ULI101: INTRODUCTION TO UNIX / LINUX AND THE INTERNET

WEEK 12 LESSON 1

LOGIC CONTINUED: IF – ELIF – ELSE STATEMENT
LOOPS CONTINUED: FOR LOOP / WHILE LOOP
EXIT & BREAK STATEMENTS / ERROR-CHECKING / EXPORT COMMAND
START-UP FILES / FURTHER STUDY

LESSON TOPICS

Additional Control Flow Statements

- **if-elif-else**
- **for** loop (continued)
- **while** loop
- **exit** and **break** statements / Error Checking / **export** Command
- Demonstration

Start-up Files

- Definition / Purpose
- **/etc/profile , ~/.bash_profile , ~/.bashrc , ~/.bash_logout /** Demonstration

Further Studies in Linux

Perform Week 12 Tutorial

- Investigations **1, 2 & 3**
- Review Questions (Questions **1 - 8**)

ADDITIONAL CONTROL FLOW STATEMENTS

As discussed in a previous lesson, we can use **control flow statements** that will control the sequence of a running script based on various situations or conditions.

Control Flow Statement are used to make your shell scripts more flexible and can adapt to changing situations.

We are going to learn **more** types of control flow statements (both logical and loops) to give more flexibility and power to your shell scripts.

ADDITIONAL CONTROL FLOW STATEMENTS

if-elif-else Statements

If the test condition returns a **TRUE** value, then the Linux Commands between **then** and **else** statements are executed.

If the test returns a **FALSE** value, then a **new condition is tested**, and action is taken if the result is **TRUE**

Otherwise, an action will be taken if the new test condition is **FALSE**

Example:

```
if [ $num1 -lt $num2 ]
 then
    echo "Less Than"
elif [ $num1 -gt $num2 ]
 then
    echo "Greater Than"
else
    echo "Equal to"
fi
```

if return 0, then do this part

```
cat elif.bash
#!/bin/bash

read -p "Enter first number: " num1
read -p "Enter second number: " num2

if [ $num1 -lt $num2 ]
then
  echo "num1 is less than num2"
elif [ $num1 -gt $num2 ]
then
  echo "num1 is greater than num2"
else
  echo "num1 is equal to num2"
fi
./elif.bash
Enter first number: 1
Enter second number: 2
num1 is less than num2
./elif.bash
Enter first number: 2
Enter second number: 1
num1 is greater than num2
./elif.bash
Enter first number: 2
Enter second number: 2
num1 is equal to num2
```

ADDITIONAL CONTROL FLOW STATEMENTS

Instructor Demonstration

Task:

Create a **Bash** Shell script to prompt the user for a percentage grade. The shell script will then assign a **letter grade** based on the percentage grade.

$0 it is good practice to include to tell which script is running

" " quote the variable (good practice)

ADDITIONAL CONTROL FLOW STATEMENTS

for Loop

In a previous lesson, you learned how to use the for loop using a **list**.

A list consists of **arguments** that are used for each iteration of the loop.

Example:

```
for item in list
do
    command(s)
Done
```

NOTE: There are other ways we can use the for loop (including **command substitution**) to allow our shell scripts to be more effective.

ADDITIONAL CONTROL FLOW STATEMENTS

for Loop using Command Substitution

In the example below, we will use **command substitution** to issue the **ls** command and have that output (filenames) become **arguments** in the **for** list.

Example: **run ls, take the output of ls**

```
for var in $(ls)
do
    echo "Filename is: $var"
Done
```

seq 5: 1 2 3 4 5

seq 5 10: 5 6 7 8 9 10

```
#!/bin/bash
clear
for i in $(seq 1 20)
do
    echo $i
done
```

```
ls
file1  file2  file3  for-command-substitution.bash

cat for-command-substitution.bash
#!/bin/bash

for var in $(ls)
do
  echo "Filename is: $var"
done

./for-command-substitution.bash
Filename is: file1
Filename is: file2
Filename is: file3
Filename is: for-command-substitution.bash
```

