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Enrol. No. .....

CSE401

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END SEMESTER EXAMINATION : NOV. – DEC., 2017

ARTIFICIAL INTELLIGENCE

Time : 3 Hrs. *Maximum Marks : 70*

Note: ***Attempt questions from all sections as directed.***

SECTION – A (30 Marks)

Attempt any **five** *questions out of* **six.**
Each question carries **06** *marks.*

1. Explain the effect of overestimation and underestimation of it on A* algorithm.

2. What is the process of perception as perceived by the robot? Why it is difficult for robot?

3. Give advantage and disadvantage of Semantic Net. Construct partitioned semantic net representation for the following sentence: God help those who help themselves.

P.T.O.

4. Explain various approaches and properties of knowledge representation.

5. What are the heuristics and what is their importance? Describe their types with the help of examples. Also justify the statement :

"Heuristics are not sure to lead to a solution yet the field of AI is full of them".

6. Derive a parse tree for "Bill loves the frog" using the following rewrite rules :

S ---> NPVP

NP ---> N DET N

VP ---> V NP

DET ---> the

V ---> loves

N ---> Bill frog

(i) Using top-down parsing

(ii) Using bottom-up parsing

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three.**
Each question carries **10** *marks.*

7. What is conceptual dependency? Give conceptual dependency representation for :

(a) Joe pushed the door.

(b) I gave book to Ram.

8. Using constraint satisfaction procedure solves the following crypt-arithmetic problem

```
  CROSS
+ ROADS
---------
 DANGER
```

9. Convert the following sentences into predicate logic and then its clause form :

(i) Coconut is a biscuit

(ii) Mary is a child who takes coconut

(iii) John loves child who .takes biscuits

(iv) For a triangle ABC it is given that sum of interior angle is 180 degree

SECTION – C (20 Marks)

(Compulsory)

10. (a) Find the value of the function "maximum" in hill-climbing, assuming the function to be negative of the number of tiles "out of place" in the 8 puzzle problem, give the initial and goal states as shown :

P.T.O.

Initial State

2	8	3
1	6	4
7	–	5

Goal State

1	2	3
8	–	4
7	6	5

(10)

(b) Give two application areas of robotics. How a robot gets various sensory information? Discuss image understanding process (robotic vision) in robotics. (10)

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END SEMESTER EXAMINATION : APRIL – MAY, 2018

ARTIFICIAL INTELLIGENCE

Time : 3 Hrs. *Maximum Marks : 70*

Note: ***Attempt questions from all sections as directed. Use of scientific calculator is allowed.***

SECTION – A (30 Marks)

Attempt any **five** *questions out of* **six.**

Each question carries **06** *marks.*

1. How problem characteristics help in the selection of AI technique? Explain these characteristics with possible examples.

2. Explain Architecture of an Expert system. Give its three application areas.

3. Explain the different components of industrial robotics. How it is different from the conventional robotics?

P.T.O.

5. How forward kinematics determines the position and orientation of the end effector?

6. Explain how prolog programing language is a good language for robot programming.

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three.**

Each question carries **10** *marks.*

7. Explain the Resolution algorithm used for reasoning under predicate logic with an example.

8. Write a script for a customer going to the bank to withdraw some money from his saving account. Considering following as component of the script :

Pros: Money, Counter, form, token

Roles: P=customer, E-Employee, C=Cashier

Entry condition : 1) P has more or less money

2) Bank is open

Result : P has more money.

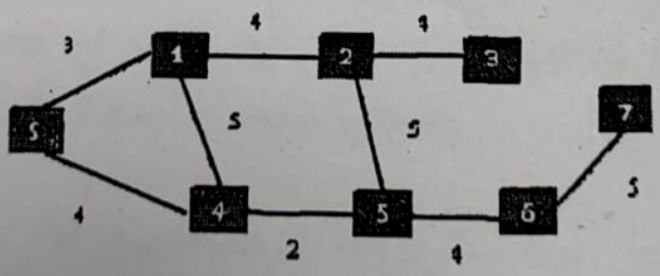
9. What is the significance of the expert-system approach to problem solving in the history of AI? How did it differ from, for example, means-ends analysis? How does it compare with AI approaches focusing on general mechanisms of intelligence?

SECTION – C (20 Marks)

(Compulsory)

10. (a) Consider the graph given in figure 1 below. Assume that the initial state is S and the goal state is 7. Find a path from the initial state to the goal state using BEST FIRST search. Also report the solution cost. The straight line distance heuristic estimates for the nodes are as follows :

h(1) = 13, h(2) = 10, h(3) = 7, h(4) = 12, h(5) = 10, h(6) = 10, h(S) = 15 (10)



(b) There is a monkey at the door in a room. In the middle of the room a bunch of banana is hanging

P.T.O.

from the ceiling. The monkey is hungry and wants to get the banana, but he cannot stretch high enough from the floor. At the window of the room there is a box . Represent the information used in the above mentioned problem in predicate logic. (10)

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END SEMESTER EXAMINATION : APRIL-MAY, 2019

ARTIFICIAL INTELLIGENCE

Time : 3 Hrs. *Maximum Marks : 70*

Note: ***Attempt questions from all sections as directed.***

SECTION – A (30 Marks)

Attempt any **five** *questions out of* **six**.
Each question carries **06** *marks.*

1. Write AO* algorithm? Use with suitable example how AO* algorithm is used for problem reduction?

2. Draw a semantic network representing the following knowledge :

   Every vehicle is a physical object. Every car is a vehicle. Every car has four wheels. Electrical system is a part of car. Battery is a part of electrical system. Pollution system is a part of every vehicle. Vehicle is used in transportation. Swift is a car.

