

COMP20050 - Software Engineering Project II

Software Specifications of Hex Oust Board Game

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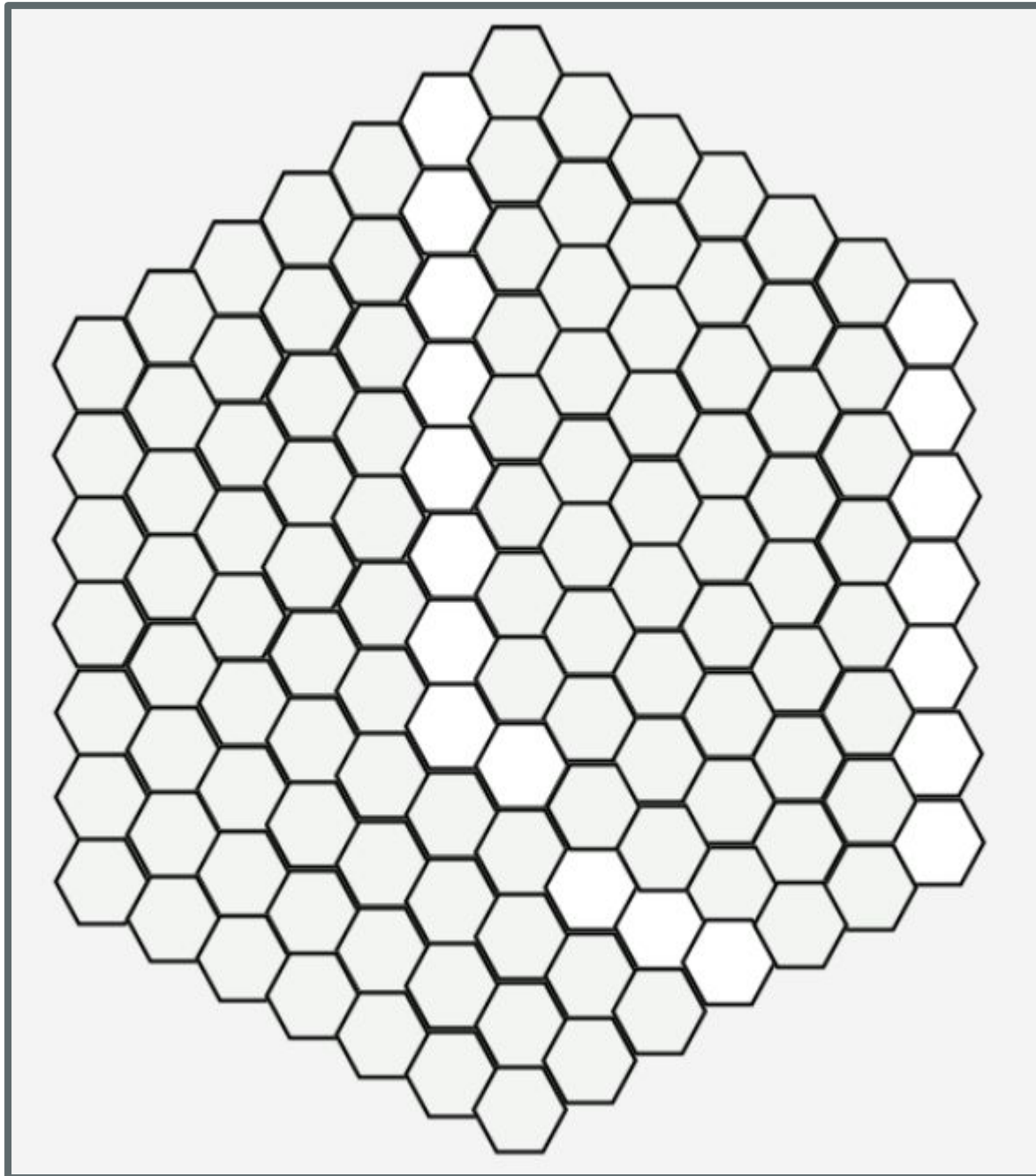
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Software Specification of HexOust

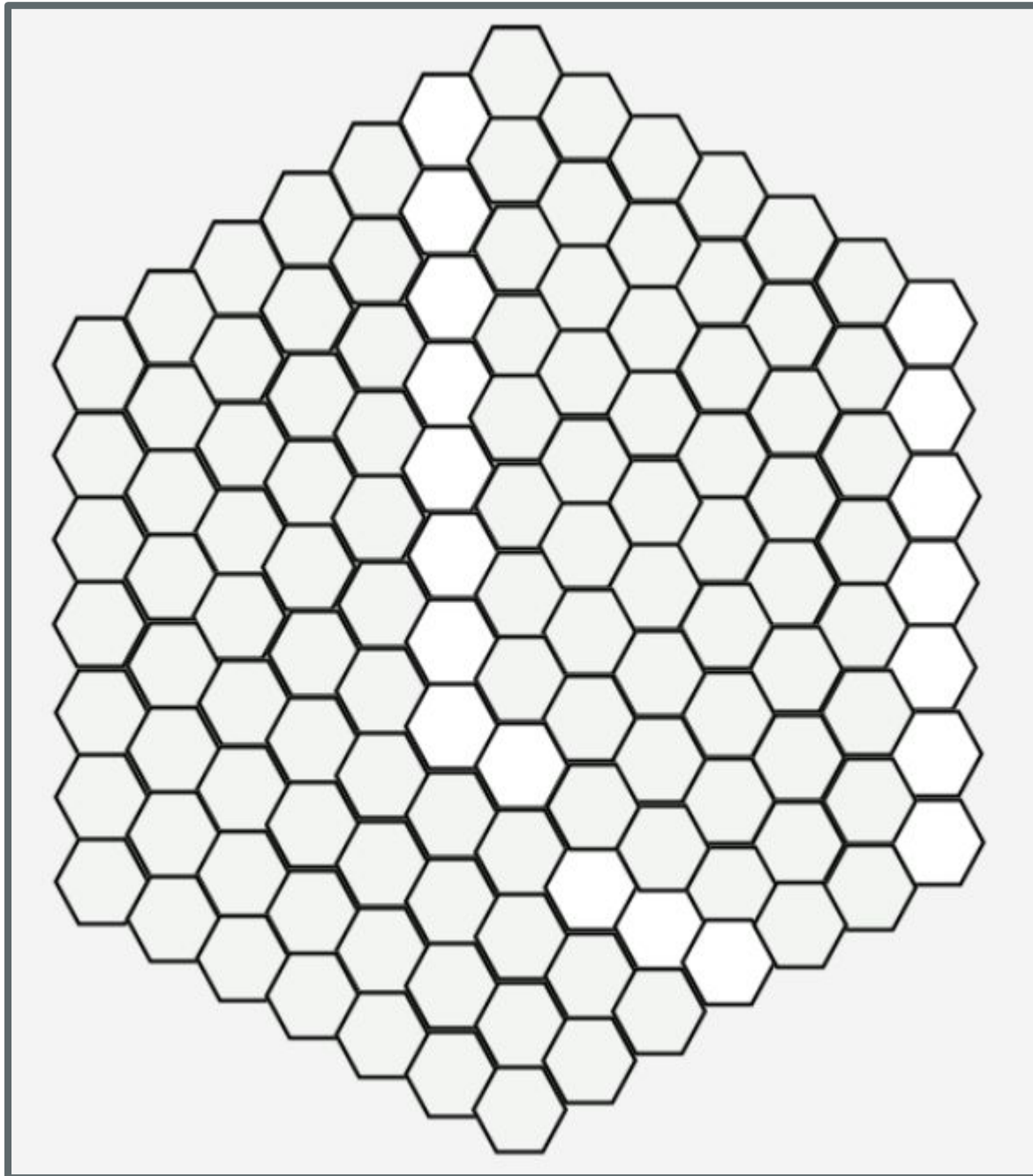


HexOust Brief (1/2)



