

# TownCount Remake: 2D Metroidvania Game with Shader Effects

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**Abstract**—This is the final project in the Interactive Computer Graphics courses. I am going to make a 2D Metroidvania game. The main character has to pass through different terrain and defeat monsters. I will apply multiple shader effects and lighting in this game to make it look more fashionable. Similar games are Hollow Knight, Mario, and Rockman.

## 1. Libraries and Material

Only use OpenGL for the Graphic programming(glm, glfw, and glew libraries) to make a 2D game engine from scratch. And use the characters and the stage sprites from my previous project.



Extra libraries: 1. The stb library to load png and jpg files. <https://github.com/nothings/stb>

2. The json library to load JSON files. <https://github.com/nlohmann/json>

There will be more extra libraries later on, but I will not use any libraries that relate to shaders or game engines.

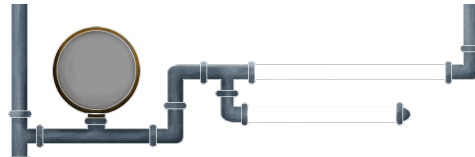
## 2. Tasks

These are the tasks I will try to attempt.

### 2.1. 2D Sprites and Animations

1. Show the animations of the characters and monsters using glBindTexture and splitting UVs. The animations I want to achieve are: Idle, Run, Jump, 3 Chain Attack, Jump Attack, Damaged, and Died animations.

2. UIs like HP bar, main menu, death screen, etc.



### 2.2. 2D AABB Collision Applies to Game Mechanics

Not only have to detect whether multiple rectangles are collided, but have to check which side has been collided: left, right, top, or bottom.

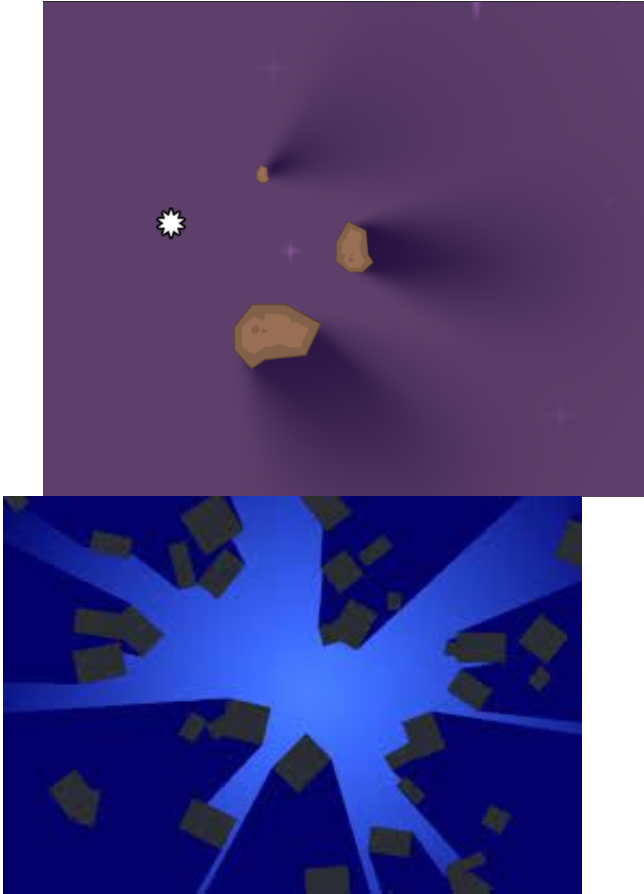
1. The character can interact with terrain or even jump on a platform from its bottom.

2. The character can attack monsters, and be hit by monsters.

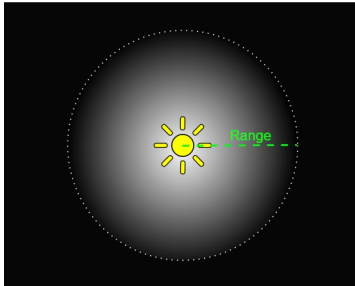
3. Trigger area where the character can interact with stages, or even spawn a boss. EX: entry area for the connecting stages.

### 2.3. 2D Light and Shadow

1. The light source came from the main character and lighten the surrounding, when the character moves the shadow will change depending on the terrain. Aka 2D Dynamic Raycast shadow light.

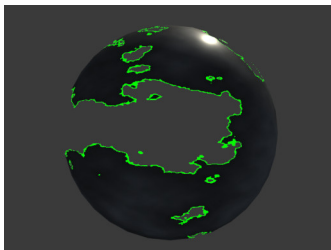


2. lamp light in the background. Point Lights around the center.



## 2.4. 2D Shaders: Dissolve Effects

1. Apply to dissolve effects on the characters and monsters when defeated. Write a shader that can dissolve 2D sprites over time till the sprite completely disappear.



## 2.5. Extra tasks

1. If I have time I wanna make a menu and a special ability for the main character. His special ability is that he can use a rope to pull himself to the terrain, or even pull a monster closer to himself.

2. Full-screen shader, the whole screen will display a Blur Shader effect with shaking when attack the enemy or being hit.

3. Other shaders like the attack effect and dust trail effect using a particle system, which can easily be done in Unity or other game engines, but not sure I can do it from scratch.

## 3. Suggested Grading

I want the 25+15% of the grading, simply because I will make a game alone. I have 4 basic tasks, each for 7%, and the other 12% for the extra task and the complexity and completeness of the whole game.