UNIVERSITY of TECHNOLOGY, MAURITIUS

MSc Software Engineering

Cohort: MSE/09/PT

Examinations for 2009 - 2010 / Semester 1

MODULE: UNIX PROGRAMMING

MODULE CODE: OSS5101

Duration: 2 Hours and 30 minutes

Instructions to Candidates:

1. Answer **FOUR** (4) Questions **ONLY**.
2. Questions may be answered in any order but your answers must show the question number clearly.
3. Always start a new question on a fresh page.
4. **Section A is Compulsory and answer any two (2) Questions out of three (3) in Sections B**.
5. Section **A** carries **60** marks and Section **B** carries **40** marks.
6. Total marks 100.

This question paper contains 5 questions and 7 pages.

SECTION A: COMPULSORY

QUESTION 1: (30 MARKS)

(i) What is the difference between a hard link and a soft link? And how can you check the link on a file? ***[2 marks]***

(ii) Discuss what is a *trap* in the C Shell and explain the following statement:

trap $HOME/.logout 0 ***[2 marks]***

(iii) The UNIX file is described by an information block called an ***i*_node**, Describe in detail (with diagram) the system V disk ***i*_node**. ***[3 marks]***

(iv) List five extra information that are available on an *i*_node once a file has been opened in the memory. ***[3 marks]***

(v) Write short notes on the following:

(a) Pipe.

(b) Filter.

And give an example where both are used in a UNIX command. ***[2 marks]***

(vi) The following **tip** commands from the remote host can be used to perform tasks on the local host while you continue working on the remote host. Explain each of the following:

(a) **~c**

(b) **~t**

(c) **~<**

(d) **~p**

(e) **~>**

[4 marks]

(vii) Explain briefly the following Metacharacters in the Korn Shell

a. &&

b. ||

c. ;

d. & ***[2 marks]***

(viii) Use **rcp** UNIX command to copy the local file, **deduct** from the directory **/usr/incomtax** on the local host to the file **overtime** in the directory **/usr/staff** on the remote host **Finance** preserve the original creation date and access permission mode of the copied file in the new file . ***[2 marks]***

(ix) Write a UNIX command that creates a listing of files, then sorts that listing in reverse alphabetical order and puts the results into a file named a.txt. ***[1 mark]***

(x) How do you know what shell you are using? And what UNIX command would you use to change the Shell. ***[1 mark]***

(xi) Explain the following UNIX command

(cd account;ls) ; ls ***[2 marks]***

(xii) Explain in details the order of execution of the *.cshrc* login script and *.login* script in a C shell environment. ***[2 marks]***

(xiii) Write a command to display a list of all accounts on the system with a login shell of ksh, sorted alphabetically by login name and displayed a screen at a time. ***[2 marks]***

(xiv) What command would you use to make the Korn shell variable ***Overtime*** available in child shells? ***[1 mark]***

(xv) Explain the following Unix Command:

Ls –l | grep r-x | wc –l ***[1 mark]***

QUESTION 2: (30 MARKS)

(i) In the UUCP (Unix UNIX Copy program); which two commands allow you to establish a full-duplex connection, giving the appearance of being directly logged in to the remote host. ***[1 mark]***

(ii) Describe What the UNIX command < **UTM%** cu -s300 4930626 **>** means in the UUCP . ***[2 marks]***

(iii) Using uux from the Bourne or Korn Shells , explain the following UNIX command:

uux "UTM!cat UTM!/u/doc/F1 UOM!/usr/doc/F2 > UTM!/u/doc/F3"

[2 marks]

(iv) Explain the following UUX command:

UTM% uucp /usr/staff/IT UOM\!~uucp ***[2 marks]***

(v) *NFS* consists of two main parts, a server and one or more clients. The client cans remotely access data on a server, In order for this to work properly few daemons has to be configured and running.

