**WATER JUG PROBLEM:**

In the **water jug problem in Artificial Intelligence**, we are provided with two jugs: one having the capacity to hold 3 gallons of water and the other has the capacity to hold 4 gallons of water. There is no other measuring equipment available and the jugs also do not have any kind of marking on them. So, the agent’s task here is to fill the 4-gallon jug with 2 gallons of water by using only these two jugs and no other material. Initially, both our jugs are empty.

**Python Code:**

x = 0  
y = 0  
m = 4  
n = 3  
print("Initial state (x,y) = (0,0)")  
print("Maximum Capacities of Jugs (x,y) = (4,3)")  
print("Goal state (x,y) = (2,y)")  
  
while x != 2:  
 r = int(input("Enter rule : "))  
 if (r == 1):  
 x = m  
 elif (r == 2):  
 y = n  
 elif (r == 3):  
 x = 0  
 elif (r == 4):  
 y = 0  
 elif (r == 5):  
 t = n - y  
 y = n  
 x -= t  
 elif (r == 6):  
 t = m - x  
 x = m  
 y -= t  
 elif (r == 7):  
 y += x  
 x = 0  
 elif (r == 8):  
 x += y  
 y = 0  
 elif (r == 9):  
 t = m - y  
 x = x + t  
 y = y - t  
  
 print ('After applying rule number : ', r, '\n Jug x = ', x, 'Jug y = ', y, '\n')

Code Output:

Initial state (x,y) = (0,0)

Maximum Capacities of Jugs (x,y) = (4,3)

Goal state (x,y) = (2,y)

Enter rule : 2

After applying rule number : 2

Jug x = 0 Jug y = 3

Enter rule : 8

After applying rule number : 8

Jug x = 3 Jug y = 0

Enter rule : 2

After applying rule number : 2

Jug x = 3 Jug y = 3

Enter rule : 9

After applying rule number : 9

Jug x = 4 Jug y = 2

Enter rule : 3

After applying rule number : 3

Jug x = 0 Jug y = 2

Enter rule : 8

After applying rule number : 8

Jug x = 2 Jug y = 0

**Implementation on Jupyter Notebook Screenshots:**

