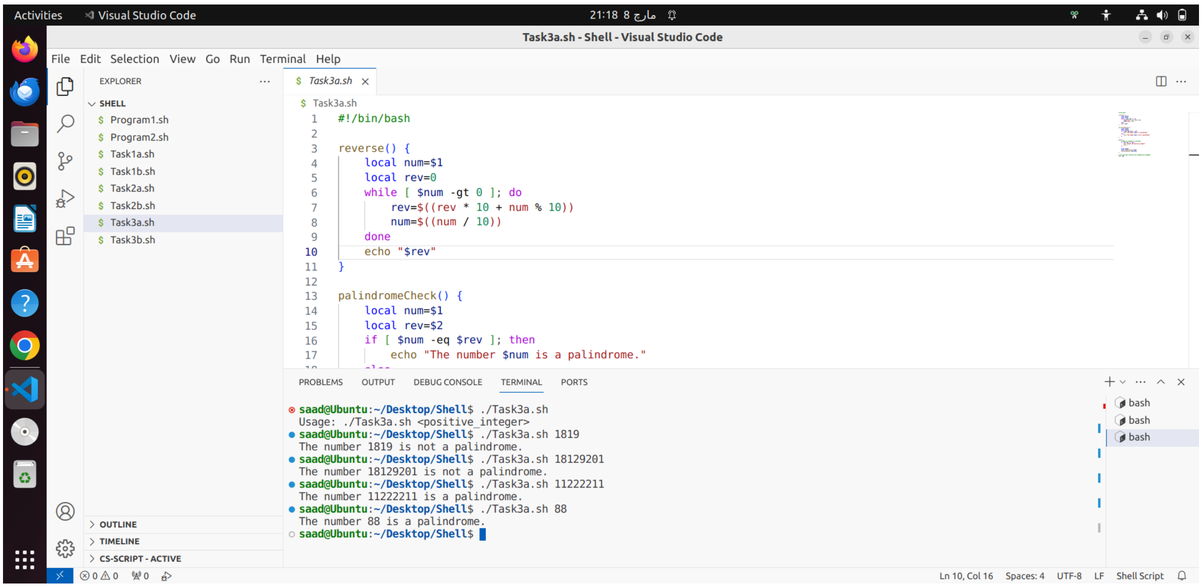
Task 3.1:

Task Description: Write a shell script which takes a positive integer as an argument on the terminal and then checks if it is a palindrome or not. In order to find the reverse of this number it must be passed to function named reverse(), which computes the reverse and passes both, the number and its reverse to another function called palindromeCheck(). palindromeCheck() then compares the numbers and echoes if the number is a palindrome or not.

Solution:

```bash
#!/bin/bash

reverse() {
    local num=$1
    local rev=0
    while [ $num -gt 0 ]; do
        rev=$((rev * 10 + num % 10))
        num=$((num / 10))
    done
    echo "$rev"
}

palindromeCheck() {
    local num=$1
    local rev=$2
    if [ $num -eq $rev ]; then
        echo "The number $num is a palindrome."
    else
        echo "The number $num is not a palindrome."
    fi
}

main() {
    # Check if argument is provided
    if [ $# -ne 1 ]; then
        echo "Usage: $0 <positive_integer>"
        exit 1
    fi
    local num=$1
    local rev=$(reverse $num)
    palindromeCheck $num $rev
}

# Call the main function with command-line argument
main "$@"
```

Output Image:



```
#!/bin/bash

reverse() {
    local num=$1
    local rev=0
    while [ $num -gt 0 ]; do
        rev=$((rev * 10 + num % 10))
        num=$((num / 10))
    done
    echo "$rev"
}

palindromeCheck() {
    local num=$1
    local rev=$2
    if [ $num -eq $rev ]; then
        echo "The number $num is a palindrome."
```

```
saad@Ubuntu:~/Desktop/Shell$ ./Task3a.sh
Usage: ./Task3a.sh <positive_integer>
saad@Ubuntu:~/Desktop/Shell$ ./Task3a.sh 1819
The number 1819 is not a palindrome.
saad@Ubuntu:~/Desktop/Shell$ ./Task3a.sh 18129201
The number 18129201 is not a palindrome.
saad@Ubuntu:~/Desktop/Shell$ ./Task3a.sh 11222211
The number 11222211 is a palindrome.
saad@Ubuntu:~/Desktop/Shell$ ./Task3a.sh 88
The number 88 is a palindrome.
saad@Ubuntu:~/Desktop/Shell$
```

