Academic Showcase Project

Group Formation: 4:00 PM, Monday, March 24, 2025
Proposals Due: 4:00 PM, Monday, March 31, 2025
Progress Report Updates: 4:00 PM each Friday 4/4, 4/11, 4/25
Event Date: Friday, May 2, 2025
Final Submission: 4:00 PM, Monday, May 5, 2025

Our class will be taking part in Siena's Academic Showcase on Friday, May 2, 2025. The college is in session, but there are no classes that day. Instead everyone will participate in a variety of talks, poster sessions, demonstrations, and other events sharing and celebrating your academic achievements and those of your fellow students, faculty, and the whole Siena community. Plan to be on campus the whole day.

There will be a session dedicated to our course Time TBD in Location TBD. Attendance and participate in our session is required. The goal of this project is for you to learn about a few algorithms, study and/or implement them, apply them to some interesting data, and share what you learn at the Academic Showcase.

This project is worth 125 points in the problem sets category.

Group Formation and Repositories

Everyone is required to form groups for this project. Groups of 3 or 4 should work well, but requests to form larger groups will be considered in cases where the work proposed is sufficient to justify a larger team. Similarly, if there is a very good reason to stay on your own or to work with a single partner, such cases will be considered. Groups must be formed by 4:00 PM, Monday, March 24, 2025 by an email to *jteresco@siena.edu* with the names and GitHub ids of all team members. You will receive a reply with the link to follow to set up your GitHub repository. Only one member of the group should follow the link to set up the repository on GitHub, then others will be granted write access.

There is a link in Canvas to a document you should use to form groups and select topics.

Project Requirements

The goal of this project is to study, implement, and analyze algorithms beyond what we have time to discuss in class, labs, and problem sets. Here are the guidelines:

- Each project will consider two or more algorithms. These algorithms should be applied to some interesting data.

- Algorithms could be ones we do not study at all in class, or could be applications of algorithms that we do study to solve some problem of interest.

- An algorithm might not be one you'd readily find in a textbook but instead be a variation on an algorithm or algorithm design technique applied to a specific problem.

- All projects must make some use of METAL graph data in some way with at least one of the algorithms studied. There is additional data from the Travel Mapping project that can help make things more interesting. Travel Mapping has information about individual roads and highway systems, as well as user information about what roads they have traveled.

- In order to have a variety of categories of algorithms and specific algorithms within those categories represented across all of our projects, a specific application of any specific algorithm may only be done by a small number (≤ 3) of teams. Claim your intended topics as soon as you have ideas by email or in person.

- All sources used must be cited properly. AI assistance in code development is permitted but must be documented thoroughly. This must be more than just a "Copilot helped" comment; describe clearly which AI tool(s) you used, how you interacted with them, and what portions of your submitted work includes code that was all or in part generated with AI assistance.

Deliverables

The project requies a series of deliverables over the last several weeks of the semester.

Proposal

The first deliverable is a written proposal, due at 4:00 PM, Monday, March 31, 2025. This should be done by creating a file in your GitHub repository. The preferred mechanism is a document `proposal.md` in GitHub markdown, but you are also permitted to commit and push a PDF document `proposal.pdf` to your repository. You are encouraged to discuss your ideas right away. Your proposal, at most one page in length, should describe your proposed project, what specifically you plan to investigate and implement, 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. If you will need access to any special hardware or software, include that in your proposal. Your proposal should convince me that you have an interesting, worthwhile, and relevant topic and that it is feasible in the time available.

The proposal is worth 15 points.

Progress Reports

Each Friday (that Siena is in session) between the proposal and presentation dates, update your group's GitHub markdown file `progress.md` or PDF document `progress.pdf` committed and pushed to your repository. This should outline your progress to date, indicate any changes to your plans since the proposal, and include a more specific timetable for completion of the project. These updates can and should be fairly brief.

The first progress report is worth 1 points, and the others are worth 2 points each, for a total of 5.

Academic Showcase Presentations

Everyone is required to take part in the presentation of their group's work at the Academic Showcase Time TBD on Friday, May 2, 2025. Each group will set up at one or two tables in Location TBD and be available to demonstrate and discuss your work. You could prepare a small poster, but a few slides you can bring up on a computer along with live demonstrations, if applicable, would be appropriate as well. Your presentation needs to work well for two audiences: those with a good understanding of algorithms (your classmates, other upper-level Computer Science students, faculty), and others who might be in attendance with very limited exposure to algorithms. Your task is to teach those in attendance a little bit about the algorithms you have studied and why they are interesting to you, and possibly, to them.

The Academic Showcase presentation and the related materials combine to be worth 75 points.

Final Submission

By 4:00 PM, Monday, May 5, 2025, all project materials must be submitted by commiting and pushing to your GitHub repository. The submission should include all of your code, presentation materials, a brief writeup of your findings (again, either as a GitHub markdown document `final.md` or a PDF document `final.pdf`), and any supporting materials such as data sets, empirical analysis results, solutions obtained, etc. One section of this must be a specific breakdown of the contributions of each group member to the project. Typical writeups would be under 5 pages in length, including figures and citations, but longer writeups might be appropriate in some cases.

Your final submission is worth the remaining 30 points.