

Paper / Subject Code: 42103 / Artificial IntelligenceB.E. Sem VII - Computer - CBSQS.

1/2

20/11/19

Time: 3 Hours

Total Marks: 80

**Note:**

- (i) Each question carries 20 marks
- (ii) Question 1 is compulsory
- (iii) Attempt any three (3) from the remaining questions
- (iv) Assume suitable data wherever required

Q1. Attempt any four (4) questions from the following [20]

- (a) Give PEAS description for a **Personal Assistant in Smartphone**. Characterize its environment.
- (b) Give the initial state, goal test, successor function, and cost function for an "N Queens problem".
- (c) Draw and explain architecture of Utility Based Agent.
- (d) Define Turing test and explain its significance in AI.
- (e) What are universal and existential quantifiers? Illustrate its usage in predicate logic with a suitable example

Q2 (a) Explain termination conditions in a decision tree learning algorithm with an example for each condition. What are decision rules? How to use it for classifying new samples? [6+2+2]

- (b) Consider the following sentences:  
Anyone passing his history exams and winning a lottery is happy. But anyone who studies or is lucky can pass all his exams. John did not study but he is lucky. Anyone who is lucky wins the lottery.  
Answer "Is John happy?" using proof by resolution

Q3 (a) Design a suitable planning agent for cleaning the kitchen. Give **any 2 STRIPS** style operators that might be used. When designing the operators take into account considerations such as --- Cleaning the stove or refrigerator will get the floor dirty. [10]

- (b) Explain the Bayesian Belief Networks (BBN) with a suitable example. What types of inferences can be drawn from such networks? [10]

Q4 (a) Define heuristics. Give a suitable heuristic function to solve a **tic-tac-toe** problem in AI. Illustrate its application to any state of a tic-tac-toe problem [6]

Q4 (b) Write a pseudo code for alpha-beta algorithm. Consider a section of min-max tree shown in Figure 1. Is there any Beta Cut Off possible? If possible, Where and Why? [4+2+4]

Paper / Subject Code: 42103 / Artificial Intelligence  
 B.E. Sem VII - ~~Electronics~~ - CBSGS - Computer

2/2  
 20/11/19.

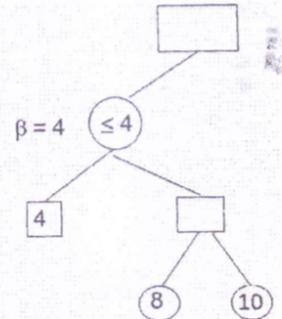


Figure 1

- (c) What are the frustrations that occur in hill climbing algorithm? [4]

- Q5 (a) Explain how Genetic algorithms work with a suitable example? Define the terms chromosome, fitness function, crossover and mutation for the same example. [10]
- (b) Consider the graph given in Figure 2 below. Assume that the initial state is S and the goal state is G. Show how A\* Search would create a search tree to find a path from the initial state to the goal state [10]

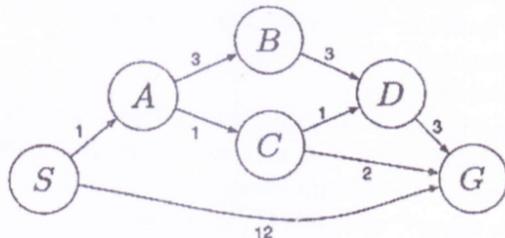


Figure 2

Assuming the straight-line distance as the heuristics function:  $h(S)=4$ ,  $h(A)=2$ ,  $h(B)=6$ ,  $h(C)=2$ ,  $h(D)=3$  and  $h(G)=0$ .

- Q6 Answer any two (2) of the following [20]
- (a) How would you differentiate between Expert System and just an AI program? Draw and illustrate expert systems architecture. Use an example to support your claims.
- (b) What are steps involved in natural language processing (NLP) of an English sentence? Explain with an example sentence. Briefly explain any one application of NLP
- (c) Write a short note on simulated annealing.

