CS312 Homework #1

January 14, 2015

Instructions

Please email all answers as a single text file to cs312@osuosl.org using the naming format `$onidusername-hw1.txt`. This homework is due at 4pm on Friday, Jan 23.

Questions

1. (1pt) Give one command that would install the following packages:

   ```
   bash-completion
   curl
   jwhois
   lsof
   man
   man-pages
   man-pages-override
   nc
   net-tools
   ```

2. (1pt) Give the command that reports which package is reponsible for installing the file `/bin/bash` (hint: use `rpm`)

3. (2pt) Given the text file at `https://cs312.osuosl.org/_static/hw/pkgs`, produce a short bash script (one-liners are acceptable) that lists the

number of machines that have each package installed. The format of each line in the file is `machinename package`.

For example, the `zsh` package is installed on 13 machines, so one line produced by your script should be `13 zsh`, but `apt-transport-https` is only installed on one machine, so its respective line would be `1 apt-transport-https`

4. (1pt) Given the following output, why does `du` report the size of `/tmp` as `1.1G` even though `/tmp` only is `246 M` large? Does `/tmp` really contain `1.1G` of data?

```
[centos@localhost ~]$ du -Lsxh /tmp
1.1G    /tmp
[centos@asdf ~]$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/vda1       9.9G  2.2G  7.2G  24% /
tmpfs           246M     0  246M   0% /dev/shm
[centos@localhost ~]$ ls -la /tmp
total 24
drwxrwxrwt.  3 root   root   4096 Jan 12 21:06 .
dr-xr-xr-x. 24 root   root   4096 Jan 12 18:29 ..
drwxrwxrwt.  2 root   root   4096 Jan 12 18:29 .ICE-unix
-rwx------.  1 root   root    226 Jan  6 19:01 ks-script-WfHb73
-rwxrwxrwx.  1 centos centos  558 Jan  6 19:04 script.sh
-rw-------.  1 root   root      0 Jan  6 18:58 yum.log
lrwxrwxrwx.  1 centos centos   18 Jan 12 21:06 zeros ->/home/centos/zeros
```

5. (1pt) Why is it possible for `du` and `df` to disagree about disk space usage? Which is correct? See below for an example:

```
[centos@localhost ~]$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/vda1       9.9G  1.8G  7.7G  19% /
tmpfs           246M     0  246M   0% /dev/shm
[centos@hostname ~]$ sudo du -hsx /
724M    /
```

6. (2pt) What do the following internal bash variables store?

   $*

   $@

   $?

   $!

   $$

7. (1pt) How has the Agile Methodology contributed to the growth of DevOps?

8. (1pt) Linux distributions are composed of, among other things, a kernel and a set of userland utilities. Who created and maintains the kernel? What was the first Linux distribution?

9. (1pt) What are the differences between Ext 2, 3, and 4? When would you use each?

10. (1pt) Where should user installed programs be typically installed which are not installed by package managers?

11. (1pt) What command would you use to enable the `ntpd` service on boot? What command would you use to start it?

12. (1pt) Using `dd`, show the command you would use to create a file named `disk-image` filled with zeros that is 20MB in size.

13. (1pt) Using the file in previous question, create an ext4 file system. Show the command you used and the output it provides.

14. (2pt) Using `losetup`, mount the filesystem from the previous question at the `/mnt` directory. Show the output of `df -h /mnt`.

15. (1pt) Umount the filesystem, and run a filesystem check on the filesystem. Show the command you use and the output it provides. Why do we need to unmount the filesystem?

16. (1pt) What is the maximum mount count set at for the filesystem you created? Show the command you used to find that. What command would you use to change it to 10 days?

17. (1pt) Say we added an additional 20MB to the disk file. What command would we use to grow the filesystem?