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Question Paper Code : 57262

28/5/2016 FN

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Sixth Semester

Computer Science and Engineering

CS 6659 – ARTIFICIAL INTELLIGENCE

(Common to fifth semester Instrumentation and Control Engineering and
Electronics and Instrumentation Engineering and
Sixth Semester Information Technology)

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What is ridge ?
2. How much knowledge would be required by a perfect program for the problem of playing chess ? Assume that unlimited computing power is available.
3. What is alpha-beta pruning ?
4. For the given sentence "All Pompeians were Romans" write a well formed formula in predicate logic.
5. What is Bayesian Networks ?
6. Write the properties of fuzzy sets.
7. What is rote learning ?
8. Brief frame problem.
9. What is meta knowledge ? How meta knowledge is represented in rule-based expert systems ?
10. Write any four earliest expert systems.

PART – B (5 × 16 = 80 Marks)

11. (a) (i) Explain the Heuristic functions with examples. (6)
 (ii) Write the algorithm for Generate and Test and simple Hill Climbing. (10)

OR

- (b) Solve the given problem. Describe the operators involved in it. (16)

Consider a Water Jug Problem : You are given two jugs, a 4-gallon one and a 3-gallon one. Neither has any measuring markers on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into the 4-gallon jug ? Explicit Assumptions: A jug can be filled from the pump, water can be poured out of a jug onto the ground, water can be poured from one jug to another and that there are no other measuring devices available.

12. (a) Convert the following well formed formula into clause form with sequence of steps. (16)
 $\forall x: [\text{Roman}(x) \wedge \text{Know}(x, \text{Marcus})] \rightarrow [\text{hate}(x, \text{Caesar}) \vee (\forall y: \exists z: \text{hate}(y, z) \rightarrow \text{thinkcrazy}(x, y))]$

OR

- (b) (i) Write the resolution procedure for propositional logic. (8)
 (ii) Explain the Iterative Deepening Algorithm. (8)

13. (a) (i) Briefly explain how reasoning is done using fuzzy logic. (6)
 (ii) Explain Dempster-Shafer Theory. (10)

OR

- (b) What is Forward Chaining and how does it work ? Explain the forward Chaining algorithm with an example. (16)

14. (a) (i) Describe the components of a planning system. (10)
 (ii) What is ID3 ? Write the drawback of ID3. (6)

OR

- (b) (i) Describe the Hierarchical planning method with an example. (8)
 (ii) Describe the Learning with Macro-Operators. (8)

15. (a) (i) Explain about the Knowledge acquisition. (10)
 (ii) Write the characteristic features of Expert systems. (6)

OR

- (b) (i) Explain the basic components of an expert system. (10)
 (ii) Write any six applications of expert systems. (6)

10/05/18

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

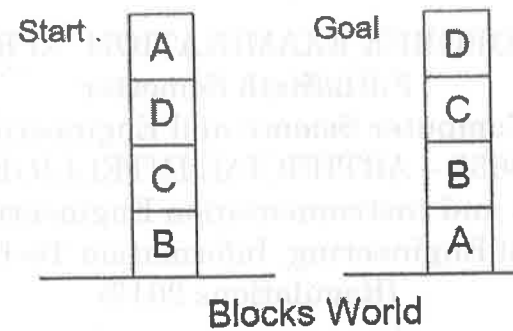
(10×2=20 Marks)

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.

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.



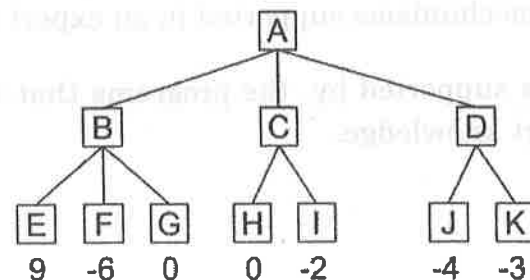
Assume the following two operations : Pick and a block and put it on table, pick up a block and put it on another block. Solve the above problem using Hill Climbing algorithm and a suitable heuristic function. Show the intermediate decisions and states.

(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 ?



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 cryptarithmic 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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F.N.

Question Paper Code : 80302

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fifth Semester

Electronics and Instrumentation Engineering

CS 6659 — ARTIFICIAL INTELLIGENCE

(Common to Instrumentation and Control Engineering and Sixth Semester
Computer Science and Engineering and Information Technology)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is Heuristic function?
2. What are the categories of production systems?
3. List the two levels of knowledge representation.
4. What is Alpha-Beta pruning?
5. What are fuzzy sets?
6. List the properties of fuzzy sets.
7. What are the different types of planners?
8. Write the difference between supervised learning and unsupervised learning.
9. Define an expert system.
10. What is XCON?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Exemplify the necessary components to define an AI problem with an example. (6)
- (ii) Consider a water jug problem. You are given 2 jugs : a 4-gallon and a 3-gallon jugs. Neither has any measuring mark in it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2-gallon of water into a 4-gallon jug? State the production rules for the water jug problem. (10)

Or

- (b) (i) Write the algorithm for steepest ascent hill climbing. (4)
- (ii) Explain DFS algorithm with an example. (8)
- (iii) State the characteristics of an AI problem. (4)
12. (a) Explain resolution in predicate logic with suitable example. (16)

Or

- (b) Consider the following sentences :
- John like all kinds of food
 - Apples are food
 - Chicken is food
 - Anything any one eats and isn't killed by is food
 - Bill eats peanuts and is still alive
 - Sue eats everything Bill eats.
- (i) Translate these sentences into formulae in predicate logic (10)
- (ii) Convert the above FOL into clause form. (6)

