



# Challenge 3

## Balloons & Booleans



<b>Challenge Overview:</b>	Apply your knowledge of physics, scrolling backgrounds, and special effects to a balloon floating through town, picking up tokens while avoiding explosives. You will have to do a lot of troubleshooting in this project because it is riddled with errors.
<b>Challenge Outcome:</b>	<ul style="list-style-type: none"> <li>- The balloon floats upwards as the player holds spacebar</li> <li>- The background seamlessly repeats, simulating the balloon's movement</li> <li>- Bombs and Money tokens are spawned randomly on a timer</li> <li>- When you collide with the Money, there's a particle and sound effect</li> <li>- When you collide with the Bomb, there's an explosion and the background stops</li> </ul>
<b>Challenge Objectives:</b>	<p>In this challenge, you will reinforce the following skills/concepts:</p> <ul style="list-style-type: none"> <li>- Declaring and initializing variables with the GetComponent method</li> <li>- Using booleans to trigger game states</li> <li>- Displaying particle effects at a particular location relative to a gameobject</li> <li>- Seamlessly scrolling a repeating background</li> </ul>
<b>Challenge Instructions:</b>	<ul style="list-style-type: none"> <li>- Open your <b>Prototype 3</b> project</li> <li>- <b>Download</b> the "Challenge 3 Starter Files" from the Tutorial Materials section, then double-click on it to <b>Import</b></li> <li>- In the <i>Project Window &gt; Assets &gt; Challenge 3 &gt; Instructions</i> folder, use the "Challenge 3 - Instructions" and Outcome video as a guide to complete the challenge</li> </ul>

Challenge	Task	Hint
1 The player can't control the balloon	The balloon should float up as the player presses spacebar	There is a "NullReferenceException" error on the player's <code>rigidBody</code> variable - it has to be assigned in <code>Start()</code> using the <code>GetComponent&lt;&gt;</code> method
2 The background only moves when the game is over	The background should move at start, then <i>stop</i> when the game is over	In <code>MoveLeftX.cs</code> , the objects should only <code>Translate</code> to the left if the game is <i>NOT</i> over
3 No objects are being spawned	Make bombs or money objects spawn every few seconds	There is an error message saying, "Trying to Invoke method: <code>SpawnManagerX.PrawnsObject</code> couldn't be called" - spelling matters
4 Fireworks appear to the side of the balloon	Make the fireworks display at the balloon's position	The fireworks particle is a child object of the Player - but its location still has to be set at the same location
5 The background is not repeating properly	Make the background repeat seamlessly	The <code>repeatWidth</code> variable should be half of the background's <code>width</code> , not half of its <code>height</code>

Bonus Challenge	Task	Hint
X The balloon can float way too high	Prevent the player from floating their balloon too high	Add a boolean to check if the balloon <code>isLowEnough</code> , then only allow the player to add upwards force if that boolean is true
Y The balloon can drop below the ground	Make the balloon appear to bounce off of the ground, preventing it from leaving the bottom of the screen. There should be a sound effect when this happens, too!	Figure out a way to test if the balloon collides with the ground object, then add an impulse force upward if it does

## Challenge Solution

- 1 In PlayerControllerX.cs, in Start(), assign **playerRb** just like the playerAudio variable:

```
playerAudio = GetComponent< AudioSource >();  
playerRb = GetComponent< Rigidbody >();
```

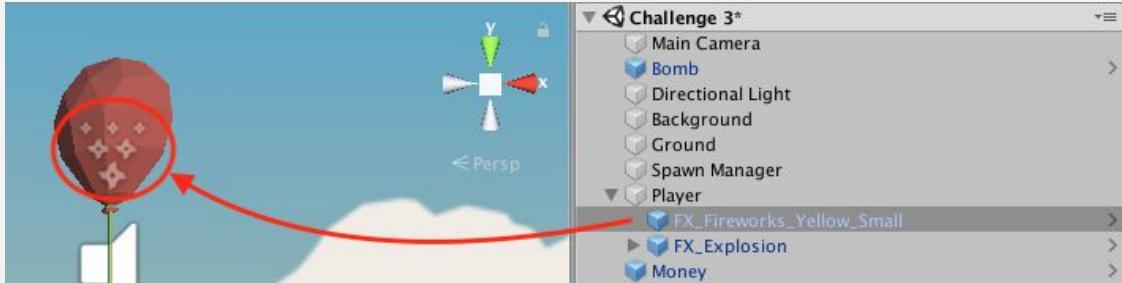
- 2 In MoveLeftX.cs, the objects should only Translate to the left if the game is NOT over - it's currently checking if the game IS over:

```
if (!playerControllerScript.gameOver) {  
    transform.Translate(Vector3.left * speed * Time.deltaTime, Space.World);  
}
```

