

Lab Part 1 - Unix Basic Skills

1. What command would I type to go to the following directory?

/home/vpallip/ecpe170/project1/src

unix> /home/vpallip/ecpe170/project1/src

2. In the following file pathname, what is the top-level directory (i.e. highest in the hierarchy) and what is the lowest-level directory?

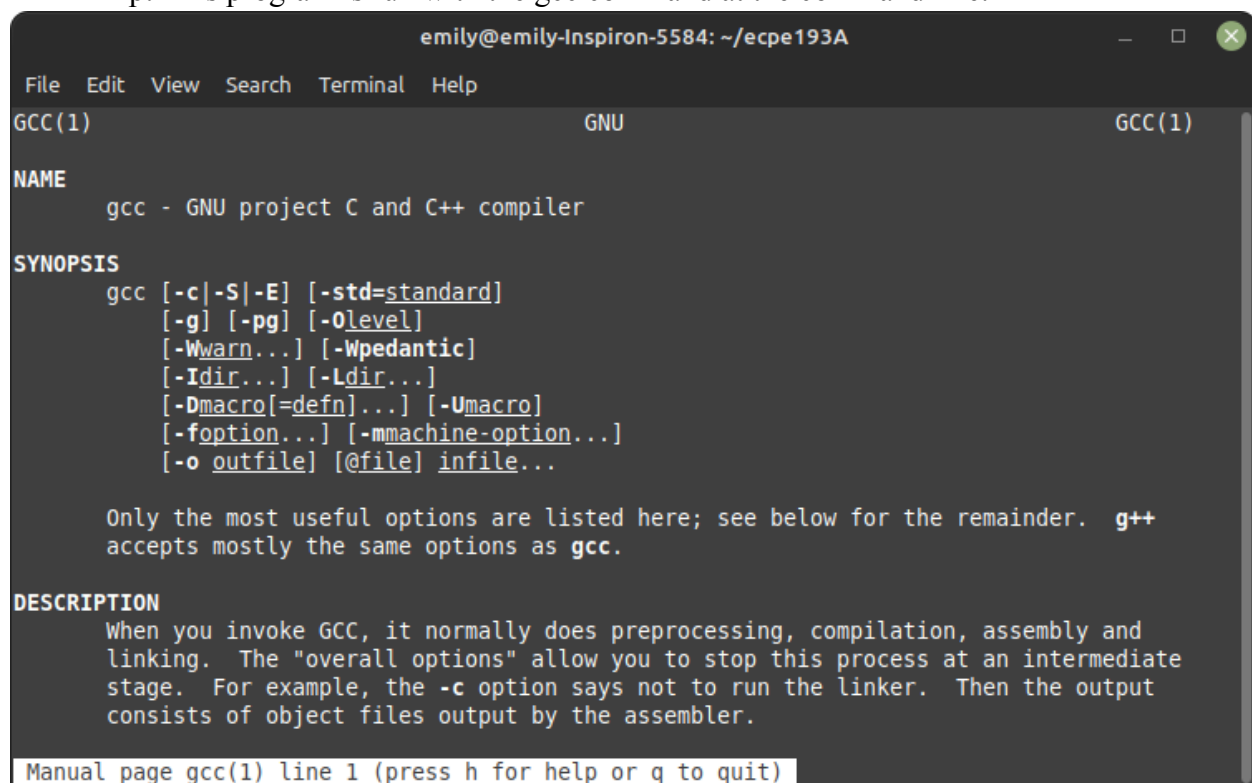
/home/vpallip/ecpe170/project2/src/main.c

Top-level directory: /home

Lowest-level directory: /src

3. Copy the first page of the manual for the GCC compiler.

Tip: This program is run with the gcc command at the command line.



