

B2.3-R3: BASICS OF OS, UNIX AND SHELL PROGRAMMING

NOTE:

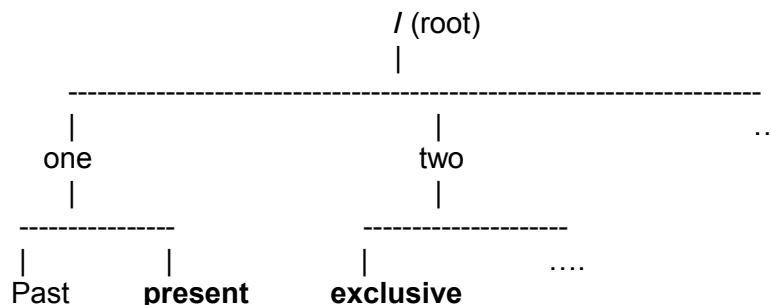
1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
2. **PART ONE** is to be answered in the **TEAR-OFF ANSWER SHEET** only, attached to the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.
3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

TOTAL TIME: 3 HOURS

TOTAL MARKS: 100
(PART ONE – 40; PART TWO – 60)

PART ONE **(Answer all the questions)**

1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the “tear-off” answer sheet attached to the question paper, following instructions therein. (1 x 10)
 - 1.1 Memory management scheme in which entire process is transferred between primary memory and secondary memory device (meant for it) is called
 - A) demand paging
 - B) segmented
 - C) swapping
 - D) None of the above
 - 1.2 The current directory is **present**. The relative path name of the file **exclusive** in the following directory structure is ...



- A) ../two/exclusive
- B) ../../two/exclusive
- C) /two/exclusive
- D) None of the above

- 1.3 The shell in which environment/built-in-variables are often featured both in lower case and upper case is
- A) C shell
 - B) Bourne shell
 - C) Korn shell / BASH shell
 - D) None of the above
- 1.4 Remote login is offered with out UNIX machine at other end by
- A) rlogin
 - B) telnet
 - C) ftp
 - D) None of the above
- 1.5 Multiple pattern for search can be given in
- A) grep
 - B) egrep
 - C) in both – grep & egrep
 - D) None of the above
- 1.6 **BEGIN** and **END** sections of **awk** are used to
- A) enclose the program
 - B) enclose the pattern
 - C) do pre and post processing work
 - D) None of the above
- 1.7 To run a UNIX program in 'C' program and resume 'C' program processing, we may use the function
- A) exec
 - B) execl()
 - C) system()
 - D) None of the above
- 1.8 To maintain the state of file and user's access to it, we may use
- A) user file descriptor table
 - B) file table
 - C) inode table
 - D) All of the above
- 1.9 In **mount** command, the first operand and second operand are
- A) device special file, directory file
 - B) device special file, ordinary file
 - C) directory file, device special file
 - D) None of the above
- 1.10 On logging in as super user, the current directory becomes
- A) /
 - B) The current directory does not change
 - C) /root
 - D) None of the above

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the “tear-off” sheet attached to the question paper, following instructions therein. (1 x 10)

- 2.1 Multitasking implies multi-user.
- 2.2 Command **rm file** will always delete the file from the system.
- 2.3 More than one file can be edited in same **vi** session.
- 2.4 **ping** is used to test network connectivity.
- 2.5 Tagged regular expression can be used in **egrep**.
- 2.6 **let** is built-in function of Korn shell and Bash shell.
- 2.7 System call is stand alone program.
- 2.8 More than one file system may reside in one disk.
- 2.9 **zip** can compress group of files into archive.
- 2.10 **/etc/inittab** is start up file of **init**.

3. Match words and phrases in column X with the closest related meaning/ word(s)/phrase(s) in column Y. Enter your selection in the “tear-off” answer sheet attached to the question paper, following instructions therein. (1 x 10)

| X | | Y | |
|------|--|----|------------------------------------|
| 3.1 | Commands issued to kernel | A. | Daemon |
| 3.2 | Execute permission for directory | B. | umask |
| 3.3 | Repeating the last command in vi | C. | xclipboard |
| 3.4 | Not associated with any user but does system wide function and is flexible | D. | init 2 |
| 3.5 | Component of X-windows | E. | fdisk |
| 3.6 | Integer manipulation and string manipulation | F. | Super block |
| 3.7 | Stand-alone program | G. | init 0 |
| 3.8 | State of file-system | H. | fsck |
| 3.9 | Integrity of file-system | I. | widgit |
| 3.10 | To shut down the system | J. | File table |
| | | K. | System call |
| | | L. | Files in directory can be accessed |
| | | M. | sh |
| | | N. | Files in directory can be executed |
| | | O. | chmod |
| | | P. | u |
| | | Q. | . (dot) |
| | | R. | Kernel |
| | | S. | Unix command |
| | | T. | expr |
| | | U. | bc |

