

# CS 197U: Lab #3

Arun Dunna  
adunna@cs.umass.edu

Revision 1.1 - February 9, 2020

**NOTE: Submit your question responses to Moodle as a single PDF file.**

**If a question asks for command(s), give the complete command with programs, options, arguments, pipes, redirects, etc.  
ex: “*vim file.txt*” instead of “*vim*”**

**The PDF should be named in the format: *lastname\_firstname\_lab3.pdf***

## Introduction

This Lab will primarily entail working with compression, links, SSH, and various networking commands. We will not cover package managers with this lab as they will vary depending on operating system, and you do not have permissions to install software on EdLab.

However, you should experiment with your own distribution’s package manager. You will need to install software at some point in the future, if you haven’t already, to your Unix-like system.

Likewise, we won’t cover mounting. This is for two primary reasons:

1. The operating system typically handles this through an interface, such as Nautilus on Ubuntu. If you are using a distribution without such an interface, you likely are already familiar with mounting, or can learn it with minimal practice.
2. When you work with servers, such as cloud instances, you may have to mount file systems yourself. In this case, you’ll need to practice. However, a majority of the time, this will be handled by someone else (such as the cloud interface or server operator) due to permissions and hassle.

If you would like to practice mounting, I recommend doing so with a USB drive. When you are comfortable with it, try using a tool such as **sshfs** or **google-drive-ocamlfuse** to mount remote disks locally.

You should do the following questions and include your responses in your response sheet. All of this should be done in your home directory (i.e. if you’re asked to create/move/modify/remove files, it should all be done in your home directory).

## 1 Compression

Make the **Lab3** directory in your home directory.

### Question 1

Using **gzip**, compress the Dracula book that we downloaded in the last lab to `~/Lab3/dracula.txt.gz`. Do this with the highest compression ratio (smallest compressed file size) you can, that still maintains the lowest compression strength. (ex: If compression strengths 7, 8, and 9 all yield the same compressed size, choose 7)

**Q:** What full command did you use to compress and write `dracula.txt.gz` to file? What command did you use to determine the compressed file size in order to determine which compression strength to use?

#### Question 2

Repeat **Question 2**, but for **bzip2** instead of **gzip**. The output file should be `~/Lab3/dracula.txt.bz2`.

**Q:** What full command did you use to compress and write `dracula.txt.bz2` to file? What command did you use to determine the compressed file size in order to determine which compression strength to use?

#### Question 3

Repeat **Question 2**, but for **xz** instead of **gzip**. The output file should be `~/Lab3/dracula.txt.xz`.

**Q:** What full command did you use to compress and write `dracula.txt.xz` to file? What command did you use to determine the compressed file size in order to determine which compression strength to use?

#### Question 4

Decompress your compressed files (with the respective compression method) to:

1. `~/Lab3/dracula_gz.txt`
2. `~/Lab3/dracula_bz2.txt`
3. `~/Lab3/dracula_xz.txt`

For each decompressed file, use the **diff** command to check the differences between the decompressed file and the original downloaded Dracula text file.

**Q:** What full commands did you use to decompress each archive? Do you notice any discrepancies using the **diff** command and if so, what?

#### Question 5

Use the **tar** command to wrap your **Lab3** directory into `~/Lab3.tar`. This should be done without compression.

**Q:** What full command did you use?

#### Question 6

Use the **tar** command to wrap and compress your **Lab3** directory into `~/Lab3.tar.gz`. This should be done using **gzip** compression.

**Q:** What full command did you use? What do you see when you “peek inside” using the flags **-tvf**?

## 2 Links

You should still be working on the remote server.

### Question 7

Create a symbolic link from the original downloaded Dracula text file to *dracula-symlink.txt* in your *Lab3* directory. Use the **md5sum** program to hash both the original file and the new symbolic link, and compare the hashes.

**Q:** What full command did you use to create the symbolic link? Were both hashes the same?

### Question 8

Try to edit the symbolic link you created using **vim**. When you're done, remove the symbolic link using the **rm** command, like you would any other regular file.

**Q:** Were you able to modify the symbolic link? Why do you think this is?

## 3 SSH and Keys

### Question 9

From your home directory on your local system, run **ssh-keygen** to create a public/private key pair. If you don't have this program, look up how to install it for your distribution and corresponding package manager. You should use a password when generating the key as well.

**Q:** Where did your private key save to? Where did your public key save to?

### Question 10

**Q:** If you were to use the **ssh-copy-id** command to put your public key on a remote server, such as *google.com*, what full command would you use? What full command would you then use to login to the remote server, which is *google.com* in this example?

## 4 Networking Commands

### Question 11

Use the **ping** command to ping *google.com* with 7 packets, and wait 1 second in between each packet.

**Q:** What full command did you use? What output did the command give you?

Question 12

Use the **curl** command to write the contents of <https://adunna.me/courses/cs197u-s20/labs/sample.txt> to `~/Lab3/sample.txt`.

**Q:** What full command did you use? What text does the file contain?

Question 13

Use the **wget** command to download the directory <https://adunna.me/courses/cs197u-s20/> to `~/Lab3/DL/`. Make sure that you only download this directory, and that you do not go to the parent, as you don't want to accidentally download unnecessary files.

**Q:** What full command did you use?