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CS440 Intro to AI – Assignment 3

1. Done
2. Done
3. Done

4.

- Let p(x) be the probability of an adversary piece or pit in the cell
- Give the cell a value:
  1*p(winsAgainst) + -1*p(losesAgainst) + -0.5*p(bothDie) + -1*p(pit)
- When comparing cells, whichever cell has the greater of the value calculated above is the better move.

Example:

- Let pW, pH, pM, pP be the probability that the cell contains an adversary Wumpus, Hero, Mage, or Pit
- Suppose we are considering possible moves of an Agent Wumpus.

  Suppose the possible moves are to:
  Cell 1: pW=0.01, pH=0.02, pM=0.03, pP=0.04
  Cell 2: pW=0.01, pH=0.02, pM=0.20, pP=0.04

  Calculating the values to Cell 1 and Cell 2:
  Cell 1 value = -0.5*0.01 + -1*0.02 + 1*0.03 + -1*0.04 = -0.035
  Cell 2 value = -0.5*0.01 + -1*0.02 + 1*0.10 + -1*0.04 = 0.135

  Since Cell 2 value is greater than Cell 1 value, Cell 2 would be a better move than cell 1.

5. Similar to how the agent would calculate the better move using the above method described in question 4, the agent can assume the adversary is also using this method to decide the better moves. The better moves would be given a higher probability and the worser moves would be given a lower probability.

   Example:

   - Suppose we are considering possible moves of an Adversary Wumpus

     Suppose the possible moves are
     Cell 1: pW = 0.0, pH = 0.8 pM = 0.2, value = -0.6 (worst)
     Cell 2: pW = 0.0, pH = 0.2, pM = 0.8, value = 0.6 (best)
     Cell 3: pW = 0.2, pH = 0.1, pM = 0.7, value = 0.5

     Instead of assuming the adversary has an equal probability of choosing each cell, we can assume the adversary will choose the best move (100% choose Cell 2) or will choose the

better moves with a higher probability (ex. 60% chance of choosing Cell 1, 30% chance of choosing Cell 2, 10% of choosing cell 3)

6. Done