CSED451 Computer Graphics (Spring 2021)

Assignment #2

2D Animation

Due date: April 5th, 2021, Monday, 11:59pm

In this assignment, you improve the 'simple shooting game' game of assignment 1.

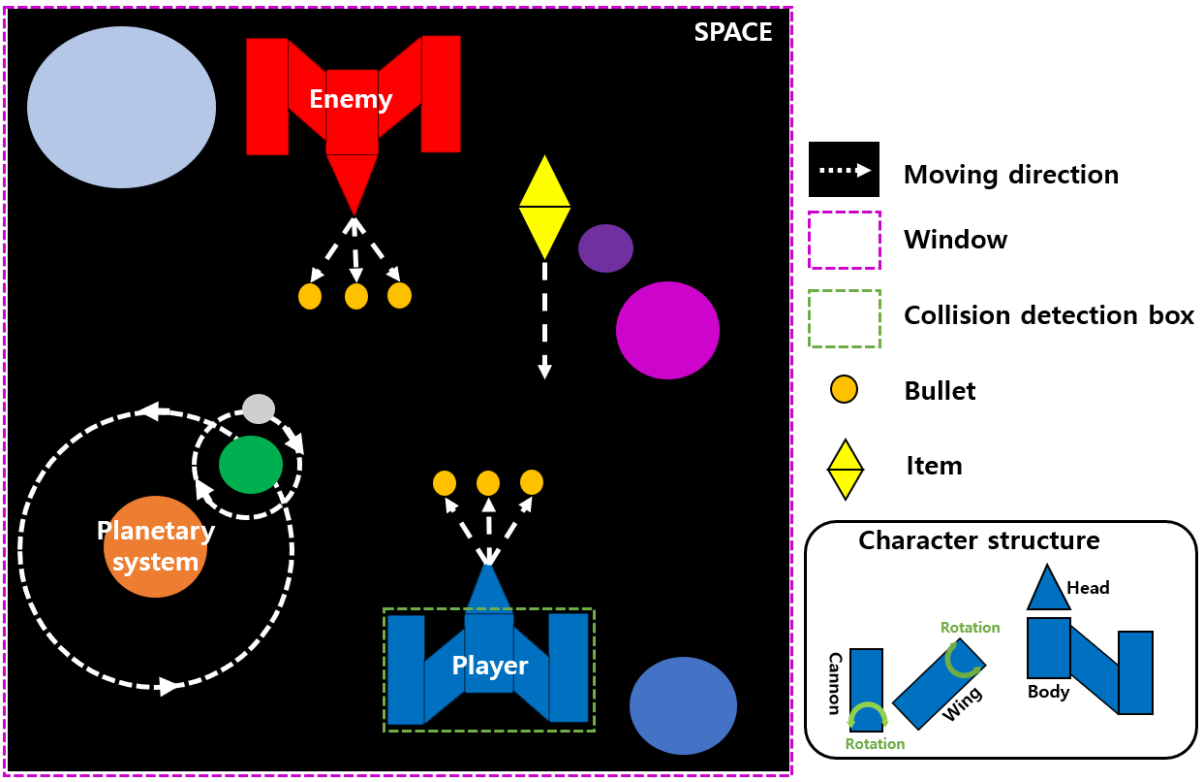

Figure 1. Prototype

Summary of added items

- Design all graphical objects using a 'Scene Graph'.
- Add a hierarchical structure to the character and planetary system to describe movements.
- **Requirements of assignment #1 still must be satisfied if not specified.**
- Identically to assignment#1, all objects in this game may be represented by using simple shapes such as triangle, rectangle, and circle.

Requirements

* Characters

1) The following applies to both the player and the enemy character.
2) Using the scene graph hierarchy, design a character consisting of 2 cannons, 2 wings, 1 body,

and 1 head. (refer to the 'Character structure' in Fig. 1)

3) Create an animation loop in which the character's wing and cannon rotate within a certain angle. (rotation angle is free)
   A. The wing rotates within a certain angle based on the joint connected to the body.
   B. The cannon rotates within a certain angle based on the joint connected to the wing.

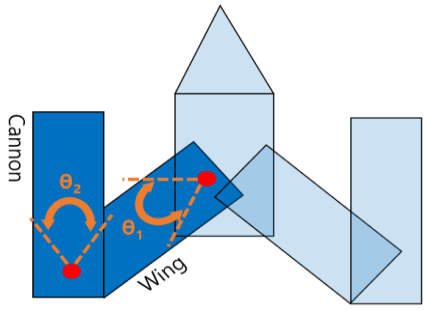

Figure 2. Example of character's animation.

4) The collision detection is implemented using a bounding box, ignoring the details of head.

Background

1) The color of background is black, which represents the space.
2) Using the scene graph hierarchy, design a planetary system consisting of 1 star, 1 planet, and 1 satellite, and place it at least 2 in the background. (Refer to Figure 1)
   A. The planetary system is a set of gravitationally bound non-stellar objects in or out of orbit around a star or star system. (link)
   B. The star is fixed.
   C. The planet orbits the stars, and the satellite orbits the planet. (speed is free)
3) The background objects do not cover the character.

System

1) When an enemy is destroyed, an item appears, and the item moves at a constant speed to the bottom of the window. (speed is free)
2) When the player acquires an item, the bullet direction increases. (direction is free)

Figure 3. Example of adding bullet direction.

3) As in assignment 1, the enemies appear 5 times in total, and the direction of the next enemy's bullet increases by 1 compared to the previous one. (direction is free)

* You are free to implement any details that are not specified (ex: shape type, size, color, etc.) and record them in the report.
* If you implement additional functions unspecified in this document, you can get extra points, up to 10% of the full score.
    - This should be stated in the report.