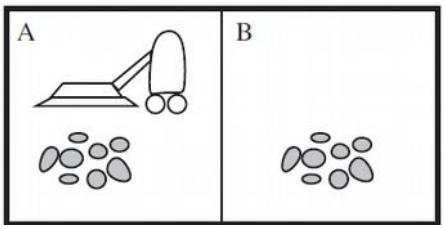
Department of CSE, NIT Calicut

CS4023D Artificial Intelligence

Monsoon 2021 Semester

Assignment 1 – Due by 28 October 2021, 10PM

1: Implement a simulator of simple reflex agent for the vacuum cleaner environment as shown below and with the assumptions that follow.



Assumptions

- The performance measure awards one point for each clean square at each time step, over a "lifetime" of 1000 time steps.
- The "geography" of the environment is known *a priori* (Figure 2.2) but the dirt distribution and the initial location of the agent are not. Clean squares stay clean and sucking cleans the current square. The *Left* and *Right* actions move the agent left and right except when this would take the agent outside the environment, in which case the agent remains where it is.
- The only available actions are *Left*, *Right*, and *Suck*.
- The agent correctly perceives its location and whether that location contains dirt.

Run your simulator for all the possible initial dirt configurations and agent locations. Show the performance measure for each configuration. Also display the state space search graph. **4 marks**

2. Develop a MiniMax algorithm based game agent for the following game description. Provide options for a human player to play with your agent.

Consider a two player game. Assume there are some piles of stones. At each turn, a player can remove any number of stones from any single pile. A player loses, if there are no stones left on his turn.

An evaluation score of 1 if Player 1 wins, -1 if Player 2 wins and 0 for a tie (if possible). Assume that both players play optimally.

Assume there are two piles and accept the number of stones in each pile at the bginning of the game. Show the moves taken by the winning player in the game tree. **6 marks**

Submission guidelines

- You can use any programming language.
- You have to submit a single zip file (at the Eduserver) containing two folders: one for each question, with all the related source codes.
- A PDF file containing sample outputs (for different cases of each question) and the design details must also be provided in the zip file.
- Please name your zip file in the format **Firstname_Rollnumber.pdf**