QBF

by Mark Steere

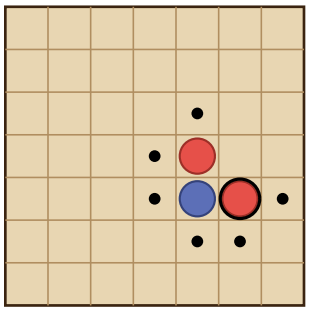


Figure 1
Dots mark the squares available to Blue

INTRODUCTION

QBF, which stands for Quantified Boolean Formula, is a two-player game. It's played on an initially empty square board. Mark Steere, in collaboration with Claude, an AI model made by Anthropic, designed QBF in November 2026.

PLAY

The two players, Red and Blue, take turns placing checkers of their own color onto unoccupied squares on the board. Red begins by placing a stack of two red checkers on any square. This stack is called the **root**, and is treated as a single, marked checker.

QBF uses the pie rule. Blue, for his first turn, can choose to switch colors with Red instead of placing a checker. If he does, the root remains red, but the player who placed the root is now Blue, and places a blue checker. Thereafter, players take turns placing one checker per turn.

LEGAL MOVES

After the root is placed, you must place your checker onto a square that is orthogonally adjacent to exactly one checker, of either color. Diagonal adjacencies are irrelevant.

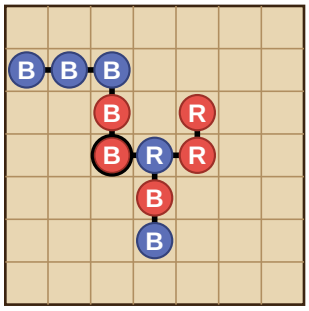


Figure 2
Letters show who owns each checker.

In **Figure 1**, the root is outlined in bold. Dots mark the squares available to Blue. The checker that a new checker is placed next to is called its **parent**. The newly placed checker is a **child** of that parent. In **Figure 2**, each checker is joined to its parent by a line segment. The game ends when no unoccupied square is orthogonally adjacent to exactly one checker.

OBJECT OF THE GAME

When the game ends, the players **claim** the checkers on the board. A player can claim ownership of checkers of either or both colors. Start with the checkers that have no children and work inward toward the root:

A checker belongs to its own color if all of its children belong to its own color. Otherwise it belongs to the other color. Childless checkers belong to their own color. **You win if you claim the root.**

In **Figure 2**, the game hasn't ended yet, but the claiming process can be demonstrated nonetheless. The letter on each checker shows who currently owns it. Blue claims the red root, because Blue owns the checker above the root.

Multiple claims can change hands on every turn. In **Figure 3**, a continuation of **Figure 2**, Red has placed a checker above the blue checker two squares above the root. That blue checker now has a child owned by Red, so Red claims it. Red then claims the red checker above the root, and the root.

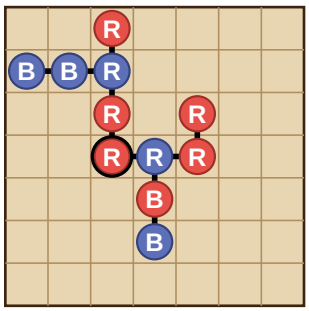


Figure 3
After Red's placement at the top, Red claims the root.

DESIGN NOTES

A paper I'm working on uses QBF in a proof. This gave me the idea of using QBF as the basis for a design. I had an initial idea, and Claude carried the idea farther from the tree.

AUTHOR'S NOTE

Feel free to publish this rule sheet and to program the game of QBF. No licensing fee or royalties are expected. However, please don't change the name or the rules, and please attribute the game to me, Mark Steere. My other games can be found at marksteeregames.com.

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