Lab Sheet 3: Shell Scripting

Conditional Statements

There are total 5 conditional statements that can be used in bash programming

1. if statement

2. if-else statement

3. if..elif..else..fi statement (Else If ladder)

4. if..then..else..if..then..fi..fi..(Nested if)

5. switch statement

if statement

```
if [ expression ]
then
   statement
fi
```

Sample Code

```
#Initializing two variables
a=10
b=20

#Check whether they are equal
```

```
if [ $a == $b ]
then
    echo "a is equal to b"
fi

#Check whether they are not equal
if [ $a != $b ]
then
    echo "a is not equal to b"
fi
```

if-else statement

```
if [ expression ]
then
   statement1
else
    statement2
fi
```

Sample Code

```
#Initializing two variables
a=20
b=20

if [ $a == $b ]
then
    #If they are equal then print this
    echo "a is equal to b"
else
```

```
    #else print this
    echo "a is not equal to b"
fi
```

if..elif..else..fi statement (Else If ladder)

```
if [ expression1 ]
then
    statement1
    statement2
.
elif [ expression2 ]
then
     statement
     statement4

else
     statement5
fi
```

if..then..else..if..then..fi..fi..(Nested if)

```
if [ expression1 ]
then
    statement1
    statement2

else
    if [ expression2 ]
    then
```

```
        statement
   fi
fi
```

switch statement

```
case in
      Pattern 1) Statement 1;;
      Pattern n) Statement n;;
esac
```

Sample code

```
CARS="bmw"
#Pass the variable in string
case "$CARS" in
    #case 1
    "mercedes") echo "Headquarters - Affalterbach, Germany" ;;

    #case 2
    "audi") echo "Headquarters - Ingolstadt, Germany" ;;

    #case 3
    "bmw") echo "Headquarters - Chennai, Tamil Nadu, India" ;;
esac
```

Looping Statements in Shell Scripting

There are total 2 looping statements which can be used in bash programming

1. while statement
2. for statement

To alter the flow of loop statements, two commands are used they are,

1. break
2. continue

while statement

```
while command

do

Statement to be executed

done
```

Sample Code

```
a=0

# -lt is less than operator


#Iterate the loop until a less than 10

while [ $a -lt 10 ]

do

    # Print the values

    echo $a


    # increment the value

    a=`expr $a + 1`

done
```

for statement

```
for var in word1 word2 ...wordn

do

   Statement to be executed

done
```

for loop with break statement

```
#Start of for loop

for a in 1 2 3 4 5 6 7 8 9 10

do

    # if a is equal to 5 break the loop

    if [ $a == 5 ]

    then

        break

    fi

    # Print the value

    echo "Iteration no $a"

done
```

Brace expansion

We use the brace expansion {m..n} to generate string in shell script.

```
{1..5} will give 1 2 3 4 5

{a..f} will give a b c d e f

{Z..T} will give Z Y X W V U T

{-5..5} will give -5 -4 -3 -2 -1 0 1 2 3 4 5

{A,B,C,D} will give A B C D

{A,B,C{1..3},D} will give A B C1 C2 C3 D
```

Example

```
#!/bin/sh

for i in {1..10}

do

   echo $i

done
```

```
#!/bin/sh

for ch in {A..Z}

do

   echo $ch

done
```

Using the seq command and set FIRST to 1, INCREMENT to 2 and LAST to 10.

```
#!/bin/sh

for i in $(seq 1 2 10)

do

   echo $i

done
```

```
for (( var=val; var<=val2; var++ ))

do

   # body of for loop

done
```

For example a shell script to print the following pattern

1

1 2

1 2 3

1 2 3 4

```
#!/bin/sh

for r in {1..4}

do

     for i in $(seq 1 $r)

     do

          printf "$i "

     done

     printf "\n"

done
```

Lab Exercises

1. Write shell scripts for the following:
    a. To take your name, programme name and enrolment number as input from user and print it on the screen.
    b. To find the sum, the average and the product of four integers.
    c. Write a program to check whether a number is even or odd.
    d. To exchange the values of two variables.
    e. To find the lines containing a number in a file.
    f. To concatenate two strings and find the length of the resultant string.
    g. To concatenate the contents of two files.
    h. Write a shell script that would wait 5 seconds and then display the time.
2. The length and breadth of a rectangle and radius of a circle are provided as user input. Write a shell script that will calculate the area and perimeter of the rectangle and the area and circumference of the circle.Hint: - Area of Rectangle = L*B Perimeter of Rectangle = 2(L+B) Area of Circle = $\pi.r^2$ Circumference of circle = 2. π.r

3. Write a menu driven shell program to read two numbers and print the results of all the arithmetic operations. (+ , - , * , / , % , ++ , --)
4. Write two separate shell scripts to find the factorial of a number using **while** statement and **for** statement.
5. Given a file of numbers (one number per line), write a shell script that will find the lowest and highest number.
6. Write a shell program to read n numbers into an array and display the average of them.
7. Write a shell program to print the following Patterns.

```
* * * * *
* * * *
* * *
* *
*
```

```
      *
    * * *
  * * * * *
* * * * * * *
* * * * * * * * *
```

8. Write a shell program to read two matrices, add them and print the output matrix.

9. Write a program to read a matrix and print the transpose of it.