Ballistic Classroom

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COSC 829

Fall 2021

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Goals:

- Create a Classroom simulation for students to learn a particular physics lessons.

- Physics lessons are relevant to the real world. Making a spectacle keeps young students engaged.

- Students can learn about projectile motion and how to predict and calculate the trajectory of a projectile in motion.

Users enter the simulation with a username of their choice which is displayed above the avatar.
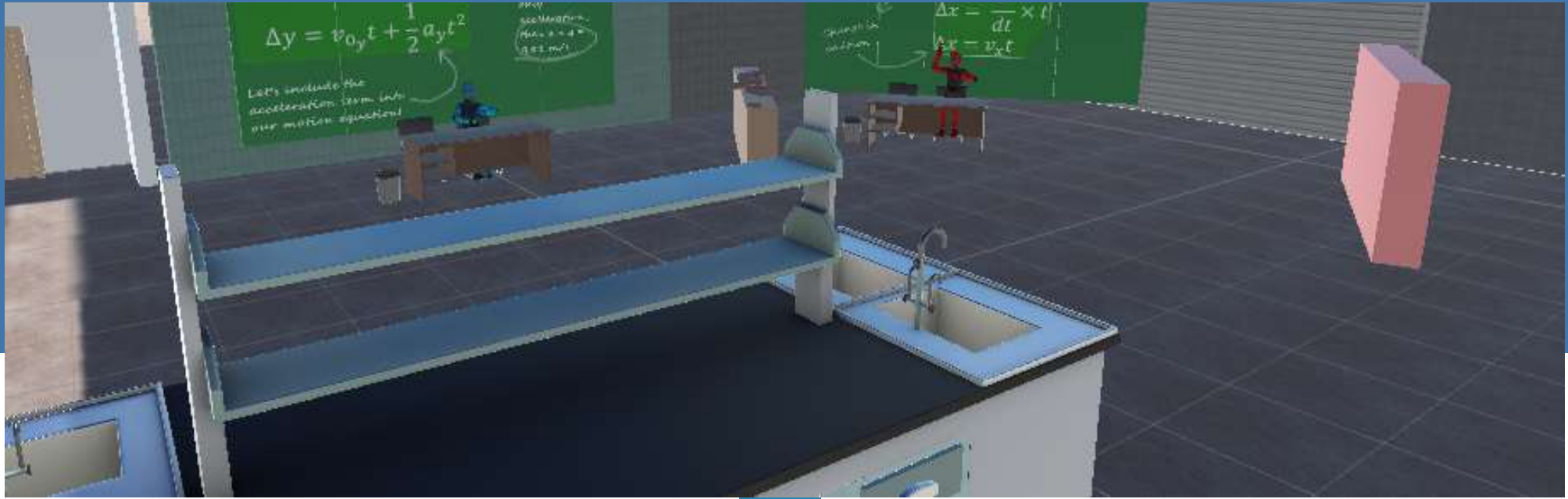
Lobby

Create/Join Room

Photon allows the use of multiple rooms with different permissions.
That is not implemented here, all users enter the same room (the name of which is randomly generated)

Multi-user

Multi-user

Indoor Environments

CLassroom

- The classroom contains 8 parts that contribute to the overall lesson

- When students approach the desk, the avatar acknowledges the student and explains the sub-lesson

- Familiar 3D models used to keep the user comfortable

- Robots used to match the robot "voice"

Simulation

Cannon Area

- Students are able to engage with a real world simulation
- Cannons are able to be rotated in the x and y direction
- An avatar is present to aide the student

Targets

- Targets are platforms with billboarded the distance to center
- Students make 2 hits to finish the lesson

Traditional Physics (especially kinematics) experiments are small and potentially dangerous

Virtual

Making lessons large and visually captivating increases engagement

code

```
void CreateAndJoinRoom()
{
    string randomRoomName = "Room " + Random.Range(0, 999
    RoomOptions roomOptions = new RoomOptions();
    roomOptions.IsOpen = true;
    roomOptions.IsVisible = true;
    roomOptions.MaxPlayers = 20;

    PhotonNetwork.CreateRoom(randomRoomName, roomOptions)
}
```

- Photon Implementation is straight forward and syncing the scene among players is done in one line.

```
public void ConnectToPhotonServer()
{
    if(!PhotonNetwork.IsConnected)
    {
        PhotonNetwork.ConnectUsingSettings();
        ConnectionStatusPanel.SetActive(true);
        EnterGamePanel.SetActive(false);
    }
}
```

```
id Awake()

clients in room sync their scenes w
Network.AutomaticallySyncScene = tru
```

code

```
1 reference
IEnumerator SelfDestruct()
{
    yield return new WaitForSeconds(secondsToLive);
    Destroy(gameObject);
}
```

- Cannonballs are temporary

- Make sure the PhotonView you are working from is yours!

- PhotonViews are how information is given to clients from the master.

```
if (!PV.IsMine)
{
    return;
}
else
{
```

code

```
angleInRadians = angleInDegrees * (Mathf.PI / 180f);
//float dist = Vector3.Distance(player.transform.position, transform.position);
//if(dist<2f && Input.GetKeyDown(KeyCode.Space))
if (Input.GetKeyDown(KeyCode.Space))
{
    //newBall = PhotonNetwork.Instantiate("Cannonball", shootSpot.transform.position, Quaternion.identity);
    newBall = Instantiate(Cannonball, shootSpot.transform.position, Quaternion.identity);
    Instantiate(explosion, shootSpot.transform.position, Quaternion.identity);
    rb = newBall.GetComponent<Rigidbody>();
    rb.AddForce(force * Mathf.Cos(angleInRadians) , force * Mathf.Sin(angleInRadians), 0, ForceMode.Impulse);
```

- Add Force in FixedUpdate

- Explodes on contact

```
private void OnTriggerEnter(Collider other)
{
    Instantiate(explosion, transform.position, Quaternion.identity);
    Destroy(other.gameObject);
    //Destroy(gameObject);
    increaseHits();
}
```

External Assets used

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- Assets bought or contain free licenses
  - Fx Explosion Pack from GAPH
  - Concrete Barrier from SABRI AYES
  - Old Wallpaper Pack from FROZBI
  - Stylish Cannon Pack from STREAKBYTE
  - Science Lab from GVRGAMES
  - University Classroom from 3D EVERYTHING
  - City Street Skyboxes by MOODWARE
  - 8K Skybox Pack from BG STUDIO
  - PUN 2 from EXIT GAMES