Five years Integrated M.Sc. (IT) & B. Sc. (IT) (Semester - 4)
Practical List
IT4009 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
	6. What will be the output of following commands?
	a. $date "+This is Date"
	b. $date "+This is date: %B"
	
	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 current directory recursively.
	5. List all file names having only one character length.
	6. 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).
	
	5: Write a **bc** command for following:
	1. To evaluate "21/2". Answer should contain 5 decimal places.
	2. To convert 42 from decimal to hexadecimal.
	3. To print digits from 1 to 10 using for loop.
	4. To convert 1100 from binary to decimal.
	5. To print digits from 11 to 20 using while loop.
	
	6: Solve following using **echo** command:
	1. Write the output of a command:
	$ echo "Current directory file list is `ls`" (` is back quote)
	2. Write an interpretation of a command:
	$ echo Welcome to the LINUX's world.

	3. Write the output of a command: echo {first, second, black, white}fish 4. Write an interpretation of a command: echo -e "Welcome to the LINUX \c world." echo "Welcome to the LINUX \c world." 5. Write the output of a command: echo *.txt 6. Write output and interpretation of: echo "0 || 0" | bc echo "0 || 0" 7. Write output and interpretation of: echo "3*4+2"|bc* echo "3*4+2"|bc 8. Write output and interpretation of: echo "length(123456)" | bc echo "length(123456)" 9. Write output of and interpretation: echo "(2+3)*4"|bc echo "(2+3)*4" 10. Write output and interpretation of following commands: a. echo "1 == 2" | bc b. echo "10 == 10" | bc c. echo "10 == 1 || 1 == 2" | bc d. echo "10 == 10 || 1 == 2" | bc 7: Write **ls** & **echo** command to display following list of files: File names: 1. Having digit at the end of filename. 2. First characters should be capital rest of could be anything. 3. Having three consecutive alphabets. 4. Having "?" and "*" characters in filename. 5. Minimum length is 5 characters. 6. First character may be in uppercase or lowercase & second character must in uppercase. 7. Having first and last character must be capital letter.
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.

Practical No: 2	**Enrollment No:**
Practical Problems	1. Write a script to find the smallest number amongst three numbers 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. Write a menu-driven script that will execute the following command as per user's choice: ls -l, date , cal, who, pwd & exit.
12. The year of joining an employee, employee details, salary, and the current year are input through the keyboard. If the years of service are greater than 3 then employee is given a bonus of Rs. 3000. Write a script that displays the employee's detail report 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 displays a number among given inputted numbers of the largest addition of digits. 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 that accepts numbers from the command line and calculate the sum of the first N natural numbers. Put appropriate validation on command line.
17. Write a script to print multiplication table of any number using FOR loop.
18. Write a script to print the Fibonacci series.
19. Write a script to count total number of directories and files under the current directory.
20. Write Script to see current date, time, username, and current directory.
21. 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.
22. 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.
23. Write a script that accepts weekday number from command line and display the weekday name on terminal. If the user passes the wrong week number or any other wrong input, then display the appropriate error message on the terminal.
24. 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
25. Write a menu-driven script that takes file name from the command line and print total words and lines in the file. Do not use wc command directly and put appropriate command line validation.
26. 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
27. Write a command-line script to display following report(regular files in current directory):

	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?