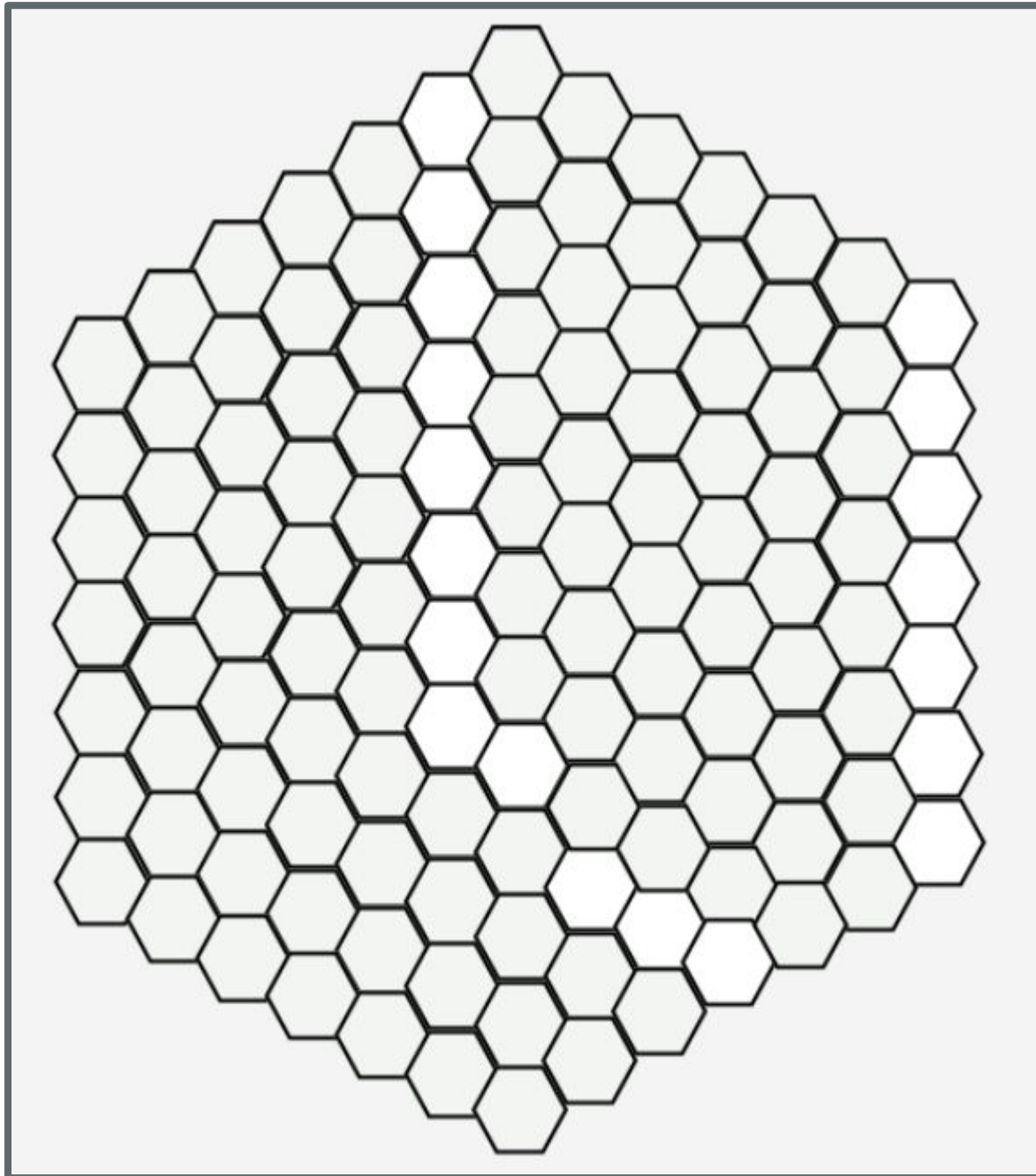
- **HexOust** is a two-player game on a base-7 **hexagonal board**.
 - Seven hexagons on each side.
 - In total, there are 127 hexagons .
- The board starts out empty.
- The two players, **RED** and **BLUE**, take turns placing stones of their own color on **unoccupied** cells on the board.

HexOust Brief (2/2)



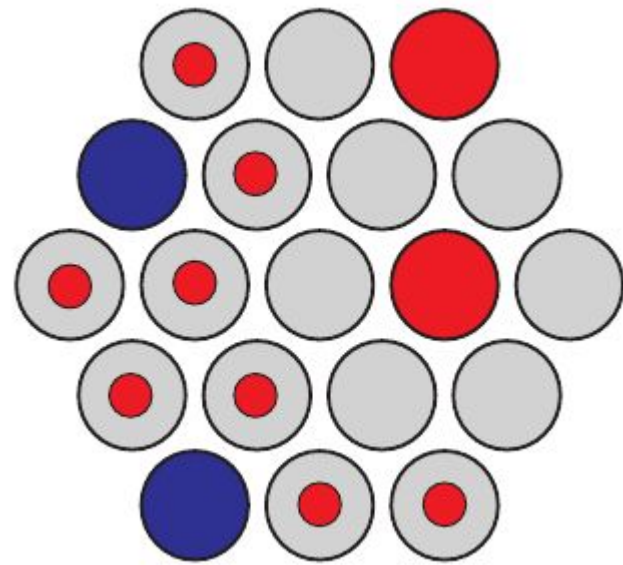
- **RED** player moves first.
- The goal is to **oust** your opponent by completely clearing the board of her stones or capturing all of her stones.
- HexOust comprises what are known as **non-capturing** and **capturing** moves.
- Draws cannot occur in **HexOust**.

HexOust: Glossary



- **HexOust** software system will be abbreviated as **HOS**.
- The two players will be called **RED** and **BLUE**.
- A **GROUP** is a set of interconnected like-colored stones.
- **NCP** and **CP** are non-capturing and capturing placements.

HexOust Rules: Non-capturing Placements

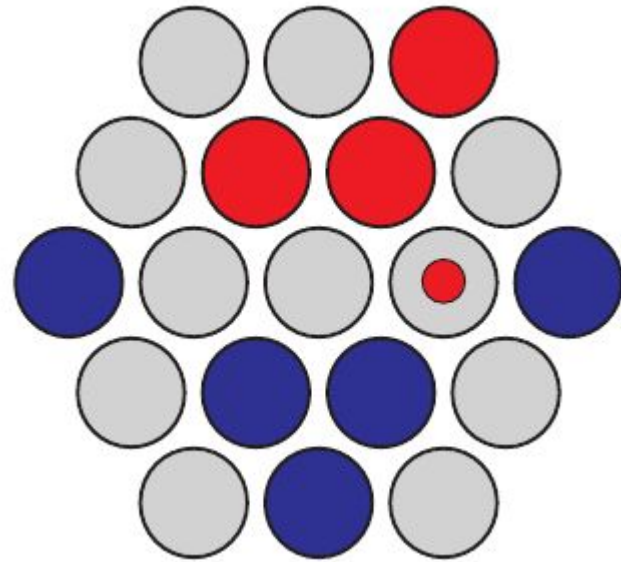


RED dots represent the only placements available to the **RED** player.

- *I will illustrate the rules using a simple circular board.*
- A **non-capturing placement** either forms no connections (adjacencies) with any stones.
- **OR** forms one or more connections only with enemy stones.
- A **non-capturing placement** does not form any connections with stones of its own color.
- A player concludes her turn by making a **non-capturing placement**.



