

Assignment - 02

CS341: Operating System Lab

General Instruction

- Markings will be based on the correctness and soundness of the outputs. Marks will be deducted in case of plagiarism.
- Proper indentation & appropriate comments (if necessary) are mandatory in the code.

Today's lab assignment aims to execute all the fundamental commands to get familiar with (Linux) tools and files used for system and process behavior information, monitoring, and control.

1. Collect the following basic information about your machine using the `/proc` file system and answer the following questions:
 - (a) How many CPU sockets, cores, and CPUs are in your machine?
 - (b) What is the CPU model name and stepping (a specific version or revision of a CPU model) of each processor in the system?
 - (c) What is the frequency of each CPU?
 - (d) What is the total amount of memory in your machine?
 - (e) How much memory is currently free, and how much is available? What distinguishes free memory from available memory?
 - (f) How much swap memory is configured on your machine? How much of it is currently used?
 - (g) What version of the kernel is currently running on your machine?
 - (h) How many user-level processes are currently running in the system?
 - (i) What is the total number of context switches that have occurred since the system was booted?
 - (j) How long has your system been running since the last boot? What is the average load on the system?
 - (k) What is the size of the files located in the `/proc` directory?
 - (l) What are the top 5 processes consuming the most memory on your system? Provide their PID, user, and memory usage.
2. Collect the read-and-write statistics for disks and disk usage for mounted file systems:
 - (a) What are the read-and-write statistics for the disks on your machine?
 - (b) Display the disk usage for each mounted filesystem and explain the output.
3. Collect the packet statistics for network interface and current network:
 - (a) What are your machine's RX and TX packet statistics for each network interface?
 - (b) What is the current network configuration of your machine, including IP addresses and interface statuses?
4. Collect the information regarding file descriptors as mentioned below:
 - (a) Identify the number of open file descriptors for a specific process.
 - (b) List all the open file descriptors and their corresponding files for a specific process.
5. Collect the information for the following:
 - (a) List all the currently mounted filesystems, mount points, and filesystem types.
 - (b) Find the block devices on your system and their sizes. Provide a summary of the disk layout.
6. Identify a running process and find all its child processes. After this, send a SIGSTOP signal to a process to stop it and then a SIGCONT signal to resume it. Document the steps and the results.
7. Run 'strace' on a system utility (e.g., ls). What are the first 10 system calls made by this utility? Also, run 'strace' on two different utilities (e.g., cat and grep). Compare their system call traces and identify the unique system calls made by each utility.