13. (a) Explain in detail about forward chaining and backward chaining with algorithms. (16)

Or

- (b) What is Dempster-Shafer theory? Explain with suitable example. (16)
14. (a) (i) Describe hierarchical planning method with an example. (8)
- (ii) Describe learning with macro-operators. (8)

Or

- (b) (i) Explain the various types of learning in problem solving. (6)
- (ii) Explain learning in Decision Tree with example. (10)
15. (a) (i) Explain about the Knowledge acquisition. (10)
- (ii) Brief any six applications of expert systems. (6)

Or

- (b) Explain with neat diagram the architecture of expert system and mention its features. (16)



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Question Paper Code : 20373

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fifth Semester

Computer Science and Engineering

CS 6659 — ARTIFICIAL INTELLIGENCE

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

(Regulations 2013)

(Also Common to PTCS 6659 – Artificial Intelligence for B.E. (Part-time) Fifth Semester – Computer Science and Engineering – Regulation 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the ways to formulate a problem.
2. What is problem graph?
3. Differentiate declarative and procedural knowledge.
4. State how knowledge is represented using structured format.
5. Differentiate propositional and first order logic.
6. State Generalized Modus ponens.
7. Differentiate supervised learning and unsupervised learning.
8. List the purpose of STRIPS language.
9. Define Localization and list their techniques.
10. Write about Meta Knowledge acquisition in expert Systems

PART B — (5 × 13 = 65 marks)

11. (a) Elaborate on the following search technique
- (i) Greedy best-first search (5)
 - (ii) A* search (5)
 - (iii) Memory bounded heuristic search. (3)

Or

- (b) Explain Backtrack searching for Constraint Satisfaction Problem for Map Coloring Problem. (13)
12. (a) Relate first order logic with proposition logic and discuss in detail about the same. (13)

Or

- (b) Describe a procedure for converting a sentence to CNF with an example. (13)

13. (a) Discuss about the exact inference in Bayesian networks. (13)

Or

- (b) Explain forward chaining and Backward Chaining for Proportional Definite Clauses. (13)

14. (a) Explain in detail about STRIPS and write the components of STRIPS for the given scenario: "Consider a flight journey in a luxurious flight from India to US". (13)

Or

- (b) (i) Express your views about Roté Learning. (7)
- (ii) How would you express Formal learning theory? (6)

15. (a) Illustrate in detail about the expert system shells. (13)

Or

- (b) Explain in detail about General Learning Model. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Consider the problem of changing a flat tire. The goal is to have a good spare tire properly mounted onto the car's axle, where the initial state has a flat tire on the axle and a good spare tire in the trunk. To keep it simple, our version of the problem is an abstract one, with no sticky lug nuts or other complications. There are just four actions: removing the spare from the trunk, removing the flat tire from the axle, putting the spare on the axle and leaving the car unattended overnight. Write the STRIPS and find out the solution.

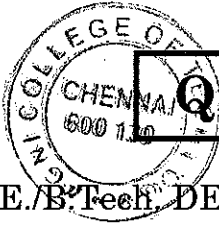
Or

- (b) Construct a Bayesian network and define the necessary CPTs for the given scenario We have a bag of three biased coins a, b, and c with probabilities of coming up heads of 20%, 60%, and 80%, respectively. One coin is drawn randomly from the bag (with equal likelihood of drawing each of the three coins) and then the coin is flipped three times to generate the outcomes X1, X2 and X3.



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Question Paper Code : 91407

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

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)

(Also Common to PTCS 6659 – Artificial Intelligence for B.E. (Part-Time) –

Fifth Semester – (Regulations – 2014))

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. What is Artificial Intelligence ?
2. Compare program with pattern matching.
3. Differentiate propositional and predicate logic.
4. What is refutation principle ?
5. Define forward chaining.
6. What is Baye's theorem ?
7. What is planning ?
8. What do you understand by the term "K-strips" ?
9. Enumerate the features of DART expert system.
10. What are the components of an expert system ?

PART – B

(5×13=65 Marks)

11. a) Describe the following Hill Climbing procedures

- i) Simple hill climbing.
- ii) Simulated annealing.

(6)

(7)

(OR)

- b) Illustrate constraint satisfaction problem to solve a cryptarithmic problem.



12. a) Discuss alpha-beta pruning with suitable examples.

(OR)

b) Consider the following facts.

- Any boy or girl is a child.
- Any child gets a toy or a candy or a stick.
- No boy gets any toy.
- No child who is good gets a stick.
- If no child gets a candy, then no boy is good.

i) Translate the above facts to wff. (5)

ii) Convert the wff to clause form representation. (8)

13. a) Construct a comparison between production based system and frame based system.

(OR)

b) i) Explain Dempster-Shafer theory with examples. (6)

ii) Give a brief outline on Bayesian network with an example. (7)

14. a) Analyze the search strategy used in STRIPS with examples.

(OR)

b) What is Adaptive learning ? Illustrate with suitable examples.

15. a) Construct an outline on MYCIN.

(OR)

b) i) What is knowledge acquisition ? Discuss. (6)

ii) Write a brief summary on expert system shells. (7)

PART – C

(1×15=15 Marks)

16. a) What is machine learning ? Construct a creative discussion to relate machine learning vs. artificial intelligence.

(OR)

b) Compile a case study of a knowledge based expert system for selecting a course in University.
