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Design development;

Before I start working on this project, I have created the “devices” that I want to have in the scene with Maya and they are given with simple materials. With the models ready, I have then arranged the general layout for the game scene.

Just to clarify, all the models used for this project are created by me.

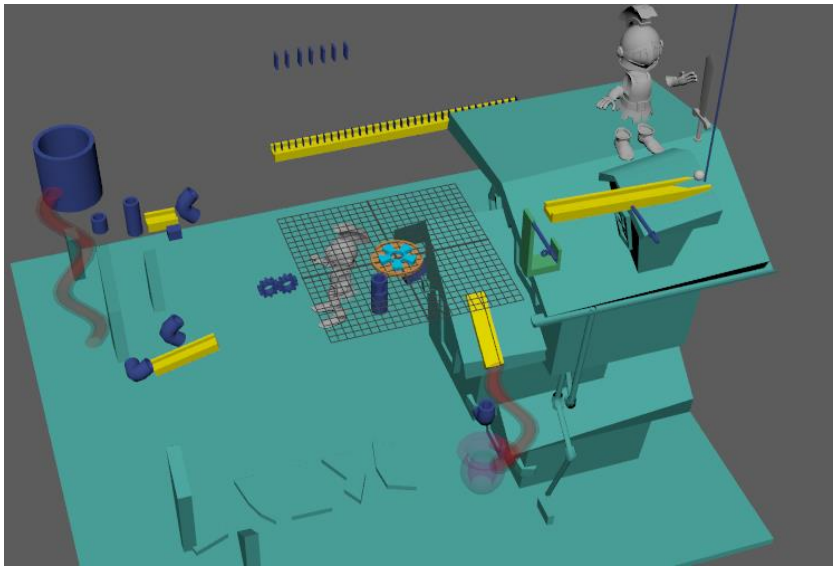

Figure 1

With the meshes imported into the game engine, I have started to work on this project by modifying the mesh collider for each of meshes, applying rigidbody to the object that needs it. As these basic components are applied to the objects where necessary, I have begun to create scripts for each of my devices.

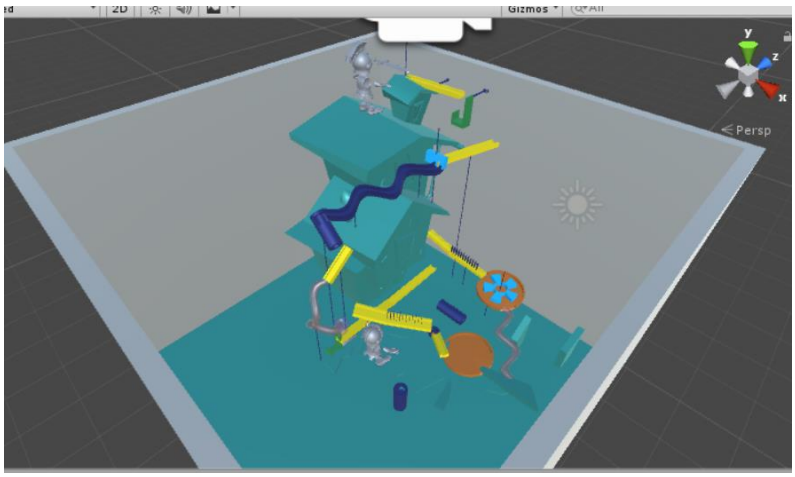

Figure 2

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With the prototype finished, it is time to play test my project. Throughout the play throughs, I have encountered a few problems on the way to the end. Many adjustments has taken in place to aid this machine from those errors. For instance the scaling of some meshes are too thin for the ball to go through and some of the scripts doesn't function properly due to reasons.

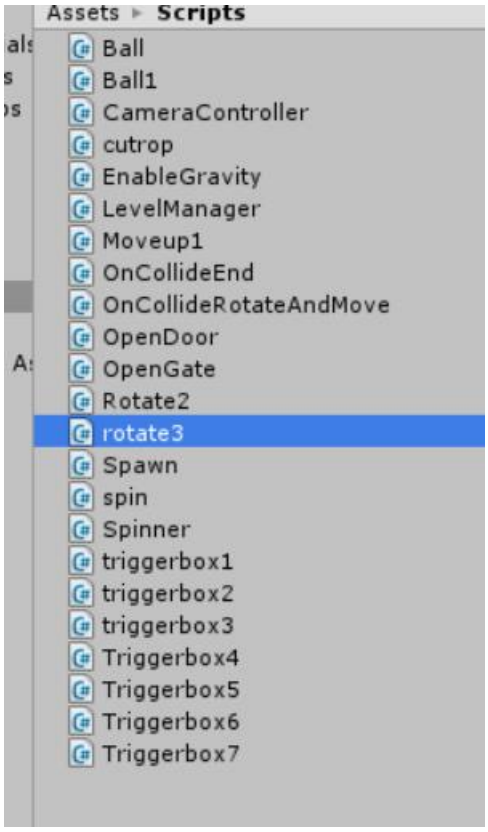

Figure 3

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Difficulties encountered and solutions;

Provlem; some of the meshes were too small, and due to this the ball couldn't be able to go through them.

