

In this homework, you will need to work on the eniac-l.seas.upenn.edu server. If you need help logging in to this machine see the following webpage: <http://www.seas.upenn.edu/cets/answers/remote.html> (note: you need to swap eniac-l.seas.upenn.edu for eniac.seas.upenn.edu).

In most questions below, you will be asked to enter some command with some set of arguments. Depending on the command, there may or may not be output generated. For each command, you should use your mouse to highlight the command (including the prompt) and the output (if there is any) and copy it to a separate *text* document. Obviously, when you make mistakes, you should not copy the text. You should also copy the question to the text document as well. For questions that do not ask you to enter a command, you can simply type the answer into the text document.

When you are finished with the assignment, attach the text document to an email and send to mcorliss@cis.upenn.edu. The subject of the email should be "cse399 - hw1" (without the quotes). The homework is due by the beginning of Wednesday's class. Total points: 50.

1. [32 Points] Basic Unix/Linux commands.

- (a) Make a new directory called cse399.

Answer:

```
bash$ mkdir cse399
```

- (b) Change your location to this directory.

Answer:

```
bash$ cd cse399
```

- (c) Make a new directory called hw1. You should specify a flag to print out a message after the directory is created (*i.e.*, use 'man' pages to find this flag).

Answer:

```
bash$ mkdir -v hw1
mkdir: created directory 'hw1'
```

- (d) Copy the directory /home1/m/mcorliss/teaching/cse399/hw1 and all of its subcontents to your current location.

Answer:

```
bash$ cp -r /home1/m/mcorliss/teaching/cse399/hw1 .
```

- (e) Change your location to this directory.

Answer:

```
bash$ cd hw1
```

- (f) List only files ending in '.txt' using the long format (hint use 'man' to find out to list files using the long format).

Answer:

```
bash$ ls -l *.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-1.txt
```

```

-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-10.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-2.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-3.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-4.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-5.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-6.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-7.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-8.txt
-rw-r— 1 mcorliss 30675 14 Jan 19 09:44 cse399-9.txt
-rw-r— 1 mcorliss 30675 9 Jan 19 09:44 print-file.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-1.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-10.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-2.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-3.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-4.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-5.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-6.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-7.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-8.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-9.txt

```

- (g) List only files ending in '.jpg'. Again, use the long format and in addition, the files should be sorted by modification time.

Answer:

```

bash$ ls -lt *.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-10.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-9.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-8.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-7.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-6.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-5.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-4.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-3.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-2.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 cse399-1.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-10.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-9.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-8.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-7.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-6.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-5.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-4.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-3.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-2.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-1.jpg

```

- (h) Remove files starting with 'cse399' and ending in '.jpg'. You should specify an argument that forces the system to ask you if you want to delete each file.

Answer:

```

bash$ rm -i cse399*.jpg
rm: remove regular empty file 'cse399-1.jpg'? y
rm: remove regular empty file 'cse399-10.jpg'? y
rm: remove regular empty file 'cse399-2.jpg'? y

```

```
rm: remove regular empty file 'cse399-3.jpg'? y
rm: remove regular empty file 'cse399-4.jpg'? y
rm: remove regular empty file 'cse399-5.jpg'? y
rm: remove regular empty file 'cse399-6.jpg'? y
rm: remove regular empty file 'cse399-7.jpg'? y
rm: remove regular empty file 'cse399-8.jpg'? y
rm: remove regular empty file 'cse399-9.jpg'? y
```

- (i) Print out the file 'print-file.txt'.

Answer:

```
bash$ cat print-file.txt
uiouiore
```

- (j) Rename the file 'cse399-9.txt' to 'print-file.txt'. This will remove the old 'print-file.txt'. You should specify an argument that will backup this old file.

Answer:

```
bash$ mv -b cse399-9.txt print-file.txt
```

- (k) Print out the new 'print-file.txt'. Each line should be numbered.

Answer:

```
bash$ cat -n print-file.txt
1 dkfldsfdklds
```

- (l) Move all the contents from directory 'tmp/' to the current location.

Answer:

```
bash$ mv tmp/* .
```

- (m) Remove the directory 'tmp/'.

Answer:

```
bash$ rmdir tmp
```

- (n) List all files using the long format. The files should be sorted by file size.

Answer:

```
bash$ ls -lS
total 56
-rw-r-- 1 mcorliss 30675 47635 Jan 19 09:44 cse399.1
drwxr-x 2 mcorliss 30675 4096 Jan 19 09:44 foo
-rw-r-- 1 mcorliss 30675 14 Jan 19 09:44 print-file.txt
-rw-r-- 1 mcorliss 30675 9 Jan 19 09:44 print-file.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-1.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-10.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-2.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-3.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-4.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-5.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-6.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-7.txt
-rw-r-- 1 mcorliss 30675 0 Jan 19 09:44 cse399-8.txt
```

```
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 tmp-1.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 tmp-2.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 tmp-3.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-1.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-1.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-10.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-10.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-2.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-2.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-3.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-3.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-4.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-4.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-5.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-5.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-6.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-6.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-7.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-7.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-8.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-8.txt
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-9.jpg
-rw-r— 1 mcorliss 30675 0 Jan 19 09:44 unix-9.txt
```

- (o) List the contents of the directory 'foo' without changing your location.

Answer:

```
bash$ ls foo/
foo-1.txt foo-2.txt foo-3.txt
```

- (p) List only the directory name 'foo' (and not its contents) without changing your location.

Answer:

```
bash$ ls -d foo/
foo/
```

2. [8 Points] Advanced uses of man.

- (a) In your current location, there is a file called 'cse399.1'. This is actually a manpage. Enter a command to man this page.

Answer:

Two approaches:

1) bash\$ man -l cse399.1

2) bash\$ man ./cse399.1

man by default wants a command name not a filename. To pass it a filename you need to either use the "-l" flag or you need to give man a path to the file (*i.e.*, containing at least one '/').

- (b) Use the man command to search all man pages to find man pages whose command or description contain 'printf'.

Answer:

```
bash$ man -k printf
vasprintf (3) - print to allocated string
```

vwprintf (3p) - wide-character formatted output of a stdarg argument list
 vfprintf (3) - formatted output conversion
 snprintf (3) - formatted output conversion
 swprintf (3) - formatted wide character output conversion
 asprintf (3) - print to allocated string
 Printf (3o) - Formatted output functions.
 vsprintf (3p) - format output of a stdarg argument list
 printf (3p) - print formatted output
 sprintf (3p) - print formatted output
 wprintf (3p) - print formatted wide-character output
 sprintf (3) - formatted output conversion
 vdprintf (3) - print to a file descriptor
 fwprintf (3) - formatted wide character output conversion
 dprintf (3) - print to a file descriptor
 ber_printf (3) - LBER simplified Basic Encoding Rules library routines for encoding
 wprintf (3) - formatted wide character output conversion
 printf (3) - formatted output conversion
 vswprintf (3p) - wide-character formatted output of a stdarg argument list
 swprintf (3p) - print formatted wide-character output
 vfprintf (3p) - format output of a stdarg argument list
 printf (1p) - write formatted output
 vswprintf (3) - formatted wide character output conversion
 snprintf (3p) - print formatted output
 vwprintf (3) - formatted wide character output conversion
 fprintf (3p) - print formatted output
 printf (1) - format and print data
 fprintf (3) - formatted output conversion
 vfwprintf (3p) - wide-character formatted output of a stdarg argument list
 vsnprintf (3p) - format output of a stdarg argument list
 vsnprintf (3) - formatted output conversion
 vfwprintf (3) - formatted wide character output conversion
 fwprintf (3p) - print formatted wide-character output
 vsprintf (3) - formatted output conversion
 vprintf (3p) - format output of a stdarg argument list
 format (n) - Format a string in the style of sprintf
 vprintf (3) - formatted output conversion

- (c) Man pages are separated into different sections ('man man' to find out what the sections are). In some cases, multiple sections have pages with the same name. (e.g., read). By default, man only gives you the first man page it finds. Use man to give you all man pages for 'read'.

Answer:

```
bash$ man -a read
```

```
Reformatting bashbuiltins(1), please wait...
```

```
-Man- next: read(1p) [ view (return) — skip (Ctrl-D) — quit (Ctrl-C) ]
```

```
Reformatting read(1p), please wait...
```

```
-Man- next: read(n) [ view (return) — skip (Ctrl-D) — quit (Ctrl-C) ]
```

```
Reformatting read(n), please wait...
```

```
-Man- next: read(2) [ view (return) — skip (Ctrl-D) — quit (Ctrl-C) ]
```

```
Reformatting read(2), please wait...
```

- (d) Use man to view the man page for the read system call only. Make sure the command you enter does not

force you to view any of the other read man pages from other sections.

Answer:

bash\$ man -S2 read

Note: for you C programmers, man -S3 gives you access to most standard library functions.

3. [10 Points] New command: *less*. In the lab, we talked about the command 'more'. 'less' is similar to 'more', *i.e.*, it allows you to view a file. However, less is a lot more powerful (thus, less is more). In this problem, you do not need to cut and paste commands, but rather can just type your answers directly into the text document.

(a) When viewing a file using 'less', what key do you use to go to the top of the file and to the bottom of the file?

Answer:

'g' takes you to the top, 'G' takes you to the bottom.

(b) What key do you use to scroll up a line or down a line?

Answer:

'y' or the up arrow will scroll up a line, the enter key or the down arrow will scroll down a line.

(c) What key do you use to scroll up N lines or down N lines?

Answer:

'u' will scroll up, the space bar will scroll down.

(d) What key do you use to enter a search expression?

Answer:

Can use '/' or '?' to enter a search expression. '/' will search forward, '?' will search backwards.

(e) What key do you use to search forwards or search backwards using the current search expression?

Answer:

Can use 'n' to search forwards or 'N' to search backwards.

Note: man uses less to view manuals by default. So, all of this is applicable to man as well as less.

4. About this assignment.

(a) Approximately, how long did it take you to complete this homework?

(b) Would you classify this assignment as easy, straight-forward, or difficult?