Computer Science 225
Advanced Programming
Siena College
Spring 2020

Final Project

Matching groups to ideas through 4:00 PM, Friday, April 3, 2020
Groups must be formed and repositories created by: Wednesday, April 8, 2020
Proposals due: 11:59 PM, Wednesday, April 15, 2020
Presentations: TBD, possibly May 1
Final submission: 4:00 PM, Monday, May 4, 2020

For the remainder of the semester, much of your time for the course will be spent completing a final project, worth 300 assignment points. This should put it in the range of a little more than 10% of your course grade.

You will choose two or more significant programs of interest to you and your teammates to design and implement using Java. You have a great deal of freedom in choosing what to program for this project. However, taken together, your programs must be an effective demonstration of your Java programming skills. More details can be found below. As part of the purpose is to develop your abilities to work collaboratively, you are expected to work in groups. Groups of size 2 may be approved, but most should involve 3-5 team members. Groups must be formed and all repositories created (regardless of group size) by Wednesday, April 8, 2020.

Basic Requirements

You may find it difficult to estimate the programming effort that will be required for programs you are considering. Please discuss ideas with with me before going too far.

Your project should showcase many of the programming skills you have worked on this semester. In particular, all projects must include all of the following, in at least one of the programs you choose to implement.

- A meaningful object-oriented design, making effective use of interfaces, abstract classes, inheritance, etc.

- Event-driven programming including Java graphics and Java Swing GUI components.

- Threads for animation or computational speedup.

- Appropriate use of data structures.

- At least one Java or general programming feature or construct that we have not specifically studied in this or prerequisite classes.

Similar assignments in the past have tended to gravitate toward games, but this is by no means a requirement. People have implemented (often simplified) version games like Tetris, Minesweeper, Space Invaders, Pac Man, Angry Birds, Frogger, Breakout, and various 2D scrolling games. If you are going the games route, do not limit yourself to the above list by any means. Have a look at your favorite list of old Atari games or check for games in your favorite app store for lots of ideas.

Applications outside of the realm of games could include simulations, larger-scale computations that take advantage of threads, data processing, image processing, among others.

Basically, find something that you're interested in doing, and have some fun with it.

Matching Groups to Project Ideas

Through 4:00 PM, Friday, April 3, 2020, we will work toward matching people into groups by what they are interested in doing, and to make sure we end up with a nice variety of projects, by contributing to a shared document. Please start thinking about some possible applications you would like to implement right away and put those ideas in the document. This document can also help those looking to form groups to find others with similar interests.

The Proposal

By 11:59 PM, Wednesday, April 15, 2020, submit a proposal (by committing and pushing a file `proposal.pdf` or by creating a GitHub Markdown file `proposal.md` in your repository), at most one page in length, that briefly describes the programs you wish to write, which of the requirements each program is expected to satisfy, and how you plan to go about it. Describe the major milestones for your project, a rough schedule for achieving these milestones, and which milestones you believe are most important for your project to be considered a success. Your proposal should make it clear that you have an interesting and worthwhile set of programs to write, and that it is feasible to complete them in the time available. You should also propose a breakdown of the 300 points among your programs.

Working Collaboratively

In a semester of social distancing, a significant challenge will be to find ways to collaborate effectively without in-person team meetings. Of course, we will make good use of GitHub for this, but groups are encouraged to establish communication mechanisms that work for their own situations. This could include web conferencing, using GitHub Issues, a Slack discussion, shared documents, lots of email, etc.

Most likely, you'll end up with a mix of some synchronous team programming with screen sharing, and breaking out tasks for subgroups to work on, then integrate them back together.

Your collaboration will be measured as it has in earlier problem sets by the Git commits from each team member's account.

The Project

You should submit your fully-documented source code and instructions on how to run each program. Source code should be committed and pushed to your repository by 4:00 PM, Monday, May 4, 2020.

The Presentation

You will demonstrate your program to others in the class, but these details are to be determined.

Academic Honesty Guidelines

Collaboration within a group is unrestricted. Since each group is working on different programs, you are free to discuss your projects with each other. If you wish to use or refer to any software libraries or outside source code beyond the standard Java API, check first, and cite their usage appropriately. All sources must be cited properly. If in doubt about anything related to Academic Honesty, ask now and avoid problems later!

Final Thoughts

You have several weeks, so the expectation is for several weeks of work. You will not be able to do a good job if you put it off. The expectation is not for you to produce a Ph.D. thesis, but this project should be much more than your average problem set assignment.

Submission

Commit and push!