

## I/O and File “Gymnastics”

Q1. Create an ssh tunnel from this computer to a service that is visible from another ssh-capable computer (but, of course, not necessarily visible from the computer you're using). Then, access that service from your computer through localhost and the tunneled port number.

A1.

The collage consists of several overlapping screenshots:

- Top Left:** A terminal window showing the user `aalzaidd1@my.cs.lmu.edu` logging into `Abduls-MacBook-Pro`. It displays system information for Ubuntu 11.10 (GNU/Linux 3.0.0-12-server x86\_64), including system load, memory usage, and swap usage. It also shows the command `cat /etc/issue` outputting the LMU logo and rules like "Rule #1: Read The Manual." and "Rule #2: Google Is Your Friend."
- Top Right:** A terminal window showing a Python script execution. It starts with `aalzaidd1@ab201:~$ python -m SimpleHTTPServer 8080`. A `Traceback` error occurs: `socket.error: [Errno 98] Address already in use`. The user then runs `aalzaidd1@ab201:~$ python -m SimpleHTTPServer 8070`, which successfully starts the server on port 8070. Subsequent `curl` commands show GET requests for `/HTTP/1.1` and `/favicon.ico`.
- Middle Left:** A terminal window showing the user `Abduls-MacBook-Pro:~ AbdulZaid$ ssh -L 9000:localhost:8070 aalzaidd1@my.cs.lmu.edu`. It shows the user logging in as `aalzaidd1@my.cs.lmu.edu` and displaying the same system information as the top-left window.
- Middle Right:** A terminal window showing the user `aalzaidd1@my.cs.lmu.edu` running `cat /etc/issue`, displaying the LMU logo and rules.
- Bottom:** A screenshot of a web browser window. The address bar shows `localhost:9000`. The page title is "Directory listing for /". The content shows a list of files and directories, including `.adobe/`, `.bash_history`, `.bash_logout`, `.bashrc`, `.cache/`, `.config/`, `.dbus/`, `.esd_auth`, `.evolution/`, `.gconf/`, `.gconfd/`, `.gnome2/`, `.gnome2_private/`, `.gtk-bookmarks`, `.gvfs/`, `.ICEauthority`, `.local/`, `.macromedia/`, `.mission-control/`, `.mozilla/`, `.nautilus/`, `.openoffice.org/`, `.pki/`, `.profile`, `.pulse/`, `.pulse-cookie`, and `.recently-used.xbel`.

Q2. Run something lengthy (ping, vm\_stat/vmstat loooooong download, finding the quadrillionth prime number...) inside screen; logout of that computer entirely, login again, and reconnect to screen to prove to yourself that the process has continued to run without interruption. Submit screenshots of your long-running command before you logged out, then after you reconnected to it.

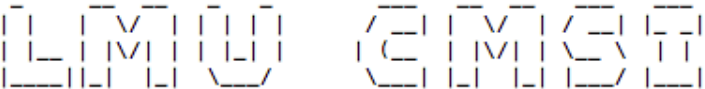
```
Abduls-MacBook-Pro:~ AbdulZaid$ ssh aalzaid1@my.cs.lmu.edu
aalzaid1@my.cs.lmu.edu's password:
Welcome to Ubuntu 11.10 (GNU/Linux 3.0.0-12-server x86_64)

 * Documentation:  https://help.ubuntu.com/11.10/serverguide/C

System information as of Tue Feb  4 00:00:27 PST 2014

System load:      1.9                Processes:        140
Usage of /home:   1.4% of 45.83GB    Users logged in: 3
Memory usage:     28%               IP address for eth0: 157.242.71.21
Swap usage:       0%

Graph this data and manage this system at https://landscape.canonical.com/
New release '12.04 LTS' available.
Run 'do-release-upgrade' to upgrade to it.
```



The logo consists of two parts. The first part is 'LMU' in large, outlined capital letters, followed by a small 'COM' also in outlined capital letters. The second part is 'COM' in a larger, more stylized font where each letter is composed of multiple overlapping outlines, giving it a 3D or layered appearance.