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Enter your choice in the “tear-off” answer sheet attached to the question paper, following instructions therein. (1 x 10)

| | | | | | | | |
|----|-------------|----|------------------|----|-------------|----|------------|
| A. | SUID | B. | SGID | C. | x | D. | df |
| E. | internal | F. | library function | G. | external | H. | bit-mapped |
| I. | \$0 | J. | \$# | K. | 1 | L. | directory |
| M. | file system | N. | u | O. | system call | P. | 2 |
| Q. | mount | R. | load | S. | du | | |

- 4.1 File descriptor _____ is normally attached to terminal input screen to serve and handle error messages and diagnostic information.
- 4.2 _____ is also a type of file in UNIX.
- 4.3 To cancel the action of previous command under vi, we press _____ under command mode.
- 4.4 X window uses a(n) _____ display.
- 4.5 The shell parameter _____ contains the name of script is being executed.
- 4.6 _____ is part of programming of the kernel.
- 4.7 _____ representation of file is given by inode.
- 4.8 Directory structure of the file system is accessible by root inode after execution of _____ system call.
- 4.9 _____ is used to know amount of disk space used.
- 4.10 Setting _____ for the file by super user may provide privileges of owner of the file during execution of the program.

PART TWO
(Answer any **FOUR** questions)

- 5.
- a) Explain and draw the block diagram of the UNIX kernel showing various modules and their relationship to each other.
 - b) How files are internally organized in UNIX system, explaining the use of various data structure by kernel?

(8+7)

- 6.
- a) Write a shell script to do the following:
A file **name** is given, which consists of the records having Mr. or Ms. in first field, followed by number of first names, like

```
Mr. Shyam   Ram Abdull   Adit   Shekh
Ms. Rita    Veema           Berry Nazima   Sheela   Geeta
Ms  ---     ---     ---     -----
Mr.  -----
```

(The field separator is one or more blanks.)

Prefix the first field with each remaining field of the same record and output as one line after prefixing the first field and put it in file **oname**. Sort this file on name and output it as **ooname**.

oname will be containing the records like

```
Mr. Shyam
Mr. Ram
.....
.....
Ms. Rita
Ms. Veema
-----
.....
Ms. Geeta
```

- b) Attempt any **three** of the following:
 - i) Write an interactive shell script which should find the frequency of the word, to be inputted from keyboard, in the text file **word** and display "the frequency of word".
 - ii) Write a shell script which should display the users (along with all information which appears as output of **who** command), who have logged in and logged out in last five minutes.
 - iii) Write a shell script which should list all those users (output in form of **who**) who have logged in between 10:00 AM and 11:29 AM.
 - iv) Print the name of the current directory in which you are logged in. (NOT the absolute pathname)

(6+[3x3])

7.

- a) Write an **awk** script (or otherwise) to do the following:
Given a file named **weekt**, which has the records having the following fields separated by one blank:

Day of week, name of vegetable, rate.

Find the average rate of each vegetable. For calculating the average, the highest rate of the vegetable in the day is to be considered, that means for same day there may be more than one record for the vegetable. List only those vegetables which have been sold on every day of the week in the following format:

| Serial No. | Name of vegetable | Average rate |
|------------|-------------------|--------------|
| ----- | ----- | ----- |
| 1 | xxxxxxxxxxxxx | xx.xx |

- b) i) Write **awk** script to simulate **wc** command.
ii) Write **sed** command to replace **doeacc** by **DOEACC** in file **FILE** and print only those lines which have been replaced.
iii) Write a shell script **appends** which can take either one parameter or two parameters. If only one parameter is given then it is the name of existing file to which will be appended any text entered from the keyboard. If a second parameter is given then it should be the name of the file which will be used as a source of the text to append to the first file specified (i.e. instead of using text from keyboard.)

(10+[2+1+2])

8.

- a) Write in brief about **.exrc** file and write a **.exrc** file mapping the functions keys F1 for help on vi and F2 for saving changes if any in current vi environment.
b) What are the important roles of the system administrator in Linux/Unix?
c) Describe the characteristics of DNS in Unix and internet domain structure.

(5+5+5)

9. Write short notes (or do as directed) on any **THREE** of the following:

- a) TCP / IP.
b) The X architecture and running X programs remotely.
c) Process states and transitions.
d) i) structure of command in **vi**.
ii) create a file **OFFILE** from **FILE**, which is opened under vi session, which should have first fifty lines of **FILE** at the end and remaining lines in the beginning.

(3x5)