HexOust Rules: Capturing Placements

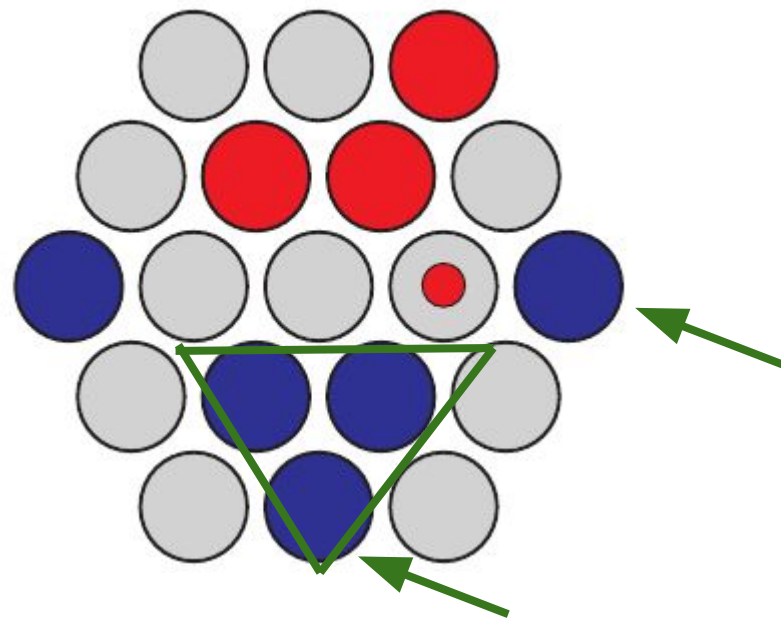


RED placement (the dotted cell) captures two **BLUE** groups.

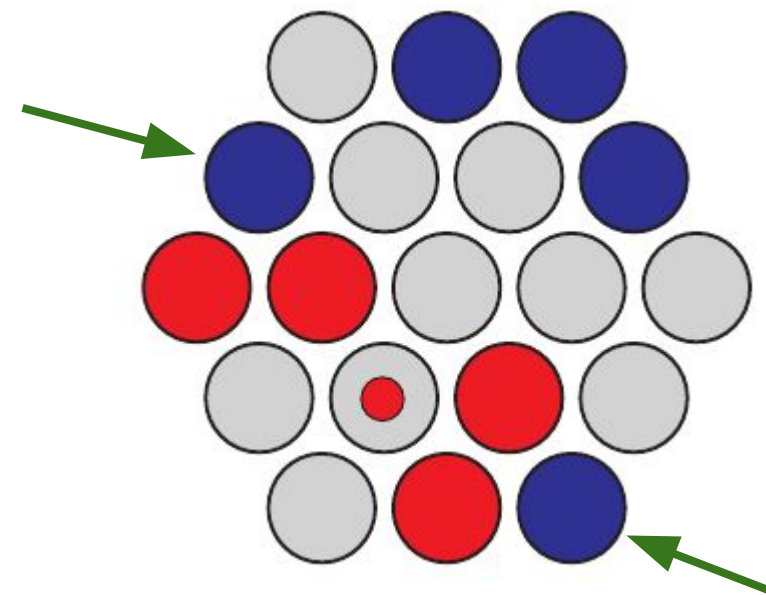
- When a player places a stone which forms one or more connections with the player's own groups, the player creates a **new, larger group** of her own stones.
- A player can only make such a placement if the **new group** will have one or more connections with the **opponent's groups** upon its creation.
- **AND** if all **opponent's groups** are **smaller** than the new group.
- Upon making such a placement, all **opponent's groups** with connections with the placed stone are removed from the board.



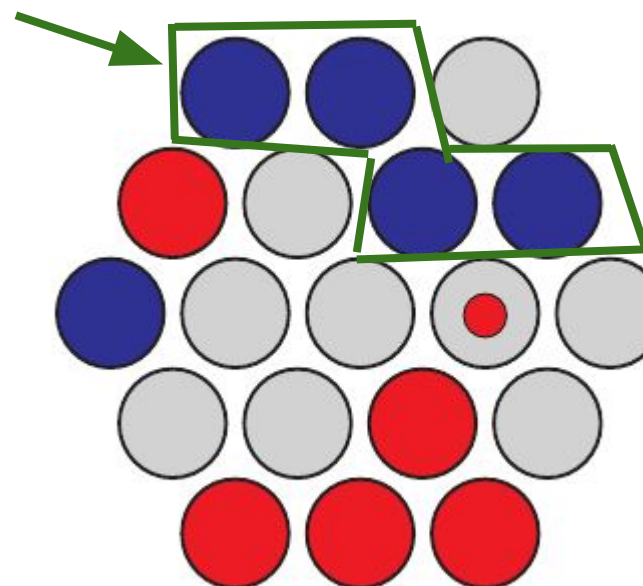
HexOust Rules: Capturing Placements



RED placement (the dotted cell) captures two **BLUE** groups.



RED placement (the dotted cell) captures two **BLUE** singleton groups.



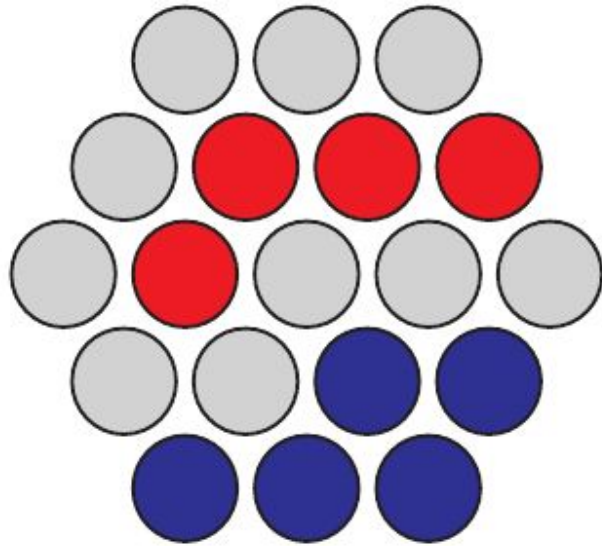
RED placement (the dotted cell) captures **BLUE's** group of four.

HexOust Rules: Multiple Placements Per Turn

- A player will continue to add stones after capturing one or more opponent's groups until the player makes a non-capturing placement.
- Making a non-capturing placement concludes the turn of a player.
- Therefore, a player can make multiple placements per turn and can potentially clean up all the opponent's groups.



HexOust Rules: Making a Placement

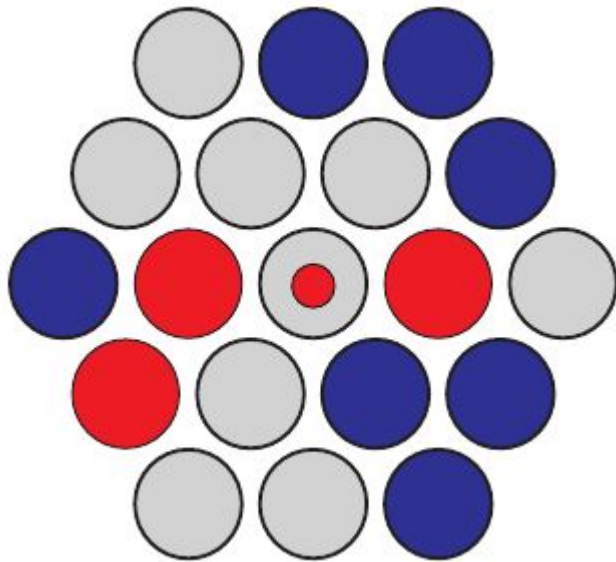


RED player will pass her turn.

