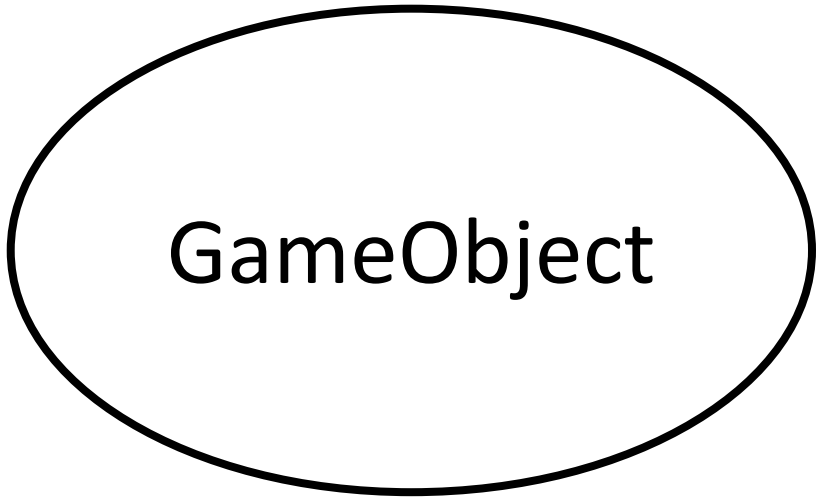
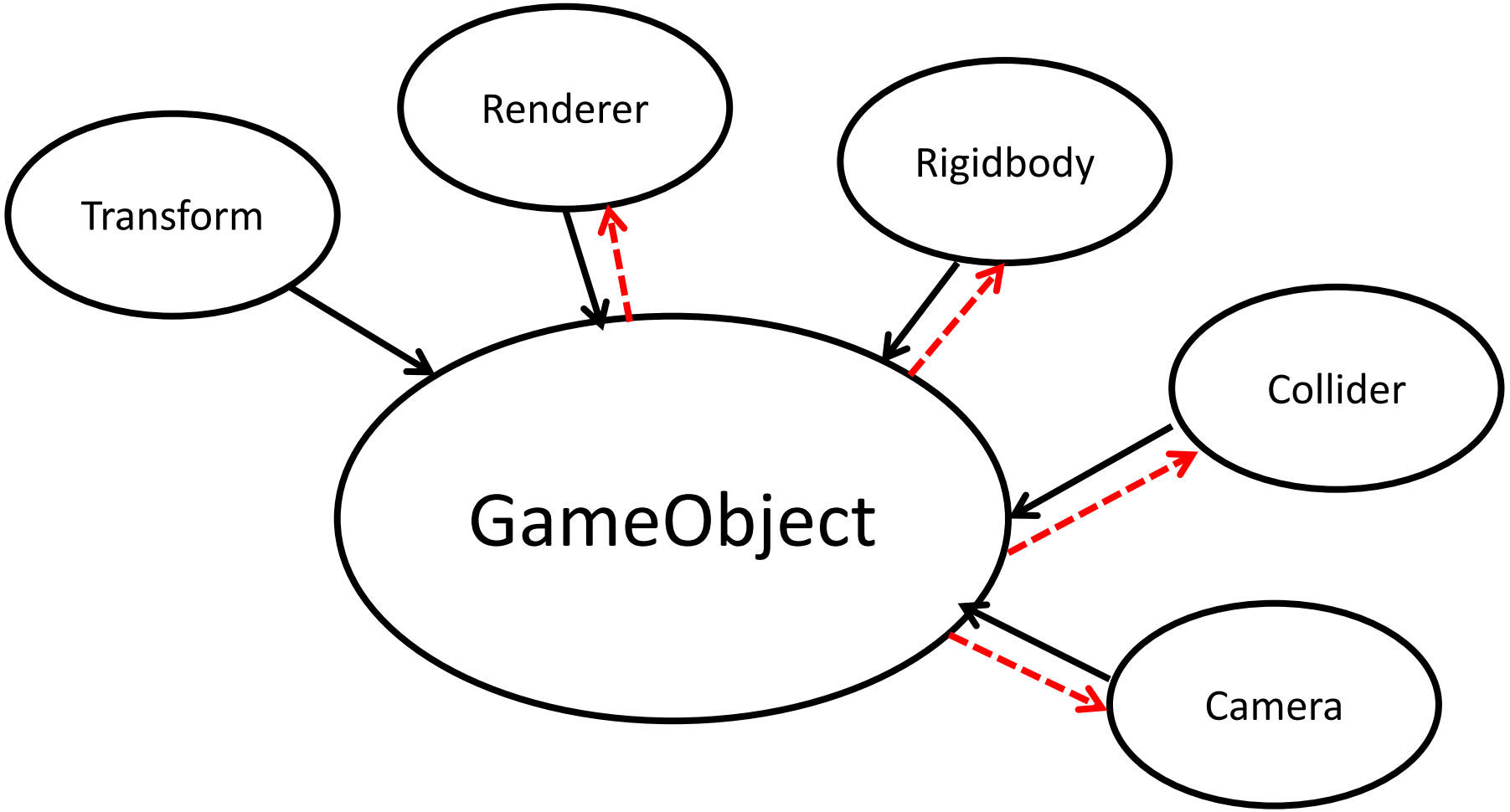
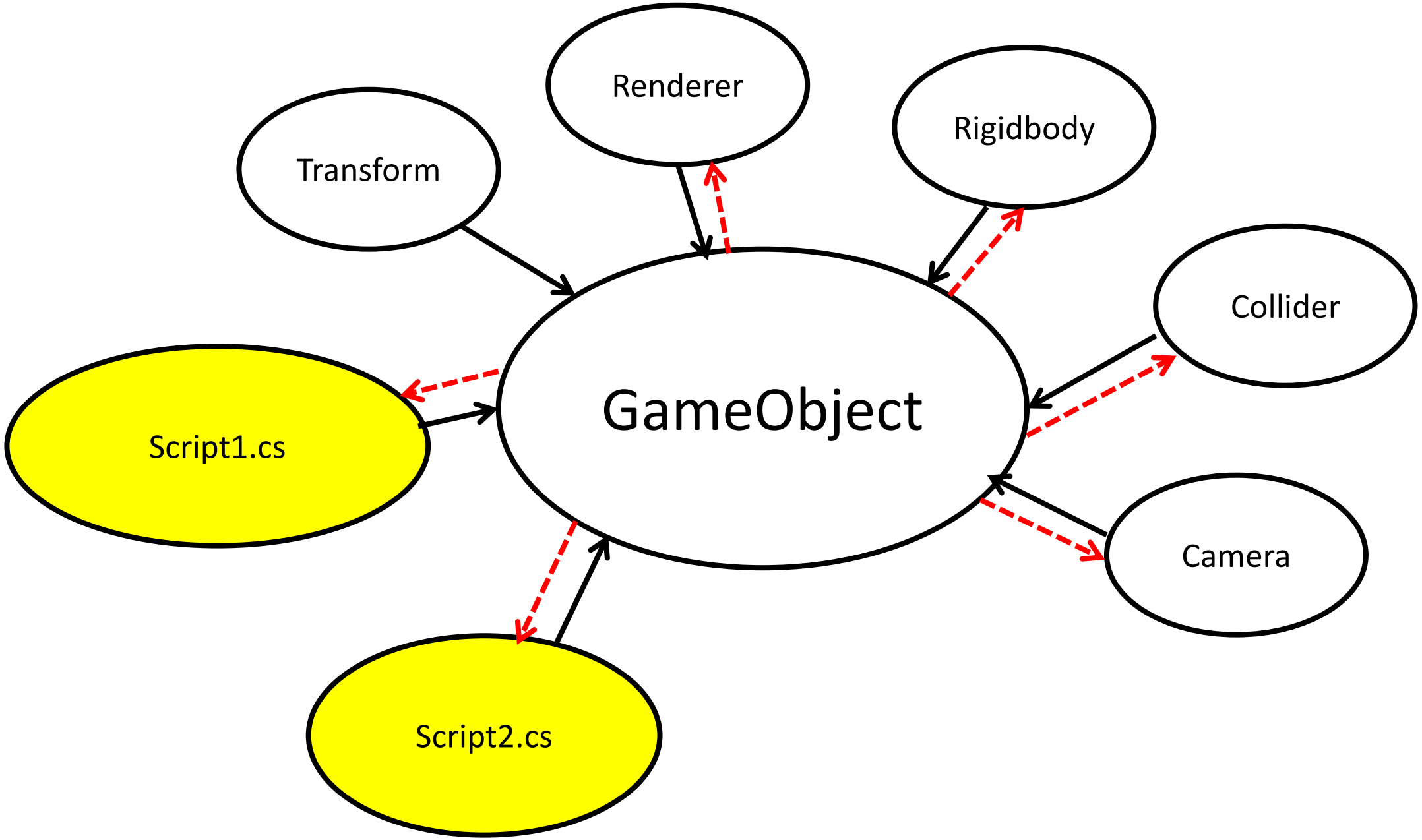
Unity II - Code Analysis

