TE1250

Total No. of Printed Pages:3

T.E. (Computer) (Semester - VI) (RC 2019-20)
EXAMINATION JULY 2022
Artificial Intelligence

[Duration : Three Hours] **[Total Marks : 100]**

Instructions:
1) Attempt TWO questions from PART-A and PART-B and ONE question from PART-C.
2) Make suitable assumptions wherever necessary.
3) Abbreviations have their usual meaning.

PART-A

Q.1 a) Differentiate between Depth First Search and Breadth First Search algorithms with suitable example. 5

b) With respect to Hill Climbing algorithm explain the terms local maximum, Plateau, Ridge. 5

c) Apply Best First Search algorithm for 8 puzzle problem as shown in the figure below 5

Start state

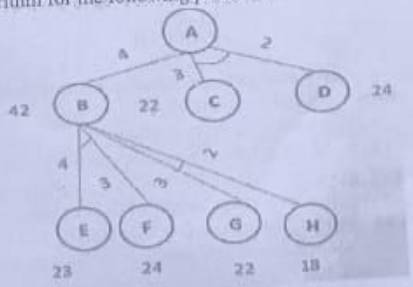
1	2	3
	4	6
7	5	8

Goal state

1	2	3
4	5	6
7	8	

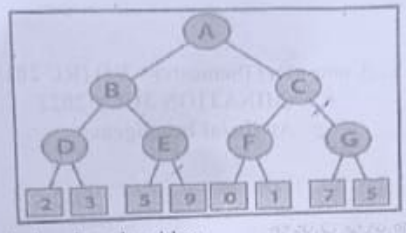
d) The search algorithm A* produces optimal solutions provided the heuristic estimate h', never overestimates the least cost h. Explain with example. 5

Q.2 a) Apply AO* algorithm for the following problem. 5



b) Differentiate between 5
i) Backward and Forward reasoning
ii) Backward and Forward chaining

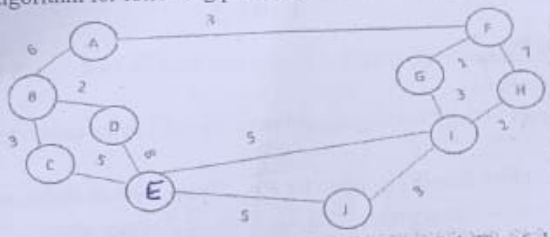
c) Apply Alpha-Beta pruning algorithm for the following problem. 5



d) Explain Goal stack planning algorithm. 5

Q.3 a) Explain various parameters to be considered while choosing the search algorithm for an application 6

b) Apply A* algorithm for following problem. 6



h(A) = 10, h(B) = 8, h(C) = 5, h(D) = 7, h(E) = 3, h(J) = 0, h(F) = 6, h(G) = 5, h(H) = 3, h(I) = 1.

a) Apply Goal Stack Planning algorithm using STRIPS to solve the following block world problem. 8

PART - B

Q.4 a) Construct partitioned semantic net representations for the following 6

i) All red cars are safe and economical.

ii) Every dog in town has bitten every postman

b) Illustrate with help of diagram a semantic network that captures the following Knowledge: 6

A dog is a pet which has an average height of 0.75 m and an average weight of 20 kg. Pets have four legs and fur. Bobby is a dog who weighs 12 kg and has a height of 0.5 m. Bobby has been in a car accident and only has three legs. Ginger is a cat who weighs 20 kg.

c) Convert the following statements to first order predicate calculus in clausal form. 8

i) Anyone passing compilers exam and winning the lottery is happy.

ii) Anyone who studies hard for the exam or is just lucky passes the exam.

iii) Peter did not study hard for his compilers exam but he is lucky

iv) anyone who is lucky wins the lottery
v) John passes all exams that peter passes.
Prove that Peter is happy using resolution.

Q.5 a) What is computer vision? Explain block diagram of computer vision system. 6
b) Define learning in AI. Explain any two methods of learning with suitable examples. 6
c) Explain essential components of expert system. 8

Q.6 a) Describe the way in which frames are used to represent a knowledge domain in Artificial Intelligence System. 6
b) Express each of the following First Order Predicate Calculus: 6
i) Some houses have a kitchen garden without plants but all the plants have leaves.
ii) Wine can be red, white or rose but milk is white.
iii) Nobody likes the wind and rain in summer when they are in beaches.
Write and explain the Unification algorithm.
c) Explain Waltz algorithm for image reconstruction with suitable example. 8

PART - C

Q.7 a) Explain the necessity of heuristic function in the case of search algorithms. Suggest the heuristic function for 8 puzzle and block world problems. 5
b) Differentiate between informed and uninformed search algorithms. 5
c) Explain necessity of non-linear planning with suitable example. 5
d) Solve the following cryptarithmetic problem by showing detailed working. 5

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Q.8 a) Critically compare the way the knowledge is represented in Semantic nets and frames. 6
b) Correct the following predicate logic sentence so that it means "Any Football player from Goa is better than some Football player from Mumbai". ∀ x FballPlayer(x)∧ From(x, Goa) ∧(∃y(FballPlayer(y) ∧ From(y, Mumbai)) ⇒ Better(x,y)). 4
c) What is expert system? Explain the advantages of expert system over human expert. 5
d) Explain any two applications of computer vision system. 5