

Department of Computer Science  
M.Sc. Mid-Term Examination 2017-18  
Paper Code: CS-208  
Max. Marks:20  
Paper Title: Artificial Intelligence  
Time: 1 hour

Note : Attempt all questions

- 1 Mention any four properties of searching techniques. 2
- 2 What is State Space Search Technique? How does it facilitate in solving AI Problem? 2
- 3 Why A\* algorithm is not sufficient for searching the AND-OR graphs 2
- 4 Explain the Minimax Algorithm with a suitable example 3
- 5 For the Missionaries and Cannibals problem 6
  - (i) Give a good state space representation
  - (ii) Write down the production rules
  - (iii) Analyze the problem with respect seven AI problem characteristics
  - (iv) Generate the partial game tree up to three levels
- 6 Explain A\* algorithm 5

Department of Computer Science  
MCA/M.Sc. Mid-Semester Examination 2018-19  
Paper Code: CS-208  
Max. Marks:20  
Paper Title: Artificial Intelligence  
Time: 1 hour

Note : Attempt all questions

- 1 (i) What is State Space Search Technique? 4
  - (ii) How can a problem state be efficiently represented?
  - (iii) How does this technique facilitate in solving AI Problem? 3
- 2 Briefly discuss about the properties of searching Methods. 5
- 3 Explain the seven AI problem characteristics with suitable examples 5
- 4 For the Missionaries and cannibals problem
  - (i) Give a good state space representation
  - (ii) Write down the production rules
  - (iii) Generate the partial game tree up to 9 levels
- 5 Discuss about the classes of problem that hill climbing may fail to find a solution 3

Department of Computer Science  
M.Sc./MCA Mid-Term Examination 2019-20

Paper Code: CS-208  
Max. Marks:20

Paper Title: *Artificial Intelligence*  
Time: 1 hour

Note : Attempt all questions

- |   |   |   |
|---|---|---|
| 1 | Why A* algorithm is not sufficient for searching the AND-OR graphs      | 2 |
| 2 | Explain the Minimax Algorithm with a suitable example                   | 6 |
| 3 | For the water jug problem   | 6 |
|   | (i) Give a good state space representation                              |   |
|   | (ii) Write down the production rules                                    |   |
|   | (iii) Analyze the problem with respect seven AI problem characteristics |   |
|   | (iv) Generate the partial game tree up to five levels                   |   |
| 4 | Explain AO* algorithm   | 6 |

14/02/2017

Roll No. 16419 CMP026

## M.Sc. Semester I Examination 2016-17

### Computer Science

Paper: CS-208 (Artificial Intelligence)

Time: Three Hours

Full Marks: 70

Note: Attempt Five questions including Question Number I, which is compulsory.

1. Consider the following problem.

A farmer wants to get a lion, a fox, a goose and some corn across a river. There is a boat, but the farmer can only take one passenger in addition to himself on each trip, or else both the goose and the corn, or both the fox and corn. The corn cannot be left with the goose because the goose will eat the corn; the fox cannot be left with the goose because the fox will eat the goose; and the lion cannot be left with the fox because the lion will eat the fox. How does everything get across the river? Assume animals do not wander off when left alone.

- (a) Design a suitable state space representation. 3
- (b) Write down all possible production rules. 6
- (c) Analyze this problem with respect to AI problem characteristics. 7
- (d) Draw the first three levels of the search graph. 4
- (e) What is the average branching factor for two levels? Disregard branches back to previous states. 2

- 2 a) Explain the Hill climbing procedure 4
- b) How the Hill Climbing Procedure can be fooled by foothills, plateaus and ridges? Explain with illustrations. 6
- c) Explain any four important properties to evaluate search methods. 2

