Module - 1

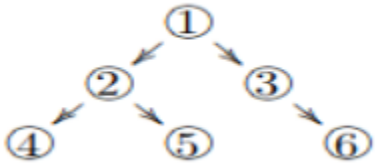
1. Define an agent and rational agent in AI.
2. Solve the following crypt arithmetic problem. EAT + THAT APPLE
3. List major application areas in AI
4. Explain the classes of production system.
5. What is Knowledge? How is it classified?
6. What is meant by state space representation of a problem? Explain.
7. What is a Production System in AI? How Production Systems are classified?
8. Define 8 Puzzle Problem. Represent 8 puzzle problem using a search tree.
9. Discuss any three production system characteristics.
10. Solve the crypt-arithmetic puzzle GO + TO = OUT.

Essays

1. Solve missionaries and cannibals problem.
2. Describe a production system in AI. What are the merits and demerits of production systems?
3. Explain the blocks world problem in AI.
4. Define production systems. Explain the components of a production system.
5. What is a Production System in AI? Explain various types of Production Systems with appropriate examples.
6. Explain various task domains of AI.
7. How Missionaries and Cannibals problem can be solved using State space representation scheme?
8. Explain various AI problem characteristics with appropriate examples
9. What is Water Jug problem in AI? How it can be represented using state space representation scheme. Draw the search tree for the problem
10. Explain various characteristics of AI problems with appropriate examples.

Module - 2

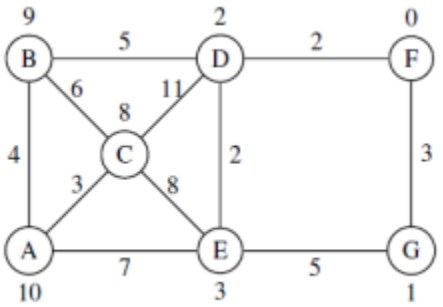
1. Compare and contrast BFS and DFS methods.
2. Define a heuristic function and an admissible heuristic function with examples
3. Define search tree and illustrate with an example.
4. Consider the following graph:



   Starting at root node 1, give the order in which the nodes will be visited by the breadth-first and depth-first algorithms.
5. What are admissible Heuristics? Give examples.
6. What is Steepest ascend hill climbing? How does it differ from Hill climbing? Explain with appropriate examples.
7. What are the problems associated with Hill climbing search procedure?
8. What is Simulated annealing in AI?
9. Why searching is important in AI? How searching algorithms are classified?
10. What is admissible Heuristics? Give any two examples

Essays

1. Explain various uninformed search strategies.
2. Explain the following types of hill climbing:
   a. Simple hill climbing.
   b. Steepest-ascent hill climbing
3. Using the greedy best first search algorithm, find an optimal path from A to F in the search graph given below. In the figure, the numbers written alongside the nodes are the values of the heuristic function and the numbers written alongside the edges are the costs associated with the edges.

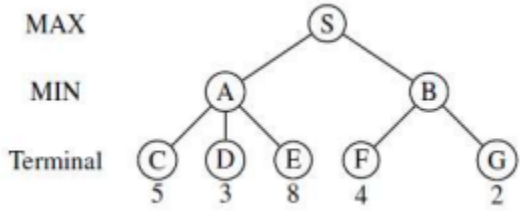


4. Explain about admissible heuristic function with example.
5. Illustrate Iterative Deepening search with an example.
6. Compare Best first search and Breath first Search algorithms.

7. Compare Hill climbing and Steepest ascent hill climbing algorithms with appropriate examples.
8. Explain various blind search strategies in AI
9. Compare Hill climbing and steepest ascend hill climbing search procedures.
10. Explain A* Algorithm. What is its advantage over Best First Search algorithm?

Module - 3

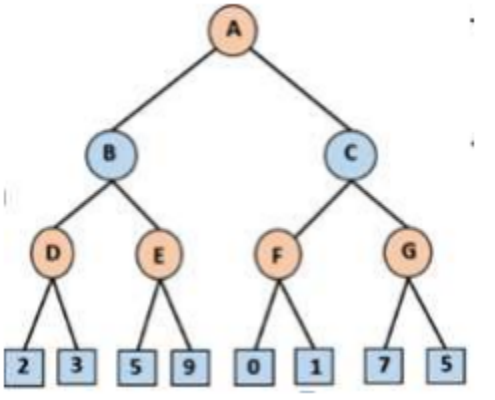
1. Compute MINIMAX(S) in the following game tree.



2. List the requirements for knowledge representation systems in AI
3. Explain the strategy of minimax algorithm
4. Why the alpha-beta pruning method is better than the minimax search method in solving a game?
5. What is the drawback of Minimax algorithm? Discuss
6. Consider the following facts and represent in FOPL: a) Bill has at least one sister. b) All purple mushrooms are poisonous. c) Every gardener likes the Sun.
7. Distinguish between Semantic network based and frame based knowledge representation schemes with the help of an example.
8. Give the conceptual dependency representations of the following sentences: (a) Bob shot Mary. (b) John fertilized the field. (c) Susan drove her car to the office.
9. Represent the following statements using CD structures. a. Bill is a programmer b.Sam gave Mary a box of candy c.Charlie drove the car fast.
10. What is the drawback of Minimax algorithm? How it can be overcome?

Essays

1. Express the following concepts as semantic network structure with interconnected nodes and labeled arcs:Company Hamen is a software development company. Three departments within the company are Sales, Administration and Programming. Ansu is the manager of Programming. Deepthi and Vini are Programmers. Deepthi is married to Vipin.Vipin is an editor for journal of Computing. They have three children and live in Elm street. Deepthi wear glasses and is five feet four inches tall.



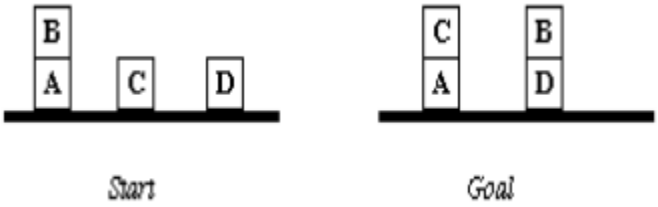
2. What is Conceptual dependency theory? What are its components?
3. Explain MINMAX algorithm with the help of an example.
4. What is Conceptual dependency Theory? What are its components?
5. Express the following concepts as a semantic network structure with interconnected nodes and labeled arcs:
   IGNOU is an open university. It is located in Delhi. IGNOU has a Vice chancellor and has regional centers. IGNOU has a school of studies which offers Academic Programmes such as MCA and BCA.MCA has Syllabus and CS-51 is a MCA syllabus. School of studies has a Director.
6. Discuss Alpha-Beta cut-off algorithm with the help of an example.
7. Explain alpha-beta pruning algorithm with an example.
8. Explain about Frames and Conceptual Dependency.
9. Explain alpha-beta pruning and determine which of the branches in the game tree below will be pruned if we apply alpha-beta pruning to solve the game(Assume that the maximising player plays first).
10. a)List advantages and disadvantages of semantic networks.
    b)Describe the different types of semantic networks with examples.

Module - 4

1. Explain the inference rules in FOPL.
2. Describe supervised, unsupervised and reinforcement learning.
3. Explain the existential and universal quantifiers in First Order Logic.
4. List components of a planning system.
5. What is the advantage of Frame based knowledge representation scheme over FOPL? Explain with an example
6. Compare Supervised, Unsupervised and Reinforcement leaning techniques
7. What is a WFF? Explain quantifiers in FOPL with examples.
8. Discuss the importance of planning in AI? Explain Hierarchical Planning?
9. What are quantifiers? Explain with an example.
10. Explain inference rules in FOPL.

Essays

1. Explain the algorithm to convert WFF to clause with an example
2. Explain Neural net and Genetic learning methods in AI
3. Explain resolution-refutation method in FOPL with an example.
4. Explain
   a) Goal stack planning.
   b)Hierarchicalplanning.
5. What is Goal Stack planning? Solve the following Blocks World problem using goal stack planning algorithm.



6. Consider the following facts and represent it in FOPL:
   Ram is a good student. All good students have high grades. All good students with high grades are bright. Show that Ram is bright using Resolution.
7. John likes all kinds of fruits. Orange is a fruit. Prove that John likes Orange in two ways.
8. Explain various learning techniques in AI? What methods are used for learning?
9. Explain the various forms of learning.
10. What is goal stack planning algorithm? Explain with an example.

Module - 5

1. Give a short note on role of an expert system
2. List some membership functions that define a certain special fuzzy sets.
3. Discuss the roles of individuals who interact with expert system
4. Define a fuzzy set.
5. What is MYCIN? Explain
6. What is the difference between Fuzzy Logic and Binary logic? Give examples.
7. What is Fuzzy Logic? What are its applications?
8. How Expert systems are different from Conventional Programs? Explain.
9. What is the importance of an expert system?
10. Discuss various languages in AI.

Essays

1. What is an Expert system? Explain architecture of an expert system with a diagram.
2. Perform the operations i) Algebraic Sum ii) Bounded sum iiiBounded differance
3. How fuzzy sets are different from crisp sets? Explain following fuzzy operations with examples.i) Fuzzy Union ii) Fuzzy Intersection iii) Fuzzy Compliment
4. Mention characteristic features of an expert system and explain its architecture.
5. With appropriate examples, perform any three operations on Fuzzy sets?
6. What is the importance of an Expert System? Mention its characteristic features. Explain Architecture of an expert system.
7. Define the set-theoretic operations for fuzzy sets with suitable examples.
8. Illustrate the architecture of expert system and mention its features.
9. Given the fuzzy sets
   A = {0.3/2, 0.4/3, 0.1/4, 0.8/5, 1.0/6}
   B = {0.7/4, 0.5/5, 1.0/6, 0.02/7, 0.75/8} find A B and A B.
10. Briefly explain about typical expert systems.