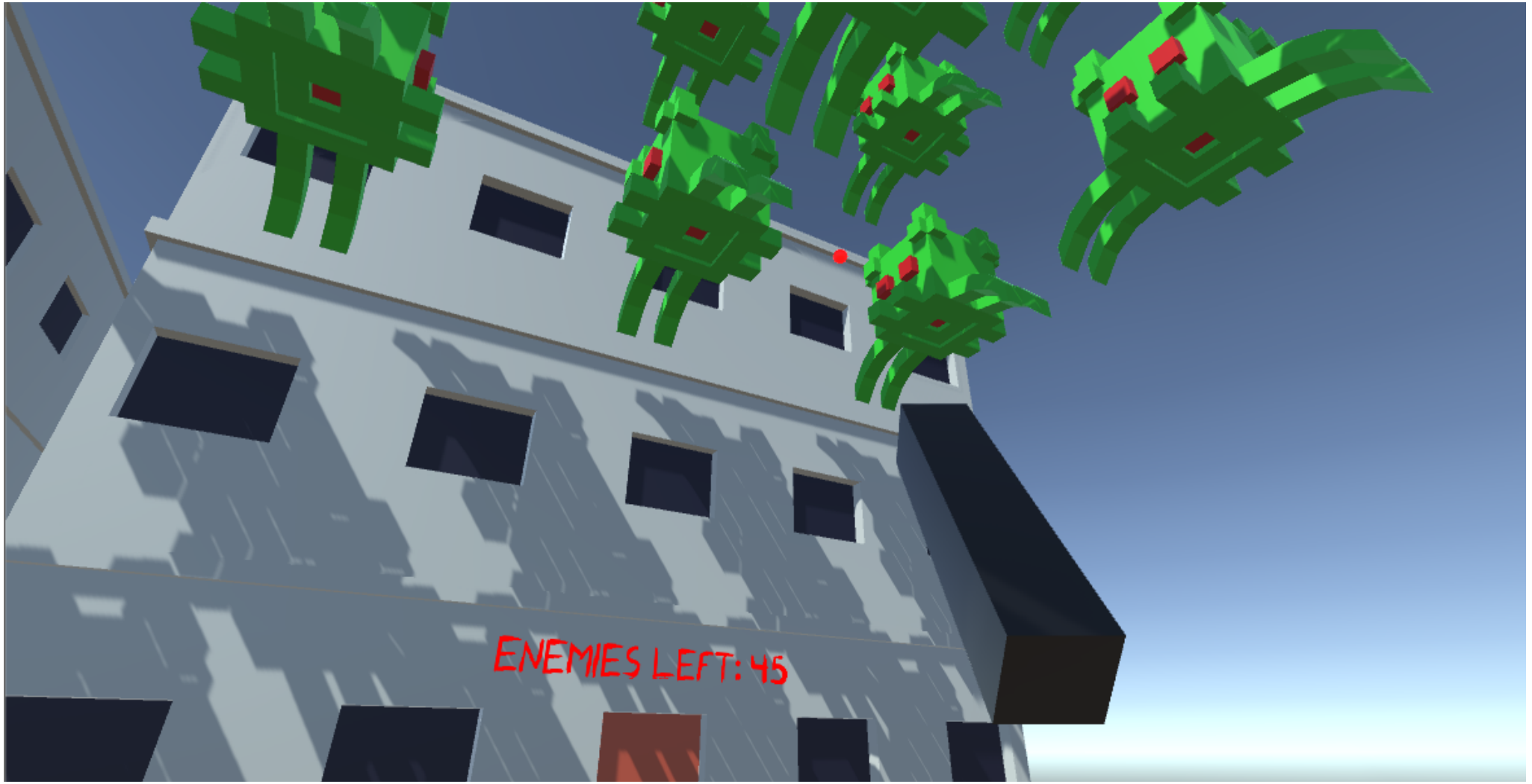
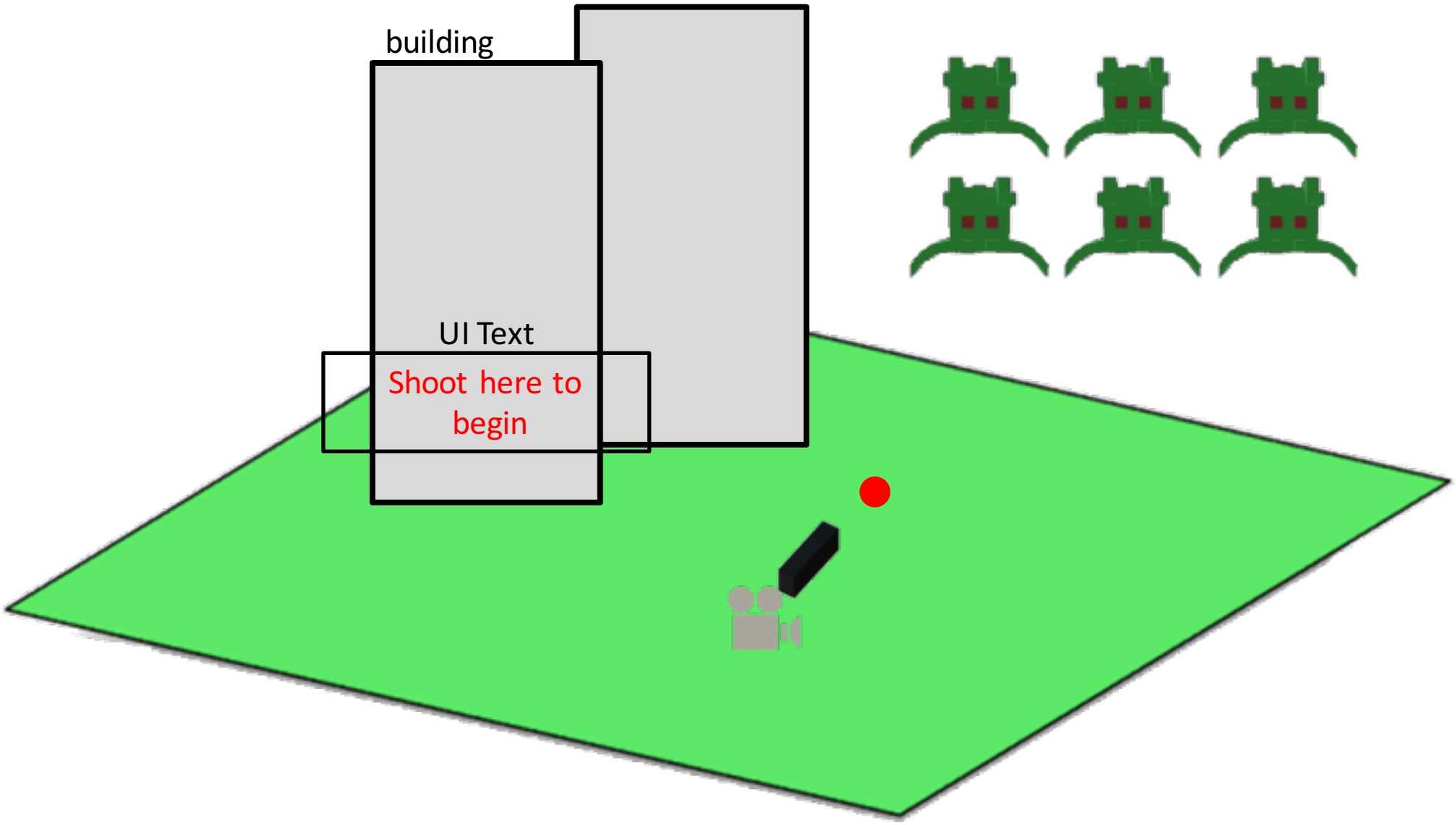
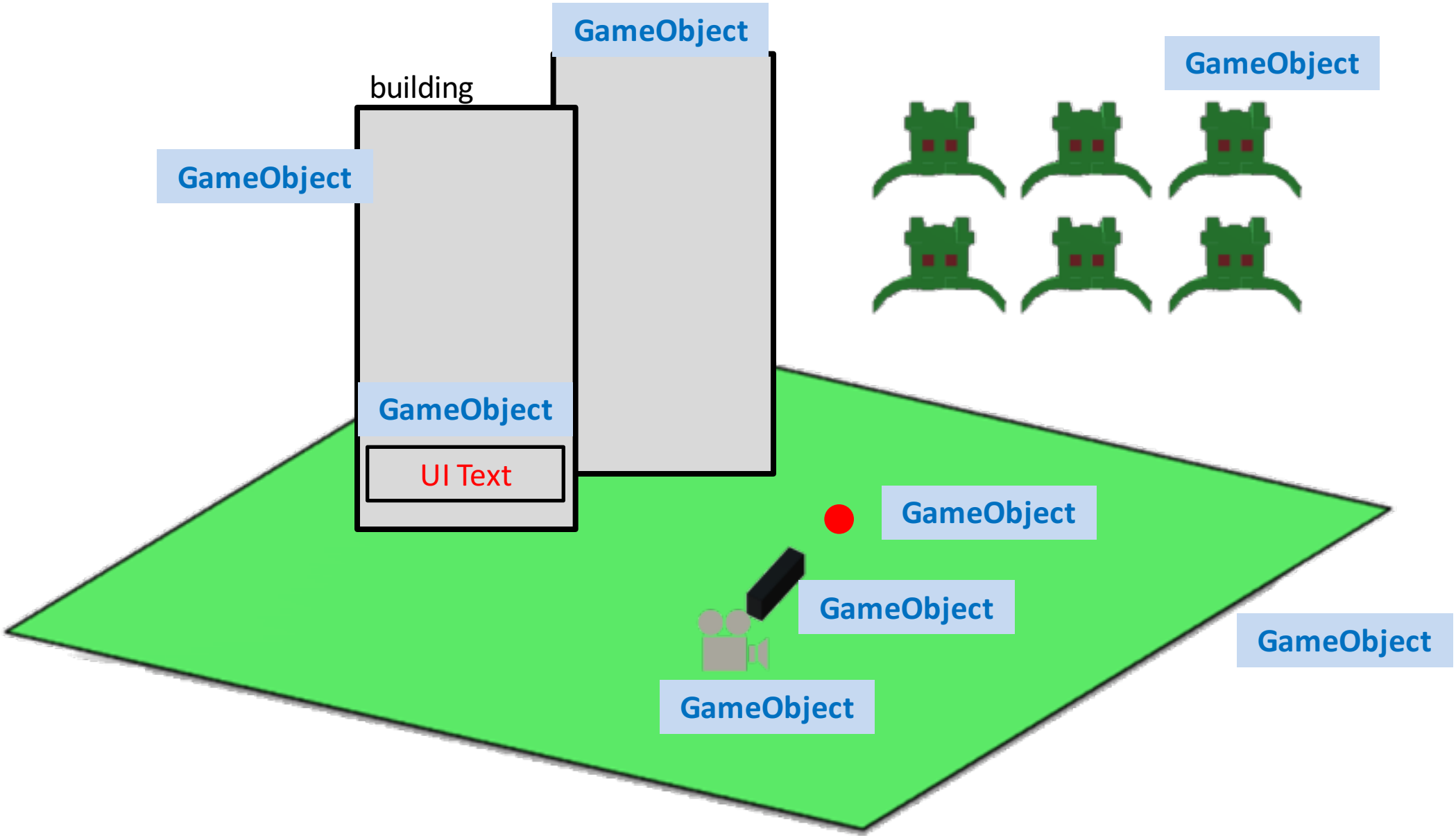
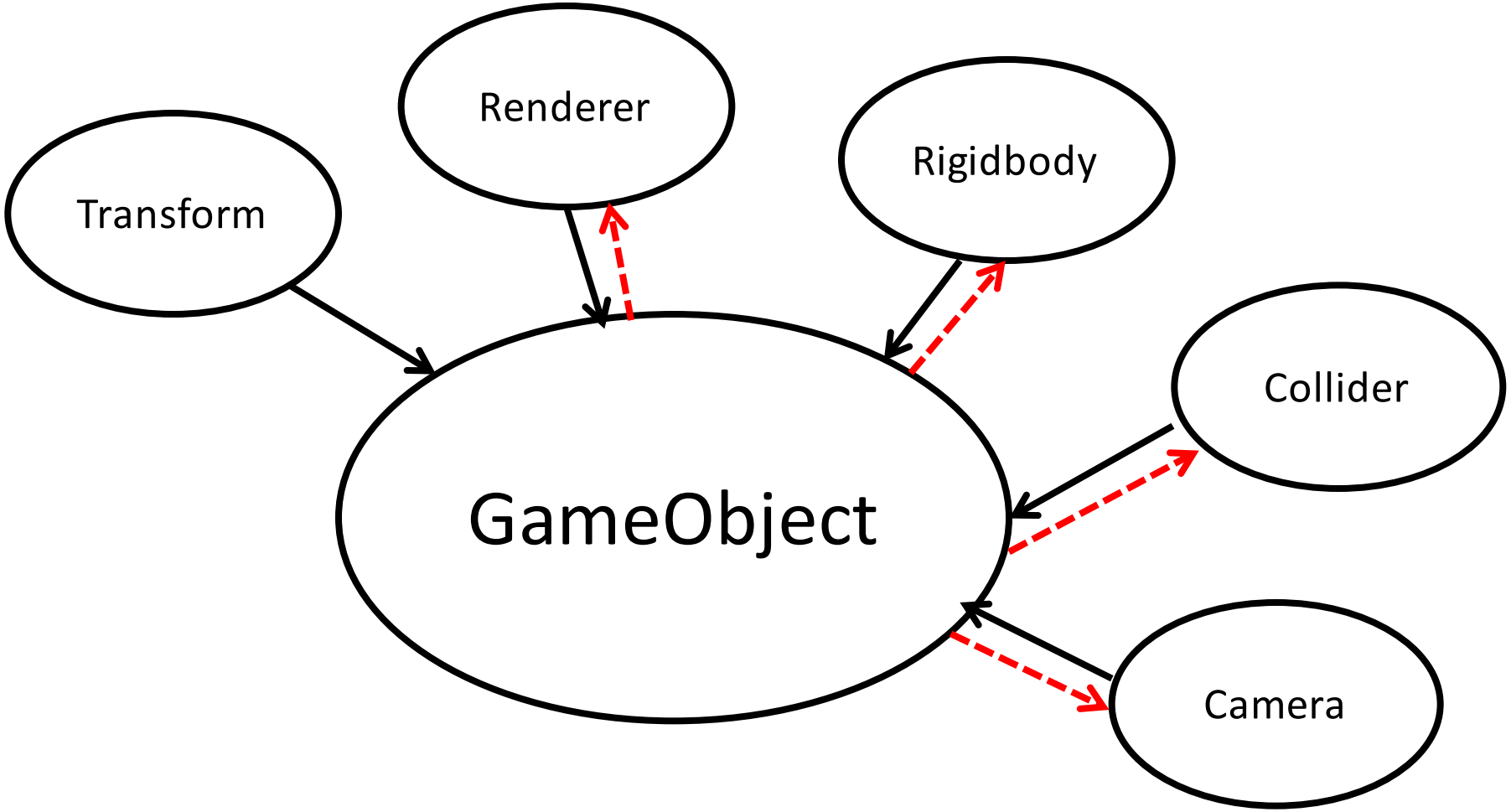
Unity Code Analysis
Space Invaders
02.10.18