ADDITIONAL CONTROL FLOW STATEMENTS

Instructor Demonstration

Task:

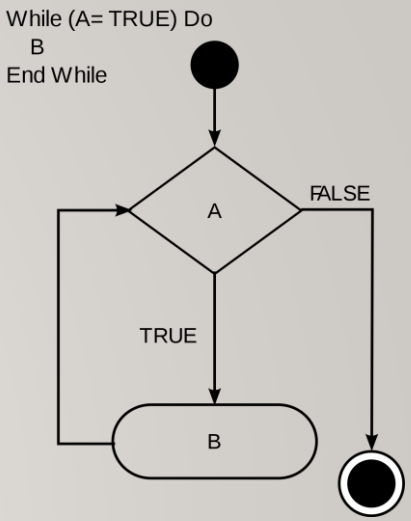
Create a **Bash** Shell script to clear the screen and then display all files (non-hidden) in your home directory.

The output should show files on each line and number:

For Example:

```
File 1: abc.txt
File 2: def.txt
File 3: ghi.txt
etc...
```

ADDITIONAL CONTROL FLOW STATEMENTS



Using the while Loop Statement

The condition/expression is evaluated, and if the condition/expression is ***TRUE***, the code within … the block is executed.

This repeats until the condition/expression becomes **FALSE**.

Reference: https://en.wikipedia.org/wiki/While_loop

Example:

```
answer=10
read -p "pick a number between 1 and 10: " guess
while [ $guess -ne 10 ] $answer
do
    read -p "Try again: " guess
done
echo "You are correct"
```

```
cat while.bash
#!/bin/bash

answer=10
read -p "Pick a number between 1 and 10: " guess

while [ $guess -ne 10 ]
do
   read -p "Try again: " guess
done

echo "You are CORRECT"

./while.bash
Pick a number between 1 and 10: 4
Try again: 7
Try again: 3
Try again: -3
Try again: 10
You are CORRECT
```

ADDITIONAL CONTROL FLOW STATEMENTS

Instructor Demonstration

Task:

Create a **Bash** Shell script to prompt the user for a number **(error check for an unsigned integer**).

Once the user enters a **VALID** unsigned integer, count-down the numbers on a separate line by a value of 1 until you reach the value 1, then print on the last line**: Blast Off!**

EXIT STATEMENT

The **exit** statement is used to **terminate** a shell script.

This statement is very useful when combined with logic in a shell script. The *exit* command can contain an argument to provide the **exit status** of your shell script.

Example:

```
if [ $# -ne 1 ]
then
  echo "USAGE: $0 [arg]"
  exit 1
fi
```

```
[ murray.saul ] cat myscript.bash
#!/bin/bash

if [ $# -ne 1 ]
then
  echo "USAGE: $0 [arg]"
  exit 1
fi

echo "The argument is: $1"

exit 0
[ murray.saul ]
[ murray.saul ] ./myscript.bash
USAGE: ./myscript.bash [arg]
[ murray.saul ] echo $?
1
[ murray.saul ] ./myscript.bash uli101
The argument is: uli101
[ murray.saul ] echo $?
0
```

BREAK STATEMENT

The **break** statement is used to **terminate a loop**.

Although the loop terminates, the shell script will continue running.

Example:

```
read -p "Enter a number: " number
while [ $number -ne 5 ]
do
   read -p "Try again. Enter a number: " number
   if [ $number -eq 5 ]
   then
     break
   fi
done
```

```
[ murray.saul ] cat myloop.bash
#!/bin/bash

read -p "Enter a number: " number

while [ $number -ne 5 ]
do
   read -p "Try again. Enter a number: " number
   if [ $number -eq 5 ]
   then
     break
   fi
done

echo "Congratulations"
[ murray.saul ]
[ murray.saul ] ./myloop.bash
Enter a number: 3
Try again. Enter a number: 7
Try again. Enter a number: 5
Congratulations
```

ERROR-CHECKING

As mentioned in Week 10, instead of using the **test** command,
you can run a Linux command or Linux pipeline command to test a condition.

