

## F.A.Q. for CS162 at Oregon State University



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# 1 Intro

This is a simple guide for CS162, but would be useful for those in 160 or 161 as well. It was created by a TA who over time noticed several repeating and common questions from his students, and got tired of endlessly explaining the concepts. Hopefully this guide will stand the test of time, serving well those who review it. It is written in LaTeX and the source is available on Github: <https://github.com/el7/faq4u>. This is done so that after myself has left the schooling system, that another TA may pick it up and update any changes that come to play. It's meant to be a living document for the university. Though some items in the document may change, several will likely stay the same. Enjoy.

It should be noted that your instructor may make some of these requirements and failing to use them could mean point deduction. For instance, if your code is unreadable without any comments, or if you have an excessive amount of files without a makefile. Just dont make grading hard for us.

## 2 Web Portals

### 2.1 TEACH

[https://secure.engr.oregonstate.edu:8000/teach.php?type=want\\_auth](https://secure.engr.oregonstate.edu:8000/teach.php?type=want_auth)

This is a web portal to a server on campus where we collect your submissions. Each time you submit to TEACH, a new folder is created titled with your username in a parent folder cooresponding to the assignment. If you submit to TEACH more than once, the folders on our end get renamed as so:

username/	Most recent submission.
username.old.1/	Very first submission.
username.old.2/	Second submission, etc.

Keep in mind: Its a general principle to always include all of your work every time you submit. Dont split up the files in the submissions. For instance if your professor asks you to submit a writeup before the actual assignment, you'll want to first submit the writeup, and then include it again once you submit the code. Unless otherwise specified, we will likely look over your .old folders.

### 2.2 Canvas

Coming soon to OSU. This will supposedly replace Blackboard in Fall 2014.

### 2.3 Blackboard

<https://my.oregonstate.edu/webapps/portal/frameset.jsp>

eCampus interface. It has your grades, holds a lot of course material, and you take tests and quizzes here. There's also a discussion forum that is sometimes used.

## 2.4 Piazza

<https://piazza.com/>

Discussion board, used by many professors.

## 3 Submission

\* Also see Web Portals

Though completely dependant on the class and professor, I've found Assignments are generally due at 23:59:59 the night of the due date. Depending on how the professor sets up their submission system, you might not be able to submit anything after the time is up- making you email your work to a TA. Similarly with online quizzes and exams.

### 3.1 Source Files

#### 3.1.1 file.cpp

These are the C++ source files you will be working with. Each program submission will (likely) have at least one of these, if not many.

#### 3.1.2 file.h / file.hpp

These are header files, which is a supporting file to the source files. You don't necessarily need these in your assignments (unless the instructor asks for them), but they can be beneficial. For instance they can make your code and project more readable, and are essential in good program design. The biggest difference between .h and .hpp files is that the .hpp file extension should indicate to the user that the file is not interchangeable with a C program, whereas .h could be.

### 3.2 Writeup

This is a PDF document you will include with all (most) submissions. These are the generally required sections, but will vary depending on your instructor or the particular assignment:

Requirements:	Talk about the assignment requirements.
Assumptions:	Is there something that's not clear?

Design:	How do you envision your program?
Testing:	Test valid and invalid values. What is observed?
Reflection:	Discuss your project in retrospect.

### 3.2.1 Design & Testing

These are usually two of the most important sections of the writeup. The design is supposed to reflect your conception of the program.

Testing is supposed to reflect the idea that you've used your program and understand what happens when you use it with interesting values. Generally this section is just a table with at minimum three columns: Input, Expected Output, Actual Output. Then the rows consist of various input you've given your program. You'll want to test obvious cases (1, 5, 8), boundary cases (0, 10, 100), and extreme cases (999999, negative numbers). The previous numbers are arbitrary and depend on your program, but hopefully you get the idea. You then record this data under the testing section of the writeup.

## 3.3 Makefiles

You can think of makefiles as an engine to start your engine. The file has a special language with semantics meant for build control. During your 162 adventures many of you will make programs that require 10 or more files, making compilation confusing, difficult or tedious. That is where makefiles come in handy. When you have a working makefile alongside your project, you can turn this compilation command:

```
g++ -std=c++0x driver.cpp class1.cpp class1.hpp class2.cpp class2.hpp other_class.cpp other_class.hpp parent_class.cpp parent_class.hpp child_class.cpp child_class.hpp -o p1
```

To this:

```
make
```

Much easier! There should be two makefiles included somewhere alongside this document; a simple makefile that's easy to understand, and a more robust makefile that's more reusable. Please include a makefile in your submissions.