Space Invaders

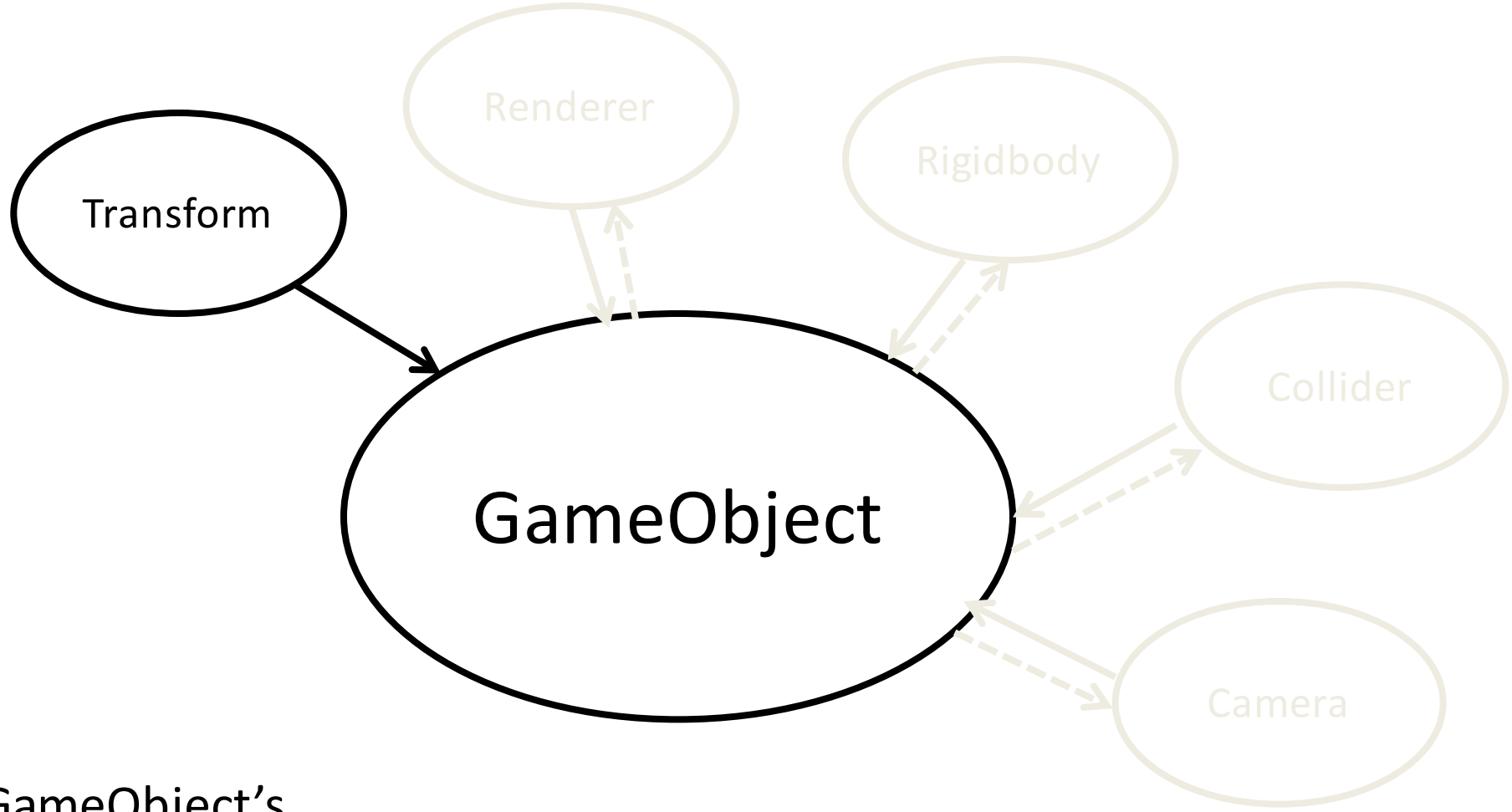



building
UI Text
Shoot here to begin

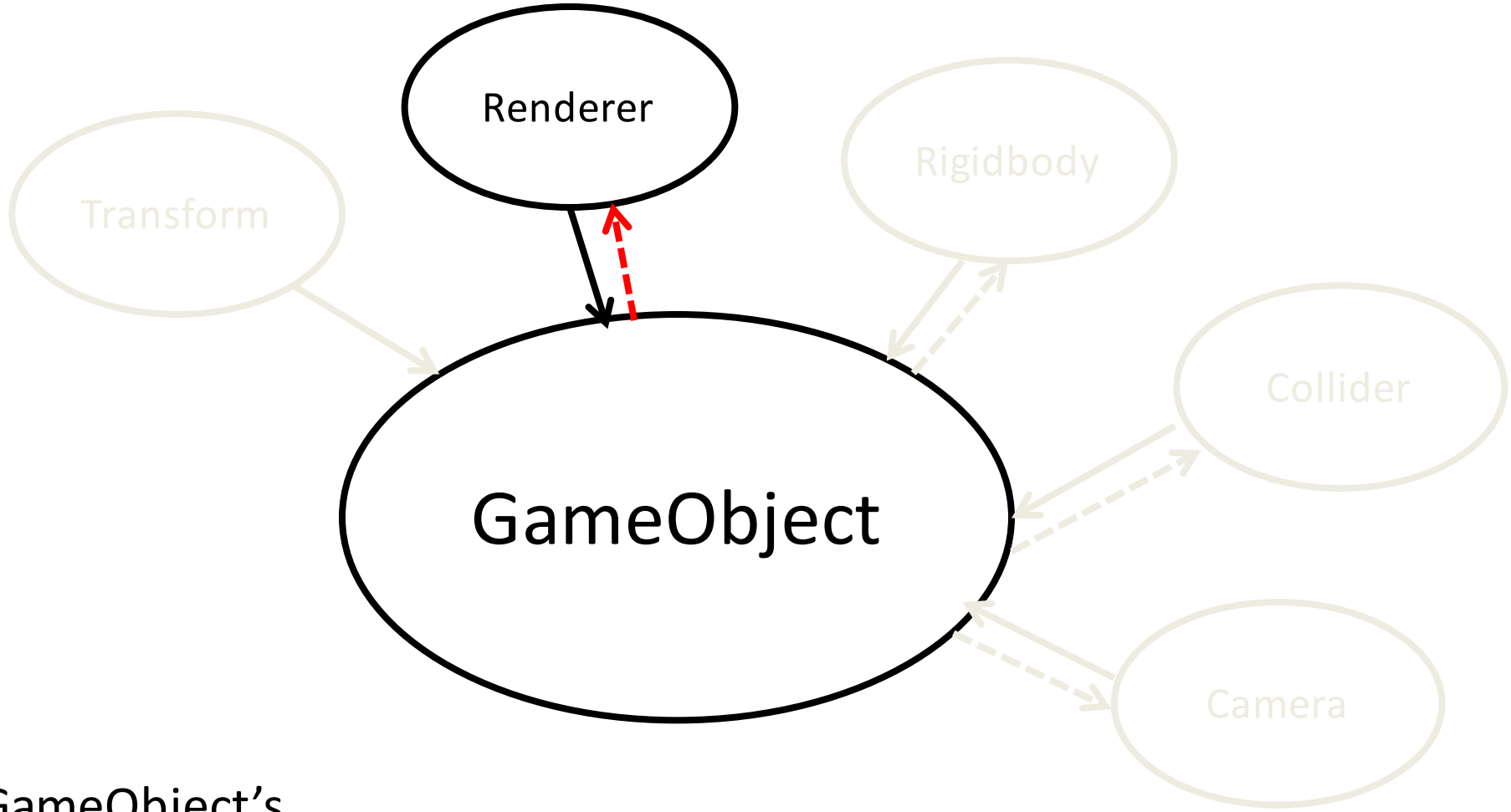

GameObject
building
GameObject
GameObject
GameObject
UI Text
GameObject
GameObject
GameObject
GameObject



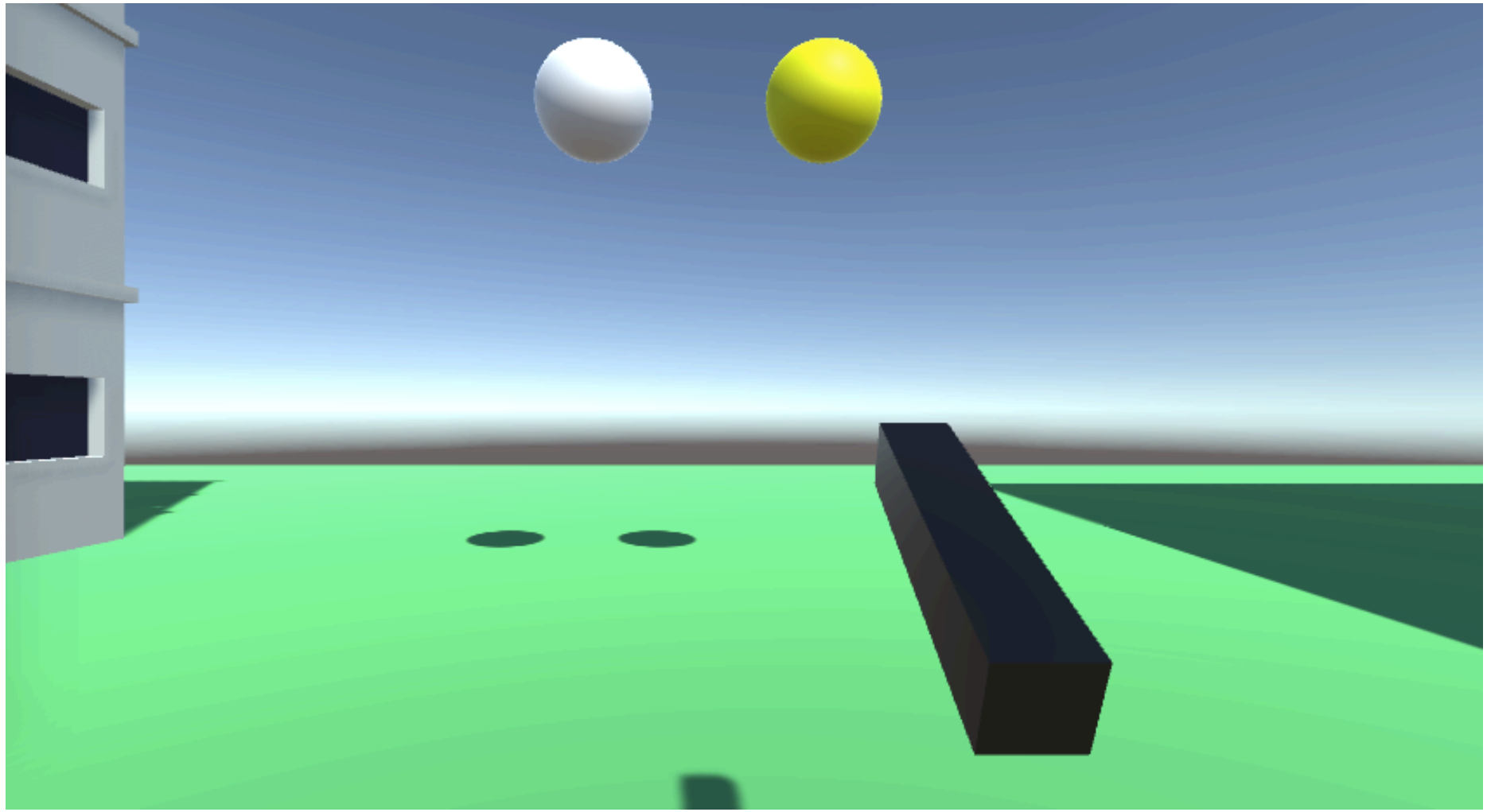
A GameObject has many components.
They all can be attached or removed in Unity or by script.

