

Print Name:

PART A: Knowledge Engineering

Question 1

A Knowledge Engineer needs knowledge or understanding of three main areas, list them:
[6 marks]

1. Knowledge elicitation
2. Knowledge level modelling
3. Knowledge representation

(sensible variations were permitted)

Question 2

In the AI documentary we watched John Searle introduce the story of the *Chinese Room*. Briefly describe the implication of the Chinese Room for AI.
[10 marks].

The Chinese Room implies that it is possible for a computer to seem intelligent by just manipulating symbols and following rules or procedures, without having any understanding of what the symbols mean or ever learning what the symbols mean.

Computers are by definition symbol manipulators and therefore will never understand or have true intelligence.

But, on the other hand, the Chinese Room shows that a symbol manipulator can seem intelligent and from a users perspective that may be sufficient.

Question 3

What is the *knowledge elicitation bottleneck* and what are its causes?

[6 marks]

The knowledge elicitation bottleneck refers to the observation that the task of eliciting or obtaining knowledge from domain experts is the most difficult and time consuming task in developing a knowledge based system. Once the knowledge has been elicited, modeling and coding are relatively easy tasks and hence knowledge elicitation is a bottleneck in the development process.

Knowledge elicitation is difficult because domain experts often find it difficult to express their knowledge as rules and/or may find it hard to verbalise at all. This is made especially difficult when problem solving knowledge is tacit rather than explicit. Tacit knowledge may be impossible to codify.

Question 4

What is heuristic knowledge? Give an example.

[5 marks]

Heuristic knowledge is like a “rule of thumb” something that is normally true but to which there may be exceptions.

For example: IF the location is Auckland AND the season is winter THEN it's raining

Question 5

Not all knowledge is suitable for inclusion in a knowledge based system. Is dynamic knowledge suitable or not? Please explain your answer.

[5 marks].

No it is not. Dynamic knowledge is constantly changing which means it may have changed by the time the knowledge has been elicited, modeled and implemented. Moreover, if the knowledge changes very fast it may even be changing whilst the KBS is problem solving. Knowledge must remain stable during problem solving.

Question 6

List four advantages of knowledge level modeling.

[8 marks].

1. identify errors

2. identify omissions

3. identify contradictions

4. reduce the cost of re-writes

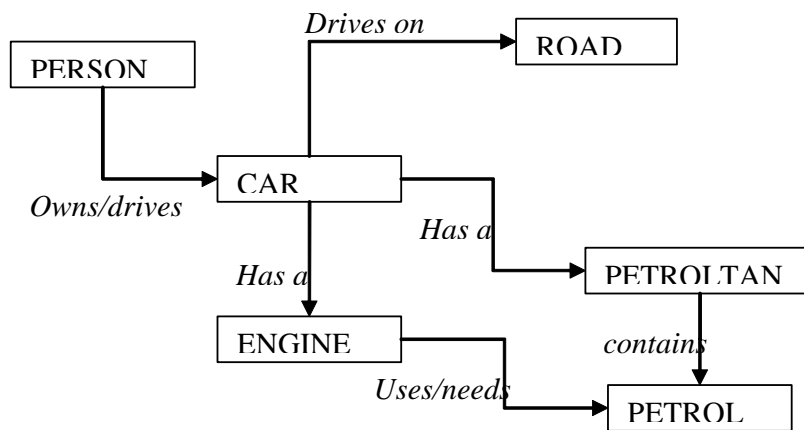
(variations on the above and sensible answers also gained marks)

Question 7

Create a semantic network to describe a car. Your network should include the concepts: *car*, *person*, *engine*, *fuel*, *fuel tank*, and *road*.

[12 marks]

There is no single correct semantic network, something like the following would get full marks



Question 8

Define a CLIPS rule for the following pseudocode:

```
IF the animal is a dog
THEN the sound made is woof
```

[4 marks]

```
(defrule dog "optional comment"
  (animal-is dog)
  =>
  (assert (sound-is woof)))
```

(some marks were lost for incorrect syntax)

Question 9

What happens if you define two rules in CLIPS both called *dog* ?

[4 marks]

Each rule must have a unique name. If two rules are defined with the same name the rule that is defined last (i.e., the second) will overwrite the first.