Artificial Intelligence Assignment 1

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Problem 2

1.1   A

Suppose we have an n × n grid of points, where we'd like to place 4 arbitrary axis-aligned rectangles (i.e., the sides of the rectangle are parallel to the axes). Each corner of each rectangle must be one of the points in the grid, but otherwise there are no constraints on the location or size of the rectangles. For example, it is possible for all four corners of a single rectangle to be the same point (resulting in a rectangle of size 0) or for all 4 rectangles to be on top of each other. How many possible ways are there to place 4 rectangles on the grid? In general, we only care about asymptotic complexity, so give your answer in the form of O(n c) or O(c n) for some integer c. [NOTE: It is unnecessary to consider whether order matters in this problem, since we are asking for asymptotic complexity. You are free to assume either in your solution, as it doesn't change the final answer.] [What we expect: A big-O bound for the number of possible ways to place 4 rectangles and some simple explanation/reasoning for the answer (2 sentences).]

Solution:

There are n^2 possiblities to place a rectangle in a a grid of n*n to to get the possiblities for 2 rectangles there will be

$$n^2 * n^2$$

possiblities.