

UNIT I

- 1)What do you mean by control strategies ? What are requirements of good control strategies ?
- 2)Write & explain various AI problem characteristics.
or
Give the characteristics of AI problems with the help of suitable example.
- 3)What is production system ? Give the classification of production system. Explain it with examples.
- 4)List the various task domains of Artificial Intelligence with suitable examples.
- 5) Analyze the following problems with respect to all problem characteristics.
 - i) Travelling salesman problem
 - ii) Block world problem
- 6)What is production system? Give production system rules or water jug problem. Also give the sequence of rules to solve water jug problem
- 7)What is AI ? What are its related fields?
- 8) You are given 4 gallon and 3-gallon water jugs. Both the jugs are initially empty. Neither of them has measuring mark on it. How can you get exactly 2 gallon of water in 4-gallon jug? Define the above problem as state space search Also give solution path from initial state to goal state
- 9) What are the different issues in the design of search programs?
- 10)What are intelligent agents? Draw and explain generic architecture of intelligence agents.
- 11)Explain the importance of defining the problem as a state space search. Give example.
- 12)Why we need production system? Write the different types of production systems and write one example of each type.
- 13) What are issues taken into consideration in the design of search programs. Suggest any optimized solution for it.

Unit II

- 1) Explain generate & test search technique.
- 2) Write the difference between:-
 - i) Procedural and declarative knowledge
 - ii) Predicate logic and propositional logic
 - iii) Forward and Backward reasoning.
- 3) Explain mean-end analysis with the help of robot example.
- 4) What are the problems of hill climbing? How they are overcome?
- 5) Represent the following facts in FOPL and convert them into clause form. Use resolution technique to find that Ravi is spy.
 - i) One of Raman, Ravi, Raghu and Ramesh is spy.
 - ii) Raman is not spy.
 - iii) Spies were light coloured dresses and do not attract attention of others.
 - iv) Raghu was wearing a dark-coloured suit.
 - v) Ramesh was the Centre of attention of that evening.
- 6) Explain resolution in predicate logic in detail
- 7) Explain simple hill climbing.
- 8) Explain generate & test search technique. How it differs from hill climbing?
- 9) Explain best-first search with example
- 10) Explain constraint satisfaction with some examples.
- 11) Write & explain various steps used in conversion of Wffs. into clause form.
- 12) Write short note on resolution in propositional logic.
- 13) Write the steps used for unification algorithm.
- 14) Write and Explain Breadth First Search (BFS) Algorithm considering the Water Jug Problem as an example. Trace out all the steps of BFS algorithm for this example. Also draw the BFS tree and mark on it the BFS solution path.
- 15) What is Best First Search Algorithm? Give its stepwise illustration with respect to suitable example
- 16) What is Hill Climbing Algorithm? What are its limitations? How these limitations are solved?
- 17) What are various approaches to knowledge representation? Explain in detail.
- 18) Represent following facts in wff's in predicate logic.
 - I. Marcus was born in 40 A.D.
 - II. All men are mortal.
 - III. All Pompeians died when the volcano erupted in 79 A.D.
 - I. No mortal lives longer than 150 years.
 - II. It is now 2020.
 - III. Alive means not dead.

IV. If someone dies, then he is dead at all later times.

19)What is resolution in artificial intelligence?

Consider the following sentences:

1.Raju likes all kind of food.

2.Apple and vegetable are food.

3.Anything anyone eats and not killed is food.

4.Rani eats peanuts and still alive.

5.Amit eats everything that Rani eats.

Then using resolution prove that: Raju likes peanuts.

20)Why we need heuristic function? Explain the heuristic function to solve Tic-Tac-Toe problem or 8-puzzle problem.

21)Discuss the importance of heuristic search over conventional search.

UNIT III

1) Explain the following.

i) Scripts

ii) Frames

iii) Conceptual dependency.

2) Construct the semantic network for following sentence.

"Every mail carrier was bitten by a dog".

3) For the following statement, construct a conceptual graph:-

"If a dog is on a mat, then it is a happy pet".

4) Write short note on fuzzy logic.

5) Write a script for restaurant.

6) Represent the following statements using semantic net.

i) Radha gave a book to Sita

ii) Every dog in the city bites the constable

7) What is the importance of using Bayes theorem? Explain, the conditional probability, posterior probability and prior probability.

9) What is Semantic Network? Explain its advantages and disadvantages.

10) Represent the following facts in semantic network:

i. Every batsman has hit a ball.

ii. Every batsman has hit every ball.

iii. Every batsman in team India has hit a ball.

iv. Every batsman in team India has hit every ball.

v. Sachin gave the bat to Saurav.

11) Represent the following logic statements using semantic network nodes and links

i) $(\forall x) [\text{Pigeon}(x) \rightarrow \text{Bird}(x)]$

12) Explain the following :-

i) Fuzzy logic and its applications.

ii) Certainty factor.

iii) Monotonic reasoning with example.

13) Explain in brief how Bayes' theorem can be used for uncertainty handling in AI problem

14) Explain Bayesian network with an example.

UNIT IV

- 1) Explain, with the help of block diagram, knowledge acquisition process.
- 2) What do you mean by expert system shell? Draw neatly the architecture of expert system. Give explanation
- 3) Compare knowledge based expert system with rule based expert system.
- 4) Explain minimax search procedure.
- 5) Explain the two basic parsing techniques & differentiate between them.
- 6) List the levels of NLP and explain each with suitable example.
- 7) What are the types of grammar? Explain each of them.
- 8) What are the different ways in which ambiguity results in a natural language statement? Give an example of each.
- 9) Explain the following any one.
 - i) Mini Max search procedure
 - ii) Alpha - beta pruning
- 10) Explain the following knowledge system building tools any two.
 - i) Radian Rule master
 - ii) KEE (Knowledge engineering Environment)
 - ii) OPS5 system.
- 11) Explain the importance of game playing in AI.
- 12) Write short note on case grammar & semantic grammar.
- 13) Explain the Minmax search procedure with illustration of following:
 - i) One /Two play search
 - li) Backing UP
 - lii) Alpha /Beta cut-off
- 14) What are the types of grammar? Explain each of them.
- 15) What are the different ways in which ambiguity results in a natural language statement? Give an example of each.

UNIT V

- 1) Explain the life cycle of Genetic Algorithm.
- 2) Explain in detail knowledge representation in ANN.
- 3) List the genetic operators and explain each of them with suitable example.
- 4) What do you mean by artificial neural network ? Explain various applications of ANN.
- 5) Explain the following terms:-
 - i) Genes
 - ii) Chromosomes
 - iii) Cost function.
4. Write one application of neural network, and explain it.
5. Draw & explain the basic neuron model with example.
6. Write short note on Genetic Algorithm based machine learning.
- 7) Define :
 - i) Artificial Neural Network.
 - ii) Genetic Algorithm.
- 8) Explain in detail knowledge representation in ANN.
- 9) Write short note on.
 - i) Genetic operator.
 - ii) Neural learning.