CS 251: Inlab: [Code Warrior:] Bash Scripting and Linux Shell

- Handed out: 8/17 Due: 8/17 4:30pm.

- Please write (only if true) the honor code. If you used any source (person or thing) explicitly state it. You can find the honor code on the web page.

Overview

The goal of this assignment is to make you familiar with some of the tools available on a typical bash shell, and also a bit about scripting using bash.

The goals in this assignment can be accomplished using multiple ways. The goal is to do the assignment using bash constructs, and commonly available tools in `coreutils` under GNU-Linux. You are not expected to write the answer in C or C++, or use other mechanisms.

On the other hand, don't make life tortuous for you. Where unclear, please ask on the help forum. By default, assume the scripts written by you are present in the current working directory.

Pretasks

Make sure you link your previous assignment in your `public_html` directory so that the instructor can find it during viva hours.

Before coming to lab, or the first thing in the lab, complete your pretasks. Ask your jTA to record this.

Tasks:

1. `ssh` & passwords. `ssh-copy-id` is a nifty tool that makes it less painful to log on to multiple computers. As with all tools, it is good to understand what the tool is doing. In this task we are going to make a smaller version of `ssh-copy-id` (without using this tool) to automate the process of copying your "web files" to mars. This will be useful in future assignments.

   (a) First we need to set up password-less entry into mars. (Wait, it's not so dangerous). Write a script `makePasswordless.sh` which takes two inputs, the user name and the host name to achieve this task. Here is the format

   `./makePasswordless.sh cse_username target_machine_hostname`

   - The script should throw an error message if either of the two prompts are missing and exit.
   - The script may prompt the user for any further inputs

   After running the above script the command `ssh cse_username@target_machine_hostname` should not prompt for a password but directly log in. Also, what is the difference between passphrase and password, from this question's perspective?

   Hints: ssh-keygen, ssh.   Marks:10

   (b) Typing `cse_username@target_machine_hostname` every time is painful. Read about SSH config file (`.ssh/config`) and give your mars account a nickname (we will use `mymars` for the rest of this question). Make relevant modifications. Typing `ssh mymars` should automatically log you into your mars account.   Marks:10

(c) Now we are ready to sync files automatically to mars . Read about `rsync`. What is the difference between `scp` and `rsync`? Write a script `syncToMars.sh` which takes two folder paths as input.

$$\text{./syncToMars.sh public\_html mymars:}$$

`mymars:` will be interpreted as `cse_username@target_machine_hostname:~/` if correctly configured in `.ssh/config`. The invocation of the above script should create a replica of `public_html` inside the home folder of `mymars` using `rsync`.   Marks:10

(d) Modify the script `makePasswordless.sh` to do some checks. If *the command line argument user name already has access without password,*, the script exits silently, there is nothing to do. Otherwise proceed (i.e., only if there is NO access).   Marks:10

Hints: ssh options: `-oBatchMode` OR `-oNumberOfPasswordPrompts`, "$?".

Submit `makePasswordless.sh`, `syncToMars.sh`, and config file with minimal length. Also don't forget to answer the theory questions asked.

2. Write a script `countFreq` using `awk` that takes one line string as input from stdin and prints the frequency count of every word in that string. What is the big-Oh complexity of your program where there are n words in the line?   Marks:20

Submission Guidelines:

1. When you submit, please document individual percentages such as Student 1: 80%, Student 2:100%, Student 3:10%. In this example, the second student will get full marks, i.e., 10/10 and the first student will receive 8/10.

2. Do include a `readme.txt` (telling me whatever you want to tell me including individual percentages). Do include group members (name, roll number), group number, honour code, citations etc. Make sure that numbers are in sorted ascending order.

3. The name of the submission folder should be `lab04_groupXY_final.tar.gz`

How We will Grade You

- Complete package as usual may attract negative points if not properly submitted.

- Marks corresponding to all the question is given along with the question itself.