CMR

INSTITUTE OF TECHNOLOGY

Scheme of Evaluation
Internal Assessment- I
September - 2016

Sub: UNIX Shell and Programming **Sem : III** **Branch: ISE**

Q.no				Total Marks
1.	a) With a neat diagram explain the architecture of UNIX operating system.	Diagram Components Role of kernel Role of Shell	1 M 1 M 2M 2M	6 M
	b) Write a note on UNIX environments	Personal Environment Time Sharing Client Server	1 M 1.5 M 1.5 M	4 M
2.	a) File's current permissions are rw--w-r— write chmod expression required to change them for the following using both relative and absolute mode.	Absolute and Relative for i)r--r----x ii) rwxrw---x iii) r-xr-xr-x iv)rwxrwx---	 2 M 2 M 2 M 2 M	8 M
	b) Differentiate between internal and external commands with example	Internal Commands External Commands	1 M 1 M	2 M
3.	Explain the various attributes of a file with example	Listing and example for seven attributes	6 M	6 M
	Explain absolute and relative pathnames with example	Absolute pathname with example Relative pathname with example	2 M 2 M	4 M

4.	Explain the UNIX file system with the tree structure	Listing all the directories and explaining the content of these directories Tree diagram	5 M 1 M	6 M
	b) What are the commands for adding a user and group? Briefly explain the fields of each entry in /etc/passwd and /etc/group files.	useradd command with example groupadd command with exmaple	2 M 2 M	4 M
5.	a) Draw the tree structure of the file system created by the following commands (assume you are in the directory /usr/office.)	$mkdir left $mkdir middle $mkdir right cd left $mkdir left middle right $cd ../middle $mkdir dir1 dir2/usr/office/right/dir3	5 M	5 M
	b) Explain chown and chgrp commands with example.	chown command with example chgrp command with example	2.5 M 2.5 M	5 M
6.	a) Write the significance of following UNIX commands i) ls –ld / ii) chmod –R 755 /usr/cmrit iii) wc –l < myfile iv) date ; who > myfile	i)long list of directory root ii) changing permission recursively with absolute mode iii) word count only with l option and input redirection iv) combining of commands and output redirection	2 M 2 M 2 M 2 M	8 M
	b) Write a command to copy all file from current directory to temp directory Write a UNIX command to delete a file called foo forcefully	copy command with * and absolute path for temp folder rm command with –f option	1 M 1 M	2 M

UNIX Shell Programming (15CS35)

Solution
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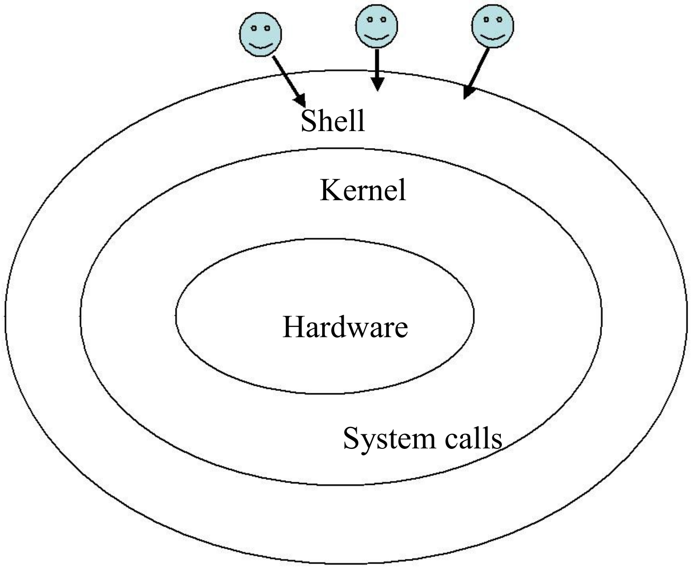
1 a) With a neat diagram explain the architecture of UNIX operating system



UNIX architecture comprises of two major components viz., the shell and the kernel. The kernel interacts with the machine's hardware and the shell with the user.

The **kernel** is the core of the operating system. It is a collection of routines written in C. It is loaded into memory when the system is booted and communicates directly with the hardware. User programs that need to access the hardware use the services of the kernel via use of system calls and the kernel performs the job on behalf of the user. Kernel is also responsible for managing system's memory, schedules processes, decides their priorities.

The **shell** performs the role of command interpreter. Even though there's only one kernel

running on the system, there could be several shells in action, one for each user who's logged in. --The shell is responsible for interpreting the meaning of metacharacters if any, found on the command line before dispatching the command to the kernel for execution.

