Assignment Unit 1

MCA Semester-III

PS03CMCA53: Artificial Intelligence

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1. List any three characteristics of natural intelligence.
2. Describe Turing Test.
3. Explain Production Systems w.r.t AI. Elaborate w.r.t water-jug problem.
4. What is full form of DIKW? Explain it using Pyramid Structure.
5. Draw general structure of KBS.
6. What are the limitations of knowledge acquisition in a typical KBS?
7. List three strategies of knowledge update.
8. Give full form of WFF. Where can it be used?
9. Define predicate in knowledge representation.
10. Explain with steps following three types of Hill Climbing. Mention advantages and disadvantages of each.
    - Simple hill Climbing:
    - Steepest-Ascent hill-climbing:
    - Stochastic hill Climbing:
11. Explain following terms(with diagram) w.r.t Hill climbing.
    - Local Maximum
    - Global Maximum
    - Shoulder
    - Flat Maximum (Plateau)
    - Ridge
12. Describe limitations of symbolic representations of knowledge into a typical KBS.

13. Given a full 5-gallon jug and an empty 2-gallon jug, the goal is to fill the 2-gallon jug with exactly one gallon of water. You may use the following state space formulation. State = (x,y), where x is the number of gallons of water in the 5-gallon jug and y is # of gallons in the 2-gallon jug

    Initial State = (5,0)

    Goal State = (*,1), where * means any amount

Create the search tree. Discuss which search strategy is appropriate for this problem.

14. Explain heuristics. Write down two heuristics (Hamming Distance and Manhattan Distance) that can be utilized to solve 8-puzzle problem.

15. Breadth First Search Guarantees Solution. Depth First does not, but Iterative Deepening Search again guarantees a solution. Justify your agreement/non-agreement.

16. A man is walking down the village road with a tiger, a goat and a bundle of grass. Soon he arrives at the river bank where there is one tiny boat that can carry him and another animal or grass at a time. Constraint: Left alone, the tiger will eat the goat. And similarly, the goat will eat the grass bundle.
    - Formulate and Draw State-Space Search Steps for the above problem (till depth 3/or till the Goal is reached.
    - Is it a good idea to check for repeated states?

17. Why do you think people have a hard time solving this puzzle, given that the state space is so simple?

18. Draw First four piles of Game tree for Tic-Tac-Toe.

19. Differentiate between the following giving one example of each.
    - Tacit Knowledge and Explicit Knowledge
    - Procedural Knowledge and Declarative Knowledge
    - Prepositional Logic and Predicate Logic
    - Predicate Logic and Fuzzy Logic
    - Backward Chaining and Forward Chaining