

COMP/VII/CBGS/A.I/08-12-2016

Artificial Intelligence
(3 Hours)

Q. P. Code : 811602

(Total Marks : 80)

- N.B. 1. Question No. 1 is compulsory
2. Attempt any three (3) out of remaining five (5)
3. Assume suitable data if necessary and justify the assumptions
4. Figures to the right indicate full marks



- Q1 Attempt an four (4)
- [A] What are PEAS descriptors? Give PEAS descriptors for a robot meant for cleaning the house. [05]
- [B] Define heuristic function. Give an example heuristics function for 8-puzzle problem. Find the heuristics value for a particular state of the Blocks World Problem. [05]
- [C] Compare and Contrast problem solving agent and planning agent [05]
- [D] What are the problems/frustrations that occur in hill climbing technique? Illustrate with an example [05]
- [E] Represent the following statement into FOPL. [05]
- (i) Every tree in which any aquatic bird sleeps is beside some lake.
(ii) People try to assassinate rulers they are not loyal to.

- Q2 [A] Consider the given instance of 8-puzzle. [10]

1	2	3	1	2	3
4	5	6	4	6	
7	8		7	5	8

Goal State

Initial state

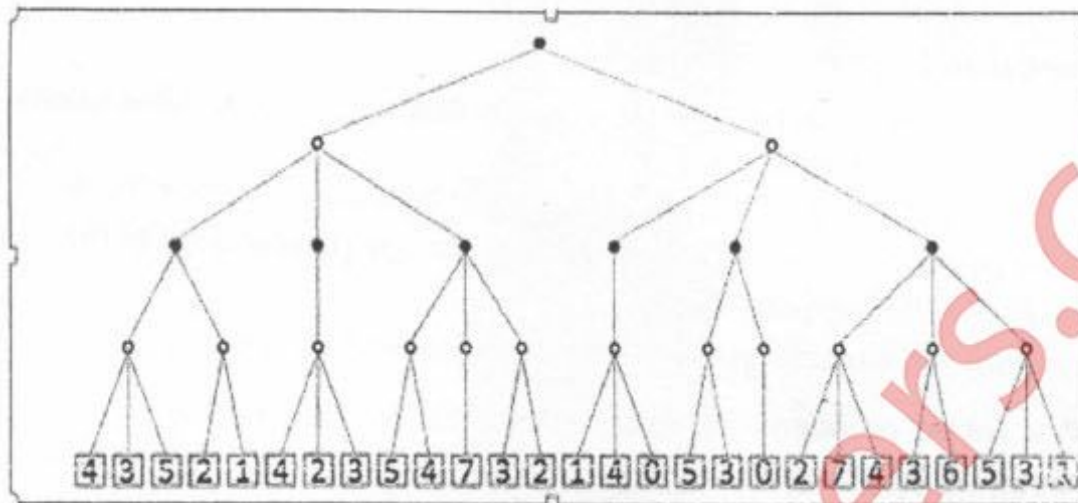
Compare and contrast uninformed search strategies with respect to solving 8-puzzle problem.

- [B] Draw and describe the architecture of goal based agent. [06]
- [C] Convert the following propositional logic statement into CNF [04]
- $(A \leftrightarrow B) \rightarrow C$
- Q3 [A] The law says that it is a crime for an American to sell weapons to hostile nations. The country Nono, an enemy of America, has some missiles, and all of its missiles were sold to it by Colonel West, who is an American.
- (i) Represent the above sentences in first order predicate logic (FOPL). [04]
- (ii) Convert them to clause form [04]
- (iii) Prove that "West is Criminal" using resolution technique [04]
- [B] What are the basic building blocks of Learning Agent? Explain each of them with a neat block diagram. [08]

[TURN OVER]

Q4 [A]

Apply alpha-Beta pruning on following example considering first node as MAX [10]



[B] Draw general architectural diagram of Expert system. Explain every component in detail of this block with an example. [10]

Q5 [A] Give the initial state, goal test, successor function. and cost function for the travelling salesperson problem (TSP). There is a map involving N cities some of which are connected by roads. The aim is to find the shortest tour that starts from a city, visits all the cities exactly once and comes back to the starting city. [06]

[B] Prove the admissibility of A* [06]

[C] Explain a partial order planner with an example [08]

Q6 [A] Given a full 4-gallon jug and an empty 3-gallon jug, the goal is to fill the 4-gallon jug with exactly 2-gallons of water. Give state space representation. [10]

[B] The gauge reading at a nuclear power station shows high values if the temperature of the core goes very high. The gauge also shows high value if the gauge is faulty. A high reading in the gauge sets an alarm off. The alarm can also go off if it is faulty. The probability of faulty instruments is low in a nuclear power plant. [10]

(i) Draw the Bayesian Belief Network for the above situation

(ii) Associate a conditional probability table for each node