



How to Make Pong

Your goal:

Make a simple pong clone that has the following features:

- Paddles controlled by two players
- A ball that moves linearly, "collides" with the paddles and the boundary of the play area, and changes angle of attack with collisions with the player object
- Some method of keeping track of the score
- Reset the ball when a player scores



You are not allowed to use any physics components for this exercise.
No rigidbodies, no colliders, no triggers.



Core concepts: Camera, Transform, Scene View, Hierarchy, Prefabs, Input, Scripts & Components, `Time.deltaTime`

Instructions

1. Create a new Unity project in Unity Hub using the 2D template
2. Set up the camera
 1. Orthographic mode
 2. Solid color background (not blue)
3. Create a ball prefab and a player prefab by making a 2D or 3D object in the Hierarchy and dragging it to the Assets folder in the Project window.
 1. If you make a 2D sprite, you will need to make a sprite to put in the `SpriteRenderer` by right clicking in the Project window and going to `Create > Sprites`
4. Create a script called `Player` and add it to the Player prefab
 1. Add the following public fields to the Player class
 1. `float Speed`
 2. `int PlayerNumber`
 2. Add input to the player object. In the `update()` method, add logic that checks `UnityEngine.GetKeyDown()` or `UnityEngine.GetButton()` to move the player up and down with `transform.translate()`
 1. You should pass something like `Vector2.up * Speed * Time.deltaTime` to `translate()`
5. Create a script called `Ball` and add it to the Ball prefab
 1. Add the following public fields to the Ball class:
 1. `float Speed`
 2. `Vector2 Direction`
 3. `Vector2 Boundary`
 2. In the ball prefab, set the initial values of `Speed` to 2, `Direction` to `<1, 0>`, and `Boundary` to `<5, 5>`
 3. In the `Update()` method, add logic that does the following:

1. Translate the transform by `Speed * Time.deltaTime * Direction`
2. Check when the Ball's `transform.position` is greater than `Boundary` and less than `-Boundary` and either change the direction or score for one of the players depending on the position of the ball transform
4. In the `Start()` method, add `Direction = new Vector2(-1, Random.Range(-1.0f, 1.0f))`
 1. Figure out a way to make the ball randomly go left or right when it resets
6. Place one instance of the ball prefab at `<0, 0>` in the scene view.
7. Place one instance of a player prefab at `<-5, 0>` and the other at `<5, 0>`

The basic setup for Pong is now complete, but with some features missing.

Your Assignment



Due Monday, Sept. 9

Figure out how to add collision logic between the ball and the player that satisfies the following requirements:

- The ball bounces off the player objects without scoring
- The ball bounces off the player objects and changes direction depending on where the ball hit the player object
- One player scores if the other player fails to hit the ball
- The ball resets after a player scores

You may work with other students on this assignment, get help from the code help desk, and look up examples online, but you must make your own project. No copying projects, most of your work is already in the instructions!

You will demo your games in class.

Challenge Tasks

If all of the above was too easy, here are some additional challenges. Some of these are easier than the others.

- Add logic to keep the Paddles on the screen
- Add a way of visualizing the score during the game
- Add a time limit to the game
- Add visual effects or animations
- Add a title screen and end game screen
- Add screen shake
- Add additional players
- Add special abilities
- Add sounds
- Use the Ball and Paddle parameters to make gameplay more interesting
- Remove the need for the `Boundary` parameter and just use the position of the Paddles