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## X BE COM SEM VII DEC 2018.pdf



Paper / Subject Code: 42103 / Artificial Intelligence  
BE (COMPUTER) SEM VII EBS9S

03/12/18 (1/2)

3 Hours

Total Marks = 80

**Note:**

- (i) Each question carries 20 marks
- (ii) Question 1 is compulsory
- (iii) Attempt **any three (3)** from the remaining questions
- (iv) Assume suitable data wherever required

Q1 Attempt **any four (4)** questions from the following [20]

- (a) Give PEAS description for a **Self Driving Car** agent. Characterize its environment.
- (b) Give the initial state, goal test, successor function, and cost function for the **Travelling salesman problem**
- (c) What will be the job of each of the components (Performance element, Learning element, Critic and problem generator) of learning agent?
- (d) Consider an 8 puzzle problem with the following initial state and goal state.

7	2	4
5		6
8	3	1

Initial State

	1	2
3	4	5
6	7	8

Goal State

Generate successors at next two levels. Apply number of misplaced tiles as the heuristic function. Which successor nodes will be selected at each level if we apply Hill climbing algorithm?

- (e) Convert the following English sentence into predicate logic and then into CNF  
**"The culprit was tall and dark"**

Q2 (a) Explain decision tree learning with an example. What are decision rules? How to use it for classifying new samples? [10]

- (b) Write first order logic equivalent of the following statements:
  - (i) Anand likes only comedy films.
  - (ii) The culprit has to be one from Tinker, Tailor and Butler.
  - (iii) Whoever can read is literate.
  - (iv) Every child loves Santa.
  - (v) Some birds cannot fly.

Q3 (a) Design a classical planner for air cargo transportation problem using STRIPS. The problem involves loading, unloading cargo and flying it from place to place. Define three actions: Load, Unload and Fly. The actions affect two predicates: In(c, p) means that cargo c inside plane p, and At(x, a) means that object x (either plane or cargo) is at airport a. [10]

- (b) Give a formal definition of a Bayesian Belief Network (BBN). Illustrate the process of constructing a BBN with a suitable scenario. What type of inferences can be drawn from BBN network? [10]

Q4 (a) Compare **Breadth first search (BFS)**, **Depth first search (DFS)**, **Depth limited search (DLS)** and **Iterative Deepening search** algorithms based on performance measure with justification: Complete, Optimal, Time and Space complexity. [10]

- (b) Write a pseudo code for alpha-beta algorithm. Apply alpha-beta pruning on example [10]

PTO  
[10]

given in Figure 1 considering first node as max.

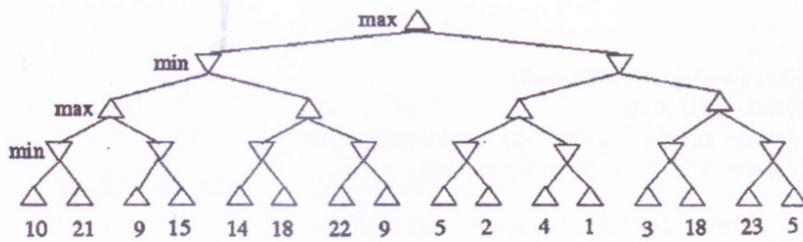


Figure 1

- Q5 (a) How will you convert the propositional logic statement into CNF? Give a suitable example at each step? [10]  
 (b) Consider the graph given in Figure 2 below. Assume that the initial state is S and the goal state is G. Show how A\* Search would create a search tree to find a path from the initial state to the goal state: [10]

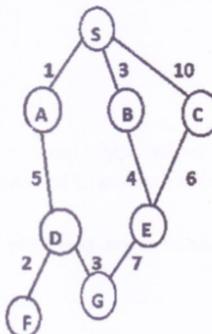


Figure 2

At each step of the search algorithm, show which node is being expanded, and the content of fringe (OPEN). Also report the eventual solution found by the algorithm, and the solution cost. Assuming the straight-line distance as the heuristics function:  $h(S)=13$ ,  $h(A)=7$ ,  $h(B)=9$ ,  $h(C)=11$ ,  $h(D)=2$ ,  $h(E)=4$ ,  $h(F)=1$ , and  $h(G)=0$ .