3. Using constraint satisfaction procedure solve the following crypt-arithmetic problem

P.T.O.

CROSS
+ ROADS

DANGER

4. Write various Knowledge Representation issues. Provide the solution of any of two issues.

5. Explain the difference between :

   (a) Deductive and inductive learning

   (b) Forward and Backward reasoning

6. Discuss is the significance of sensors and vision system in robotics designing.

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three**.
Each question carries **10** *marks.*

7. Discuss the expert system in domain of medicine using suitable case study? Explain its architecture describing its components.

8. (a) Victor has been murdered, and Arthur, Bertram, and Carleton are the only suspects (meaning exactly one of them is the murderer). Arthur says that Bertram was the victim's friend, but that

Carleton hated the victim. Bertram says that he was out of town the day of the murder, and besides, he didn't even know the guy. Carleton says that he saw Arthur and Bertram with the victim just before the murder. You may assume that everyone—except possibly for the murderer—is telling the truth. Use Resolution to find the murderer. In other words, formalize the facts as a set of clauses, prove that there is a murderer, and extract his identity from the derivation. (5)

(b) Write a prolog program to enter three side and find the whether given triangle is right angle or not. (5)

9. (a) What is a Script? Construct a script for going to a bank to withdraw money. (5)

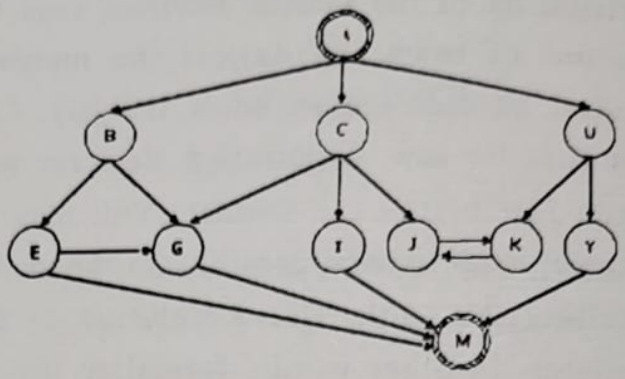
(b) Describe the basic concepts of control systems, feedback components, actuators and power transmission systems used in robots. (5)

SECTION – C (20 Marks)

(Compulsory)

10. (a) Find the search steepest Ascent hill climbing for following graph. (10)

P.T.O.



h(a):

h(A) = 2
h(B) = 5
h(C) = 3
h(U) = 4
h(E) = 2
h(G) = 3
h(I) = 6
h(J) = 2
h(K) = 1
h(Y) = 2
h(M) = 0

(b) Consider the following clausal form :

isa(X, living_thing) <- isa(X, animate)

isa(X, animate) <- isa(X, human)

isa(X, human) <- isa(X, man)

isa(Jay, man)

Represent forward reasoning inference. (5)

(c) Develop a parse tree for the sentence "Rita went to the temple by cycle" using the following rules :

S -> NP VP
NP -> P
NP -> DET
VP -> VPP
PP -> PREP PP
N -> Rita | temple | cycle
V -> went
DET -> the
PREP ->to | by

(5)

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SUPPLEMENTARY EXAMINATION : JULY, 2019

ARTIFICIAL INTELLIGENCE

Time : 3 Hrs. *Maximum Marks : 70*

Note: ***Attempt questions from all sections as directed.***

SECTION – A (30 Marks)

Attempt any **five** *questions out of* **six**.

Each question carries **06** *marks.*

1. AI is about simulating human Intelligence. Justify.

2. A farmer wants to cross the river along with a fox, Chicken and grain with him. He can take only 5 one of them. If fox and chicken are left alone fox may eat chicken grain and chicken are left along fox chicken eat grain. Give necessary solution.

3. Explain Hill climbing algorithm and what are the main issues in Hill climbing.

P.T.O.

4. Explain concept of learning using decision tree and Neural Network approach.

5. Explain Conceptual dependency. Give conceptual dependency representation for :

   (a) Satish gave chocolate to Rita (3)

   (b) Krishna goes to temple by car (3)

6. Briefly explain back tracking in prolog program.

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three**.

Each question carries **10** *marks.*

7. Explain Robotics and Robot. Write short note on applicability of robots in industrial environment.

8. What is knowledge acquisition? Discuss why you think the rule induction and protocol analysis, knowledge elicitation techniques are different.

