

Model Paper AI

Q1 is compulsory. Attempt any 3 rest of questions.

1. Differentiate :

a. difference between meta knowledge and heuristic knowledge

Meta knowledge: Knowledge about knowledge, e.g., the knowledge that blood pressure is more important for diagnosing a medical condition than eye color.

Heuristic knowledge: Rule-of-thumb, e.g. if I start seeing shops, I am close to the market.

Heuristic knowledge is sometimes called shallow knowledge.

Heuristic knowledge is empirical as opposed to deterministic

b. conventional system and expert systems

An expert system is different from conventional programs in the sense that program control and knowledge are separate. We can change one while affecting the other minimally. This separation is manifest in ES structure; knowledge base, working memory and inference engine. Separation of these components allows changes to the knowledge to be independent of changes in control and vice versa.

c. monotonic and non monotonic reasoning

Non-Monotonic reasoning is used when the facts of the case are likely to change after some time, e.g. Rule: IF the wind blows THEN the curtains sway When the wind stops blowing, the curtains should sway no longer. However, if we use monotonic reasoning, this would not happen. The fact that the curtains are swaying would be retained even after the wind stopped blowing. In non monotonic reasoning, we have a „truth maintenance system“. It keeps track of what caused a fact to become true. If the cause is removed, that fact is removed (retracted) also.

2. Forward chaining and its approach?

Forward Chaining Let's look at how a doctor goes about diagnosing a patient. He asks the patient for symptoms and then infers diagnosis from symptoms. Forward chaining is based on the same idea. It is an "inference strategy that begins with a set of known facts, derives new facts using rules whose premises match the known facts, and continues this process until a goal state is reached or until no further rules have premises that match the known or derived facts". As you will come to appreciate shortly, it is a data-driven approach. Approach 1. Add facts to working memory (WM) 2. Take each rule in turn and check to see if any of its premises match the facts in the WM 3. When matches found for all premises of a rule, place the conclusion of the rule in WM. 4. Repeat this process until no more facts can be added. Each repetition of the process is called a pass.

3. Describe Appropriate Domains for Expert System?

When analyzing a particular domain to see if an expert system may be useful, the system analyst should ask the following questions: • Can the problem be effectively solved by conventional programming? If not, an ES may be the choice, because ES are especially suited to illstructured problems. • Is the domain well-bounded? e.g. a

headache diagnosis system may eventually have to contain domain knowledge of many areas of medicine because it is not easy to limit diagnosis to one area. In such cases where the domain is too wide, building an ES may be not be a feasible proposition. • What are the practical issues involved? Is some human expert willing to cooperate? Is the expert's knowledge especially uncertain and heuristic? If so, ES may be useful.

4. Convert this to CNF $(A \vee B) \rightarrow (C \rightarrow D)$?

$$(A \vee B) \rightarrow (C \rightarrow D)$$

$$1. \neg(A \vee B) \vee (\neg C \vee D)$$

$$2. (\neg A \wedge \neg B) \vee (\neg C \vee D)$$

$$3. (\neg A \vee \neg C \vee D) \wedge (\neg B \vee \neg C \vee D)$$

5. In Adversarial Search evaluation function is used to score / number the nodes? Do you agree or not. Give Reason

If we have a situation analyzer that converts all judgments about board situations into a single, overall quality number. This situation analyzer is also called a static evaluator and the score/ number calculated by the evaluator is called the static evaluation of that node. Positive numbers, by convention indicate favor to one player. Negative numbers indicate favor to the other player. The player hoping for positive numbers is called maximizing player or maximizer. The other player is called minimizing player or minimizer.