- If the player has a placement available on her turn, then she must make the placement.
- If the player has no placements available, then the player must pass her turn.
- There will always be a placement available to at least one of the two players.
- In the figure, **RED** player has no placements available and so must pass.



HexOust Rules: Winning Move



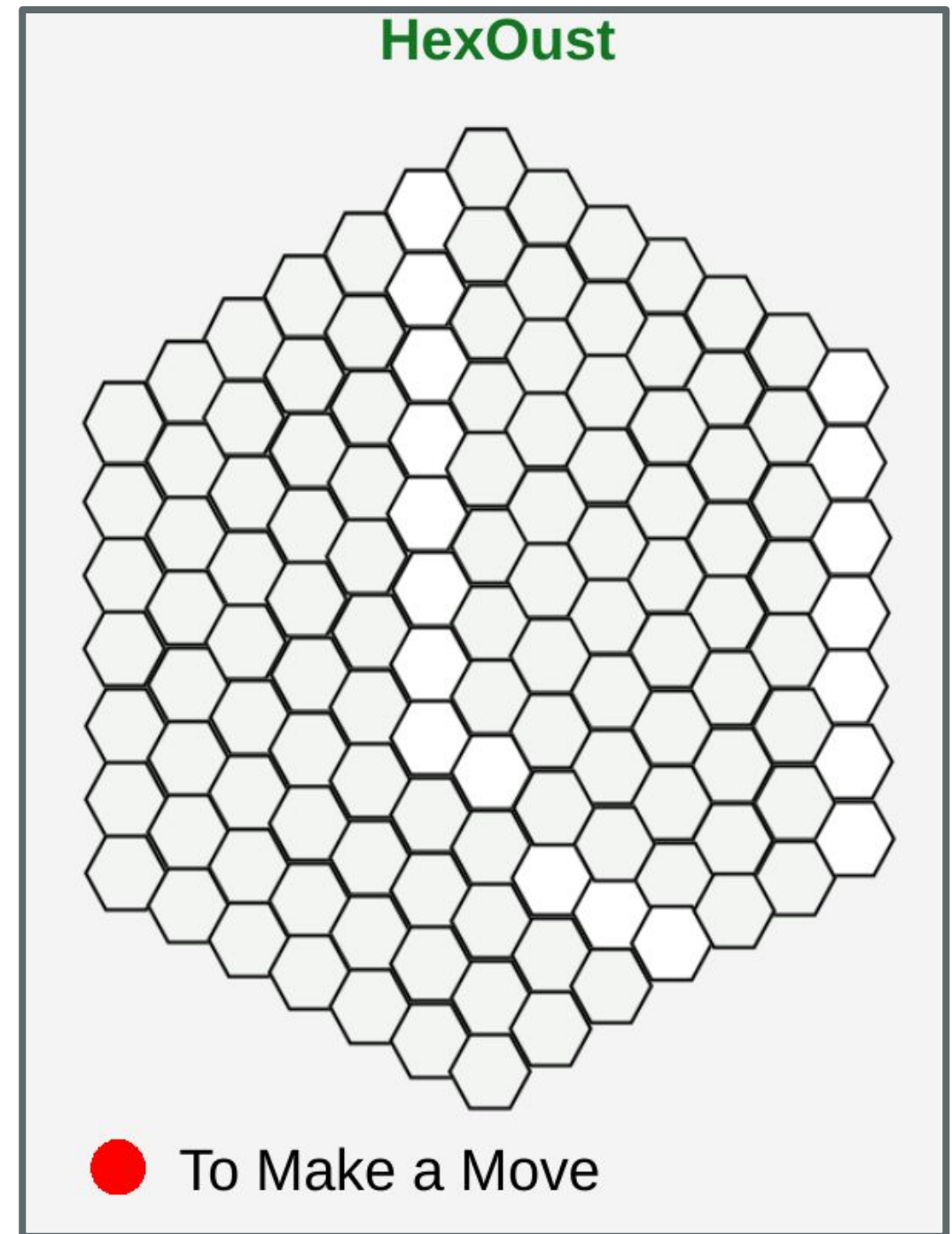
RED placement (the dotted cell) captures all the **BLUE's** groups.

- A player wins by making a placement which captures all of the enemy stones on the board.
- In the figure, **RED** captures all of the **BLUE's** stones and wins the game.
- Group of 4 **RED** stones is bigger than the three **BLUE** groups. Therefore, the move captures all the **BLUE** stones.



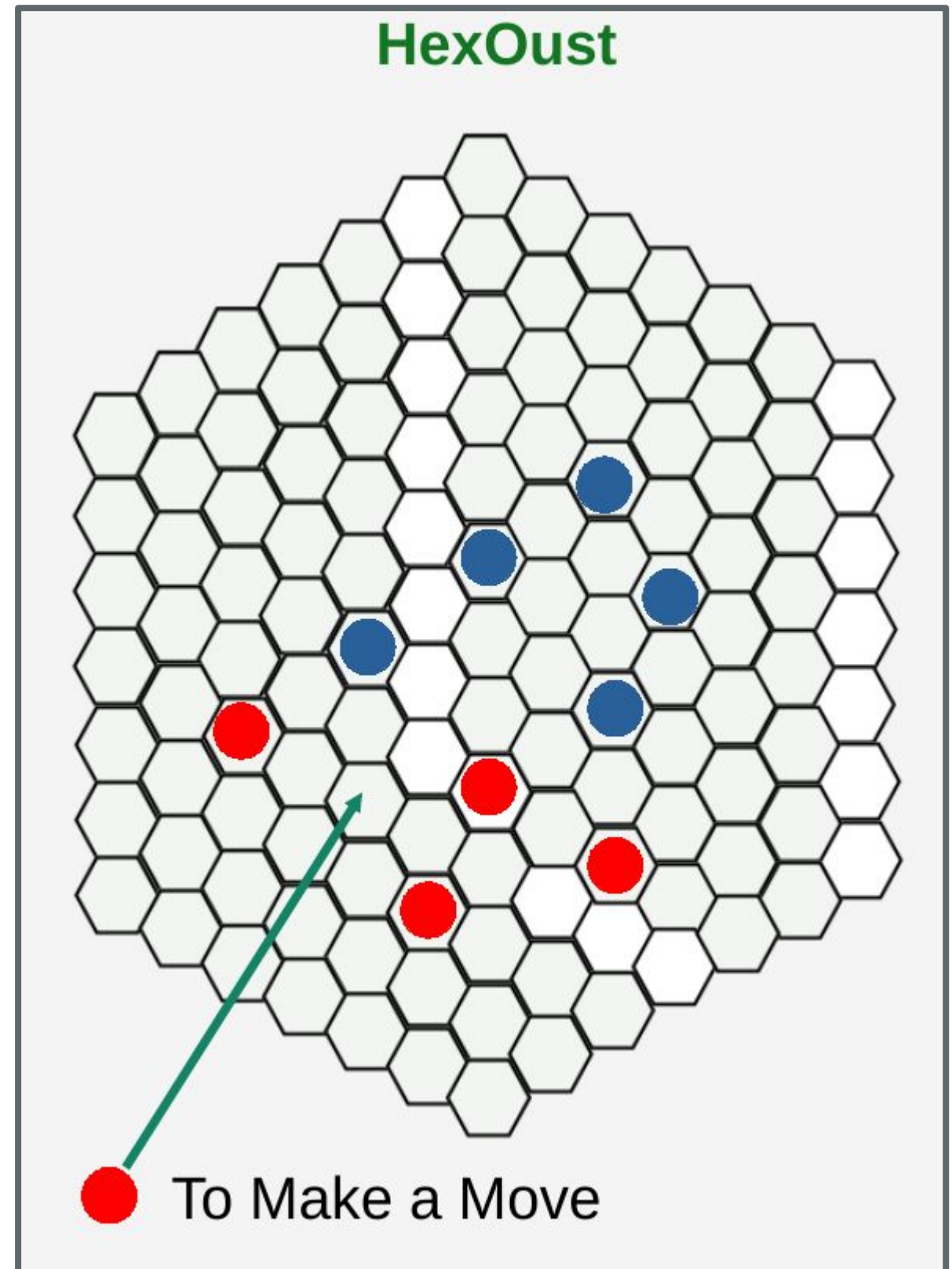
HexOust Requirements Specification (SRS)