The screenshot shows a terminal window titled "emily@emily-Inspiron-5584: ~/ecpe193A". The window displays the first page of the GCC(1) manual. The title bar includes standard window controls and a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal content shows the title "GCC(1)" and "GNU" on the right. The "NAME" section describes gcc as the "GNU project C and C++ compiler". The "SYNOPSIS" section lists various command-line options for gcc, including -c, -S, -E, -std, -g, -pg, -O, -W, -Idir, -Ldir, -Dmacro, -Umacro, -f, -m, and -o. A note states that g++ accepts mostly the same options as gcc. The "DESCRIPTION" section explains that GCC normally performs preprocessing, compilation, assembly, and linking, and that the -c option stops the process at the assembly stage. The bottom of the window shows a status bar: "Manual page gcc(1) line 1 (press h for help or q to quit)".

```
emily@emily-Inspiron-5584: ~/ecpe193A
File Edit View Search Terminal Help
GCC(1) GNU GCC(1)
NAME
gcc - GNU project C and C++ compiler
SYNOPSIS
gcc [-c|-S|-E] [-std=standard]
    [-g] [-pg] [-Olevel]
    [-Wwarn...] [-Wpedantic]
    [-Idir...] [-Ldir...]
    [-Dmacro[=defn]...] [-Umacro]
    [-foption...] [-mmachine-option...]
    [-o outfile] [@file] infile...
Only the most useful options are listed here; see below for the remainder. g++
accepts mostly the same options as gcc.
DESCRIPTION
When you invoke GCC, it normally does preprocessing, compilation, assembly and
linking. The "overall options" allow you to stop this process at an intermediate
stage. For example, the -c option says not to run the linker. Then the output
consists of object files output by the assembler.
Manual page gcc(1) line 1 (press h for help or q to quit)
```

4. (Question 4a) What does this command do? `sudo rm -rf /`

Tip: **DO NOT** type this at the command line to find out, **you will regret it!**

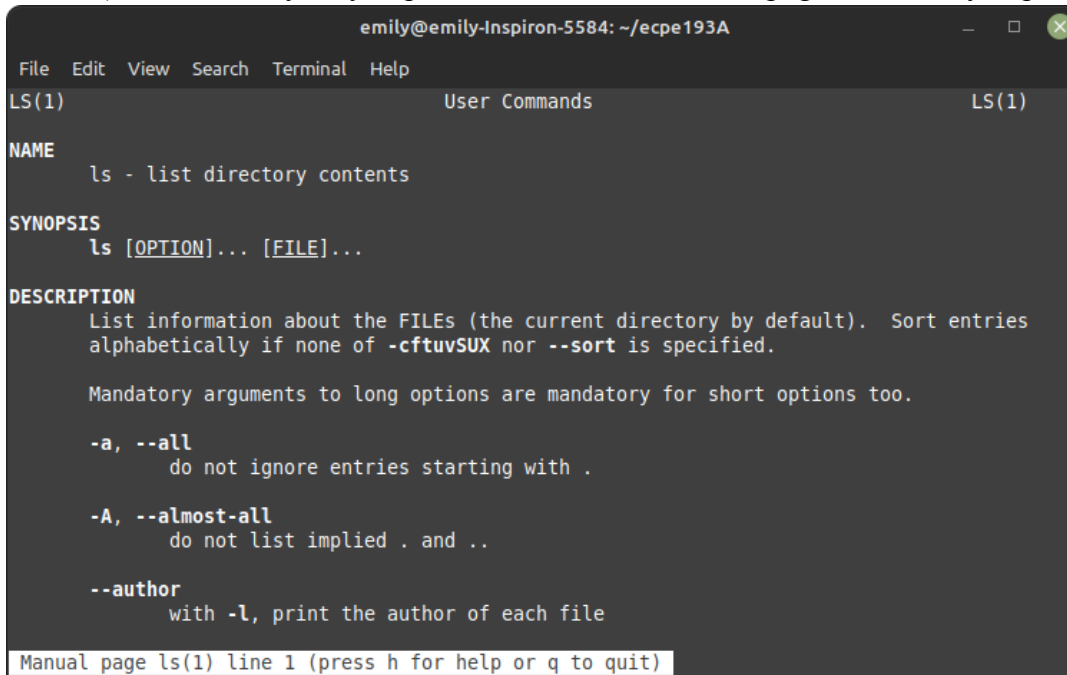
Removes ALL root owned files and directories

Questions 5-13:

Show the command (or keystrokes) that are needed to perform the desired operation.

In addition, document your command, clearly identifying the command name and describing the purpose of each argument that follows.

