

FSEM Midterm Exam Topic List

Here is a rough list of the topics which could appear on your midterm next Thursday. **DISCLAIMER:** This is meant to be a useful study aid, but I do not promise that it is absolutely exhaustive in every regard; i.e. it's possible that a question on the test could have a component which doesn't fit neatly into one of these categories.

Sections covered in Straffn: 1, 2, 3, 5 (sort of; Final Jeopardy! was very similar to Guerrillas and Missiles), 11.

- Know what a payoff matrix is for both zero-sum and nonzero-sum games

Zero-sum games:

- Know how to remove dominated strategies and look for saddle points in zero-sum games
- Know how to solve 2×2 , 2×3 , 2×4 , ... and 3×2 , 4×2 , ... zero-sum games by setting up variables for the likelihood of one player playing one of two strategies, graphing the expected payoffs of each of the opponent's counterstrategies, and using either the lowest point on the upper envelope or the highest point on the lower envelope to reduce to a 2×2 game. Know what the value of a game is and know that the solution to a game needs to include optimal mixed strategies for both players.
- Know how to solve 3×3 zero-sum games by using the method of equalizing expectations
- Know how to write down a payoff matrix for a game involving randomness by using expected payoffs, e.g. Final Jeopardy! or 1-card poker

Nonzero-sum games:

- Know how to find pure strategy Nash equilibria for nonzero-sum games by drawing the movement diagram
- Know how to find Pareto optimal outcomes for nonzero-sum games by drawing the payoff polygon
- Know what it means for a game to be solvable in the strict sense (SSS), and that this is the one situation where we say that a nonzero-sum game has an optimal strategy for both players
- Know how to find strategic moves for a player in a non-zero sum game, such as seizing the first move, making your opponent move first and threatening, or making your opponent move first and promising. Remember that it is never possible to force your opponent to take their WORST payoff via a strategic move.