- **SR1:** On launch of HOS, an empty base-7 hexagonal board shall be displayed with a **RED** sphere indicating the **RED** player's turn.
- **SR1.1:** **RED** player's stones shall be represented by 2D **RED** spheres.
- **SR1.2:** **BLUE** player's stones shall be represented by 2D **BLUE** spheres.
- **SR1.3:** A **RED** sphere followed by a text shall be displayed (*not necessarily below the board*) to indicate the **RED** player's turn.

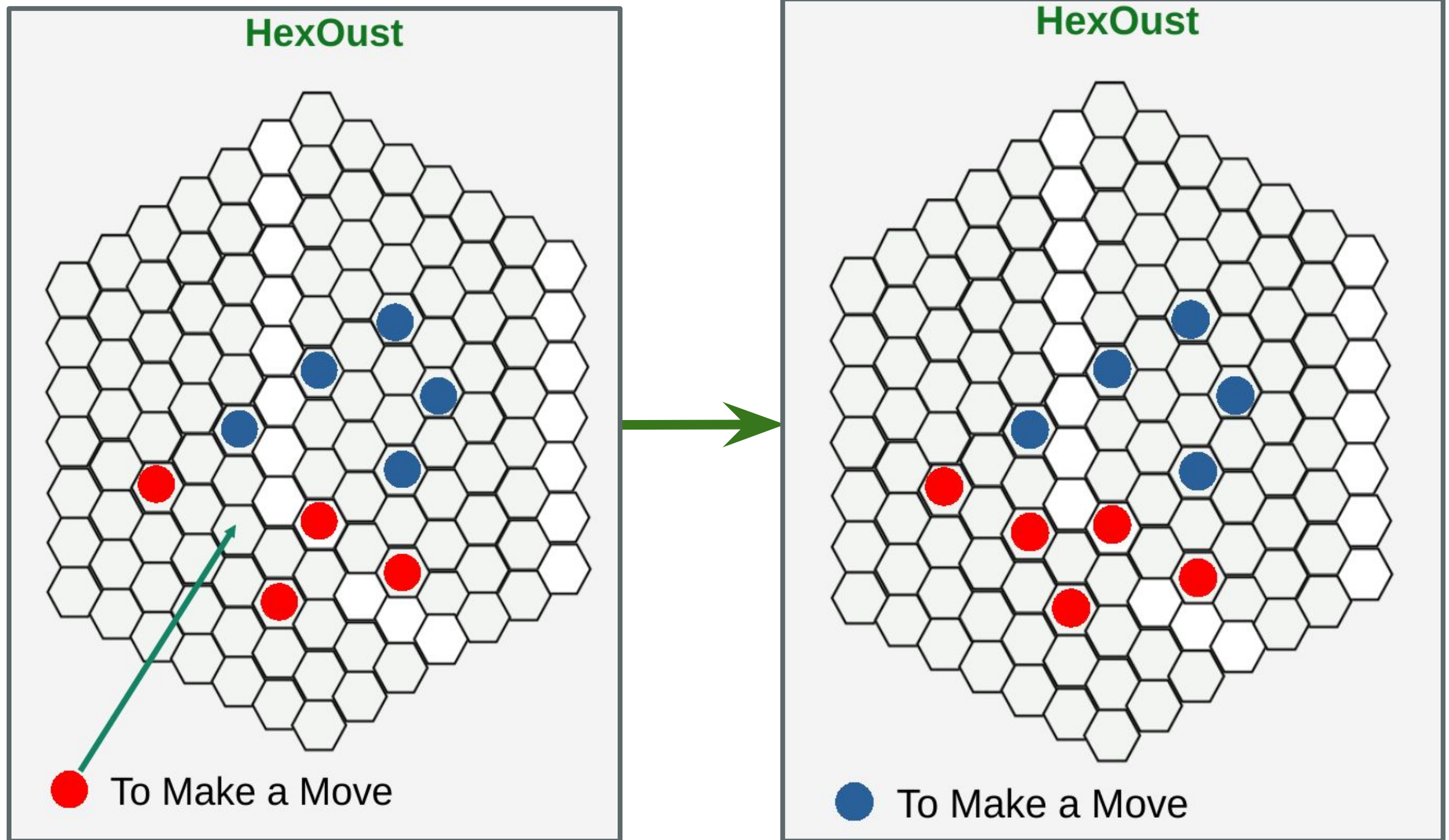


HexOust SRS 2 (Non-capturing Placements)

- **SR2:** A player (**RED** or **BLUE**) should place her stone in a valid cell by drag-and-drop or clicking the cell.
- **SR2.1:** If the player made an NCP, the stone shall be placed in the valid cell, and
- **SR2.2:** If the player made an NCP, a stone of the opponent player's color followed by a text shall be displayed to indicate the opponent player's turn.



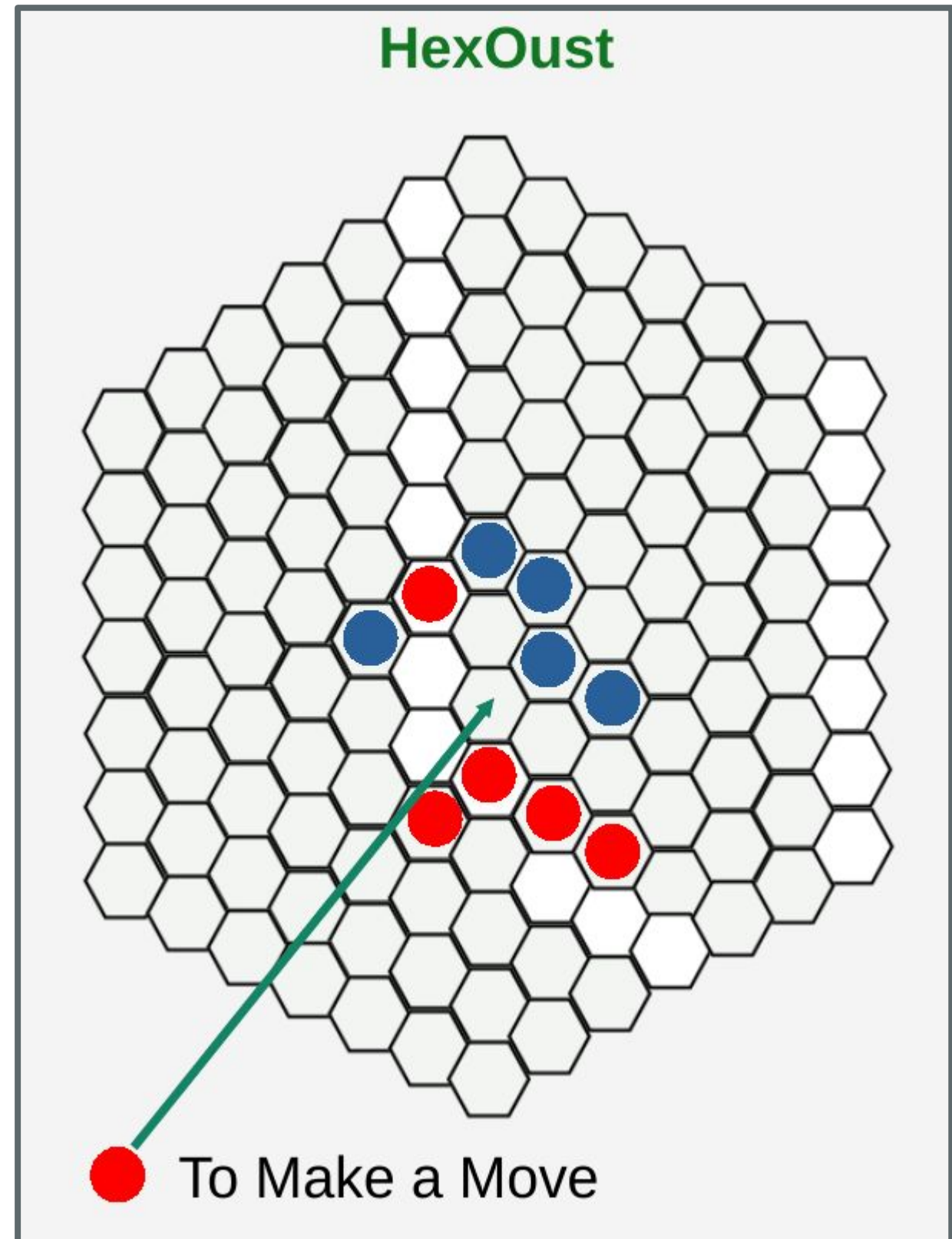
HexOust SRS 2 (Example)



