SRM IST, NCR Campus

Department of CSE

AI CSC305J

**Assignment 1**

Unit 1

1. What are the main techniques used in AI?
2. What are advantages and disadvantages of using AI?
3. Write brief history of AI.
4. Write different example of usage of AI techniques in real world.
5. What do you mean by AI agent? What are different types of agents?
6. What is an intelligent agent and how does it differ from a traditional agent?
7. What are the key characteristics of a rational agent and how are they measured?
8. How does flexibility affect the performance of an intelligent agent?
9. What are the properties of a task environment and how do they impact the performance of an agent?
10. What are the different types of agents and what are their strengths and weaknesses?
11. How do agents handle uncertainty and what are the different methods used?
12. What are the challenges in designing and implementing intelligent agents?
13. How do agents coordinate and communicate with other agents?
14. How do agents learn and improve over time?
15. How do we evaluate the performance of an intelligent agent?
16. What are some of the open research challenges and future directions in the field of AI and intelligent agents?
17. How do agents make decisions and what are the different decision-making methods used?
18. How do agents handle time-constrained problems and what are the different methods used?
19. How do agents handle human-agent interaction and what are the different methods used?
20. What is a constraint satisfaction problem (CSP) and what are the key characteristics?
21. Can you provide examples of crypto arithmetic puzzles and how they relate to CSPs?
22. How are constraints represented in CSPs and what are the different methods used?
23. How does backtracking work in CSPs and what is its role in solving problems?
24. How do heuristics impact the performance of backtracking in CSPs?
25. What is forward checking and how does it relate to constraint propagation in CSPs?
26. How does constraint propagation impact the performance of CSPs?
27. What is intelligent backtracking and how does it differ from traditional backtracking in CSPs?
28. How does intelligent backtracking improve the performance of CSPs?
29. How do we evaluate the performance of CSP algorithms?
30. Solve Water jug problems:
    1. Given three jugs with capacities of 8 gallons, 5 gallons and 3 gallons, and an infinite water source, the goal is to measure exactly 4 gallons of water.
    2. Given two jugs with capacities of 7 gallons and 5 gallons, and an infinite water source, the goal is to measure exactly 6 gallons of water.
    3. Given two jugs with capacities of 5 gallons and 3 gallons, and an infinite water source, the goal is to fill the 5-gallon jug to the 3-gallon level.
    4. Given three jugs with capacities of 11 gallons, 9 gallons, and 6 gallons, and an infinite water source, the goal is to measure exactly 7 gallons of water.
31. Solve Cryptarithmetic problems:
    1. SEND + MORE = MONEY: Each letter represents a different digit, find a unique assignment of digits to the letters such that the equation is true.
    2. EIGHT + EIGHT = SIXTEEN: Each letter represents a different digit, find a unique assignment of digits to the letters such that the equation is true.
    3. COW + CAR = RACE: Each letter represents a different digit, find a unique assignment of digits to the letters such that the equation is true.
    4. CRYPT + ARITH = METIC: Each letter represents a different digit, find a unique assignment of digits to the letters such that the equation is true.
    5. A + B = C: Each letter represents a different digit, find a unique assignment of digits to the letters such that the equation is true.
32. Solve Tower of Hanoi Problem (The Tower of Hanoi is a classic problem in AI and algorithms that can be used to teach the concepts of search and planning. The problem consists of three rods and a number of disks of different sizes, which can slide onto any rod. The puzzle starts with the disks in a neat stack in ascending order of size on one rod, the smallest at the top, thus making a conical shape.

The objective of the puzzle is to move the entire stack to another rod, obeying the following simple rules:

* 1. Only one disk can be moved at a time.
  2. Each move consists of taking the upper disk from one of the rods and sliding it onto another rod, on top of the other disks that may already be present on that rod.
  3. No disk may be placed on top of a smaller disk.)