### Experiment – No-1

### *Problem Statement :* A Water Jug Problem: You are given two jugs, a 4-gallon one and a 3-gallon one, a pump which has unlimited water which you can use to ﬁll the jug, and the ground on which water may be poured. Neither jug has any measuring markings on it. How can you get exactly 2 gallons of water in the 4-gallon jug?

### *Algorithm:*

### Production Rules : State Process

### Rule 1 : (X,Y | X<4) (4 ,Y) {Fill 4−gallon jug}

### Rule 2 : (X,Y |Y<3) (X,3) {Fill 3−gallon jug}

### Rule 3 : (X,Y |X>0) (0 ,Y) {Empty 4−gallon jug}

### Rule 4 : (X,Y | Y>0) (X,0) {Empty 3−gallon jug}

### Rule 5 : (X,Y | X+Y>=4 ˆ Y>0) (4 ,Y−(4−X)) {Pour water from 3−gallon jug into 4−gallon jug until 4−gallon jug is full}

### Rule 6 : (X,Y | X+Y>=3 ˆX>0) (X−(3−Y) ,3) {Pour water from 4−gallon jug into 3−gallon jug until 3−gallon jug is full}

### Rule 7 : (X,Y | X+Y<=4 ˆY>0) (X+Y,0) {Pour all water from 3−gallon jug into 4−gallon jug}

### Rule 8 : (X,Y | X+Y <=3ˆ X>0) (0 ,X+Y) {Pour all water from 4−gallon jug into 3−gallon jug}

### Rule 9 : (0 ,2) (2 ,0) {Pour 2 gallon water from 3 gallon jug into 4 gallon jug}

***Program:***

x , y=  0 , 0

m , n = 4 , 3

print("Initial State: (0,0)")

print("Capacities: (4,3)")

print("Goal State: (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

    print(x,y)

### *Output :*

### https://lh5.googleusercontent.com/ABOzeuvfEY7TxbhCe3dFNIHtIwuZAQyH94uZIifv8jI4vMZg539gN1JG5H6w9csZSdcpnmNMp4ltm3jE89MCiui33ayvjXDFs9zTKJUgBchQ3uYb0hCMk9yOCDJXYG_a9rglB0xH