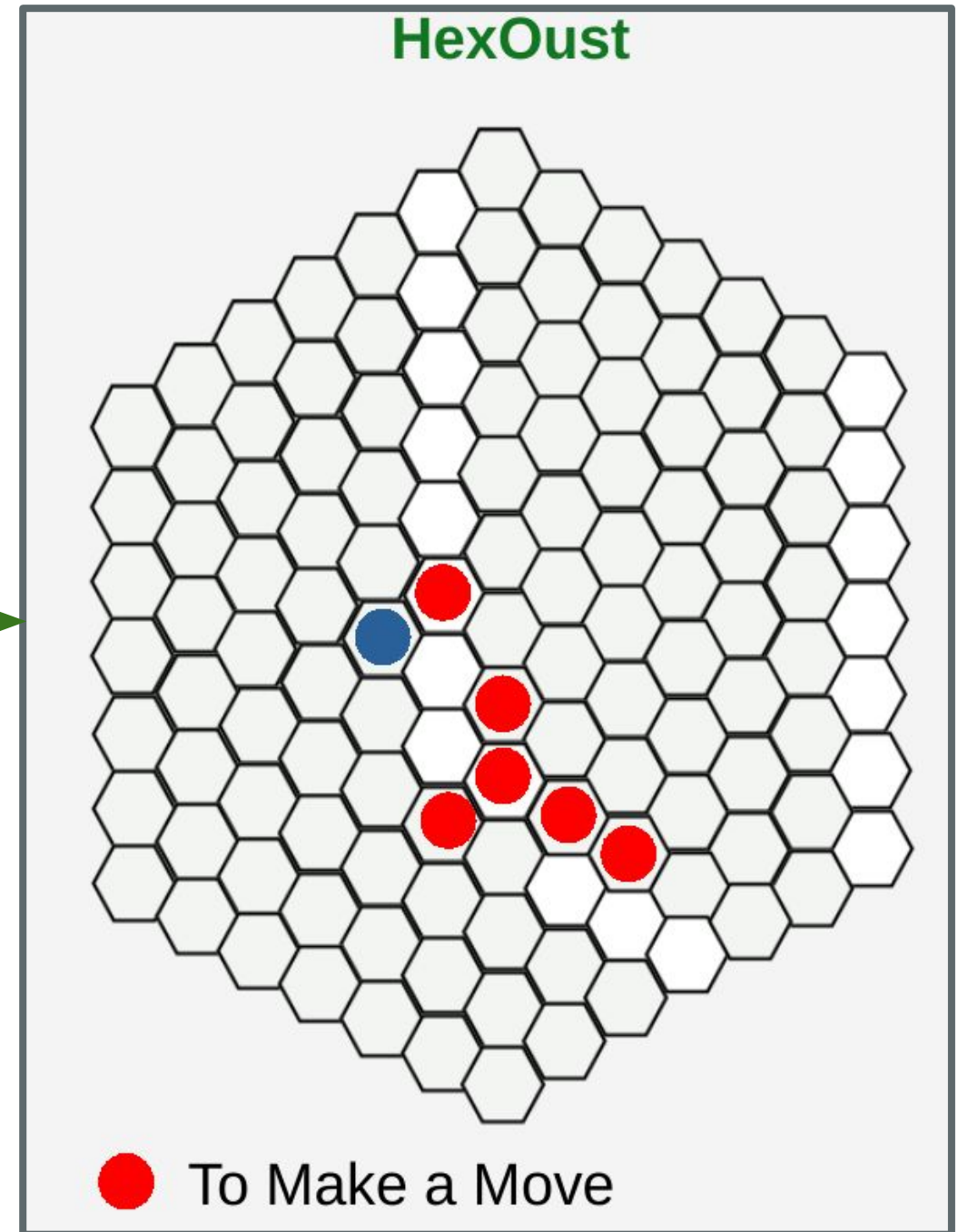
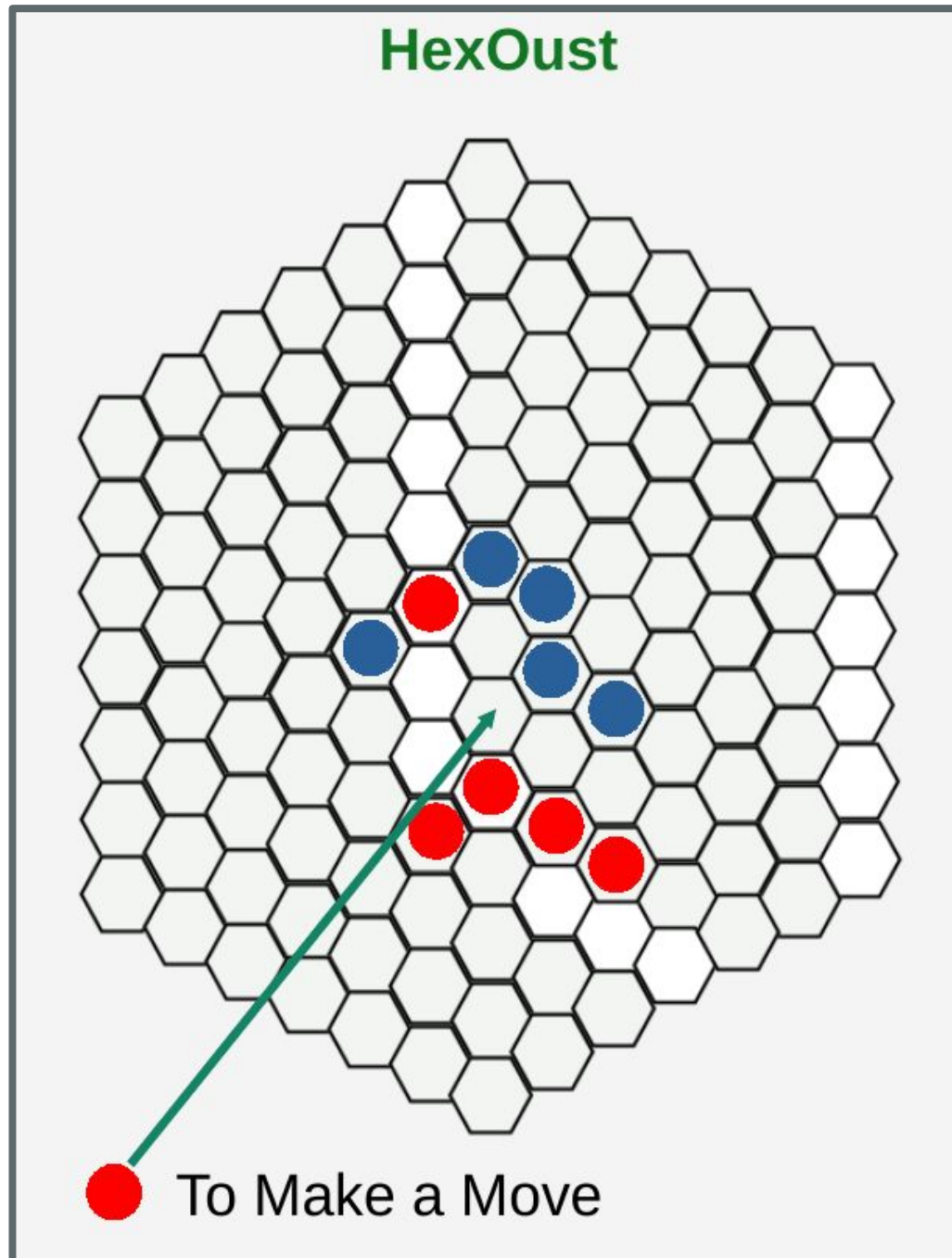
HexOust SRS 3 (Capturing Placements)

