15.094/SMA5223 Systems Optimization: Models and Computation

Facility Location Challenge

The Facility Location Problem (FLP) is a classic problem in discrete optimization. The setting is that there is a list of potential facility locations, but the facilities have not been built yet. There is a fixed cost for building each facility. The problem is to determine at which locations to build facilities, and to choose which customers get served by each facility (an assignment problem).

The demand that we have chosen for each city is proportional to the population of its state, and the fixed cost for erecting a facility is proportional to the median home price in that city. The distances between cities are used to determine the shipping costs.

In one type of FLP there is no constraint on the amount an individual facility can supply. The more difficult type is the capacitated facility location problem, where each facility can only handle a certain amount of demand. Both of these can be explored here.

For the exercise, all you need to do is choose the facility locations, which includes deciding how many facilities you want to build. The algorithm then solves the assignment problem. It is your job to optimally place facilities though!