CS 4700: Foundations of Artificial Intelligence
More sample exam questions

1. Agents A and B are located in cells on an NxN grid. They both know where each of them is on the grid. They each have at most five actions they can take, UP, DOWN, LEFT, RIGHT, and STOP, where each action does what you would expect it to do. If any of these actions would cause them to hit a wall then that action is not permissible in that location. They need to wind up in the same location, they don't care where. They both take actions simultaneously – they do not alternate turns. The problem is to come up with a sequence of actions for the two agents that is as short as possible.
    a. How might you formulate this as a search problem?
    b. Give a (non-trivial) admissible heuristic for this problem.
    c. Which of the following are guaranteed to find a shortest solution?
        1. Depth-first search
        2. Breadth-first search
        3. Hillclimbing using an admissible heuristic
        4. A* with a heuristic that returns 0 for all states
2. There are 2^{2^n} distinct Boolean functions over n inputs. Thus, for example, there are 16 distinct Boolean functions over 2 inputs. How many of these 16 are representable by a perceptron?
3. Textbook:
    a. Exercise 18.16a
    b. Exercise 18.22a