## 3.4 Archiving

Please archive your work. If you don't understand the importance of this, let me tell a story. I was grading an assignment one term that dealt with file IO. The student had (I'll assume accidentally) made a program that deleted some of their header files and an input.txt file after the first execution. They didn't archive their work before submission and so the files were lost and they received a poor grade. Had they submitted an archive, I would have been able to just pull their work back out of the archive. Let their lesson be your own: archive your work.

For compatibility reasons, Zip is the preferred method. This is because it's naturally supported on all the big operating systems. Alternatively, your TA may request another tool.

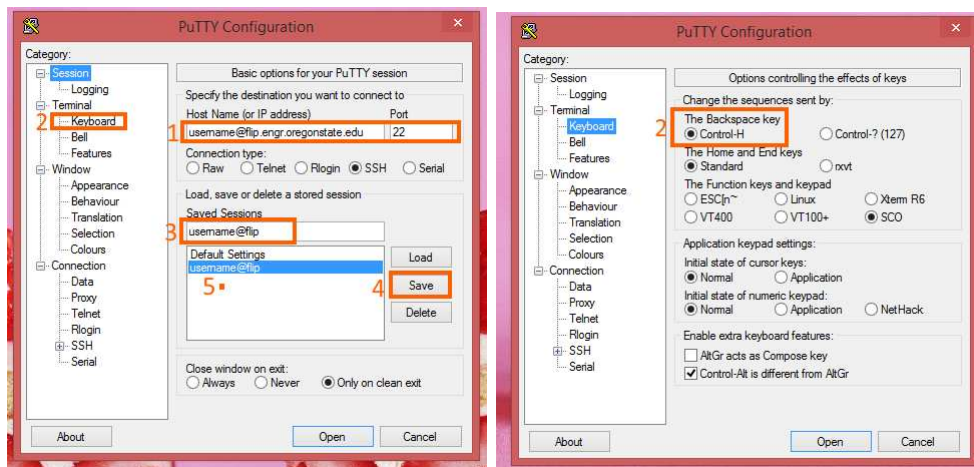
This is how the archive should be named:  
**class\_assignment\_username.extension**

Example:  
**cs162\_assignment3\_cooljoe.zip**

## 4 SSH and the Campus Server

As a TA or instructor, we are responsible for grading your material. As you might imagine there are an absurd amount of ways to code, compile, and run programs. However for our convenience, we're going to be grading you based on how your programs work on the school's server. This means it's completely within your benefit to at least test your work there before submitting, or as I would suggest, just learn to develop your programs there. I'll give a short guide to getting to the server.

Windows: Use PuTTY or KiTTY



1. Enter your username and the server's address. Note: port 22 is standard. 2. Go to the keyboard settings. Make sure Control-H is set for backspace. 3. Enter a profile name. I usually use the username and server name. 4. Save the profile. Do this after making the above changes. 5. Double click the profile to load it.

Linux / Mac: Use a terminal program.



1. Enter 'ssh username@address' into the terminal and press enter.

This is the MOTD, it's asking what kind of terminal you want. Just press enter..



## 5 Basic Shell Commands

Since your programs must work on the school servers, and since many of your future CS classes will require Linux knowledge, it's a good idea for you to learn some basic shell commands. Nothing fancy, just getting around.

<code>pwd</code>	Prints the current working directory.
<code>ls</code>	Lists files in current directory.
<code>ls -a</code>	Includes self and parent folders, and hidden files
<code>ls -l</code>	Shows permissions, timestamps, groups, etc.
<code>mkdir newdir</code>	Creates new folder.
<code>cp file1.cpp file2.cpp</code>	makes a copy of file1 and names it file2.
<code>cd newdir/</code>	change directory to nested folder2 ( relative path )
<code>cd /folder1/</code>	change directory to folder1. ( absolute path, / is your home folder )
<code>cd ../</code>	change directory to the parent folder ( ../ is a link the the parent folder )
<code>rm file1 file2.c file3.cpp</code>	removes these files.
<code>rm -r folder1/</code>	removes folder and everything in it.
<code>mv file1.cpp ../folder2/</code>	moves a file to different folder.
<code>mv file1.cpp file2.cpp</code>	keep file in same folder but renames it.
<code>man ascii</code>	Man page (and tables) for the ASCII character set.
<code>man man</code>	Gives the manual page for the man command.
<code>top</code>	Lists working processes in resource-heavy order.
<code>exit</code>	An explicit exit from a terminal (or ssh session).

