***CS 345 Week 6 Homework***

Make sure you put your answers in numerical order!

Answers in yellow

1 - 5) Finally! You get to prove your scripting skills since I know you’ve been chomping at the bit to do so. I would like you to create a script called “tell” that when run, does a variety of tasks:

1. You will need to use loop across each user that is currently logged in on the system.
2. For each user logged in, you will print information out about the user: their login name, where they are logged in from, how long they have been logged in and where their home directory is located. You can mostly get this information from the who command that we talked about way back in week one.
3. Next, we want to print out the amount of diskspace that a particular user is consuming in his/her home directory with files. Print out each file and its size in K, and then at the end print out a grand total of diskspace used in K as well. Your friends, the find and du commands, will serve you well in this effort.
4. Print out whatever processes are owned by the user. With a little bit of help from man you can create the cascading ps print to show nested processes like what I have in my output.
5. Finally, consulting top would let you determine how much CPU time and memory the user is consuming. Print that information out in a nice concise format.

Provide a copy of your script and run it to show the output from the script – no screenshots!

Hints:

1. You may need to use the cut command to remove extraneous punctuation or ends of lines. You’ll want to read up on this command in man and try it outside of the script to see how it works.
2. You’ll find the awk command useful for printing out a specific column of output from a command that returns multiple columns. For example piping some output to awk in the form of *command* | awk ’{print $4}’ would print out the fourth column of information that the command generated.
3. The awk command can also be told to count and print when done counting as in *command* | awk '{ cnt = cnt+$1 } END {print "Count is : ",cnt}'

Here’s the output from my script…

root@CS345:~# ./tell

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Username: reguser

Logged In From: pts/1 Since: 03-12 14:25 (192.168.1.109)

Home Directory: /home/reguser

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Disk space consumed in home directory (in K block):

4.0K /home/reguser/.config/gtk-2.0/gtkfilechooser.ini

8.0K /home/reguser/.config/terminology/config/standard/base.cfg

4.0K /home/reguser/.config/featherpad/fp.conf

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4.0K /home/reguser/.dmrc

4.0K /home/reguser/.xsession-errors.old

0 /home/reguser/.sudo\_as\_admin\_successful

Total Used (in K blocks): 10348

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Process Information:

PID TTY TIME CMD

2576 ? 00:00:00 sshd

2580 pts/1 00:00:00 \\_ bash

2549 ? 00:00:00 systemd

2550 ? 00:00:00 \\_ (sd-pam)

2556 ? 00:00:00 \\_ pulseaudio

2579 ? 00:00:00 \\_ dbus-daemon

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Overall CPU and Memory Utilization Information:

CPU Utilization % = 0 Memory Utilization % = 4

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Username: root

Logged In From: pts/0 Since: 03-11 13:16 (192.168.1.109)

Home Directory: /root

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Disk space consumed in home directory (in K block):

4.0K /root/.profile

0 /root/.cache/motd.legal-displayed

0 /root/.cache/mesa\_shader\_cache/index

4.0K /root/.selected\_editor

4.0K /root/.bash\_history

4.0K /root/.elementary/config/profile.cfg

12K /root/.elementary/config/standard/base.cfg

4.0K /root/.bashrc

4.0K /root/.dbus/session-bus/4407183167844338923bca9c0003d374-0

4.0K /root/tell

Total Used (in K blocks): 40

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Process Information:

PID TTY TIME CMD

2 ? 00:00:00 kthreadd

3 ? 00:00:00 \\_ rcu\_gp

4 ? 00:00:00 \\_ rcu\_par\_gp

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416 ? 00:00:00 sshd

1292 ? 00:00:01 \\_ sshd

1330 pts/0 00:00:00 | \\_ bash

1608 pts/0 00:00:00 | \\_ ftp

3252 pts/0 00:00:00 | \\_ tell

3254 pts/0 00:00:00 | \\_ tell

3288 pts/0 00:00:00 | \\_ ps

2536 ? 00:00:00 \\_ sshd

419 tty1 00:00:00 agetty

827 ? 00:00:00 cron

1095 ? 00:00:01 upowerd

1105 ? 00:00:00 polkitd

1303 ? 00:00:00 systemd

1304 ? 00:00:00 \\_ (sd-pam)