Rule #1: Read The Manual.

```
aalzaidd1@ab201:~$ cd Desktop
aalzaidd1@ab201:~/Desktop$ ls
a.out          Die.class      ks.o           Q6.scd
Coin.java      Echo.class     ks.s           Quad
Coins          fib.s          Ks.s           QuadSolver.java
Dicce.java     GoodDate (1).java LeapYear.java  RecursiveFibs.class
Dice           GoodDate.class max3.s          RecursiveFibs.java
DiceApp.class  GoodDate.java  maxofthree.c   SetOfCoins.class
DiceApp.java   hi.c           NextDate.class SetOfCoins.java
Dice.class     hi.s           NextDate.java  SetOfCoinsTester.java
Dice.java      homework       Q6.s           untitled folder
aalzaidd1@ab201:~/Desktop$ screen
```

```
Screen version 4.00.03jw4 (FAU) 2-May-06

Copyright (c) 1993-2002 Juergen Weigert, Michael Schroeder
Copyright (c) 1987 Oliver Laumann

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Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA.

Send bugreports, fixes, enhancements, t-shirts, money, beer & pizza to
screen@uni-erlangen.de

[Press Space for next page; Return to end.]
```



```
LMU CMSC

Rule #1: Read The Manual.
Rule #2: Google Is Your Friend.

- Manage Your Account: https://secure.cs.lmu.edu
- Change Password via Command Line: yppasswd
- BASH Quick Reference: http://www.cs.lmu.edu/bash.pdf
- VIM Quick Reference: http://www.cs.lmu.edu/vim.pdf
- Printer Drivers: http://www.cs.lmu.edu/drivers
- How To List Files: ls, ls -la
- How To Change Directories: cd [directory-name]
- How To Edit Files: nano, vim, emacs
- (Win) How To Transfer Files: WinSCP, Filezilla
- (Win) How To SSH Remotely: Putty, Cygwin
- (Mac) How To Transfer Files: Filezilla, Cyberduck, Fugu
- (Mac) How To SSH Remotely: Terminal

Last login: Tue Feb  4 00:00:27 2014 from cpe-23-241-186-214.socal.res.rr.com
aalzaid1@ab201:~$ screen -r

aalzaid1@ab201:~/Desktop$ java RecursiveFibs 150
```

As shown above this program takes time to compute the fibonacci number 150, and from the time it was compiled to the time I logged in again it still computing.

Q3. Learn how to use `du`, which tells you how much disk space you're using in a given directory

(a) Which first-level subdirectory in `~` is taking up the most space? Submit the command that includes this information in as little output as possible.

(b) Submit a command that displays only the disk usage of directories matching some regular expression. Hint: `l`.

A.

```
Abduls-MacBook-Pro:~ AbdulZaid$ du -d 1 -h
8.0K  ./adobe
4.0K  ./config
4.0K  ./cups
11M   ./dropbox
4.0K  ./eclipse
36K   ./filezilla
8.0K  ./idlerc
0B    ./m2
58M   ./npm
8.0K  ./putty
12K   ./ssh
20K   ./titanium
1.7M  ./Trash
1.2M  ./Applications
16K   ./Conduit
262M  ./Desktop
18G   ./Documents
5.4G  ./Downloads
303M  ./Dropbox
140K  ./GoideProjects
6.8M  ./Google Drive
du: ./Library/Saved Application State/com.adobe.Installers.Setup.savedState: Permission denied
15G   ./Library
156G  ./Movies
26G   ./Music
32G   ./Pictures
52K   ./project
0B    ./Public
28K   ./R Console
0B    ./tmp
254G  .
Abduls-MacBook-Pro:~ AbdulZaid$
```

(a) As shown below the subdirectory that's using the most space is Movies = 156G

```
Abduls-MacBook-Pro:~ AbdulZaid$ du -d 1 -h | grep "d"
du: ./Library/Saved Application State/com.adobe.Installers.Setup.savedState: Permission denied
8.0K  ./adobe
11M   ./dropbox
8.0K  ./idlerc
16K   ./Conduit
5.4G  ./Downloads
140K  ./GoideProjects
Abduls-MacBook-Pro:~ AbdulZaid$
```

(b) `du -d 1 -h | grep "d"`

Q4. On a Keck lab machine, create a file within ~. Run `ls -i` to determine that file's inode number. Move this file to another directory inside ~, then move it to /tmp, then move it back to your home directory. After each move, use `ls -i` to see its inode number.

- (a) Submit the output of `ls -i` both right after you created the file and after each file move.
- (b) Submit the piped commands that you would type in order to filter out all lines of `ls -i`'s output except for the file that you created.