(a) ***nfsd***,

(b) ***mountd***,

(c) ***rpcbind***,

Explain these daemons. ***[3 marks]***

(vi) Write a UNIX command line for the following program : (***conditional Execution based on failure***)

Suppose that the command *mysort* is a sorting program that creates a temporary file (mysort.txt*)* in the course of its sorting process. When the sorting program finishes successfully, it cleans up after itself, deleting the temporary file. If on the other hand, the program fails, it may neglect to clean up. ***[4 marks]***

(vii) Some important files in Unix/Linux are:

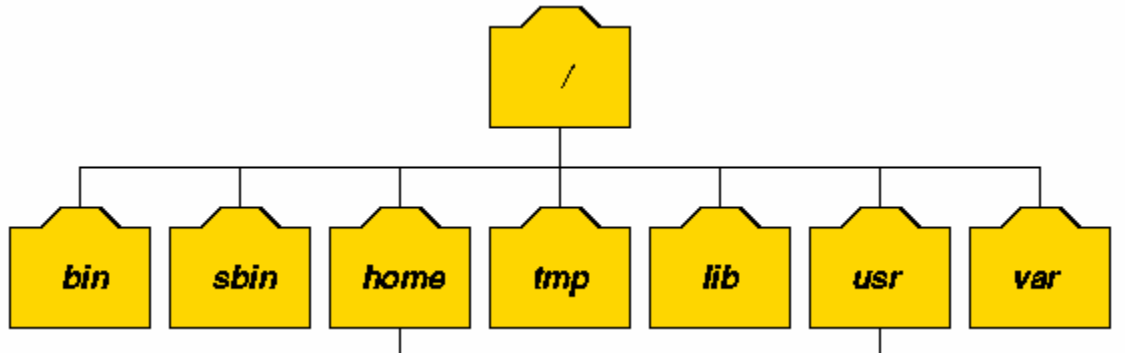
(a) */etc/hosts*.

(b) /etc/resolve.conf.

(c) /etc/routes.

Explain briefly the importance of each of these files. ***[6 marks]***

(viii) Some of the Directories required to run the UNIX system are shown below:



Give a brief explanation on each directory in the UNIX system. ***[10 marks]***

SECTION B: (Answer only two Questions from this Section)

QUESTION 3: (20 MARKS)

(i) All Security authentication mechanism that run on the TRU64 Unix Operating system run under the *Security Integration Architecture* (SIA) layer. Explain with diagram the *Security Integration Architecture.* ***[5 marks]***

(ii) Using UNIX command describe how would you install a multiple layered security product? ***[3 marks]***

(iii) Write brief notes on the following two files.

(i) /etc/hosts.equiv

(ii) $HOME/ .rhosts. ***[4 marks]***

(iv) What is an authentication subsystem in a UNIX system environment? ***[3 marks]***

(v) After having loaded the ACLs, (Access Control: list) what command would you use to determine the status of ACLs in the kernel? (i.e *verifying the kernel change*). ***[2 marks]***

(vi) What command will determine if access control list (ACLs) is currently running in the system? ***[3 marks]***

QUESTION 4: (20 MARKS)

(1) Explain each Variable below in the Built Korn Shell variables :

[5 Marks]

I. *HOME*
II. *PATH*
III. *SHELL*
IV. *CDPATH*
V. *MAILCHECK*

(2) What is wrong with the following shell program? ***[5 Marks]***

```
#!/bin/sh
echo "Enter height of parallelogram: "
read height
echo "Enter width of parallelogram: "
read width
area = 'expr $height * $width'
echo "The area of the parallelogram is $area"
```

(3) What is wrong with the following shell program? ***[5 Marks]***

```
#!/bin/sh
user=`whoami`
if[$user = "utm"]
        echo "Hi students!"
else
        echo "Hi user!"
fi
```

(4) What is wrong with the following shell program? ***[5 Marks]***

```
#!/bin/sh
users=`who | wc -l`
if [ $users >= 4 ]
then
        echo "Heavy load!"
elif[ $users > 1 ]
        echo "Medium load"
else
        echo 'Just me!'
fi
```

QUESTION 5: (20 MARKS)

(i) Write brief notes on the Logical Storage Manager. ***[2 marks]***

(ii) Draw the Logical Storage Manager Software Architecture, and explain the function of the Volume Device Driver. ***[4 marks]***

(iii) List three benefits of the Logical Storage Manager. ***[3 marks]***

(iv) The partition on a physical device are mapped by a partition table called the disk label.

List three characteristics of a *disklabel*. ***[3 marks]***

(v) Write *Unix* commands and explain briefly with examples the process of

(a) Renaming a disk. ***[2 marks]***

(b) Reserving a disk. ***[2 marks]***

(c) Removing a disk. ***[2 marks]***

(d) Disabling a disk. ***[2 marks]***

******END OF QUESTION PAPER******