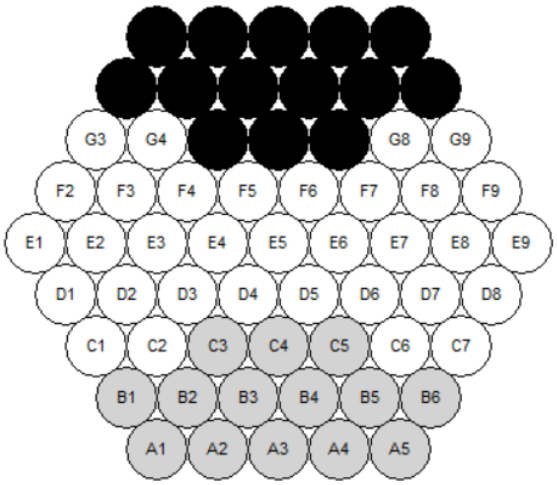
Part 1

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.



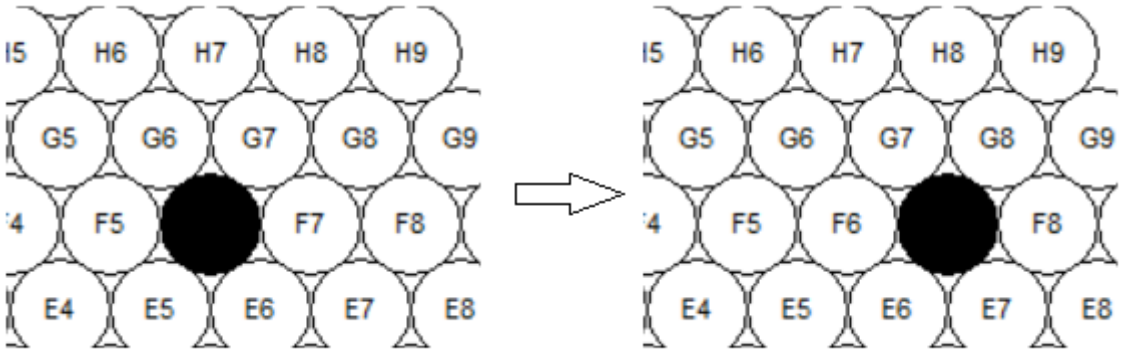
II Moving Notation

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

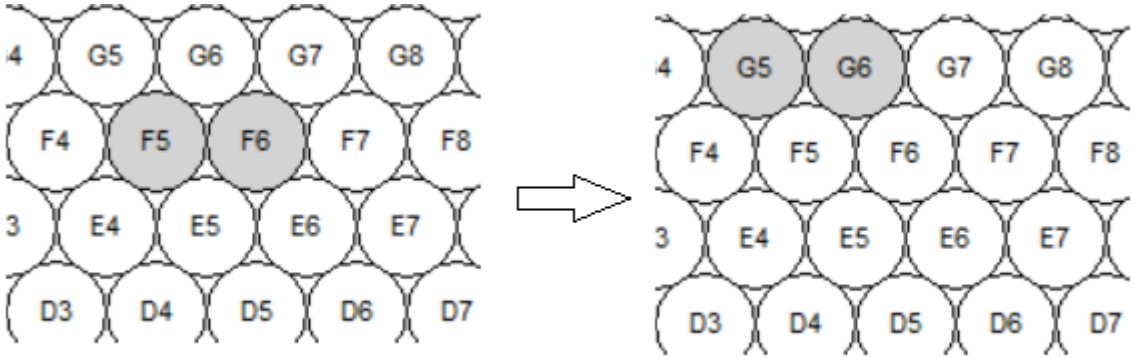
- X: Contains coordinates of each marble that will be moved in an array
- Z: Direction of movement (R, L, UL, DL, UR, DR).
  - R: Right
  - L: Left
  - UL: Up Left
  - DL: Down Left
  - UR: Up Right
  - DR: Down Right

Example Notation with Pictures

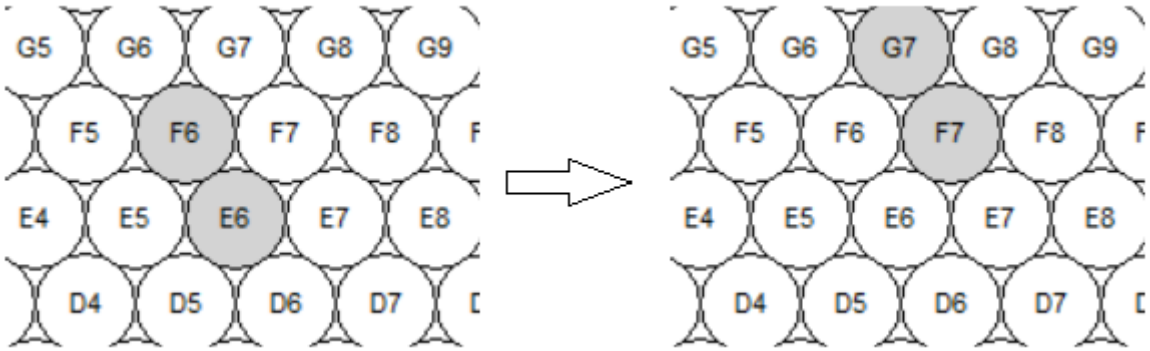
- Single Black Marble Move Right: `[[F6] ,R]`