- Q6 Answer any two (2) of the following [20]  
 (a) What are the steps involved in natural language processing (NLP) of an English sentence? Explain with an example sentence.  
 (b) Draw and describe each component in the Architecture of Expert System with a suitable example  
 (c) Explain how Genetic algorithms work. Define the terms chromosome, fitness function, crossover and mutation as used in Genetic algorithms

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## X BE COMP SEM-VII Rev May 2018.pdf

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 2/2  
 BE Sem VII (CBAS) Computer  
 sub - A.I.  
 (3 Hours)

Q.P. Code: 24612  
 23105118  
 [Total Marks: 80]

## Note:

- (i) Each question carries 20 marks
- (ii) Question 1 is compulsory
- (iii) Attempt any three (3) from the remaining questions
- (iv) Assume suitable data wherever required

Q.1. Attempt any four (4) questions from the following.

[20]

- a) Define Intelligent Agent. What are the characteristics of Intelligent Agent?
- b) Give State space representation for 8 puzzle Problem. What are possible Heuristic functions for it?
- c) What is FOPL? Represent the following sentences using FOPL
  - i) John has at least two friends
  - ii) If two people are friends then they are not enemies.
- d) Differentiate between forward and backward chaining.
- e) Define Belief Network. Explain conditional Independence relation in Belief Network with example.

Q.2 a) Draw and Describe the Architecture of Utility based agent. How is it different from Model based agent?

[10]

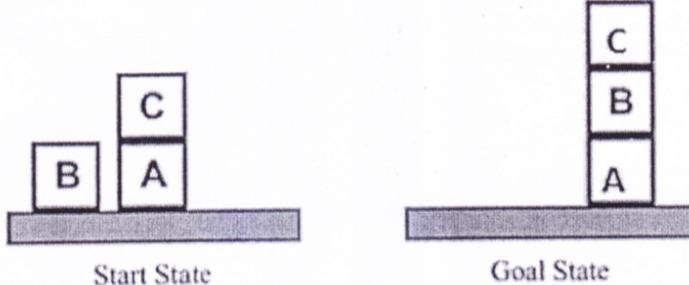
b) Explain A\* Algorithm with example.

[10]

Q.3 a) Explain Resolution by Refutation with suitable example

[10]

b) Give the partial order plan for the following blocks-world-problem



BE Sem VII (CBAS) computer  
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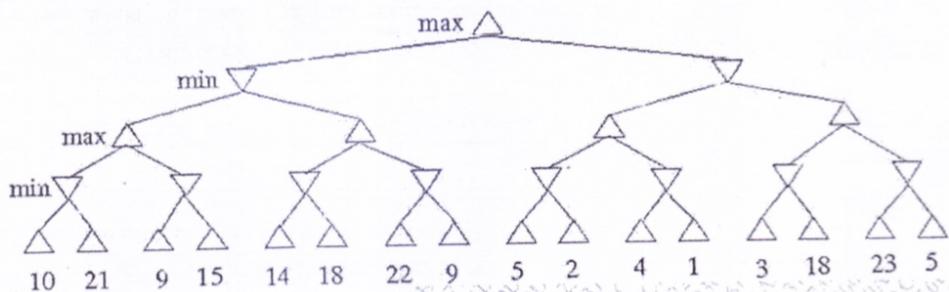
Q. P. Code: 24612

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(2)  
2

Q.4 a) Apply Alpha-Beta pruning on following example considering first node as MAX [10]



b) Explain different Inference Rules for First Order Predicate Logic. [10]

Q.5 a) Define the terms chromosome, fitness function, crossover and mutation as used in

Genetic algorithms. Explain how Genetic algorithms work. [10]

b) What are steps involved in natural language processing (NLP) of an English sentence? Explain with an example sentence. [10]

Q. 6 Write short note on any two of the following [20]

- a) Expert System Architecture and Applications
- b) Local Search Algorithms
- c) Decision Tree learning

Paper / Subject Code: 42103 / Artificial Intelligence

B.E. Computer Sem - VII CBSGS

12-15/2019

Time: 3 Hours

Total Marks = 80

(1/2)