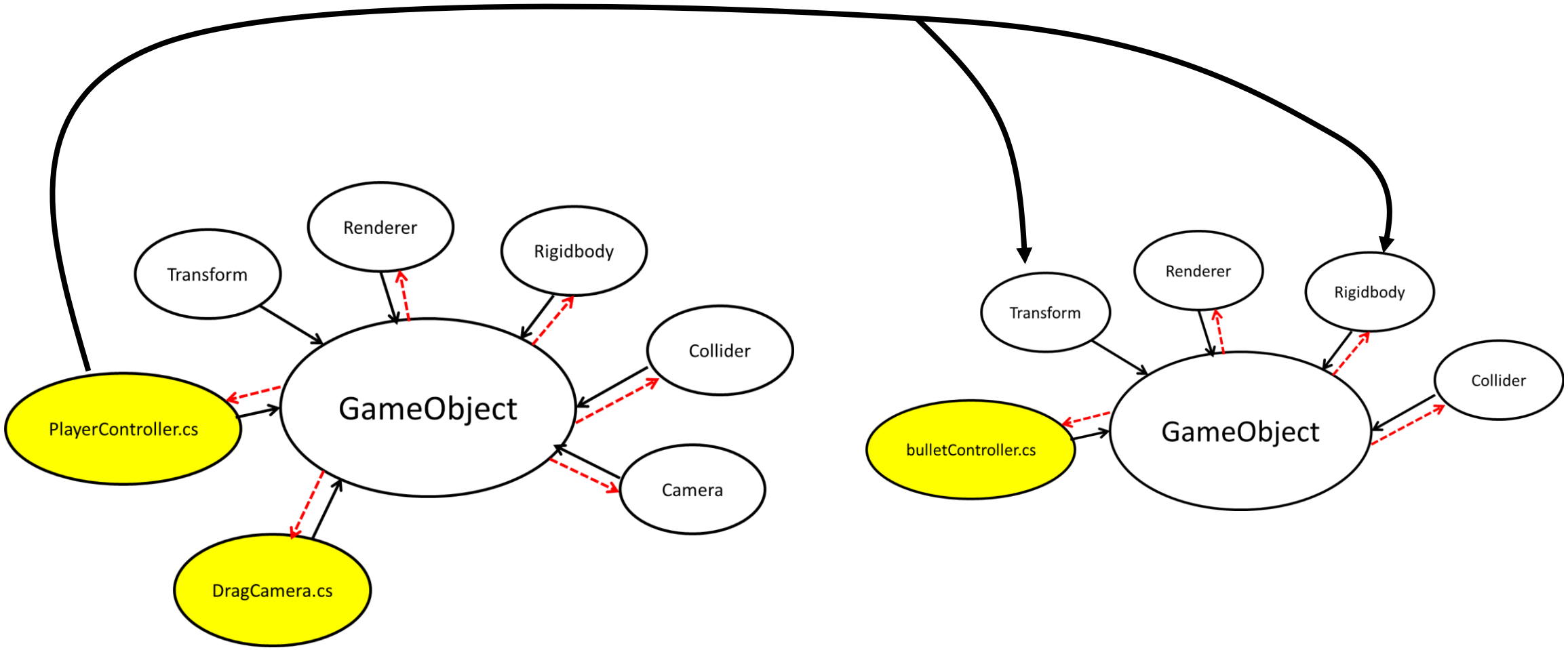


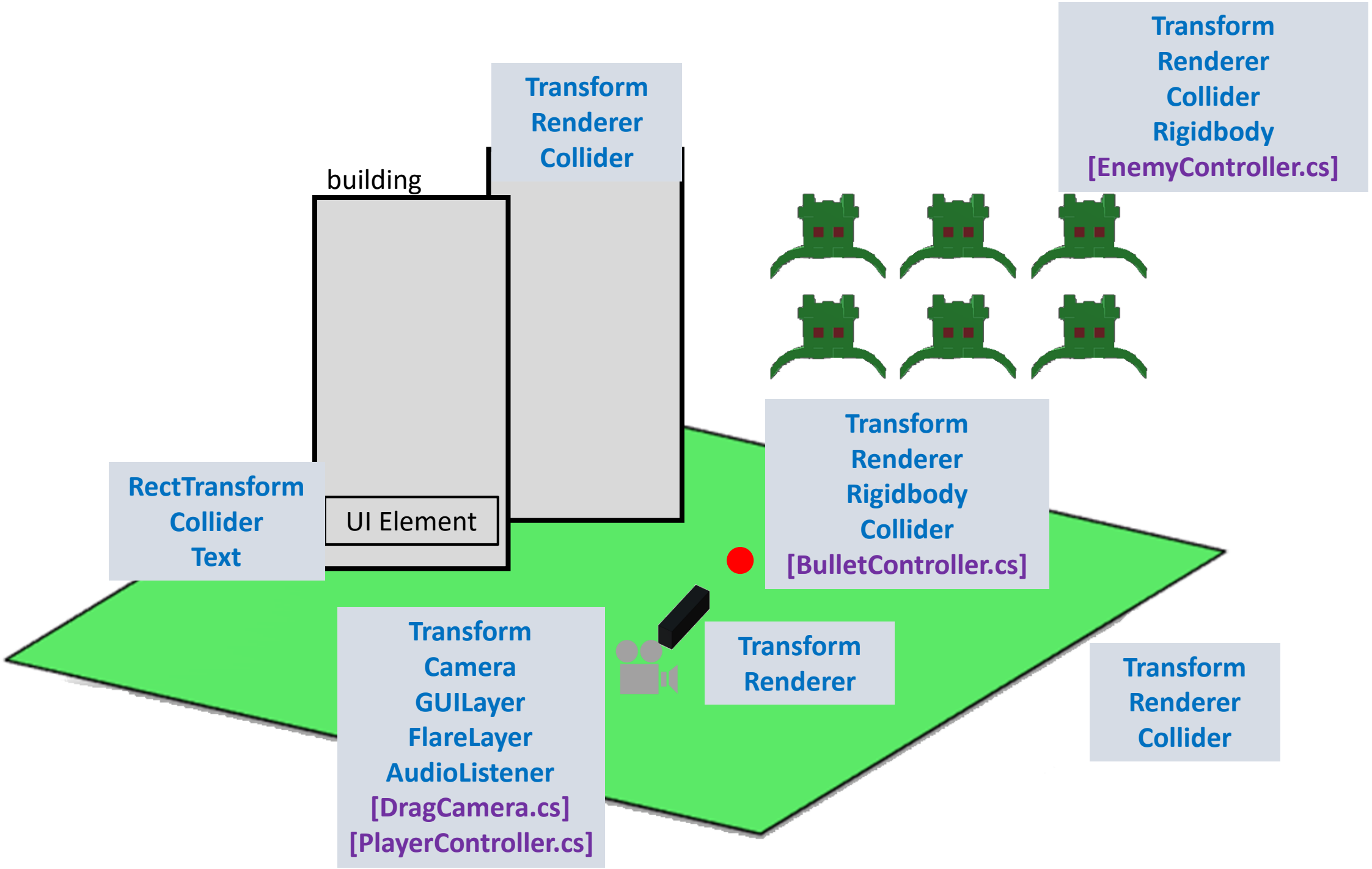
GameObject is the base entity in the unity scene.

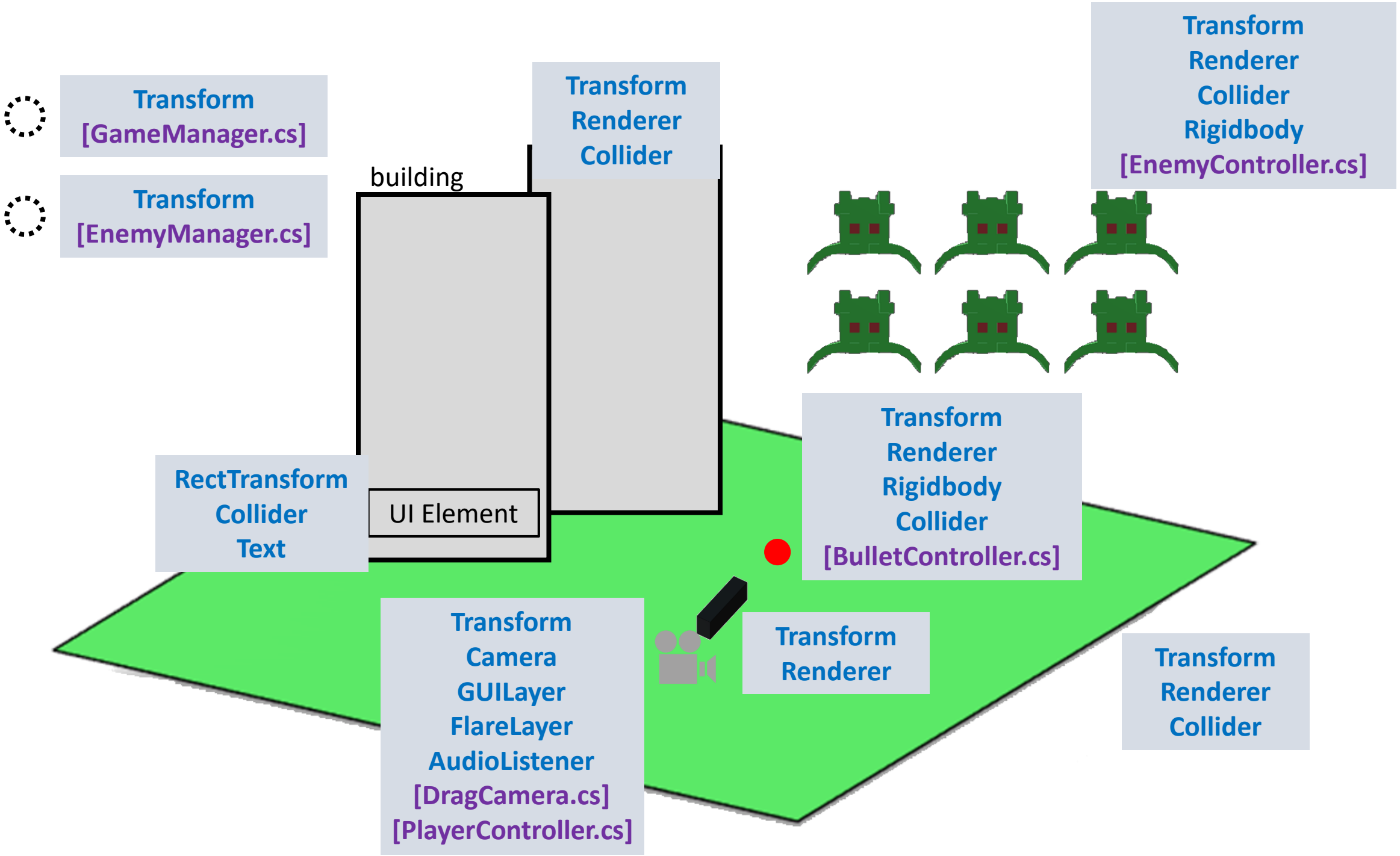


A GameObject has many components.
They all can be attached or removed in Unity or by script.

