# Water Jug Problem using DFS

## 1. Problem Definition

Given two jugs with capacities 4L and 3L, the objective is to measure exactly 2L of water. We can perform the following actions:  
1. Fill a jug completely.  
2. Empty a jug.  
3. Pour water from one jug to another until it is full or the other is empty.

## 3. Depth-First Search (DFS) Approach

DFS explores each possible state deeply before backtracking. It uses recursion to navigate different possible states by applying predefined rules.  
  
In this implementation:  
✔ The function recursively tries all possible actions.  
✔ It maintains a list of visited states to avoid loops.  
✔ Each applied rule is printed for better understanding.

## 4. Defining the Possible Actions (Rules)

* These rules represent the valid actions:
* **Fill Jug 1** completely.
* **Fill Jug 2** completely.
* **Empty Jug 1** completely.
* **Empty Jug 2** completely.
* **Pour water from Jug 1 into Jug 2** until:
  + Jug 2 is full OR
  + Jug 1 is empty.
* **Pour water from Jug 2 into Jug 1** until:
  + Jug 1 is full OR
  + Jug 2 is empty.

## 5.Output:

