

1. What are Constraint satisfaction problem. Solve the following Crypt-arithmetic problem.

$$\begin{array}{r} \text{FORTY} \\ \text{TEN} \\ + \text{TEN} \\ \hline \text{SIXTY} \end{array}$$

2. A farmer has a goat, a wolf & a cabbage on the west side of a river. He wants to get all of his animals & his cabbage across the river onto the east side. The farmer has a row boat but he only has enough room for himself & one other thing. The wolf will eat the goat if they are left together alone. The goat will eat the cabbage if they are left together alone. How can the farmer get everything on the east side?
- Formulate this puzzle as search.
  - Solve this problem using search (any method). Draw the search tree & show the final solution.
3. You are given two jugs, a 4-gallon one and a 3-gallon one. Neither has any measuring marker on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into the 4-gallon jug? Solve by production rule system.
4. Consider a person has certain number of flowers and he has to visit three temples and has equally number to present flower in each temple. When enters in any temple with flowers, the number of flowers just becomes doubles. After visiting each temple, he returns with empty hand. How many flowers were there with him initially and how many flower he presented in each temple. Formulate this problem.
5. There is a robot that can walk, lift an object, carry an object and put it down. Also there's a floor with a hole in it that the robot move obstacles into. Use state-space search to plan paths for the robot discussed here, assuming there is no uncertainty in the robots movements and the obstacles are fully known.
6. There are three pegs, labelled A, B and C. There are 3 disks on peg A. The top disk has a diameter of 1, the middle disk has a diameter of 2, and the bottom disk has a diameter of 3. There are no disks on peg C. You must move one disk at time and you can not place a larger disk on top of a smaller disk. The problem is to get all of the disks on peg C.
- Find a representation for the states of this problem.
  - Describe all of the operators that might be applied to a state.
7. Suppose a car with navigation system is travelling from Basundhara, Ring Road to Satdobato, Patan. Draw a graph showing all the intermediate nodes for the route. There should be at least three options for the route. By showing all the steps, compare what will happen if navigation system uses A\* algorithm and Greedy algorithm to find optimum path.
8. Write short notes on
- Turing Test and Total Turing Test
  - State space problem
  - Constraint Satisfaction Problem
  - Min-Max search.
  - Alpha-Beta Pruning search.