Final Project

Due: Monday, April 13, 11:59 PM  (no extensions: late submissions receive 0)

This is a self-directed assignment where you get to decide what your p5 sketch does and what it looks like. This is your chance to show what you learned in the course and what you can do. This project will be marked out of 21 marks, and it is worth 10% of your final grade.

You are encouraged to discuss project ideas with your instructors and peers.

Requirements

Use this starter project: https://editor.p5js.org/cs105-sketches/f7OKBSHW1

General

- The starter code has a README section at the very top of the code file that must be included and completed as per the instructions below.

- **Your project must be a single p5 JavaScript project.** You may have multiple data files (such as images, sound files, etc.), but these must be in the “data” directory of the project and included in your submission.

- **Once your submission is unzipped, your sketch must be ready to load into the Processing IDE and run in a browser using p5 mode.** If it does not run, you could receive 0.

[ 10 marks ] Demonstration of Programming Concepts

The main functional requirement is that you apply key coding concepts from this course. Specifically, you must demonstrate in code how you applied ten programming concepts.

You receive 1 mark for applying each concept correctly in code. Use comments in your code to make it clear to the TAs where you’re using the concept. (As mentioned below in Coding Style and Efficiency, code without comments will result in up to 3 marks being deducted). If you use a concept multiple times, just point out the “best one”.

You must use these 6 basic concepts:

- drawing shapes and using drawing attributes (e.g. fill, stroke, lineCap, …)
- user-defined global variables
- user-defined local variables (use them correctly)
- conditionals
- loops
- user-defined functions
You must choose at least 4 of these extended concepts:

- remapping with map()
- rectangle or circle hit testing
- arrays
- mouse or keyboard event functions
- loading and displaying images
- image processing

General Correctness

- You can choose any canvas size, but no larger than 1024 by 768 is recommended.
- One or more marks will be deducted if the program crashes or “locks up” from an infinite loop (depending on the frequency and circumstances).
- Projects that do not run may receive a grade of 0. Even if you don't complete the entire project, don't leave it in a broken state. Make sure it runs to get part marks.

[ 4 marks ] Coding Style and Efficiency

Follow the course “Code Style Guide” (on Learn).

- We will be strict on coding style for this final project.

One or more marks may be deducted for solutions that have obvious inefficiencies.

- Variables or functions that are declared, but not used.
- Unnecessarily repeating the same code in multiple places.
- Using “magic numbers” instead of variables, when the same value is used frequently or when the value requires manual calculation that could have been performed in code.

Up to 3 marks will be deducted for missing comments on the applied concepts.

[ 4 marks ] Coding Quality and Visual Design

You will receive marks for any of the following: code that shows your programming skill, the creativity of your idea, or your visual design. You can get full marks for really amazing code but mediocre design. Mediocre code and amazing design will receive at most 3 marks.

You must write a short rationale in the “README section” to argue why your coding quality and visual design are great. You should explain what part of your code you are most proud of and why. This might be code you wrote that you think is elegant, code that you were stuck on for a while and figured it out, or code that does something very cool. What visual effect was difficult to achieve?

[ 1 mark ] Video

Use a screen recording tool (like the built-in Quicktime player on macOS) to record a program demo similar to the assignment demonstration videos from previous assignments. Upload your video to a site like Youtube or Vimeo, and submit only the URL (see README section).
• Videos **must be less than 2 minutes**, preferably 1 minute. **You will not receive a mark if your video is longer than 2 minutes.**
• If mouse movement is used, your screen recording tool must capture the mouse cursor.
• If key presses are important, try to find a way to show key presses in your video.
• Adding music and/or a voice-over explaining what’s happening might be nice (this could be a way to explain when keys are pressed), but is not required.
• Keep it simple: cool transitions and fancy video effects are strongly discouraged.
• The artistic or design quality of the video will not be marked. As long as it clearly demonstrates the project, then you will receive the mark.

This video is your chance to show off your program to the TAs, and will be a great way for you to show off your media programming skills in your resume.

With your permission, we would also like to use these videos to promote CS 105 to potential students. Most likely this would mean posting it on a website, tweeting it, showing it in next year’s class, showing it at recruiting fairs, etc. We would always acknowledge your name. You may grant this permission in the README section.

[2 marks] README Section

The top of your sketch file must have a “README” section, like the following text (you need to include the /* and */). This is included in the starter project linked above.

```*/
<project>
Jane Smith
jsmith500

INSTRUCTIONS
<explain what your program does and how to use it>

CODING QUALITY AND VISUAL DESIGN
<argue for your coding quality and visual design>

VIDEO
<paste video URL here>

RELEASE
I <type your full name> grant permission to CS 105 course staff to use my Final Project program and video for the purpose of promoting CS 105. <if you don't grant permission, erase the line above>
*/
```

Instructions:

• Replace <project> with your project name.
• Change “Jane Smith” and “jsmith500” to your name and WatID.

• Below VIDEO, paste the URL where your video is hosted. The video URL is required.

• Below INSTRUCTIONS, type in complete instructions for how to use your program and describe what it does. If you use keys, explain what each key does. If you use the mouse, explain what the mouse does. If you can click or hover on objects, explain what they are and what happens. The INSTRUCTIONS are required.

• Below CODING QUALITY AND DESIGN, write your short rationale for why your coding skill and visual design are great. This section is required.

• Below RELEASE, type your full name if you grant us permission to use your program and video in CS 105 promotional materials. We hope you will grant us permission, but if you decide not to, rest assured it will not affect your mark in any way. The RELEASE is optional.

Restrictions

In general, you may not use any functions, libraries, or statements not covered in lectures or labs unless not specifically exempted below or in a post by a TA or instructor on this assignment discussion channel. For example:

• NO circle or square functions
• NO translate(), rotate(), or scale() functions
• NO classes
• You MAY use bezier, arc, and other standard drawing functions
• You MAY use the two p5.js Core libraries (p5.dom and p5.sound) that are part of the p5.js distribution.
• NO p5.js contributed libraries may be used.

If in doubt, make a post to ask about using a specific statement or function.

Marks will be deducted for using forbidden functions/statements/libraries.

Academic Integrity

This is an individual project, you are expected to do this final project yourself.

• You CAN use code from any lecture, lab, or assignment from this term, but you should understand how the code works and why you’re using it.
• You CANNOT copy a project from a previous term and use it. Remember, we run plagiarism detection software to check this.
• Other than code covered by the bullet above, all code submitted MUST be written by you.
• TAs are available during lab time, during office hours, on Discord, and through email to provide guidance.

NOTICE: We may request a meeting with you to go over your submitted code. If this happens, you will be expected to explain in person how your program works and answer questions about
specific sections of the code. Failure to attend this meeting, or inability to answer questions about the code you submitted could lead to an academic integrity investigation.

If you are unclear what constitutes an academic integrity violation (i.e. plagiarising code), review the academic integrity tutorial in Lab 0, review the related sections of the Syllabus, or email Barbara Daly at barbara.daly@uwaterloo.ca.

Submitting

Zip your whole project into one zip file, and submit it to the correct assignment dropbox. This single zip file must contain all the files to run your sketch including all files needed in the “data” subdirectory. Consult “How to Submit” on Learn for more information on how to create a ZIP.

It is your responsibility to submit to the correct dropbox with the correct files before the deadline. Otherwise, you will receive a mark of 0.