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# Final Project

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## Overview

The climax of this course is its final project. The final project is your opportunity to take your newfound savvy with programming out for a spin and develop your very own piece of software. So long as your project draws upon this course's lessons, the nature of your project is entirely up to you. You may implement your project in any language(s). You are welcome to utilize infrastructure other than the CS50 Appliance. All that we ask is that you build something of interest to you, that you solve an actual problem, that you impact your community, or that you change the world. Strive to create something that outlives this course.

Inasmuch as software development is rarely a one-person effort, you are allowed an opportunity to collaborate with one or two classmates for this final project. Needless to say, it is expected that every student in any such group contribute equally to the design and implementation of that group's project. Moreover, it is expected that the scope of a two- or three-person group's project be, respectively, twice or thrice that of a typical one-person project. A one-person project, mind you, should entail more time and effort than is required by each of the course's problem sets.

If at a loss for ideas, turn to [CS50's seminars](#)<sup>1</sup> for inspiration!

## Academic Honesty

This course's philosophy on academic honesty is best stated as "be reasonable." The course recognizes that interactions with classmates and others can facilitate mastery of the course's material. However, there remains a line between enlisting the help of another and submitting the work of another. This policy characterizes both sides of that line.

The essence of all work that you submit to this course must be your own. Collaboration on problem sets is not permitted except to the extent that you may ask classmates and others for help so long as that help does not reduce to another doing your work for you. Generally speaking, when asking for help, you may show your code to others, but you may not view theirs, so long as you and they respect this policy's other constraints. Collaboration on the course's final project is permitted to the extent prescribed by its specification.

Below are rules of thumb that (inexhaustively) characterize acts that the course considers reasonable and not reasonable. If in doubt as to whether some act is reasonable, do not commit it until you solicit and receive approval in writing from the course's heads. Acts considered not reasonable by the course are handled harshly.

## Reasonable

- Communicating with classmates about problem sets' problems in English (or some other spoken language).
- Discussing the course's material with others in order to understand it better.
- Helping a classmate identify a bug in his or her code at Office Hours, elsewhere, or even online, as by viewing, compiling, or running his or her code, even on your own computer.
- Incorporating snippets of code that you find online or elsewhere into your own code, provided that those snippets are not themselves solutions to assigned problems and that you cite the snippets' origins.
- Reviewing past semesters' quizzes and solutions thereto.

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<sup>1</sup> <https://manual.cs50.net/seminars/>

- Sending or showing code that you've written to someone, possibly a classmate, so that he or she might help you identify and fix a bug.
- Sharing snippets of your own code online so that others might help you identify and fix a bug.
- Turning to the web or elsewhere for instruction beyond the course's own, for references, and for solutions to technical difficulties, but not for outright solutions to problem set's problems or your own final project.
- Whiteboarding solutions to problem sets with others using diagrams or pseudocode but not actual code.
- Working with (and even paying) a tutor to help you with the course, provided the tutor does not do your work for you.

## Not Reasonable

- Accessing a solution in CS50 Vault to some problem prior to (re-)submitting your own.
- Asking a classmate to see his or her solution to a problem set's problem before (re-)submitting your own.
- Decompiling, deobfuscating, or disassembling the staff's solutions to problem sets.
- Failing to cite (as with comments) the origins of code or techniques that you discover outside of the course's own lessons and integrate into your own work, even while respecting this policy's other constraints.
- Giving or showing to a classmate a solution to a problem set's problem when it is he or she, and not you, who is struggling to solve it.
- Looking at another individual's work during a quiz.
- Paying or offering to pay an individual for work that you may submit as (part of) your own.
- Providing or making available solutions to problem sets to individuals who might take this course in the future.
- Searching for, soliciting, or viewing a quiz's questions or answers prior to taking the quiz.
- Searching for or soliciting outright solutions to problem sets online or elsewhere.

- Splitting a problem set's workload with another individual and combining your work.
- Submitting (after possibly modifying) the work of another individual beyond allowed snippets.
- Submitting the same or similar work to this course that you have submitted or will submit to another.
- Submitting work to this course that you intend to use outside of the course (e.g., for a job) without prior approval from the course's heads.
- Using resources during a quiz beyond those explicitly allowed in the quiz's instructions.
- Viewing another's solution to a problem set's problem and basing your own solution on it.

## Getting Started

If using the CS50 Appliance for your final project, start up your appliance and, upon reaching John Harvard's desktop, open a terminal window (remember how?) and execute

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```
update50
```

---

to ensure that your appliance is up-to-date!

## C

If using C for your final project (and the CS50 Appliance), odds are you'll want to execute commands like the below.

---

```
cd ~/Dropbox  
mkdir project  
cd project  
gedit project.c
```

---

## PHP

If using PHP (and CSS and HTML) for your final project, odds are you'll find it easiest to develop inside of a vhost on the CS50 Appliance, just like you did for Problem Set 7 and Problem Set 8!

## MySQL

If using MySQL for your final project (and the CS50 Appliance), recall that you can create a database by visiting <http://localhost/phpMyAdmin/> using Chrome inside of the appliance. Log in as John Harvard if prompted (with a username of **jharvard** and a password of **crimson**). Then click phpMyAdmin's **Databases** tab, which will allow you to create a database called, say, `project`. (If using Problem Set 7's distro code as a foundation for your final project, be sure to edit `config.php` accordingly.)

## Other

If using some other language(s) or environment for your final project, we leave it to you to determine how to get started!

Though do beware if using PHP in some environment other than the CS50 Appliance. The CS50 Appliance supports (and Problem Set 7 assumes) PHP 5.5, whereas some commercial web hosts only support 5.3 or earlier. Realize that syntax like

---

```
$variable = ["a" => 1, "b" => 2, "c" => 3];
```

---

was introduced in PHP 5.4. In earlier versions of PHP, you'll need to use syntax like

---

```
$variable = array("a" => 1, "b" => 2, "c" => 3);
```

---

instead. See <http://php.net/manual/en/migration55.changes.php> for other differences.

## How to Submit

Unlike problem sets, you don't actually have to submit the code that you write for your final project. (Or a pre-proposal, proposal, or status report, as are required on campus.) Rather, you only need to submit a short video (that's no more than 2 minutes in length) in which you present your project to the world, as with slides, screenshots, voiceover, and/or live action. Your video should somehow include your project's title, your name, your city and country, and any other details that you'd like to convey to viewers. See <http://www.cs171.org/2015/screencast/> for tips from another class at Harvard on how to make a "screencast," though you're welcome to use an actual camera. Upload your video to

YouTube (or, if blocked in your country, a similar site) and take note of its URL; it's fine to flag it as "unlisted," but don't flag it as "private."

When ready to submit your video, head to the URL below where a form awaits.

<https://x.cs50.net/2015/project/>

## CS50 Fair

The CS50 Fair is an epic display of final projects online, your opportunity to showcase your work not only to us but also to others throughout the world.

Shortly after 31 December 2015, we'll create a website where you'll be able to explore classmates' projects anytime, anywhere. We'll let you know when the epic display is ready!