

CSC 425/525 Homework #1 (Chapter 1, Part II (pages 35-44) and Chapter 2)
Due: Wednesday, January 25

Word process your answers (your answer to #4 can be hand drawn). Undergraduates answer either question 1 or 2, question 4, question 6 and two others. Graduate students answer all seven questions.

1. Compare a computer to a physical symbol system. What are the symbols that the computer uses? What types of expressions do we use made out of those symbols? What are the processes that the computer uses to manipulate those symbols?
2. The Chinese Room Problem points out an interesting problem. Externally, some entity might seem intelligent because it responds intelligently (e.g., can answer questions as you would expect an intelligent entity to) but internally it may not understand any of the symbols it is manipulating. With this said, do you feel the Turing Test is a useful way to gauge intelligence? Should it be used to gauge artificial intelligence or should we have a better test? If the latter, provide an example of a test you would like to devise.
3. Compute the total number of states that would make up the tic-tac-toe search space. Remember that each square of the tic-tac-toe grid will either be empty, an 'X' or an 'O' and that you will either have the same number of 'X's and 'O's or one extra 'X' (since 'X' goes first). Redo your computation assume a 4x4 tic-tac-toe grid instead of a 3x3 grid.
4. Examine the state space for automotive diagnosis given in figure II.7 (page 43). This is also known as a decision tree. Each square node represents a question and the edges coming from the node are the possible answers. Leaf nodes are solutions (in this case, diagnoses of auto problems). Come up with a similar state space/decision tree for helping a student decide whether he or she would be better off studying computer science, English, accounting, marketing, nursing or mathematics.
5. The blocks world example in section 2.2.3 (pages 60-62) only uses square blocks. Assume that a block can be square, rectangular, pyramidal or round. Two square or pyramidal blocks can sit on top of a rectangular block or one pyramidal or rectangular block can sit on top of a rectangular block. No block can sit on a pyramidal or round block and round blocks cannot sit on any block. Provide rules (such as the "clear" rule on page 61) that given two blocks, A and B, whether A can sit on B, and whether two blocks, A and B, can sit on a block C.
6. Given the following information
 - a. rewrite each term in predicate calculus form
 - b. of the three students listed, prove who can get a high paying job (prove it)
 - data science majors study data mining
 - data science majors study machine learning
 - data science majors study statistics
 - if you do not like a topic, you should not study a major that requires it
 - if you cannot pass a course of an area of study in your major, you must change majors
 - Carol does not like statistics

- Jeff and Bob both took the artificial intelligence course
 - Jeff cannot pass machine learning
 - Carol, Jeff and Bob are all data science majors
 - Carol and Bob both do well in all of their course work (this means they do not fail any courses)
 - a student who is a data science major who does well in his/her coursework and takes the artificial intelligence course will receive a high paying job
7. Using the financial advisor knowledge shown in section 2.4 (pages 73-76), answer the following questions.
- a. Ruth has an unsteady income of \$25,000, \$10,000 in her savings account, and 1 dependent. What investment should she make?
 - b. Ian has an steady income of \$30,000, \$15000 in his savings account, and 5 dependents. What investment should he make?