

## IS Prelim 0607

**24.** a. The expert system is limited to providing advice contained within its knowledge base. It cannot provide advice on any new cameras that come out. The system cannot provide any common sense advice. It may recommend a camera that is not in stock and will not be re-stocked, which a person would not.

b. (i). The inference engine applies the facts to the rules and determines the order that questions are asked via the user interface.

(ii). The KRL is used to code the knowledge gathered during the knowledge acquisition stage as facts and rules in the knowledge base.

**25.** a. Internist and MYCIN are examples of expert systems used for diagnosis whilst ONCOCIN was used for planning.

b. An expert system is designed to provide the actual advice that is used to treat a patient.

A decision support system provides information that is used as part of the process by medical professionals to allow them to best develop solutions and treatments for patients symptoms.

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**25.** c. (i). If a patient develops a problem that could have been avoided had the expert system been used, then the patient may choose to sue the doctor who ignored the advice.

(ii). Perhaps it could be decided in the future all doctors must consult with an expert system before carrying out a course of treatment for certain conditions.

**26.** a. R3 and R4

b. (i). Advice: Restaurant is Uropa.

Rule ordering chooses the first rule in the conflict set which is rule 3, with the advice as shown.

(ii). Advice: Restaurant is Uropa.

Specificity picks the rule with most conditions attached. Rule 3 has 4 conditions while rule 4 has only 3.

c. The domain is restricted to Restaurants within Glasgow.

The range and coverage of rules is very restricted as there are only a very small number of restaurants and restaurant types covered. Very few constraints are also taken into account, which could affect the quality of advice.

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**27. a.** An experienced caseworker would be a suitable expert.

They would be involved in observing or taking part in testing the system to ensure that the advice generated by the system matches the advice that they would give.

b. (i). Poor advice may be generated due to a poor choice generated by the implementation of a particular conflict resolution strategy.

(ii). The knowledge engineer coding the system may code information wrongly.

c. (i). The nature of the domain can affect the type of inference engine used.

Often a planning system is better suited to backward chaining, whereas advice, diagnosis and classification systems are better suited to forward chaining.

If there are only a limited number of goals and many different factors to consider in seeking a goal, then this scenario might well suggest a backward chaining system should be used.

(ii). Using both methods could help to lead to more efficient generation of advice quickly. It could help to cut down the asking of questions that will ultimately prove pointless as they do not help to pinpoint any particular advice.

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**27. d.** The expert system will be far more effective in terms of timing. Advice will be generated very quickly, whereas the caseworkers sometimes had delays of a matter of months.

The availability of the system is also an improvement. Whenever a user has access to a computer, night and day, they have access to the system. Care workers will only be available during working hours, and can take holidays or be ill, meaning they are unavailable

**28. a.** mammal ( has\_hair, provides\_milk)

carnivore (mammal, meat\_eating, has\_claws, has\_pointed\_teeth)

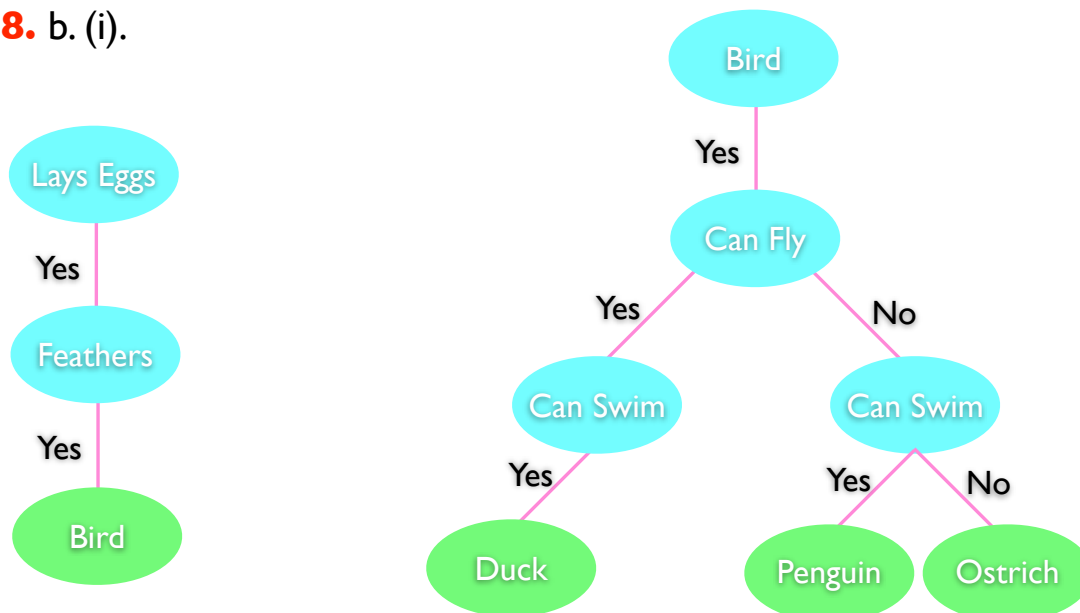
tiger (carnivore, has\_black\_stripes)

giraffe (ungulate, has\_long\_neck)

zebra (ungulate, has\_black\_stripes)

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28. b. (i).



(ii). The decision tree provides a visual representation of the knowledge and makes it easier to follow each branch to identify potential problems in the system.

The factor table is easier to use to represent information when there are a lot of goals with many conditions attached as the decision tree can become too large to represent on a page.

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28. c. (i).  $\forall(x): \text{elephant}(x) \rightarrow \text{grey}(x)$

(ii).  $\forall(x): \text{has\_large\_ears}(x) \wedge \text{african}(x) \rightarrow \text{grey}(x)$

d. An expert system extracts information by posing the user questions via the user interface and then providing the user with the appropriate piece of advice. A relational database extracts information by the user performing a query (search) and entering the appropriate constraints into the required fields. All records that match the query constraints are then provided to the user.

29. a. Certainty factors can be used to show the user that there is an element of risk in taking the advice generated by the expert system.

They can also be used at the input stage, to allow the user to indicate their degree of confidence in their answer to a particular question, as they may be less than 100% sure that the answer they are giving is correct.

b. CF conclusion = CF rule x Min (CF condition)

CF = 80% x Min (80%, 70%)

CF = 80 x 70

CF = 56%

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**30.** c. The expert system would use How justification.

The system would indicate the questions posed to the user and give the user responses to show how the combination of questions and answers justifies the advice.