First **pwd** is used to print the working directory. Then **mkdir** is used to make the new directory 'z\_new\_folder'. **ls** is then used to print the contents of the current directory. You can see 'z\_new\_folder' at the end. Then we used **cp** to copy the file 'router' to the new folder, and used **mv** to move the file 'turkey' to the new folder. We then print out the directory again, and you can see the file 'turkey' is no longer there. We then use **cd** to move into the new folder, and print out it's contents. You can see the 'router' and 'turkey' files. We then use **rm** to remove the 'router' file. Then we use **mv** on 'turkey' again, but instead of moving it we are renaming it 'chicken'. We then use **cd ../** to move back a folder, and try to use **rmdir** on the new folder. We get an error saying we can't remove it because there are items inside it. Since I know there's nothing



```
dgzl@marvin430: ~ 99x48
dgzl@marvin430:~$ pwd
/home/dgzl
dgzl@marvin430:~$ mkdir z_new_folder
dgzl@marvin430:~$ ls
14_summer Documents Game math231 practice schedule turkey
contacts Downloads git Media programs scripts Videos
Corvallis eBooks hiero Music Public Skype VirtualBox VMs
cryptic ethics house ok public_html software vmware
cs411-group31 examples.desktop ISO OSU Resume SOU winter_break
Desktop Firefox_wallpaper.png Jive output roms svn z_new_folder
documents FreeMind Legal Pictures router Templates
dgzl@marvin430:~$ cp router z_new_folder/
dgzl@marvin430:~$ mv turkey z_new_folder/
dgzl@marvin430:~$ ls
14_summer Documents Game math231 practice schedule Videos
contacts Downloads git Media programs scripts VirtualBox VMs
Corvallis eBooks hiero Music Public Skype vmware
cryptic ethics house ok public_html software winter_break
cs411-group31 examples.desktop ISO OSU Resume SOU z_new_folder
Desktop Firefox_wallpaper.png Jive output roms svn
documents FreeMind Legal Pictures router Templates
dgzl@marvin430:~$ cd z_new_folder/
dgzl@marvin430:~/z_new_folder$ ls
router turkey
dgzl@marvin430:~/z_new_folder$ rm router
dgzl@marvin430:~/z_new_folder$ ls
turkey
dgzl@marvin430:~/z_new_folder$ mv turkey chicken
dgzl@marvin430:~/z_new_folder$ ls
chicken
dgzl@marvin430:~/z_new_folder$ cd ../
dgzl@marvin430:~$ rmdir z_new_folder/
rmdir: failed to remove 'z_new_folder/': Directory not empty
dgzl@marvin430:~$ rm -rf z_new_folder/
dgzl@marvin430:~$ ls
14_summer Documents Game math231 practice schedule Videos
contacts Downloads git Media programs scripts VirtualBox VMs
Corvallis eBooks hiero Music Public Skype vmware
cryptic ethics house ok public_html software winter_break
cs411-group31 examples.desktop ISO OSU Resume SOU
Desktop Firefox_wallpaper.png Jive output roms svn
documents FreeMind Legal Pictures router Templates
dgzl@marvin430:~$ man ascii
```

important in there, I use **rm -rf** to remove the folder. The -r option tells the program to search and delete things recursively, and -f means to use force (don't ask permission). Finally, **man** is short for 'manual' and lets you see manual page set for certain things. This example shows the manual page for the ascii character set. Give it a try.

## 6 Useful CLI Tools

ssh. This tools lets you connect your host computer to a remote terminal.

example: ssh username@flip.engr.oregonstate.edu

sftp. Its like using SSH but with easy file transferring commands. Adding l in front of the command applies the command to the host computer. example: sftp username@flip.engr.oregonstate.edu connects to the flip server. ls Lists files on remote server.

lls Lists files on host server

cd dir/ Changes directories on remote server.

lcd dir/ Changes directories on host server.

put file.cpp Transfers file from host to remote server.  
get file.cpp Transfers file from remote to host server.

tar. It's an archiving / compression tool used widely in \*nix.

