Math 408-01
Spring 2019
Project Information

Overview. Combinatorial designs, coding theory, and graph theory are areas of combinatorics with many interesting and practical applications. Unfortunately, there is limited time in the course to discuss these topics in depth. Nonetheless to gain some exposure, each student will give a 10-12 minute presentation with slides to introduce the class to a combinatorial topic of their choice. In addition, each student will write about their findings in a 3-4 page paper.

Timeline and deadlines.

- Jan. 23. Submit a one-paragraph describing your idea for presentation topic. List at least one alternative. (5 points)

- Feb 4-8. Give a 2-3 minute teaser to the class of your presentation. This will be an opportunity to practice the first few minutes of your presentation and pique interest for your full talk. (10 points)

- Feb. 25 - Mar. 1. Presentations (25 points)

- March 25. Rough draft (10 points)

- April 15. Final paper (50 points)

Scoring Rubric. Expectations and a breakdown of the scoring for the various parts of the project can be found in scoring rubric document posted in Blackboard.

Suggestions. It is highly recommended to use either Power point or LaTeX beamer for your presentation slides. Keep in mind that the presentations are limited to 10-12 minutes. Be sure that your presentation is timed well to present everything that you'd like to share with the class.

Links.
Templates for LaTeXpresentation slides. http://www.latextemplates.com/
Helpful hints for math talks. http://www.d.umn.edu/ jgallian/goodPPtalk.pdf

Some topic ideas. Feel free to come up with your own.

- Königsberg Bridge Problem/Eulerian paths

- Gas-Water-Electricity Problem/Planar graphs

- Four Color Theorem

- Kirkman's schoolgirl problem/Steiner triple systems

- Finite projective planes and Latin squares

- Euler's 36 officer problem and Latin squares

- Traveling Salesman Problem

- Stable Marriages

Some topic ideas (Continued)

- Knight Tours/Hamiltonian paths

- Manhattan Tourist problem

- Minimum connector problem

- One way street problem

- Quick intro to coding theory/error correcting codes/Hamming distance

- Juggling sequences

- Art Gallery Problem/Graph colorings

- Fibonacci, Lucas, and/or Padovan sequences