Amrita School of Computing, Amritapuri Campus.

19CSE213: Operating Systems

LAB SHEET 3

Linux Shell Programming

Shell Scripting Tutorial

Conditional Statements:

There are total 5 conditional statements which 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

```
#!/bin/bash
#Reading input from user
echo "Enter first number: "
read a
echo "Enter Second number: "
read b

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
    statement3
    statement4
.
else
    statement5
fi
```

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

```
if [ expression1 ]
then
    statement1
    statement2
    .
else
    if [ expression2 ]
    then
        statement3
        .
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

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
```

```
#!/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
```

Write 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
```

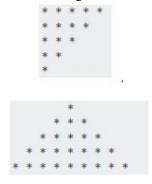
Lab Exercises

- 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 = $2 . \pi . r$

- 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.