GLA University, Mathura

Course: B. Tech (CSE/ IBM related courses) **UNIX OS Lab/BCSC 0804**

Session: 2020-21

COMMAND IMPLEMENTATION ON SHELL

1. **Implement the following basic commands used in LINUX/ UNIX OS (Also perform all the commands with their switches as assignment)**

ls	man	pwd	who	whoami	date
cal	mkdir	rm	rmdir	cat	head
tail	more	less	cp	mv	echo

Perform following queries on the basis of above commands

a. Who is current user
b. What is current login name
c. How to take backup of a file
d. How to create 3 subdirectories in a directory using single line command
e. How to remove file of .txt extension
f. How to remove file of any extension
g. How to remove file starting with "a"
h. How to remove non empty directory

2. a**. Implement the following basic commands used in LINUX/ UNIX OS (Also perform all the commands with their switches)**

cut	uniq	chmod	du	diff	history
last	sort	sed	grep	pipe	

Perform following queries on the basis of above commands

a. Total no of users connected to system currently
b. Display only current local time of system
c. Arranging the files of directory on ascending order of their sizes
d. Display 5^{th} character of your name
e. Display 7^{th} line of a file
f. Sort a file on second column basis

b**. Implement the special shell scripting variables such as $$,$0,$1,$*,$@,$# etc.**

SHELL PROGRAMMING

3. **Shell scripts that uses simple commands:**
   a. Write a shell script to display current date in a particular format, number of users currently login and current month's calendar.
   b. Write a shell script to display the process name and its process id.
   c. Write a shell script to take name as a input and display a greeting message to the user by checking system clock. (Ex :- Hello John Good Morning in morning time else Hello John Good Afternoon in afternoon time else Hello John Good Evening in Evening time)
   d. Write a shell script to merge the content of 2 files into one file.
   e. Write a shell script to create a tsv file containing name, roll no. and age of 10 students. Then use that tsv file to display only the names of the students in alphabetical order.

f. You are given a file of **tab-delimited** weather data (TSV). There is no header column in this data file. The first five columns of this data are: (a) the name of the city (b) the average monthly temperature in Jan (in Fahrenheit). (c) The average monthly temperature in April (in Fahrenheit). (d) The average monthly temperature in July (in Fahrenheit). (e) the average monthly temperature in October (in Fahrenheit).You need to sort this file on the basis of average monthly temperature in April.

4. Decision based Shell scripts:

a. Write a shell script that finds whether an entered number is even or odd.
b. Write a shell script to input the name of a file as command line argument and display whether it is a file, a directory or anything else.
c. Write a shell script to input the marks of a student in 3 subjects and find his grade.
d. Write a Shell script to accept a filename as argument and displays the last modification time if the file exists and a suitable message if it doesn't.
e. Write the shell script to take file name as input and if the file exists then print the number of lines and also print 10^{th} line of that file.

5. Shell scripts related to loops and arrays:

a. Write a shell script that print multiplication table of a given no.
b. Write a shell script to implement a timer.
c. Write a shell script that print reverse of a given positive number.
d. Write a shell script that print factorial of a given number.
e. Write a shell to demonstrate the working of array. Input 10 integer in array and display maximum, minimum, total sum and average of an array.
f. You are given a file with four space separated columns containing the scores of students in three subjects. The first column contains a single character (A-Z), the student identifier. The next three columns have three numbers each. The numbers are between 0 and 100, both inclusive. These numbers denote the scores of the students in English, Mathematics, and Science, respectively. Your task is to identify whether each of the students has passed or failed.
   A student is considered to have passed if (s) he has a score 50 or more in *each* of the three subjects.

6. Shell scripts related to strings and pipes:

a. Write a shell script to input two strings from the user and determine whether they are same or not.
b. Write a shell script to input a string from the user and determine its length.
c. Write a shell script to input two strings from the user and find the occurrences of string2 in string 1.
d. Write a shell script to input the name of a file as command line argument and display the number of characters, words and lines in the file.
e. Write a shell script to display a list of directories within the current directory and how much space they consume, sorted from the largest to the smallest.
f. Write a short script count txt to count the total number of .txt files in the current directory, and print out this number to screen.

SYSTEM CALL PROGRAMS

7. **Briefly discuss and Implement following file structure related system calls:**
   Creat(), open(), close() read(),write()

8. **Briefly discuss and Implement following file structure related system calls:**
   lseek(), dup(), link(), unlink(), stat(), fstat(), access(), chmod(), chown(), umask(), ioctl()

9. **Briefly discuss and Implement following process related system calls:**
   Exec(),fork(), exit(), getuid(), geteuid(), getgid(), getegid(), getpid(), getppid(), signal(), kill(), alrm(),chdir()

10. **Briefly discuss and Implement following inter process communication related system calls:**
    Pipe(), msgget(),
    sgsnd(),msgrcv(),msgctl(),semget(),semop(),shmget(),shmat(),shmdt()

EXTRA PROGRAMS

a. For each line in a given input file, transform all the occurrences of the word '*thy*' with '*your*'. The search should be **case insensitive**, i.e. '*thy*', '*Thy*', '*tHy*' etc. should be transformed to '*your*'.
b. Given a txt file where each row contains the name of a city and its state separated by a comma, your task is to restructure the file in such a way, that three consecutive rows are folded into one, and separated by tab. In this challenge, we practice using the *uniq* command to eliminate consecutive repetitions of a line when a text file is piped through it.
c. Write a script that accepts a compressed filename as argument (.gz,.bz, zip) it looks at the extension and decompress the file using the correct decomposition program.
d. Given a text file, which will be piped to your command through STDIN, use grep to display all those lines which contain any of the following words in them:

   the
   that
   then
   those

   The search should not be sensitive to case. Display only those lines of an input file, which contain the required words.
e. Write a shell script that accepts two directory names, X and Y, and deletes those files in Y which are identical to their names in X.