



EASTERN UNIVERSITY, SRI LANKA

DEPARTMENT OF MATHEMATICS

EXTERNAL DEGREE EXAMINATION IN SCIENCE-2005/2006

THIRD YEAR FIRST SEMESTER (MARCH/MAY-2010)

EXTCS 304 – ARTIFICIAL INTELLIGENCE

Answer all question

Time allowed: 02 Hours

1.

i. Explain rational agent in AI?

(10 Marks)

ii. What is Turing test?

(10 Marks)

iii. Design a suitable representation and draw the complete search tree for the following problem:

A farmer is on one side of a river and wishes to cross the river with a wolf, a chicken, and a bag of grain. He can take only one item at a time in his boat with him. He can't leave the chicken alone with the grain; it will eat the grain. He can't leave the wolf alone with the chicken; the wolf will eat the chicken.

How does he get all three safely across the river?

Note: omits cycles and repeated states

(60 Marks)

iv. What do you mean by "Describe and match method"? Explain with example.

(20 Marks)

- iii. To get from a random start state to the goal state, illustrate the way in which heuristics are developed. (40 M)
- iv. What do you mean by relaxing the problem? (20 M)
- v. What is the simplest method for identifying the optimal path? Explain. (15 M)
- vi. Give Three (03) sophisticated techniques for identifying optimal paths. (05 M)

2.

i. In which situations hill climbing can be fooled? Explain it.

(20 Marks)

ii. The puzzle consists of a 3×3 grid, with the numbers 0 through 7 on tiles within the grid and one blank square. Tiles can be slid about within the grid, but a tile can only be moved into the empty square if it is adjacent to the empty square. The start state of the puzzle is a random configuration, and the goal state is as shown in the second picture of the Figure, below:

5	7	2
3		4
0	6	1

Start State

0	1	2
3	4	5
6	7	

Goal State

iii. To get from a random start state to the goal state, illustrate the way in which heuristics are developed.

(40 Marks)

iv. What do you mean by relaxing the problem?

(20 Marks)

v. What is the simplest method for identifying the optimal path? Explain.

(15 Marks)

vi. Give Three (03) sophisticated techniques for identifying optimal paths.

(05 Marks)

3.

Consider the following classroom scheduling problem:

There are 4 classes, C1, C2, C3, and C4, and 3 class rooms, R1, R2, and R3. The following table shows the class schedule:

Class	Time
C1	8 am - 10.30 am
C2	9 am - 11.30 am
C3	10 am - 12.30 am
C4	11 am - 1.30 am

In addition, the following restrictions apply:

- Each class must use one of the 3 rooms, R1, R2, R3.
- R3 is too small for C3.
- R2 and R3 are too small for C4.

One way of formulating this problem as a constraint satisfaction problem is to let each class, C1, ..., C4, be a variable, and each room, R1, R2, R3, be the possible values for these variables.

- Show the initial possible values for each variable, C1, ..., C4, given the Restrictions above.
- Express formally all the constraints in this problem.
- Identify and develop a solution method for this.
- Explain A* algorithm.

(4 X 25 Marks)

4.

i. Translate the following sentences into logical statements, using either propositional or predicate logic as appropriate:

a. The best score in History is better than the best score in Biology

(10 Marks)

b. Politicians can fool some of the people all the time, and they can fool all the people some of the time, but they can't fool all the people all the time.

(20 Marks)

ii. Explain the following

a. Goal-driven Search

b. Data-driven search

c. Brute-force search

d. Properties of search methods.

e. Compare Breath First Search(BFS) and Depth First Search(DFS)

(5 * 14 Marks)