## Note:

- (i) Each question carries 20 marks
- (ii) Question 1 is compulsory
- (iii) Attempt any **three (3)** from the remaining questions
- (iv) Assume suitable data wherever required

Q1. Attempt any **four (4)** questions from the following: [20]

- (a) Compare Model based agent with Goal based agent.
- (b) Given a full 5-gallon jug and an empty 3-gallon jug, the goal is to fill the 3-gallon jug with exactly one gallon of water. Give state space representation
- (c) Explain conditional independence relation in belief network with example
- (d) Describe the environmental characteristics of WUMPUS world Puzzle.
- (e) What is Supervised and Unsupervised learning? Give example of each.

Q2 (a) Draw and illustrate the Architecture of Learning agent. Describe each of its component w.r.t. Medical diagnosis system [6+4]

- (b) Distinguish between Propositional logic (PL) and first order predicate logic (FOPPL) knowledge representation mechanisms. Take suitable example for each point of differentiation.

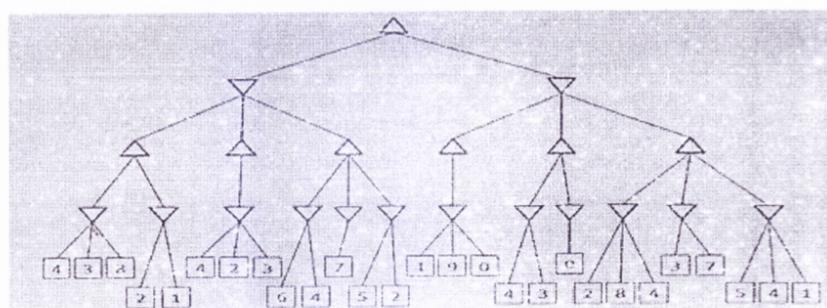
Q3 (a) Consider the following set of sentences [10]

- a) Whoever can read is literate
- b) Birds are not literate
- c) Some birds are intelligent

Prove the following using forward reasoning "Some who are intelligent cannot read"

- (b) Evaluate IDA\* search algorithms based on performance measures such as Complete, Optimal, Time and Space complexity with justification. Illustrate its working with a suitable example.

Q4 (a) Apply Alpha-Beta Pruning on following example [10]



## X BE SEM VII COMPU MAY 2019.pdf



Paper / Subject Code: 4Z103 / Artificial Intelligence

B.E. Computer SCM - II, C3598  
12/5/2019  
2/2

- (b) Define Belief Network. Describe the steps of constructing belief network with an example. What types of inferences can be drawn from that? [2+5+2]
- Q5 (a) Explain Partial order planning with example. [10]  
(b) Describe each component in the architecture of Expert System? What are the limitations of Expert System? [10]
- Q6 Answer any **two (2)** of the following [20]  
(a) Construct the decision tree from the following set of training data. Classify the new record: outlook=rain, temp =70, humidity=65, wifdy=true.

Tid	Refund	Marital Status	Taxable Income	Cheat
1	Yes	Single	>100	No
2	No	Married	80-100	No
3	No	Single	<80	No
4	Yes	Married	>100	No
5	No	Divorced	80-100	Yes
6	No	Married	<80	No
7	Yes	Divorced	>100	No
8	No	Single	80-100	Yes
9	No	Married	<80	No
10	No	Single	80-100	Yes

- (b) What are steps involved in natural language processing (NLP) of an English sentence? Explain with an example sentence.  
(c) Write a short note on local search algorithms.