5. Display information on how to use the `ls` command, such as what optional arguments the program accepts.
(Also, what key do you press to advance to the next page? What do you press to exit?)



```
emily@emily-Inspiron-5584: ~/ecpe193A
File Edit View Search Terminal Help
LS(1) User Commands LS(1)
NAME
  ls - list directory contents
SYNOPSIS
  ls [OPTION]... [FILE]...
DESCRIPTION
  List information about the FILES (the current directory by default). Sort entries
  alphabetically if none of -cftuvSUX nor --sort is specified.

  Mandatory arguments to long options are mandatory for short options too.

  -a, --all
      do not ignore entries starting with .

  -A, --almost-all
      do not list implied . and ..

  --author
      with -l, print the author of each file
Manual page ls(1) line 1 (press h for help or q to quit)
```

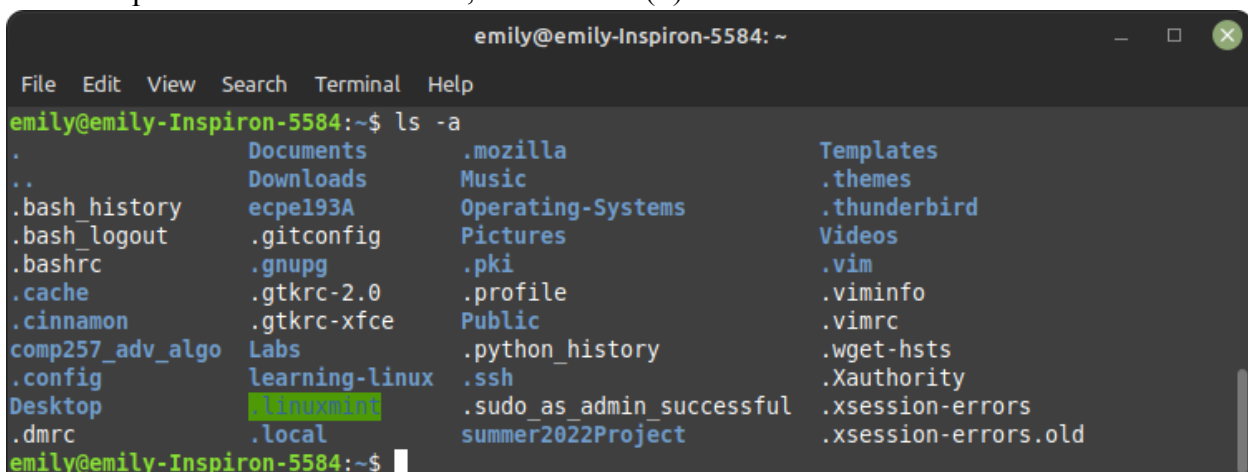
Use the page up and page down buttons to advance through the file documentation;
Press 'q' to exit

6. Count the number of characters in `myfile.txt` and save the result in the file `myfile_char_count.txt` (if the filename is also saved in the output file, that's OK)

`unix> wc myfile.txt > myfile_char_count.txt`

7. List all files contained in your home directory, including **hidden files** where the filename starts with a period.

This command should work for *any* user, so don't put an explicit path that hardwires it to a specific username. Instead, use the tilde (`~`) character.



```
emily@emily-Inspiron-5584: ~
File Edit View Search Terminal Help
emily@emily-Inspiron-5584:~$ ls -a
.          Documents  .mozilla  Templates
..         Downloads  Music     .themes
.bash_history ecpe193A  Operating-Systems .thunderbird
.bash_logout .gitconfig Pictures  Videos
.bashrc      .gnupg    .pki      .vim
.cache       .gtkrc-2.0 .profile  .viminfo
.cinnamon    .gtkrc-xfce Public     .vimrc
comp257_adv_algo Labs       .python_history .wget-hsts
.config      learning-linux .ssh      .Xauthority
Desktop      .linuxmint .sudo_as_admin_successful .xsession-errors
.dmrc        .local    summer2022Project  .xsession-errors.old
emily@emily-Inspiron-5584:~$
```

8. Move the file "data.txt" from the current directory to inside the directory "experiment1".
The destination directory is located directly under (i.e. inside) the user's home directory.
Note: The current directory is left unspecified in this problem.

```
unix> mv data.txt ~/experiment1
```

9. Sort the directory listing of the /etc directory by file size

```
unix> ls -S /etc
```

10. Download the file <http://www.google.com/doodles/roswells-66th-anniversary> from the web to your current directory.

```
unix> wget http://www.google.com/doodles/roswells-66th-anniversary
```

11. Print the current directory that you are in. (By "print", I want to know *what* directory you are currently in, and where it exists in the filesystem. I do not want a list of the files in that directory).

```
/home/emily/ecpe193A
```

