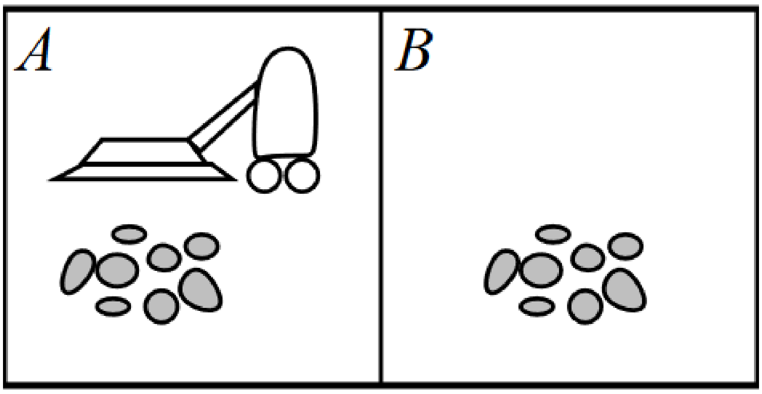
Madhukesh Bhat M
1BM18CS051

Implement vacuum cleaner agent.

Problem Statement

Vacuum Cleaner Agent:
It is a goal-based agent, and the goal of this agent, which is the vacuum cleaner, is to clean up the whole area. The vacuum cleaner can perform the following functions: move left, move right, move forward, move backward and to suck dust.
Precepts: location and contents, e.g., [A, Dirty]
Actions: Left, Right, Up, Down, Suck, No Operation



Explanation:

Percepts: The percept sequence consists of the history of percepts the vacuum cleaner senses, and the agent function maps each percept of the sequence to an action. The agent function for this vacuum cleaning agent is:

Agent function = {([A: Clean], Right), ([A: Dirty], Clean), ([B: Clean], Left), ([B: Dirty], Clean), ([A: Clean, B: Clean], Stop), ([A: Clean, B: Dirty], Clean), …}

Actions: There are five actions available: go forward, turn right by 90°, turn left by 90°, suck up dirt, and turn off.

Environment: The environment consists of a grid of squares. Some squares contain obstacles (walls and furniture) and other squares are open space. Some of the open squares contain dirt. Each "go forward" action moves one square unless there is an obstacle in that square, in which case the agent stays where it is, but the touch sensor goes on. A "suck up dirt" action always cleans up the dirt. A "turn off" command ends the simulation.

Pseudocode:

```
function  Reflex-Vacuum-Agent( [location, status]) returns an action
If status = Dirty then return Suck
else if location =A then return Right
else if location = B then return Left
```

Since here there are only two rooms, the possibilities of agent to move are only left and right.

If there are more than two rooms then the possibilities will be left, right, up, and down.

Implementing vacuum cleaner agent:

Based on this information we implement vacuum cleaner agent for any number of rooms. Code follow below:

1. To clean a room
   def clean(grid):
   i. Declare a grid of size m x n
   ii. Here 0 represents the clean state of room and 1 represents the dirty state of room
   iii. Traverse through the grid depending on the value i.e., clean (0) or dirty (1), if the state is 1 then change state to 0 else no action and continue to check for states of other rooms.
   iv. Depending on the room location the agent moves left, right, up, and down.

2. To print the states of room in each move
   def printFloor(grid, row, col):
   i. Printing the grid every time we move another room to check the state of room.
   ii. Once the states of all rooms are 0 it shows that all rooms are cleaned.