- 3 In SpawnManagerX.cs, in Start(), the InvokeRepeating method is using an incorrect spelling of "SpawnObjects" - correct the spelling error

```
void Start() {  
    InvokeRepeating("PrawnsObjectSpawnObjects", spawnDelay, spawnInterval);  
    ...  
}
```

- 4 Select the Fireworks child object and reposition it to the same location as the Player



- 5 In RepeatBackgroundX.cs, in Start(), the repeatWidth should be dividing the X size (width) of the box collider by 2, not the Y size (height)

```
repeatWidth = GetComponent< BoxCollider >().size.y / 2;
```

## Bonus Challenge Solution

- X1** In PlayerControllerX.cs create a boolean to track whether the player is low enough to float upwards, then in Update(), set it to **false** if the player is above a certain Y value and, else, set it to **true**

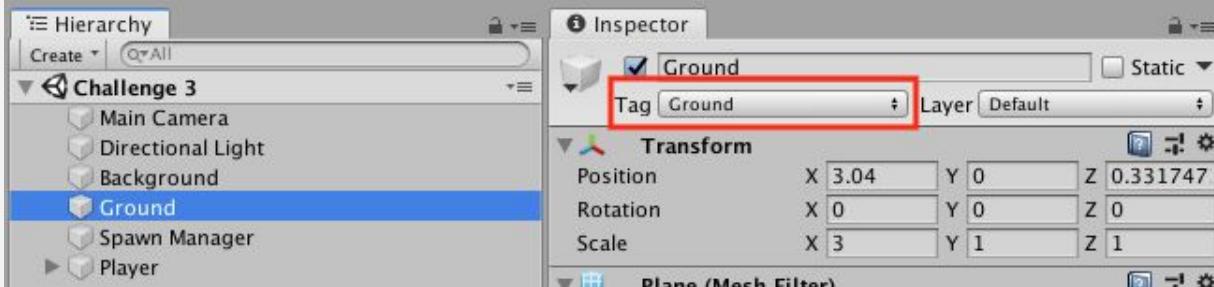
```
public bool isLowEnough;

void Update() {
    if (transform.position.y > 13) {
        isLowEnough = false;
    } else {
        isLowEnough = true;
    }
}
```

- X2** In the if-statement testing for the player pressing spacebar, add a condition testing that the **isLowEnough** boolean is true:

```
if (Input.GetKeyDown(KeyCode.Space) && isLowEnough && !gameOver) {
    playerRb.AddForce(Vector3.up * floatForce
}
```

- Y1** Add a tag to the Ground object so that you can easily test for a collision with it



- Y2** In PlayerControllerX.cs, in the OnCollisionEnter method, add a third else-if checking if the balloon collided with the ground during the game, and if so, to add an impulse force upwards

```
private void OnCollisionEnter(Collision other) {
    ...
} else if (other.gameObject.CompareTag("Ground") && !gameOver)
{
    playerRb.AddForce(Vector3.up * 10, ForceMode.Impulse);
}
```

- Y3 To add a sound effect, declare a new AudioClip variable and assign it in the inspector, then use the PlayOneShot method when the player collides with the ground.

```
public AudioClip moneySound;  
public AudioClip explodeSound;  
public AudioClip bounceSound;  
  
private void OnCollisionEnter(Collision other) {  
    ...  
} else if (other.gameObject.CompareTag("Ground") && !gameOver)  
{  
    rigidBody.AddForce(Vector3.up * 10, ForceMode.Impulse);  
    playerAudio.PlayOneShot(bounceSound, 1.5f);  
}
```