Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 40915

B.E./B.Tech. DEGREE EXAMINATION, APRIL /MAY 2018

Fifth/Sixth Semester

Computer Science and Engineering

CS 6659 – ARTIFICIAL INTELLIGENCE

(Common to Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Information Technology)

(Regulations 2013)

Time : Three Hours — Maximum : 100 Marks

Answer ALL questions

PART – A — (10×2=20 Marks)

1. Will Breadth-First Search always find the minimal solution. Why ?

2. What is a monotonic production system ?

3. Write the following in a predicate logic : For all x and y, if x is a parent of y then y is a child of x.

4. List any three methods to select an initial structure knowledge representation.

5. Given that P (A) = 0.3, P (A|B) = 0.4 and P (B) = 0.5, compute P (B|A).

6. How does forward chaining differs from backward chaining ?

7. Define machine learning.

8. When is a *why explanation* better than a *how explanation* ?

9. What are the common mechanisms supported in an expert system shell ?

10. List the three activities supported by the programs that interact with domain experts to extract expert knowledge.
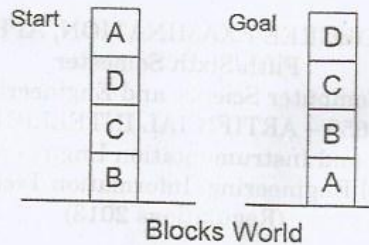
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PART – B

(5×13=65 Marks)

11. a) Consider the Blocks World problem with four blocks A, B, C and D with the start and goal states given below.

Start   Goal

A		D
D		C
C		B
B		A

Blocks World

Assume the following two operations : Pick and a block and put it on table, pick up a block and put it on another block. Solve the above problem using Hill Climbing algorithm and a suitable heuristic function. Show the intermediate decisions and states.

(OR)

b) List and describe the problem characteristics that need to be considered for selecting appropriate heuristics for a given class of problems.

12. a) Consider the following facts :
   - Steve only likes easy courses.
   - Science courses are hard.
   - All the courses in the HaveFun department are easy.
   - BK301 is a HaveFun department course.

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

(OR)

b) Consider a two player game in which the minimax search procedure is used to compute the best moves for the first player. Assume a static evaluation function that returns values ranging from − 10 to 10, with 10 indicating a win for the first player and −10 a win for the second player. Assume the following game tree in which the static scores are from the first player's point of view. Suppose the first player is the maximizing player and needs to make the next move. What move should be chosen at this point ? Can the search be optimized ?

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                    A
         B          C          D
      E  F  G     H   I      J   K
      9  -6 0     0  -2      -4  -3
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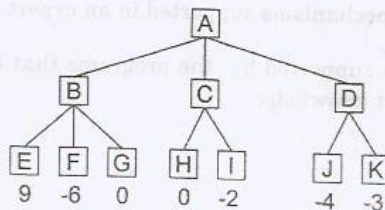
13. a) Discuss the need and structure of Bayesian networks.

(OR)

b) How are frames used in knowledge representation ? Give the structure of a general frame.

14. a) Discuss planning methodology used by STRIPS in detail.

(OR)

b) Discuss the various types of machine learning with appropriate examples.

15. a) Write a detailed note about the MYCIN expert system and its functioning.

(OR)

b) Write a detailed note on expert systems including representation, usage of domain knowledge, reasoning and explaining.

PART – C   (1×15=15 Marks)

16. a) Suppose the police is informed that one of the four terrorist organizations A, B, C or D has planted a bomb in a building. Draw the lattice of subsets of the universe of discourse, U. Assume that one evidence supports that groups A and C were responsible to a degree of m_1 ({A, C}) = 0.6 and another evidence supports the belief that groups A, B and D were involved to a degree m_2 = ({A, B, D}) = 0.7. Compute and create the tableau of combined values of belief for m_1 and m_2.

(OR)

b) Consider the cryptarithmetic problem shown below. The goal is a problem state where all letters have been assigned a digit in such a way that all the initial constraints are satisfied.

Problem :   S E N D
            + M O R E
            M O N E Y

Initial State constraints :

• No two letters have the same value

• The sums of the digits must be as shown in the problem

Explain steps in detail to solve this problem using the constraint satisfaction algorithm.

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