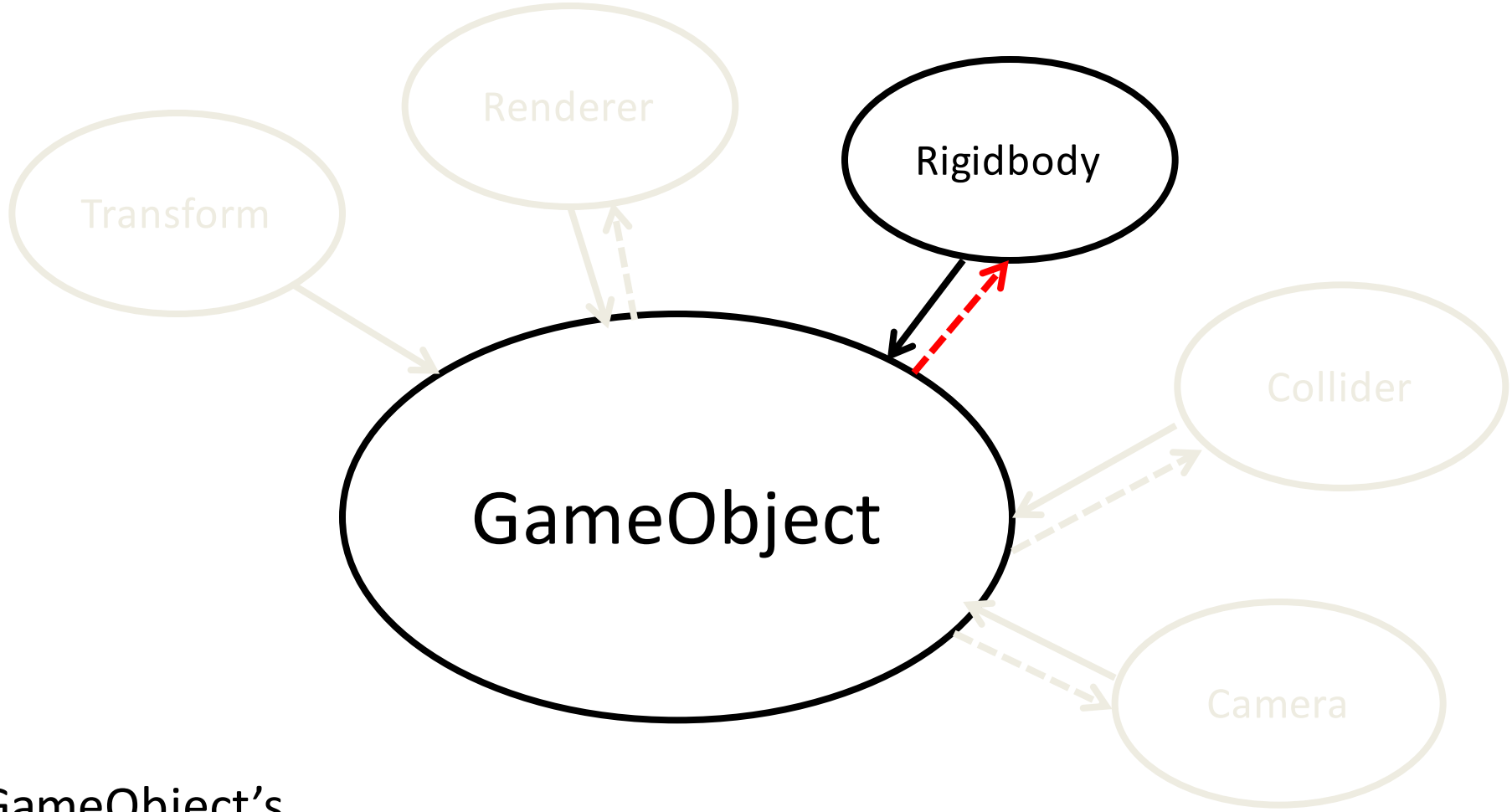


GameObject’s
Position, rotation, and scale on the scene

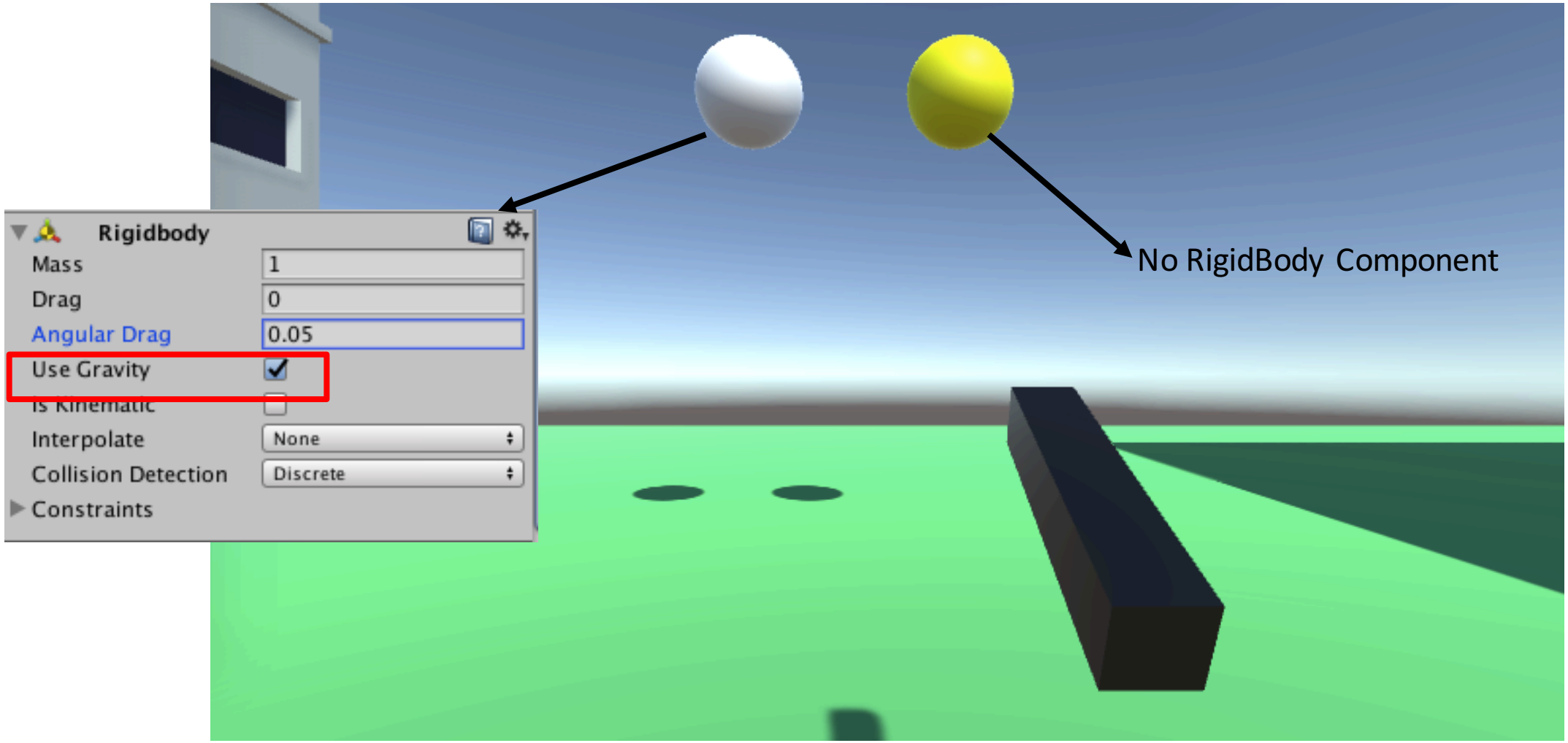


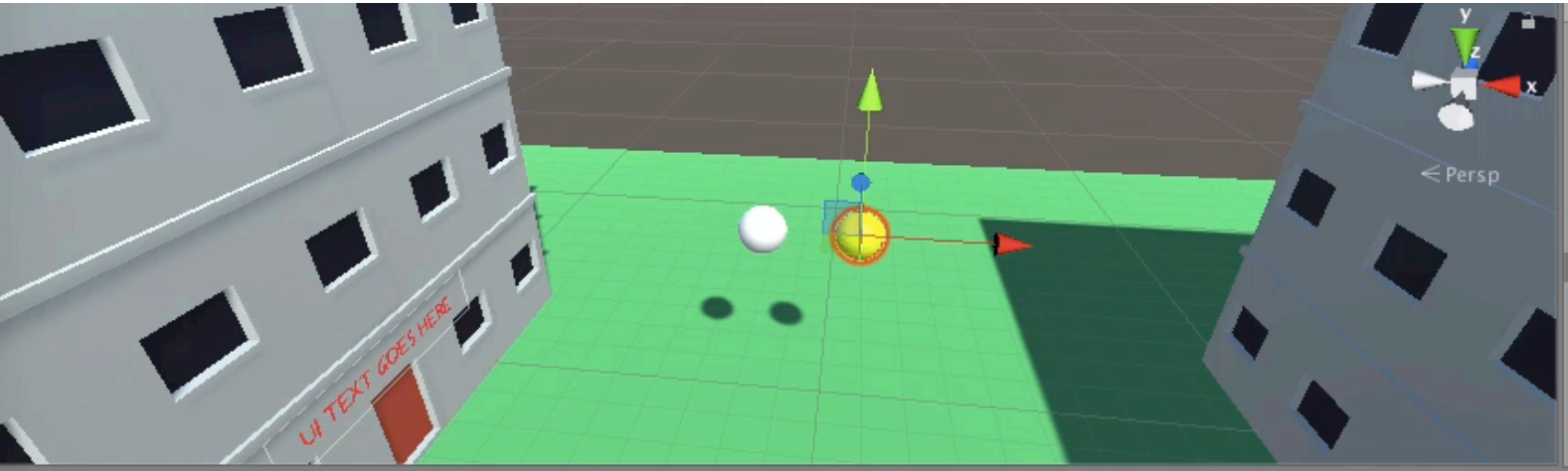
GameObject’s
Appearance on the scene.





GameObject’s
Physics affect on the scene,
Ex: mass, velocity, gravity effect…etc.


Rigidbody
Mass
1
Drag
0
Angular Drag
0.05
Use Gravity
Is Kinematic
Interpolate
None
Collision Detection
Discrete
Constraints
No RigidBody Component



Game

Environment
UI Canvas
EventSystem
Directional Light
VR Camera
Enemy Manager
Game Manager
Sphere
Sphere (1)
Sphere (2)

Tag Untagged Layer Default

Transform

Position	X 0.69	Y 4.35	Z 9.86709
Rotation	X 0	Y 0	Z 0
Scale	X 1	Y 1	Z 1

Sphere (Mesh Filter)

Mesh: Sphere

Sphere Collider

Edit Collider

Is Trigger
Material: None (Physic Material)
Center
X 0 Y 0 Z 0
Radius: 0.5

Mesh Renderer

Lighting
Light Probes: Blend Probes
Reflection Probes: Blend Probes
Anchor Override: None (Transform)
Cast Shadows: On
Receive Shadows
Motion Vectors: Per Object Motion
Lightmap Static

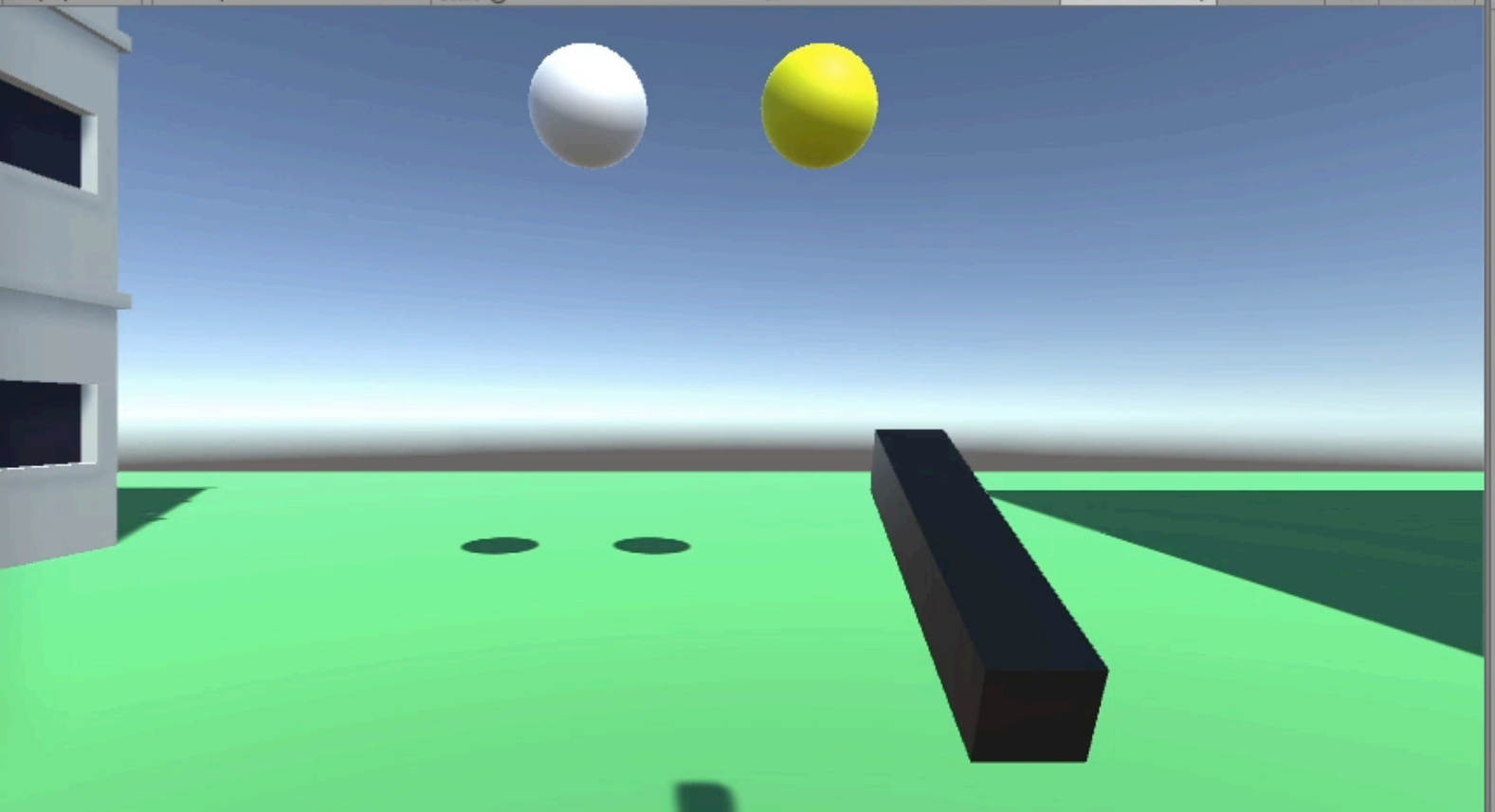
To enable generation of lightmaps for this Mesh Renderer, please enable the 'Lightmap Static' property.

Materials
Size: 1
Element 0: Yellow
Dynamic Occluded

Yellow
Shader: Standard

Add Component

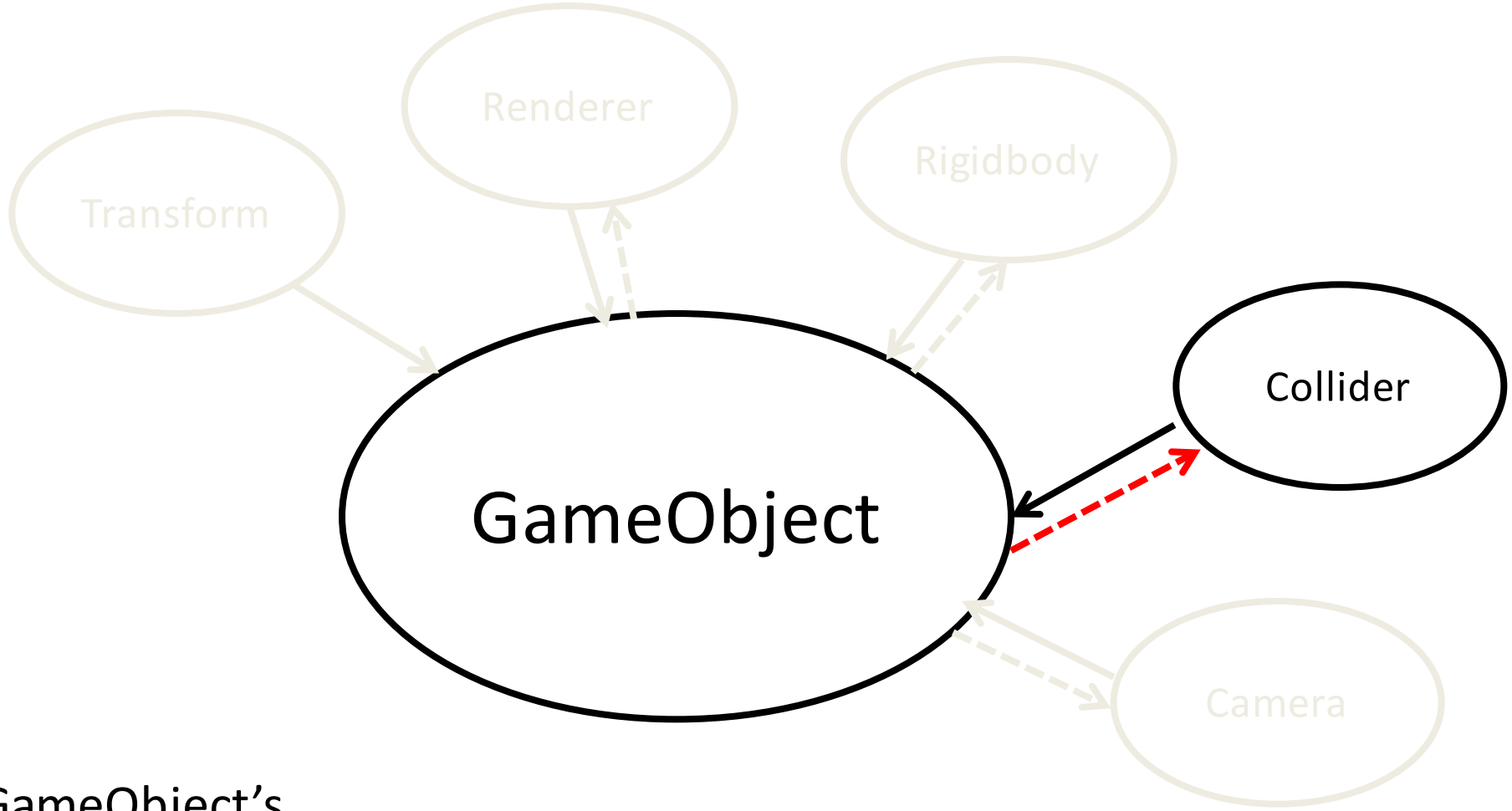
Game
Display 1 | Free Aspect | Scale 1x | Maximize On Play | Mute Audio | Stats | Gizmos



