**PROGRAM-2**

**Aim:** Write a program in python to implement Water Jug problem.

**Logic: Problem contains m** liter jug and a **n** liter jug where **0 < m < n**. Both the jugs are initially empty. The jugs don’t have markings to allow measuring smaller quantities. You have to use the jugs to measure d liters of water where d < n. Determine the minimum no of operations to be performed to obtain d liters of water in one of jug.   
The operations that can be perform are:

1. Empty a Jug
2. Fill a Jug
3. Pour water from one jug to the other until one of the jugs is either empty or full.

**Algorithm:**

1. (x,y) Fill 4 gallon jug x = m
2. (x,y) Fill 3 gallon jug y=n
3. (x,y) Empty 4 gallon jug on ground x = 0
4. (x,y) Empty 3 gallon jug on ground y = 0
5. (x,y) Pour water from 4 gallon jug into 3 gallon jug until the 3 gallon jug is full

t = n-y

y = n

x -= t

1. (x,y) Pour water from 3 gallon jug into 4 gallon jug until the 4 gallon jug is full

t =m-x

x = m

y -= t

1. (x,y) Pour all water from 4 gallon jug into 3 gallon jug until 4 gallon becomes empty
2. (x,y) Pour all water from 3 gallon jug into 4 gallon jug until 3 gallon becomes empty

**Implementation:**

x=0

y=0

m=4

n=3

*print*(*f*"Initial state : ({x},{y})")

*print*(*f*"Capacities : ({m},{n})")

*print*(*f*"Goal state : (2,y)")

while x != 2:

*print*(*f*"Curent state : ({x},{y})")

    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*(*f*"\nGoal State Reached : ({x},{y})")

**Input:**

2 8 2 6 3 8

**Output:**

