

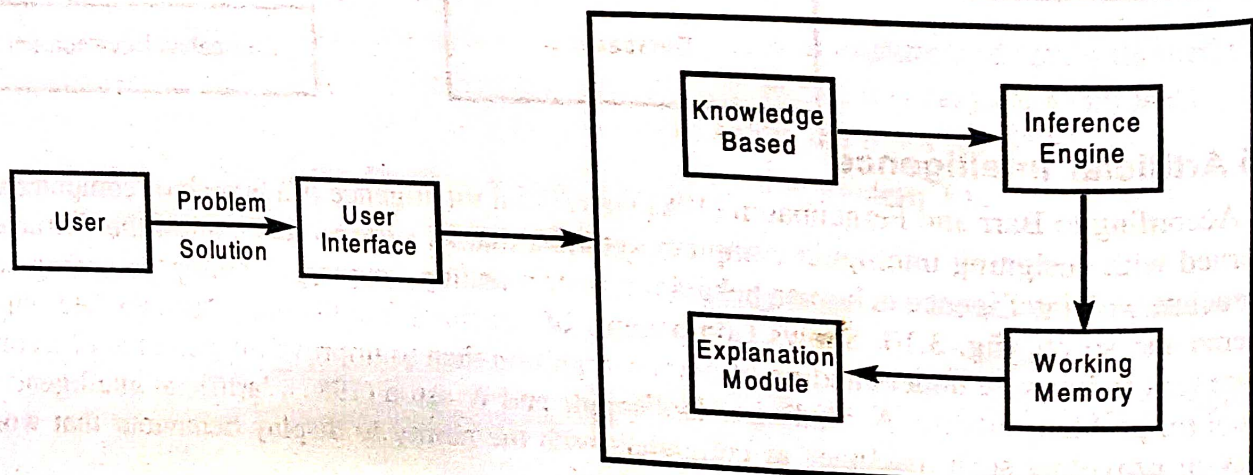
Fig. 3.9. Artificial Intelligence.

3.9.6 Expert System

An expert system stores the knowledge of an expert in a specific area of study, such as internal medicine, genetic engineering/DNA engineering and so on. Expert systems could be classified either as operation information system or management information system. Although expert systems is versatile, it cannot be used everywhere. Seven questions must be answered before implementation of expert systems :

- Is domain expertise rare and expensive ?
- Is the knowledge likely to be inconsistent and incomplete ?
- Does the problem-solving process involve judgement, heuristics and rule of thumb ?
- Is it possible to state precisely what the system should do ?
- Is common sense required to solve the problem under study ?
- Can distributing the solutions to this class of problems derive significant benefits ?
- Is top management committed to solving this problem under study ?

a. Components of an Expert System



(i) Knowledge Base (KB)

Knowledge Base is a depository of knowledge that human experts might apply to solve problem in a subject area like medicine, engineering, finance and so on.

Heuristics are based on experience, intuition and judgement and hence vary from one expert to another.

Deep knowledge. Includes general theories, first principles and axioms acquired from textbooks and school.

Surface knowledge. Obtained from experience and heuristics.

(ii) Inference Engine. It is a section of software that determines what knowledge to apply, when and how to apply it. A program has the ability to reason and draw inferences. There are two types of reasoning :

a. Deductive Reasoning. Arrives at a specific conclusion based on a set of general principles and facts.

Example : *General Principle : All human beings are intelligent.*

Fact : Ram is a human being.

Conclusion : Ram is intelligent

b. Inductive Reasoning. Uses facts to arrive at general principle.

Example : *Fact : IBM has a profit and loss statement.*

Fact : Microsoft has a profit and loss statement.

Fact : Both IBM and Microsoft are business organisations.

General Conclusion : Business organisations in general, have profit and loss statements.

(iii) User Interface (UI). A User Interface is software that helps a user to interact with the computer by accepting input from the user and displaying different kinds of output.

(iv) Working Memory (WM). Working Memory also referred to, as the "blackboard" is the fourth component of an expert system. It provides temporary storage for data related to the problem at hand. It consists of the following elements :

- *The plan of action for solving the problem.*
- *The action that needs to be implemented to solve the problem and*
- *The alternative courses of action that can be taken to solve the problem.*

(v) Explanation Module (EM). Explanation module answers questions such as :

- *How to arrive a solution for a particular problem under study ?*
- *What were the intermediate steps in the problem solving process ?*
- *Why were certain alternatives rejected ?*
- *What type of knowledge was used to solve the problem ?*

Explanation Module can provide either 'canned' or 'customised' explanation to queries. Explanation module is like a Teacher who explains how and why of the problem solving process. The relationship of MIS and operation information systems to business operations and various levels of management were shown in the Fig. 3.10.