3.Write the python program for Water Jug Problem

from collections import deque

def water\_jug\_bfs(jug1, jug2, target):

visited = set()

queue = deque()

# Start with both jugs empty

queue.append((0, 0))

while queue:

a, b = queue.popleft()

if (a, b) in visited:

continue

visited.add((a, b))

print(f"Jug1: {a}, Jug2: {b}")

# Check if target reached

if a == target or b == target:

print("\nTarget reached!")

return True

# Possible operations

next\_states = [

(jug1, b), # Fill Jug1

(a, jug2), # Fill Jug2

(0, b), # Empty Jug1

(a, 0), # Empty Jug2

# Pour Jug1 → Jug2

(a - min(a, jug2 - b), b + min(a, jug2 - b)),

# Pour Jug2 → Jug1

(a + min(b, jug1 - a), b - min(b, jug1 - a)),

]

for state in next\_states:

if state not in visited:

queue.append(state)

print("\n No solution possible.")

return False

if \_\_name\_\_ == "\_\_main\_\_":

jug1, jug2, target = 4, 3, 2 # Example: 4L jug, 3L jug, target=2

water\_jug\_bfs(jug1, jug2, target)

