UVA WELLASSA UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY

END SEMESTER EXAMINATION – SEMESTER I – 2008/2009

CST307-3 INTELIGENT SYSTEMS

Time Allowed: 3 Hours

This paper has two parts, Answer four questions from part I and all questions from part II. All questions carry equal marks

Q1.

Briefly describe

i. The Turing Test.
ii. The Chinese Room Experiment.
iii. The four main approaches (schools of thought) pursued by AI researchers in the field of Intelligent Systems
iv. The main difference between the weak AI philosophy and the strong AI philosophy
v. The famous 2 experiments used to promote the ideas of strong AI and weak AI respectively.

Q1.

i. Name the experiment that was used to promote the idea of strong AI.
ii. Name the experiment that promotes the idea of weak AI.
iii. Name the 5 types of environment pairs an agent can operate in.
iv. Consider an expert system involved in medical diagnosis. Define the environment of this application using its variables.
v. Name the 3 basic components of an expert system.

Q2.

i. Do you agree with the Chinese Room argument that even if a computer (program) passes the Turing Test, it does not prove that the computer is intelligent? State and justify your reasons.
ii. If you are a software developer, when would you consider applying Expert Systems Technology to solve a problem you face?
iii. Draw a diagram of the main components of an expert system, indicating which of them compose the shell.
iv. List the possible representation mechanisms for the knowledge base component of an expert system.

Q3.

i. Convert the following knowledge facts into predicate logic sentences.
   - Abhaya and Dishna are married.
   - Bimal and Chintha are siblings. (i.e. bother and sister)
   - Chintha's mother is Dishna.
   - Abhaya's son is Bimal.

ii. Try to figure what basic AI processes would be involved in the following:

- Translating English sentences into, say, Japanese.
- Teaching a child to subtract integers.
- Solving a crossword puzzle.

iii. Outline the different types of knowledge defined in AI giving an application area wherever possible.

iv. Can a chess playing program which always wins, be regarded as an ideal rational agent? Justify your answer.

v. There is a Neural network (MLP) with 26-50-5 nodes (26 input nodes, 50 hidden nodes and 5 output nodes) and also trained to an application for classification. What will happen to the **trained** MLP, if removes 2 hidden nodes from it?

Q4.

i. What is the search mechanism used in Prolog?

ii. Represent the following statements in Prolog.
   - 12 is an integer.
   - If a number is an integer and positive it is called a positive integer.
   - Some one is an ancestor if he or she is either a parent or a parental predecessor.

iii. Consider the following Prolog code fragment.

```
modulex([],L,L).
modulex([H|T],L2,[H|Y]) :- modulex(T,L2,Y).
```

What will be the output produced for the following input?

Q : modulex([a,b,c,d],[e,f,g,h],X).

iv. Suppose a robot is about to enter a maze about which it has no information. The robot has the goal of finding the EXIT of the maze starting from the ENTRANCE with minimum effort. What is the best searching technique the robot should utilize if it wants to save fuel? Justify your answer.

v. Express the three following logic expressions in natural language.
   a. $\exists X(\text{student}(X) \rightarrow \sim \text{bright}(X))$
   b. $\forall X(\text{human}(X) \wedge (\text{male}(X) \vee \text{female}(X)))$
   c. $[\forall X(\text{god}(Y) \wedge \text{loves}(Y,X))] \wedge [\exists X(\text{god}(Y) \wedge \sim \text{loves}(X,Y))]$