COMP 3981 Project

Part 1

Team Members

Mangat Toor | A00991501

Nicolas Rodriguez | A01335359

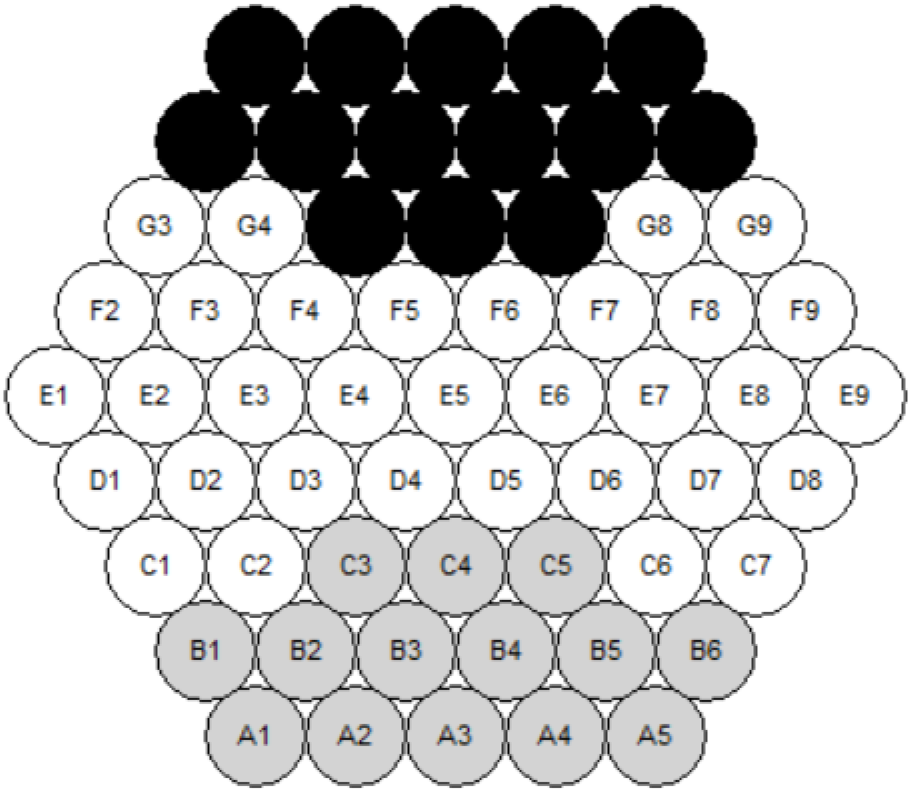
Tomasz Stojek | A00989515

Vitor Guara | A01339914

Contents

I Game Board Representation

The game board is represented by 61 circles; Each circle has a tag made of a letter and a number. Each circle can contain a white or a black marble.



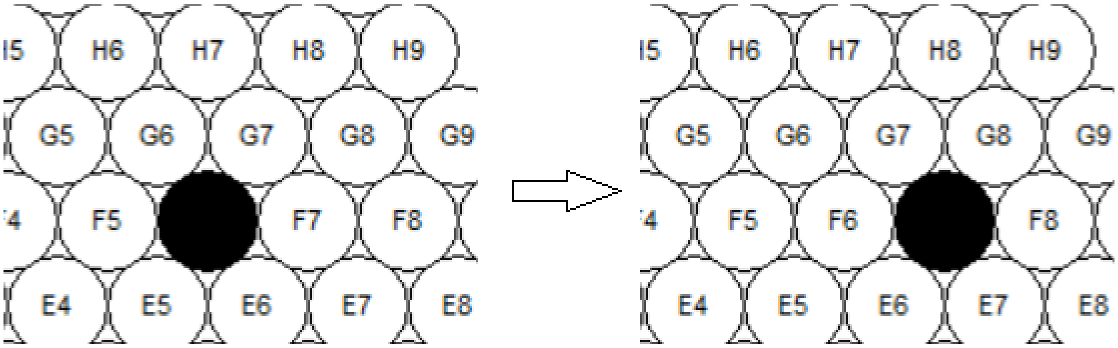
II Moving Notation

Moves are represented as [[X], Z], where:

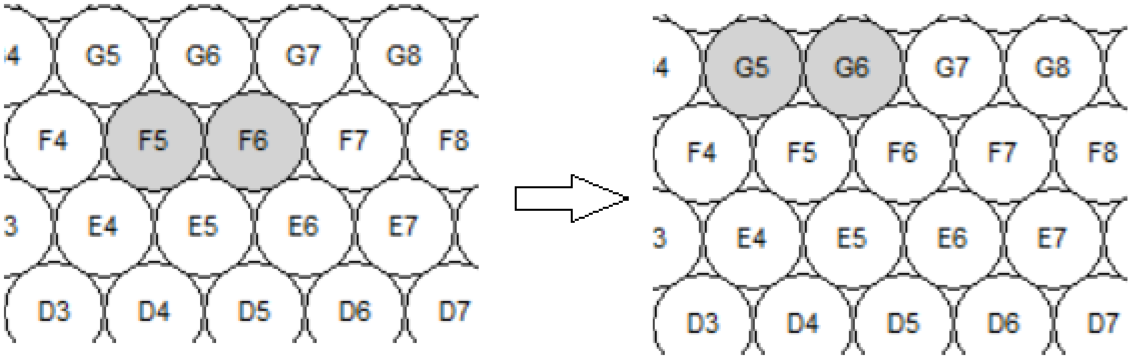
- X: Contains coordinates of each marble that will be moved in an array
- Z: Direction of movement (R, L, UL, DL, UR, DR).
  - R: Right
  - L: Left
  - UL: Up Left
  - DL: Down Left
  - UR: Up Right
  - DR: Down Right

Example Notation with Pictures

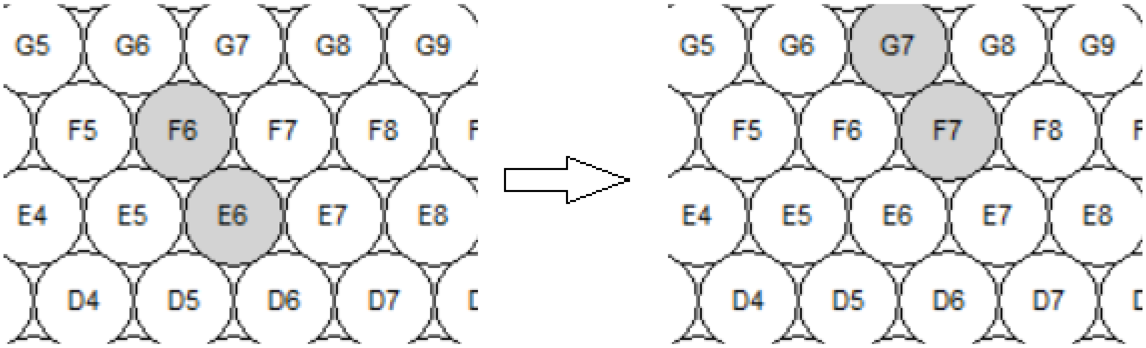
- Single Black Marble Move
  Right: [[F6],R]



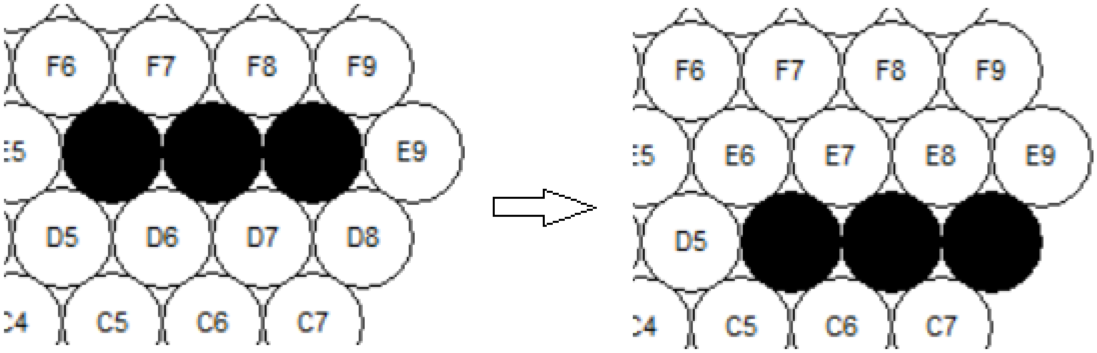
- Double White Marble (Straight Line) Move Up
  Left: [[F5,F6],UL]



- Double White Marble (Diagonal) Move Up
  Right: [[F6,E6],UL]



- Triple Black Marble Move Down Right: [[E6,E7,E8],DR]



