

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS:M.Tech
BRANCH:CSE**

**SEMESTER : II
SESSION : SP/22**

SUBJECT: CS512 ARTIFICIAL INTELLIGENCE

TIME: 2 Hrs

FULL MARKS:50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Candidates need to attempt all 5 questions maximum of 50 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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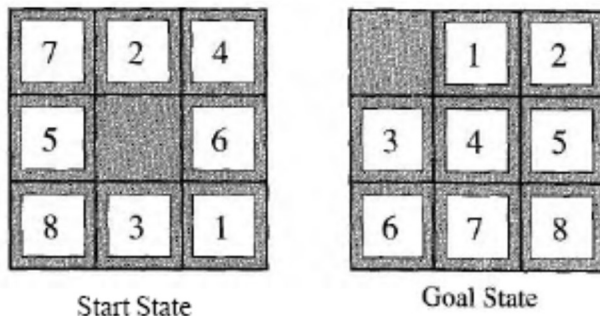
- Q.1(a) Differentiate between Goal based and utility-based agents with suitable example. [5]
- Q.1(b) Three missionaries and three cannibals are on one side of a river, along with a boat that can hold one or two people. Find a way to get everyone to the other side, without ever leaving a group of missionaries in one place outnumbered by the cannibals in that place. [5]

Assumptions:

- (i). Number of trips is not restricted
- (ii). Both the missionary and cannibal can row the boat

Generate the production system and find out which rules are used successively to achieve the goal.

- Q.2(a) [5]



For the above 8 puzzle problem the initial state and final state is given. Using sliding to legal movements, find the shortest solution (3 steps) using Best First and A* heuristic function that never overestimates the number of steps to the goal.

The legal moves can be that result from trying the four actions (blank moves Left, Right, Up, or Down). Also state the basis of movements in the search space to reach the goal state.

- Q.2(b) Write the Minimax algorithm and show the branching through suitable example. [5]

- Q.3(a) What is Forward Versus Backward Reasoning? Discuss with the help of examples. [5]

- Q.3(b) Consider the following set of facts: [5]

- (i) John likes all kind of foods.
- (ii) Apples are food.
- (iii) Chicken is food.
- (iv) Anything anyone eats and isn't killed by is food.
- (v) Bill eats peanuts and still alive.
- (vi) Sue eats everything Bill eats.

Prove John like peanuts using backward chaining.

Q.4(a) Explain how Bayesian Probabilistic Inference and Dempster-Shafer theory is used in uncertainty. [5]

Q.4(b) Consider the following facts: [5]

- (i) Most things do not fly
- (ii) Most birds do fly, unless they are too young or dead or have broken wing
- (iii) Penguins and Ostriches do not fly
- (iv) Magical Ostriches fly
- (v) Tweety is a bird
- (vi) Chirpy is either a Penguin or an Ostrich
- (vii) Feathers is a magical Ostrich

Use Non-monotonic reasoning and show the Truth Maintenance System to answer

(l) Does Chirpy fly?

Q.5(a) Differentiate Syntactic Processing, Semantic Analysis of NLP with suitable example. [5]

Q.5(b) Differentiate Discourse & Pragmatic Processing of NLP with suitable example. [5]

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