Project | Console

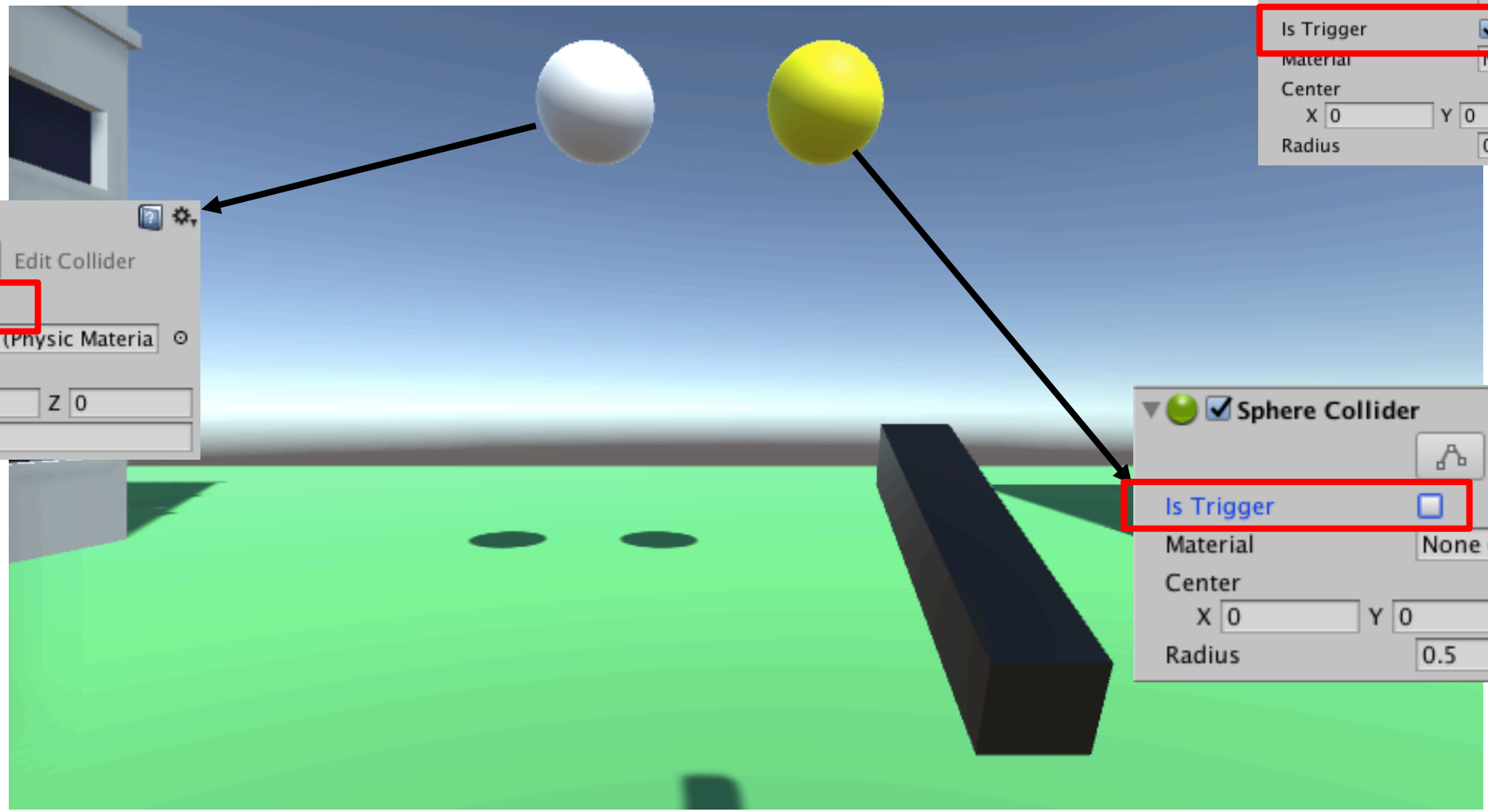
Create

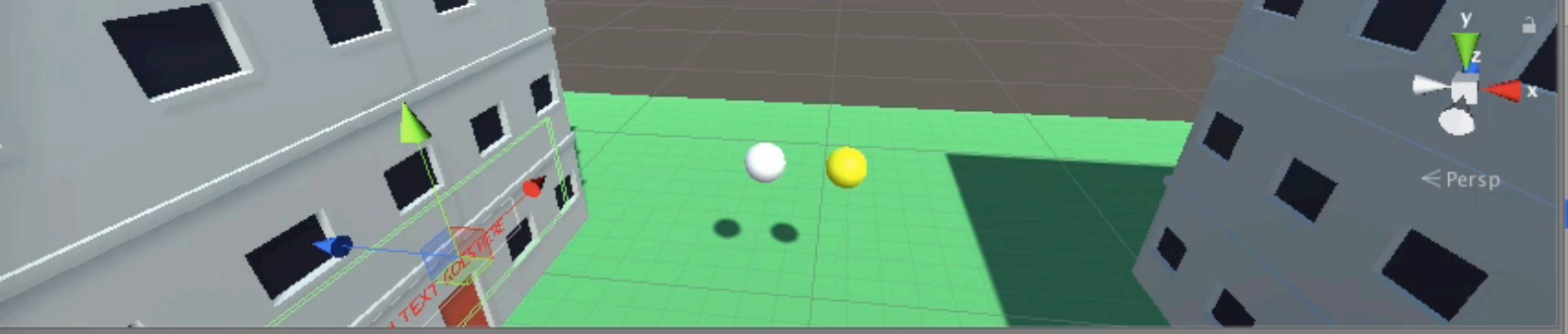
Fonts
Materials
Blue
Bullet Material
Dead Enemy Material
Ground Material
Gun Material
Yellow
Models
Building Model
Invader Model
Materials
Prefabs
Bullet
Invader
Scenes
Scripts
BulletController
EnemyController
EnemyManager
GameManager
NewScript
PlayerController
ZenvaVR
Prefabs
Scripts
DragCamera



GameObject’s
Collision detection’s range and method on the scene.

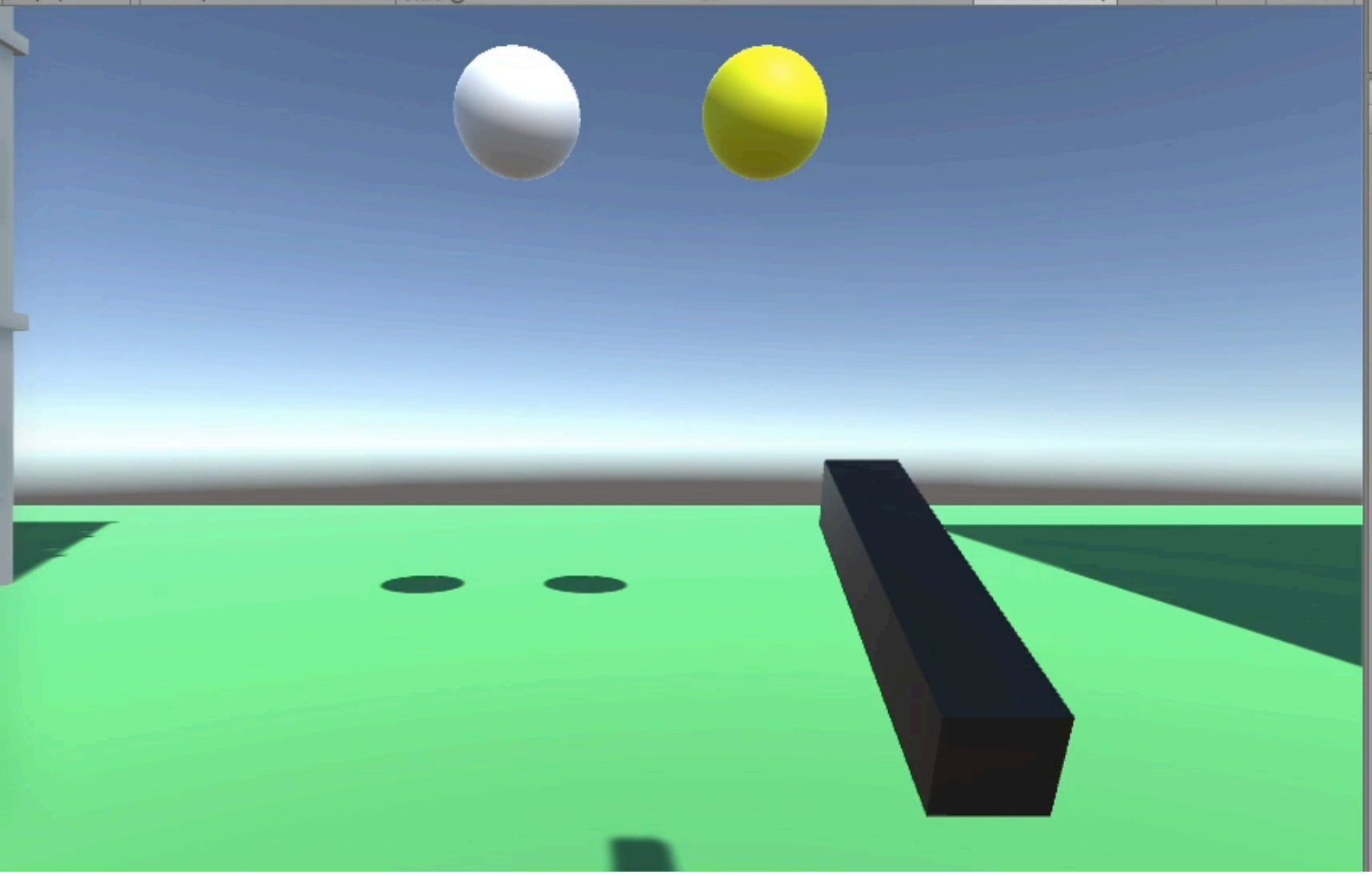
Bullet


Sphere Collider
Edit Collider
Is Trigger
Material
None (Physic Materia
Center
X 0
Y 0
Z 0
Radius
0.5
Sphere Collider
Edit Collider
Is Trigger
Material
None (Physic Materia
Center
X 0
Y 0
Z 0
Radius
0.5
Sphere Collider
Edit Collider
Is Trigger
Material
None (Physic Materia
Center
X 0
Y 0
Z 0
Radius
0.5



Game

Display 1 | Free Aspect | Scale 1x | Maximize On Play | Mute Audio | Stats | Gizmos



Game*
- Environment
  - Ground
  - Building
  - Building (1)
  - Building (2)
  - Building (3)
  - UI Canvas
  - EventSystem
  - Directional Light
  - VR Camera
  - Enemy Manager
  - Game Manager
  - Sphere
  - Sphere (1)
  - Sphere (2)

Project | Console

Create

- Fonts
- Materials
  - Blue
  - Bullet Material
  - Dead Enemy Material
  - Ground Material
  - Gun Material
  - Yellow
- Models
  - Building Model
  - Invader Model
  - Materials
- Prefabs
  - Bullet
  - Invader
- Scenes
- Scripts
  - BulletController
  - EnemyController
  - EnemyManager
  - GameManager
  - NewScript
  - PlayerController
- ZenvaVR
  - Prefabs
  - Scripts
    - DragCamera

Tag: Graffiti | Layer: UI

Rect Transform

Pos X	Pos Y	Pos Z
-8.02	2.6	6.94

Width	Height
5	1

Anchors

Pivot X 0.5 Y 0.5

Rotation X 0 Y -90 Z 0

Scale X 1 Y 1 Z 1

Canvas

Render Mode: World Space

Event Camera: None (Camera)

Sorting Layer: Default

Order in Layer: 0

Additional Shader Cha: Nothing

Canvas Scaler (Script)

UI Scale Mode: World

Dynamic Pixels Per Un: 1

Reference Pixels Per U: 100

Graphic Raycaster (Script)

Script: GraphicRaycaster

Ignore Reversed Grap: ☑

Blocking Objects: None

Blocking Mask: Everything

Box Collider

Edit Collider

Is Trigger: ☐

Material: None (Physic Material)

