

GRAPH THEORY PROJECTS 2016

The main goals of the course project are to:

- allow students to choose a topic of personal interest for in-depth study and research
- provide experience in reading technical literature
- provide experience in self-directing a partnered project
- provide practice at presenting technical information (orally/visually) at a level approaching that of professional journals/conferences
- provide a meaningful culminating experience for every student

A successful project will:

- build upon your graph theory foundation (for example, by going deeper into a graph theory topic already covered in this course, by investigating a new area of graph theory that builds upon knowledge gained in the course, or by improving key skills developed in - or relevant to - this course)
- involve something hard/rigorous
- involve something creative/original

Preliminary milestones:

1. **(Hopefully) by Friday March 18th: Choose a topic and a partner:** Feel free to choose your own topic that satisfies the above criteria.
2. **Preliminary background research:** Each person in your team must research the chosen topic. I suggest starting with web-searches, looking for scientific/technical articles, and using interlibrary-loan as necessary to procure books/journals (plan ahead!). Your bibliography should (eventually) include professional technical material (available on- or off-line).
3. **By Friday March 25th: write a project outline (submit via D2L):**
 - a. A brief description (2-3 sentences) of the chosen area of study
 - b. A list of the **specific goals** of the project. (What do you hope to accomplish? What specific aspects of the topic will you investigate?)
 - c. A brief explanation of why the chosen topic is appropriate* given the backgrounds, interests, and learning goals of you. (*Do not propose to learn about a specific topic if you already know about this topic. Do propose to learn about a specific topic if you have no idea what this means but it sounds interesting.)
 - d. How might your project build upon your graph theory foundation?
 - e. How might your project satisfy the “hard, rigorous” requirement?

- f. How might your project satisfy the “creative” or “original thought” requirement?
4. **By Friday April 15th, the draft paper is due (submit via D2L)**
5. **During the last two weeks of the semester (April 18th – April 29th), presentations will be held during the class period.**

Final Deliverables

Your final deliverables will include an oral presentation and a paper.

Oral Presentation:

- Each team will deliver a 15 to 20 minute (depending on team size) presentation on their project. [Number of minutes subject to change once the number of teams is finalized this year.]
- Successful oral presentations generally omit certain technical details in favor of providing an overview of new material to your peers in a way that is digestible; the technical details can be explained in your supplemental documentation.
- You will have had a lot of practice in your topic by the end of the semester, but most of your peers will be seeing the material for the first time. It is generally helpful to include many examples.
- Structure your presentation as you would hope others would structure theirs! Make it interesting and easy to understand! It should have an easy-to-follow structure (introduction through conclusions).
- Through your oral presentation, it should be obvious how the topic builds upon your graph theory foundation, what was hard/rigorous, and what was creative.
- You may include brief interactive activities with the class, but be mindful of time because these activities often take longer than anticipated.
- Give credit where credit is due (for figures, graphs, theorems, algorithms, etc.)

Scientific Paper

- Every project will include an annotated bibliography. Include full bibliographic information for each reference, along with a quick indication of how the reference was used.
- The length of the paper is not required, but suggested to be between 5 to 10 pages. It will include an introduction, main part, and the conclusion.
- The paper will also include some of the following:
 - Detailed proofs that you wrote
 - Detailed descriptions of algorithms that you wrote (or very well commented code)
 - The details of certain examples, or more advanced examples

- Any other work that was critical to the overall project

Final preparations

Proof-read, proof-read, and proof-read your slides again. Practice the talk, and then practice, practice, and practice again. Practice your talk with another student, and give each other feedback on your slides, your delivery, your content. The timing should be precise (exactly 20 minutes), the content should be precise, any activities should be well rehearsed, and extraneous chatter should be eliminated in order to achieve a high-density talk. The goal is to have your slides and explanations at a level approaching that of a professional presentation.

Evaluation

Please see the criteria for effective papers and oral presentations. Keep these criteria in mind as you proceed with your project. These criteria will be used in the evaluation of your work. Each student will also evaluate every other presentation.