Final Project: Overview

An education is useless unless you put the knowledge into practice. In the context of this class, we provide this project as an opportunity to expand on the skills and techniques that we have covered over the course of the semester. We also hope that it is a project that you will enjoy and be proud to show off to prospective employers.

Requirements/Instructions

1. You should work in groups of 3-5 people. If you do not know with whom you would like to work, you may post on Slack to find partners.
2. The average difficulty of the group project should be roughly twice as difficult as a weekly homework assignment, per person in the group.
3. As a group, you are responsible for meeting the deadlines listed below.
4. You will be graded primarily on the programming skills used in your project, however integration with other physical or software platforms, or integration of 3rd party libraries, is encouraged and will be taken into consideration.
5. Grading will be based on overall group performance on the project and required reporting, as well as individual peer reporting.
6. Each group will receive a project directory into which they can submit all reports, code, and into which will be placed their grade. The project directory is shared with everyone in the group.
7. All reports must be submitted to the group project folder. Do not attempt to submit them via email.
8. All code must be submitted in the group project directory by the final due date. If your code is designed to run on a different system, you should still upload all important files, and indicate the required system information in a README.
9. A final video must be submitted that presents your project and explains how you created it. The video must be uploaded to YouTube (it can be set to private and only accessible via URL, if you wish), and the URL must be included in your final report. While you will not be graded on production polish (this is not a cinematography class!), this video will serve as your final presentation for grading purposes, and should reflect the information necessary for me to properly evaluate your project. An example of a very good submission from a previous year’s class can be seen here (https://www.youtube.com/watch?v=Q4ziN1zyR_Y). Again, this video should be something that you would be proud to show a future employer.
Important Dates

1. **Wednesday, November 7** — All groups must submit the names of their group members and a group name by the beginning of class via email to cpennycu@nd.edu. Afterwards, you will be provided with a folder in which all of your reports and code will be turned in.

2. **Friday, November 9** — All groups must submit a written description of their project, with sufficient detail to justify its selection, at the beginning of class. The report should be submitted as a text document in the 1.overview directory.

3. **Friday, November 16** — All groups must submit a written progress report of the project status by the beginning of class. The report should be submitted as a text document in the 2.report1 directory.

4. **Friday, November 30** — All groups must submit a written progress report of the project status by the beginning of class. The report should be submitted as a text document in the 3.report2 directory.

5. **Monday, December 3** — All groups must submit a written progress report of the project status by the beginning of class. The report should be submitted as a text document in the 4.final directory. The video is also due, and the URL must be included in the final report. The code and any accompanying artifacts (necessary images, data files, etc.) are also due. Write access to the project directory will be removed at this time. Each student must also submit an individual report in his or her own dropbox, which contains a personal evaluation of the contribution of each member of the group to the project. See the example file for guidance.

6. **Wednesday, December 5** — Selected groups will be allowed to present their project to the class during the lecture time. The class will vote on their favorite project, and the winning group will receive a reward. Depending on the available funds, there may also be runner-up awards. Either way, the winner gets the bragging rights! (Note: class vote does not impact grade in any way.

Evaluation

1. **35% — Use of C/C++**. Does the code base demonstrate a command of the language and its features? Is the code well-structured and documented? Did the group fulfill the stated objectives, and to what degree?

2. **20% — Deadlines**. Performance of the group in turning in required written information over the course of the project.

3. **15% — Project idea**. Was the project creative and/or unique? Was the project ambitious enough to justify its selection?

4. **30% — Group performance**. This will be individually graded. Did the individual demonstrate an equal contribution to the creative output of the group? Did the individual’s participation significantly increase the quality of the group’s project?
Ideas

Projects may be entirely software-centric, or they may include hardware such as the Arduino or Raspberry Pi. (It may be possible to procure some hardware from the school, however supplies are limited. Let me know immediately if your group needs access to the school’s resources. Otherwise, you are free to supply your own hardware.) A few ideas are listed below, but you are not limited to just these:

1. [http://viewsourcecode.org/snaptoken/kilo/](http://viewsourcecode.org/snaptoken/kilo/) - Follow the steps, then expand on this project. You could add a hex editor mode, or add/expand on other features.
3. Build Conway’s Game Of Life in a console window. See the Kilo project (mentioned above) for information on how to take full command of the console window output.
4. Build a simulation and measure/report the result of changing variables. (Example: Build an elevator simulation that spans X floors. Compare the efficiency of various algorithms in moving people from floor to floor, and report on average wait times, average car load, etc.)
5. Create a data analysis tool that does non-trivial work on complex datasets.
6. Use your imagination! You may use 3rd-party libraries as necessary.