UEM

श्रद्धावान लभते ज्ञानम्

UNIVERSITY OF ENGINEERING & MANAGEMENT

Good Education, Good Jobs

UNIVERSITY	**:**	**UNIVERSITY OF ENGINEERING & MANAGEMENT**
DEPARTEMNT	**:**	**CSE Department**
ASSIGNMENT ON	**:**	**UNIX and Shell Programming**
COURSE	**:**	**B.TECH**
SEMESTER	**:**	**4TH SEMESTER**
SUBJECT	**:**	**Operating System Lab (PCCCSE493)**

Pre-requisites:

Data Structures

Course Objectives:

- To familiarize the students with the Operating System.
- To demonstrate the process, memory, file and directory management issues under the UNIX/ LINUX operating system
- To introduce LINUX basic commands
- To make students how to make simple programs in LINUX and administrative task of LINUX

Course Outcomes:

- Describe OS support for processes and threads
- Recognize CPU Scheduling, synchronization, and deadlock.
- Use C / C++ and Unix commands, and develop various system programs under Linux to make use of OS concepts related to process synchronization, shared memory, file systems, etc.

WEEK 1

passwd, who, tty, script, clear and tput, uname, date, cal, bc, man, pwd, mkdir, cd, rmdir

***Lab Assignments*:**

1. Perform the following

a) List the names of the users logged in and their total count without displaying any further details.

b) Find out your terminal‟s device name.

c) Display current date in the form dd/mm/yyyy.

d) Find out your machine‟s name and the version of the operating system.

e) Clear the screen and place the cursor at row 12, column 25.

f) Find the decimal equivalent of 1101001.

g) Find out the users who are idling.

h) Use man to get help

i) Ensure that bc displays the results of all divisions using three decimal places.

WEEK 2

cp, rm, mv, cat, file, ls, umask, chmod, touch, ln, find

***Lab Assignments*:**

1. Perform the following:

a) Create a directory structure in your home directory (*mca*, two subdirectories *cprogs* and *projects* under *mca*) while being in your home directory.

b) Change to the directory *projects.*

c) Create a file called *biodata* and store your name, age, sex, and address in it.

d) Make a copy of the file *biodata* into another file *text* within the directory *cprogs*.

e) Move the file *text* from *cprogs* to *projects.*

f) Combine the contents of the file *biodata* and *text* into another file *datatext*.

g) Rename the file *text* to *newtext.*

h) Change the permissions of the file *newtext* to rw-rw-rw-.

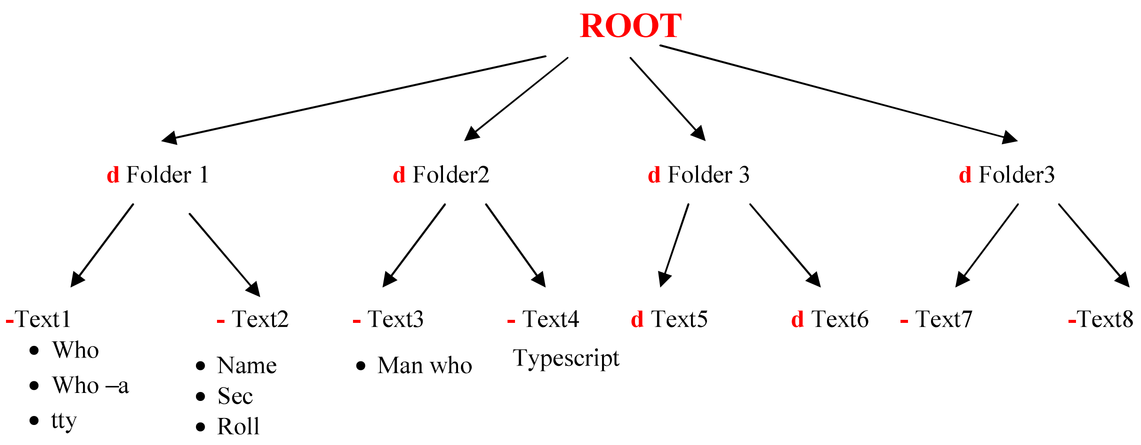
i) List all filenames starting with „a‟ or „b‟ or „m‟.

j) List all filenames that end with a digit.

k) List all files in the current directory whose second character is a digit.

l) Use command(s) to create a directory in your home directory called KeepOut whose contents can be read only by you.

