Questions 7

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Question 1

Consider the following production rule:

$$\text{IF} \quad \textit{green} \quad \text{THEN} \quad \textit{walk}$$

a) What is the antecedent of this rule?

b) What is the consequent of this rule?

c) Which part of the rule will be matched against the working memory in case of forward chaining?

d) And in case of backward chaining?

Question 2

The following is the rule set of a simple weather forecast expert system:

1	IF	*cyclone*	THEN	*clouds*
2	IF	*anticyclone*	THEN	*clear sky*
3	IF	*pressure is low*	THEN	*cyclone*
4	IF	*pressure is high*	THEN	*anticyclone*
5	IF	*arrow is down*	THEN	*pressure is low*
6	IF	*arrow is up*	THEN	*pressure is high*

a) Use forward chaining to reason about the weather if the working memory contains the fact: *arrow is down*. Show your answer in a table naming the rules matching the current working memory (conflict set), which rule you apply, and how the working memory contents changes on the next cycle after a rule has fired:

Cycle	Working Memory	Conflict set	Rule fired
⋮	⋮	⋮	⋮

b) Use backward chaining to reason about the weather if the working memory contains the fact: *clouds*. Show your answer in a similar table.

c) Suppose that the user interface of our ES allows the system to ask a user about the facts whether they are true or false. What question (or questions) the system should ask the user in order to conclude that the sky is clear? What will the user answer? Which rule will require the clarification from the user?

Question 3

Consider the following familiar set of rules:

1	IF	*green*	THEN	*walk*
2	IF	*red*	THEN	*wait*
3	IF	*green* AND *blinking*	THEN	*hurry*
4	IF	*red* OR *green*	THEN	*traffic light works*

a) Which of the above rules will be put into a conflict set by the system if the working memory contains two facts: *green*, *blinking*? Explain why each rule is selected or not.

b) Which of the rules would fire if we used the specificity conflict resolution strategy? Explain why.

Question 4

Describe characteristics of problems in which it is better to use rule–based expert systems or problems where the case–based systems are more appropriate.

Question 5

Briefly describe the cyclic process of CBR.

Question 6

Briefly describe the nearest neighbour retrieval method used in CBR systems for case retrieval.