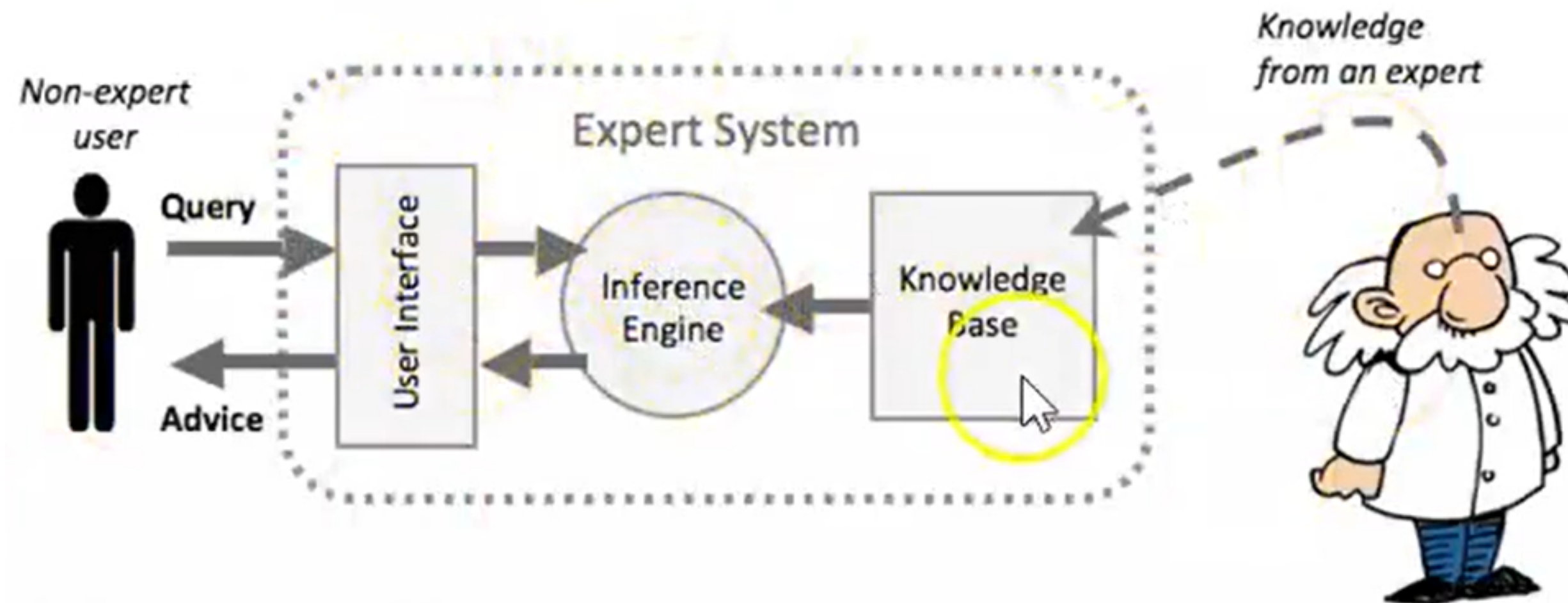# *EXPERT SYSTEM*

LESSON : 02

What is the inference engine?

□ The inference engine is the part of the expert system that makes judgements and reasoning using the knowledge base and user responses.

□ It is designed to produce reasoning based on a set of rules.

What does the inference engine do? How does it do this?

☐ It organizes and controls steps to solve the problem. It uses a method called the chaining method to do this. It combines IF-THEN rules to form a line of reasoning

☐ The IF part is a condition, for example IF I am hungry. The THEN part is an action.

☐ For example IF I am hungry THEN I will need to eat.

There are two methods that can be used to obtain a result by the inference engine. How does it know which method to use?

☐ It will depend on how the expert system was designed. If it is designed to produce a diagnosis or final result.

As opposed to:

☐ It begins with a known conclusion and then tries to support or gain evidence for this conclusion.

One method is forward chaining. What is this?

One method is forward chaining. What is this?

□ If the process starts with a set of conditions and chaining moves towards a final conclusion, this is called forward chaining.

► In a forward chaining ing syst system, the expert system will take the data input and match it to the knowledge and rules it contains.

► It will keep doing this until it can reach an end goal or outcome.

► A forward chaining system is data driven. Data is gathered about the problem and then the system infers what it can from the data to reach a conclusion.

Example of forward chaining

□ If the user has a temperature higher than 37 degrees, they have a fever

□ If the user has been sick for a week and has a fever, the user may have a bacterial infection

□ These start with conditions that produce a diagnosis

What is backward chaining?

☐ If the process starts with a known conclusion, but the path to it is unknown, the chaining will work in reverse and this is called backward chaining.

☐ The system in this case has a goal or solution and the inference engine attempts to find the evidence to prove it.

Example of backward chaining.

The assertion to be proved:

Patient has a fever

☐ If the person has a temperature of over 37 degrees, then the person has a fever.

Assertion to be proved: Patient has a throat infection

☐ If the person has a red throat then there are signs of a throat infection

Activation Function

Advantages	Disadvantages
• Fewer mistakes - expert systems never forget answers to problems. People do! • More knowledge than a single human expert (combine the knowledge of many experts). • Cheaper to use than hiring very expensive human experts to solve your problems. • More consistent answers than human experts (they give the same answers to the same problems every time).	• They cannot make judgments and lack common sense. • Errors in the rule base can lead to incorrect decisions being made. • Require lots of training before people can use them correctly.

Give any uses for an expert system.

☐ medical diagnosis

☐ car mechanical diagnosis

☐ playing chess

☐ providing financial advice

☐ troubleshooting computer and printer issues

☐ identifying items, for example plants and birds

☐ using a telephone helpdesk.

THANK-YOU