Military Institute of Science and Technology (MIST)
CSE 404: Artificial Intelligence Sessional
Time: 30 minutes

ID:

1. Let's Solve a River Crossing Puzzle:

There are N number of Missionaries and N number of Cannibals on the Left Bank of the river. They must all cross to the Right bank of the river via a single boat with a max capacity of 2 passengers.

Instructions:

- Use a tuple (M, C, B) to represent the number of Missionaries and Cannibals on the Left Bank and the Boat Position (0 for Left, 1 for Right).
- Initialize the start state with (3, 3, 0) and the goal state with (0, 0, 1).
- Create a function to check if a state is "Safe":
    - Missionaries aren't outnumbered by Cannibals on the Left Bank.
    - Missionaries aren't outnumbered by Cannibals on the Right Bank.
    - This check is only applicable when Missionaries are present on that bank.
- Use BFS to explore the states. Maintain an exploration Queue and a Visited Set.
- In each step, the boat can carry
    - 1 Missionary or 2 Missionaries
    - 1 Cannibal or 2 Cannibals
    - 1 Missionary + 1 Cannibal
- When the goal is reached, print each step of the journey.

Marking Criteria	**Allocated Marks**	**Obtained Marks**
Defining Start State & Goal State	2	
Valid “Safe” Check	3	
BFS Implementation	3	
Printing All The States	2	