Solution; I have resized these meshes in Maya and tested with more play throughs in advance, and at the end they were all perfectly sized.

Problem; when coding the scripts for the objects, some of them ended up not functional due to mispelling, we are not talking about the average errors that can be detected by the Debugger.

Solutions; I had to check through my codes carefully to fix them, it is always that one little mistake.

```
// Update is called once per frame
void Update () {
    if (GameObject.Find("TriggerBox (1)").GetComponent<triggerbox2>().collide2)
    {
```

Figure 4

For example, when checking if the boolean from another script true. If you typed the object name in this case TriggerBox (1) wrong, then this line of code will not be working, and the Debugger will not see this as an error.

Problem; I wasn't able to code a functional script so that spawns another ball object into the scene at the beginning, the object wasn't created at the wrong position.

Solutions; I have created an empty object that has the position configured to what I want, and I have added a public transform in the script so the script can call the "spawnpoint"'s position for the new ball instead of letting it have its default position.

```
public bool collide2;
public Transform Spawnpoint;
public GameObject SpawnTarget;
```

Figure 5

```
Instantiate(SpawnTarget, Spawnpoint.position, Spawnpoint.rotation);
```

Figure 6

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Problem; I wasn't able to enable action on collision/trigger.

Solution; I have made another script that checks the a boolean, the boolean will be true on collision and when the boolean is true, the action will be enabled.

```
ublic class triggerbox3 : MonoBehaviour {
   public bool collide3;
   // Use this for initialization
   void Start () {

   }

   // Update is called once per frame
   void Update () {

   }
   public void OnTriggerEnter(Collider col)
   {
      if (col.gameObject.name == "Bllpre(Clone)")
      {
          collide3 = true;
      }
   }
```

Figure 7

Strengths and weaknesses.

The one good thing about this project is its performance, since everything runs smoothly as planned. However, there are actions that I couldn't be able to implement, for instance I have animated the rope in Maya, but when I import it to Unity, the rope animation wasn't imported along with the meshes. This project can be improved by having proper textures on the objects for eye-candies and by adding more advanced scripts on the objects can make the play through to look more interesting.

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My Devices/subsequence, (Format; “Devices/subsequence” name, what they do and how they are triggered);

1. **Sword.** On start of the scene, the sword will be triggered automatically.
2. **Rope.** When sword collides with the rope, the rope is destroyed.
3. **Bridge.** On the destruction of the rope, the bridge starts to rotate.
4. **Ball.** As the bridge rotates, the ball will start to move as the platform is no longer parallel to the horizon. (Collision).
5. **Bridge1.** The ball triggers the transporter when they collide, and the transporter will deliver the ball to bridge1.
6. **Box.** As the ball collides with the bridge1, the block box on the bridge1 will be moving upward so the ball can access what’s behind the box.
7. **Box1**. When the box collides with triggerbox(6), box1 will be moved out of the way, and the ball can now go in to the tunnel.
8. **Can.** Once the ball runs through the series of tunnel and collides with the Can, the ball will be bounced onto the triggerbox(1.) (Collision)
9. **Transporter(1).** When the ball collides with the Triggerbox(1), the Transporter(1) will start to spin and the ball’s speed will increase when it is pushed by the Transporter(1).
10. **Ball.** When the Trasporter(1) hits the ball, the ball will be accelerated due to physics.(Collision)
11. **Cannon.** When the Transporter(1) collides with triggerbox(1), the Cannon will then launch BllPre(Clone).
12. **BllPre(Clone).** When the BllPre(Clone) collides with the first card on bridge3, the rest of the cards will collide with each other one after the other. As all the cards are down, a path would be available for BllPre(Clone) to go through. (Collision)
13. **Bridge(2).** When the triggerbox(5) is triggered by BllPre(Clone), the bridge(2) will start to move vertically and it delivers the ball to the next section on a higher horizon.
14. **Bridge7.** When the ball collides with the cards on bridge7, these cards will also create a path for the ball, see BllPre(Clone), so the ball can access the Spinner section. (Collision)
15. **Spinner.** When the ball collides with the spinner, the spinner will ensure the ball can reach the other side of the pan. (Collision)
16. **Transporter2.** When the ball collides with the triggerbox(3), the transprter2 will move vertically and rotate horizontally, this will deliver the ball to Bridge8.
17. **Triggerbox(5).** As the ball falls off from the Bridge8 and collides with the triggerbox(5), the Rube Goldberg Machine ends.

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References;

Music;

Summer - **https://www.bensound.com** .No upload date available on their website.

soccer ball hit ground 02.wav - https://freesound.org/people/volivieri/sounds/37155/ , uploaded by volivieri on July 8th, 2007.