Five years Integrated M.Sc. (IT) (Semester - 4) Practical List 060010410: CC12-Linux and Shell Programming	
Practical No : 1	**Enrollment No:**
Practical Problems	1: Write a **date** command to display date in following format: 1. dd/mm/yy hh:mm:ss 2. Today's date is: 01/04/14. Current time is: 14:50:03 04th January 2015 3. 2015-02-04 4. Sat Jan 4 2015 5 PM 5. Wish you happy Monday 2: Write a **cal** command to do following: 1. To display calendar of current month. (don't give argument as 2017) 2. Display calendar for single month and Monday as the first day of week. 3. Display calendar of January month of 2050 year. 3: Write **ls** command for following: 1. Display all files names including hidden files. 2. Display current working directory name. 3. Display all file names in one column. 4. List all files recursively. 5. List all sub directories of current directory. 6. List all file names having only one character length. 7. List filenames with their inode numbers. 4. Do as directed. 1. Create three directories named **UNIX, Assembly** and **C++** under your Home directory. 2. Write command to move into **UNIX** from current directory by writing single command. 3. Write command to move directly to **Assembly** by writing single command. (Your current directory is **UNIX**). 4. Create a directory named **LINUX** in **Desktop** directory by writing single command. (Your current directory is **UNIX** and do not use cd command.) 5. Write command to create text file named "Linux.txt"; Rename the file "Linux.txt" to "Unix.txt". 6. Recursively list all of the directories you created in Home directory by writing single command. (Your current directory is **UNIX** and do not use cd command).
Objective(s)	• Students will be able to learn **date** command with options and formats. • Students will be able to learn **cal** command with options. • Students will learn **echo** command with options & escape sequences. • Students will learn **bc** command with options & conditional statements. • Students will be able to get an idea of using **bc** command with piping mechanism. • Students will learn **ls** command with options. • Student will learn operations on directory and file.
Pre-requisite	✓ Use shell to run commands & usage of date command. ✓ Usage of **bc** command, use of 'banch calculator' in interactive mode. ✓ Usage of **echo** command and pipe.

	✓ Usage of **ls** command, meaning of all options. ✓ Usage of **ls** & **echo** command and meaning of different meta characters.
Duration for completion	5 hours
PEO(s) to be achieved	**PEO1**: To provide sound foundation in the fundamentals of computer application along with analytical, problem-solving, design and communication skill for life-long learning in chosen field. **PEO2**: To provide quality practical skill of tools and technologies to solve industry problems.
PO(s) to be achieved	**PO6**: Ability to use the techniques, skills and modern tools as necessary for software development.
CO(s) to be achieved	**CO1**: Study of LINUX/UNIX environment and its need. **CO2**: Understand and use utilities to work with LINUX/UNIX environment.
Solution must contain	Command, output and interpretation
Nature of submission	Handwritten
Reference for solving the problem	Book: i. Forouzan B. A., Gilberg R. R., UNIX and Shell Programming, Thomson ii. Das S., UNIX aoncepts and Applications, McGraw Hill
Post laboratory questions	1. What is the syntax of **date** command? 2. List out different options of **date** command. 3. List out different formats of **date** command. 4. What is the syntax of **cal** command? 5. List out different options of **cal** command. 6. How can you display calendar of year 1800? 7. What is the syntax of **echo** command? 8. List out different options of **echo** command. 9. List out different types of escape sequences of **echo** command. 10. What is the purpose of **bc** command? 11. What is the syntax of **ls** command? 12. List out different options of **ls** command. 13. Which fields are displayed in output of "**ls –l**" command? 14. What are meta characters? 15. List out different meta characters. 16. Write your observation on output of 9th practical while using ls and echo.