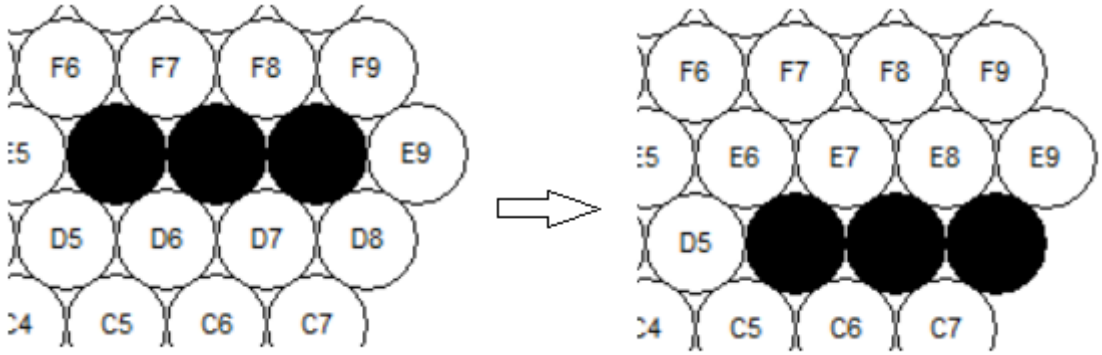
- Double White Marble (Straight Line) Move Up Left: `[[F5,F6], UL]`



- 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

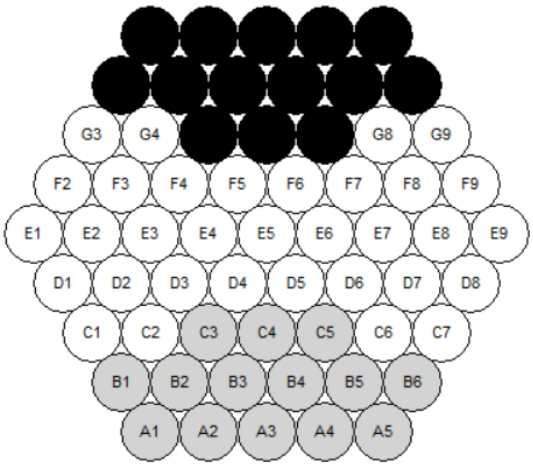
The state is represented by a dictionary(`{circle_name: circle_object}`) of circles that can contain a black or white marble. With each move, the marble(s) are moved to the intended circle.

```
state = {
    "I5": {marble: marble_object(black | white)},
    "H5": {marble: none},
    "G5": {marble: none},
    ...,
}
```

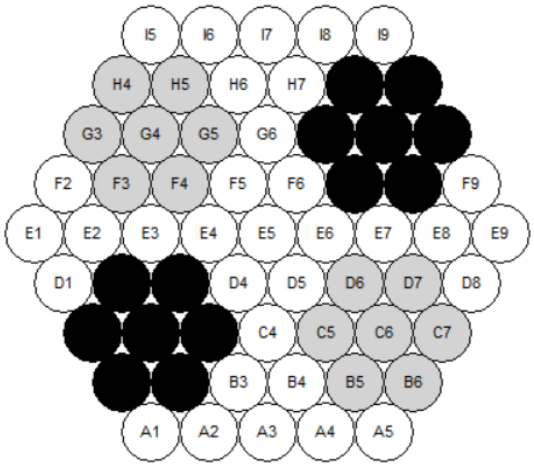
b. Initial State

The initial state can be one of three states:

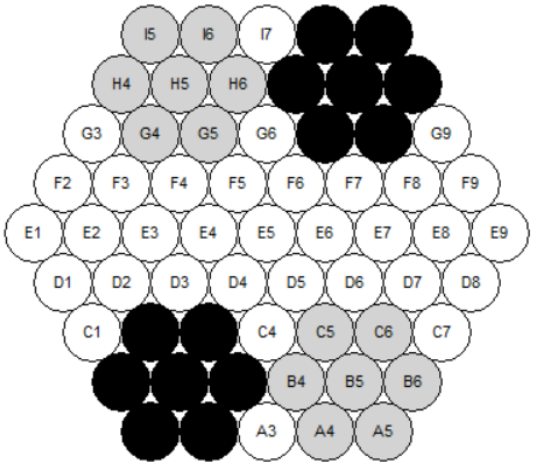
1. Standard



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