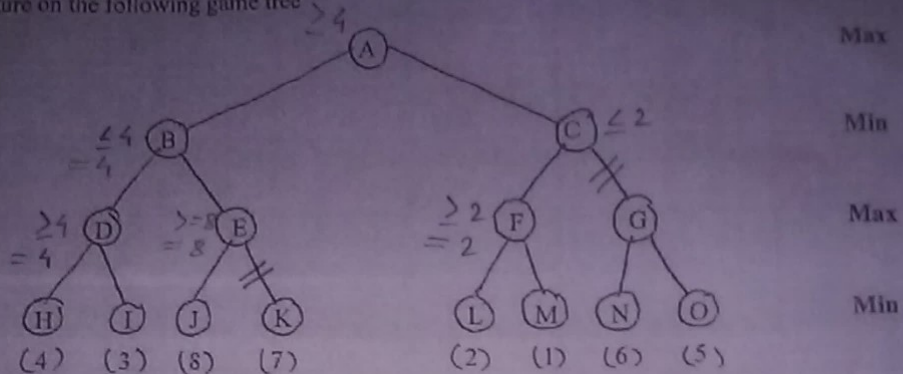
- 3 a) Explain the A\* algorithm 4
- b) Why A\* algorithm is not sufficient to search the AND-OR graph? 2
- c) Generate search tree by applying A\* algorithm using the most informed heuristic evaluation function of your choice for eight-puzzle problem with following starting state. 6

2	8	3
1	6	4
7	5	5

P.T.O.



4. a) Explain with illustration how the Problem Reduction approach can be used to find winning strategy for two players' game. 4
- b) Explain alpha-beta pruning and show the steps that would be taken in running the procedure on the following game tree 8



5. d) Explain the steps involved in converting WFF into Clause form. 4
- e) Explain the algorithm for unifying two predicate literals with suitable examples. 6
- f) Consider the following set of statements:
- Steve only likes easy courses
  - Science courses are hard
  - All the courses in the basket weaving department are easy
  - BK301 is a basket weaving course

Use resolution to answer the question, "What course would Steve like?" 2

6. Write Short Notes on any three of the followings 3x4=12
- Frames and Semantic Net
  - Constraint Satisfaction Algorithm
  - Architecture of Expert System
  - Intelligent Agent

-X-

Roll No. 18419CMP003**M.C.A(Semester III) / M.Sc.(Semester I) Examination 2018-19****Computer Application/Computer Science****Paper: CS-208 (Artificial Intelligence)****Full Marks: 70****Time: Three Hours****Note: Attempt the five questions including the Question No.1 which is compulsory.**

Consider the following problem:

A farmer wants to get a lion, a fox, a goose and some corn across a river. There is a boat, but the farmer can only take one passenger in addition to himself on each trip, or else both the goose and the corn, or both the fox and corn, or both the fox and corn. The corn cannot be left with the goose because the goose will eat the corn; the fox cannot be left with the goose because the fox will eat the goose; and the lion cannot be left with the fox because the lion will eat the fox. How does everything get across the river? Assume animals do not wander off when left alone.

(a) Design a suitable state space representation. 3

(b) Write down all possible production rules. 6

(c) Analyze this problem with respect to AI problem characteristics. 7

(d) Draw the first two level of the search graph. That's two besides the starting state 4

(e) What is the average branching factor for these two levels? Disregard branches back to previous states. 2

2/10 a) Explain AO\* algorithm 6

b) Provide definition of the word "heuristic" In what ways can heuristic be useful in search? 2

c) Explain the difference and similarities between depth-first search and breadth-first search. Give examples of the kinds of problems where each would be appropriate. 4

3/ a) Explain with illustration how the problem reduction approach can be used find winning strategy for two players' game. 5

b) Explain minimax algorithm with suitable illustration. 7

X a) Explain the steps involved in converting WFF into Clause form with an example. 8

b) What do you mean by proof by refutation? Explain the steps involved in resolution proof. 4

5/ a) What are all the rules for unifying two predicate literals? And explain the Unification Algorithm. 8

b) Consider the following set of statements:

i. Some children will eat any food

ii. No children will eat food that is green

iii. All children like food made by cadbury's

Prove the following by using resolution procedure

"No food made by Cadbury's is green". 4

6/ Write Short Notes on any two of the followings 2x6=12

a) Frames and scripts

b) Constraint Satisfaction Algorithm

c) History and foundation of Artificial intelligence

d) Expert System



M.C.A (Semester III) / M.Sc.(Semester I) Examination 2019-20

Computer Application/Computer Science

Paper: CS-208 (Artificial Intelligence)

Time: Three Hours

Full Marks: 70

Note: Attempt the five questions including the Question No.1 which is compulsory.

1. Consider the following problem:

Somewhere near Hanoi there is a monastery whose monks devote their lives to a very important task. In their courtyard are three tall posts. On these posts there is a set of sixty-four disks, each with a hole in the center and each of a different radius. When the monastery was established, all of the disks were on one of the posts, each disk resting one just larger than it. The monks' task is to move all of the disks to one of the other two posts. Only one disk may be moved at a time, and all the other disks must be on one of the pegs. In addition, at no time during the process may a disk be placed on top of a smaller disk. The third peg can, of course be used as a temporary resting place for the disks.

- Analyze this problem with respect to AI problem characteristics
- Give a good representation of the problem state.
- Give the operators.
- Draw the first four levels of the search graph besides the starting state and assume that the number of disks is three.
- What is the average branching factor for these four levels? Disregard branches back to previous states.

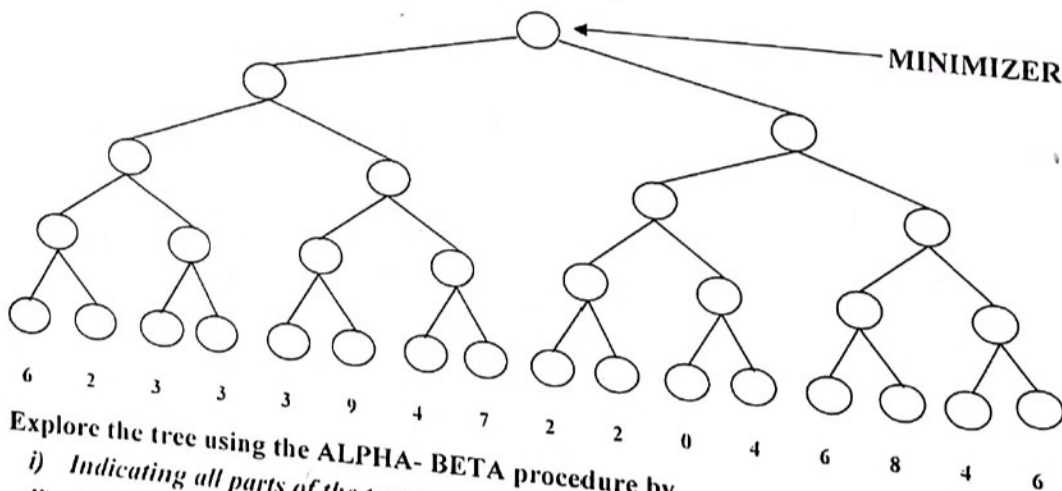
7  
3  
4  
4  
4

2. a) Describe the A\* search algorithm.  
b) Explain how does A\* search algorithm works through an example with a heuristic function of your choice.

6  
6

3. a) Explain the ALPHA-BETA procedure.  
b) Consider the game tree given below;

5  
7



Explore the tree using the ALPHA- BETA procedure by

- Indicating all parts of the tree that are cut off.
- Indicating the winning path or paths.
- Striking out all static values that do not need to be computed.

P.T.O.

- ✓ a) Explain the resolution procedure in proposition logic with an illustrative example. 6
- b) Explain the steps involved in converting WFF into Clause form. 6
- 5 a) Explain the Unification Algorithm with suitable examples. 7
- b) Consider the following set of statements:
- i. *Steve only likes easy course*
  - ii. *Science courses are hard*
  - iii. *All the courses in the basketweaving department are easy*
  - iv. *BK301 is a basketweaving course.*
- 5
- Use resolution to answer the question, "What course would Steve like?"
6. Write Short Notes on any two of the following: 2x6=12
- a) Frames and Conceptual Dependency.
  - b) What are foothill, plateau and ridge problems? And give some ways of dealing with these problems.
  - c) AND-OR graph and Computational predicates.
  - d) Expert System.

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