

Lab Assignment 1
Looking inside your Machine & OS
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Assignment ID: LA1

• **Instructions in order to start exercises nos. 1 to 8.**

- Start your Linux OS on the virtual box.
- Open a command window (using shortcut Ctrl + Alt + t).
- Start atleast the following applications - a browser along with few tabs, office, and a command window.
- Check how different commands function without using switches, and with different switches.
- For details on any command, open its manpage using `man <command> - name`

1. **Identifying your System:** Use the `uname` command to determine the following.
 - (a) Which version of Linux kernel are you using? (`uname -sr`) What does -s and -r stand for?
 - (b) What is the hardware type of your machine (32-bit or 64-bit)? (`uname -m`)
2. **Identifying your CPU / Processor unit:** Use the `cat` command to view the contents of `/proc/cpuinfo`.
 - (a) What's the family and model of the processor?
 - (b) How many cores does the processor have?
 - (c) What's the speed and cache size of the processor?
3. **Knowing about Processes on your system:** Use the `ps` command to determine the following information. (Try `ps` and `ps -efl` or possibly `ps aux`).
 - (a) How many users have processes running on the machine?
 - (b) Which process has the smallest process id?
 - (c) Do you recognize all these processes? (*Don't worry, we will discuss more on this later in other assignments.*) Find only two processes you recognized and say their purpose. Find two processes you don't recognize and google to see if you can explain their purpose.
 - (d) Can you find any children of some process? List some of them and their process ids.
 - `ps -efl` will show process id, PID, as well as parent process id, PPID.
 - Use command `pstree` that will also help you with finding this information.
4. **Knowing your CPU activity:** Bring up another command window. In the first, run the command `top` and keep it for viewing. (Note: Ctrl-C or q will exit `top`.) The `top` command is used to display resource utilization statistics of processes.
 - (a) What percentage of time is the CPU spending in user mode, in system mode?
 - (b) If the browser is already running, close it. Now restart a browser and see the effect on the output produced by `top` command. Further, compile a C program and observe the effect on output of `top` command. Summarize the effects of your above actions in few sentences.
 - (c) Name the top five processes which consume the most CPU cycles. Could you explain what applications those processes correspond to? Try finding it out, if you can.
5. **Knowing Memory statistics:** Use the `vmstat` command to determine the following
 - (a) How much virtual memory is currently in use? (look the value for `swpd` field in the output of `vmstat`)
 - (b) Use `vmstat 5 5` to report statistics 5 times in a row with a 5 second delay. Which, if any, of the statistics reported change during the time when you start a firefox browser and then close it?
 - (c) Go back to the command `top` and find which process uses the most/maximum memory. How much memory is free in the system?
6. **Finding your Network configuration and details:** Use the `ifconfig` command. `ifconfig` displays information on the network devices on the computer.

- (a) What network interfaces are available? (ethx, lo, etc.)
- (b) What MAC and IP address do those network interfaces have?
- (c) How many packets have been sent and received by each?
- (d) Why do you think lo doesn't have a HWaddr entry? Reason yourself with what you already know. Don't Google. Else, keep it unanswered.

Use the `netstat` command.

- (e) Use `netstat` alone to list the open connections. If you are logged in remotely, find the connections to the machine you are connecting from. If you are sitting at the machine, try logging in remotely to some other machine and locating that connection. Record the properties of one such connection.
- (f) Use `netstat -rn` to display the routing table. What is the default gateway for this machine?

7. **Finding Disk / Storage details:** Use the `mount` and `df` commands (`df -h` is especially nice if it works) to determine the following:

- (a) How much total space is reserved for the root filesystem (/)? How much of that space is free?
- (b) What type of filesystem is the root file system? (Use `mount` command and look at first line in output.)
- (c) How many partitions does the hard-disk have?(/dev/sda* or /dev/hda*)
- (d) How many different file system types have you found in your system? Try to explain some of them: what are they used for? If you can't we will discuss during sessions on File management.

8. **Finding IO devices on your system:** Use the command `lspci` to determine the following:

- (a) Does the machine have any Ethernet cards? What brand and model are they?
 - (b) What video card does the machine have?
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