



# **SNS COLLEGE OF ENGINEERING**

**Kurumbapalayam(Po), Coimbatore – 641 107**

**Accredited by NAAC-UGC with 'A' Grade**

**Approved by AICTE, Recognized by UGC & Affiliated to  
Anna University, Chennai**

**Department of Artificial Intelligence and Data Science  
Course Name – Introduction to Artificial Intelligence**

**II Year / III Semester**

**Unit 5 Expert System and Application**





# Inference Engine

It is the **brain** of the Expert System.

1. **Match the premise patterns** of the rules against elements in the working memory. Generally the rules will be domain knowledge built into the system, and the working memory will contain the case based facts entered into the system, plus any new facts that have been derived from them.

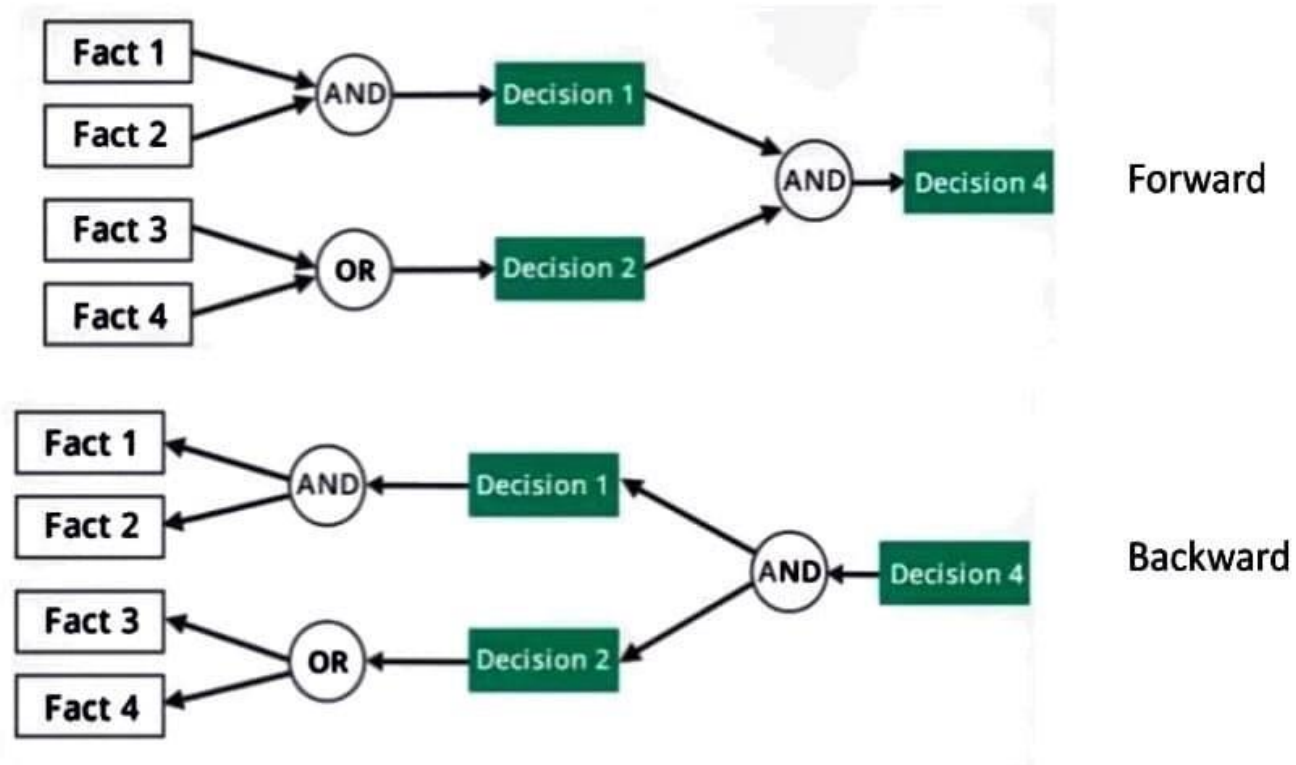
2. If there is more than one rule that can be applied, use a **conflict resolution strategy** to choose one to apply. Stop if no further rules are applicable.

3. **Activate the chosen rule**, which generally means adding/deleting an item to/from working memory. Stop if a terminating condition is reached, or return to step 2.

- Early production systems spent over 90% of their time doing **pattern matching**.

# Chaining

To recommend a solution, the Inference Engine uses the following strategies –Forward Chaining, Backward Chaining





# Forward Chaining

- Forward Chaining -"What can happen next?" Here, the Inference Engine follows the chain of conditions and derivations and finally deduces the outcome.
- It considers all the facts and rules, and sorts them before concluding to a solution.
- This strategy is followed for working on conclusion, result, or effect.
- For example, prediction of share market status as an effect of changes in interest rates.



# Backward Chaining

- Backward Chaining - An expert system finds out the answer to the question, “**Why this happened?**”
- On the basis of what has already happened, the Inference Engine tries to find out which conditions could have happened in the past for this result.
- This strategy is followed for **finding out cause or reason**. For example, diagnosis of blood cancer in humans.





# User interface

The Expert System user interface usually comprises of two basic components:

1. **The Interviewer Component** : This controls the dialog with the user and/or allows any measured data to be read into the system. For example, it might ask the user a series of questions, or it might read a file containing a series of test results.
2. **The Explanation Component** : This gives the system's solution, and also makes the system's operation transparent by providing the user with information about its reasoning process.