CSE 3812/CSI 342
Assignment 1

Lab Practice

1. Can you save Princess Peach trapped in one of the four corners of a square grid? Mario is in a different position of the grid and can move one step at a time in any of the four directions. Move Mario to Peach in the shortest number of steps.
    - **Inputs:** Size of the square grid, position of Peach and Mario.
    - **Outputs:** Movement Directions (Print LEFT, RIGHT, DOWN or UP for each step taken).
2. The bot here is positioned at the top left corner of a 5×5 grid. Your task is to move the bot to clean all the dirty cells. You will try to minimize the number of steps taken by the bot.
    - **Inputs:** The 5×5 grid with dirty cells represented as 'd' and clean cells represented as '_'. Also, take as input the position of the robot.
    - **Outputs:** Movement Directions (Print LEFT, RIGHT, DOWN or UP for each step taken). Also print CLEAN when the bot cleans a dirty cell.

Assignment Description

There will be a grid of size $N \times N$ and 2 bots on the grid. The bots will clean the dirty cells of the grid while trying to minimize the number of steps taken. The bots will also communicate with each other while cleaning the grids.

- **Inputs:** Size of grid N, the full grid where dirty cells are denoted by 'd' and clean cells are denoted by '_'.
- **Outputs:**
    1. Print the position of the dirty cells the bots are targeting at the moment. For example, if bot 1 is targeting cell $(1, 1)$, print "Bot 1 target: $(1, 1)$". If bot 2 is targeting cell $(4, 6)$, print "Bot 2 target: $(4, 6)$".

2. Print the movement directions for both bot 1 and bot 2. For bot 1 you will print LEFT1, RIGHT1, DOWN1 or UP1 for each step taken. You will do the same for bot 2 (LEFT2, RIGHT2, DOWN2 or UP2). Also print CLEAN1 or CLEAN2 with the position of the cleaned cell depending on whether bot 1 or bot 2 cleans a cell. For example, if bot 1 cleans cell $(2, 3)$, print "CLEAN1: $(2, 3)$".

- **Implementation Details/Conditions:**

1. Randomly determine whether bot 1 or bot 2 will start first.
2. Each bot will set a target dirty cell. It will be targeted based on shortest distance. But both bots cannot target the same dirty cell. So, when determining target, a bot will check whether the other bot has set the same target. If not, it will set the target, otherwise it will set a target from the other dirty cells.
3. The two bots cannot be on the same cell. So, a bot will always check if a cell is occupied before moving to that cell. If a cell is occupied, move randomly to another cell.

- **Marking:**

Task	**Marks**
Taking input	1
Setting target according to the condition	2
Ensuring two bots are not on the same cell	2
Successfully cleaning the cells	4
Maintaining output format	1