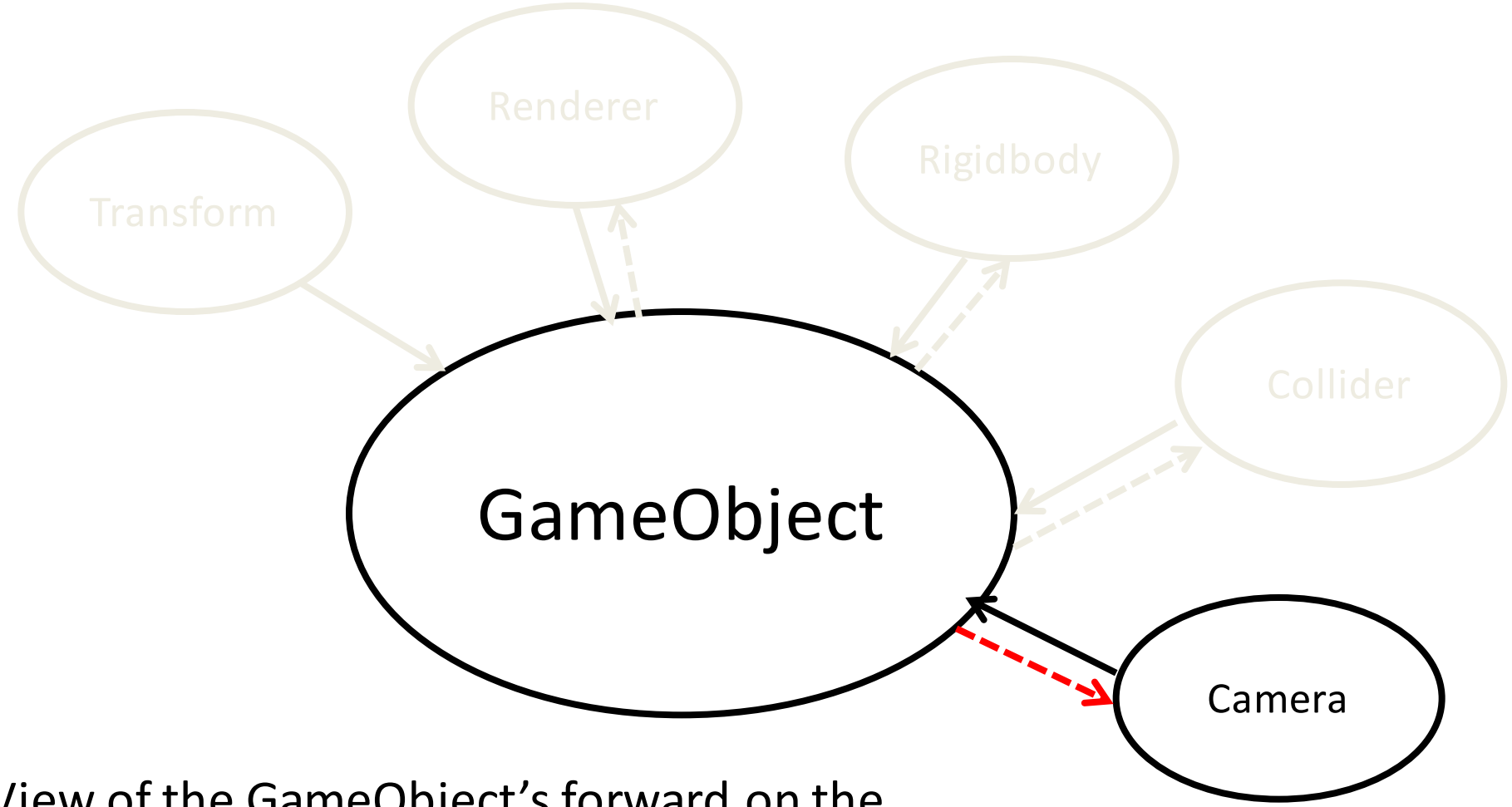
Center

X 0.3300352 Y 0.2039363 Z 1.13737e-1

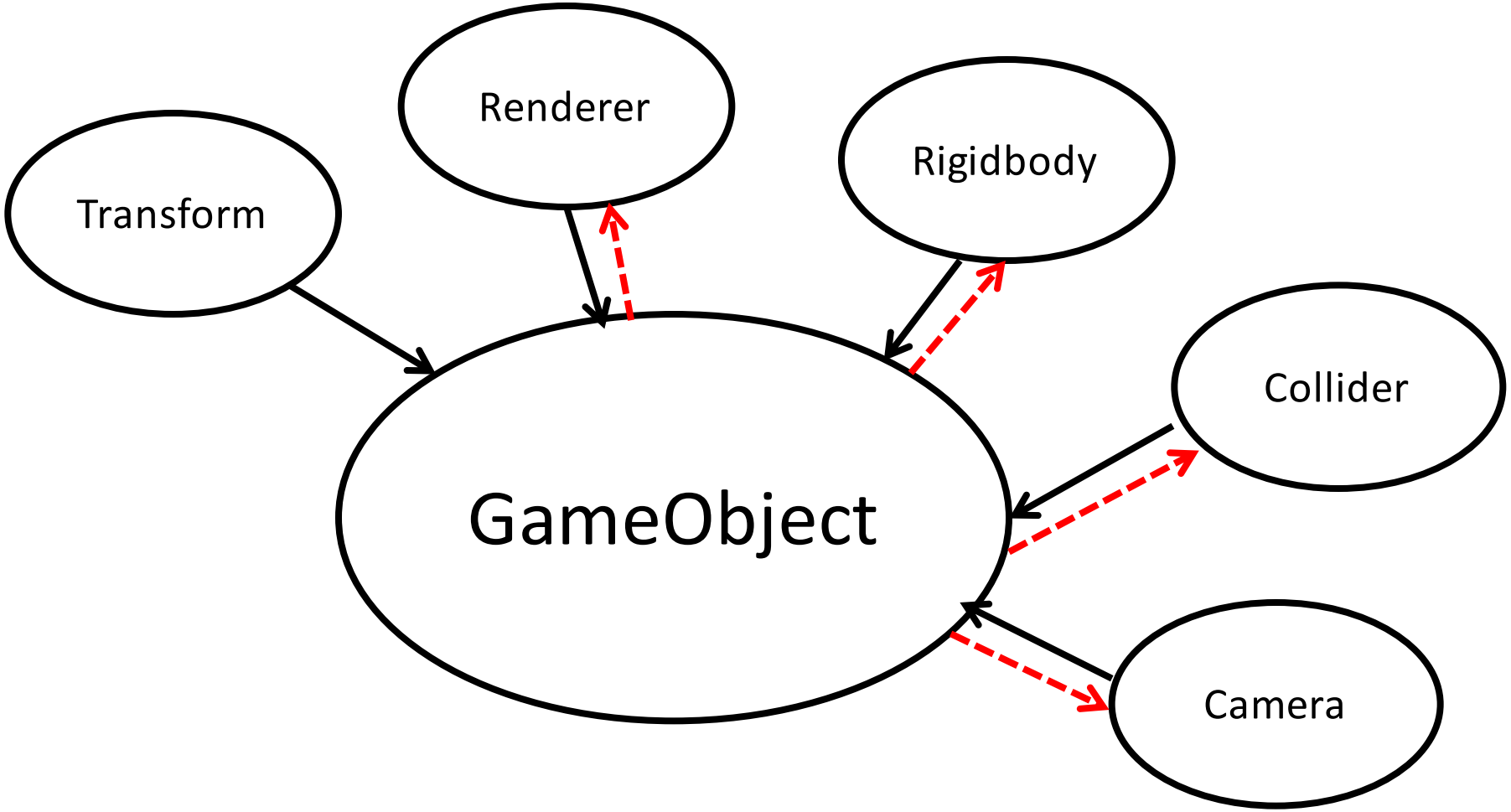
Size

X 9.049648 Y 3.088562 Z 0.1

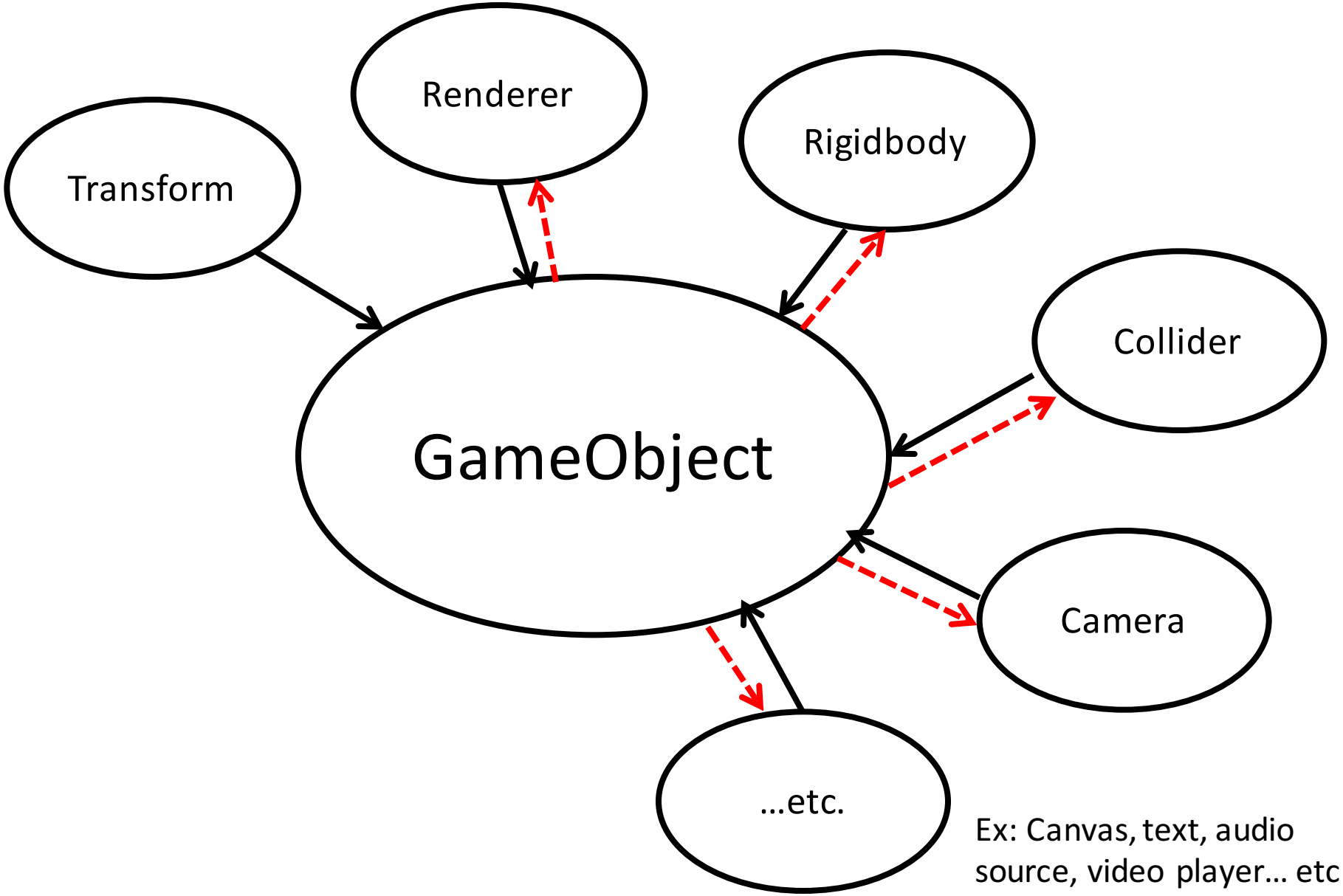
Add Component



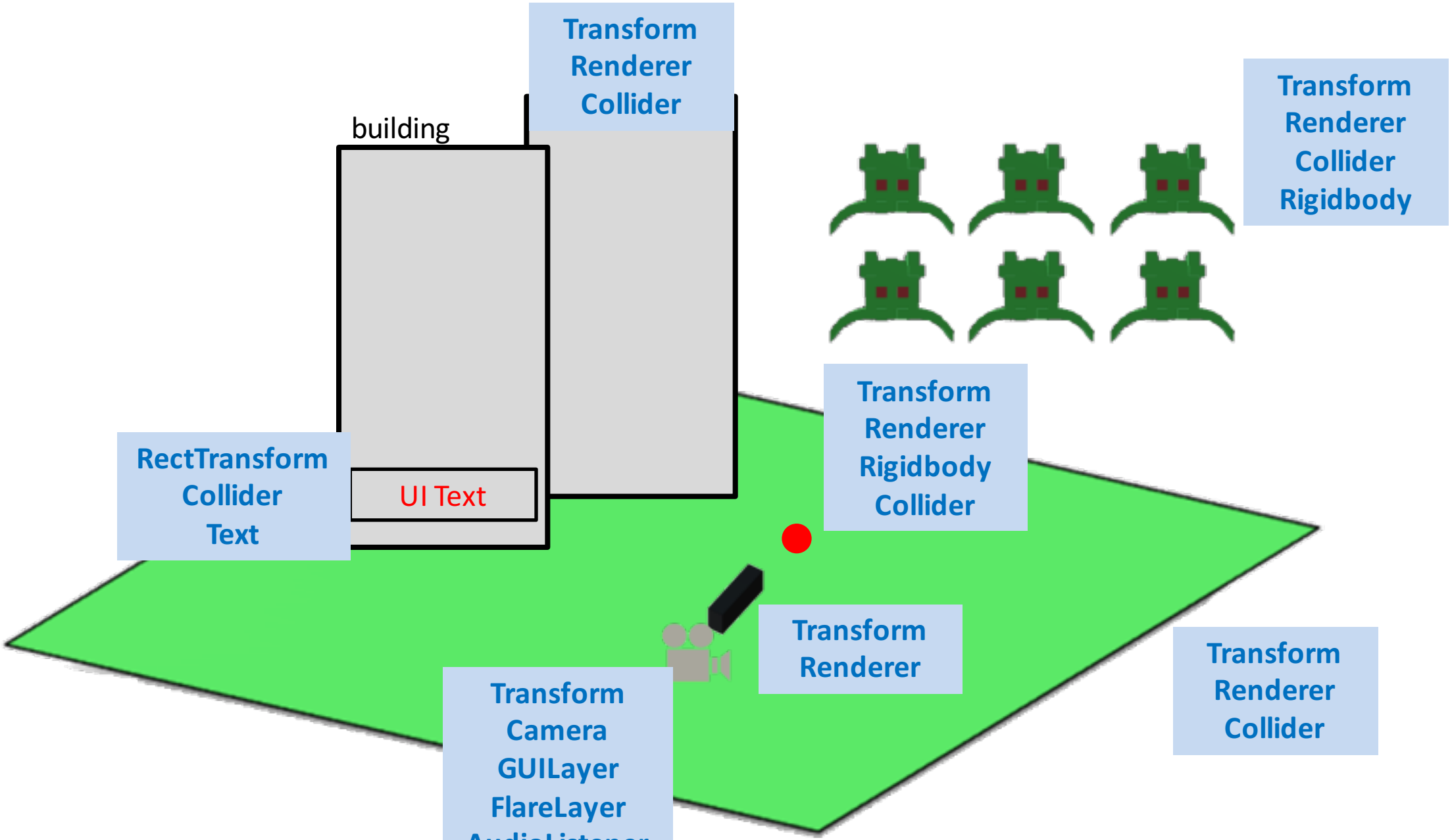
View of the GameObject’s forward on the scene.

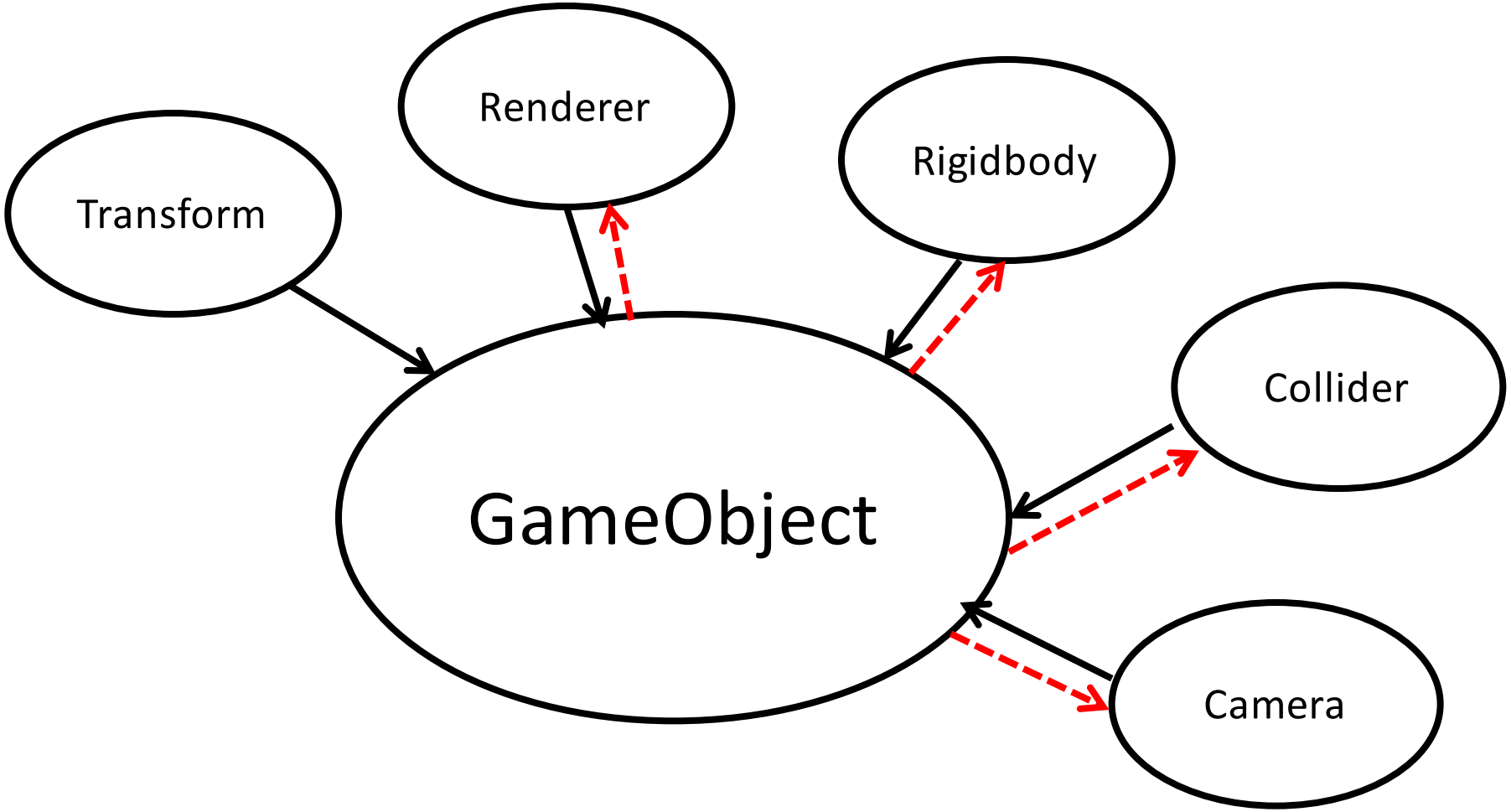


They represents the GameObject’s Behaviors.

