# Simple Breakout Clone

Simple Breakout Clone is a copy of the Breakout arcade game made by Atari. The goal of the game is to bounce a ball off the paddle into the bricks to break them. Breaking all the bricks is how you win. If the ball falls below the paddle and touches the bottom of the screen, the game is lost. This game was created in Unity with only base assets utilizing C# scripting.
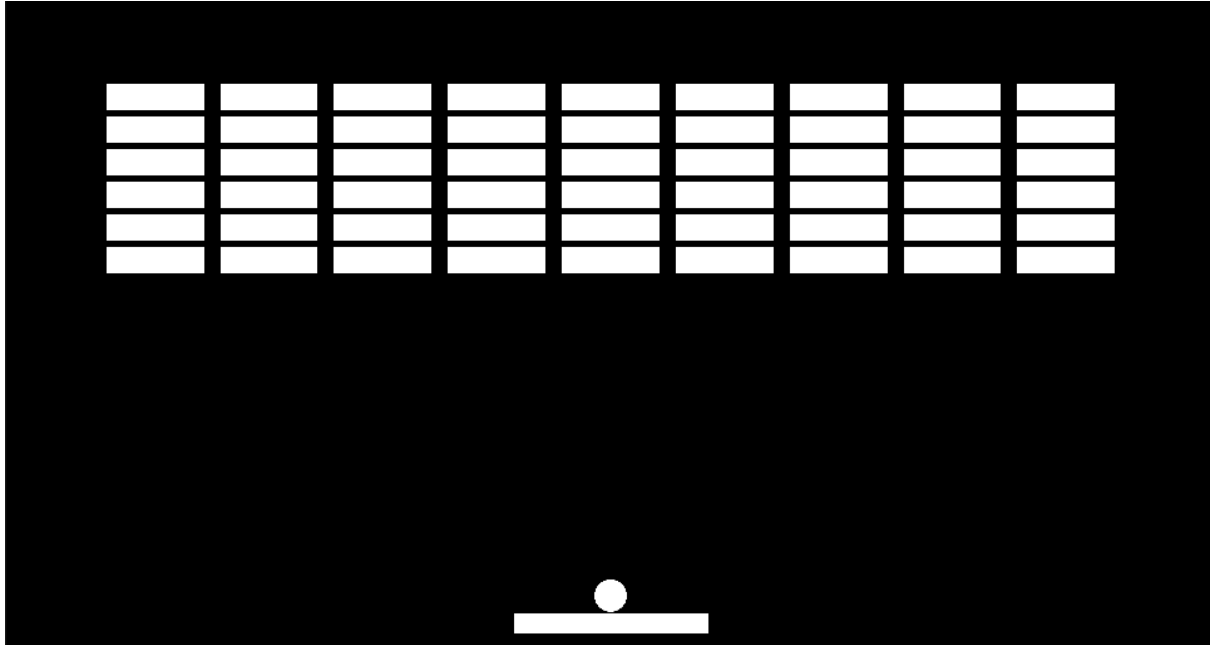
How to play:

The paddle is controlled by the A and D keys, or the arrow keys on a keyboard. The game starts automatically after 1 second. In case of a game over, the game will restart automatically after 1 second.

How the game works:

Rather than hard coding animations and reflections, I utilized the Unity physics engine. The game uses 4 main assets:

- Ball
- Paddle
- Blocks
- Walls

The ball is a 2D unity circle sprite with a RigidBody2D, CircleCollider2D and a Ball script attached to it. The RigidBody2D is used for physics calculations and the CircleCollider2D for hit detection. The script is simple and contains a function called on game start and game restart to give the ball a random angle and a set velocity.

The paddle is a 2D unity square sprite with the same components as a Ball. The attached script updates which key is pressed on every frame, but only applies force in that direction in fixed intervals. This was done to avoid paddle movement being dependent on framerate. Additionally, it calculates angles of reflection when a collision with the ball is detected. The further from the center of the paddle, the more extreme the angle of reflection, adding or subtracting from the angle of reflection based on which side was hit. The diagrams below are a not-to-scale representation of this mechanic.
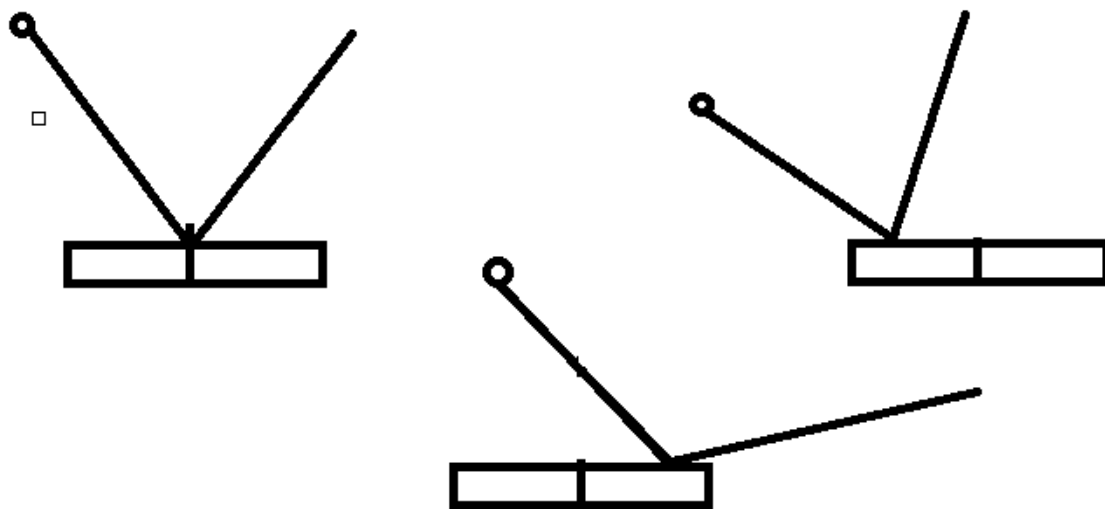
The bricks use only a BoxCollider2D and a script, as they have no need for any interactions with the physics engine. When a collision is detected with the ball, the brick sets itself as inactive, essentially deleting itself.

As for the walls, 3 of them are simple BoxCollider objects used so that the ball can not fly off screen, but simply reflects into the visible play area. The final wall, located on the bottom under the playable area, contains a Game Over script. This script freezes the ball, reactivates all the bricks, and sets the ball and paddle back in their starting positions, after which the game will replay as normal.

To start the game, download the files and load them into Unity. Then, start the game as if you were to test a project in Unity. You can feel free to modify as you wish and export an exe or apk file and install the game onto the device of your choice.