Final Project Proposal

Math 123

Due April 7, 2023 by midnight

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Instructions. Choose a final project and a final project partner (groups of 2 - anything different needs approval). I would like you to submit the following information:

(i) *Project title:* Knight's Tour

(ii) *One paragraph about the focus and scope of your project. (Don't be overly ambitious. The presentation is 10 minutes! You should pick a single question/problem/theorem to focus on.)*

The presentation will focus on the Knight's tour problem and its relationship with graph theory. We will discuss how the problem of finding a knight's tour on a chessboard can be translated into a graph theory problem of finding a Hamiltonian path on the board, a subset of the Hamiltonian path problem, which in itself is a subset of the NP-hard traveling salesman problem. We will highlight the fact that while the traveling salesman problem is NP-hard, the Knight's tour problem is a special case that can be solved in linear time.

Some topics we may briefly cover given time:

(a) History

(b) Number of tours

(iii) *A list of at least two references you will use (not Wikipedia)*

1. https://web.archive.org/web/20151010071713/http://faculty.olin.edu:80/ sadams/DM/ktpaper.pdf (general overview)
2. http://www.mayhematics.com/t/t.htm (examples/history)
3. https://www.tandfonline.com/doi/pdf/10.1080/0025570X.1991.11977627 (existence theorem)
4. https://www.sciencedirect.com/science/article/pii/0166218X9200170Q?via%3Dihub