STS 350

Exam #2

Name _____

Friday, March 23
100 pts.

Good Old Fashioned AI

Symbolic AI, or good old-fashioned AI (GOFAI) is characterized by the commitment to the physical symbol system hypothesis (PSSH). Please look at the problem on the next page before proceeding.

1. (5 pts.) What is a physical symbol system (formal definition)?

2. (5 pts.) State the physical symbol system hypothesis (formally)

3. (The physical symbol system hypothesis, continued - 15 pts)

Explain the physical symbol system hypothesis (including an explanation of a physical symbol system) to an intelligent colleague who has not taken the class.

(GOF)AI = KR (knowledge representation) + Search. Newell and Simon remark on the importance of heuristic search in their Turing award paper.

We begin by recalling some definitions:

4. (5 pts. each) Give brief definitions of each of the following terms related to using search in problem-solving. It might help to use one of our examples (for example, the wine-pouring puzzle) for illustrations, but please give general definitions.

state

operator

precondition

(problem 4 continued)

postcondition

heuristic

script (as we have discussed it in class)

isa hierarchy

Search can be divided into **uninformed** search and **informed** (heuristic) search. Uninformed search generally comes in two varieties: depth-first and breadth-first search.

5. (15 pts.) You are lost in a maze with a bit of string and chalk (both provided so that you can find your way back and so that you can mark directions you have taken). Give a brief description of depth-first search, and say how it would apply to your efforts to find your way out.

6. (5 pts. - continuation of the previous problem) You remember that you once heard that in a maze you should always keep to one side (left or right), and that you have a better chance of more quickly finding your way out of the maze. What sort of tool is this?

On the second level of Marr's three levels of explanation of an information processing system, we have algorithms and representations. In symbolic AI, representations are in the form of knowledge representation schemes.

7. (10 pts.) What is a basic slot and filler structure (some examples are records, frames, and scripts). As a part of your answer, briefly describe a slot and filler structure to describe a CD in your music collection.

8. (10 pts.) Briefly describe how knowledge can be stored in productions (rules, condition-action pairs). As an example: you decide to have a meal. What conditions would cause that decision? What (briefly) actions would you want as a result of those conditions? (just doing the example is not a complete answer)