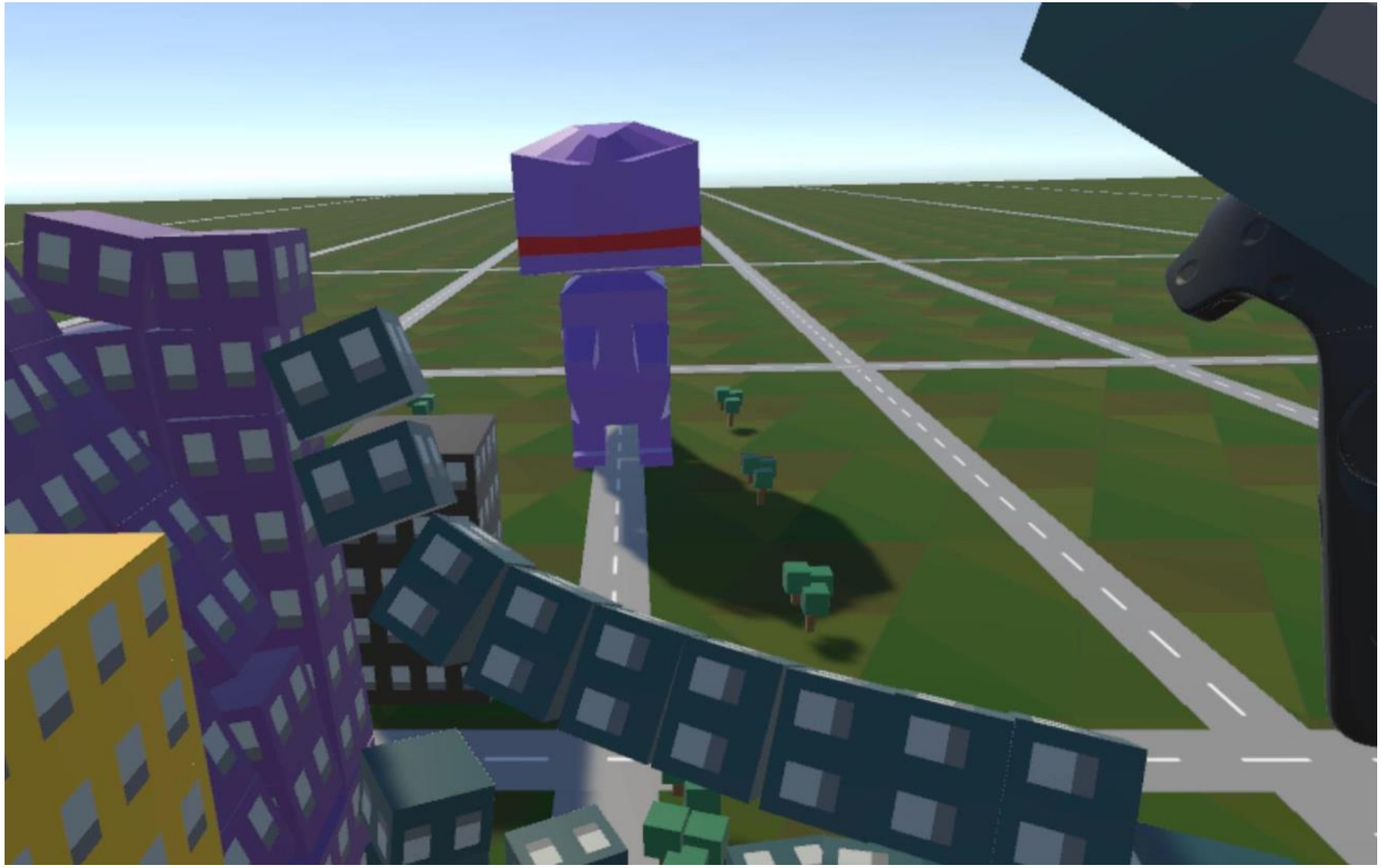

Renderer
Transform
Rigidbody
Collider
GameObject
Script1.cs
Camera
Script2.cs

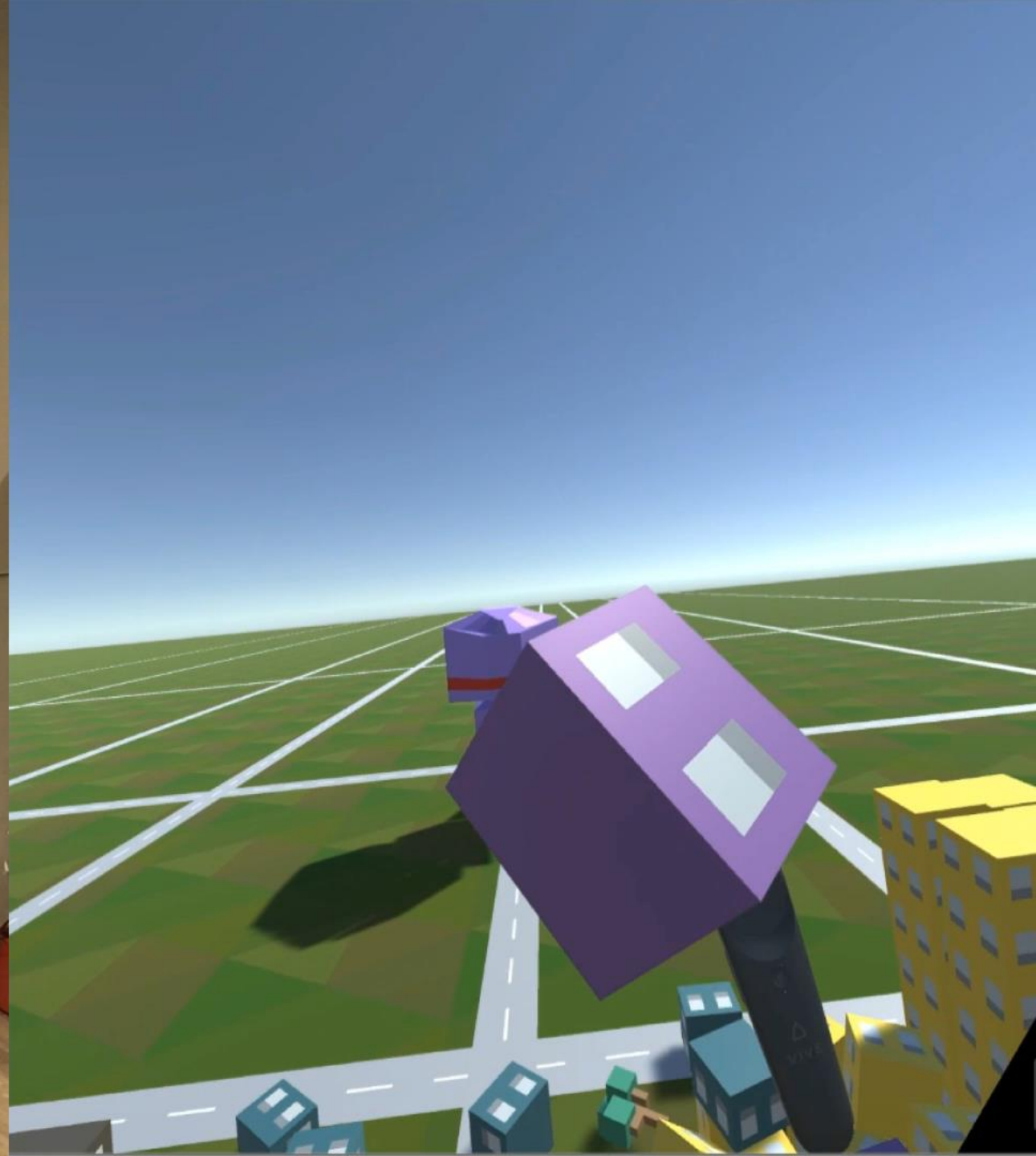

Transform
Renderer
Rigidbody
Collider
GameObject
PlayerController.cs
Camera
DragCamera.cs
Transform
Renderer
Rigidbody
Collider
GameObject
bulletController.cs


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

Giant Dinosaur Experience



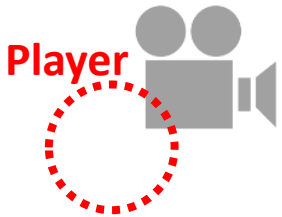


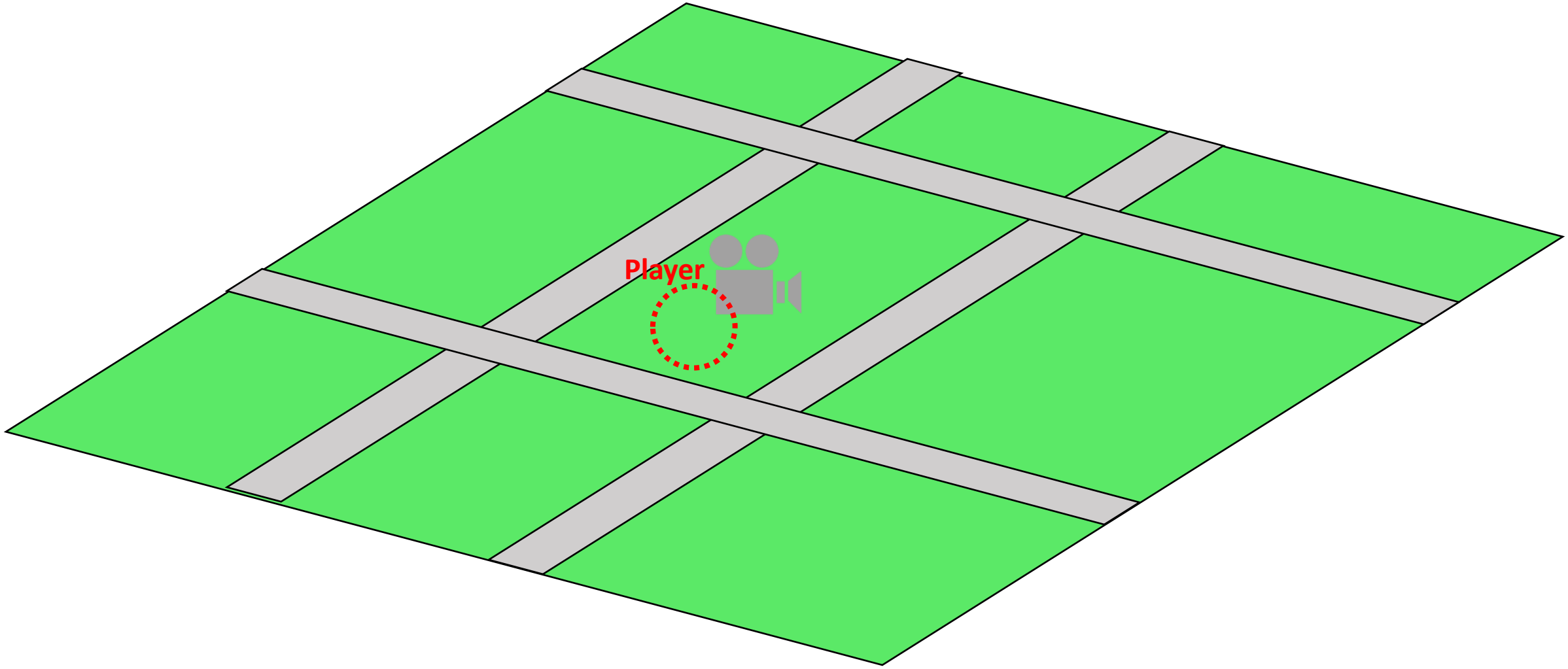
Game Structure

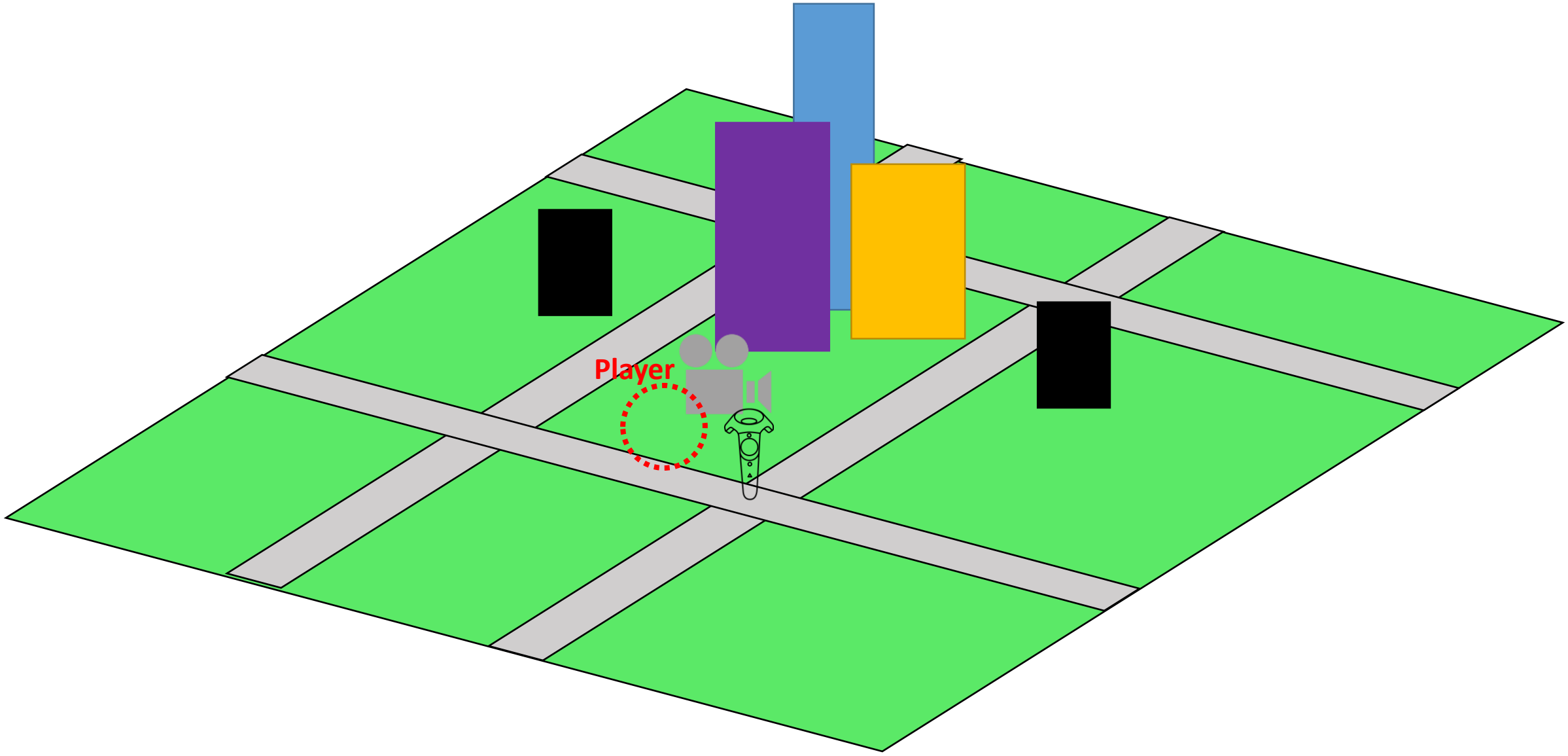
Game Concept

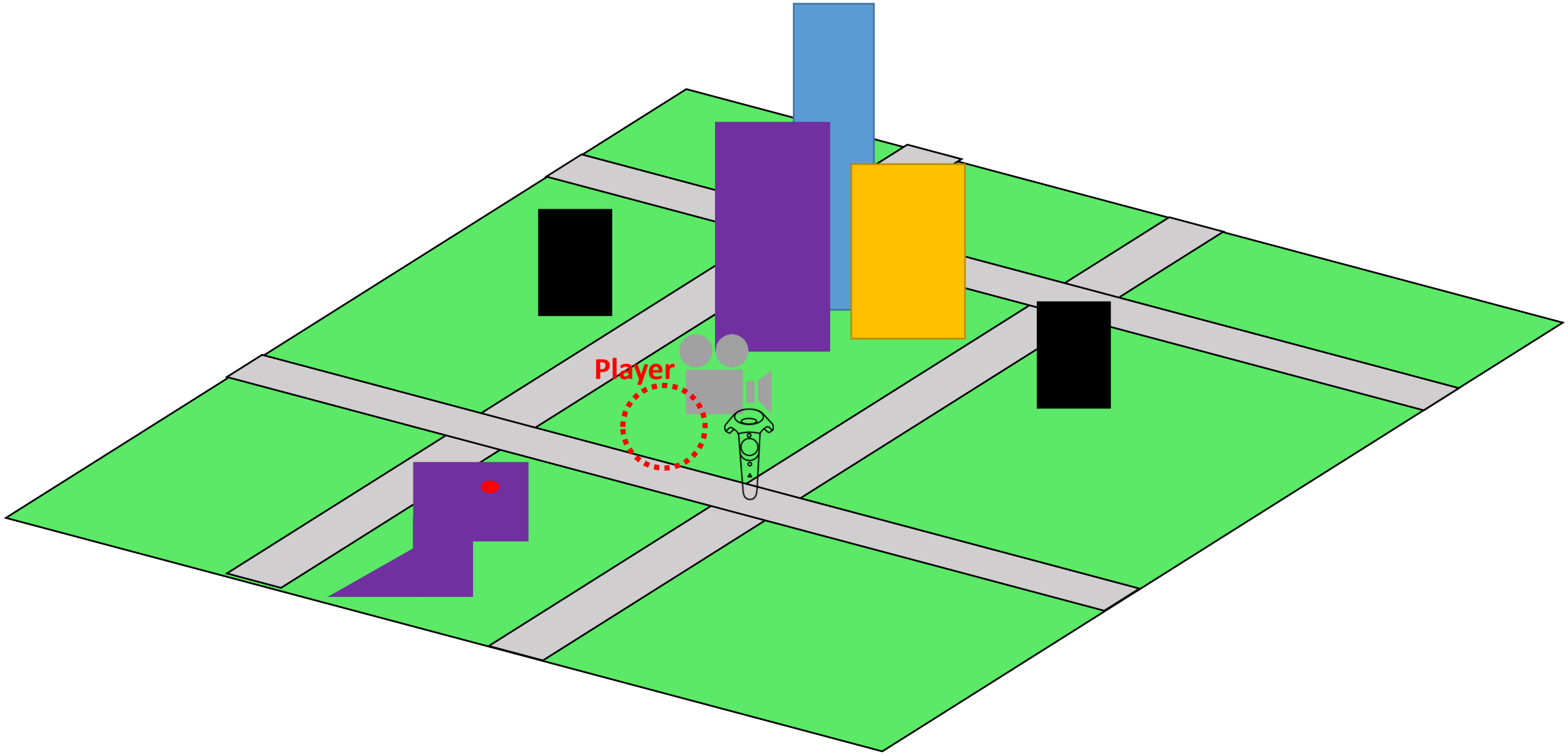
- “Gozilla” type of experience. Fighting giant monsters as city gets destroyed around you.

