

BE2-R3: ARTIFICIAL INTELLIGENCE AND APPLICATIONS

NOTE:

1. Answer question 1 and any FOUR questions from 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.
 - a) Why Backtracking (or depth-first-graph search) control strategies should be used when there are multiple paths between problem states. Explain your answer with the help of an example.
 - b) Let Y and R be two fuzzy sets of young and rich people. What is the member grade of person being young and rich if the member grade of a person being young is 0.8 and being rich is 0.7?
 - c) What are the desirable properties of Natural Language as a medium for human-machine interaction?
 - d) What do you mean by planning? How it is useful in achieving goals and strategy?
 - e) Define the term "pattern recognition" and "learning from experience" with respect to Neural Networks.
 - f) A Bayesian Network is a graphical representation of a probability distribution. What are the advantages of it? How does Bayesian Network learn?
 - g) The usefulness of current expert systems depends on their users having common sense and explanation facility. Justify the sentence by giving an example.

(7x4)

2.
 - a) What do you understand by underestimation and overestimation of a heuristic function? Why is it must for the heuristic function to underestimate in case of A* algorithm.
 - b) Prove each of the following statements:
 - i) Breadth First Search is a special case of uniform cost search.
 - ii) Random search is a special case of A* algorithm.
 - c) State and explain unification algorithm. Trace the operation of unification algorithm on each of the following pairs of literals:
 1. $P(x, f(x))$ and $P(y, y)$
 2. $P(g(f(v)), g(u))$ and $P(x, x)$
 - d) Differentiate between declarative and procedural knowledge.

(4+4+6+4)

3.
 - a) Trace the execution of the constraint satisfaction procedure in solving the crypt arithmetic problem:

$$\begin{array}{r} \text{LOGIC} \\ + \\ \text{LOGIC} \\ \hline \end{array}$$

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- b) What do you mean by partitioned semantic nets? Draw the partitioned semantic net for "Andrew believes that the earth is flat".
- c) What are the components in which knowledge is composed in Expert System? Explain the formalization with reference to development cycle of an Expert System.

(10+4+4)