Compress tar cvjf cs162\_assignment2\_username.tar.bz2 file1.cpp file2.cpp file3.cpp

Decompress tar xvjf cs162\_assignment2\_username.tar.bz2

cvjf are options: c / x: (create / xtract) archive v: verbose, j: bzip2 compression, f: use the following file.

cs162\_assignment2\_username.tar.bz2 is the name of the compressed file were going to create. file1.cpp, file2.cpp, file3.cpp are the files that are going to be archived.

alias. This tool lets you make custom command line commands.

example:

alias Lists all current aliases.

alias l=ls Binds l to ls.

alias flip=ssh username@flip.engr.oregonstate.edu Binds flip to ssh to flip server.

grep. Lets say you want to look for a particular bit of text, but you have several files to search through. Wouldnt be efficient to open each of them and search, would it? Grep comes in handy by scanning as many files as you like for text.

example:

grep text \* This searching the term 'text' in all (\*) of the files in the folder.

find. Like grep but used for file names.

vim/emacs. Command line text editor that comes stock on all (most) Linux distributions. I encourage you to learn one and use this throughout your courses. Benefits include increased code dexterity, more exposure to the CLI, and theyre stock on nearly every unix environment, so you can edit files on an ssh connection.

A short guide to Vim:

If you use your keyboards Delete command, it saves the deleted character into a register.

There is a file saved in your home folder that is used for your vim configurations. The file (.vimrc) can be used to customize your vim experience. Here is an example .vimrc file: [link to rc](#)

Useful Vim commands:

:w: save file

:q: quit editor

:q!: quit without saving

:wq: Save and quit

Movement:  
 (same as arrow keys)  
 h: left  
 j: down  
 k: up  
 l: right  
 0: Move to first character of the line. Same as `|Home|`.  
 \$: Move to the last char of the line. Same as `|End|`.  
`#|direction|`: Move `#` units in `|direction|`.

i (when in command mode): change to insert mode.  
 esc (when in insert mode): change to command mode.  
 (the following will assume we are in command mode)  
 yy: yank (copy) the current line.  
 dd: delete (and copy) the current line.  
`y|arrow|` (where `|arrow|` is an up / down directional key): yank the current line and 1 line in that direction.  
`d|arrow|` (where `|arrow|` is an up / down directional key): delete (and copy) the current line and 1 line in that direction.  
`y#|arrow|` (where `|arrow|` is an up / down directional key and `|#|` is a number greater than 0): yank the current line and `#` lines in that direction. `d#|arrow|` (where `|arrow|` is an up / down directional key and `|#|` is a number greater than 0): delete (and copy) the current line and `#` lines in that direction.  
 p: Paste the most recent item in the save register.  
 u: Undo.  
`|ctrl|R`: Redo.  
 v: visual mode, similar to highlighting with a mouse. Can be used with other commands like y and d.  
 x: Deletes the character in front of the cursor. Same as using the `|delete|` button.  
 ZZ: Save and quit, like `:wq` but can be done easily with one hand.  
 ZQ: Quit and exit, like `:q!`.  
 gg=G: This will use Vims auto-indent feature. It comes in handy if you have a particularly messy coding style.  
`/|string|` (where `|string|` is a string of your choice): This will search your program for and highlight `|string|`.  
 n: Moves your cursor to the next instance of the term you searched for.  
 N: Moves your cursor to the prev instance of the term you searched for.  
`:%s/string1/string2/gc`: This is a search and replace command where `string1` is your string to replace and `string2` is the string to replace it with. The `c` at the end of this command means to ask you permission before overwriting at each instance. Without the `c` it will not ask.  
`:set number`: Shows / hides line numbers.  
`:|number|`: Jumps to that line number.  
`:set colorscheme |scheme|`: Changes text colors based on `|scheme|`.  
 \*: Highlights and searches for whatever text your cursor is on.

## 7 Style Guide

Code should look nice. It should have logical and consistent Indentation. There should be descriptive yet concise comments describing the functions. If your code is sloppy you may recieve comments from your TA or even point deductions.

See style guide document?

## 8 Useful Software

FileZilla. A file transfer protocol (FTP) program. Used for transferring files to / from another computer.

PuTTY (alt: KiTTY). Secure Shell (SSH) software for Windows. It gives you a linux terminal from OSUs Flip sever. Dont forget to change keyboard settings to Alt-H so you can use backspace.

GIT / SVN

Revision control software. This is beyond the scope of these classes, but theyre very useful to learn and you will need it in future classes / work.

Vim (alt: Emacs). Advanced command line text editor.

Notepad++

## 9 Useful Websites

github.com  
pastebin.com  
stackoverflow.com  
cplusplus.com  
linuxquestions.com  
piazza.com  
blackboard.com

## 10 Other

## 11 nothing of importance

This section is for testing and will be deleted before released.

Code block

Code block