Assignment #3

Date Due: November 15, 2019

Total: 100 marks

When you are processing system files you need root access. For this exercise your root file system `$ROOTFS` is considered to be `/home/sysp/users/groups/cs2820/A3` Thus `/etc/passwd` in your exercise is in fact `${ROOTFS}/etc/passwd`. Your `${ROOTFS}/etc/passwd` and `${ROOTFS}/etc/group` will be created from the tar archive provided.

Don't use root access to test any of the exercises in this assignment.

1. (20 marks) Write an `awk` script that emulates the `wc` command.
2. (40 marks) You are asked to process the password file (`$ROOTFS/etc/passwd`) using an `awk` script as follows:
   (a) If your student id is
      i. even, then all users with $GID = 20000$ will have new $GID = 2000x$, where $x=$ the order of the first letter of their `username` (login name).
      ii. odd, then all users with $GID = 20000$ will have new $GID = 200x0$, where $x=$ the order of the first letter of their `username` (login name).
   (b) all users with $GID = 30000$ will have new $GID = 30xyz$, where xy is determined as follows
      i. if your student id is multiple of 5 xy are the last two digits of your student ID.
      ii. if your student id is multiple of 5 plus 1 xy are the first two digits of your student ID.
      iii. if your student id is multiple of 5 plus 2 xy are the second digit and the second last digit of your student ID.
      iv. if your student id is multiple of 5 plus 3 xy are the last digit and the first digit of your student ID.
      v. if your student id is multiple of 5 plus 4 xy are the first digit and the last digit of your student ID.

      z is the order in the English alphabet of the first letter of you first name computed mod 9. The student id and the first name should be stored in environment variables, but the value of the digits xy can be done offline (in another file or on paper). The value of z must be determined by your code.
   (c) all users in group `bashgroup` will have new shell `bash`
   (d) all users in group `tcshgroup` will have new shell `tcsh`

   (e) all other non-system users that are not in `tcshgroup` nor in `bashgroup` will have new shell `dash`

3. (40 marks) Repeat exercise 2 for `sed` utility. You may use a combination of shell commands and `sed` commands to achieve the required functionality.

4. (30 marks) You are asked to process the password file (`$ROOTFS/etc/passwd`) using a combination of `awk`/`sed` script as follows:

   (a) Produce a list of users that belong to more than 1 group

   (b) For each such users produce a line as follows
   `username:$id:group1:$idgroup1:group2:$idgroup2:group3:$idgroup3`

   (c) All these lines are stored in a new file called `usersgroups`

Note: For both files `passwd` and `group` the line order is not important. `A3-Sample.tar.gz` contains the two files you need to use for processing.