CS242
System Programming Lab

Objective

This lab is to introduce the general Linux Environment and basic system administration procedures to students.

Starter

1. Explain the differences between installing a boot loader into "the master boot record" (MBR) vs. "the root partition."
2. What are the default configuration files for the GRUB Legacy bootloader and the GRUB2 bootloader ? (Give absolute paths.)
3. How is the default runlevel for a Linux system determined? I.e., what file specifies it and how is it specified? (Assume standard init based system.)
4. What command can be used to change runlevels to some runlevel i? (Assume standard init based system.)
5. What does one have to do to convert Ubuntu to allow login as root?
6. You want to find the number of users who login to the system at midnight everyday. How will you schedule it?
7. Linux keeps track of all activities by storing information in log files. Give the log file name for the following:
   (a) General message and system related stuff
   (b) Authentication logs
   (c) Logs for cron daemon
   (d) System boot information
   (e) Record of users logged in to your system.

Main Course

In this assignment, you will explore the /proc filesystem in linux. The /proc filesystem provides a means to get and set various information about the kernel and about particular processes. You have to write a C program SystemInfo.c that will read the /proc file system and print out the following (with an appropriate message in each case):

a. The number of CPUs in your machine and their clock speed, number of cores.
b. The version of Linux kernel running on your system
c. The time in day:hr:min:sec when the system was last booted
d. The average load on the system in the last 15 minutes
e. The total usable and currently free memory in the system
f. The total swap space and the currently used swap space in the system
g. The swap partitions and their sizes
h. The time the CPU spent (over all processes) in the user mode and kernel mode
i. The number of context switches made by the system so far
j. The number of interrupts handled by the system so far

Deliverables

Create a pdf document (containing snapshots wherever applicable) of the starter question. Next create an archive file by the name <roll number>.tar that contains the pdf document and the C program.

Mail the document to cs242@iitp.ac.in with subject "Lab 1".

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