Home Assignments:



Note*****

1. Run the files text1, text3
2. For text4 do the typescripting
3. Change the name of Typescripting to T1
4. Copy the content of text 1 to Text 8
5. Copy the content of Text3 and Text 4 to Text 7
6. Move the file text2 to directory text 5
7. Combine text3 and text4 to a file named COMBINETEXT
8. Change the permission of Text5 whose contents can be read by you, write and execute by group and no permission for 3rd user level
9. Delete the directory Folder 3

WEEK 3

wc, od, cmp, diff, comm., tee, head, tail, cut, paste, sort, tr, uniq

Lab Assignments:

1. Perform the following:

a) List all files beginning with character „a‟ on the screen and also store them in a file called *file1.*

b) Sort the output of *who* and display on screen along with total number of users. The same output except the number of users should be stored in a file *file1*.

c) Double space a file

d) Select lines 5 to 10 of a file

e) Find the user name and group id from the file /etc/passwd using the cut command.

f) Extract the names of the users from /etc/passwd after ignoring the first 10 entries.

g) Sort the file /etc/passwd on GUID (primary) and UID (secondary) so that the users with the same GUID are placed together. User with a lower UID should be placed higher in the list.

h) List from /etc/passwd the UID and the user having the highest UID.

i) Device a sequence which lists the five largest files in the current directory.

j) Remove duplicate lines from a file.

k) Count the frequency of occurrences of words in a file.

l) Find "long" listing of the smallest 5 files in the **/etc** directory whose name contains the string ".conf", sorted by increasing file size.

m) What would you type at the command line to get a sorted list, with no duplicates, of all the users logged into the local network?

n) What would you type at the command line to find all files in your home directory that are more than a week old and end with .bak?

o) What would you type at the command line to find out how many total lines are contained in all the files ending in .c in the current directory, printing only the total number of lines?

Home Assignments:

1. Write and execute the following UNIX commands
(i) Create two files.
(ii) Combine the two files.
(iii) Search a specific word from any one of the file.
(iv) Search a specific file from a directory.

2. Under the same directory create 8 files with any extension of your choice but at least 3 file names must start with letter d and has extension .sh & 2 files with letter t. Note that no file should be empty.

3. Sort the output of *who* and display on screen along with total number of users. The same output except the number of users should be stored in a file *file1*.

4. Write a shell script to implement a basic calculator (+,-,/,*)

5. Write and execute the following UNIX commands
(i) To view all the files and directories.
(ii) To view only the directories.
(iii) To view only the files in a directory.
(iv) Display the working directory.
(v) Rename file1 to file2. if file2 exists prompt for confirmation before overwriting it.

6. Write and execute the following UNIX commands
i. Create a directory SAMPLE under your home directory.
ii. Create a sub-directory by name TRIAL under SAMPLE.
iii. Change to SAMPLE.
iv. Change to your home directory.
v. Change from home directory to TRIAL by using absolute and relative pathname.
vi. Remove directory TRIAL.

7. Write and execute the following UNIX commands

i. start a script in your home directory
ii. in your cs330 lab directory create three new directories named 'weather', 'assignment', and 'web' (if you do not have a cs330 lab directory then create it)
iii. change the permissions of the directory 'web' to -rwx r-x r-x using the octal form of chmod
iv. change your working directory to weather

v. without using a text editor create three files called 'today', 'tomorrow', and 'deer'
vi. check the permissions with ls -l
vii. change the permissions of 'deer' to -rwx r-- r--
viii. change the permissions of 'today' to -rw- r-- r--
ix. check the permissions with ls -l

8. Write a shell script which will take a filename as input and apply READ & EXECUTE permissions only for the owner and group.

WEEK 4

ps, kill, grep, egrep, fgrep

Lab Assignments:

1. Perform the following

a) Find out the PID of your login shell.

b) Remove the header line from the ps output.

c) List all processes that you are currently running on your machine, sorted by the command name in alphabetical order (i.e. a process running acroread should be listed before a process running zwgc). The output should consist only of the processes you are running and nothing else (i.e. if you are running 6 processes, the output should only have 6 lines).

d) Display the files in the current directory that contain the string MCA HITK in either upper- or lowercase.

e) Store in a variable the number of lines containing the word MCA in the files mca1, mca2 and mca3.

f) If you did not have the wc command, how would you use grep to count the number of users currently using the system?

g) Remove blank lines from a file using grep.

h) List the ordinary files in your current directory that are not writable by the owner.

i) Locate lines ending and beginning with a dot and containing anything between them.

j) Locate lines that are less than 100 characters in length.

WEEK 5

Lab Assignments:

1. Write a shell script to find out whether an integer input through the keyboard is an odd number or an even number.
2. Write a shell script to find out whether any year input through the keyboard is a leap year or not. If no argument is supplied the current year should be assumed.
3. Write a shell script to find the maximum of three numbers provided as command line arguments.
4. Write a shell script to check whether a given number is prime or not.

