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QUESTION BANK

DECEMBER 2018 - JUNE 2019 / EVEN SEMESTER

BRANCH: CSE

YR/SEM: III/VI

BATCH: 2016 - 2020

SUB CODE/NAME: CS6659 – ARTIFICIAL INTELLIGENCE

UNIT I

INTRODUCTION TO AI AND PRODUCTION SYSTEM

PART - A

1. Define AI.
2. List out some of the applications of Artificial Intelligence.
3. What is ridge and plateau? (*May 2016*)
4. Mention the criteria's for the evaluation of search strategy.
5. Define agent and ideal rational agent. (*May 2016*)
6. Why problem formulation must follow goal formulation?
7. What is Heuristic function?
8. What are the categories of production system?
9. What is a constraint satisfaction problem?
10. What is the use of online search agent in an unknown environment?
11. What are the differences between informed and uninformed search strategies?
12. What is bidirectional search?
13. Differentiate blind search & heuristic search.
14. Write the time & space complexity associated with depth limited search.
15. Define iterative deepening search.
16. Explain depth limited search.
17. List the basic elements that are to be include in problem definition.
18. Mention the criteria for the evaluation of search strategy.
19. State the various properties of environment.
20. What are the different types of the problem?
21. State the advantages of Breadth First Search (*NOV 2017*).
22. What is Commutative production system ? (*NOV 2017*).
23. **What is ridge?(May 2016)**
24. **How much knowledge would be required by a perfect program for the problem of playing chess? Assume that unlimited computing power is available.(May 2016)**
25. **Why Breadth First Search always find minimal solution. Why?(April 2018)**
26. **What is monotonic production system?(April 2018)**
27. **What is Heuristic function?(Nov 2016)**
28. **What are the categories of production systems?(Nov 2016)**
29. **List down the characteristics of intelligent agent.(April 2017)**
30. **List some of the uninformed search techniques.(April 2017)**

PART – B

1. What are the different kinds of agent program and explain them. (13)

2. Explain briefly the various problem characteristics. **OR** State and explain the characteristics of AI problem. (10)
3. Explain about uninformed search strategies (Blind search)with example. (13)
4. Explain about informed search strategies with example. (13)
5. Discuss about CSP or Constraint Satisfaction Problem. (13) (Dec 2017)
6. Explain the following types of Hill Climbing search techniques.(Dec 2017)
 - i. Simple Hill Climbing (4)
 - ii. Steepest –Ascent Hill Climbing (5)
 - iii. Simulated Annealing (4)
7. (i)Explain Heuristic functions with examples.(8)
(ii) Write the algorithm for Generate and Test and simple Hill climbing(8) (May 2016)
- 8.Solve the given problem.Describe the

PART - C

1. 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.

UNIT II
REPRESENTATION OF KNOWLEDGE
PART - A

1. Define Game Theory.
2. What are the components of game playing?
3. Define Minimax algorithm.
4. Define pruning.
5. What is Alpha Beta Pruning? (*Nov 2016/May 2016*)
6. Define Quiescence.
7. Define knowledge base system.
8. Define the term syntax and semantics in logic.
9. Define Logic.
10. What are the requirements of a knowledge representation?
11. What are all the different types of knowledge?
12. What is first-order logic?
13. List the Procedure for resolution.
14. What are the limitations in using propositional logic to represent the knowledge base?
15. Represent the following sentence in predicate from “All the children likes sweet”.
16. Write a well formed formula in predicate logic for the given sentences . OR
Represent using first order logic symbols.
 - i. “Joe, Tom and Sam are brothers” (*May 2009*)
 - ii. “All Pompeians were Romans” (*May 2016*)
17. Distinguish between predicate logic and propositional logic. (*Nov 2011/April 2017*)
18. List the canonical forms of resolution. (*May 2009*)
19. Write down the syntactic elements of FOL. (*Nov 2008*)
20. List the levels of Knowledge representation. (*Nov 2016*)
21. What are the models available in structured representation of knowledge? (or)
Mention some of the knowledge representation techniques.
22. Define atomic sentence and complex sentence. (*Nov 2014*)
23. What is unification algorithm? (*May 2008*)
24. How can you represent the resolution in predicate logic? (*May 2008*)
25. What is the difference between declarative and procedural knowledge?

PART – B

GAME PLAYING

1. Explain the concept of Alpha beta pruning.(13) (*April 2017*)
2. Illustrate the method of MIN MAX procedure in game playing.(13) (*April 2017*)

KNOWLEDGE REPRESENTATION

3. Brief about the different approaches of knowledge representation.(13)
4. How does a knowledge is represented using predicate logic.(13)
5. How will you represent facts in propositional logic with an example? (13)

RESOLUTION

6. Explain about unification algorithm.(13)
7. Explain about resolution procedure in detail.(13)
8. Explain the algorithm of conversion of FOL into clause form.(13)
9. Explain the resolution procedure in prepositional logic. (10) (*May 2016*)
10. Explain resolution in predicate logic with suitable example.(13) (*Nov 2016*)

STRUCTURED REPRESENTATION OF KNOWLEDGE

11. Explain about the structured representation of knowledge.(13)
12. Explain about the following : a) Frames b) semantic Net (13)

PART - C

1. Consider the following sentences:
- John likes all kinds of food.
 - Apples are food.
 - Chicken is food.
 - Anything any one eats and is not 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.(8)
ii) Convert the above FOL into clause form. (7) (*Nov 2016 & Dec2017*)
2. Convert the following well formed formula into clause form with sequence of steps.
 $\forall x : [\text{Roman}(x) \wedge \text{know}(x, \text{Marcus})] \rightarrow [\text{hate}(x, \text{Caesar}) \vee (\forall x : \exists z: \text{hate}(y, z) \rightarrow \text{thinkcrazy}(x, y))]$.
(15) (*May 2016*)

