# **MarbleMind**

**USER GUIDE**

## ****1. Introduction****

### ****Game Overview****

**MarbleMind** is a fun and strategic two-player marble game played on a 4x4 grid. The objective is to align four marbles of the same type in a row, column, or diagonal. What makes this game unique is the **counterclockwise movement mechanic**, where all marbles shift counterclockwise after each turn. This adds an extra layer of strategy and keeps the game dynamic and challenging.

### ****Key Features****

* **Two-Player Mode**: Play with friends or family in a local two-player game.
* **Counterclockwise Marble Movement**: Marbles shift counterclockwise after each turn, making gameplay more dynamic.
* **Timer**: Players have a limited time to make their moves, adding pressure and excitement.
* **4x4 Grid**: A compact but strategic grid that makes every move count.
* **Winning Conditions**: Align four marbles in a row, column, or diagonal to win.

### ****Game Platform(s)****

**MarbleMind** can be installed on an Android **device** with the help of apk provided to you.

## ****2. Getting Started****

### ****System Requirements****

* **Mobile**: Android 5.0+

### ****Installation/Setup****

* **Mobile**: Download the apk file and install it in your device.

### ****Setting Up the Game****

When you open the game, you’ll see the **game board**, which is a 4x4 grid. The grid is initially empty, and each player will take turns placing their respective marbles. The marbles are represented as "X" and "O" on the grid.

1. **Players**: The game is played between two players:
   * Player 1 uses the "X" marble.
   * Player 2 uses the "O" marble.
2. **Turn Timer**: Each player has 30 seconds to make their move. The timer starts as soon as the previous player places their marble on the grid.

## ****3. Game Controls and Interface****

### ****Controls Overview****

* **Mobile**: Tap on a grid cell to place your marble.

### ****Gameplay Screen****

* **Grid**: A 4x4 grid where marbles are placed.
* **Timer**: Displays the remaining time for the current player’s turn.
* **Restart/Undo Button**: At the bottom, you can restart the game or undo the last move.
* **Game Status**: Displays the current state (e.g., Player 1's turn, Winner, Draw).

## ****4. Gameplay Mechanics****

### ****Objective of the Game****

### The goal is to align four marbles (either X or O) in a row, column, or diagonal. The first player to do so wins the game. ****Step-by-Step Gameplay****

1. **Player Turn**:
   * Players take turns placing their marble on the grid. When a player taps a cell in the grid, their marble is placed in the selected cell (if it’s empty).
2. **Counterclockwise Marble Movement**:
   * After a marble is placed, **all other marbles** on the board shift counterclockwise.
   * This means that each marble, except the newly placed one, moves to the next available position in the counterclockwise direction. The exact sequence is:
     + Marbles move **up** (top-left to bottom-left).
     + Then **left** (top-left to top-right).
     + Then **down** (bottom-left to bottom-right).
     + Finally, marbles move **right** (bottom-right to top-right).
   * This mechanic adds an interesting twist, as players need to plan ahead and anticipate how marbles will move after each turn.
3. **Winning the Game**:
   * The game checks after every turn if there are four consecutive marbles in a row, column, or diagonal (either horizontal, vertical, or diagonal).
   * The first player to align four marbles in a row, column, or diagonal wins the game.
   * If there are no moves left, and no winner is found, the game ends in a draw.
4. **Game Over**:
   * The game displays a dialog box when a winner is found or when the game ends in a draw.
   * Once the game ends, the winner is declared, and the game timer stops

### ****Player Actions****

During their turn, a player can:

* **Place a Marble**: Select any empty cell on the grid.
* **Counterclockwise Movement**: After placing the marble, the game automatically moves all marbles counterclockwise, except the newly placed one.

## ****Features of MarbleMind****

### ****Dynamic Gameplay with Counterclockwise Marble Movement****

The most unique feature of **MarbleMind** is the **counterclockwise marble movement**. After every turn, all marbles on the grid (except the new one) shift in a counterclockwise direction. This means players must constantly rethink their strategies as the board changes after each move.

### ****Turn Timer****

Each player has a **30-second turn limit**. The timer keeps the game moving and adds pressure to make quick decisions. If a player does not place a marble within the time limit, the game will automatically switch to the other player.

### ****Winning Conditions****

The game supports multiple ways to win:

* **Horizontal lines**: Align four marbles in a row.
* **Vertical lines**: Align four marbles in a column.
* **Diagonals**: Align four marbles in either of the two diagonals.

The game logic checks these conditions after every turn and declares the winner as soon as the condition is met.

### ****Game Over Dialog****

When the game ends (either because of a winner or a draw), a dialog box will appear, notifying the players of the outcome. The dialog includes a button to close it and end the game session.

### ****Color-Coded Grid****

The grid is color-coded, and **winning cells** are highlighted in **green** to indicate which marbles contributed to the victory. Non-winning cells are displayed in a neutral color.

### ****Clean User Interface****

The UI is designed to be minimal yet informative. Players can easily see the current player’s turn, the remaining time for each turn, and the game board’s status. The design allows players to focus entirely on the game.

## ****6. Advanced Gameplay****

### ****Strategy Tips****

1. **Plan Ahead**: Always think about how the marbles will move after your turn. Try to anticipate your opponent’s strategy while setting up your own.
2. **Control the Center**: Marbles placed in the center cells have more potential to form winning lines because they are part of both rows and diagonals.
3. **Defend**: If your opponent is close to winning, use your turn to block their potential line.

## ****7. Troubleshooting****

### ****Possible Issues and Solutions****

 **Game Not Loading**

* **Cause**: Missing files or incorrect installation.
* **Solution**:
  + Ensure all required files are present in the project directory.
  + Check if the Flutter environment is correctly installed and configured.

 **Controls Not Responding**

* **Cause**: Input not being registered or an app freeze.
* **Solution**:
  + Restart the game.
  + Verify that you are tapping within the grid area.
  + If using a touch screen, ensure it is responsive.

 **Player Unable to Place a Marble**

* **Cause**: Clicking on an occupied cell or invalid grid area.
* **Solution**:
  + Ensure you are selecting an empty cell.
  + Follow the game rules for valid marble placement.

 **Game Freezing Mid-Turn**

* **Cause**: Overlapping game logic operations or resource issues.
* **Solution**:
  + Close the app and relaunch.
  + Avoid rapid inputs; let animations or moves complete.

## ****8. FAQ (Frequently Asked Questions)****

### ****Q1: How do I win the game?****

A1: To win, you need to align four marbles of the same type (either X or O) in a row, column, or diagonal.

### ****Q2: What happens if I run out of time?****

A2: If you run out of time, your turn automatically passes to the other player, and no move is made.

### ****Q3: Can I play against the computer?****

A3: Currently, **MarbleMind** is designed for two-player local play only. AI opponents are not yet available.

## ****Appendix****

### ****Glossary****

* **Counterclockwise Movement**: The shifting of marbles on the grid after each turn in a counterclockwise direction.
* **Winning Line**: A line of four consecutive marbles either horizontally, vertically, or diagonally.

### ****Game Design Notes****

* **Shift Algorithm**: The game’s counterclockwise movement is implemented by shifting the marbles in a sequence, taking into account their positions relative to the grid and wrapping around when necessary.