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BE Computer (Sem. - VII) CBSCS  
Artificial Intelligence  
3 Hours

Q. P. Code: 24610  
Total Marks = 80

5/12/17

112

Note:

- (i) Each question carries 20 marks
- (ii) Question 1 is compulsory
- (iii) Attempt any three (3) from the remaining questions
- (iv) Assume suitable data wherever required

Q1. Attempt any four (4) questions from the following: [20]

- (a) Give PEAS description for an Autonomous Mars Rover. Characterize its environment.
- (b) Give the initial state, goal test, successor function, and cost function for the following problem  
"You have to colour a planar map using only 4 colours, in such a way that no two adjacent regions have the same colour".
- (c) Draw and explain architecture of Expert System.
- (d) Explain Hill-climbing algorithm with an example.
- (e) Convert the following propositional logic statement into CNF
  - (i)  $A \rightarrow (B \leftrightarrow C)$

Q2. (a). Explain decision tree learning with an example. [10]

(b) Write first order logic statements for following statements: [10]

- (i) Horses, cows, and pigs are mammals.
- (ii) Bluebird is a horse.
- (iii) Whoever can read is literate.
- (iv) Every tree in which any aquatic bird sleeps is beside some lake.
- (v) Anything anyone eats and is not killed by is food.

Q3. (a) Design a planning agent for a Blocks World problem. Assume suitable initial state and final state for the problem. [10]

- (b) Consider a situation in which we want to reason about the relationship between smoking and lung cancer. Intuitively, we know that whether or not a person has cancer is directly influenced by whether she is exposed to second-hand smoke and whether she smokes. Both of these things are affected by whether her parents smoke. Cancer reduces a person's life expectancy.
  - (i) Draw the Bayesian network.
  - (ii) How many independent values are required to specify all the conditional probability tables (CPTs) for your network? [10]

Q4. (a) Compare Greedy Best first search and A\* search algorithms based on performance measure with justification: Complete, Optimal, Time and Space complexity. [10]

- (b) Write a pseudocode for alpha-beta algorithm. Apply alpha-beta pruning on example given in Figure 1 considering first node as max. [4+6]

5 | 12 | 17 (2)

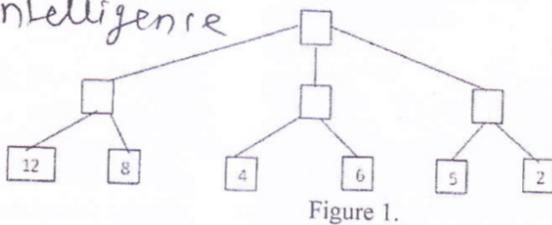


Figure 1.

- Q5. (a) Define the terms chromosome, fitness function, crossover and mutation as used in Genetic algorithms. Explain how Genetic algorithms work? [4+6]
- (b) Consider the graph given in Figure 2 below. Assume that the initial state is A and the goal state is G. Show how **Greedy Best first Search** would create a search tree to find a path from the initial state to the goal state: [10]

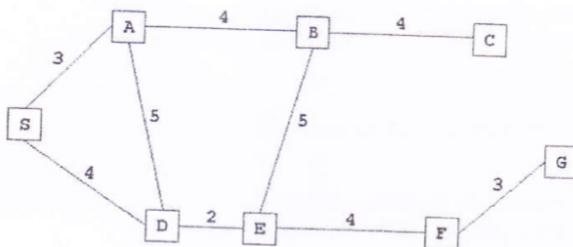


Figure 2.

At each step of the search algorithm, show which node is being expanded, and the content of fringe. Also report the eventual solution found by the algorithm, and the solution cost. Assuming the straight-line distance as the heuristics function:  $h(S)=10.5$ ,  $h(A)=10$ ,  $h(B)=6$ ,  $h(C)=4$ ,  $h(D)=8$ ,  $h(E)=6.5$ ,  $h(F)=3$  and  $h(G)=0$ .

- Q6. Answer any two (2) of the following [20]
- What are steps involved in natural language processing (NLP) of an English sentence? Explain with an example sentence.
  - Draw and explain the basic building blocks of Learning Agent.
  - How will you convert the propositional logic statement into CNF? Give a suitable example at each step.