III Problem Formulation

a. State Representation

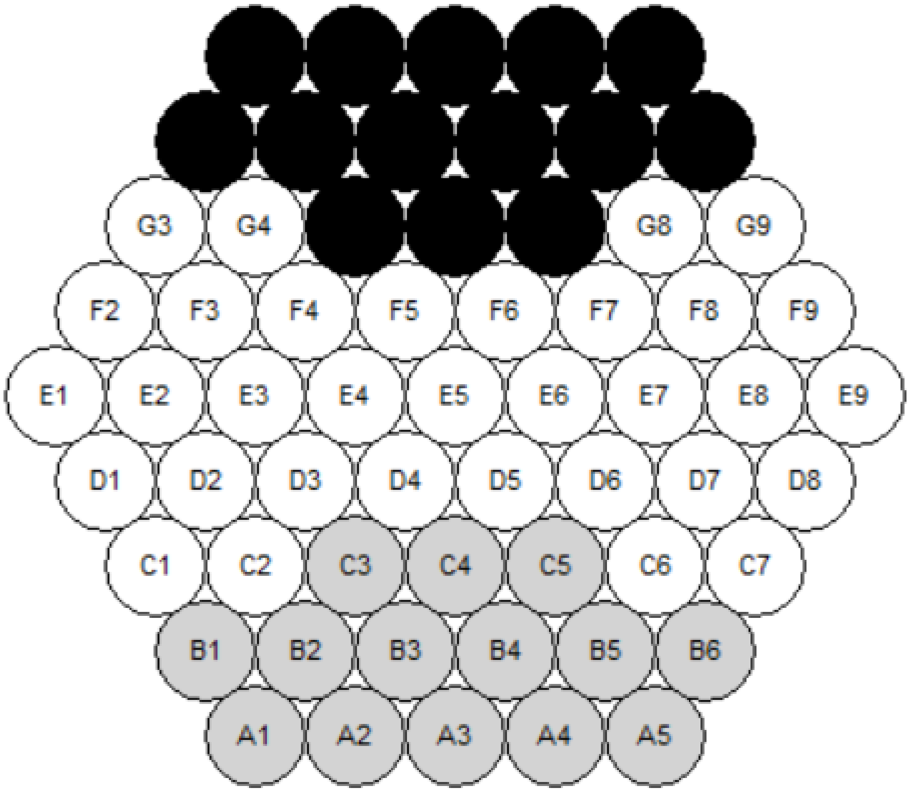
The state is represented by a dictionary({circle_name: circle_object}) of circles that can contain a black or white marble. With each move, the marble(s) are moved to the intended circle. It also has a captured_mables attribute that stores how many white or black marbles are captured.

```
state = {
  captured_mables: [w, b],
  circles: {
    "I5": {marble: marble_object(black | white)},
    "H5": {marble: none},
    "G5": {marble: none},
    ...,
  }
}
```

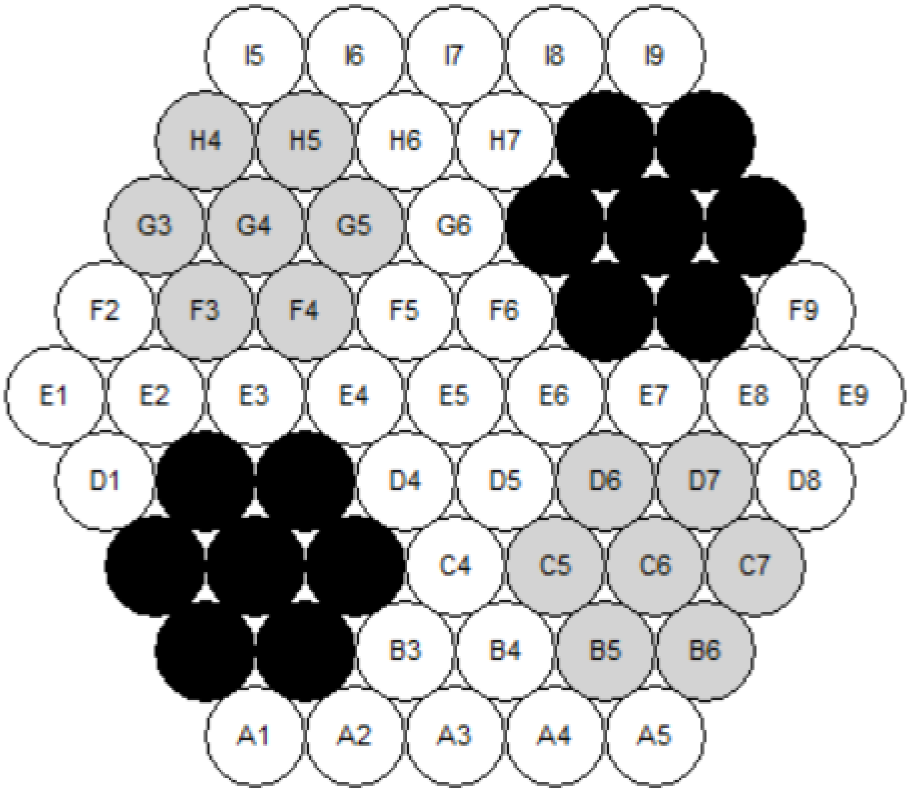
b. Initial State

The initial state can be one of three states:

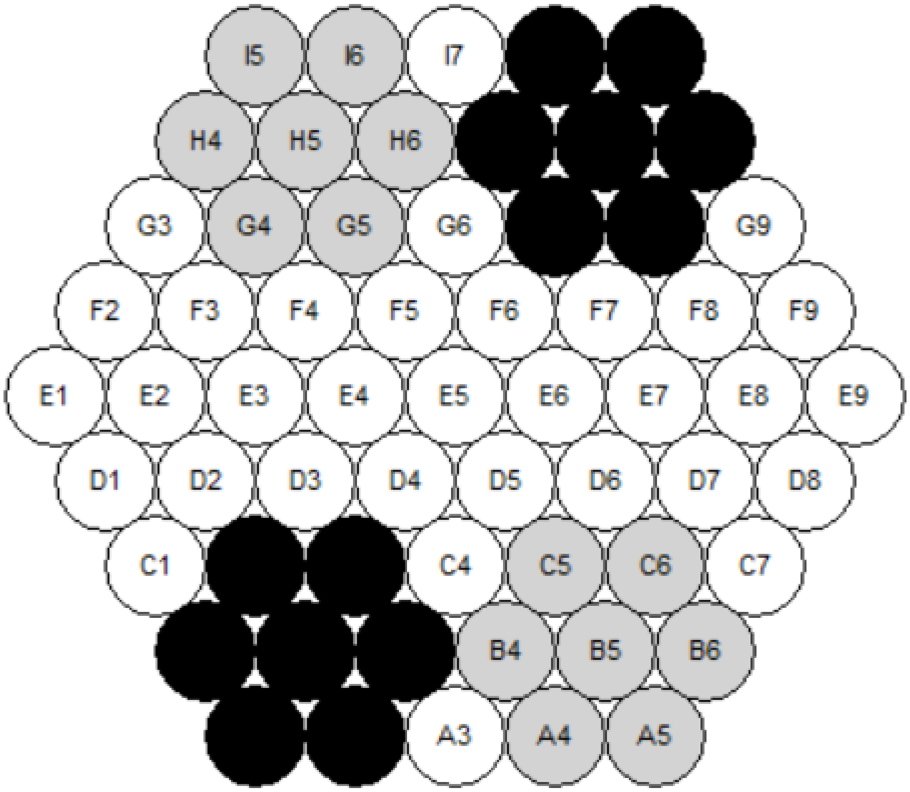
1. Standard



2. German Daisy



3. Belgian Daisy



c. Actions

The actions are defined using the move notation and involve moving marbles (1 to 3) to one of six directions (as defined in part II).

d. Transition Model

Actions	**Resulting State**
[[marble(s)],R]	Move each marble to: Circle(old_l, old_num + 1)
[[marble(s)],L]	Move each marble to: Circle(old_l, old_num - 1)
[[marble(s)],UL]	Move each marble to: Circle(old_l + 1, old_num)
[[marble(s)],UR]	Move each marble to: Circle(old_l + 1, old_num + 1)
[[marble(s)],DL]	Move each marble to: Circle(old_l - 1, old_num - 1)
[[marble(s)],DR]	Move each marble to: Circle(old_l - 1, old_num)

e. Goal Test

The goal test consists of checking if any player has gotten six of the opposite marbles out of the board.

IV Team Member Contribution

1. **Mangat Toor**
    - Worked on timer logic for the game.
    - Worked on move notation and problem formulation.
    - Worked on move logic.
    - Worked on pause functionality.
    - Worked on documentation.
2. **Nicolas Rodriguez**
    - Worked on moving single marbles.
    - Worked on axis checking logic when moving marbles.
    - Worked on creating the initial GUI.
    - Worked on move history.
    - Worked on selection logic.
3. **Tomasz Stojek**
    - Worked on logic for moving multiple marbles.
    - Worked on logic for selecting multiple marbles.
    - Worked on move history.
4. **Vitor Guara**
    - Worked on the skeleton of the classes mapped to the GUI.
    - Worked on initial board positions.
    - Worked on undo and start buttons.
    - Worked on saving the states for the undo button.
    - Worked on displaying the score.