Laboratory Assignments 3
Subject: Design of Operating Systems
Subject code: CSE 4049

Assignment 3: Shell Programming using user defined variables, arithmetic operators, conditional statements.

Objective of this Assignment:

 To learn the proper use of user defined variables and arithmetic operators in shell programming. To write shell script producing solution to decision making problems.

1. Write a shell script **iaop** to perform integer arithmetic on two numbers, where the value of the two numbers will be given during runtime.

```
echo "Enter the 1st no"
read a
echo "Enter the 2nd no"
read b
echo "$a + $b = $((a+b))"
echo "$a - $b = $((a-b))"
echo "$a * $b = $((a*b))"
echo "$a / $b = $((a/b))"
echo "$a % $b = $((a%b))"
```

```
Enter the 1st no
4
Enter the 2nd no
1
4 + 1 = 5
4 - 1 = 3
4 * 1 = 4
4 / 1 = 4
4 % 1 = 0
```

2. Write a shell script **faop** to perform floating point arithmetic on two numbers, where the value of the two numbers will be given during runtime.

```
echo "Enter the 1st no. (floating):"
read a
echo "Enter the 2nd no. (floating):"
read b
echo "$a + $b = $(echo "$a + $b" | bc -l)"
echo "$a - $b = $(echo "$a - $b" | bc -l)"
echo "$a * $b = $(echo "$a * $b" | bc -l)"
echo "$a / $b = $(echo "$a / $b" | bc -l)"
echo "$a % $b = $(echo "$a % $b" | bc -l)"
```

```
student@D001-38:~/2141020022/DOS/Assignment 3/q2$ ./faop.sh
Enter the 1st no. (floating):
10.23
Enter the 2nd no. (floating):
5.13
10.23 + 5.13 = 15.36
10.23 - 5.13 = 5.10
10.23 * 5.13 = 52.4799
10.23 / 5.13 = 1.994152046783625730
10.23 % 5.13 = .000000000000000000213
```

3. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary, and house rent allowance is 20% of basic salary. Write a program to calculate his gross salary.

```
echo "Enter the Ramesh salary:"
read a
da=$(echo "0.4*$a" | bc)
ra=$(echo "0.2*$a" | bc)
echo "Gross salary is : $(echo "$a + $da + $ra" | bc)"
```

```
student@D001-38:~/2141020022/DOS/Assignment 3/q3$ ./q3.sh
Enter the Ramesh salary:
45453.34
Gross salary is : 72725.33
```

4. If a five digit number is input given through the keyboard during runtime, write a program to calculate the sum of its digits.

```
echo "Enter a 5 digit number: "
read a
sum=0
r=$((a%10))
sum=$((sum+r))
a=$((a/10))

sum=$((sum+r))
a=$((a/10))

r=$((a%10))
sum=$((sum+r))
a=$((a/10))

r=$((a%10))
sum=$((sum+r))
a=$((a/10))

r=$((a%10))
sum=$((sum+r))

echo "$sum"
```

```
student@D001-38:~/2141020022/DOS/Assignment 3/q4$ ./q4.sh
Enter a 5 digit number:
12345
15
```

5. If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Also determine how much profit was made or loss incurred.

```
echo "Enter the CP: "
read a
echo "Enter the SP: "
read b

if [ $b -gt $a ]; then
    echo "Profit of Rs. $((b-a))"
elif [ $a -gt $b ];then
    echo "Loss of Rs. $((a-b))"
else
    echo "No profit, no loss."
fi
```

```
student@D001-38:~/2141020022/DOS/Assignment 3/q5$ ./q5.sh
Enter the CP:
5
Enter the SP:
6
Profit of Rs. 1
```

6. Write a shell script which receives any year from the keyboard and determines, whether the year is a leap year or not. If no argument is supplied the current year should be assumed.

```
echo "Enter a year"
read year

if [ -z "$year" ]; then
    year=$(date +'%Y')
fi

if [ $((year%4)) -eq 0 ] && [ $((year%100)) -ne 0 ] || [ $((year%400)) -eq 0 ]; then
    echo "$year is a leap year"
else
    echo "$year is not a leap year"
fi
```

```
student@D001-38:~/2141020022/DOS/Assignment 3/q6$ ./q6.sh
Enter a year
2000
2000 is a leap year
```

7. Write a shell script **allow** that will display a message to enter internal mark and percentage in attendance, if the entered mark is greater than equal to 20 and entered percentage in attendance is greater that equal to 75 then display the message Allowed for Semester otherwise display the message Not allowed.

```
echo "Enter internal marks"
read m
echo "Enter percentage in  attendance"
read p

if [ $m -ge 20 ] && [ $p -ge 75 ]; then
    echo "Allowed for Semester"
else
    echo "Not Allowed"
fi
```

```
student@D001-38:~/2141020022/DOS/Assignment 3/q7$ ./q7.sh
Enter internal marks
70
Enter percentage in  attendance
74
Not Allowed
```

8. Write a shell script **small3** that will compare three numbers passed as command line arguments and display the smallest one.

```
a=$1
b=$2
c=$3
if [ $a -lt $b ] && [ $a -lt $c ]; then
    echo "$a is smaller"
elif [ $b -lt $c ] && [ $b -lt $a ]; then
    echo "$b is smaller"
else
    echo "$c is smaller"
fi
```

```
student@D001-38:~/2141020022/DOS/Assignment 3/q7$ ./q8.sh 9 6 1
1 is smaller
```