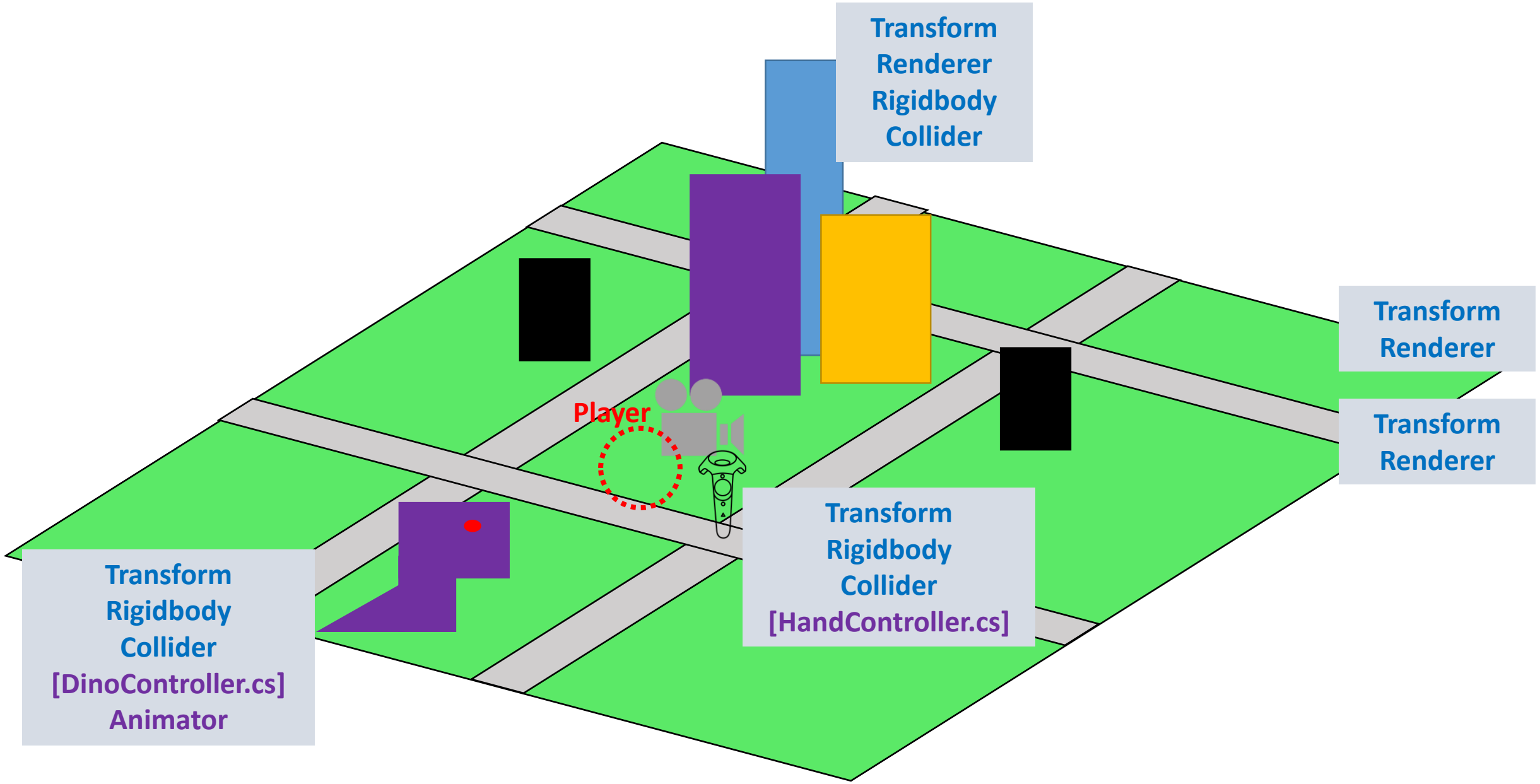
- Use Controllers to “Grab” and “Throw” objects.

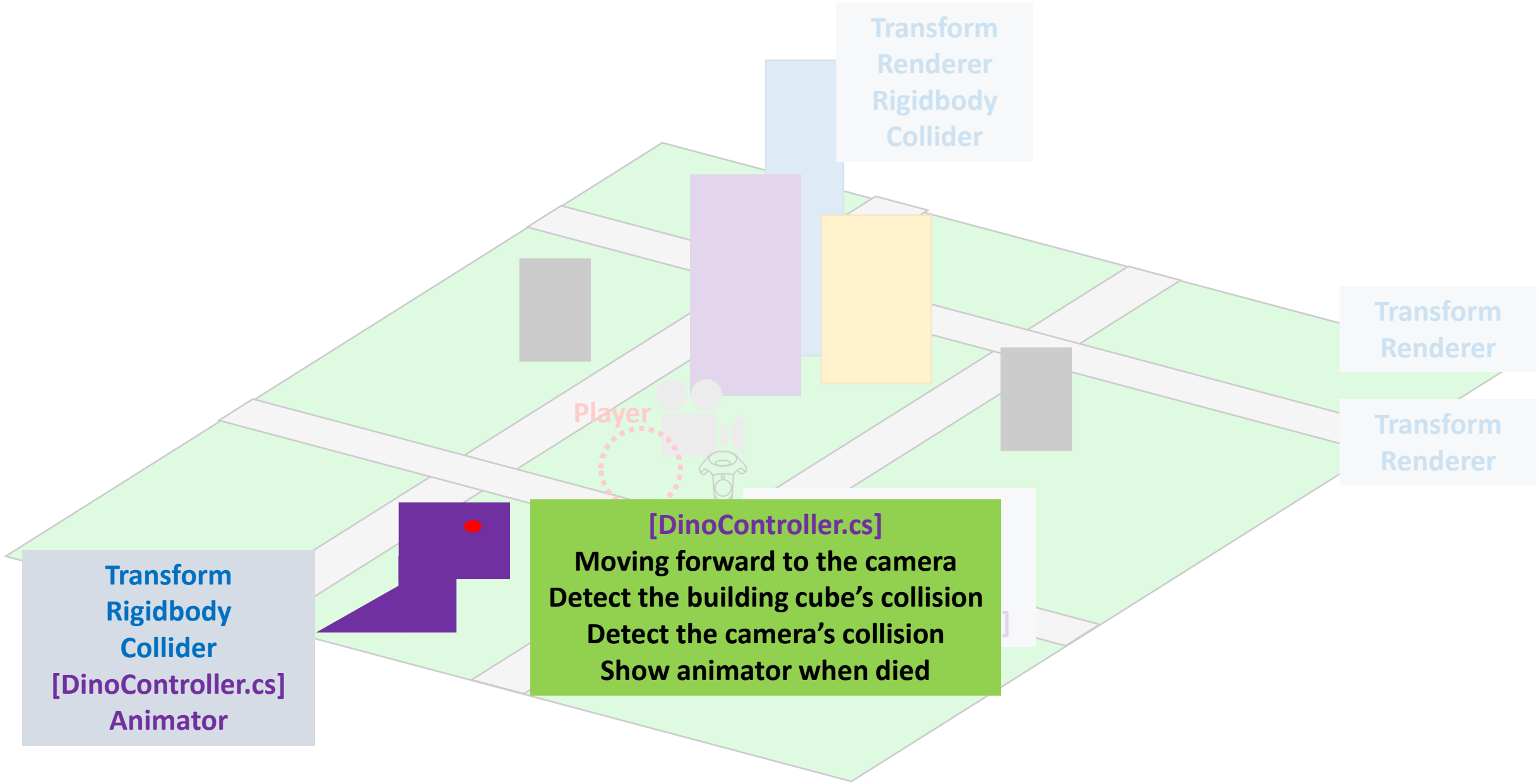

Player


Player


Player


Player


Transform
Renderer
Rigidbody
Collider
Transform
Renderer
Transform
Renderer
Player
Transform
Rigidbody
Collider
[HandController.cs]
Transform
Rigidbody
Collider
[DinoController.cs]
Animator

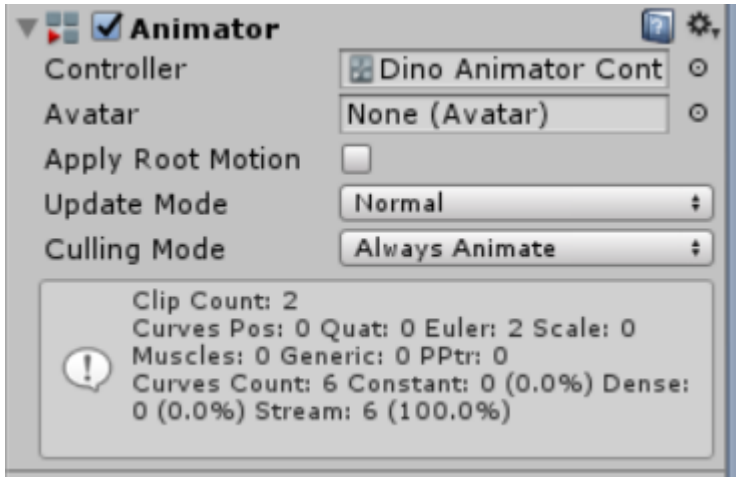

Transform
Renderer
Rigidbody
Collider
Transform
Renderer
Transform
Renderer
Player
Transform
Rigidbody
Collider
[DinoController.cs]
Animator
[DinoController.cs]
Moving forward to the camera
Detect the building cube's collision
Detect the camera's collision
Show animator when died

