

CS 380: Artificial Intelligence

Assignment 1

Written Problems (5 points)

1: Watson (2 points)

Read this article (http://www.economist.com/blogs/babbage/2011/02/artificial_intelligence) published by The Economist on IBM's Watson system. Then, answer the following questions:

- Other than Jeopardy, do you see other application domains for Watson?
- Chess is considered a game for intellectuals, while Jeopardy is a game for the masses. Why do you think then that it's harder to create an AI system that plays Jeopardy than to create a system that plays Chess?
- You sure have seen this XKCD entry <http://xkcd.com/1002/>. Is there any game there that you consider out of place?

2: Problem Definition (3 points)

Write a formal specification of the following problems as we did in class (PEAS: performance measure, environment, actions, and sensors). Be as explicit as possible, providing a specific data representation for the states and actions and showing how the results of applying an action to a state are determined. **You do not need to specify an algorithm for solving the problem; possible algorithms for choosing between applicable actions will be covered later:**

- **Small Towers of Hanoi:** there are three vertical rods (R1, R2, R3) and three disks (D1, D2, D3). Each disk has a hole in the center so that it can slide into any of the three rods. Disk D1 is small, disk D2 is medium-sized, and disk D3 is large. Initially, all three disks are stacked on rod R1, with the largest at the bottom and the smallest at the top. The goal is to move all the disks to another rod, with the following rules: 1) only one disk can be moved at a time, 2) each move consists of taking the upper disk at one rod, and sliding it onto another rod, placing it on top of any disk already present in that rod, 3) No disk may be placed on top of a smaller disk. (see Wikipedia for more info on the Towers of Hanoi, if necessary)
- **Pac-Man:** we all know the game of Pac-Man. For this exercise, consider a simplified version of Pac-Man, where the map is a rectangular grid. At each position of the map, there might be a wall, a pellet (that Pac-Man has to eat), Pac-Man, or nothing. There are no ghosts, fruits, or other power-ups. At each time step, Pac-Man moves one cell up, down, left, or right; the game ends when Pac-Man eats all the pellets.

What to Submit

All homework for this course must be submitted electronically using Blackboard. Do not e-mail your assignment to a TA or Instructor! If you are having difficulty with your Blackboard account, you are responsible for resolving these problems with a TA, an instructor, or someone from IRT, before the assignment is due.

For this assignment, you must submit a PDF document with your answers to the "Written problems" (please do **NOT** submit a Microsoft Word, OpenOffice document, Pages, or any other format that is not a PDF, points will be deducted if you do so!).