# CS241 : Assignment V

Prof. Hemangee K. Kapoor

Dr. Aryabartta Sahu

Department of CSE,

IIT Guwahati

**Submission Due: November 13, 2018**

Release Date : November 1, 2018

---

1. Suppose you want to study the memory (including swap and installed memory), disk (space used by all your file systems) and CPU usage of your machine for a period of 60 seconds by reporting the memory usage, disk usage and CPU usage in percentage for every 5-second interval. Write a shell script to display memory usage, disk Usage, and CPU Load of your system in the following format:

   | Time | Memory | Disk | CPU |
   |------|--------|------|-----|
   | 0 | 22.00% | 89.04% | 0.70% |
   | 5 | 22.03% | 89.04% | 0.6% |
   | 10 | 22.10% | 89.04% | 0.55% |

   ( Hint: you can use free, df and top command appropriately, if any of the commands won't work with your system then install those using "sudo apt-get install ......." )

2. Write a shell script to continuously monitor whether any USB device is plugged-in into the system.

3. Sality is the classification for a family of malicious software (malware), which infects files on Microsoft Windows systems. Sality was first discovered in 2003 and has advanced over the years to become a dynamic, enduring and full-featured form of malicious code. Systems infected with Sality may communicate over a peer-to-peer (P2P) network for the purpose of relaying spam, proxying of communications, exfiltrating sensitive data, compromising web servers and/or coordinating distributed computing tasks for the purpose of processing intensive tasks (e.g. password cracking). Sality usually targets all files in drive C: that have .SCR or .EXE file extensions, beginning with the root folder. Infected files increase in size by a varying amount. The virus also targets applications that run at each Windows start and frequently used applications. Sality affects system performance by creating unnecessary Executables with extension .exe or .EXE inside almost every directory and subdirectories. It also places one virus definition file with name

"virusdefinition.virus" which contains some virus files which are auxiliary files created by sality inside every directory. Your task is to write a shell based program to delete these unnecessary executable files. The directories may contain some .exe program files which are not infected. There are different parts of the questions. Implementing each part is mandatory.

(a) Delete all the .EXE or .exe files created by sality inside present working directory, directories and also from all the sub directories.

(b) Delete all the auxiliary files mentioned in "virusdefinition.virus" file inside each directories and sub directories.

NOTE:

- The program must able to delete infected files up to any level of sub directories. Sality creates .exe file inside a directory with the same name of directory e.g. if a directory name is "games" then the infected file inside the games will be "games.exe" or may be "games.EXE"

- Extract dummy folder from "pendrive.tar.gz" which containing .exe files.

HINT:

- Please read the question carefully.

- Don't forget to use commands from previous assignments.

- Use of functions in shell will help you to access directories recursively.

4. Four schools (School1, School2, School3, School4) were established in the same year. File "school_database" shows the number of students taking admission in these schools in the last 10 years. Write shell scripts to answer the following questions :

(a) Find the average number of students taking admission in each school in the last 10 years.

(b) Find the average of students taking admission in each school for even-numbered years like 2nd, 4th and so on.

(c) Find the average of students taking admission in each school for odd-numbered years like 3rd, 5th and so on.

5. Write a shell script to design a menu that encode and decode a given file entered by the user. The menu contains three options: (i) Encode (ii) Decode and, (iii) Exit. The file encoding rules are as follows:

(a) The rules for encoding a given file: Each alphabet character number is replaced with the opposite alphabet character number. for example: character 'a/A' to be replaced with character 'z/Z', character 'b/B' to be replaced with

character 'y/Y'....., character 'z/Z' to be replaced with character 'a/A'. Similarly, the digit '0' to replaced with the digit '9', the digit '1' to be replaced with digit '8' etc.

(b) The rules for decoding a given file is same as follows as the encoding.

(c) All the other characters (including blank space, newline and the end of file) other than the alphabets, digits remains to be intact.

Note that entering the other option number in the menu bar generated an "Invalid Input" error message to the output screen and the program is terminated immediately.

6. Write a shell script for image resizing and format conversion of the images as provided in "nature_images" directory. You have to convert the jpg and jpeg images into pdf in the same directory. Remove all the jpg and jpeg files from the directory. Move all pdf of images in a directory named as **image** inside your home directory. Check the size of the **image** directory. Scale each image by 50% to reduce their size. Now print the size of the **image** directory. Your shell program must perform all such operations.

7. Write a shell script to split the "Linux.Shell.Scripting.Cookbook.pdf" file into 192 pdfs in the directory **multiple_pdf**. Each pdf should have two pages after splitting into multiple pdfs. Now move all the pdf into a directory named as **Success** under the home directory and remove the older directory multiple_pdf.

8. Write a shell script to convert excel files "marks.xlsx" and "grades.xlsx" into marks.csv and grades.csv files of either comma separated or tab space separated. Add a column with name grades in the marks.csv file, the input for the eighth column grade should read through another file grades.csv. Delete the column four, five and six from the file marks.csv and create the xlsx file final_marksheet.xlsx from the file marks.csv. (Hint: there are many command-line utilities that convert "xlsx" file to "csv". You can download any suitable utility if your system does not have such kind of utility)

9. Write a shell script that shall find the total time of the user sonal who did not spend her time on the system on Sep 25. Your program should read the "auth.log" file. You have to add all the time differences between session closed to session opened in "auth.log" file.

---

**Note:** Problem from 1-9 are some set of problems. During the evaluation, we may ask similar kind of questions.

---