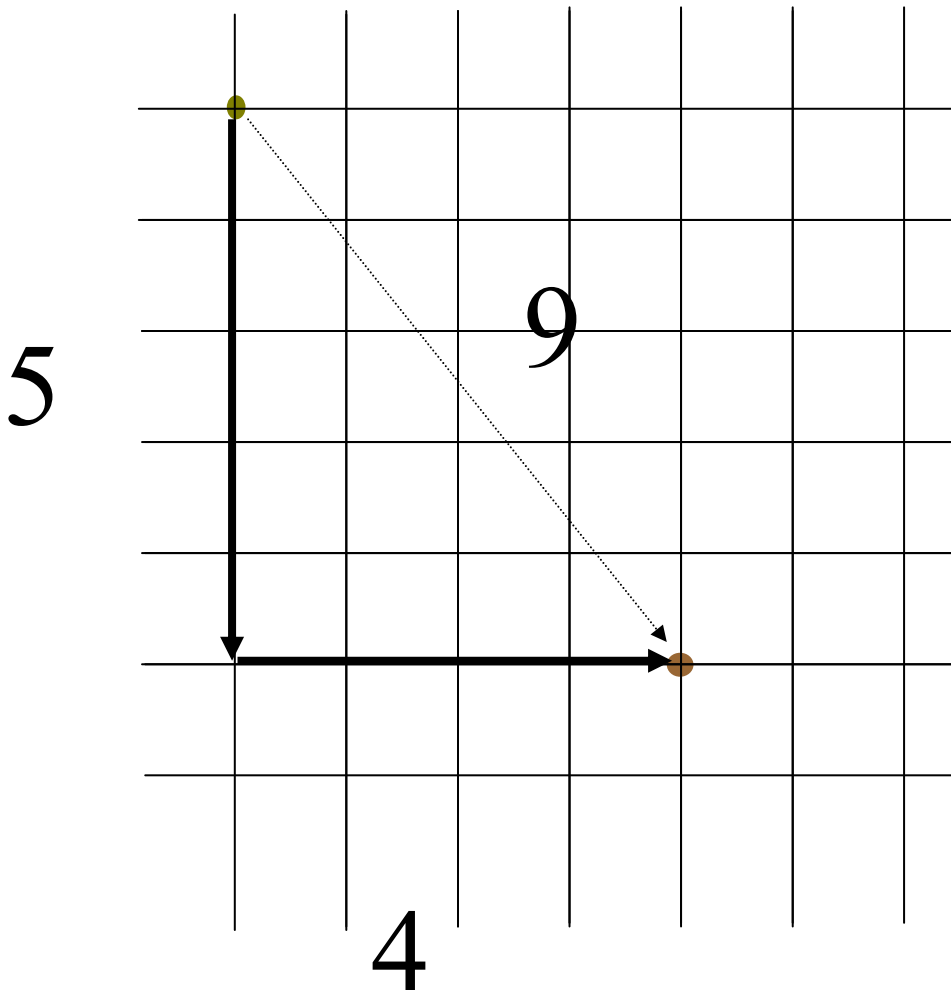


Challenge #3
15.057
Spring '03
Integer Programming Modeling

Square County, Kansas needs to locate a landfill within the county boundaries. Naturally every town in the county is up in arms about the possibility of having the site located nearby. Consequently, county administrators want to find a spot that is as far as possible from the nearest town. The administrators have decided to measure distance according to the Manhattan Metric (named after Manhattan, KS dontcha know) which defines the distance between two points as if we can only travel east-west or north-south as shown below.



The county is a perfect 10 mile by 10 mile square (hence the moniker). Denote the Southwest corner of the county by $(0, 0)$. Under this system, the towns are located at:

Town	East	North
1	9	9
2	9	3
3	8	6
4	3	9
5	0	6
6	4	2
7	4	0
8	2	0
9	0	9
10	5	2

So, for example, to get to Town 10 from the Southwest corner of the county, travel 5 miles due East and 2 miles due North (The county is small enough that we can safely ignore the curvature of the Earth).

Formulate a linear program in Excel and one in AMPL to help the county administrator find the ideal location for the landfill. The landfill need not be located at a grid crossing. It can be anywhere within the county boundaries. Turn in an Excel Spreadsheet with your self-documenting model and a text document with your AMPL model at the beginning of lecture #11.