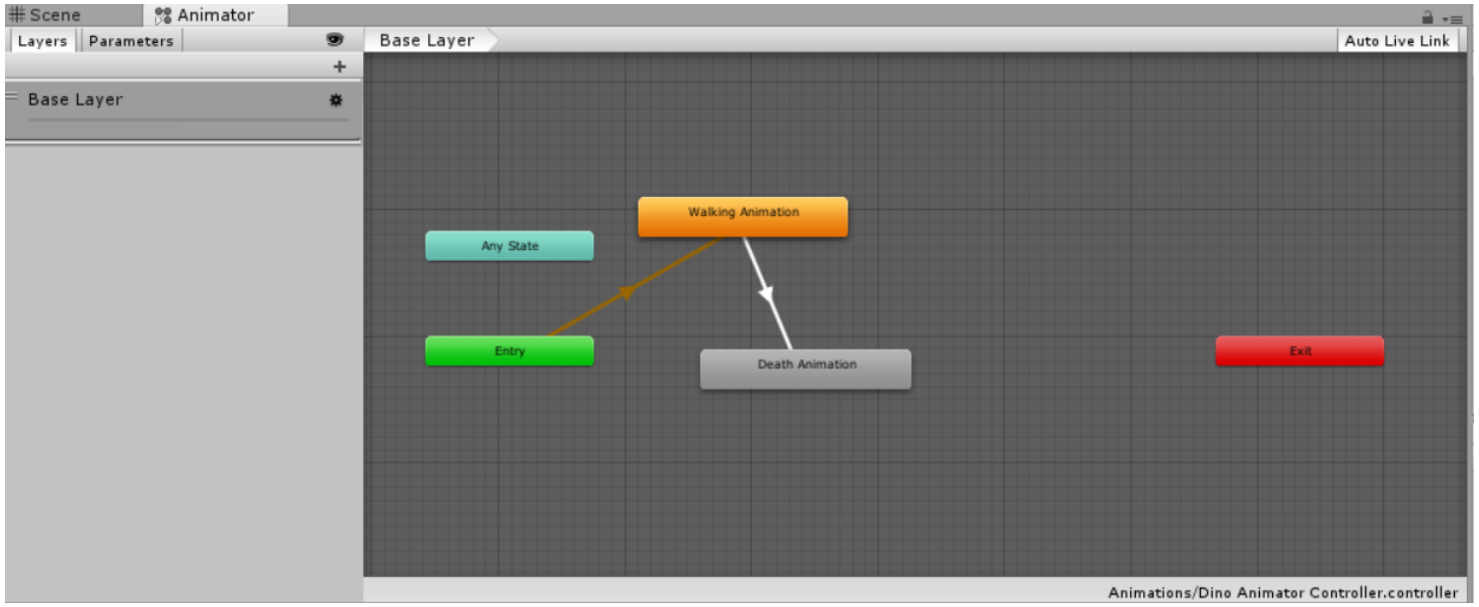
DinoController.cs

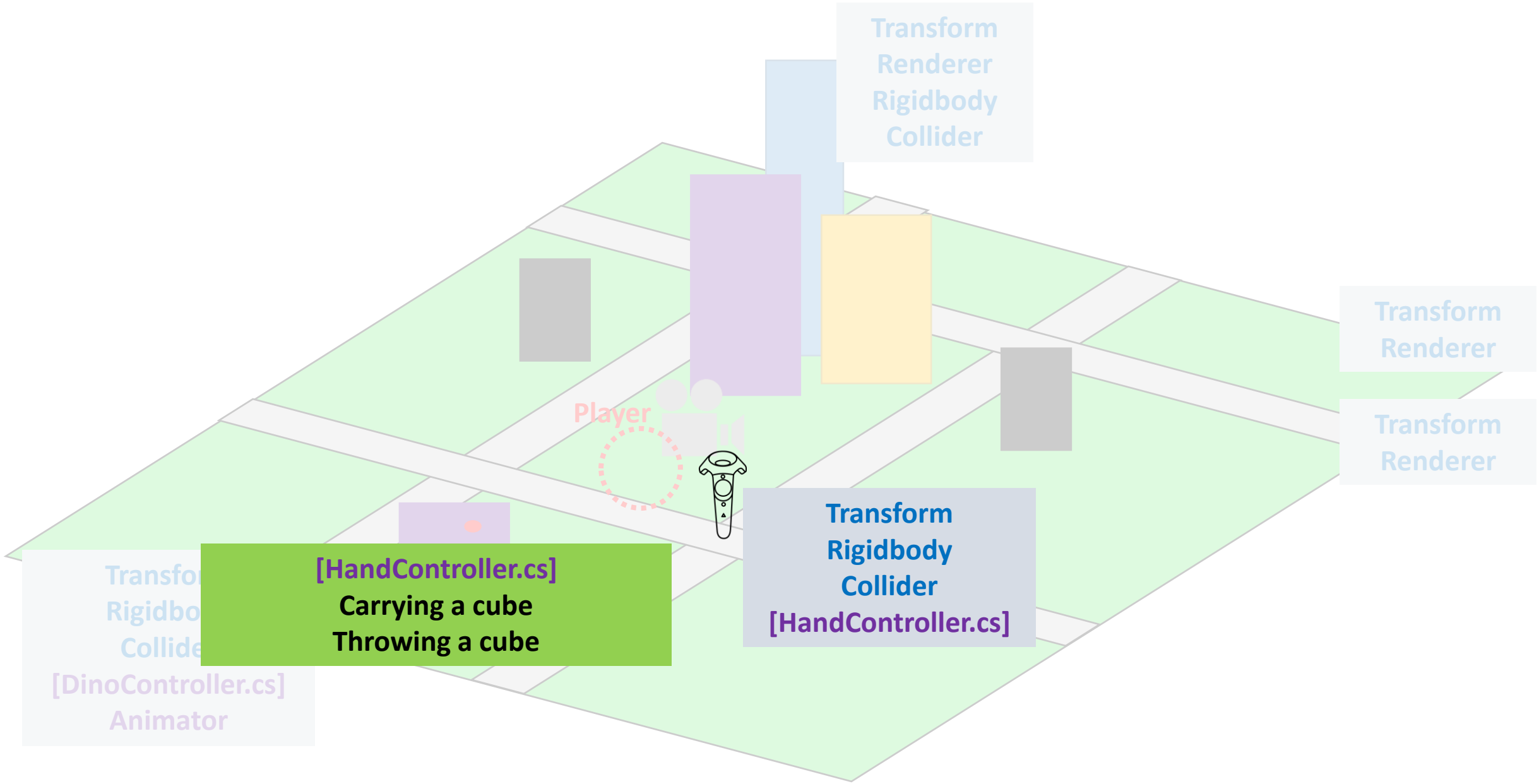
- Moving forward to the camera
  - FindTarget()
  - FixedUpdate()
- Detect the building cube's collision
  - OnCollisionEnter()
- Detect the camera's collision
  - OnTriggerEnter()

DinoController.cs

- Show animator when died
  - Animator Controllers: state machines that determine which animations are currently being played and blends between animations seamlessly.
  - The defeat animation is set in OnCollisionEnter()






Transform
Renderer
Rigidbody
Collider
Transform
Renderer
Transform
Renderer
Player
Transfo
Rigidbo
Collide
[DinoController.cs]
Animator
[HandController.cs]
Carrying a cube
Throwing a cube
Transform
Rigidbody
Collider
[HandController.cs]

HandController.cs

- SteamVR_TrackedController

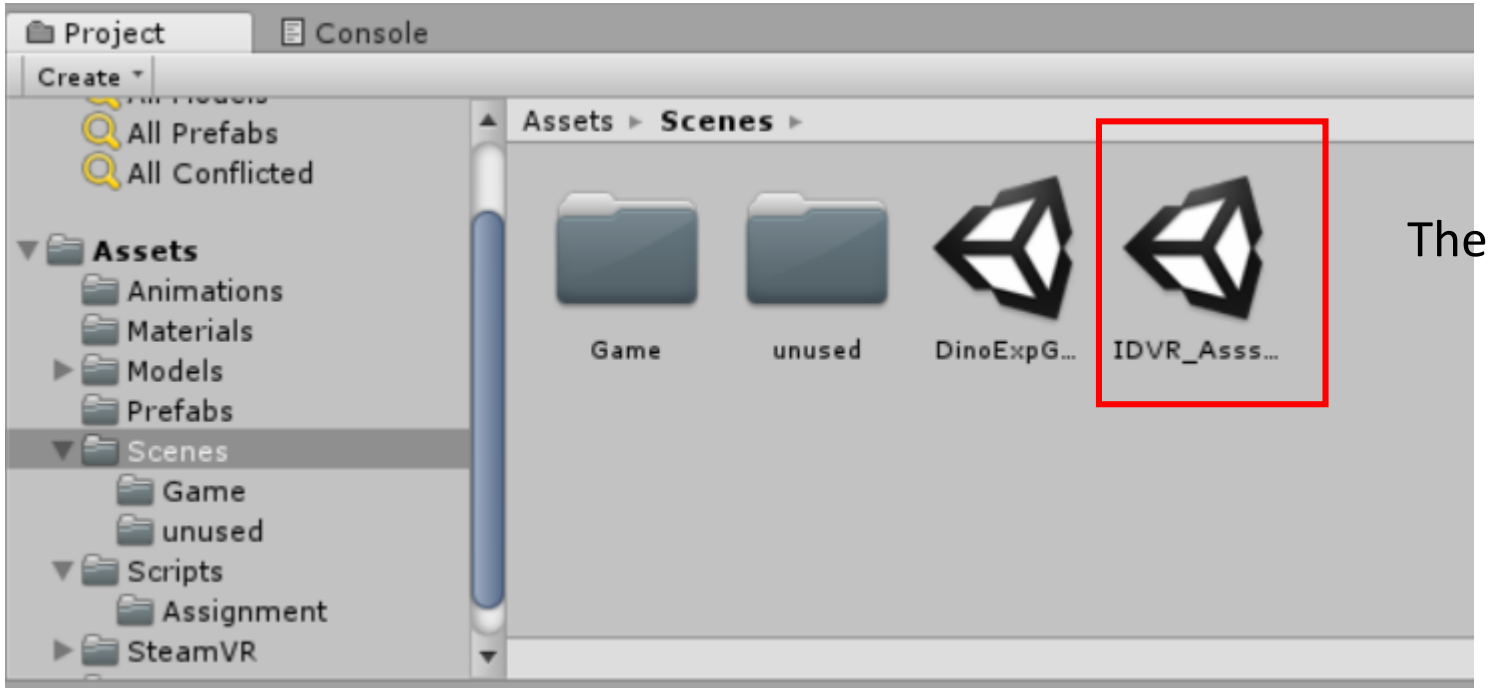
```
2 references
public SteamVR_TrackedController controller;
```

```
// check user input
if (controller.triggerPressed)
// if (controller.steamPressed)
// if (controller.menuPressed)
// if (controller.padPressed)
// if (controller.padTouched)
// if (controller.gripped)
```

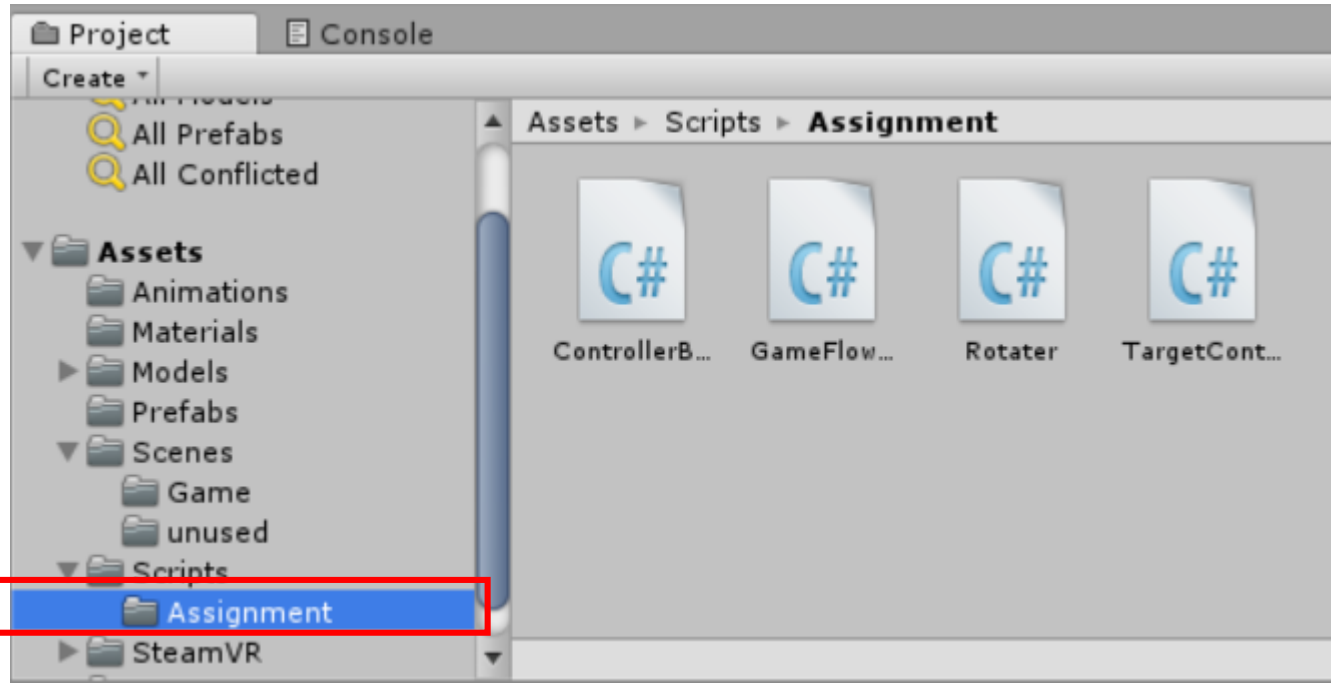
HandController.cs

- Carrying a cube
  - Update()
  - OnTriggerStay()
  - OnTriggerExit()
  - Carry()
- Throwing a cube
  - Update()
  - Throwing()