Objectives	Solution achieves the desire the desired objective(s)	Signature
To be able to use basic commands		
To be able to use wildcard		
To be able to perform basic operations on directory and files		

Practical No : 2	Enrollment No:
Practical Problems	1: Write a **chmod** command for following rwx triplets using symbolic code & octal code either for file or directory: 1. rwxrwxrwx 2. - - - - - -rw- 3. r-xr-xr-x 4. -w- -w- -w- 5. r- -r- -r- - 6. -w---x-w- 7. -wx—xr- - 8. rw-rw-rw- 9. - - - - - - - - - 10. rwxrw-r - - 2: Perform following instruction and execute commands. 1. Write command to send your current process in background. 2. Write a command to bring lastly suspended job in foreground. 3. Write two different ways to terminate a job having ID 5. 4. What will be the effect of following command? $fg $fg %% 5. What will be the output of ps command? Describe all columns. 6. What will be the output of **jobs** command? Give detailed of all columns.
Objective(s)	• Student shall understand use of **chmod** command for granting and revoking of permissions to files as well as directories using symbolic code and octal values for user, group & others. • Student shall understand concept of converting particular permission into rwx triplets for file. • Student shall understand use of **umask** command for setting default permissions for files as well as directories & convert it into rwx triplets. • Student shall understand use of Job Scheduling commands.
Pre-requisite	✓ Usage of **chmod** command and meaning of all set of permissions. ✓ Usage and concept of job scheduling commands.
Duration for completion	2 hours
PEO(s) to be achieved	**PEO1**: To provide sound foundation in the fundamentals of computer application along with analytical, problem-solving, design and communication skill for life-long learning in chosen field. **PEO2**: To provide quality practical skill of tools and technologies to solve industry problems.
PO(s) to be achieved	**PO6**: Ability to use the techniques, skills and modern tools as necessary for software development.
CO(s) to be achieved	**CO1**: Study of LINUX/UNIX environment and its need. **CO2**: Understand and use utilities to work with LINUX/UNIX environment.
Solution must contain	Command, output and interpretation
Nature of submission	Handwritten
Reference for solving the problem	Book: i. Forouzan B. A., Gilberg R. R., UNIX and Shell Programming, Thomson ii. Das S., UNIX aoncepts and Applications, McGraw Hill

Post laboratory questions	1. What is the syntax of **chmod** command? 2. List out different symbolic codes with their meaning. 3. List out different octal values with permissions. 4. List different users' categories. 5. What are the three levels of security in LINUX? 6. What permission is needed in directory to list the content of a directory? 7. What type of permission is needed to delete a file from a directory? 8. What is the syntax of **umask** command? 9. What is the difference between use of **chmod** & **umask** command for granting and revoking permissions? 10. What is foreground job? 11. What is background job? 12. What is the meaning of "+"(plus) and "-(minus)" sign in output of "jobs" command? 13. What are the six different states of job?

Objectives	Solution achieves the desire the desired objective(s)	Signature
Understanding of file permission		
Able to manipulate permission		
Understanding of permission Symbolic mode Octal mode		

Practical No : 3	Enrollment No:

Practical Problems	• Create file "ABC.txt" and "PQR.txt" with at least 10 lines. Apply following on them.
	
	1. Write a command to store contents of file "ABC.txt" and "PQR.txt" into file "New.txt".
	2. Write command for following:
	      a. Display first 3 lines.
	      b. Display last 7 lines.
	      c. Display all lines rather than last 1 line.
	      d. Display lines from 6 to 10.
	      e. Display last to 3rd line.
	      f. Display only second line.
	3. Write command to translate all capital characters into small characters and vice versa in file "ABC.txt".
	4. Sort long listing of current directory by "size" column in ascending order.
	5. Lists the five largest files in the current directory.
	6. Extract the name of only user from file **/etc/passwd**.
	7. Write command to count total number of words from file without using **wc** command.
	8. Write sort command to sort long listing of current directories firstly name wise and secondly their size wise using single **sort** command.
	9. Write command to cut second and third fields from file PQR.txt vertically.
	10. Write command to concatenate two file name ABC.txt and PQR.txt vertically.
	11. Write command to merge two sorted file in single file.
	12. Write command to add today's date and time to the end of a given file.

