

Homework Assignment 3

(100 points)

Assigned Date: Thursday, October 29, 2009

Due Date: 4:00 PM Monday, November 16, 2009

Educational Goal

Become familiar with the simulated annealing algorithm, which is a local search algorithm of informed search.

Requirements

- Implement the 8-queens example (Lecture “Informed Search and Exploration Part II”, Slides 22, 23 and 24). You may use the same h function defined in Slide 24, or you invent your own objective function. The initial state should be generated randomly or accept a given input of the positions of 8 queens. The goal is to place 8 queens on a chessboard such that no queen attacks any other. A queen attacks any piece in the same row, column or diagonal. The successor function returns all the possible states generated by moving a single queen to another square in the same column (each state has $7 * 8 = 56$ successors).
- Solve the problem using the simulated annealing algorithm. Your program should output the initial state and the final goal state. Mark the location of the 8 queens using (col, row) coordinate. For example, the 8 queens positions in Slide 24 of “Informed Search and Exploration Part II” are (1,5), (2,6), (3,7), (4,4), (5,5), (6,6), (7,7), (8,6).
- Your program should be able to accept two different inputs:
 - 1) A random initial state generated by the program itself
 - 2) A given initial state provided by your TA. Your program should allow the TA enters the (col, row) positions of 8 queens.
- Write a report no less than 200 words to discuss the design of the algorithm. For example, the design of the schedule and iteration times, interesting experiences or lessons learned in this assignment, etc.

Submission Requirements

1. Follow the language requirements for programming assignments posted at http://www.cs.umb.edu/~ding/classes/470_670/student.htm
2. Your program should be well-documented. Variable names and function names should be self-descriptive. Major functions should be explained clearly in comments.

3. Turn in the paper copy and soft copy of all the files **including your program code and results of at least one successful run**. Submit a **single zipped file** of all the files of this assignment through your UMassOnline account at <http://boston.umassonline.net/index.cfm>. Submit the paper copy along with the cover page in class. Paper copy should be bound firmly together as one pack (for example, staple, but not limited to, at the left corner). 5 points will be deducted for unbounded homework.
4. Name your file with AI_ lastname_ firstname_ hw3. For example, student John Smith should name his file as AI_Smith_John_hw3.zip.
5. No hard copies or soft copies results in 0 points.