UNIT – III

KNOWLEDGE INFERENCE

PART-A

1. Define an inference procedure.
2. List some of the rules of inference.
3. What is truth Preserving?
4. What is forward chaining and backward chaining?
6. Differentiate the forward and backward reasoning. (*Dec 2017*)
7. What are the techniques used to represent knowledge?
8. What are the issues in Knowledge Representation?
9. Define Logic.
10. List the different types of Logic.
11. State the use of unification (or) what is the significance in using unification algorithm? (*MAY 2012*)
12. What factors justify whether the reasoning is to be done in forward or backward Reasoning?
13. Define unification.
14. What is Horn Clause?
15. Define Bayesian network. (*May 2016*)
16. List the 2 ways for understanding the semantics of Bayesian networks.
17. Write the properties of fuzzy sets. (*May 2016*)
18. Define inference in Bayesian networks.
19. Define Dempster-Shafer theory. (*MAY 2011*)
20. Define the Bayes rule? (Or) State Baye's rule? (*NOV 2012*)(*MAY 2013*)
21. Give the full specification of a Bayesian network? (*MAY 2013*)

PART-B

1. Explain in detail about forward chaining algorithm with example.
2. Explain in detail about backward chaining algorithm with example.
3. Explain Dempster Shafer Theory with example. (*Dec 2017*)
4. Explain how reasoning is done using fuzzy logic.
5. Explain about Bayesian network.(probabilistic reasoning). (*May 2013*)
6. Explain Bayes theory and its use.
7. Discuss about Bayesian Theory and Bayesian Network. (13) (*Dec 2017*)
8. Explain about various types Knowledge Representation Schemes.

PART-C

1. Explain in detail about forward chaining and backward chaining algorithms with example. (*May 2013 / May 2015*)
2. Explain about room cooler using fuzzy logic control.

UNIT – IV
PLANNING AND MACHINE LEARNING

PART-A

1. Define Planning.
2. What is rote learning. (*Jun 2016*)
3. What is Partial Order Planning ?
4. What are the difference and similarities between problem solving and planning?
5. What are the characteristics of partial order planner?
6. What is a consistent plan?
7. List out the various planning techniques.
8. Give the advantage of STRIPS language.
9. What is hierarchical planning? (*Dec 2017*)
10. Define adaptive learning. (*Dec 2017*)
11. What is meant by learning?
12. List the types of learning.
13. Define supervised learning and unsupervised learning.
14. What is Explanation-Based Learning? How is it useful?
15. List the advantages of Decision Trees.
16. Differentiate between supervised learning & unsupervised learning. (*Nov 2016*)
17. Why do you require Machine Learning?
18. Define Analogy.
19. Define Reinforcement.
20. What are the different types of planners? (*Nov 2016*)
21. Brief frame problem. (*May 2018*)

PART-B

PLANNING:

1. Describe the components of a planning system. (*May 2016*) OR Explain about plan generation systems.(13)
2. Illustrate about nonlinear planning using constraint positioning with an example. (13) (*Dec 2017*) OR Explain about partial order planning. OR Discuss in detail about advanced plan generation systems.

LEARNING:

3. Explain about rote learning. (8)
4. Express your views about learning by taking advice. (8)
5. Explain the various types of learning in problem solving.(8) (*Nov 2016*)
6. Explain about learning from examples or learning by induction method.(13)
7. Explain in detail about EBL or Explanation based learning.(8)
8. Describe learning with macro operators.(8) (*May 2016/Nov 2016*)
9. Explain learning in Decision Tree with example. Or Explain about ID3.(8) (*May 2016/Nov 2016*)
10. Write short notes on the (*Dec 2017*)
 - i. Learning by Parameter adjustment (4)
 - ii. Learning with Macro Operators (4)
 - iii. Learning by chunking (5)

PART-C

1. Describe in detail about Goal stack planning? Or Explain about STRIPS. (15)
2. Explain any two machine learning algorithms. (15) (*Dec 2017*)

UNIT-V
EXPERT SYSTEMS

PART-A

1. Define Expert system.
2. List some of early expert systems. (*May 2016*)
3. List various components of Expert system.
4. Define Forward reasoning and backward chaining.
5. What are the characteristics of Expert system. (*Dec 2017*)
6. What are the applications of Expert system.
7. List out the advantages of Expert system.
8. Define knowledge acquisition.
9. What is meta knowledge? (*May 2016*)
10. Define Expert system shell.
11. Name any 2 expert system tools used for research.
12. Name the people involved in designing expert system.
13. Define MYCIN.
14. Define DART.
15. Define XCON.
16. What is MOLE? (*Dec 2017*)
17. What are the limitations of Expert system.
18. What is Heuristic knowledge.
19. What is called reasoning engine?
20. What is MOLE-p.

PART-B

1. Explain about the rule based architecture of an Expert system.(13)
2. Describe the components of an Expert system.(10) (*May 2016*)
3. Explain about Knowledge acquisition system.(13) (*May 2016*)
4. Describe about Expert system shell.(10)
5. List out the applications of Expert system.(6) (*May 2016*)
6. Write the characteristic features of an Expert system.(6) (*May 2016*)
7. Explain about heuristics.(8)
8. Explain the role of knowledge engineer, domain expert and an end user in an expert system. (8)

PART-C

1. Write short notes on following typical expert systems:
i) MYCIN(12) (*Dec 2017*) ii) DART(12) (*Dec 2017*) iii) XCON (6)
2. Write short notes on following (10). SALT, Metadendral