Objective(s)	Students will be able to understand the concept of Filtering utilities.
Pre-requisite	Concepts of redirection, piping & commands like head, tail, cut, paste, uniq, sort, tr etc.
Duration for completion	3 hours
PEO(s) to be achieved	**PEO1**: To provide sound foundation in the fundamentals of computer application along with analytical, problem-solving, design and communication skill for life-long learning in chosen field. **PEO2**: To provide quality practical skill of tools and technologies to solve industry problems.
PO(s) to be achieved	**PO6**: Ability to use the techniques, skills and modern tools as necessary for software development.
CO(s) to be achieved	**CO1**: Study of LINUX/UNIX environment and its need. **CO2**: Understand and use utilities to work with LINUX/UNIX environment. **CO3:** Understand and use Shell features of redirection, pipe, grouping commands, joining commands and running jobs.
Solution must contain	Command, output and description
Nature of submission	Handwritten
Reference for solving the problem	Book: i. Forouzan B. A., Gilberg R. R., UNIX and Shell Programming, Thomson ii. Das S., UNIX aoncepts and Applications, McGraw Hill
Post laboratory questions	1. What is the purpose of **tr** command? 2. List out different options of **uniq** command.

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| | 3. List out different options with purpose of **sort** command.
4. What is the purpose of cut command?
5. List the options of cut command.
6. List three uses of cat commands.
7. State the difference between head and cut command.
8. State the difference between cat and paste command.
9. What is filter? |

Objectives	Solution achieves the desire the desired objective(s)	
To be able to understand the basic filters with pipe and redirection		
To be able to manipulate the file content using different filter utilities		

Practical No : 4	Enrollment No:
Practical Problems	1. Write a script to find smallest number amongst three numbers that are read from the keyboard.
	2. Write a script that accepts three digits number as argument as well as from keyboard and check whether the number is Armstrong or not.
	3. Write a script that should display message like "Good Morning", "Good Afternoon", "Good Evening" or "Good Night" based on the time when you are executing that script.
	4. Write a script to input a number and display following pattern up to inputted number. If inputted number is 5 then pattern will be: * * * * * * * * * * * * * * *
	5. Write a script to input a number and display following pattern up to inputted number. If inputted number is 5 then pattern will be: 　* 　* * 　* * * 　* * * * 　* * * * *
	6. Write a script to input a number and display following pattern up to inputted number. If inputted number is 5 then pattern will be: 　　* 　* * 　* * * 　* * * * * * * * * 　* * * * 　* * * 　* * 　　*
	7. Write a script to input a number and display following pattern up to inputted number. If inputted number is 5 then pattern will be: 　　0 　0 1 　0 1 0 　0 1 0 1 0 1 0 1 0
	8. Write a script to input a number and display following pattern up to inputted number. If inputted number is 5 then pattern will be: 1 2 3 4 5 1 2 3 4 1 2 3 1 2 1
	9. Write a script to input a number and display following pattern.

