Question:6

VACUUM CLEANER PROBLEM

AIM

To solve the Vacuum Cleaner problem using Python

ALGORITHM

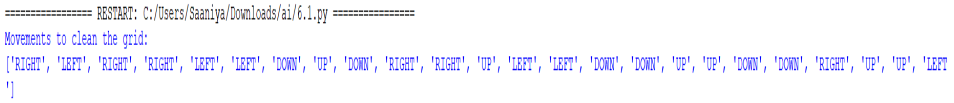
1. Initialize an empty list `movements` to store the movements.
2. Get the number of rows (`rows`) and columns (`cols`) in the grid.
3. Iterate through each cell in the grid using nested loops:
   a. If the current cell contains 'D' (dirty), proceed to clean it.
   b. Determine the number of movements needed to reach the dirty cell:
   - Move DOWN `i` times if `i` is greater than 0 (to reach the dirty cell's row).
   - Move RIGHT `j` times if `j` is greater than 0 (to reach the dirty cell's column).
   - Move UP `i` times (to return to the original row after cleaning).
   - Move LEFT `j` times (to return to the original column after cleaning).Return the list of movements.
4. Change the value of the current cell to 'C' (clean).
5. The main part of the code checks if it's being run as a script (`__name__ == "__main__"`), creates a sample grid, calls `clean_grid` function to get the movements needed to clean the grid, and then prints the movements.

CODE

```
def clean_grid(grid):
    movements = []
    rows, cols = len(grid), len(grid[0])
    for i in range(rows):
        for j in range(cols):
            if grid[i][j] == 'D':
                movements.extend(['DOWN'] * i if i > 0 else [])
                movements.extend(['RIGHT'] * j if j > 0 else [])
                movements.extend(['UP'] * i)
                movements.extend(['LEFT'] * j)
                grid[i][j] = 'C'
    return movements
```

```
if __name__ == "__main__":
    grid = [['C', 'D', 'D'], ['D', 'C', 'D'], ['D', 'D', 'C']]
    movements = clean_grid(grid)
    print("Movements to clean the grid:")
    print(movements)
```

OUTPUT



```
================ RESTART: C:/Users/Saaniya/Downloads/ai/6.1.py ================
Movements to clean the grid:
['RIGHT', 'LEFT', 'RIGHT', 'RIGHT', 'LEFT', 'LEFT', 'DOWN', 'UP', 'DOWN', 'RIGHT', 'RIGHT', 'UP', 'LEFT', 'LEFT', 'DOWN', 'DOWN', 'UP', 'UP', 'DOWN', 'DOWN', 'RIGHT', 'UP', 'UP', 'LEFT
']
```