CS241 : Assignment IV

Prof. Hemangee K. Kapoor
Dr. Aryabartta Sahu
Department of CSE,
IIT Guwahati

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Part-A: Awk Command Related Questions

Download the "*sample.txt, days.txt, line.txt*" files from the course website and save that to your home directory. Each row of the "*sample.txt*" consists of 11 fields with delimited by space, and each field represents the following; Field-1: timestamp, field-2: job-id, field-3: task index within job, field-4: machine-id, field-5: event type, field-6: scheduling class, field-7: priority, field-8: CPU usage, field-9: RAM usage, field-10: disk usage and field-11: machine constraint. All the questions (except Q.14 & Q.15) require this file, and you are required to use "*awk*" commands to solve these questions.

1. Write an awk command to find the total number of lines in the file "*sample.txt*" without using *NR* of awk or *wc* command.
2. Write a command to find the distinct number of tasks of the job whose job-id is "*515042969*" (Each job consists of more than one tasks).
3. Write the command to find the total memory usage of the job whose job-id is "*515042969*" (Hint: One job has different tasks, and you need to find the sum of the memory usage of all it's tasks).
4. What is the command to print the records of the "*sample.txt*" file, whose machine constraint is "*1*" ?
5. How many records are present in the "*sample.txt*" file, whose CPU usage is in-between 0.001 to 0.009 ?
6. Write a command to find the length of the longest line present in the file "*sample.txt*".

7. Write a command to display the (job-id, CPU usage, RAM usage, and disk usage) of records from line 100 to 200 of the "*sample.txt*" file.

8. Write a command to split the "*sample.txt*" file, so that all the records whose priority value is less than and equal to "*0*" are in the file "*sample0.txt*", and the rest are in the file "*sample1.txt*".

9. Write a command to split the file "*sample.txt*" into multiple files at every 100th line i.e., first 100 lines into "*sample1.txt*", next 100 lines into "*sample2.txt*" and so on.

10. Suppose you want to display the records by inserting a new column (say the serial number) before the 1st column of the file "*sample.txt*". Write the command to perform that.

11. Suppose you want to display the contents of the file "*sample.txt*" by swapping the columns in the following manner, that is column-1 swaps with column-11, column-2 swaps with column-10 and so on. What is command to perform that task ?

12. Find the job-id from the longest record of the file "*sample.txt*".

13. Write the command to display all the records in the file "*sample.txt*" in reverse order.(NOTE: Do use print key word the command)
    For example:
    INPUT: 4 78.5 46.6 78123 0.001
    OUTPUT: 0.001 78123 46.6 78.5 4

14. Suppose we have a file containing names of days of a week. Each line contains single or multiple words. We want to return how many times each day occurs in the file. (Use *days.txt* file)

15. A line begins with line number. But due to some reason the lines are jumbled up. Use *awk* command to print lines as per their line number. (Use *line.txt* file)

Part-B: Shell Scripting Questions

A shell script is a computer program designed to be run by the Unix/Linux shell which could be one of the following:

- The Bourne Shell
- The C Shell
- The Korn Shell
- The GNU Bourne-Again SHell (BASH)

A shell is a command-line interpreter and typical operations performed by shell scripts include file manipulation, program execution, and printing text. You may know the shell types that are supported by your operating system. You can type the command in your terminal under the root directory **cat etc/shells**. It will display the shell names supported by your operating system. The default shell of the system is BASH shell. The command **which shell** will display your default shell name. For different bash commands, you can take the help from reference bash scripting cheatsheet.

1. Write a shell program that will
    - contains a multi-line comment. At the beginning of your shell program, you will enter your name, roll no., semester, shell program name which will remain commented using multi-line comment but entered in each separate line.
    - print a message on terminal **This is the first shell program. Please enter the username**.
    - read username from the terminal e.g. **Neel Kamal**. The output should be displayed as "Username::Neel Kamal"
    - write "End of the Program" in shell script using single line comments.
2. Write a shell script which prints the following
    - Current working directory.
    - Current username.
    - The message "Today is:" with the current date in dd/mm/yyyy format
3. Write a shell script
    - to add four numbers when the inputs read from the terminal. Display the output as "Sum of four numbers::".
    - to add two numbers when the inputs are given as command line arguments and if two numbers are not given, show an error message as "both command line arguments are missing". If one number is missing show the error message as "one command line argument is missing".
    - to take any number of integers between 10 and 20 as command line arguments and return sum of numbers. Ex sum of "12 6 13" would return sum as 25.
4. Write a shell script to perform operations like a calculator (addition, subtraction, division, multiplication) for the two input numbers. It should ask for the numbers and operator from the user. You have to use case...esac for checking conditions.
5. Write a shell script to generate a random number between 1 to 20. For conditions, you have to use if..elif. Allow a user to guess 3 times to get the number. Print appropriate messages after each guess. e.g.

Random generated number is 10
User enters a number: 4
Output message: Entered number is SMALLER
User enters a number: 14
Output message: Entered number is BIGGER
User enters a number: 10
Output message: Entered number is MATCHED

6. Write a shell script to find out string is palindrome or not. If we read a string from end to beginning, it is same as begin to end. Display the result with the length of the string e.g.
   Input: ABCDCBA
   Output: Yes Length of String: 7

7. Take a directory name as command line argument, and perform following operations through shell scripts.
   - search a file inside the given directory name
   - to count total no. of files and directories inside the given directory name
   - delete all the files in a specific directory that has .c extension. (Note: directory should not get deleted)
   - delete all files in the current directory with 0 bytes.

8. Write a shell script that makes a backup of a file given in command line argument. i.e. make another copy of the given file in the same directory

9. There is a file given roll_list.txt where the first column represents roll no. and the second column represents subject taken by the student. Write a shell script for the following problems taking filename input from command line argument: "roll_list.txt"
   - To create an empty file for each roll no. with .txt extension. Ex for roll no. 170101001 create a file 170101001.txt
   - To display the roll no and subject of students whose roll no is odd and chosen the subject "CS241" in the roll no range 17491011-17491015. Display the result in the format "Roll no:17491011 Subject:CS241"

Note: Problem from Part-A and Part-B are some set of problems. During the evaluation, we may ask similar kind of questions.
