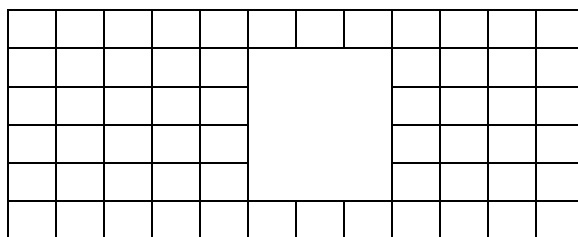


CS405 Mid-term Exam Spring 2004

Name: _____

You may use any resource (book, internet, notes, etc) as long as you complete this exam without help from anyone else. Turn in this exam at the beginning of class on Thursday March 11. If you are unsure how to proceed on a question, write down your assumptions and solve the problem based on those assumptions - you will be graded on your solution and how reasonable your assumptions were. Your grade will also be based on the efficiency of your solution. Each problem is worth 20 points. Good luck.

1. Given the “Egyptian Cat Salt and Pepper Shakers Maze” (attached), develop a problem representation (similar to page 62) to find a path from S to P. Discuss your state representation, how you encode the maze information, and how you will search for a solution. Draw the root node and the next two levels of your search tree. (See <http://www.amazingart.com/2amaze.html> for an on-line version).
2. Create a minimax search tree with 5 levels (root + 4 alternating moves), a branching factor of at least 3 at each level, and values for leaf nodes that will cause exactly half of the nodes to be pruned by the alpha-beta search algorithm given on page 170. Draw the entire tree and cross out the nodes that are pruned.
3. Given the following board, how many ways are there to place one each of the 12 pentominoes? If there are any solutions, give them all. Otherwise, state how you determined there is no solution and how confident you are of that conclusion.



4. You are tasked with improving Blondie24 to beat Chinook within 10 years. In other words, you need to use a neural network evaluation function and an evolutionary process to create a program that will get a higher checkers rating than Chinook. If you don't think it is possible, give your reasons. If you think it is possible, give your approach. Justify your answers – this is more important than your yes/no answer!
5. Describe your approach to create a world champion Boggle player (see attached rules).

