

Midterm Review

- The midterm is Monday, November 15.
- You may bring one page of hand-written notes (both sides) to the exam if you wish. No calculators.
- If you must miss the midterm, please make arrangements in advance. If you are ill please contact me the morning of the exam, and I will also expect to see a Doctor's note.

The exam will again cover basic techniques and ideas of modeling, primarily the types of things seen on homeworks. Some of the things we've studied:

- Combinatorics and counting arguments
 - Counting number of possibilities for solution by enumeration,
 - Estimating complexity of an algorithm.
- Graph theory and network algorithms:
 - Setting up a simple model as a graph theory problem,
 - Dijkstra's algorithm for shortest path,
 - Branch and bound for the traveling salesman problem.
- Monte Carlo methods:
 - Use of random numbers in simulation,
 - Uniform, binomial and exponential distributions,
 - Poisson processes and Poisson distribution,
 - Interpretation of results from simulations, e.g. histograms.
- Markov chains and matrix iterations:
 - Defining a set of states and transition probabilities,
 - Determining transition matrix (or Leslie matrix),
 - Computation and use of eigenvalues and eigenvectors.
(Predicting growth, decay, steady states).
- Linear programming:
 - Formulating problems as linear programs,
 - Graphical solution of problems with 2 variables and several constraints
(Feasible set, level sets of objective function)
 - Graphical solution of integer programming problems with two variables.

Some sample problems from exams last year can be found on the Handouts webpage.