

Indian Statistical Institute
Operating Systems
Lab 1: Processes

Make sure man pages for system calls are installed. If you are using a Fedora based distribution, you will need to install `man-pages`; for an Ubuntu based distribution, please install `manpages-dev`.

Man pages: `fork(2)`, `execve(2)`, `exit(2)`, `wait(2)`, `sleep(3)`, `pstree(1)`, `getenv(3)`, `setenv(3)`.

1. Run `ps tree` and study the output.
2. Write a (single) C program that does the following:
 - (a) creates a child process;
 - (b) parent process prints the child's process ID and exits;
 - (c) child executes `/bin/ls` and exits.
3. Write a program to fork 10 children. Each process should print its own pid and exit.
4. Write a program that prints a) "Hello World ", and b) "Hello World\n" and then forks. Also, try using `fprintf(stderr, ...)` instead of `printf`. Explain the output.
See <http://stackoverflow.com/questions/1716296/why-does-printf-not-flush-after-the-call-unless-a-newline-is-in-the-format-strin> for the answer.
5. Consider a process that forks n children. The children exit one by one, but not in the order in which they were created. The parent eventually calls `wait()` for each of these children. In what order are the zombie children now cleaned up: based on the order in which they were created, or based on the order in which they terminate? Write a program to empirically find the answer to this question.