T4527 / T1308 ARTIFICIAL INTELLIGENCE

*BE (Comp) SEM VII C3545 Q. P. Code : 811600  
 Artificial Intelligence  
 (3 Hours)*

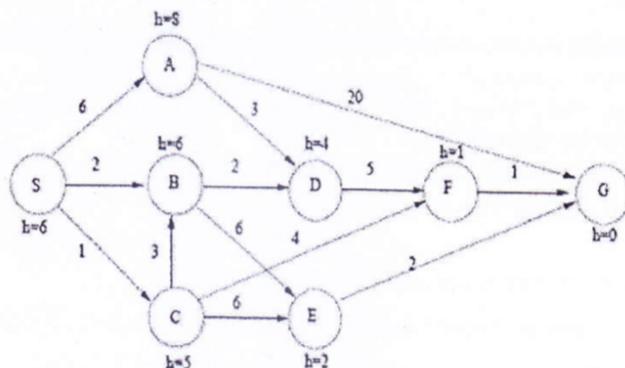
*25/05/17**Total Marks : 80**Y2*

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

Q1 Attempt any four (4) from the following

- [A] Define AI. What are applications of AI? [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 Model based Agent with Utility based Agent. [05]
- [D] What are the problems/frustrations that occur in hill climbing technique? Illustrate with an example [05]
- [E] What is supervised learning and unsupervised learning? Give example of each. [05]

Q2 [A] Consider the search problem below with start state S and goal state G. The transition costs are next to the edges and the heuristic values are next to the states. What is the final cost using A\* search. [10]



- [B] Explain the architecture of Expert System. What are advantages and limitations of Expert System? [10]

- Q3 [A] Explain with example various uninformed search techniques. [10]  
 [B] Illustrate Forward chaining and backward chaining in propositional logic with example [10]

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BE (Comp) SEM-VII CBSCS

Q. P. Code : 811600

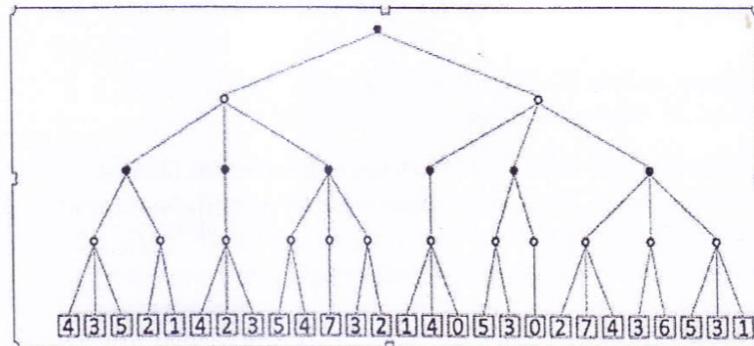
25/05/17.

# Artificial Intelligence

R<sub>12</sub>

Q4 [A] Apply alpha-Beta pruning on following example considering first node as MAX

[10]



[B] Explain a partial order planner with an example.

[10]

**Q5 [A]** Consider the following facts about dolphins:

[10]

Whoever can read is literate. Dolphins are not literate. Some dolphins are intelligent.

- (i) Represent the above sentences in first order predicate logic (FOPL).
  - (ii) Convert them to clause form
  - (iii) Prove that “Some who are Intelligent cannot read” using resolution technique

[B] What is Uncertainty? Explain Bayesian Network with example

[10]

**Q6** Write short note on any two of the following:

[20]

- (i) Steps in Natural Language Processing
  - (ii) Decision Tree Algorithm with an example
  - (iv) Genetic Algorithms

B.E Sem-VII CBGS  
Computer Engg

A.F  
(3 Hours)

Q. P. Code : 811602  
(Total Marks : 80)

8/12/201  
1/2

- 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 any 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.
  - (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  

$$(A \leftrightarrow B) \rightarrow C$$
 [04]

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]

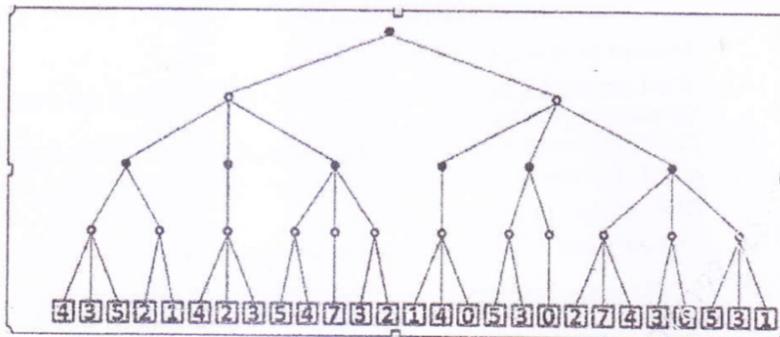
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B.E sem-VII CB63 AD<sub>2</sub>  
Computer Engg

