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TE Comps A.

Postlab-8

Q.1. List all the methods which could be used to solve the tower of Hanoi problem.

→ There are several methods that can be used to solve the Tower of Hanoi problem:

- a) Recursion: The most common and efficient method involves using recursive algorithms to move the disks from the source peg to the destination peg, while adhering to the rules of the Tower of Hanoi puzzle.
- b) Iterative approach: It's possible to solve the tower of Hanoi problem iteratively using techniques like dynamic programming or using stacks to simulate the recursive calls.
- c) Mathematical approach: It can also be solved using mathematical formulas or patterns to determine the optimal moves without actually simulating the moves.
- d) Binary representation: Some algorithms use binary representations of the disk positions to determine the optimal moves.

Q.2) Which is the best approach and why?

→ The best approach for solving the Tower of Hanoi problem is typically the recursive approach. Recursion is intuitive for this problem, because it

directly ~~also~~ mirrors the problem's structure. It's also often the most efficient method in terms of time complexity, as it only requires $2^n - 1$ moves to solve a Tower of Hanoi puzzle with n -disks. Other methods may involve more complex algorithms.

3) Applications of Tower of Hanoi:

- 1) Teaching recursion: The Tower of Hanoi problem is commonly used in computer science education to teach recursion, as it provides a simple yet challenging example of a recursive problem.
- 2) Algorithm analysis: Studying the Tower of Hanoi problem helps in understanding & analyzing the efficiency of algorithms.
- 3) Problem solving skills- It can help develop problem solving skills, logical thinking & algorithmic reasoning.
- 4) Psychological skills- The Tower of Hanoi puzzle has been used in psychological studies to assess problem solving abilities & cognitive processes in humans.
- 5) Optimization problems. - It can be seen as an optimization problem, where the goal is to find the shortest sequence of moves to solve the puzzle. It has applications in areas such as operation research and logistics.