

## Homework 6

The practice midterm, and:

**Question 1:** Company  $I$  opens one restaurant and company  $II$  opens two. Each company decides in which of three locations each of its restaurants will be opened. The three locations are on the line, at Central and at Left and Right, with the distance between Left and Central, and between Central and Right, equal to half a mile. A customer is located at an unknown location according to a uniform random variable within one mile each way of Central (so that he is within one mile of Central, and has an even probability of appearing in any part of this two-mile stretch). He walks to whichever of Left, Central or Right is the nearest, and then into one of the restaurants there, chosen uniformly at random. The payoff to Company  $I$  is the probability that the customer visits a Company  $I$  restaurant.

Solve the game: that is, find its value, and some optimal mixed strategies for the companies.