9. Write a shell script **check_char** which will display one message to enter a character and according to the character entered it will display appropriate message from the following options:
    - You entered a lower case alphabet You entered an upper case alphabet.
    - You have entered a digit.
    - You have entered a special symbol.
    - You have entered more than one character.

```
echo "Enter a char"
read c

if [ ${#c} != 1 ]; then
    echo "Length is more than one or no input"
else
    if [[ $c == [A-Z] ]];then
        echo "Upper Case"
    elif [[ $c == [a-z] ]];then
        echo "Lower case"
    elif [[ $c == [0-9] ]];then
        echo "Number"
    else
        echo "Symbol"
    fi
fi
```

```
student@D001-38:~/2141020022/DOS/Assignment 3/q9$ ./q9.sh
Enter a char
A
Upper Case
student@D001-38:~/2141020022/DOS/Assignment 3/q9$ ./q9.sh
Enter a char
js
Length is more than one or no input
student@D001-38:~/2141020022/DOS/Assignment 3/q9$ ./q9.sh
Enter a char

Length is more than one or no input
```

10. Write a shell script **class_time** which will display one message to enter a day and according to the day entered it will display the DOS class time along with the room information or the message “No class on day_name” or “Holiday” for Sunday.

```
student@LAPTOP:/mnt/e/2141020022/DOS_2141020022/DOS_Assignment3$ nano class_time.sh
student@LAPTOP: /mnt/e/2141020022/DOS_2141020022/DOS_Assignment3$ chmod +x class_time.sh
student@LAPTOP: /mnt/e/2141020022/DOS_2141020022/DOS_Assignment3$ ./class_time.sh
Enter a day
Wednesday
DOS class on Wednesday at 2:00 PM
student@LAPTOP:/mnt/e/2141020022/DOS_2141020022/DOS Assignment 3$ ./class_time.sh
Enter a day
Saturday
No class on Saturday.
```

```
 GNU nano 6.2
echo "Enter a day"
read day
day_lower=$(echo "$day" | tr [A-Z] [a-z])
case $day_lower in
    "monday")
        echo "DOS class on Monday at 1:00 PM"
        ;;
    "tuesday")
        echo "DOS class on Tuesday at 4:00 PM"
        ;;
    "wednesday")
        echo "DOS class on Wednesday at 2:00 PM"
        ;;
    "thursday")
        echo "DOS class on Thursday at 4:00 PM"
        ;;
    "friday")
        echo "No class on Friday"
        ;;
    "saturday")
        echo "No class on Saturday"
        ;;
    "sunday")
        echo "Holiday"
        ;;
    *)
        echo "Invalid day entered"
        ;;
esac
```

11. Write a shell script **filechk** that will take two file names as command line arguments, and check whether the content of two files are same or not . If contents of two files are same, then it will display the message: Files filename1 and filename2 have same content. then delete the second file and display the message: So filename2 is deleted.

    Otherwise display the message: Files filename1 and filename2 have different content.

```
 GNU nano 6.2
file1="$1"
file2="$2"
if cmp -s "$file1" "$file2"; then
        echo "Files $file1 and $file2 have the same content."
        rm "$file2"
        echo "So $file2 is deleted."
else
        echo "Files $file1 and $file2 have the different content."
fi
```

```
student@LAPTOP:/mnt/e/2141020022/DOS_2141020022/005_Assignment 3$ nano filechk.sh
student@LAPTOP:/mnt/e/2141020022/DOS_2141020022/DOS Assignment 3$ ./filechk.sh file1.txt file2.txt
Files file1.txt and file2.txt have the different content.
student@LAPTOP:/mnt/e/2141020022/DOS_2141020022/DOS_Assignment3$ ./filechk.sh file1.txt file3.txt
Files file1.txt and file3.txt have the same content.
So file3.txt is deleted.
```

12. Write a shell script **calculator** that will take three command line arguments, where the first argument will specify the first operand, second argument will specify the operator and the third argument will specify the second operand and display the output of the arithmetic operation specified in the following format: op1 operator op2 = result .

    If the arguments will be passed in any other sequence, it will display the message:

    “Invalid input “

    Enter input in following format: op1 operator op2

    The symbols to be used for different operators are as follows:

Addition:	+	Subtraction:	-
Multiplication:	x	Division:	/
Modulo:	%	Exponent:	^

```
  GNU nano 6.2
a=$1
o=$2
b=$3
if [[ $o =~ [+,-,/,%,^] ]]; then
        result=$(echo " $a $o $b " | bc -l)
        echo "$a $o $b = $result"
elif [[ "$o" == "x" ]]; then
        result=$(echo " $a * $b " | bc -l)
        echo "$a $o $b = $result"
else
        echo "Invalid Input"
fi
```

```
student@LAPTOP: /mnt/e/2141020022/DOS_2141020022/DOS_Assignment3$ nano calculator.sh
student@LAPTOP: /mnt/e/2141020022/DOS_2141020022/DOS Assignment3$ chmod +x calculator.sh
student@LAPTOP: /mnt/e/2141020022/DOS_2141020022/DOS_Assignment3$ ./calculator.sh 5/3
5/3 = 1.66666666666666666666
student@LAPTOP:/mnt/e/2141020022/DOS_2141020022/DOS_Assignment3$ ./calculator.sh 5 ^ 3
5^3 = 125
student@LAPTOP:/mnt/e/2141020022/DOS_2141020022/DOS_Assignment 3$ ./calculator.sh % 5 3
Invalid Input
```