- **SR3:** A player (**RED** or **BLUE**) should place her stone in a valid cell by drag-and-drop or clicking the cell.
- **SR3.1:** If the player made a CP, then all the opponent's groups that are captured shall be removed from the board.
- **SR3.2:** A stone of the capturing player's color followed by a text shall be displayed to indicate the capturing player's turn.

In reality, this requirement can be further broken down into several interesting CP scenarios.

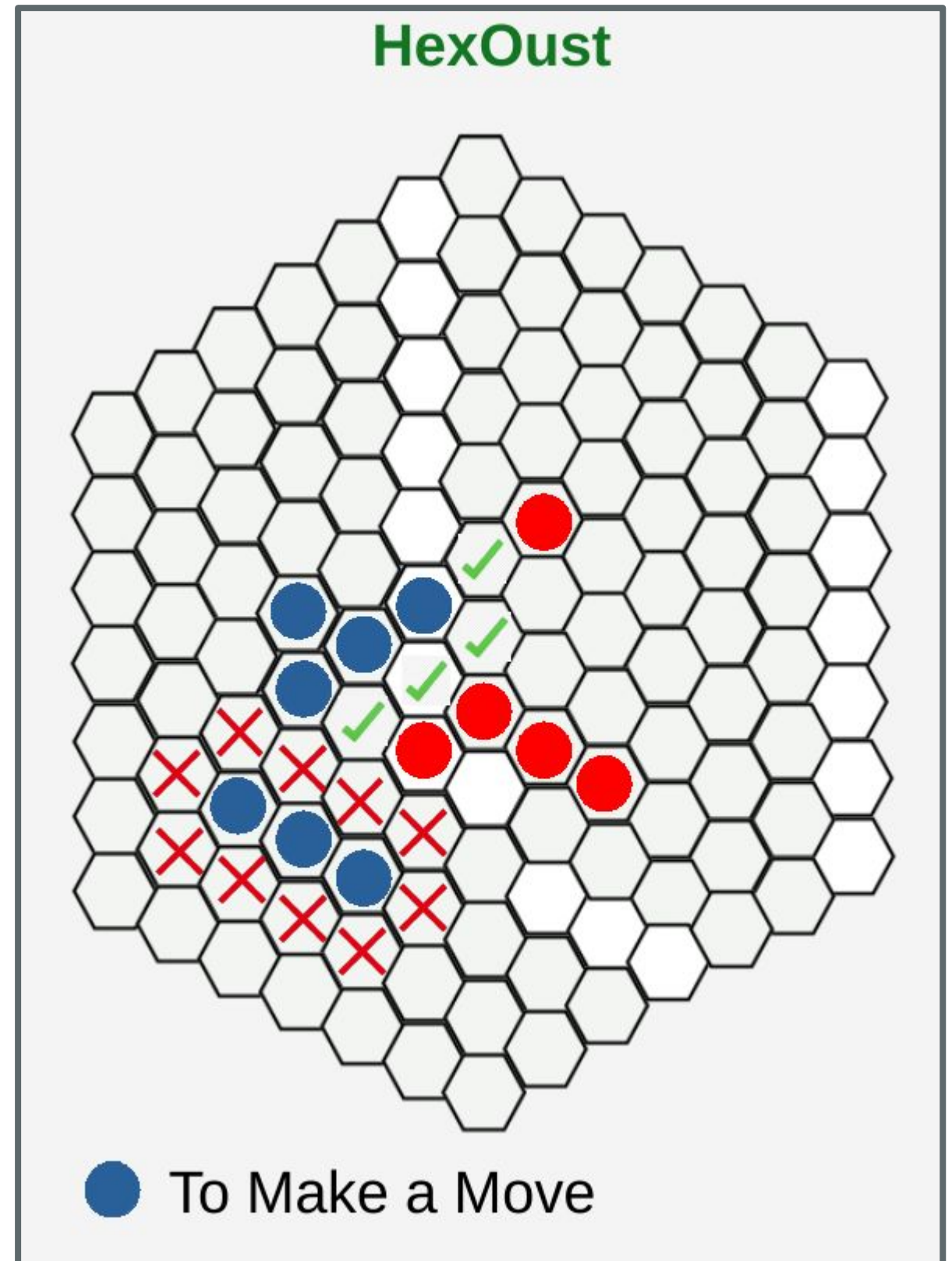


HexOust SRS 3 (Example)