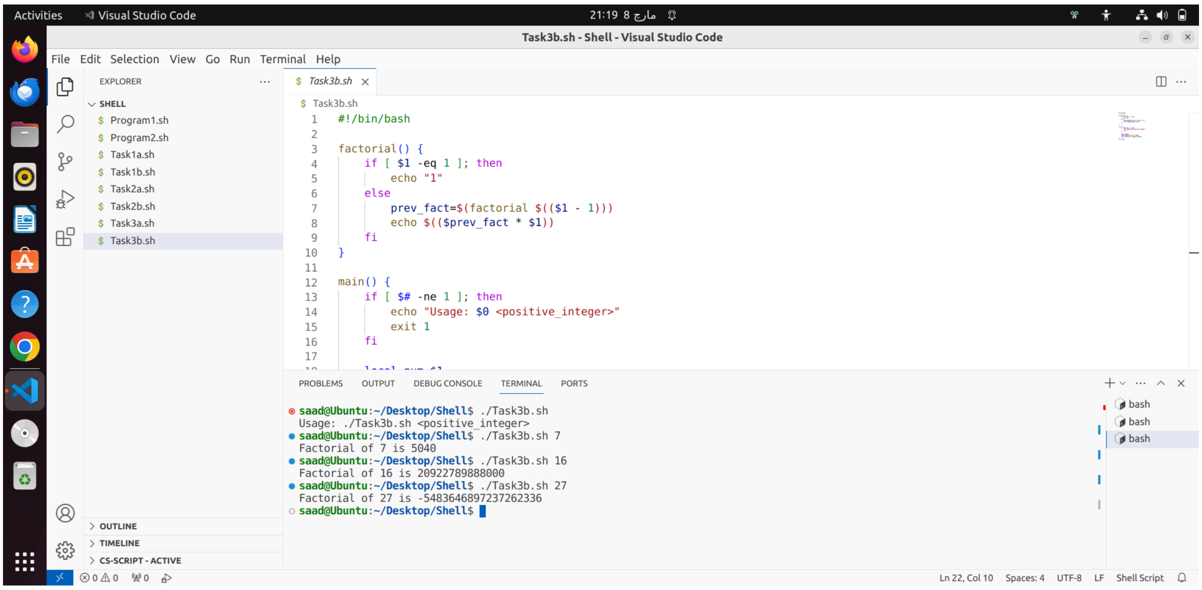
Task 3.2:

Task Description: Write a shell script which reads a number from the user and passes it to function named factorial(). This function finds the factorial of the number and prints it on the terminal. This task must be done using recursion.

Solution:

```
#!/bin/bash

factorial() {
    if [ $1 -eq 1 ]; then
        echo "1"
    else
        prev_fact=$(factorial $(($1 - 1)))
        echo $(($prev_fact * $1))
    fi
}

main() {
    if [ $# -ne 1 ]; then
        echo "Usage: $0 <positive_integer>"
        exit 1
    fi

    local num=$1
    local fact=$(factorial $num)
    echo "Factorial of $num is $fact"
}
main "$@"
```

Output Image:



```
#!/bin/bash

factorial() {
    if [ $1 -eq 1 ]; then
        echo "1"
    else
        prev_fact=$(factorial $(($1 - 1)))
        echo $(($prev_fact * $1))
    fi
}

main() {
    if [ $# -ne 1 ]; then
        echo "Usage: $0 <positive_integer>"
        exit 1
    fi

```

```
saad@Ubuntu:~/Desktop/Shell$ ./Task3b.sh
Usage: ./Task3b.sh <positive_integer>
saad@Ubuntu:~/Desktop/Shell$ ./Task3b.sh 7
Factorial of 7 is 5040
saad@Ubuntu:~/Desktop/Shell$ ./Task3b.sh 16
Factorial of 16 is 20922789888000
saad@Ubuntu:~/Desktop/Shell$ ./Task3b.sh 27
Factorial of 27 is -5483646897237262336
saad@Ubuntu:~/Desktop/Shell$
```

Github Repository Link: https://github.com/fsfrahmad/OS-Lab.git