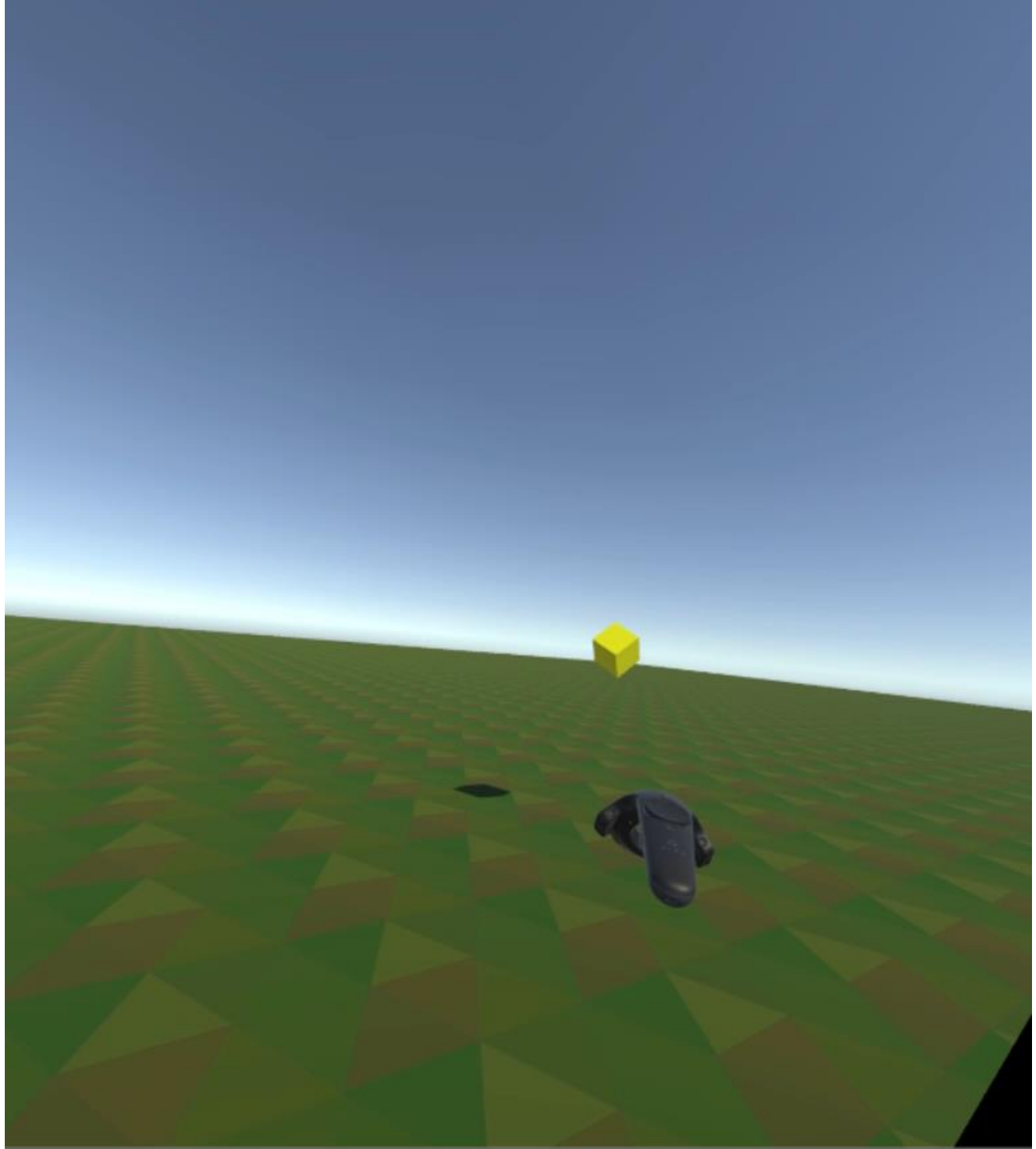
Assignment 3

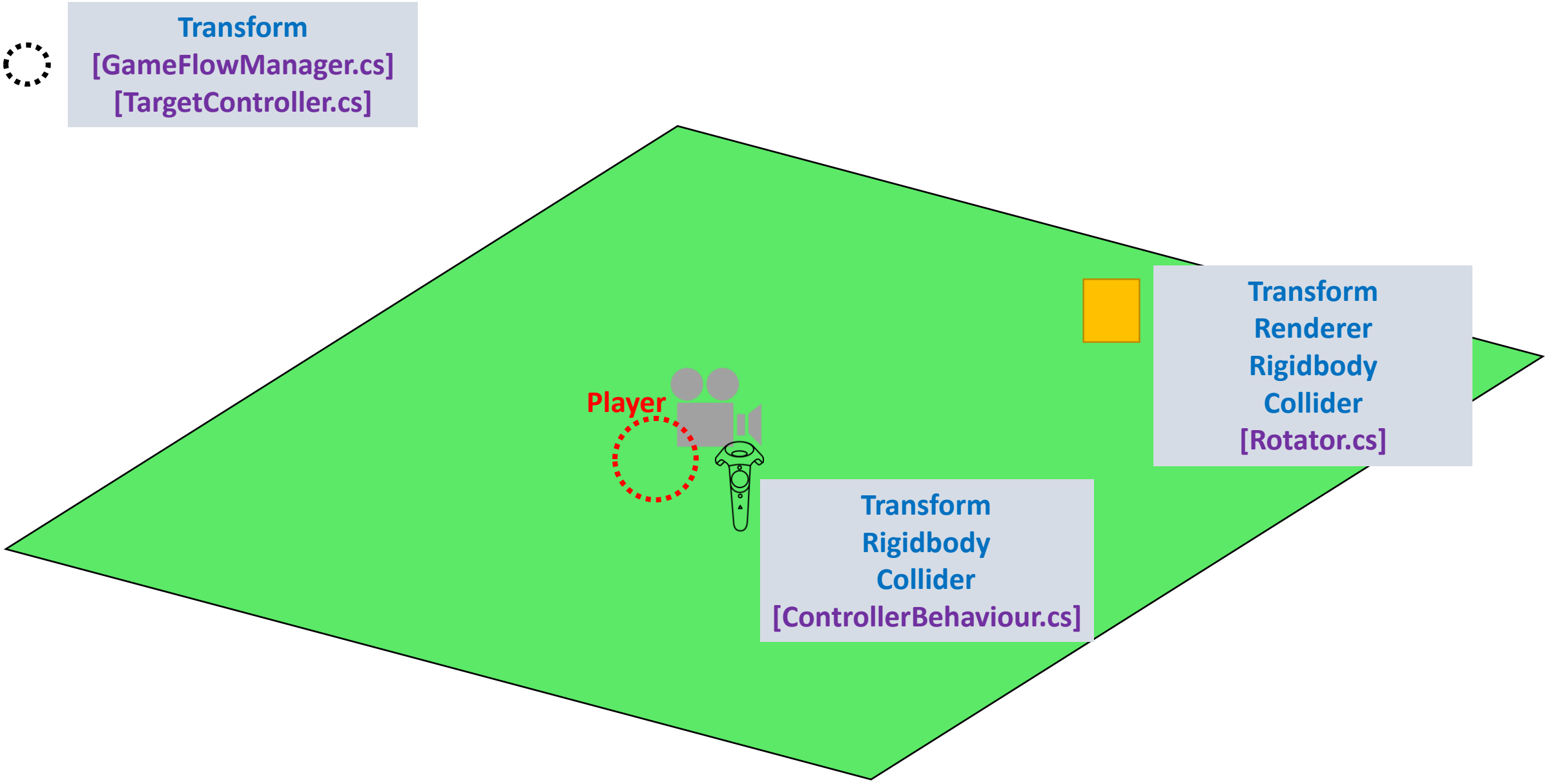


The scene we are going to use in assignment 3

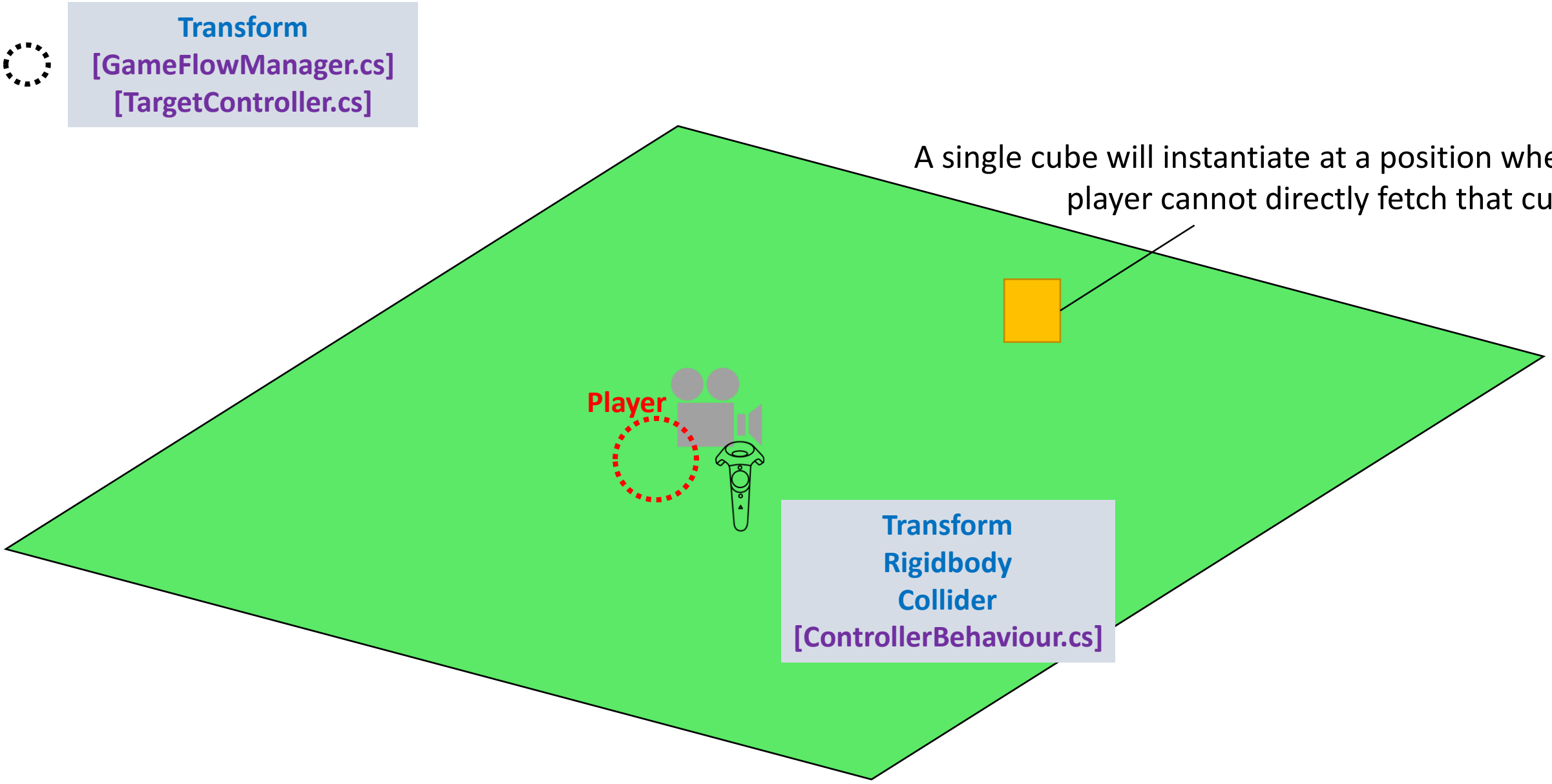


The scripts we need are located in the Assignment folder (Under the Scripts).




Transform
[GameFlowManager.cs]
[TargetController.cs]
Player
Transform
Renderer
Rigidbody
Collider
[Rotator.cs]
Transform
Rigidbody
Collider
[ControllerBehaviour.cs]

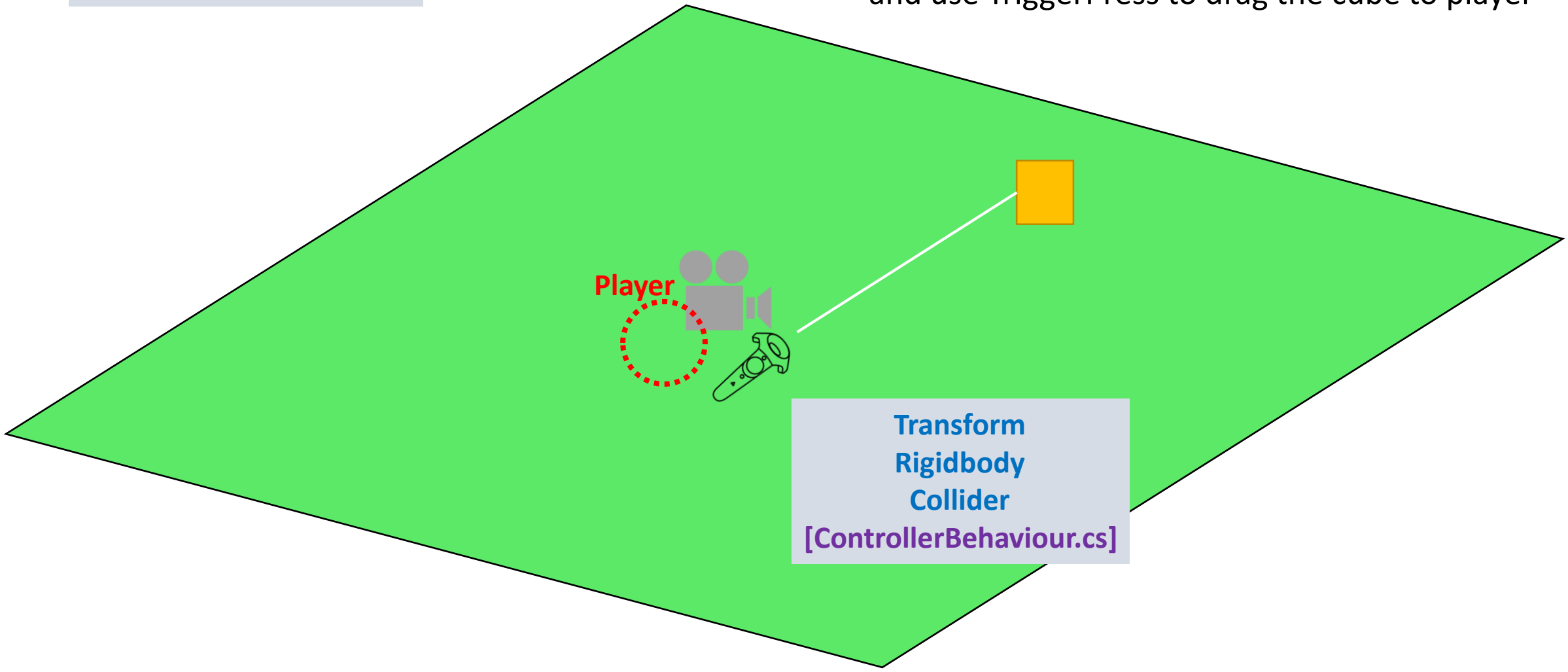
A single cube will instantiate at a position where player cannot directly fetch that cube