a.

```
Last login: Tue Feb  4 00:19:41 2014 from cpe-23-241-186-214.socal.res.rr.com
aalzaid1@ab201:~$ vi newFile.txt
aalzaid1@ab201:~$ ls
cmsi370  ~Desktop  Downloads  newFile.txt  Public      repos  Templates
Desktop Documents Music      Pictures     public_html rpg    Videos
aalzaid1@ab201:~$ ls -i
10097858 cmsi370      10093592 Music          10098073 repos
10095319 Desktop    10098100 newFile.txt    10098058 rpg
10098096 ~Desktop   10093379 Pictures      10093378 Templates
10095312 Documents 10093595 Public       10095103 Videos
10223628 Downloads 10093593 public_html
aalzaid1@ab201:~$ mv newFile.txt scratch/
mv: cannot move 'newFile.txt' to 'scratch/': Not a directory
aalzaid1@ab201:~$ ls
cmsi370  ~Desktop  Downloads  newFile.txt  Public      repos  Templates
Desktop Documents Music      Pictures     public_html rpg    Videos
aalzaid1@ab201:~$ mv newFile.txt Documents/
aalzaid1@ab201:~$ cd Documents
aalzaid1@ab201:~/Documents$ ls -i
10095314 Class Notes 10095313 CSApps 10098100 newFile.txt
```

```
aalzaid1@ab201:~/Documents$ mv newFile.txt /tmp/
aalzaid1@ab201:~/Documents$ cd /tmp/
aalzaid1@ab201:/tmp$ ls -i
1973083 hsperfdata_aalzaid1 1972358 hsperfdata_pdorin
2102619 hsperfdata_aruiz25 1972277 hsperfdata_slouie4
1972684 hsperfdata_avreelan 1972689 hsperfdata_tbramant
2102620 hsperfdata_cbillin3 1972433 hsperfdata_tvilgaly
1972276 hsperfdata_dondi 1972685 hsperfdata_vkuehn
1972357 hsperfdata_gleis 2102618 hsperfdata_waverill
1972361 hsperfdata_hdelgadi 1972760 libevent-2.0.21-stable
1972692 hsperfdata_jpiatos 1972758 libevent-2.0.21-stable.tar.gz
1972691 hsperfdata_kgosch 1972759 ncurses-5.9.tar.gz
1972686 hsperfdata_kmcgee3 1973019 newFile.txt
1972688 hsperfdata_kmeilak 2102622 ssh-cvJGD29027
1972278 hsperfdata_ksherbin 2102537 tmux-1261
1972687 hsperfdata_lhunt6 1972757 tmux-1.8.tar.gz
1972432 hsperfdata_mmalefyt 2102624 update-manager-xM7bH8
1972360 hsperfdata_mpetredi
aalzaid1@ab201:/tmp$ mv newFile.txt ~
aalzaid1@ab201:/tmp$ cd ~ && ls -i
10097858 cmsi370      10223628 Downloads      10093595 Public          10093378 Templates
10095319 Desktop    10093592 Music          10093593 public_html    10095103 Videos
10098096 ~Desktop   10098099 newFile.txt    10098073 repos
10095312 Documents 10093379 Pictures      10098058 rpg
```

b. `ls -i | grep`

```
aalzaid1@ab201:~$ ls -i | grep newFile.txt
10098099 newFile.txt
aalzaid1@ab201:~$
```



Q5. Pop a few storage devices (CD, DVD, flash drive, network drive, etc.) into your computer. Figure out the mount points for each device.

- (a) Submit the output provided by the command (or a screenshot showing the information, if you used a GUI tool).

```
Abduls-MacBook-Pro:~ AbdulZaid$ mount
/dev/disk0s2 on / (hfs, local, journaled)
devfs on /dev (devfs, local, nobrowse)
map -hosts on /net (autofs, nosuid, automounted, nobrowse)
map auto_home on /home (autofs, automounted, nobrowse)
/dev/disk2s1 on /Volumes/MESHAL (msdos, local, nodev, nosuid, noowners)
Abduls-MacBook-Pro:~ AbdulZaid$ diskutil info /dev/disk2s1
Device Identifier:      disk2s1
Device Node:           /dev/disk2s1
Part of Whole:         disk2
Device / Media Name:   Untitled 1

Volume Name:           MESHAL
Escaped with Unicode:  MESHAL

Mounted:               Yes
Mount Point:           /Volumes/MESHAL
Escaped with Unicode:  /Volumes/MESHAL

File System Personality: MS-DOS FAT32
Type (Bundle):         msdos
Name (User Visible):   MS-DOS (FAT32)

Partition Type:       DOS_FAT_32
OS Can Be Installed:  No
Media Type:           Generic
Protocol:             USB
SMART Status:         Not Supported

Total Size:            8.0 GB (8020541440 Bytes) (exactly 15665120 512-Byte-Units)
Volume Free Space:     8.0 GB (8002838528 Bytes) (exactly 15630544 512-Byte-Units)
Device Block Size:     512 Bytes

Read-Only Media:      No
Read-Only Volume:     No
Ejectable:            Yes

Whole:                No
Internal:             No

Abduls-MacBook-Pro:~ AbdulZaid$
```