Home Assignments:

1. Write a shell script to find the factorial value of any integer entered through the keyboard.
2. Write a shell script to generate all combinations of 1, 2 and 3.
3. Write a shell script to print all prime numbers in a given range.
4. Write a shell script to calculate the sum of digits of any number entered through keyboard.
5. Rajesh‟s basic salary (BASIC) is input through the keyboard. His dearness allowance (DA) is 52% of BASIC. House rent allowance (HRA) is 15% of BASIC. Contributory provident fund is 12% of (BASIC + DA). Write a shell script to calculate his gross salary and take home salary using the following formula:

   Gross salary = BASIC + DA + HRA

WEEK 6

Lab Assignments:

1. Write a shell program that takes a number from user and prints the reverse of the number.
2. Write a shell script to determine whether two numbers input through keyboard are prime to each other.
3. Write a shell script to find whether a number is divisible by 11.
4. Write a shell script that produces a shell calculator to perform the following operations:
    1. Addition
    2. Subtraction
    3. Multiplication
    4. Division

Home Assignments:

1. Write a shell script to print the following pattern for any number of lines:

```
       *
     * * *
    * * * * *
  * * * * * * *
* * * * * * * *
```

2. Write a shell script to test whether a given string is palindrome or not.
3. Write a shell script which counts the number of consonants and vowels in a given sentence.
4. Write a shell script to display the list of users as well as the number of users connected to the system.

WEEK 7

Lab Assignments:

1. Write a shell script that displays a list of all files in the current directory to which you have read, write and execute permissions.
2. Write a shell script that lists files by modification time when called with *lm* and by access time when called with *la*. By default, the script should show the listing of all files in the current directory.
3. Write a shell script to display the files created or updated within fourteen days from the current date.
4. Develop a shell script which displays all files with all attributes those have been created or modified in the month of November.

Home Assignments:

1. Write a shell script to print last twenty commands issued by the user. The user name is supplied as a command line argument to the script (use bash-history file).
2. Write a shell program, which displays the message "welcome" and prints the date when you login to your system.
3. Accept a string from the terminal and echo a suitable message if it doesn"t have at least ten characters.
4. Write a shell script which receives either the LOGNAME or the UID supplied at the command prompt and finds out at how many terminals this user has logged in.
5. Write a shell script, which gets executed the moment a user logs in. It should display the message "GOOD MORNING" or "GOOD AFTERNOON" or "GOOD EVENING" depending upon the time at which the user logs in.

WEEK 8

Lab Assignments:

1. Write a shell script, which reports names and sizes of all files in a directory (directory should be supplied as an argument to the shell script) whose size exceeds 100 bytes. The filenames should be printed in decreasing order of their sizes. The total number of such files should also be reported.
2. Write a shell script that shows the names of all the non-directory files in the current directory and calculates the sum of the size of them.
3. Write a shell script to list the name of files under the current directory that starts with a vowel.
4. Write a shell script which receives two filenames as arguments and checks whether the two file"s contents are same or not. If they are same then the second file should be deleted.

Home Assignments:

1. Write a shell script to check if a given file (filename supplied as command line argument) is a regular file or not and find the total number of words, characters and lines in it.
2. Write a shell script which reads a directory name and compares the current directory with it (which has more files and how many more files).
3. Write a shell script to check whether the given file is a blank file or not. If not found blank then display the contents of the file.
4. Write a shell script to concatenate two files and count the number of characters, number of words and number of lines in the resultant file.
5. Write a shell script that accepts two directory names, say mca1 and mca2 as arguments and deletes those files in mca2 which have identical named files in mca1.

WEEK 9

Lab Assignments:

1. A file called **list** consists of several words. Write a shell script which will receive a list of filenames, the first of which would be **list**. The shell script should report all occurrences of each word in **list** in the rest of the files supplied as arguments.
2. Write a shell script which deletes all lines containing the word *UNIX* in the files supplied as arguments to this shell script.
3. Write a shell script which would receive a log name during execution, obtain information about it from password file and display this information on the screen in easily understandable format.
4. Write a shell script, which will receive either the filename or the filename with its full path during execution. This script should print information about the file as given by *ls –l* command and display it in an informative manner.

Home Assignments:

1. Write a shell script that takes a list of names and displays all information in the password file, where login names are the members of the list.
2. Write a shell script that periodically count the number of users logged into the system. Send the number of minutes at which to check as parameter.
3. Write a shell script to count the number of words of different length present in a given text.
4. Write a shell script to count the frequency of different words used in a file.

A shell script receives even number of filenames. Suppose four filenames are supplied then the first file should get copied into the second file, the third file should get copied into the fourth file, and so on. If odd number of filenames is supplied then no copying should take place and an error message should be displayed.

WEEK 10

Lab Assignments:

1. Devise a menu-driven shell program that accepts values from 1 to 4 and performs action depending upon the number keyed in:

   1. List of users currently logged in
   2. Present date
   3. Present working directory
   4. Quit

Home Assignments:

1. Write a shell script to make a password based menu-driven program, which will give a maximum of three chances to enter the password. If the given password is correct then the program will show the

    1. Number of users currently logged in.
    2. Calendar of current month.
    3. Date in the format: dd / mm / yyyy.
    4. Quit

    The menu should be placed approximately in the centre of the screen and should be displayed in bold.