UNIX and Shell Programming (IC)

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18 CSI 353	3:0:2:0	4	CIE:50 SEE:50	3 Hours	FE

Course Objectives:

This course will enable students to:
- Learn basic commands to interact with UNIX System and VI editor.
- Understand the history, origin, features and architecture of UNIX Operating System.
- The usage of various commands in UNIX environment.
- Develop the ability to evaluate regular expressions and use them for pattern matching.
- Apply essential facets of SHELL programming in order to solve the SHELL script problems.

Syllabus

Module - I

INTRODUCTION: The UNIX operating system, Linux and GNU, The UNIX architecture, features of UNIX, POSIX and Single UNIX specification, Internal and External commands, Command structure, man browsing and manual pages on-line.

File System: The parent – child relationship, the HOME variable, pwd, cd, mkdir, absolute pathname, relative pathname.

08 Hours

Module – II

Vi editor: Basics, input mode, saving text and quitting, searching for a pattern (| and ?), substitution- search and replace(:s).

Basic file attributes: ls: listing directory contents, the UNIX file system, ls –l, -d option, file ownership, file permissions, chmod, directory permissions, changing file ownership.

More file attributes: File systems and inodes, hard links, symbolic links and ln, the directory, umask, modification and access times, find.

08 Hours

Module – III

Process basics: ps: process status, system processes(-e or –a), mechanism of process creation, process states and zombies, running jobs in background, nice:job execution, job control.

Simple filters: pr, head, tail, cut, paste, sort, uniq, tr. Filters using regular expressions – grep and sed: grep, Basic Regular Expressions (BRE), Extended Regular Expressions (ERE) and egrep.

08 Hours

Module – IV

Simple filters: sed: the stream editor, line addressing using multiple instructions (-E and -F) context addressing, writing selected lines to a file (w), text editing, substitution (s), basic regular expression revisited.

The shell: The shell's interpretive cycle, shell offerings, pattern matching, escaping and quoting, redirection, pipes, tee, command substitution, shell variables.

08 Hours

Module – V

Essential shell programming: Shell scripts, read using command line arguments, exit and exit status of command, the logical operators and ||, the if conditional, using test and {} to evaluate expression. The case conditional, expr, $0, while, for, debugging.

08 Hours

LABORATORY

1. Non-recursive shell script that accepts any number of arguments and prints them in the Reverse order, (For example, if the script is named rargs, then executing rargs A B C should produce C B A on the standard output).

2. Shell script that accepts two file names as arguments, checks if the permissions for these files are identical and if the permissions are identical, outputs the common permissions, otherwise outputs each file name followed by its permissions.

3. Shell script that accepts path names and creates all the components in that path names as directories. For example, if the script name is mpe, then the command mpe A/B/C/D should create directories A, A/B, A/B/C, and A/B/C/D.

4. Shell script that accepts valid login names as arguments and prints their corresponding home directories. If no arguments are specified, print the suitable message.

5. Shell script that takes a valid directory names as an argument and recursively descends all sub directories, find the maximum length of any file in that hierarchy and prints this maximum value to standard output.

6. Shell script that accepts file names specified as arguments and creates a shell script that contains this file as well as the code to recreate these files. Thus if the script generated by your script is executed, it would recreate the original files (This is same as the "bundle" script described by Brain W. Kernighan and Rob Pike in " The Unix Programming Environment", Prentice – Hall India).

7. Shell programming of execute multiple shell commands using suitable like ls –l, ps -f, date, cal etc.

Course Outcomes:
On completion of this course, the students are able to:
- Describe history, origin, feature and architecture of UNIX operating system.
- Interact with UNIX system easily.
- Construct and edit files, search for any patterns using regular expressions.
- Solve complex jobs using tools and utilities available in UNIX.
- Design and develop various tasks by using Shell scripting.

Text Book:
1. Sumitabha Das: "UNIX – Concepts and Applications", (Chapters 1,2,4,6-9,11-14,17,19), Tata McGraw Hill, Noida, 4th Edition, 15th Reprint, 2011, ISBN-13: 978-0-07-063546-3.

Reference Books:
1. Behrouz A. Forouzan and Richard F. Gilberg: "UNIX and Shell programming", Cengage Learning, India, 1st Edition, 2005, ISBN: 81-35-0325-9.
2. M G Venkatesh Murthy: "UNIX and Shell programming", Pearson Education, Delhi, 1st Edition, 2005, ISBN: 81-7758-745-5.

E-Resources:
1. http://www.mhhe.com/das/uca
2. http://www.tutorialspoint.com/unix/unix_tutorials.pdf.
3. http://www.perldoc.perl.org/