8/12/21

- 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.
- (i) Draw the Bayesian Belief Network for the above situation  
(ii) Associate a conditional probability table for each node

SEM-VII COMP (CBSE) 25/1st/16  
 Artificial Intelligence

QP Code : 31334

(3 Hours)

[ Total Marks : 80 ]

- N. B. : (1) Each question carry 20 marks.  
 (2) Question 1 is compulsory.  
 (3) Attempt any three (3) from the remaining questions.  
 (4) Assume suitable data wherever required.

1. Attempt any four (4) questions from the following: 20
  - (a) Draw and explain architecture of Expert System.
  - (b) Explain Hill-climbing algorithm with an example.
  - (c) Give PEAS description for a Robot Soccer player. Characterize its environment.
  - (d) Explain Turing test designed for satisfactory operational definition of intelligence.
  - (e) Prove that A\* is admissible if it uses a monotone heuristic.
  - (f) Compare and Contrast problem solving agent and planning agent.
  
2. (a) Explain decision tree learning with an example. What are decision rules? How to use it for classifying new samples? 10
  - (b) Write first order logic statements for following statements: 10
    - (i) If a perfect square is divisible by a prime p then it is also divisible by square of p.
    - (ii) Every perfect square is divisible by some prime.
    - (iii) Alice does not like Chemistry and History.
    - (iv) If it is Saturday and warm, then Sam is in the park.
    - (v) Anything anyone eats and is not killed by is food.
  
3. (a) Design a planning agent for a Blocks World problem. Assume suitable initial state and final state for the problem. 10
  - (b) Find the probabilistic inference by enumeration of entries in a full joint distribution table shown in figure 1. 10
    - (i) No cavity when toothache is there
    - (ii)  $p(\text{Cavity} \mid \text{toothache or catch})$

	toothache		$\neg$ toothache	
	catch	$\neg$ catch	catch	$\neg$ catch
cavity	.108	.012	.072	.008
$\neg$ cavity	.016	.064	.144	.576

Figure 1.

[ TURN OVER ]

4. (a) Compare following informed searching algorithms based on performance measure with justification: Complete, Optimal, Time complexity and space complexity. 10

- a) Greedy best first
- b) A\*
- c) Recursive best-first (RBFS)

- (b) Apply alpha-Beta pruning on example given in Figure 2 considering first node as max. 10

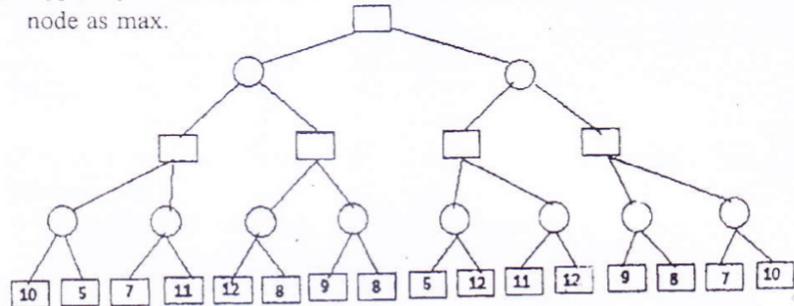


Figure 2.

5. (a) Explain how genetic algorithm can be used to solve a problem by taking a suitable example. 10
- (b) Consider the graph given in Figure 3 below. Assume that the initial state is A and the goal state is G Find a path from the initial state to the goal state using DFS. Also report the solution cost 10

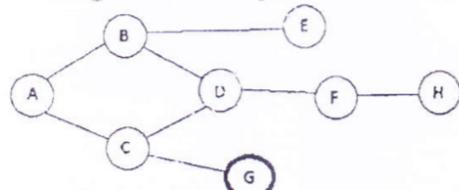


Figure 3.