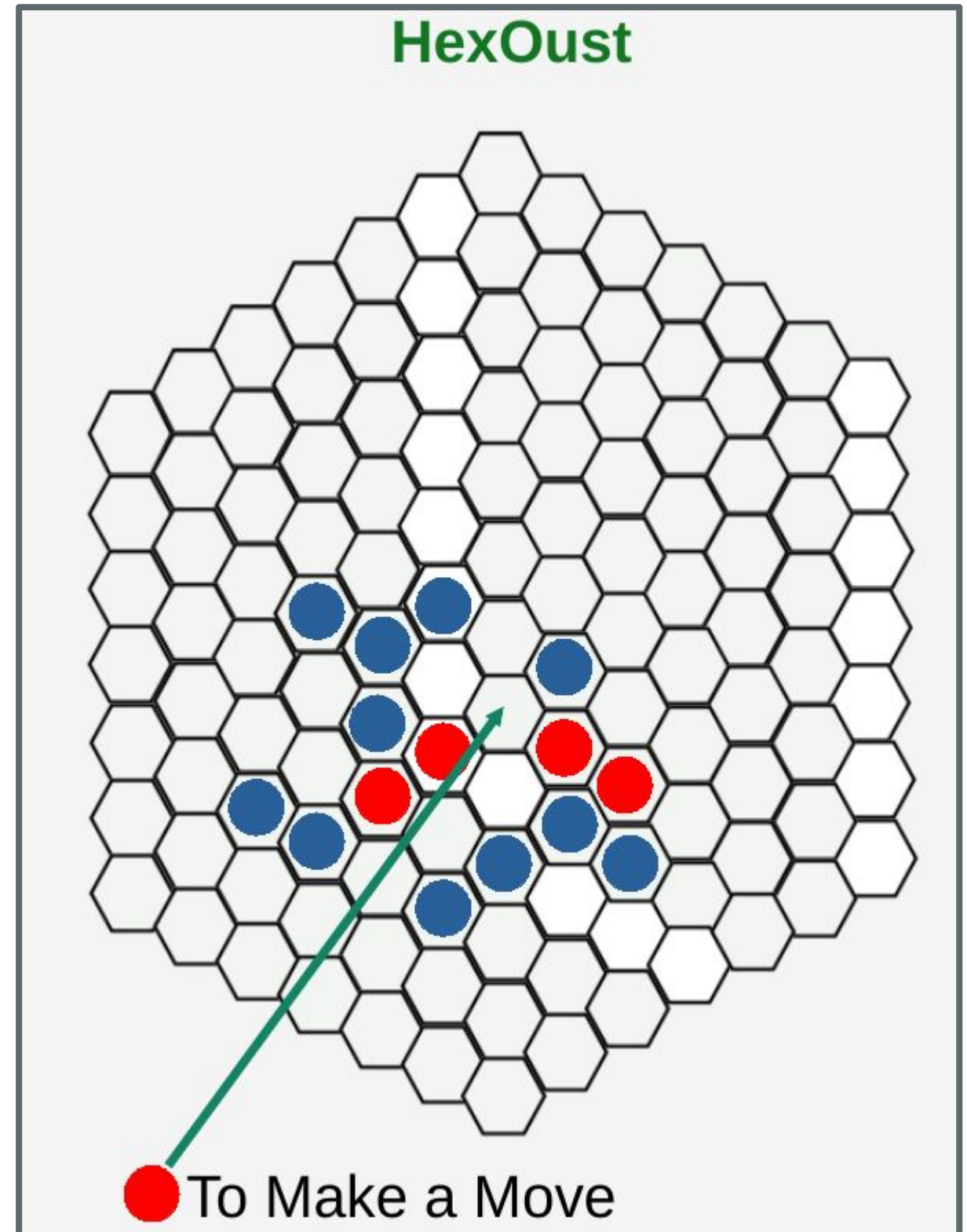
HexOust SRS 4 (Invalid Placements)

- **SR4:** If a player (**RED** or **BLUE**) places her stone in an invalid cell, then an **error message shall be displayed**.
- **SR4.1:** The error message shall be **Invalid Cell Placement**.
- *An enhanced requirement (not mandatory to implement) follows:*
- **SR4.E1:** If the player hovers her stone over a **valid cell**, then the cell should display a **green tick symbol** to indicate that the player can place a stone there.
- **SR4.E2:** Similarly, for an **invalid cell**, a red cross should be displayed.

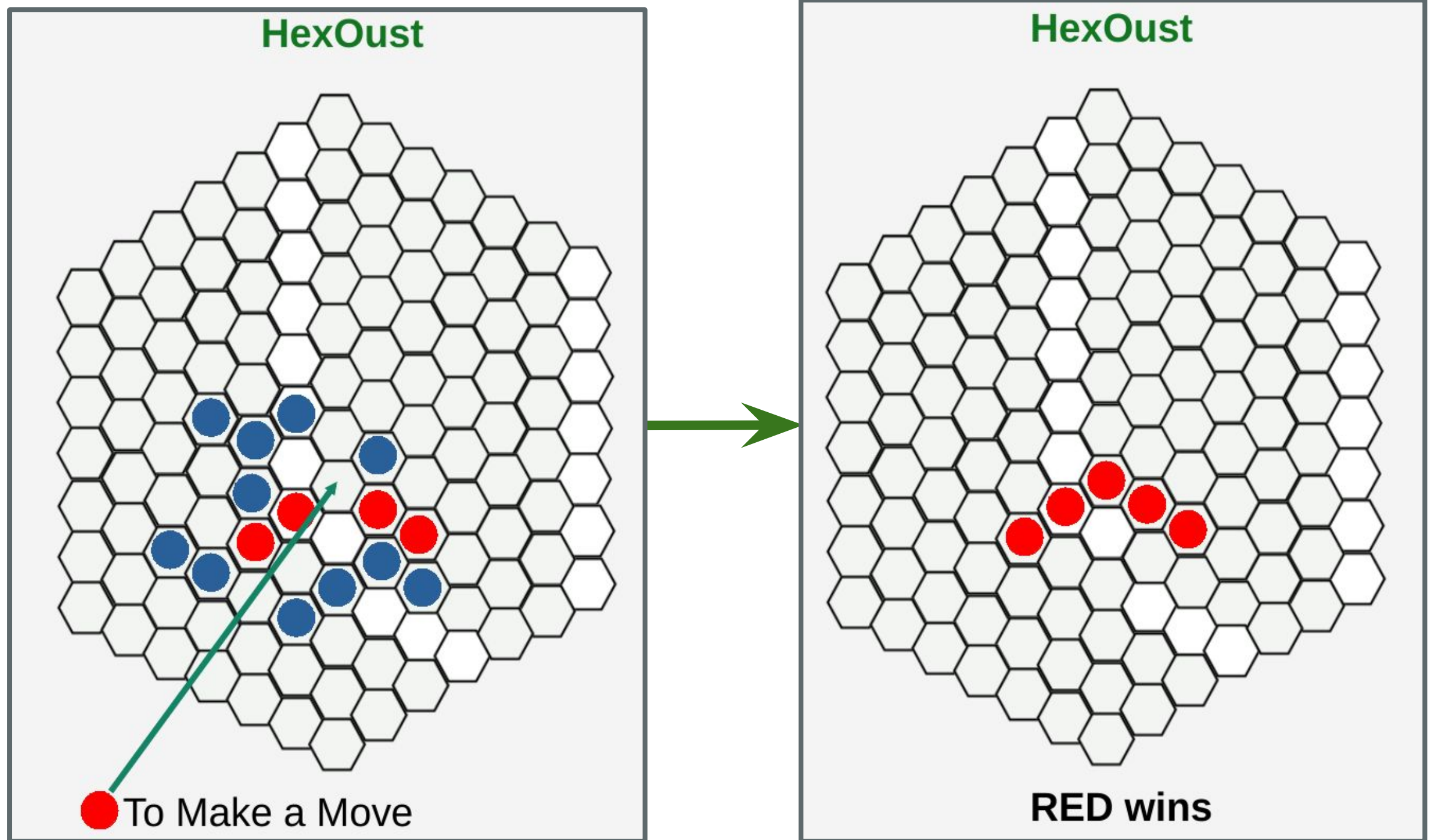


HexOust SRS 5 (Winning Move)

- **SR5:** If a player (**RED** or **BLUE**) places her stone that eliminates all the opponent's groups, then a message shall be displayed mentioning that the player won (**RED** or **BLUE**).
- **SR5.1:** The messages shall be
RED wins
BLUE wins



HexOust SRS 5 (Winning Move Example)



Non-functional Requirements for HexOust

- **Performance requirements:**
 - The event response time should not be more than **5 seconds**. An event is a move by a player.
- **Space requirements:**
 - The final release package for HexOust should not be more than **10 MB**.
- **Development requirements:**
 - The system must be implemented using **Java programming language**.
- **Usability requirements:**
 - Experienced players should not make more than **3 errors** on average during one game play.



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