12. Do a long listing for files stored in the /boot directory, and include the size of each file in human-friendly units like megabytes or kilobytes.

```
emily@emily-Inspiron-5584: ~  
File Edit View Search Terminal Help  
emily@emily-Inspiron-5584:~$ ls -l /boot  
total 312128  
-rw-r--r-- 1 root root 237852 Nov 23 11:51 config-5.4.0-135-generic  
-rw-r--r-- 1 root root 237852 Jan 5 08:08 config-5.4.0-137-generic  
-rw-r--r-- 1 root root 237884 Nov 5 2021 config-5.4.0-91-generic  
drwx----- 3 root root 4096 Dec 31 1969 efi  
drwxr-xr-x 4 root root 4096 Jan 16 00:07 grub  
lrwxrwxrwx 1 root root 28 Jan 13 00:43 initrd.img -> initrd.img-5.4.0-137-generic  
-rw-r--r-- 1 root root 88489272 Dec 10 07:37 initrd.img-5.4.0-135-generic  
-rw-r--r-- 1 root root 88495745 Jan 13 00:45 initrd.img-5.4.0-137-generic  
-rw-r--r-- 1 root root 88498122 Dec 7 14:39 initrd.img-5.4.0-91-generic  
lrwxrwxrwx 1 root root 28 Jan 16 00:07 initrd.img.old -> initrd.img-5.4.0-135-generic  
-rw----- 1 root root 4748126 Nov 23 11:51 System.map-5.4.0-135-generic  
-rw----- 1 root root 4748402 Jan 5 08:08 System.map-5.4.0-137-generic  
-rw----- 1 root root 4755132 Nov 5 2021 System.map-5.4.0-91-generic  
lrwxrwxrwx 1 root root 25 Jan 13 00:43 vmlinuz -> vmlinuz-5.4.0-137-generic  
-rw----- 1 root root 13668608 Nov 23 12:11 vmlinuz-5.4.0-135-generic  
-rw----- 1 root root 13668608 Jan 5 08:11 vmlinuz-5.4.0-137-generic  
-rw-r--r-- 1 root root 11784448 May 18 2022 vmlinuz-5.4.0-91-generic  
lrwxrwxrwx 1 root root 25 Jan 16 00:07 vmlinuz.old -> vmlinuz-5.4.0-135-generic  
emily@emily-Inspiron-5584:~$
```

13. Report the free space available on the disk in human-friendly units like megabytes or kilobytes.

```
emily@emily-Inspiron-5584: ~  
File Edit View Search Terminal Help  
emily@emily-Inspiron-5584:~$ df -H  
df: /run/user/1000/doc: Operation not permitted  
Filesystem      Size  Used Avail Use% Mounted on  
udev            4.1G   0    4.1G   0% /dev  
tmpfs           821M  1.9M  820M   1% /run  
/dev/nvme0n1p2  251G  15G  224G   7% /  
tmpfs           4.2G   65M   4.1G   2% /dev/shm  
tmpfs           5.3M   4.1k   5.3M   1% /run/lock  
tmpfs           4.2G   0    4.2G   0% /sys/fs/cgroup  
/dev/nvme0n1p1  536M   6.4M  530M   2% /boot/efi  
tmpfs           821M   25k   821M   1% /run/user/1000  
emily@emily-Inspiron-5584:~$
```

14. What is the Linux kernel?

It's the heart of the Linux OS

15. How is Ubuntu Linux different from the Linux kernel?

Ubuntu is a distribution of Linux while Linux is the actual OS

16. What is a Virtual Machine?

Software that allows an operating system (for example Windows or IOS) to run various other operating systems (such as Linux) without overwriting the current operating system

17. How is dual booting different from a virtual machine?

Dual booting allows multiple operating systems to run together on one system whereas a VM uses software to run a separate OS on that application

18. What is the best text editor: vi or emacs?

There is not one correct answer. This is a controversial topic that is subject to each individual's personal preference. Both are great options, but I personally prefer Vim.

19. Beyond inflicting pain and suffering on newbies, what are 3 advantages of using the command line to control a computer?

The command line offers more control and a better understanding of the user's system as well as faster performance. The GUI also uses more of the system's resources.

20. What does one dot (.) mean in a file path? What do two dots (..) mean in a path?

. = current working directory

.. = previous directory