Laboratory Assignments 3

Subject: Design Principles of Operating Systems

Subject code: CSE 3249

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.

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117$ cd DOSass3
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > iaop
#! /bin/bash
echo "Enter first number : "
read a
echo "Enter second number : "
read b
echo "Addition: $((a+b))"
echo "Subtraction: $((a-b))"
echo "Multiplication: $((a*b))"
echo "Division: $((a/b))"
echo "Modulus: $((a%b))"
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 iaop
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./iaop
Enter first number :
25
Enter second number :
67
Addition: 92
Subtraction: -42
Multiplication: 1675
Division: 0
Modulus: 25
```

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.

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > faop
#! /bin/bash
echo "Enter first number : "
read a
echo "Enter second number :"
read b
echo "Addition: $(echo "$a + $b" | bc)"
echo "Subtraction: $(echo "$a - $b" | bc)"
echo "Multiplication: $(echo "$a * $b" | bc)"
echo "Division: $(echo "$a / $b" | bc)"
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 faop
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./faop
Enter first number :
5.6
Enter second number :
5.9
Addition: 11.5
Subtraction: -.3
Multiplication: 33.0
Division: 0
```

3. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary, and house rent allowance is 30% of basic salary. Write a program to calculate his gross salary

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > gross_salary
#! /bin/bash
echo "Enter Ramesh's basic salary : "
read basic
da=$(echo "$basic * 0.40" | bc)
hra=$(echo "$basic * 0.30" | bc)
gross=$(echo "$basic + $da + $hra" | bc)
echo "Gross Salary : Rs. $gross"
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 gross_salary
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./gross_salary
Enter Ramesh's basic salary :
30000
Gross Salary : Rs. 51000.00
```

4. Write a shell script to accept a list of 10 numbers from the user and count how many are even and how many are odd.

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > count_even_odd
#! /bin/bash
even=0
odd=0
echo "Enter 10 numbers : "
for i in {1..10}
do
read n
if [ $((n % 2 )) -eq 0 ]
then
even=$((even + 1 ))
else
odd=$((odd + 1))
fi
done
echo "Even numbers  : $even"
echo "Odd numbers : $odd"
```

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 count_even_odd
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./count_even_odd
Enter 10 numbers :
20
45
18
60
49
10
4
80
77
33
Even numbers  : 6
Odd numbers : 4
```

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.

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > profit_loss
#! /bin/bash
echo "Enter cost price :"
read cp
echo "Enter selling price :"
read sp
if (( $(echo "$sp > $cp" | bc -l) ))
then
profit=$(echo "$sp - $cp" | bc)
echo "Profit : Rs. $profit"
elif (( $(echo "$sp < $cp" | bc -l) ))
then
loss=$(echo "$cp = $sp" | bc)
echo "Loss: Rs. $loss"
else
echo "No Profit No Loss"
fi
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 profit_loss
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./profit_loss
Enter cost price :
1000
Enter selling price :
1500
Profit : Rs. 500
```

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.

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > leap_year
#! /bin/bash
read -p "Enter a year : " y
if (( (y%400 == 0) || (y%4 == 0 && y%100!=0) ))
then
echo "$y is a Leap Year"
else
echo "$y is Not a Leap Year"
fi
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 leap_year
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./leap_year
Enter a year : 2025
2025 is Not 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.

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > allow
#! /bin/bash
read -p "Enter internal mark : " m
read -p "Enter attendance percentage : " p
if (( m >= 20 && p>= 75 ))
then
echo "Allowed for Semester"
else
echo "Not Allowed for Semester"
fi
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 allow
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./allow
Enter internal mark : 90
Enter attendance percentage : 75
Allowed for Semester
```

8. Write a shell script large3 that will compare three numbers passed as command line arguments and display the largest one.

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > large3
#! /bin/bash
if [ $# -ne 3 ]; then
echo "Please enter exactly 3 numbers."
exit 1
fi
if [ $1 -ge $2 ] && [ $1 -ge $3 ]; then
echo "$1 is the largest number"
elif [ $2 -ge $1 ] && [ $2 -ge $3 ]; then
echo "$2 is the largest number"
else
echo "$3 is the largest number"
fi
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 large3
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./large3 10 20 30
30 is the largest number
```

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

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > check_char
#! /bin/bash
read -p "Enter a character: " ch
if [ ${#ch} -ne 1 ]; then
echo "You have entered more than once character."
elif [[ $ch =~ [a-z] ]]; then
echo "You entered a lower case alphabet."
elif [[ $ch =~ [A-Z] ]]; then
echo "You entered an upper case alphabet."
elif [[ $ch =~ [0-9] ]]; then
echo "You have entered a digit."
else
echo "You have entered a special symbol."
fi
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 check_char
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./check_char
Enter a character: d
You entered a lower case alphabet.
```

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.

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > class_time
#! /bin/bash
read -p "Enter day: " day
day=$(echo "$day" | tr '[:upper:]' '[:lower:]')
case $day in
tue|tuesday)
echo "DOS class on Tuesday - Room No: E-324 , Time: 10:00-11:00 AM"
;;
thu|thursday)
echo "DOS Lab on Thursday - Room No: C-026 , Time: 2:00-4:00 PM"
;;
fri|friday)
echo "DOS class on Friday - Room No: E-324, Time : 5:00-6;00 PM"
;;
sat|saturday)
echo "DOS class on Saturday - Room No: E-324 , Time: 3:00-4:00 PM"
;;
sun|sunday)
echo "Holiday"
;;
*)
echo "No class on $day"
;;
esac
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 class_time
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./class_time
Enter day: thursday
DOS Lab on Thursday - Room No: C-026 , Time: 2:00-4:00 PM
```

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.

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > filecheck
#! /bin/bash
if [ $# -ne 2 ]; then
echo "Usage : $0 file1 file2"
exit 1
fi
f1=$1
f2=$2
if cmp -s "$f1" "$f2"; then
echo "Files $f1 and $f2 have same content"
rm "$f2"
echo "So $f2 is deleted"
else
echo "Files $f1 and $f2 have different content."
fi
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 filecheck
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./filecheck file1.txt file2.txt
Files file1.txt and file2.txt have different content.
```

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

```
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ cat > calculator
#!/bin/bash

if [ $# -ne 3 ]; then
  echo "Invalid input"
  echo "Enter input in following format: op1 operator op2"
  exit 1
fi

a=$1
op=$2
b=$3

case "$op" in
  +) echo "$a + $b = $((a + b))" ;;
  -) echo "$a - $b = $((a - b))" ;;
  x) echo "$a * $b = $((a * b))" ;;
  /) echo "$a / $b = $((a / b))" ;;
  %) echo "$a % $b = $((a % b))" ;;
  ^) echo "$a ^ $b = $((a ** b))" ;;
  *)
    echo "Invalid input"
    echo "Enter input in format: op1 operator op2"
    ;;
esac
echo "$op1 $operator $op2 = $result"
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ chmod 777 calculator
koushik_das@LAPTOP-BIHGEI3G:~/DOS_2341004117/DOSass3$ ./calculator 50 + 20
50 + 20 = 70
```