from typing import List, Tuple, Set

def get\_successors(state: Tuple[Tuple[int, int], List[List[int]]]) -> List[Tuple[Tuple[int, int], List[List[int]]]]:

pos, grid = state

successors = []

directions = [(0, 1), (0, -1), (1, 0), (-1, 0)] # Right, Left, Down, Up

x, y = pos

for dx, dy in directions:

nx, ny = x + dx, y + dy

if 0 <= nx < len(grid) and 0 <= ny < len(grid[0]) and grid[nx][ny] == 1:

new\_grid = [row[:] for row in grid]

new\_grid[nx][ny] = 0 # Clean the cell

successors.append(((nx, ny), new\_grid))

return successors

def is\_clean(grid: List[List[int]]) -> bool:

return all(cell == 0 for row in grid for cell in row)

def dfs(state: Tuple[Tuple[int, int], List[List[int]]], visited: Set[str]) -> bool:

pos, grid = state

grid\_key = str((pos, grid))

if grid\_key in visited:

return False

visited.add(grid\_key)

if is\_clean(grid):

return True

for successor in get\_successors(state):

if dfs(successor, visited):

return True

return False

if \_\_name\_\_ == '\_\_main\_\_':

grid = [

[0, 1, 1, 1],

[0, 0, 1, 0],

[1, 0, 0, 1],

[1, 1, 1, 0]

]

start\_position = (0, 0)

initial\_state = (start\_position, grid)

if dfs(initial\_state, set()):

print("✅ The room can be cleaned.")

else:

print("❌ The room cannot be cleaned.")

A screenshot of a computer

AI-generated content may be incorrect.