1. Assume that there are 3 floors and 4 rooms in each floor. Design the vacuum cleaner to ensure the rooms are clean. You may make suitable assumption for initial state.

**PROGRAM**

# Given M x N grid(floor) create an agent that moves around the grid until the entire grid is clean

floor = [[1, 0, 0, 0], # '1' represents dirty and '0' represents clean

         [0, 1, 0, 1],

         [1, 0, 1, 1]]

def clean(floor):

    m = len(floor[0]) # no of cols

    n = len(floor)    # no of rows

    no\_of\_tiles = m \* n

    tiles\_checked = 0

    row = 0

    col = 0

    while tiles\_checked < no\_of\_tiles:

        # Current position

        print\_floor(floor, row, col)

        # Suck if dirty

        if floor[row][col] == 1:

            floor[row][col] = 0

            print('Sucked the dirt')

        else:

            print('Already Clean')

        # Next tile

        if row % 2 == 0:          # Even rows the bot moves right to the next tile

            if col < m-1:

                col += 1

            else:

                row += 1  # Move to next row if we reached the last col

        elif row % 2 == 1:        # Odd rows the bot moves left to the next tile

            if 0 < col:

                col -= 1

            else:

                row += 1  # Move to next row if we reached the last col

        tiles\_checked += 1

        print('---------------')

    print('Cleaned!!!')

def print\_floor(floor, row, col):

    temp = floor[row][col]

    floor[row][col] = 'VC'

    for x in floor:

        print(x)

    floor[row][col] = temp

# Call the function

clean(floor)