63/2 (SEM–4) MCA 4·4

2024

COMPUTER SCIENCE AND TECHNOLOGY

Paper : MCA 4·4

(Artificial Intelligence)

Full Marks : 75

Pass Marks : 30

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following : 1×10=10

   (i) What is the primary goal of Artificial Intelligence ?

   (a) To replicate human intelligence in machines

   (b) To automate tasks that require human intelligence

   (c) To develop machines that can think independently

   (d) All of the above

(ii) Which problem-solving technique involves systematically generating and testing potential solutions ?

(a) Hill climbing

(b) Generate and test

(c) Means-ends analysis

(d) Heuristic search

(iii) What is a characteristic of production system in AI ?

(a) They consist of a set of rules and a control strategy

(b) They are primarily used in heuristic problem-solving

(c) They rely on constraint propagation for problem reduction

(d) They are ineffective in handling uncertainty

(iv) In game playing, what does the minimax algorithm aim to achieve ?

(a) Maximize the player's score

(b) Minimize the opponent's score

(c) Maximize the minimum possible outcome

(d) Minimize the maximum possible outcome

(v) Which knowledge representation technique is based on organizing knowledge into rules with condition-action pairs ?

(a) Frames

(b) Scripts

(c) Rule-based systems

(d) Conceptual dependencies

(vi) Which problem-solving technique involves continually moving in the direction of increasing value, without considering alternative paths ?

(a) Hill climbing

(b) Generate and test

(c) Means-ends analysis

(d) Heuristic search

(vii) Which type of reasoning involves making logical deductions from a set of given facts or rules ?

(a) Deductive reasoning

(b) Inductive reasoning

(c) Abductive reasoning

(d) Analogical reasoning

(viii) What is the primary role of neural networks in artificial intelligence ?

(a) Classification

(b) Regression

(c) Pattern recognition

(d) All of the above

(ix) Which algorithm is used to minimize the number of nodes evaluated in a game tree during search ?

(a) Minimax

(b) Hill climbing

(c) Alpha-beta pruning

(d) Means-ends analysis

(x) Which knowledge representation technique organizes information into structures called "frames", consisting of slots and fillers ?

(a) Frames

(b) Scripts

(c) Rule-based systems

(d) Conceptual dependencies

2. Answer the following : ***(any ten)*** 3×10=30

(a) What do you mean by Artificial Intelligence ?

(b) What are the goals of Artificial Intelligence ?

(c) Describe the steps involved in the minimax algorithm for game playing.

(d) Discuss the role of heuristic functions in heuristic search techniques.

(e) Define knowledge representation and what are the types of knowledge representation ?

(f) What are the difference between deductive and inductive reasoning in Artificial Intelligence ?

(g) Difference between informed search and uninformed search.

(h) Define minimax algorithm and write its properties.

(i) Explain the rule-based systems in Artificial Intelligence.

(j) What are monotic and non-monotic reasoning ?

(k) Define generate and test technique.

3. Answer the following : ***(any five)*** 5×5=25

(a) Discuss the advantages and disadvantages of the Artificial Intelligence.

(b) Explain the components and characteristics of a production system in Artificial Intelligence.

(c) Explain breadth first search with example.

(d) Discuss the knowledge representation techniques in Artificial Intelligence.

(e) Describe the concept of artificial neurons.

(f) Discuss the objectives of the Artificial Intelligence.

(g) Discuss various application of Artificial Intelligence.

(h) What is first order logic and mention its components and give one example ?

4. Write a short notes on : ***(any one)*** 10×1=10

(a) History of Artificial Intelligence

(b) Neural Network

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