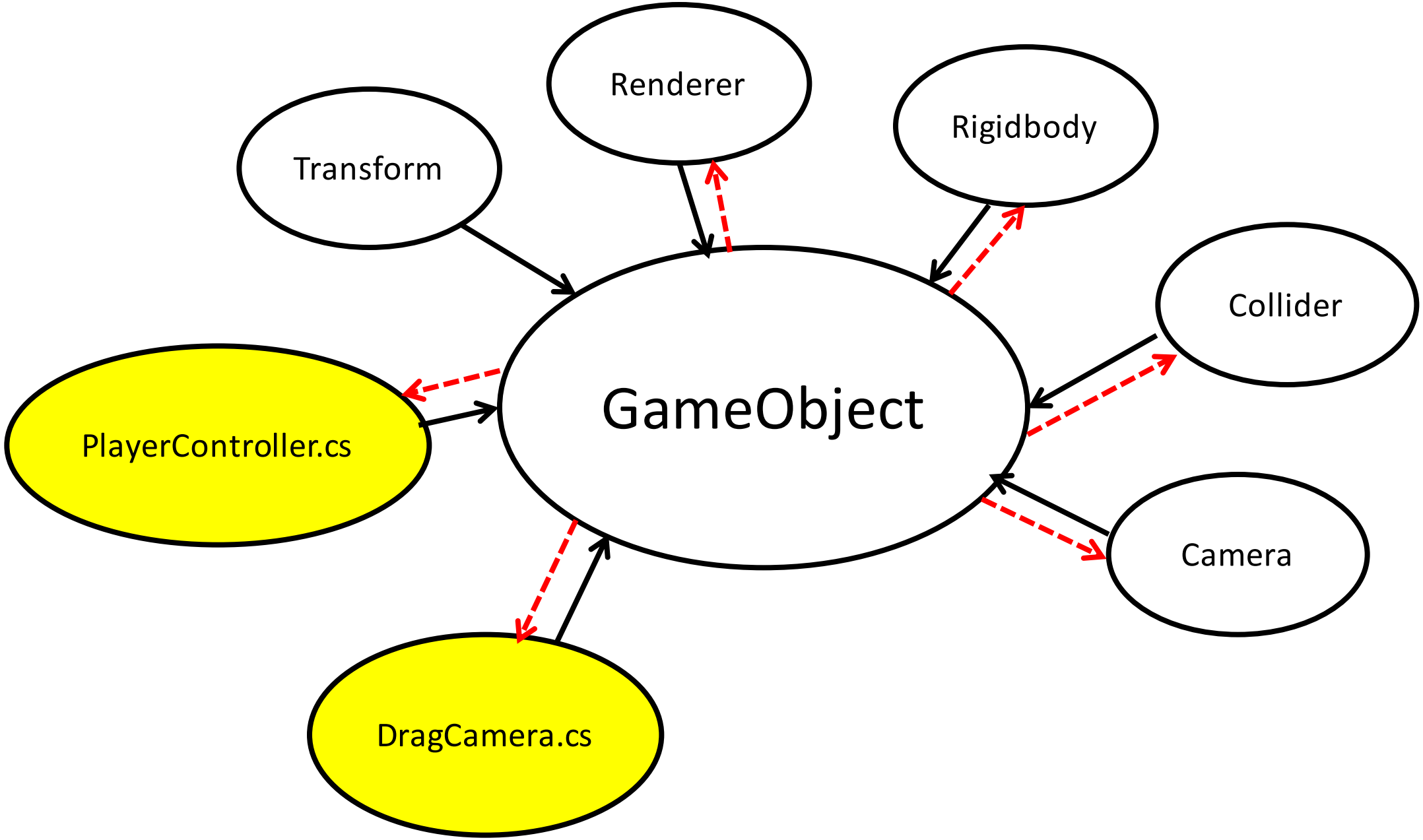


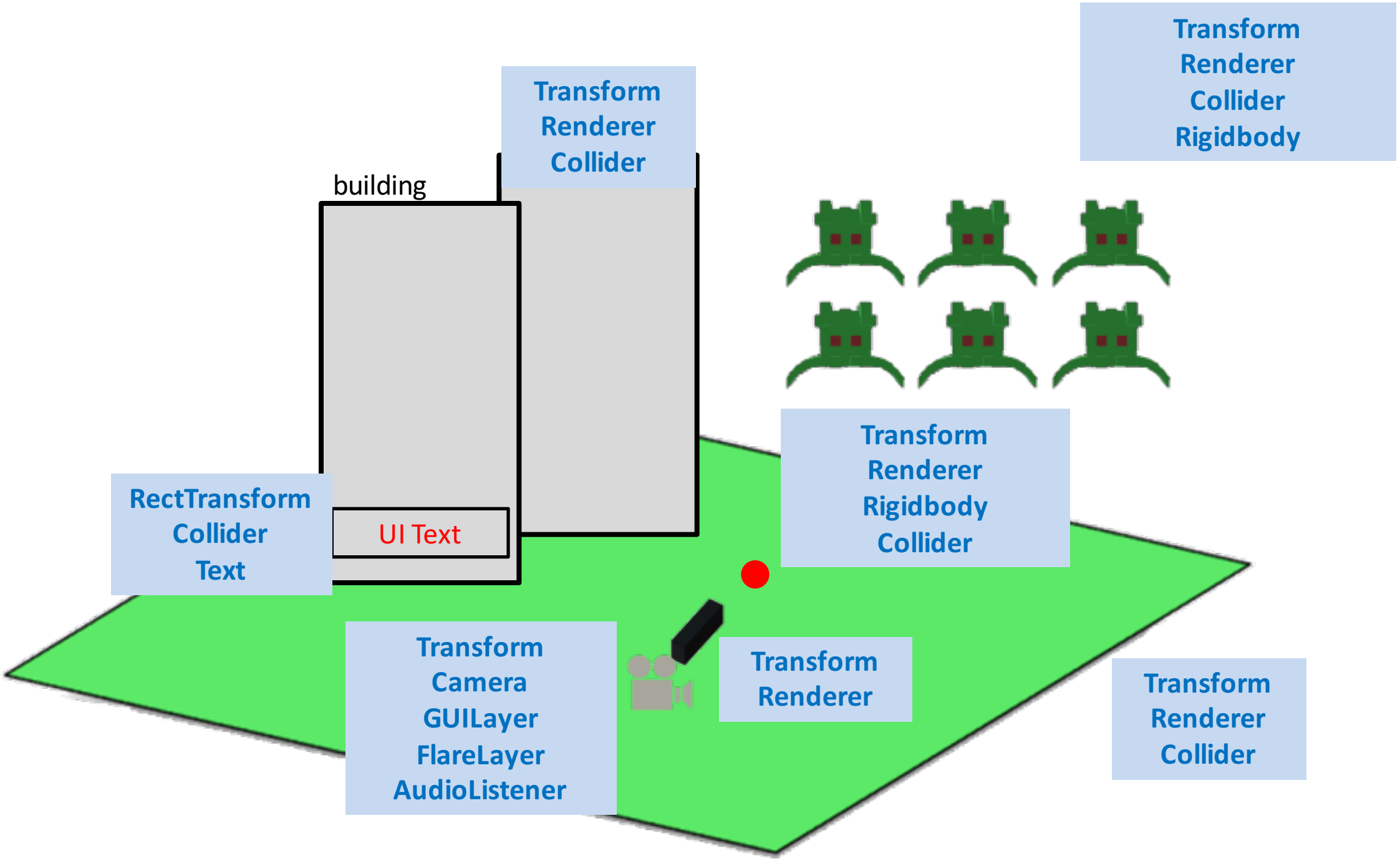
Ex: Canvas, text, audio source, video player… etc.

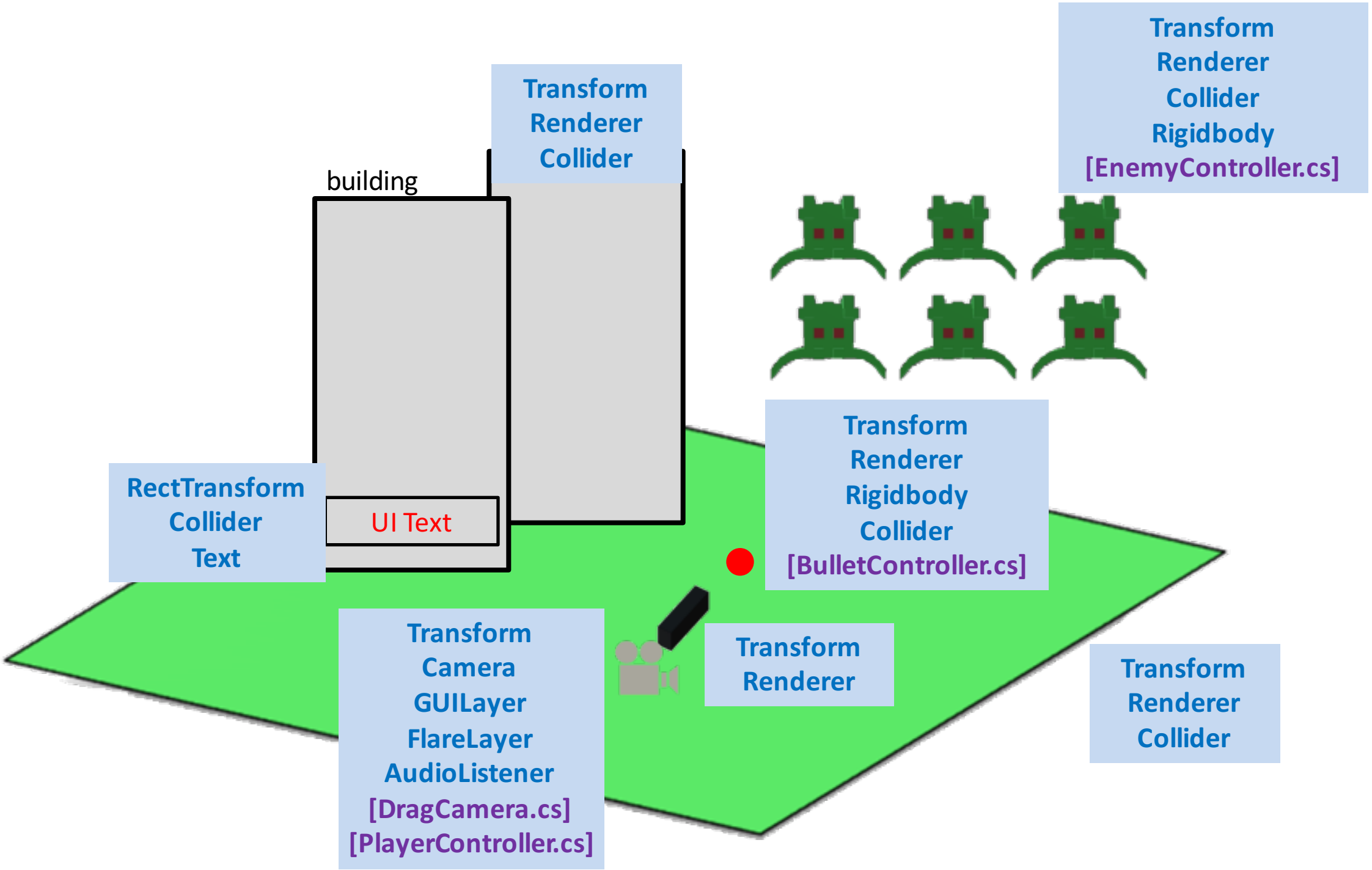

Transform
Renderer
Collider
building
Transform
Renderer
Collider
Rigidbody
RectTransform
Collider
Text
UI Text
Transform
Renderer
Rigidbody
Collider
Transform
Renderer
Transform
Camera
GUILayer
FlareLayer
AudioListener
Transform
Renderer
Collider

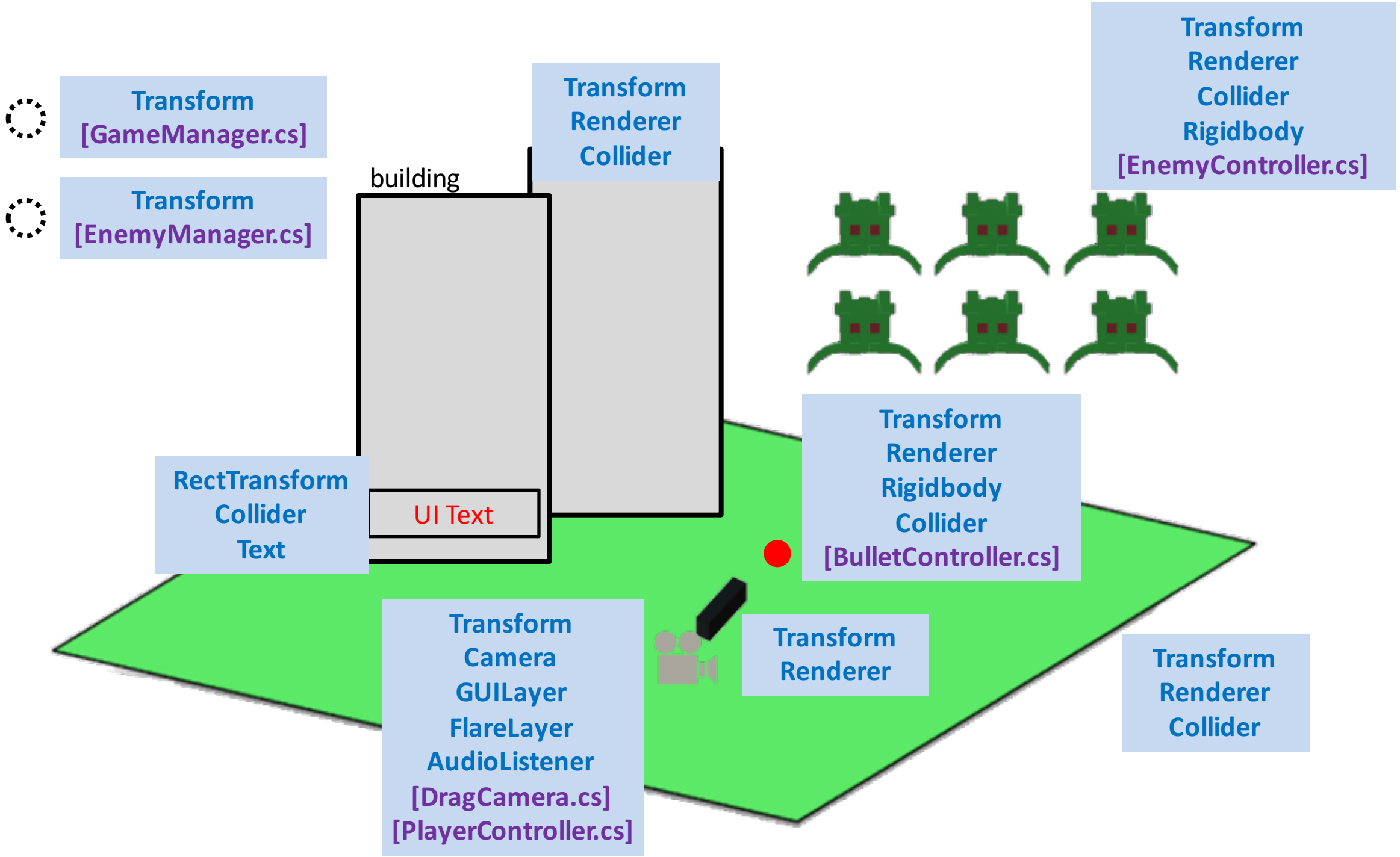


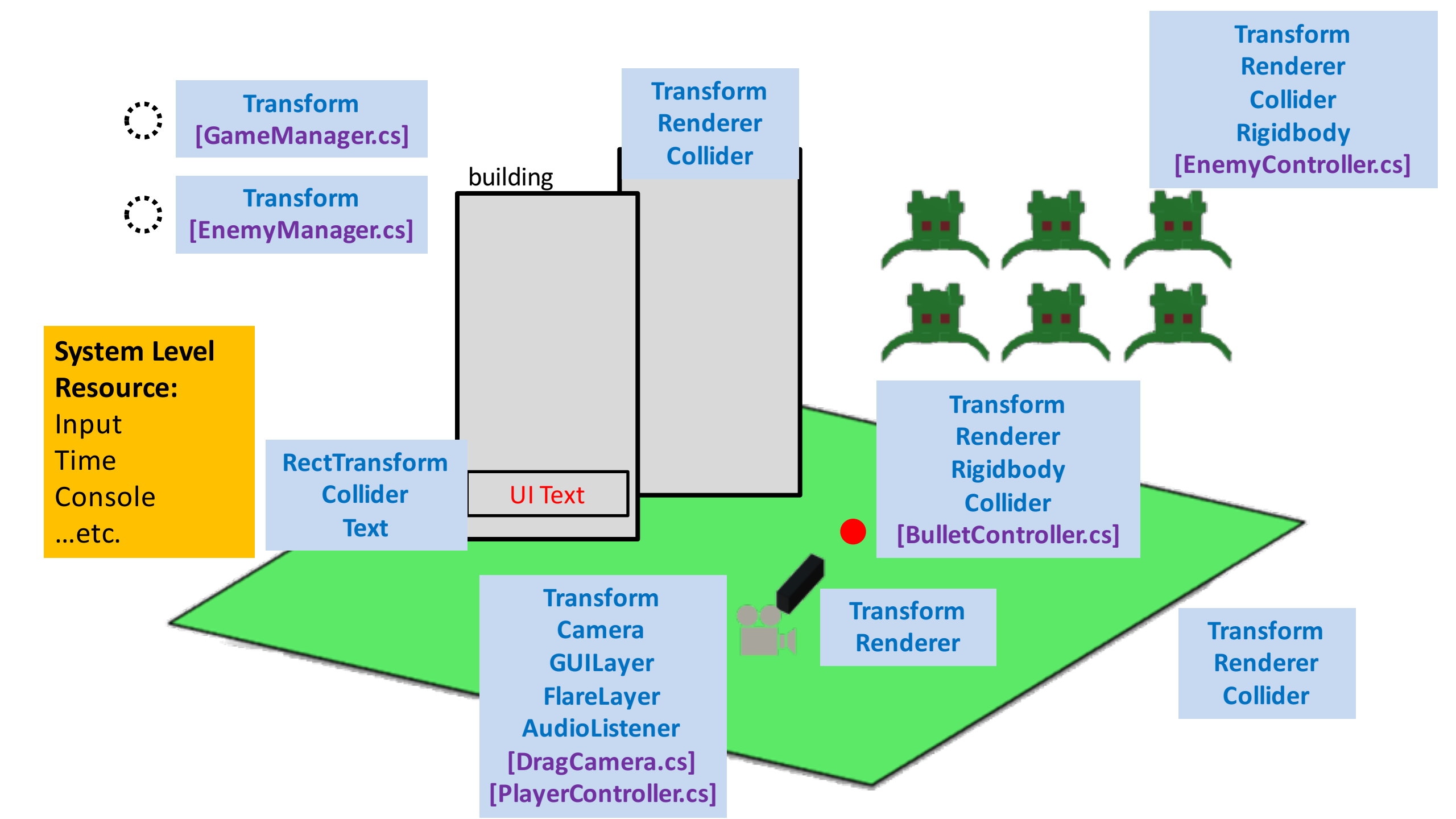
The GameObject need extra behaviors, such as removing it self after the collision, control the transform by mouse…etc.


