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
6. (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
7. (x,y) Pour all water from 4 gallon jug into 3 gallon jug until 4 gallon becomes empty
8. (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: