GAMES AND STRATEGIES

Course Syllabus
HSSP Spring 2013

GENERAL INFORMATION

Time: 10:30 am to 12:00 pm
Instructor: Megan Belzner
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COURSE DESCRIPTION

This class is a survey of a wide variety of mathematics and related fields, all studied under the umbrella of games. We'll examine games ranging from Chess to Sudoku to Poker, along with less traditional "games" such as Figure Skating and advertising, learn the techniques behind finding the "best" strategy, and discover fields of math different than any you've ever seen before!

COURSE TOPICS

Class 1 (3/2): Solved Games

What happens when you know every possible move of a game? Is there such a thing as a "perfect" strategy? How can you know who will win from the first move? This class is a brief introduction to the techniques of Combinatorial Game Theory, a field of mathematics concerning games of pure strategy.

Class 2 (3/9): Games of Limited Information

How do you make decisions when you don't have all the information? Can you find a "best" strategy? How are crime, dating, and advertising secretly all the same? This class is an introduction to Game Theory, a field of mathematics with applications to economics, political science, psychology and more.

Class 3 (3/23): Games of Luck and Chance

How are casinos rigged to make you always lose? When is it worth it to play a game of chance? How are board games and betting related? This class looks at how probability plays into a variety of games, and how you can take advantage of the math behind it.

Class 4 (3/30): Games of Skill

How does math work its way into pool? Can figure skating be analyzed mathematically? How do we quantify skill? This class examines a range of games where "strategy" largely boils down to the skill of the players.

Class 5 (4/6): Logic and Games

How can a computer be made to solve logic puzzles? How did a computer beat a world champion chess player? Are there more efficient ways to play a game? This class is an examination of the tools and techniques used in AI puzzle solvers.

Class 6 (4/20): Games on Screens

How do you balance difficulty with playability? How can you make a computer opponent seem intelligent? How do you build realistic worlds while keeping strategies fair? This class will look at the mathematics behind video games, ranging from damage equations to realistic AIs.

Class 7 (4/27): Bringing it all together

How do these different elements of strategy interact? In this final class, we'll tie together everything we've learned to examine some more complex games, ranging from board games to sports to just about any game at all.

EXPECTATIONS

This will be a fairly casual class, and will also involve a variety of mathematics you may not have seen, so feel free to ask questions at any time. This will also be a very interactive class, so be sure to come to class excited and ready to participate! I do, of course, ask that you remain respectful of me and your peers at all times. Please try to show up on time, and don't hold side conversations. And remember to play fairly, because strategy isn't always about winning!