Renderer
Transform
Rigidbody
Collider
GameObject
PlayerController.cs
Camera
DragCamera.cs


Transform
Renderer
Collider
Rigidbody
Transform
Renderer
Collider
building
RectTransform
Collider
Text
UI Text
Transform
Renderer
Rigidbody
Collider
Transform
Camera
GUILayer
FlareLayer
AudioListener
Transform
Renderer
Transform
Renderer
Collider

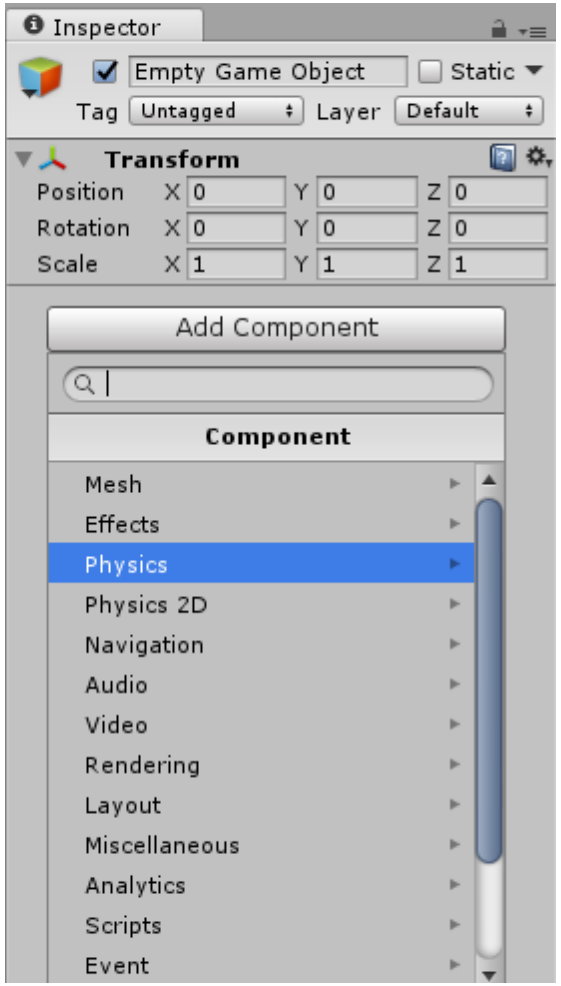

Transform
Renderer
Collider
Rigidbody
[EnemyController.cs]
Transform
Renderer
Collider
building
RectTransform
Collider
Text
UI Text
Transform
Renderer
Rigidbody
Collider
[BulletController.cs]
Transform
Camera
GUILayer
FlareLayer
AudioListener
[DragCamera.cs]
[PlayerController.cs]
Transform
Renderer
Transform
Renderer
Collider


Transform
[GameManager.cs]
Transform
[EnemyManager.cs]
Transform
Renderer
Collider
building
Transform
Renderer
Collider
Rigidbody
[EnemyController.cs]
RectTransform
Collider
Text
UI Text
Transform
Renderer
Rigidbody
Collider
[BulletController.cs]
Transform
Camera
GUILayer
FlareLayer
AudioListener
[DragCamera.cs]
[PlayerController.cs]
Transform
Renderer
Transform
Renderer
Collider

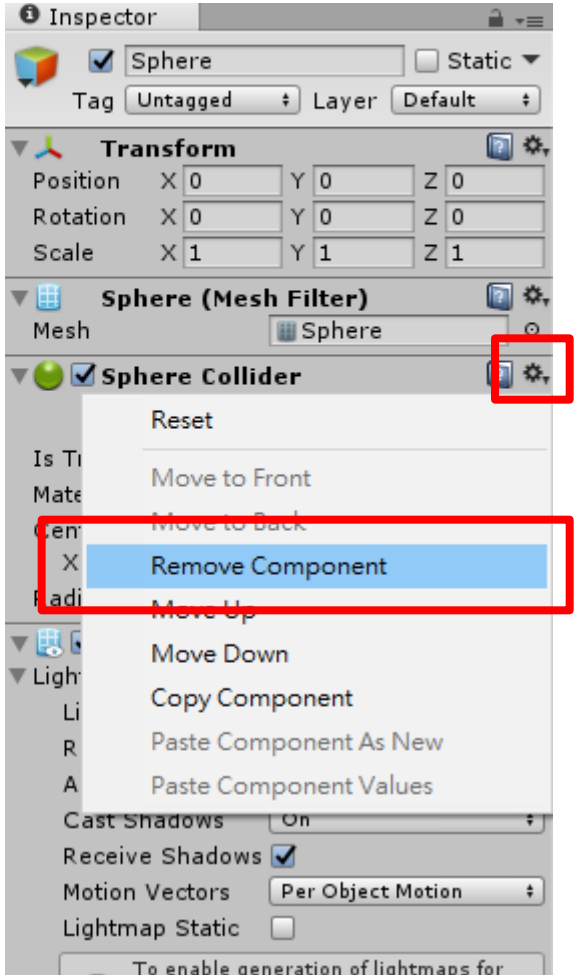

Transform
[GameManager.cs]
Transform
[EnemyManager.cs]
Transform
Renderer
Collider
building
Transform
Renderer
Collider
Rigidbody
[EnemyController.cs]
System Level
Resource:
Input
Time
Console
…etc.
RectTransform
Collider
Text
UI Text
Transform
Renderer
Rigidbody
Collider
[BulletController.cs]
Transform
Camera
GUILayer
FlareLayer
AudioListener
[DragCamera.cs]
[PlayerController.cs]
Transform
Renderer
Transform
Renderer
Collider

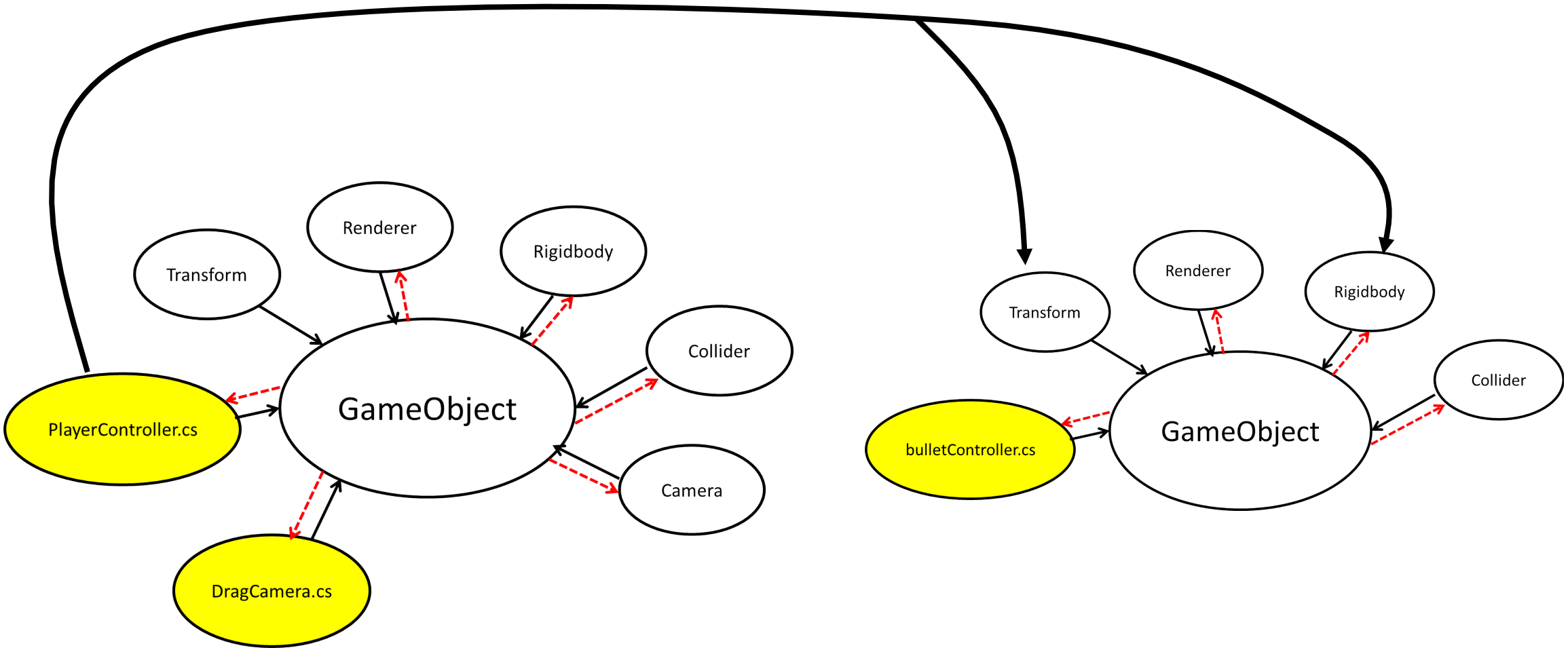
Component

- Add Component:



- Remove Component:




Transform
Renderer
Rigidbody
Collider
PlayerController.cs
GameObject
Camera
DragCamera.cs
Transform
Renderer
Rigidbody
Collider
bulletController.cs
GameObject

Component

- Add Component:

```
newBullet.AddComponent<Rigidbody>();
```

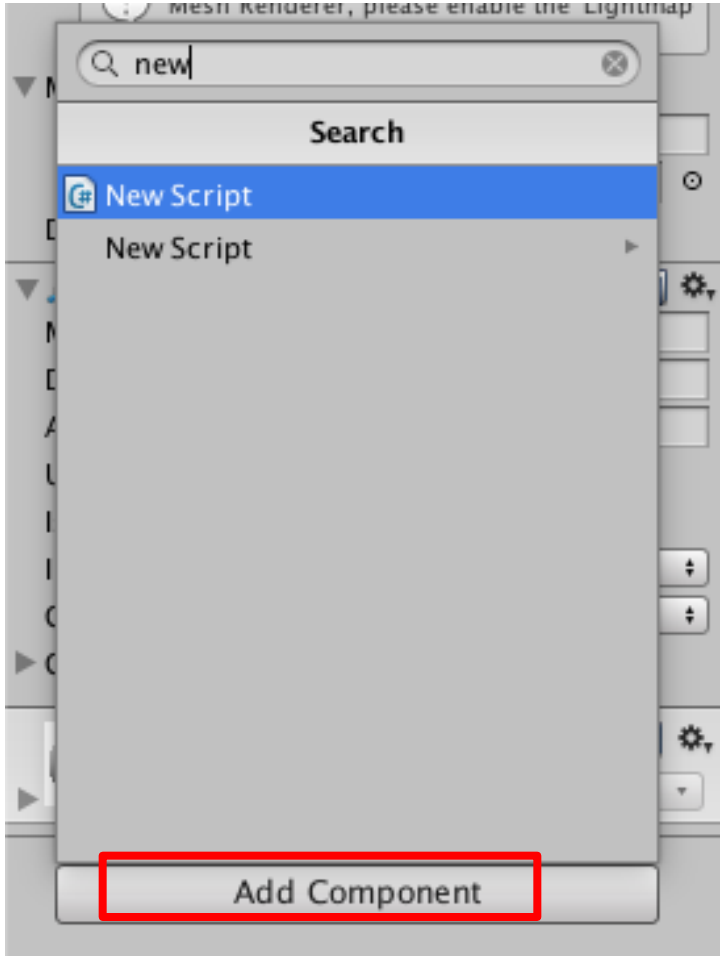
- Get Component:

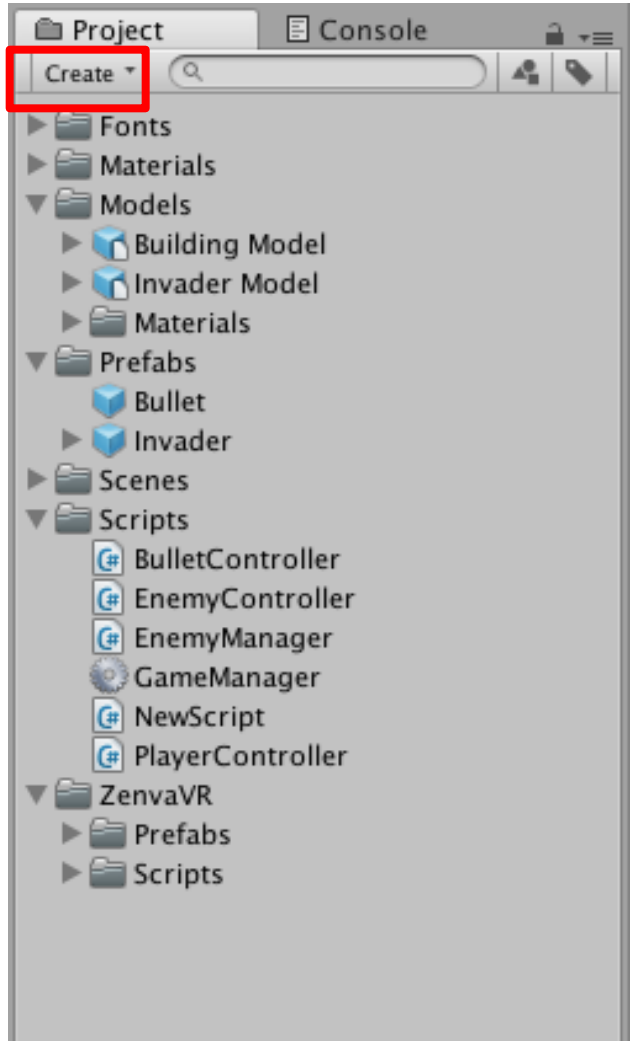
```
Rigidbody bulletRb = newBullet.GetComponent<Rigidbody>();
```