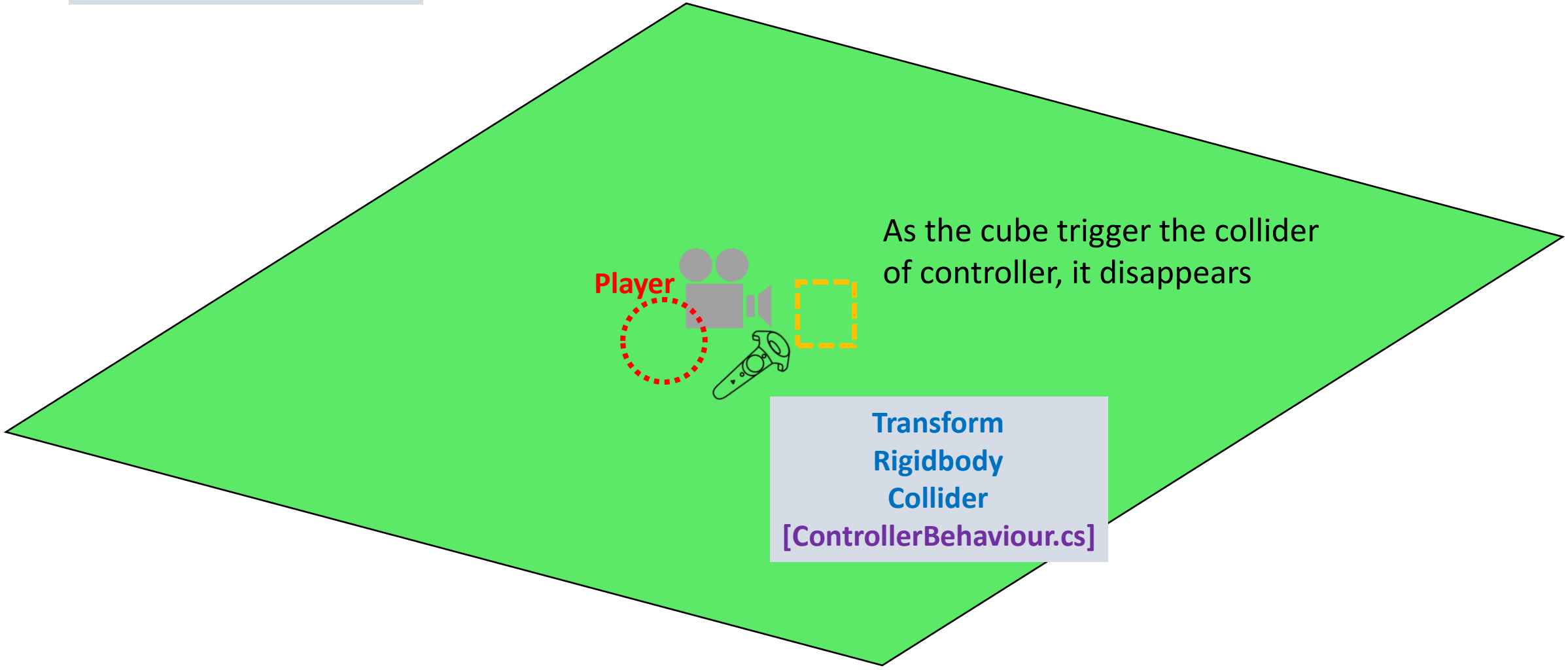

Transform
[GameFlowManager.cs]
[TargetController.cs]
A single cube will instantiate at a position where player cannot directly fetch that cube
Player
Transform
Rigidbody
Collider
[ControllerBehaviour.cs]

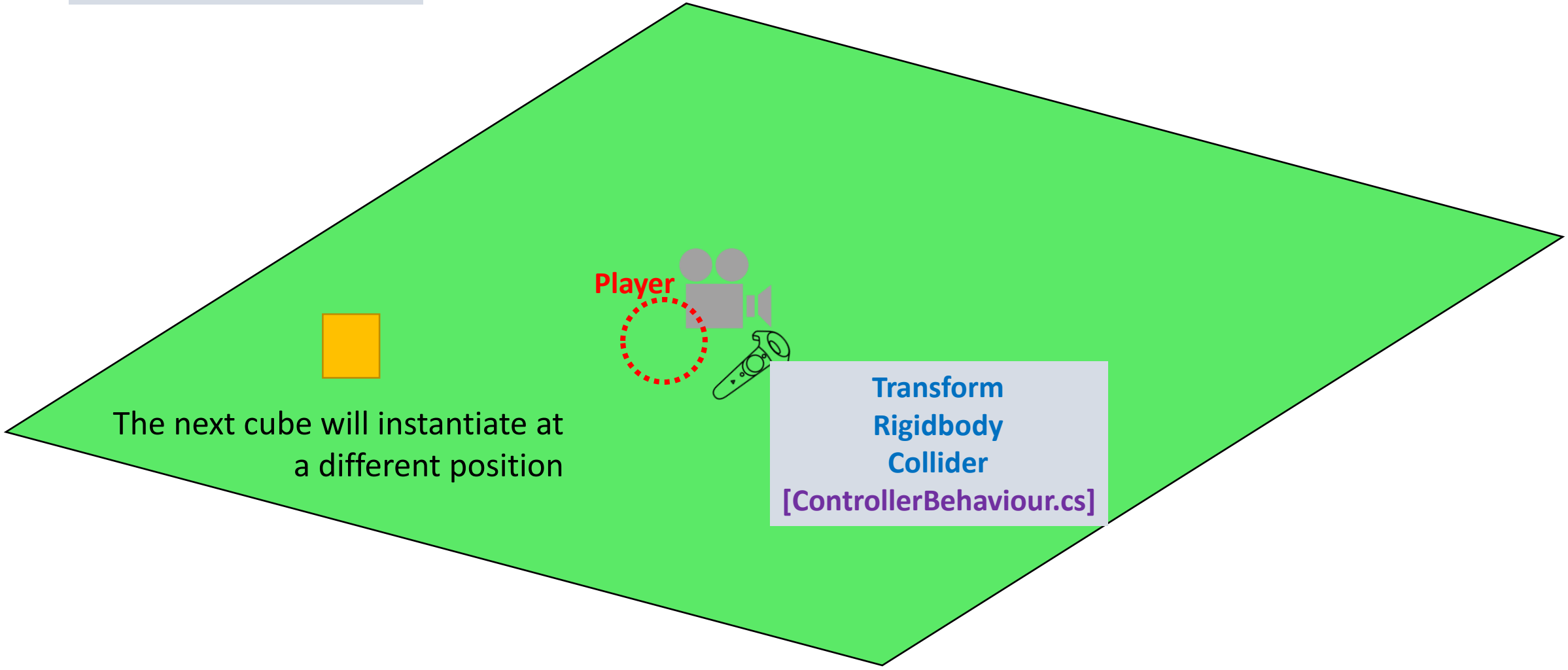
Your task: create an interaction with controller so that your can get the cubes

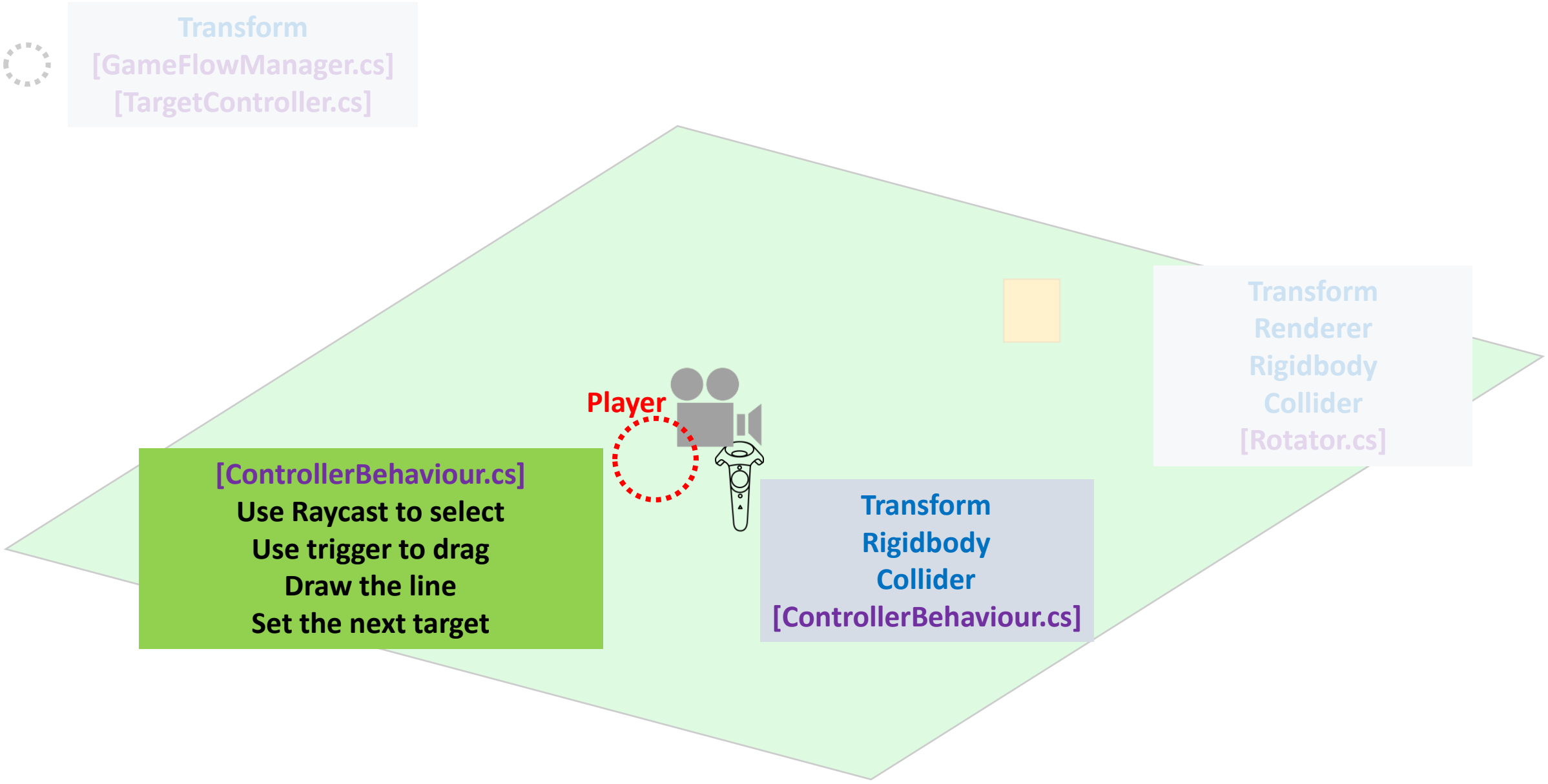
Transform
[GameFlowManager.cs]
[TargetController.cs]

For example, we can use Raycast to select the cube
and use TriggerPress to drag the cube to player