We can use a **Linux pipeline command** to **force** the user
to enter a **valid unsigned integer**.

Example:

```
read -p "Enter a mark (0-100): " mark

while ! echo $mark | egrep "^[0-9]{1,}$" > /dev/null 2> /dev/null
do
   read -p "Not a valid number. Enter a mark (0-100): " mark
done
```

ERROR-CHECKING **condition checking**

Compound operators can be used when **testing** conditions.

&& represent **AND** which requires **ALL** test conditions to be **TRUE** for the result to be **TRUE**.

|| represents **OR** which only requires one test condition to be **TRUE** for the result to be **TRUE**. If **ALL** conditions are **FALSE**, then the result will be **FALSE**.

Example:

```
read -p "Enter a mark (0-100): " mark

while [ $mark -lt 0 ] || [ $mark -gt 100 ]
do
   read -p "Invalid number range. Enter a mark (0-100): " mark
done
```

RUNNING SHELL SCRIPTS WITHIN SHELL SCRIPTS

You can run shell scripts **inside** of shell scripts.

When a variable is exported using the export command, it becomes available to any child processes created by the current shell process. This means that the value of the environment variable can be used by programs or scripts that are executed in the shell environment.

If you want the value variables to transfer to "inside" the shell script,
you would need to use the **export** command prior to executing the inside shell script.

Example of NOT using export Command:

```
> cat script1.bash
#!/bin/bash

var=10

./script2.bash


> cat script2.bash
#!/bin/bash

echo "The value of var is: $var"
>
> ./script1.bash
The value of var is:
```

*Example of using **export** Command:*

```
> cat script1.bash
#!/bin/bash

var=10
export var

./script2.bash


> cat script2.bash
#!/bin/bash

echo "The value of var is: $var"
>
> ./script1.bash
The value of var is: 10
```

ADDITIONAL CONTROL FLOW STATEMENTS

Instructor Demonstration

Your instructor will demonstrate the use of the
exit and **break** statements as well as the **export** command.

STARTUP FILES

Start-up Files

Shell configuration (start-up) files are **scripts** that are run when you **log in, log out**, or **start a new shell**. Start-up files can be used, for example, to set the prompt and screen display, create local variables, or create temporary Linux commands (aliases).

The file pathname **/etc/profile** belongs to the **root** user and is the first start-up file that executes when you log in, regardless of shell.

The **/etc/bashrc** file is used for setting the default Bash shell environments for users. It is generally NOT used to generate output from commands.

User-specific config start-up files are in the user's home directory:
~/.bash_profile runs when you log in **~/.bashrc**
runs when you start an interactive subshell. You can use **~/.bash_profile**
to issue commands that produce output (eg. **date**, **echo "hello"**)

STARTUP FILES

Logout Files

There are files that reset or restore the environment or properly shut-down running programs when the user logs out of their shell.

User-specific logout start-up files are in the user's home directory:

~/.bash_logout

STARTUP FILES

Instructor Demonstration

Your instructor will demonstrate examples of using **start-up** files.

FURTHER STUDY

In order to get efficient in working in the Linux environment
requires **practice** and **applying** what you have learned to administering Linux operating systems including: **user management**, **installing and removing applications**, **network services** and **network security**.

Although you are **NOT** required to perform **Linux administration** for this course, there are useful **course notes** and **TUTORIALS** for advanced Linux server administration that have been created for the Networking / Computer Support Specialist stream:

- OPS245: Basic Linux Server Administration
- OPS335: Advanced Linux Server Administration

Take care and good luck in your future endeavours **:)**

ADDITIONAL CONTROL FLOW STATEMENTS / FEATURES

Getting Practice

Perform **Week 12 Tutorial:**
(Due: Friday Week 13 @ midnight for a 2% grade):

- INVESTIGATION 1: ADDITIONAL LOGIC STATEMENTS
- INVESTIGATION 2: ADDITIONAL LOOPING STATEMENTS
- INVESTIGATION 3: USING STARTUP FILES
- LINUX PRACTICE QUESTIONS (Questions **1 - 8**)