

Lab_3: [Write C programs to simulate UNIX commands]

Objective: In this laboratory we will be developing the c codes to simulate the basic and frequently used Linux/Unix commands and understand how these commands works.

Unix commands: ls, grep, cp, rm, cd

Assignments:

1. Write a c program to simulate “ls” command using UNIX system calls.

Algorithm:

1. Store path of current working directory using getcwd system call.
2. Scan directory of the stored path using scandir system call and sort the resultant array of structure.
3. Display dname member for all entries if it is not a hidden file.
4. Stop.
5. **[Output]: The filenames/subdirectories are listed, similar to ls command.**

2. Write a c program to simulate “cp” command using UNIX system call.

Algorithm:

1. Get source and destination *filename* as command-line argument.
2. Declare a buffer of size 1KB
3. Open the source file in read-only mode using open system call.
4. If file does not exist, then stop.
5. Create the destination file using creat system call.
6. If file cannot be created, then stop.
7. File copy is achieved as follows:
 - a. Read 1KB data from source file and store onto buffer using read system call
 - b. Write the buffer contents onto destination file using write system call
 - c. If end-of-file then step 8 else step 7a.
8. Close source and destination file using close system call.
9. Stop.

10. **[Output]: Thus a file is copied using file I/O. The cmp command can be used to verify that contents of both file are same.**

3. Write a c program to simulate “grep” command using UNIX system call.

Algorithm:

1. Get filename and search string as command-line argument.
2. Open the file in read-only mode using open system call.
3. If file does not exist, then stop.
4. Let length of the search string be n.
5. Read line-by-line until end-of-file
 - a. Check to find out the occurrence of the search string in a line by examining characters in the range 1-n, 2-n+1, etc
 - b. If search string exists, then print the line.
6. Close the file using close system call.
7. Stop.
8. **[Output]: The program simulates grep command by listing lines containing the search text.**

4. Write a c program to simulate “rm” command using UNIX system call
Algorithm:

1. Get *filename* as command-line argument.
2. Open the file in read-only mode using read system call.
3. If file does not exist, then stop.
4. Close the file using close system call.
5. Delete the file using unlink system call.
6. Stop.
7. **[Output]: Thus files can be deleted in a manner similar to rm command. The deletion of file can be verified by using ls command.**

5. Write a c program to simulate “cd” command using UNIX system call.
(There are different versions of cd command. You chose one and simulate it. Write the algorithm in a separate file and submit.)

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