



# Game : Learning Space

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The background is a detailed, cinematic illustration of a tropical jungle. A large waterfall cascades down a mossy cliff in the center, with a river flowing through the foreground. Sunlight filters through the dense canopy of various trees and plants, creating a warm, golden glow. In the upper left, a bright sun is partially obscured by clouds. Overlaid on this scene are several elements from the Super Mario Bros. video game series. At the top center, there is a floating platform consisting of a green grassy top layer and a brown brick bottom layer. In the middle right, another similar floating platform is visible. In the lower center, a green pixelated Goomba enemy stands on a green grassy platform. To its right is a wooden signpost with a blank white rectangular area. In the bottom left corner, there is a small green pixelated character, another wooden signpost, and a red treasure chest. The entire scene is framed by a solid blue border.

# Learning Space



# SOLUTION



## TARGET AUDIENCE

Secondary school students



## ENGAGING

Captivating and Exciting



## EFFECTIVE

Implicit Learning



## ENCOURAGING

Motivates to continue exploring  
and learning





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# Key aspects of Game Engine





# Design Pattern



Factory (Scalability, Reusability)

- Scalability: Enemy class
- Reusability: Entity Class, Different Manager Class



Singleton (Single Instance to be globally Accessed)

- Reusability: SceneManager





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# Improvements to Game Engine



## ➡ Improvements to Game Engine ➡

# TMX Map Loader

## Previous way of loading map and entities:

## New implementation

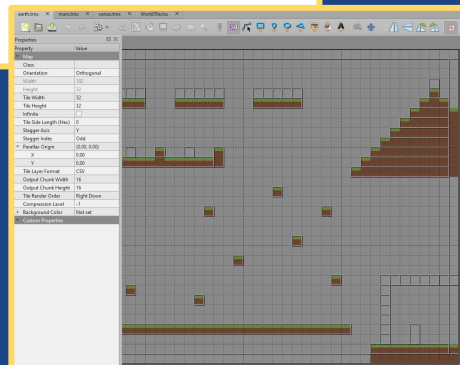
```
25
26 public void initialize() {
27     createPlayer(new Vector2(64, 32));
28
29     createBoss(new Vector2(576, 32));
30     createEnemy(new Vector2(192, 32));
31     createEnemy(new Vector2(384, 32));
32
33     createCoin(new Vector2(256, 32));
34     createCoin(new Vector2(448, 32));
35
36     createTerrain(new Vector2(0, 0), 1056, 32);
37     createTerrain(new Vector2(0, 32), 32, 32);
38     createTerrain(new Vector2(128, 32), 32, 32);
39     createTerrain(new Vector2(320, 32), 32, 32);
40     createTerrain(new Vector2(512, 32), 32, 32);
41     createTerrain(new Vector2(924, 32), 32, 32);
42 }
```

```
124     mapLoader = new TmxMapLoader();
125     map = mapLoader.load(mapString);
126     renderer = new OrthogonalTiledMapRenderer(map);
127
```

```

51
52 public void initialize() {
53     // Create Boundary
54     for (MapObject object : map.getLayers().get(1).getObjects().getByType(RectangleMapObject.class)){
55         Rectangle rect = ((RectangleMapObject) object).getRectangle();
56
57         Vector2 position = new Vector2(rect.getX(), rect.getY());
58         int width = (int)rect.getWidth();
59         int height = (int)rect.getHeight();
60
61         createBoundary(position, width, height);

```



# ▮ Improvements to Game Engine ▮

## Animation

### Player Animations



### Static Image Animations







## Unique Features



### Different Worlds and Box2D



Different Worlds



Gravity



Velocity



# Unique Features



## Educational Aspects



Signboards



Treasure Chests



# Unique Features



## Win/Lose Condition



Win

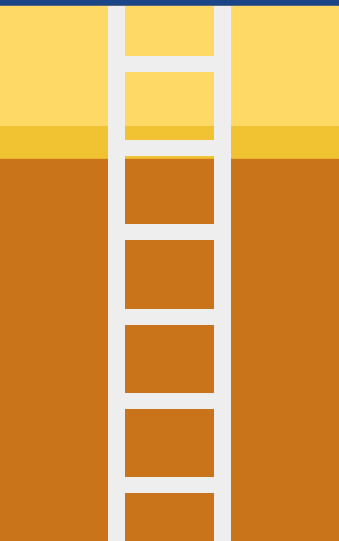


Lose



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# Game Engine Implementation





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# Game Demonstration

