Math 347
Project 1: Airline Overbooking

Historically, airlines know that only a certain percentage of passengers who have made reservations on a particular flight will actually take that flight. Consequently, most airlines overbook–that is, they take more reservations than the capacity of the aircraft. Occasionally, more passengers will want to take a flight than the capacity of the plane leading to one or more passengers being bumped and thus unable to take the flight for which they had reservations. Airlines deal with bumped passengers in various ways. Some are given nothing, some are booked on later flights on other airlines, and some are given some kind of cash or airline ticket incentive.

Build a mathematical model that examines the effects that different overbooking schemes have on the revenue received by an airline company in order to find an optimal overbooking strategy, i.e., the number of people by which an airline should overbook a particular flight so that the company's revenue is maximized. Consider various alternatives for handling "bumped" passengers, and discuss their effect on the optimal strategy. You will likely determine that different strategies are optimal for different size plans, different trip lengths, etc. Additionally, write a short memorandum to the airline's CEO summarizing your findings and analysis (this should serve as the 1 page summary referred to in the project assignment).

Note: numerous references to the airline overbooking problem can be found online (by doing a Google search, for example), and I encourage you to read the ideas of others and incorporate those that you like and understand in your model. Just be sure to cite any ideas that aren't yours.

Additionally, feel free to simulate your model using either real (i.e. obtained from the airlines or other source) or synthetic (i.e. created by your team to simulate the model) data.