2 a) Files current permissions are rw—w-r--write chmod expression required to change them for the following

i) r--r----x
chmod ug-w, g+r,o-r,o+x
chmod 441

ii) rwxrwx—x
chmod a+x, g+r, o-r
chmod 771

iii) r-xr-xr-x
chmod a+x,ug-w
chmod 555

iv) rwxrwxr—
chmod ug+x,g+r
chmod 774

b) Internal and External commands: Some commands are implemented as part of the shell itself rather than separate executable files. Such commands that are built-in are called internal commands. If a command exists both as an internal command of the shell as well as an external one (in /bin or /usr/bin), the shell will accord top priority to its own internal command with the same name. Some built-in commands are echo, pwd, etc.

3 a) Explain the various attributes of a file with example

The output from **ls -l** summarizes all the most important information about the file on one line. If the specified pathname is a directory, **ls** displays information on every file in that directory (one file per line). It precedes this list with a status line that indicates the total number of file system blocks (512 byte units) occupied by the files in that directory. Here is a sample of the output along with an explanation.

```
-rw-rw-rw- 1 root   dir 104 Dec 25 19:32 fil
```

1) **File type and permissions**: The first character identifies the file type:

-	Regular file
d	Directory

The next nine characters are in three groups of three; they describe the permissions on the file. The first group of three describes owner permissions; the second describes group permissions; the third describes other (or world) permissions.

r	Permission to read file
w	Permission to write to file
x	Permission to execute file

2) **Links** : After the permissions comes the number of links to the file.
3) **Owner name** : name of the owner of the file or directory.
4) Group name : name of the group that owns the file or directory.

5) **File size** : size of the file, expressed in bytes.
6**) Date and time**: For a file, this is the time that the file was last changed; for a directory, it is the time that the directory was created.
7**) File name** : The last item on the line is the name of the file or directory.

b) Explain absolute and relative pathnames with example

i. **Absolute and relative pathnames:** A path, which is the way you need to follow in the tree structure to reach a given file, can be described as starting from the trunk of the tree (the / or root directory). In that case, the path starts with a slash and is called an **absolute path**, since there can be no mistake: only one file on the system can comply. Paths that don't start with a slash are always relative to the current directory. In **relative paths** we also use the . and .. indications for the current and the parent directory. The HOME variable When you log onto the system, UNIX automatically places you in a directory called the home directory. The shell variable HOME indicates the home directory of the user.
E.g., $ echo $HOME
/home/kumar

What you see above is an absolute pathname, which is a sequence of directory names starting from root (/). The subsequent slashes are used to separate the directories

Below is the example for a relative pathname.

e.g rm read/hello.txt

4 a) Explain the UNIX file system with the tree structure

Unix uses a hierarchical file system structure, much like an upside-down tree, with root (/) at the base of the file system and all other directories spreading from there.

The directories have specific purposes and generally hold the same types of information for easily locating files. Following are the directories that exist on the major versions of Unix

Directory	Description
/	This is the root directory which should contain only the directories needed at the top level of the file structure.
/bin	This is where the executable files are located. They are available to all

	user.
/dev	These are device drivers.
/etc	Supervisor directory commands, configuration files, disk configuration files, valid user lists, groups, ethernet, hosts, where to send critical messages.
/lib	Contains shared library files and sometimes other kernel-related files.
/boot	Contains files for booting the system.
/home	Contains the home directory for users and other accounts.
/mnt	Used to mount other temporary file systems, such as cdrom and floppy for the CD-ROM drive and floppy diskette drive, respectively
/proc	Contains all processes marked as a file by process number or other information that is dynamic to the system.
/tmp	Holds temporary files used between system boots
/usr	Used for miscellaneous purposes, or can be used by many users. Includes administrative commands, shared files, library files, and others
/var	Typically contains variable-length files such as log and print files and any other type of file that may contain a variable amount of data
/sbin	Contains binary (executable) files, usually for system administration. For example fdisk and ifconfig utlities.

/kernel	Contains kernel files

b) What are the commands for adding a user and group? Briefly explain the fields of each entry in /etc/passwd and /etc/group files.

In UNIX, a '**useradd**' command is used for adding/creating user accounts in **Unix** operating systems.

Command :

```
# useradd –u 210 –g dba –c "THE RDBMS" –d /home/oracle –s /bin/ksh –m oracle
```

The line useradd creates in /etc/passwd is as shown below

```
Oracle:x:210:240:THE RDBMS:/home/oracle:/bin/ksh
```

1. **Username**: User login name used to login into system. It should be between 1 to 32 charcters long.
2. **Password**: User password (or x character) stored in /etc/shadow file in encrypted format.
3. **User ID (UID)**: Every user must have a User ID (UID) User Identification Number. By default UID 0 is reserved for root user and UID's ranging from 1-99 are reserved for other predefined accounts. Further UID's ranging from 100-999 are reserved for system accounts and groups.
4. **Group ID (GID)**: The primary Group ID (GID) Group Identification Number stored in /etc/group file.
5. **User Info**: This field is optional and allow you to define extra information about the user. For example, user full name. This field is filled by 'finger' command.
6. **Home Directory**: The absolute location of user's home directory.
7. **Shell**: The absolute location of a user's shell i.e. /bin/bash.

