# MINI PROJECT

Abalone Game

What is Abalone?

Abalone is a two-player strategy board game. The board consists of a hexagon of edge length 4 which will consist of 37 positions. 22 tokens are placed initially (11 per side: blue(b) and red(r)). There are 7 row markers on the board, spanning from A-G, and 7 diagonal markers, spanning from 1-7. These markers are initialized such that each position has its own unique index-ROWDIAGONAL (e.g.: E3)
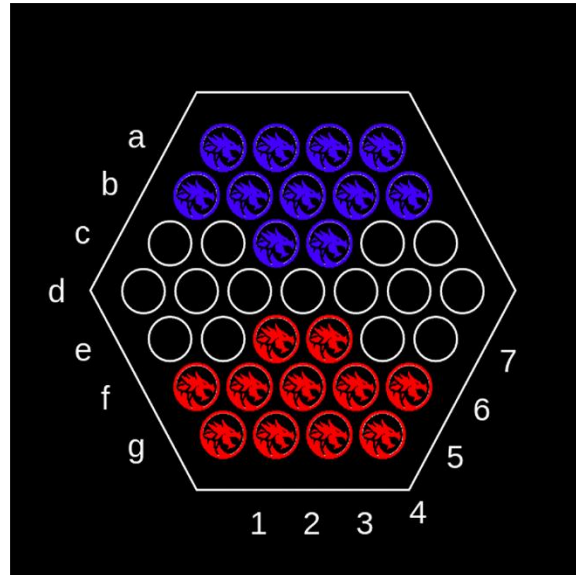
Concepts used:

1. Trees (for mini-max strategy)
2. Dictionary (uses hashing) for storing locations

Board layout:

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        A4   A5   A6   A7
       B3   B4   B5   B6   B7
      C2   C3   C4   C5   C6   C7
     D1   D2   D3   D4   D5   D6   D7
      E1   E2   E3   E4   E5   E6
        F1   F2   F3   F4   F5
          G1  G2   G3   G4
```

Initially, each team will have its 11 tokens on either the top or bottom of the board (Blue on top).

The 11 tokens of blue will be placed as:
- 4 tokens in Row A
- 5 tokens in Row B
- 2 tokens in Row C - at indices C4 and C5.
     where 'C' is Row Number and '4,5' are Diagonal Numbers.

 The 11 tokens of red will be placed as:
- 4 tokens in Row G
- 5 tokens in Row F
- 2 tokens in Row E - at indices E4 and E3.
     where 'E' is Row Number and '3,4' are Diagonal Numbers.

Initial Input:
   The player has to choose if he wants to play as player 1 or 2.
   1. If he chooses as player 1 then he starts as blue and the bot gets red.
   2. If he chooses as player 2 then the bot starts as blue and he gets red.

Input Format:
   The input to the game must be provided as a 5-character string (including spaces) of the format:
   "Ax By"
A = Row of First token
x = Diagonal of First token
B = Row of Second token
y = Diagonal of Second token

Gameplay:

The objective of the game is to strategize the moves such that, four of the opponent's tokens are pushed off the board.

Token Moves:

Moves are permitted in all directions, provided that the player's tokens continue to stay on board, that is, the player cannot push his own token out of the board.

The tokens can only move in pairs in the direction specified. For example, "Ax By" will have the token at index "Ax", which is linearly adjacent to token at index "By". The token must always move from Ax to By.

Pushing Criteria:

The player's two, linearly moving tokens can push only one of the opponent's token in the same direction.

The following moves are deemed as invalid:
- The third token that is pushed belongs to the same team as the other two.
- More than one opponent's tokens are pushed at a time
- The token is pushed off from the corner of the board in direction of the corner.

Elimination:

A player's token is said to be eliminated when it lies on the edge and has been pushed off the board by the opponent.

End of The Game:

- The Battle ends when a side loses Four of its tokens. The opposite side is declared as the Winner.
- The battle may also terminate if all tokens of a side are blocked or isolated. In such a situation, the Battle is declared as a Draw.