Homework #1

Due Apr 12 by 11:59pm **Points** 20 **Submitting** a file upload
Available Apr 5 at 12am - Apr 14 at 11:59pm

This assignment was locked Apr 14 at 11:59pm.

1. (10 points) Experiment with **ChatGPT (https://chat.openai.com/chat)** to answer the following questions. Give examples to justify your answers. How close does it come to the level of intelligence of ordinary humans? Are there places where it seems to exceed average human intelligence? Where does it fall short? Do you think that ChatGPT-like approach would lead to a program that passes the Turing Test in the next 5 years? Why or whynot?

2. (5 points) Design a simple reflex agent program and a model-based reflex agent program for a vacuum cleaner agent that lives in an N-room corridor. Each cell that has dirt costs 5 units in each step. Initially all cells are dirty. The agent can be any cell when it starts. It can only perceive whether there is dirt in its current cell or not and does not know where it is. It has the following set of actions: Move-Left, Move-Right, Suck, Halt. Nothing happens if the agent executes Move-Left from the leftmost cell, Move-right from the rightmost cell, or Suck in a clean cell. Otherwise the actions are successful. In either case, each action costs 1 unit. Assume that a cell which has been cleaned remains clean.

Represent each agent as a decision list of rules of the form: *If* <*condition*> *Then* <*action*>. At every time step, the <*condition*>s of the rules are tested from the first rule the list to the last rule. The first rule whose <*condition*> is satisfied "fires", i.e., its corresponding <*action*> is executed.

Note that the <*condition*> is based only on current percept for the simple reflex agent. For the model-based reflex agent, it can also be based on a small number (2-3) bits of memory derived from the percept history of the agent. Describe what the bits represent in English and how and when they are updated. The <*condition*>s in the rules can combine memory bits and current percept using ANDs.

What is the expected behavior of your agents in this environment for different starting locations of the agent? Write a mathematical function for the total cost incurred by each of your agents as a function of time *t,* the size of the environment *N,* and the starting location of the agent *x*.

3. (5 points) For each of the following activities, characterize the environment in terms of the properties we discussed in the class.

- Playing the game of Go
- Solving Sudoku
- Shopping for used books on the Internet
- Solving jigsaw puzzles
- Scheduling a meeting