# * AIR Assignment No. 1 *

**Aim :-** Implementation of an expert system

**Problem Definition :-** Implement expert system for medical diagnosis of 10 diseases based on adequate symptoms.

**Input :-** Yes / No (Answer given by the user for questions which is asked by system).

**Output :-** Name of disease (disease whose symptoms matches with user input)

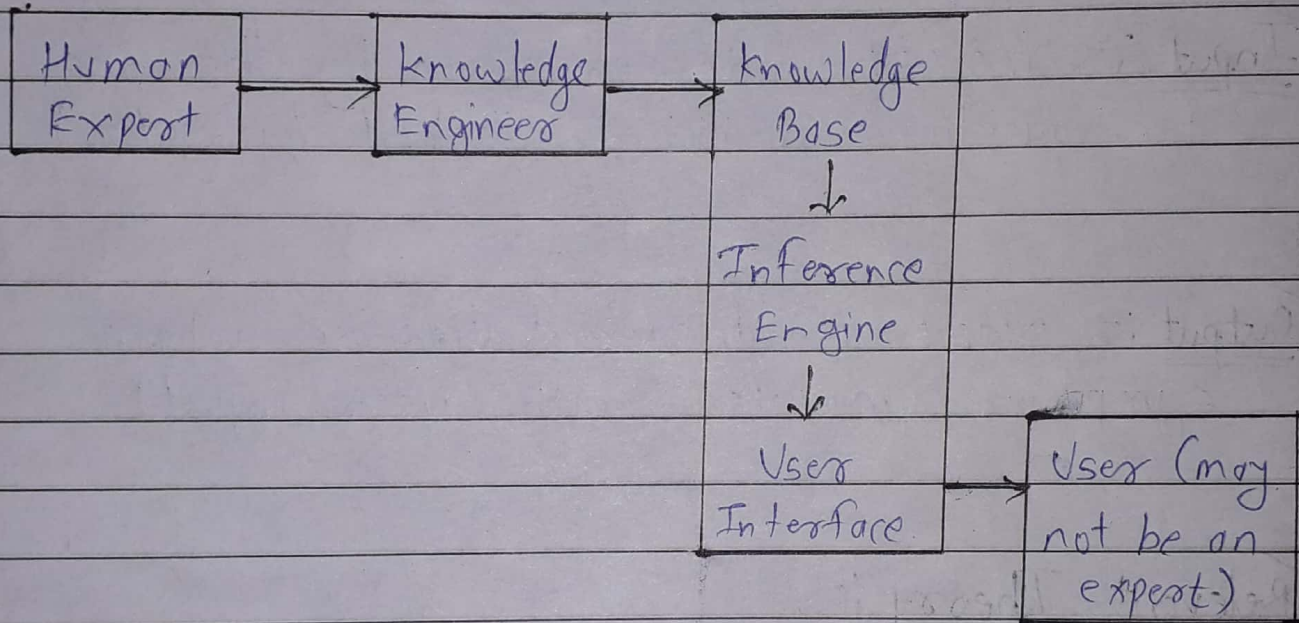**Relevant Theory :-**

**Expert System :-**
 · An expert system is a computer program that, when well crafted user artificial intelligence (AI) technologies to simulate the judgement & behaviour of a human or an organisation that has expert knowledge & experience in a particular field.

**Medical Expert System :-**
 A medical expert system is a computer

Program that when well crafted, gives decision support in the form of accurate diagnostic processes, laboratory analysis, treatment protocol, & teaching of medical students & residents.

## Architecture of Expert system :-

| Human Expert | → | Knowledge Engineer | → | Knowledge Base | |
| | | | | ↓ | |
| | | | | Inference Engine | |
| | | | | ↓ | |
| | | | | User Interface | → | User (may not be an expert) |

## Knowledge Base :-
The knowledge base represents facts & rules. It consists of knowledge in a particular domain as well as rules to solve a problem. procedures & intrinsic data relevant to domain.

## Inference Engine :-
The function of the inference engine is to fetch the relevant knowledge from the knowledge base, interpret it & to find a

a solution relevent to the user's problem. The inference engine acquires the rules from its knowledge base & applies them to known facts to infer new facts, inference engine can also include an explanation & debugging abilities.

User interface :- This module makes it possible for a non-expert user to interact with expert system & find a solution to the problem.

Advantages :-
- Low accessebility cost
- Fast response
- Low error rate

Disadvantages :-
- The expert system has no emotions.
- It is developed for specific domain.
- It needs to be updated manvally. It doesn't learn itself.
- Not capable to explain the logic behind the decision.

* Conclusion :- From the assignment, we understand the working & importance of expert system & we design a medical diagnosis expert system.

# * Decision Tree :-

**Are you Sick?..**

- yes
- no

yes → **Do you've Fever**

no → **Great! Stay Safe**

**Do you've Fever**
- yes → **fatigue**
- No → **Chest pain**

**fatigue**
- yes → **Headache**
- No → **Nausea**

**Chest pain**
- yes → **Cough**
- No → **Blurred vision**

Nausea — yes → Cough

**Headache**
- yes → **muscle pain**
- No → **loss of Appetite**

**Cough**
- yes → **shortness of breathe**

**Blurred vision**
- yes → **Thirst**

**muscle pain**
- yes → **pain behind eye**
- No → **Bodyache**

**loss of Appetite**
- yes
- No → **Abdominal Pain**

**shortness of breathe**
- yes → **You've Asthama**

**Thirst**
- yes → **Weight loss**

**pain behind eye**
- yes → **You've Dengue**

**Bodyache**
- yes → **Anaemia**
- No → **Red Spots**

**You've Asthama**
- yes → **Yellow Eye**
- No → **Nausea**

**Weight loss**
- yes → **You've diabetes**

**You've Dengue** → **You've Malaria**

**Anaemia**
- yes
- No → **Running nose**

**Red Spots** → **You've Chicken pox**

**Abdominal Pain**
- yes → **Yellow Eye**

**Nausea**
- yes → **Loose stool**

**You've diabetes**
- No → **Muscle Pain**

**You've Malaria**
→ yes → **Watering Eye**

**Running nose**
- yes → **Watering Eye**

**Yellow Eye**
- yes → **You've Jaundice**

**Loose stool**
- yes → **You've Diarrhea**

**Muscle Pain**
- yes → **You've Typhoid**

**Watering Eye**
- yes → **You've Common cold**