groupadd: Adding a group

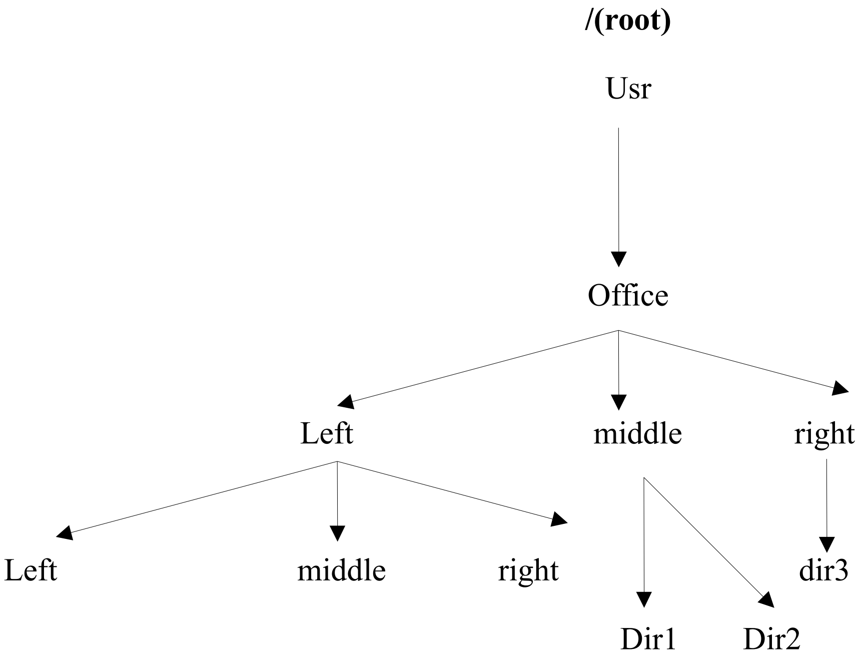
command

```
groupadd –g 241 dba
```

The command palces this entry in /etc/group which you can also insert manually
dba:x:241

5 a) Draw the tree structure of the file system created by the following commands (assume you are in the directory /usr/office.)

```
$mkdir left
$mkdir middle
$mkdir right
 cd left
 $mkdir left middle right
 $cd ../middle
$mkdir dir1 dir2/usr/office/right/dir3
```



b) Explain chown and chgrp commands with example.

Every file is associated with an owner and a group. You can use chown and chgrp commands to change the owner or the group of a particular file or directory.

Change the owner of a file

Syntax

Chown options owner[:group] filename

```
# ls -lart tmpfile
-rw-r--r-- 1 himanshu family 0 2012-05-22 20:03 tmpfile

# chown root tmpfile

# ls -l tmpfile
-rw-r--r-- 1 root family 0 2012-05-22 20:03 tmpfile
```

Change the group of a file

Through the chown command, the group (that a file belongs to) can also be changed.

```
# ls -l tmpfile
-rw-r--r-- 1 himanshu family 0 2012-05-22 20:03 tmpfile

# chown :friends tmpfile

# ls -l tmpfile
-rw-r--r-- 1 himanshu friends 0 2012-05-22 20:03 tmpfile
```

Change both owner and the group

```
# ls -l tmpfile
-rw-r--r-- 1 root family 0 2012-05-22 20:03 tmpfile

# chown himanshu:friends tmpfile

# ls -l tmpfile
-rw-r--r-- 1 himanshu friends 0 2012-05-22 20:03 tmpfile
```

Changing group with chgrp command

chgrp [OPTION] GROUP FILE

e.g chgrp hope file.txt

Change the owning group of the file **file.txt** to the group named **hope**.

6)Write the significance of following UNIX commands

i) ls –ld / : ls -l will list all the attributes of a file, d option if for listing the directory. The command here lists all the attributes of the root directory (/- root)

ii) chmod –R 755 /usr/cmrit: chmod is used to change the permission of files. In this command – R is recursive option, all the files' permission in cmrit directory will be changed to 755 absolute mode i.e read, write and execute for user, read and execute for group and others respectively.

iii) wc –l < myfile: wc –l command will count the number of lines. Here input redirection (<) means the input file is myfile. Hence the command will display the number of lines in myfile without displaying the filename.

iv) date ; who > myfile: In UNIX two commands can be combined using a semicolon, here the first command date with display the current date and time, whereas the second command will redirect the output of who (listing the user details) to myfile .

b) i) Write a command to copy all file from current directory to temp directory

```
cp * /temp
```

ii) Write a UNIX command to delete a file called foo forcefully

```
rm –f foo
```