2253 ? 00:00:00 fwupd

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Overall CPU and Memory Utilization Information:

CPU Utilization % = 0 Memory Utilization % = 22.4

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root@CS345:~#

5)

root@CS345:~# cat tell.sh

#!/bin/bash

who | while read who

do

echo "============================"

user=`whoami`

echo "Username: $user"

login=`who | tail -1 | awk '{print "Logged In From: " $2 " Since: " $3,$4,$5}'`

echo "$login"

eval echo "Home directory: ~$USER"

echo "============================"

echo "Disk Space Consumed In Home Directory (In K Block):"

directories=`du -k -ah ~/`

echo "$directories"

total=`du -s ~/ | grep -o '[0-9]\+'`

echo "Total Used (in k blocks): $total"

echo "============================"

echo "Process Information:"

process=`ps -u | awk '{print $2, $7, $10, $11}'`

echo "$process"

echo "============================"

echo "Overall CPU and Memory Utilization Information"

cpu=`top -b -n 1 |grep Cpu | awk '{print $9}'`

mem=`top -b -n 1 | awk '{print $10}'`

echo "CPU Utilization % = $cpu Memory Utilization % = $mem"

done

exit 0

1. Write a script file to check for SetUID programs 4755. (Run the commands and show the necessary output – no screenshots)

root@CS345:~# touch uid.sh

root@CS345:~# pico uid.sh

root@CS345:~# cat uid.sh

#!/bin/bash

find -perm 4755

1. Create an empty text file and change the permissions marking it as a SetUID program. (Run the commands and show the necessary output – no screenshots)

root@CS345:~# touch uid.txt

root@CS345:~# chmod 4755 uid.txt

1. Prove your script file works by running it. (Run the command and show the necessary output – no screenshots)

root@CS345:~# bash uid.sh

./uid.txt

1. Use apt to install the at package to your Bodhi distribution – you must have an internet connection for this to work. (Run the commands and show the necessary output – no screenshots)

root@CS345:~# sudo apt-get install at

Reading package lists... Done

Building dependency tree

Reading state information... Done

The following additional packages will be installed:

libfl2

Suggested packages:

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Setting up at (3.1.23-1ubuntu1) ...

Created symlink /etc/systemd/system/multi-user.target.wants/atd.service → /lib/systemd/system/atd.service.

Processing triggers for systemd (245.4-4ubuntu3.6) ...

Processing triggers for man-db (2.9.1-1) ...

Processing triggers for libc-bin (2.31-0ubuntu9.2) ...

1. Use at to run your script 5 minutes from now. Then show where your actual at job is held and the contents of the file holding the at job. (Run the commands and show the necessary output – no screenshots)

root@CS345:~# bash uid.sh | at now +5 minutes

warning: commands will be executed using /bin/sh

job 1 at Tue Jun 21 00:07:00 2022

root@CS345:~#

root@CS345:~# atq

1 Tue Jun 21 00:07:00 2022 a root

1. Show how to run your script every day at 12:34 in the afternoon via cron. You can just write the command – you do not have to execute it.

crontab -e

34 12 \* \* \* /home/uid.sh

1. Explain the purpose of a print filter in old school UNIX/Linux printing and compare it to the idea of Windows printer drivers.

A print filter is a script used by the lpr program to prepare files to be sent to a print. In Windows, the user needs to install drivers in the clients pc. In Unix, those drivers are not necessary.

1. Explain the purpose of each the following old school printing commands: lpr, lpc and lpq.

lpr is the program that prepares files to be sent to a printer. Depending on whether the OS is System V based or BSD based, lpr or lp is used. lpd is responsible for plucking jobs from the print queue and releasing them to the printer. Lpc is how you start the printer.

1. Explain some advantages of using CUPS over the old school printing.

CUPS has access to a built in web-browser which can be used for accessing the local machines web interface. This allows for easy installation of a printer.

1. Are print quotas necessary? Why or why not?

Yes, it allows for all users to receive a fair share of processing time. It can also help reduce costs associated with printing in a network environment. Some small files can use way more ink than larger files, so print quotas can prevent people from over printing.