9. (a) Explain the concept of Learning. What are different type of learning method are in AI? (5)

(b) Dealing with uncertainties is major concern of knowledge acquisition form domain experts. Justify. (5)

SECTION – C (20 Marks)

(Compulsory)

10. (a) Give the solution of the famous "Missionaries and cannibals problem using state space Search. (10)

(b) Convert the following to predicate form

(i) Every child loves all candy

(ii) Anyone who love some candy is not a nutrition fanatic

(iii) Anyone who eats any pumpkin is a nutrition fanatic

P.T.O.

(iv) Anyone who buys any pumpkin either carves it or eat it

(v) John buy a pumpkin (10)

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END SEMESTER EXAMINATION : NOV.–DEC., 2021

ARTIFICIAL INTELLIGENCE

Time : 3 Hrs. *Maximum Marks : 60*

Note: ***Attempt questions from all sections as directed.***

SECTION – A (24 Marks)

Attempt any **four** *questions out of* **five**.
Each question carries **06** *marks.*

1. How will you handle the uncertainties using non-monotonic reasoning? Give the importance of certainty factor in this respect. (4+2=6)

2. How will you justify that conceptual dependency is independent of the language in which the sentences were originally stated? Draw the conceptual dependency structure for the following statements:

   I gave the man a pencil box.

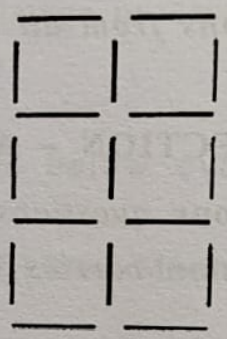
   Meera took a Book from Neera.

   Shyam went to New Delhi

P.T.O.

3. Why frame has importance in area of artificial intelligence? Explain the important characteristics of frame.

4. Given the following configuration of sticks, remove exactly 5 sticks in such a way that the remaining configuration forms exactly 3 squares. Write also State, Initial State, Operators, Goal state.



5. Write any four knowledge representation issues. How will you resolve these issues? Explain.

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three**.
Each question carries **10** *marks*.

6. How are robotics linked with artificial intelligence? How pitch, yaw and roll plays significant role in the movement of robot. Explain the relationship of robotics with industrial automation with a suitable example.

7. (a) Why fuzzy logic has much importance in AI?

Describe some of the properties of fuzzylogic make it important for AI relating it with examples. (3)

(b) Execute a script for a person wants 'to watch the play in theater'. Also mention/draw/write the following components in it:

(i) Entry conditions

(ii) Results

(iii) Props

(iv) Roles

(v) Scenes

(vi) Track (7)

8. (a) Justify the statement- "An expert system is a system that employs human knowledge captured in a computer to solve problems that ordinarily require human expertise". How expert system is associated with knowledge acquisition? Explain. (5+3=8)

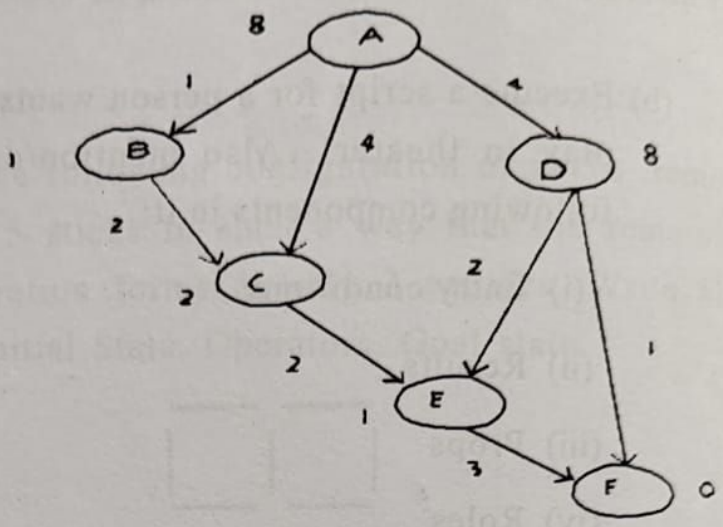
(b) Why sensors are important in robots? Describe in brief. (2)

SECTION – C (16 Marks)

(Compulsory)

9. (a) (i) Write AO* algorithm. Using the AO* algorithm, start from starting node A and draw P.T.O.

the all graphs step by step to find the goal node F.



(ii) You are provided with two jugs: one having the capacity to hold 3 gallons of water and the other has the capacity to hold 4 gallons of water. There is no other measuring equipment available and the jugs also do not have any kind of marking on them. So, your task here is to fill the 4-gallon jug with 2 gallons of water by using only these two jugs and no other material. Initially, both our jugs are empty. Specify the rules and solving procedure using state space search strategy. (12)

(b) Do you think that expert system are domain specific? In this view separate the MYCIN expert system from R1 expert system using facts, examples and application areas. (4)