SCXT 350

Exam #1

Name _____

Friday, February 18
100 pts.

The story so far.

A central commitment of Cognitive Science is to the idea that intelligent activity, language, cognition, perception and the like is computational or algorithmetic in nature.

1. (10 pts.) Give a definition of an **algorithm** together with an example.

2. (10 pts.) Descartes expressed the opinion that we would never be fooled into thinking that an automaton is human, even if it had the outward appearance of a person and was able to walk around and move like one. How (in Descartes' view) could we tell the difference?

The conversation now shifts, many years later, to Turing, who considered the question "Can machines think?" and proposed what is now known as the Turing Test.

3. (10 pts.) Give a description of the Turing test as Turing proposed it. It might help to draw a diagram.

4. (5 pts.) In his paper, Turing proposed several objections that could be raised to his thesis that machines could be capable of intelligent action, and gave responses to those objections. List two of these objections and Turing's reply to them.

Back to computers and algorithms for a bit.

5. (10 pts.) In his paper, Turing describes a computer as an example of a "discrete state machine". Explain what is meant by this.

6. (15 pts.) To understand what computable might mean, we need some examples. We begin with the notion of a computer. In talking about computers, we sketched an "architectural view" of a computer, labeling an ALU, control unit, memory, input-output, and long-term storage. Reproduce that sketch, and give brief definitions of the control unit, ALU, and memory. A full credit response would do more than simply saying what the letters in ALU stand for.

7. (10 pts.) In exploring the idea of a computer further, we listed five things that a computer could do. List these, with brief explanations.

8. (5 pts. each). Finally, in order to understand what computers can and can not do, it is important to learn something of a programming language. Please answer the following questions in LISP:

   a. Write the expression (3*2) + (7*6) in LISP

(continued on next page)

(continuation of problem 8)

Without using first, second, third, etc., write expressions which will retrieve

b, The first item in the list **lst**

c. The second item in the list **lst**

d. Using **defun**, write a function **my-second** (without using the built-in **second** function) which will take a list and return the second item in the list. For example (my-second '(a b c d)) should return **b**.

9. (10 pts.) Finally, David Marr proposed that if we want to give a complete explanation of an information processing entity, we need to provide an explanation of it on three different levels. List, and briefly describe, Marr's three levels of explanation.