Class Project for CSI 35, Fall 2015

The class project is worth 10% of your grade. It is due on Wednesday, December 9 and allows you to explore some topics from the class in more depth. It should be your own work in your own words. Any work identical to another student or an online source will not be graded. Use the textbook, library resources and the web to find information – there are some links on the class web page too. List all of the sources that you use. Contact me if you have any questions or need help.

The class project has three parts:

1. Find a mathematician or computer scientist mentioned in the textbook and write two to three pages about their life and work, especially the work related to what we have studied.
2. Writing project. Write two to three pages on *one* of the following topics:
    - Origins of Mathematical induction. Who were the first people to use it and to which problems did they apply it?
    - History of the four color theorem.
    - History of the Konigsberg bridge problem.
    - Describe some of Paul Erdos's famous results and questions. (The Erdos discrepancy problem, from 1932, was just solved last month.)
    - Explain how Cayley used trees to count hydrocarbons.
    - Explain how Helmut Hasse used what we now call Hasse diagrams.
    - Dijkstra's algorithm. Describe its history, prove by induction it works, and describe applications.
    - Check with me first if you have another idea for a writing project, related to topics covered in this class.
3. Computational project. Explore by hand or by writing a computer program *one* of the following topics:
    - Which Fibonacci numbers are divisible by 5, which are divisible by 7, which by 11? Can you use induction to prove your answer?
    - Which m by n checkerboards can be completely covered by right triominoes (see example 14, p 326)? Can you make a conjecture that answers this question?
    - Compute the number of different ways N queens can be placed on an N by N chessboard so that no queens are attacking any others. Try this for N up to 10.
    - Game of nim. Play the game with different numbers of heaps with different sizes and try to find (or look up) the winning strategy.
    - Check with me first if you have another idea for a computational project, related to topics covered in this class.

So by Wednesday, December 9 you will be handing in

1. Essay on a mathematician or computer scientist (worth 3%)
2. Writing project (worth 3%)
3. Computational project (worth 4%)

Class web page: *http://fsw01.bcc.cuny.edu/cormac.osullivan*