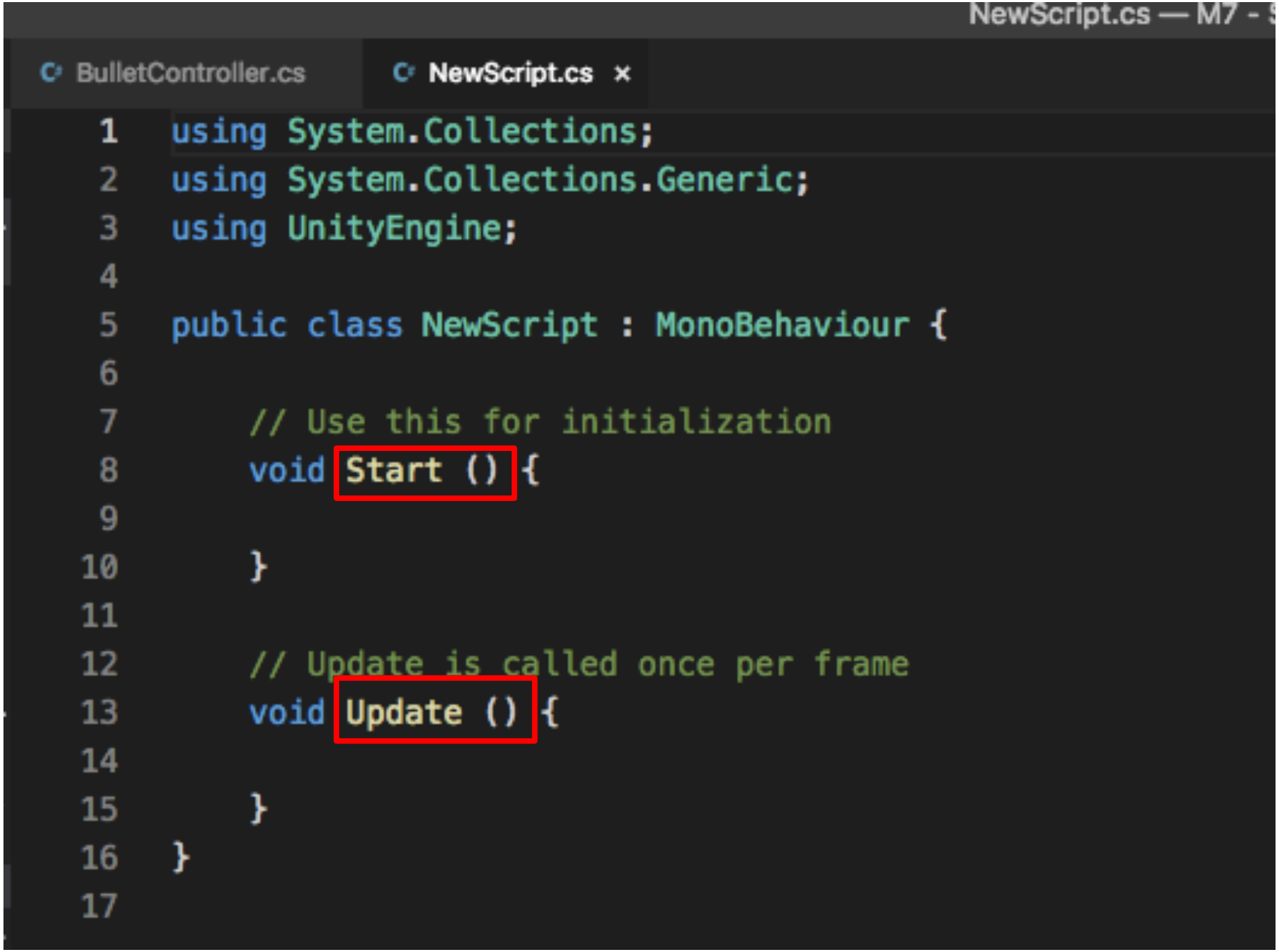
- Remove Component:

```
Destroy(newBullet.GetComponent<Rigidbody>());
```

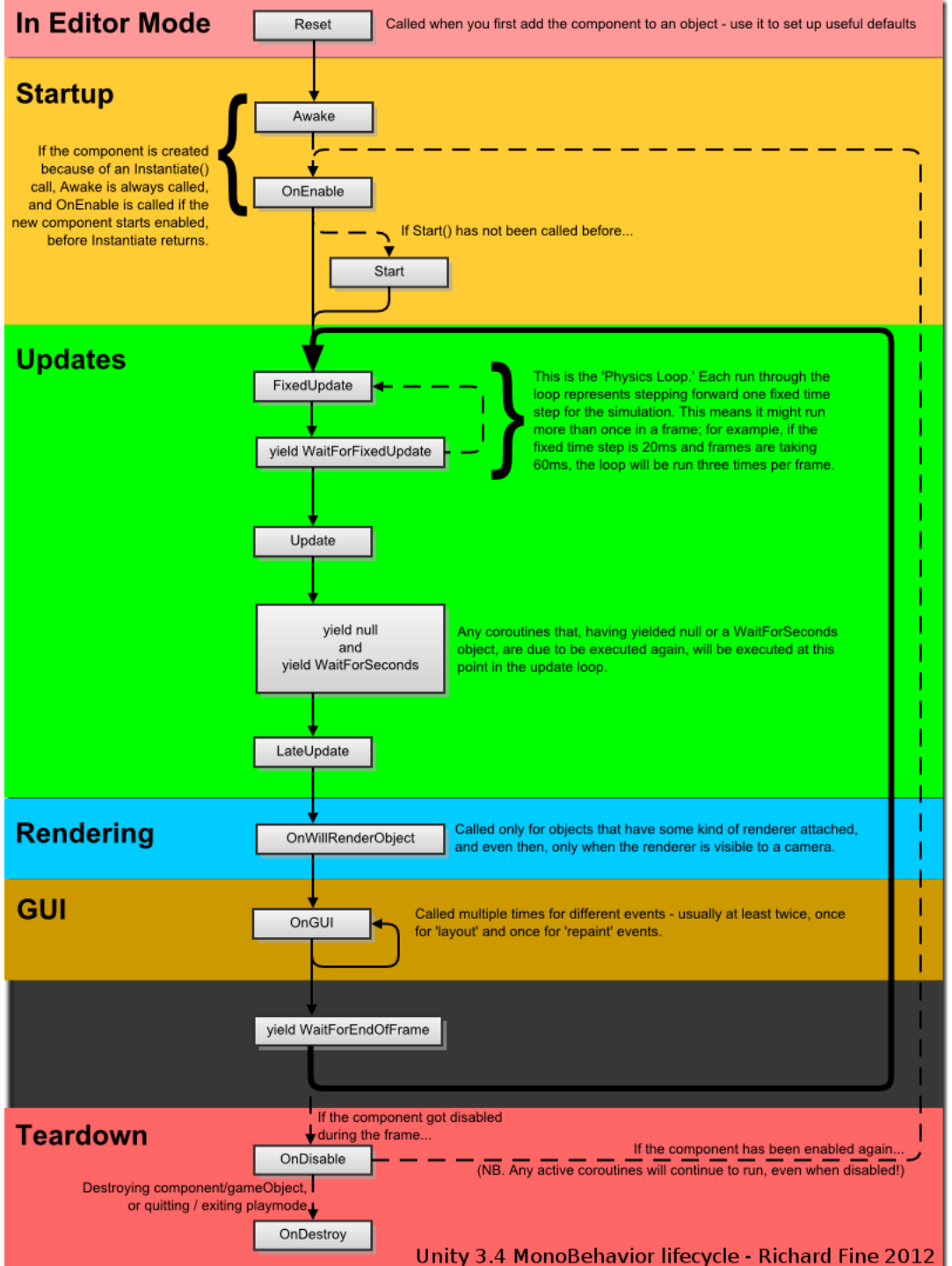
Create a new C# script



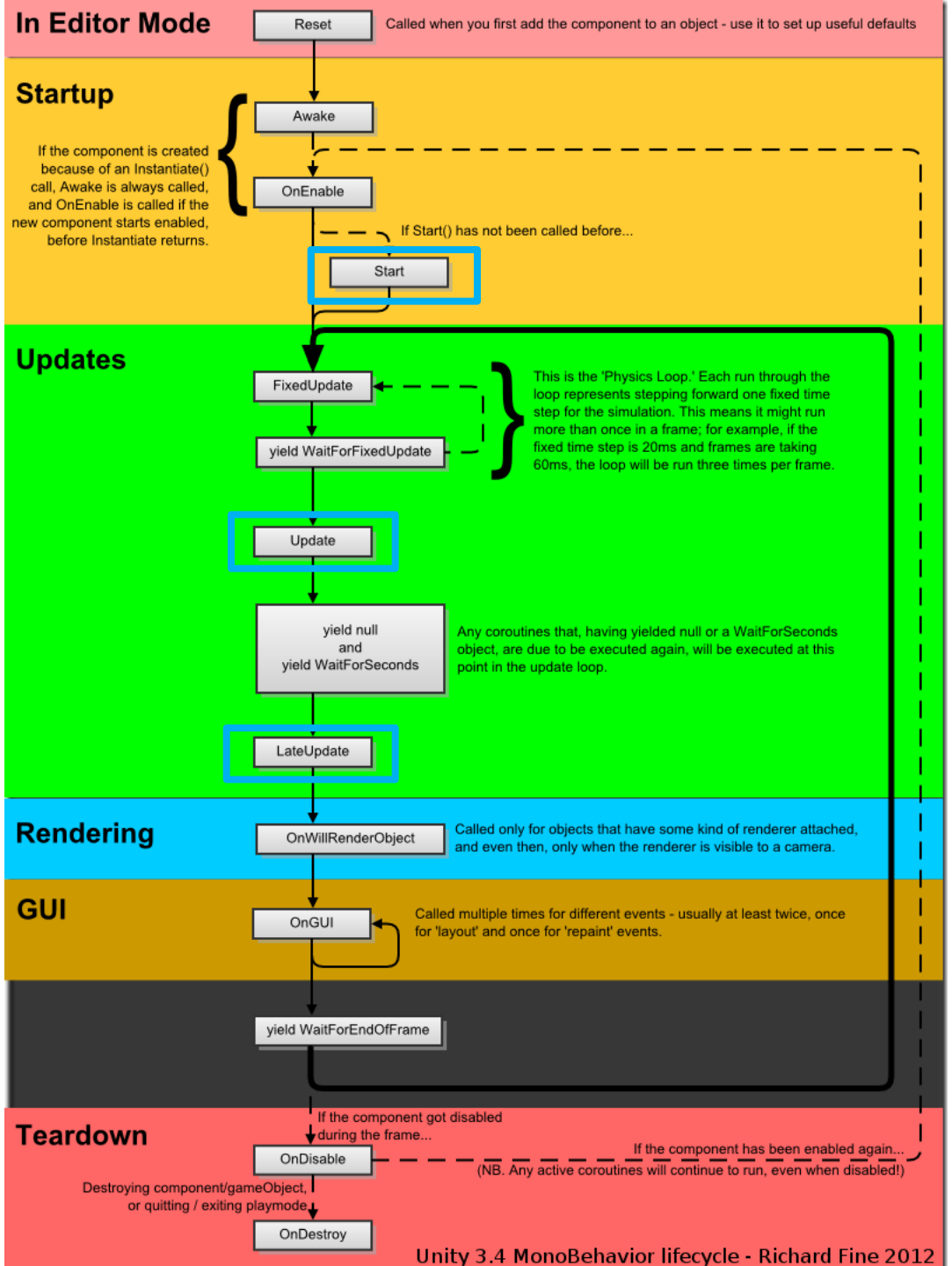



NewScript.cs — M7 -
BulletController.cs
NewScript.cs
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
public class NewScript : MonoBehaviour {
// Use this for initialization
void Start () {
}
// Update is called once per frame
void Update () {
}
}

Unity Lifecycle



Unity Lifecycle



Player

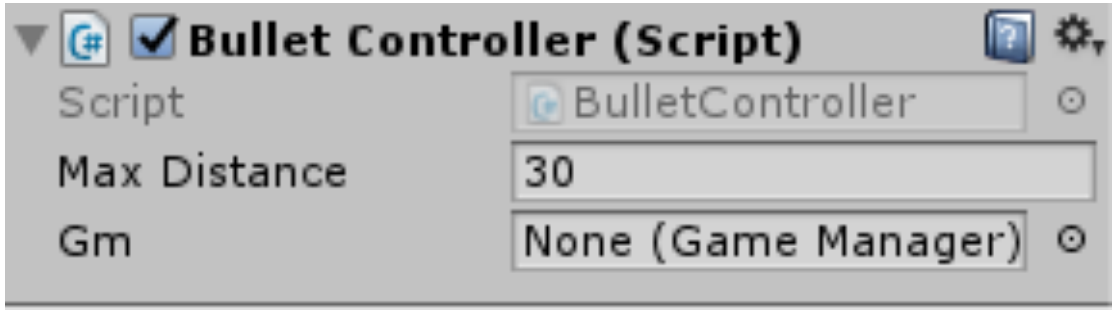
- Rotate the view with mouse right click.
  - Camera
  - [DragCamera.cs]
- Generate the bullet with the fire button
  - [PlayerController.cs]

Bullet

- Created after the left click
  - Rigidbody
  - [PlayerController.cs]
- Disappear if going too far from the scene.
  - [BulletController.cs]

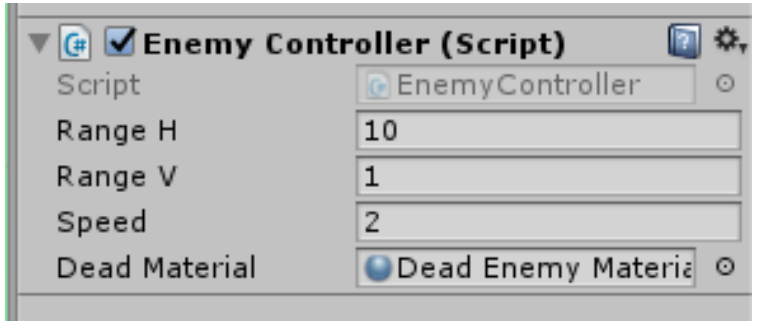
Bullet

- Disappear if trigger with other collider.
  - Rigidbody
  - Collider’s trigger
  - [BulletController.cs]
- Kill the enemy if the bullet trigger with it.
  - Rigidbody
  - Collider’s trigger
  - Tag
  - [BulletController.cs]



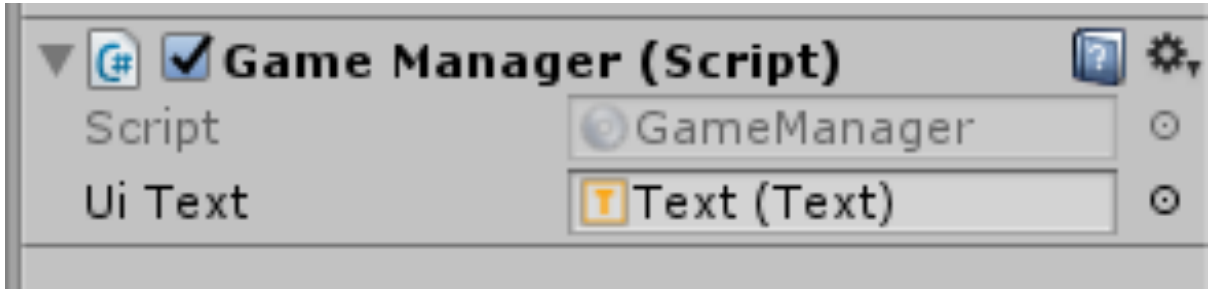
Enemy

- Total there are NumX * NumY * NumZ enemies are generated.
  - [EnemyManager.cs]
- The enemy move Horizontally and vertically during the game.
  - [EnemyController.cs]
- The enemy will fall down and check its material's color if it was shot.
  - Ridgidbody
  - [EnemyController.cs]
- The Game will be over if the enemy trigger with the player / ground.
  - Rigidbody
  - Collider's trigger
  - [EnemyController.cs]



UI Elements (GameFlow)

- Start the game if the UI is shot and the game isn’t started yet.
  - Collider’s trigger
  - [GameManager.cs]
- Display the amount of enemies or message according to the state.
  - [GameManager.cs]



Assignment

- Design your own (visual/sound) effect of an enemy being shot.
- Please implement it in the function KillEnemy() in EnemyController.cs;

```
//display the shot effect
//[implement your own effect here]

//[Example]
// remove kinematic
GetComponent<Rigidbody>().isKinematic = false;

// remove trigger
GetComponent<Collider>().isTrigger = false;

// change material
gameObject.GetComponentInChildren<Renderer>().sharedMaterial = deadMaterial;
//[End of Example]
```

Assignment

- Please upload a zip file which contains:
  - Your code (EnemyController.cs)
  - A 10 seconds video shot of your design effect.
  - Other files (ex: image, audio, material…etc) that should be added in the project
  - A “ReadMe” file to describe how to add the effect.
- Deadline: 10/15 23:59

- Link: https://www.dropbox.com/request/9WNS8cLJjeSJ71lKQQSL