6. (a) Explain the steps involved in converting the propositional logic statement into CNF with a suitable example 10
- (b) What are the basic building blocks of Learning Agent? Explain each of them with a neat block diagram. 10

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P.E. Sem VII CSEGS  
Computer Engg  
Cryptography & System Security

19/5/2016  
11 am to 2 pm  
QP Code : 31296

Q.P.Code No. : 5942

(1/2)

(3 Hrs)

Maximum Marks = 80

## Note:

- (i) Each question carry 20 marks
- (ii) Question 1 is compulsory
- (iii) Attempt any three (3) from the remaining questions
- (iv) Assume suitable data wherever required

Q1. Attempt any four (4) questions from the following [20]

- (a) Define heuristic function. Give an example heuristics function for Blocks World Problem.
- (b) Find the heuristics value for a particular state of the Blocks World Problem.
- (c) Define Rationality and Rational Agent. Give an example of rational action performed by any intelligent agent
- (d) Compare and Contrast problem solving agent and planning agent
- (e) Represent the following statement into FOPL.
  - (i) Anyone who kills an animal is loved by no one.
  - (ii) A square is breezy if and only if there is a pit in a neighboring square (Assume the wumpus world environment).
  - (iii) Give the PEAS description for an Internet shopping agent. Characterize its environment

Q2. (a) Consider the graph given in Figure 1 below. Assume that the initial state is S [10] and the goal state is 7. Find a path from the initial state to the goal state using A\* Search. Also report the solution cost. The straight line distance heuristic estimates for the nodes are as follows:  $h(1) = 14, h(2) = 10, h(3) = 8, h(4) = 12, h(5) = 10, h(6) = 10, h(S) = 15$ .

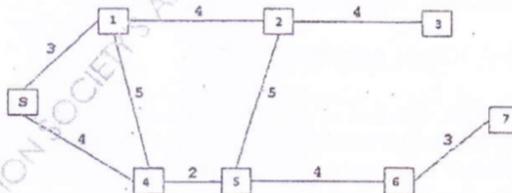


Figure 1.

- (b) Draw and describe the architecture of expert system. [6]
- (c) Convert the following propositional logic statement into CNF [4]
 
$$A \Rightarrow (B \leftrightarrow C)$$

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# BE(Computer)-sem VII (CBGS)

Artificial Intelligence 04/12/15

2

QP Code : 5942

212

[4+4+4]

Q3. (a) Consider the following axioms:

All people who are graduating are happy.

All happy people smile.

Someone is graduating.

(i) Represent these axioms in first order predicate logic.

(ii) Convert each formula to clause form

(iii) Prove that "Is someone smiling?" using resolution technique. Draw the resolution tree.

(b) What are the basic building blocks of Learning Agent? Explain each of them with a neat block diagram. [8]

Q4. (a) Construct a decision tree for the following set of samples. Write any two decision rules obtained from the tree. Classify a new sample with (gender = "Female", height = "1.92m") [6+2+2]

Person ID	Gender	Height	Class
1	Female	1.6m	Short
2	Male	2m	Tall
3	Female	1.9m	Medium
4	Female	2.1m	Tall
5	Female	1.7m	Short
6	Male	1.85m	Medium
7	Female	1.6m	Short
8	Male	1.7m	Short
9	Male	2.2m	Tall

(b) What are the problems/frustrations that occur in hill climbing technique? Illustrate with an example. [6]

(c) Draw a game tree for a Tic-Tac-Toe problem. [4]

Q5. (a) Write a short note on genetic algorithm. [8]

(b) It is known that whether or not a person has cancer is directly influenced by whether she is exposed to second-hand smoke and whether she smokes. Both of these things are affected by whether her parents smoke. Cancer reduces a person's life expectancy. [6]

- (i) Draw the Bayesian Belief Network for the above situation
- (ii) Associate a conditional probability table for each node

(c) Explain a partial order planner with an example [6]

Q6. (a) Write a PROLOG program to find Fibonacci series [10]

(b) What are the levels of knowledge used in language understanding? Also write down the techniques used in NLP. [10]

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