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|_
| |_
| | |_
| | | |_
| | | | |_
```

10. Write a script that accepts number from keyboard and display reverse of it.
11. The length & breadth of a rectangle and radius of a circle are input by user. Write a script that calculate area and perimeter of a rectangle, and area and circumference of the circle.
12. The year of joining of an employee, employee details, salary and the current year are input through keyboard. If the years of service are greater than 3 then employee is given a bonus of Rs. 3000. Write a script that display the detail report of employee with the allowed bonus.
13. A mathematics student has three equation with him :
    $x = 20$
    $z = a^2 + 2ab$
    $c = b^2 - x - 2z$
    Write a script that accept a, b as an input from user and print the value of c.
14. Write a script that display a number among given inputted numbers of whom addition of digits is largest. For example if input numbers are 123, 13 and 45 then the output should be 45 because the addition of the digits 4 + 5 = 9 which is largest among other numbers.
15. Write a script to perform all Arithmetic operations on floating point values.
16. Write a script to print multiplication table of any number using FOR loop.
17. Write a script to print the Fibonacci series.
18. Write a script to count total number of directories and files under the current directory.
19. Write Script to see current date, time, username, and current directory.
20. Write script to determine whether given file exist or not, file name is supplied as command line argument, also check for sufficient number of command line argument.
21. Write script to print lines of file from given line number to next given number of lines. For e.g. If we called this script as "scr20" and run as
    $ Scr20 5 5 myfile , Here print lines of 'myfile' file from line number 5 to next 5 line of that file. Put proper command line validations.
22. Write a script that accept weekday number from command line and display the name of the week day on terminal. If user pass wrong week number or any other wrong input then display appropriate error message on terminal.
23. Write a script to find sum and product of all digits of a number.
    Enter an integer number :1234
    SUM of all Digits is : 10
    PRODUCT of all digits: 24
24. The basic salary of an employee is pass through command line. If the dearness allowance is 40% of basic salary and house rent allowance is 20% of basic salary. Write a script that calculate the gross salary of an employee.
25. Write a menu driven script which take file name from command line and implement the functionality of **wc** command. Do not use wc command directly as well as put appropriate command line validation.
26. Write a shell script, which take a string and a character from the command line and count occurrences of given character in a string.
27. Write a command line script which accept filename and line numbers. Display all lines from the given file. Do not use head and tail command.
    e.g. ScriptName file 1 3 6 8 10

	28. Write a command line script to display following report:
	     Ex. scriptname file1 file2 file3
	
	  --- 	
	  file1
	  --- 	
	
	  Line Word Characters
	  1 4 21
	  2 3 12
	
	  --- 	
	  file2 is not readable or not exist
	  --- 	
	
	  file3
	  --- 	
	
	  Line Word Characters
	  1 3 20
	  2 4 11
	
	  --- 	
	Note: Do not use wc command.

Objective(s)	• Student shall be able to apply knowledge of commands to develop shell script. • Student shall understand use of different operators used in shell script. • Student shall understand use of different looping constructs. • Student shall understand use of commands inside shell script and file operations. • Student shall understand use of case and select loop constructs.
Pre-requisite	✓ Purpose and syntax of all commands as well as different shell script constructs. ✓ Purpose and syntax of different shell script constructs. ✓ Usage of commands inside shell script.
Duration for completion	15 hours
PEO(s) to be achieved	**PEO1**: To provide sound foundation in the fundamentals of computer application along with analytical, problem-solving, design and communication skill for life-long learning in chosen field. **PEO2**: To provide quality practical skill of tools and technologies to solve industry problems.
PO(s) to be achieved	**PO6**: Ability to use the techniques, skills and modern tools as necessary for software development.
CO(s) to be achieved	**CO1**: Study of LINUX/UNIX environment and its need. **CO2**: Understand and use utilities to work with LINUX/UNIX environment. **CO3:** Understand and use Shell features of redirection, pipe, grouping commands, joining commands and running jobs.
Solution must contain	Program, output and description
Nature of submission	Handwritten
Reference for solving the problem	Book: i. Forouzan B. A., Gilberg R. R., UNIX and Shell Programming, Thomson ii. Das S., UNIX aoncepts and Applications, McGraw Hill
Post laboratory questions	1. What is shell script? 2. How will you take input from user in shell script? 3. What is the difference between using if statement for numeric and string values? 4. What are different types of file operators? 5. What are positional parameters?

6. What is the purpose of **expr** command?
7. What is a **loop**?
8. What are different types of looping constructs?
9. What is the difference between **while loop** & **until loop**?
10. What is argument validation?
11. What is the purpose of **shift** command?
12. What is the use of **$@** and **$*** parameters?
13. What is the use of **$#** and **$0** parameters?

Objectives	Solution achieves the desire the desired objective(s)	Signature
To be able to understand the purpose of to write a script file		
To be able to use various commands inside the script file		
To be able to use the different operators supported by shell		
To be able to use various decision and looping constructs supported by shell		
To be able to use and manipulate command line arguments in shell script		
To be able to produce the shell script which is working on files		
To be able to use different filter utilities to develop the shell script for specific purpose		