

IIT Bhubaneswar
School of Electrical Sciences
Operating Systems Lab (0-0-3)
Spring 2018

Lab Schedule: Mon (2:30-5:30)

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Laboratory 3 (**Submission Deadline: 28/01/2018 midnight**)

Points: 40

Objectives: The object of this assignment is to gain experience with some advanced programming techniques including file descriptors, signals and pipes. To do this, you will be writing your own command shell - much like bash shell.

Practice during Laboratory Hours:

Understand various commands and functions: `getcwd()`, `df`, `which`, redirect signs (`<`, `>`), pipes (`|`) `jobs`, `cd`, `exec`, `history`, `kill`, etc.

Hint for assignment: Carefully follow the pseudo-code of a basic shell interface. You can use this as the base logic to implement your shell.

```
int main (int argc, char **argv)
{
    while (1)
    {
        int childPid;
        char * cmdLine;
        printPrompt(); //This function will print the prompt.
        cmdLine= readCommandLine(); //To read the command line given by the user.
        cmd = parseCommand(cmdLine); // Understand and parse the command
        record_command_history();// Similar feature is available in GNU
        // Do the job now
        if ( isBuiltInCommand(cmd))
        {
            executeBuiltInCommand(cmd);
        }
        else
        {
            childPid = fork();
            if (childPid == 0)
            {
                executeCommand(cmd); //calls execvp
            }
            else
            {
                if (isBackgroundJob(cmd))
```


numbered such that the numbers can be used with **!** to indicate a command to repeat. **exit** should terminate your shell process, **kill %num** should terminate the process numbered, **num** in the list of background processes returned by jobs (by sending it a **SIGKILL** signal).

- If the user chooses to **exit** while there are background processes, notify the user that these background processes exist, do not exit and return to the command prompt. The user must **kill** the background processes before exiting.
- You may assume that each item in the command string is separated on either side by at least one space (e.g. `prog > outfile` rather than `prog>outfile`).

Submission Guidelines: Source files, Readme.txt, and other necessary files should be zipped together in a file named “**RollNo_Lab3.zip**” and send it to the TA with the following subject line: “**OS_lab3_Assignment**”.