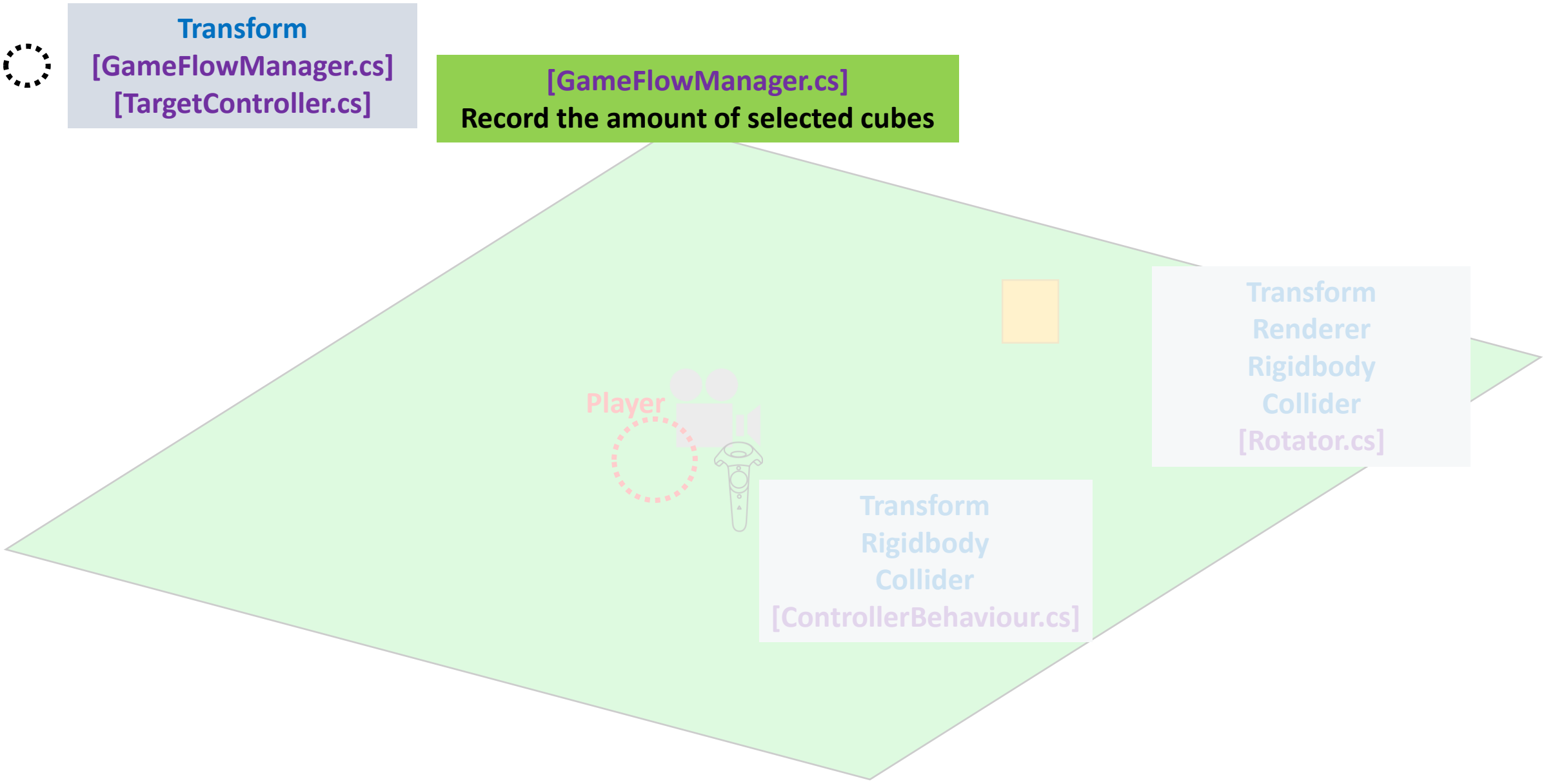

Transform
[GameFlowManager.cs]
[TargetController.cs]
Player
As the cube trigger the collider of controller, it disappears
Transform
Rigidbody
Collider
[ControllerBehaviour.cs]


Transform
[GameFlowManager.cs]
[TargetController.cs]
Player
The next cube will instantiate at
a different position
Transform
Rigidbody
Collider
[ControllerBehaviour.cs]


Transform
[GameFlowManager.cs]
[TargetController.cs]
Transform
Renderer
Rigidbody
Collider
[Rotator.cs]
Player
[ControllerBehaviour.cs]
Use Raycast to select
Use trigger to drag
Draw the line
Set the next target
Transform
Rigidbody
Collider
[ControllerBehaviour.cs]

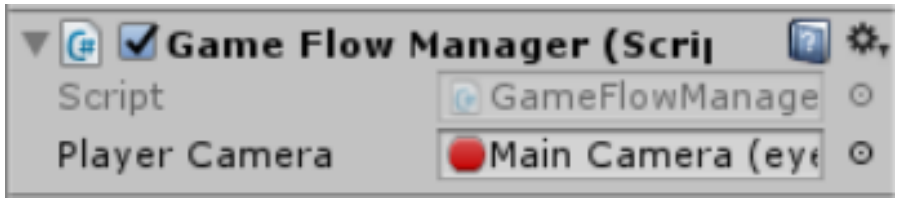
ControllerBehaviour.cs

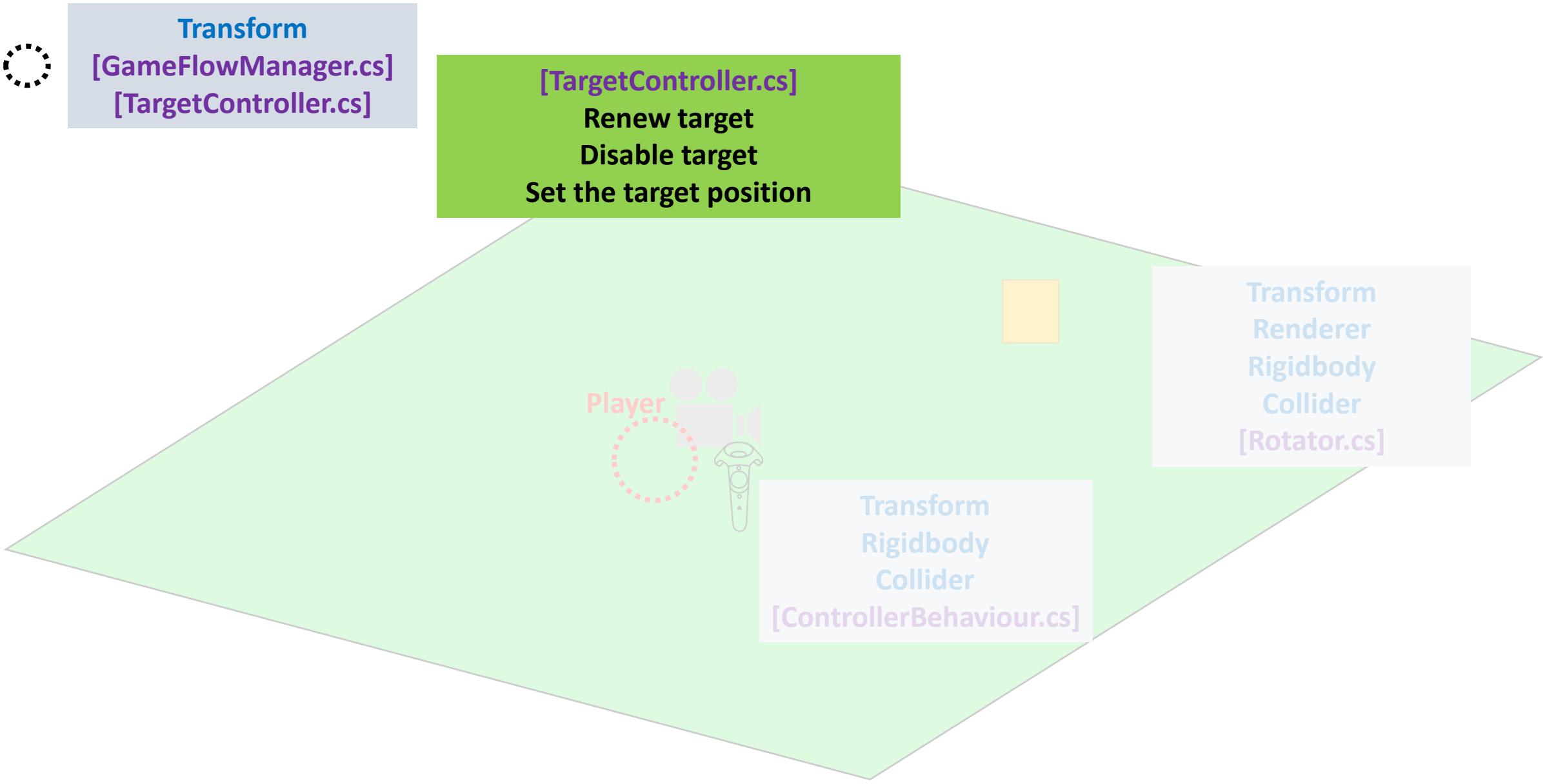
- Use Raycast to select
  - Update()
- Use trigger to drag
  - Update()
- Draw the line
  - setLineRenderer()
- Set the next target
  - OnTriggerEnter()


Transform
[GameFlowManager.cs]
[TargetController.cs]
[GameFlowManager.cs]
Record the amount of selected cubes
Player
Transform
Renderer
Rigidbody
Collider
[Rotator.cs]
Transform
Rigidbody
Collider
[ControllerBehaviour.cs]

GameFlowManager.cs

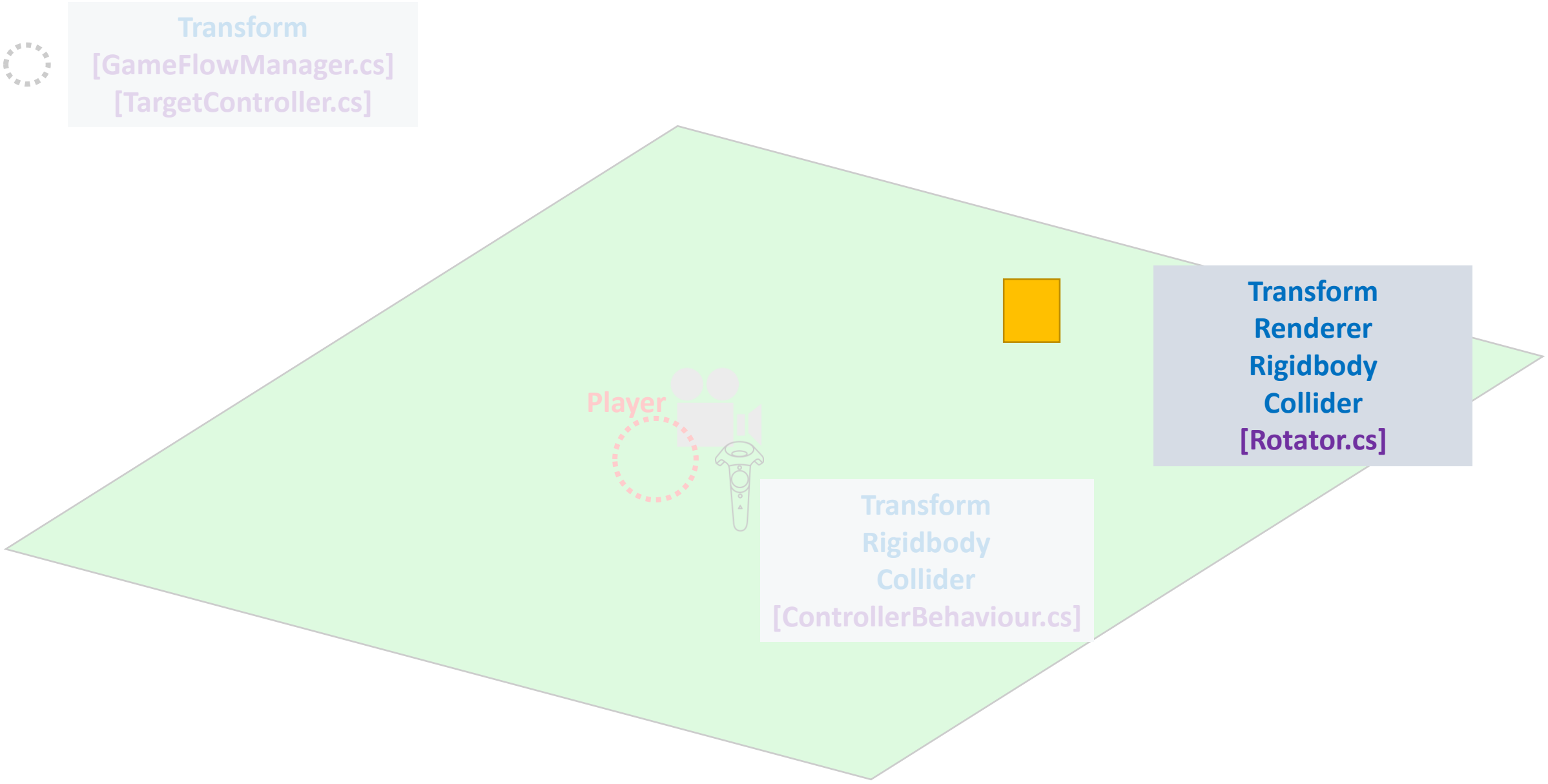
- Record the amount of selected cubes
  - nextTurn()




Transform
[GameFlowManager.cs]
[TargetController.cs]
[TargetController.cs]
Renew target
Disable target
Set the target position
Player
Transform
Renderer
Rigidbody
Collider
[Rotator.cs]
Transform
Rigidbody
Collider
[ControllerBehaviour.cs]

TargetController.cs

- Renew targets
  - renewTarget()
- Disable targets
  - disableTarget()
- Set the target position according to the position of camera.
  - setTargetPosition()


Transform
[GameFlowManager.cs]
[TargetController.cs]
Player
Transform
Renderer
Rigidbody
Collider
[Rotator.cs]
Transform
Rigidbody
Collider
[ControllerBehaviour.cs]

Rotator.cs

- Rotate the block to get player's attention
  - Update()

```
// Update is called once per frame
0 references
void Update () {
    //Rotate the gameObject 15 degrees, 30 degrees, 45 degrees in x,y,z axis every second
    this.transform.Rotate(new Vector3 (15, 30, 45) * Time.deltaTime);
}
```

Your task: create an interaction with controller so that your can get the blocks

Requirement 1: use locomotion to get 5 blocks

Your task: create an interaction with controller so that your can get the blocks

Requirement 1: use locomotion to get 5 blocks

Requirement 2: shoot a video and screen record

Your task: create an interaction with controller so that your can get the blocks

Requirement 1: use locomotion to get 5 blocks

Requirement 2: shoot a video and screen record

Bonus: tunneling effect

Your task: create an interaction with controller so that your can get the blocks

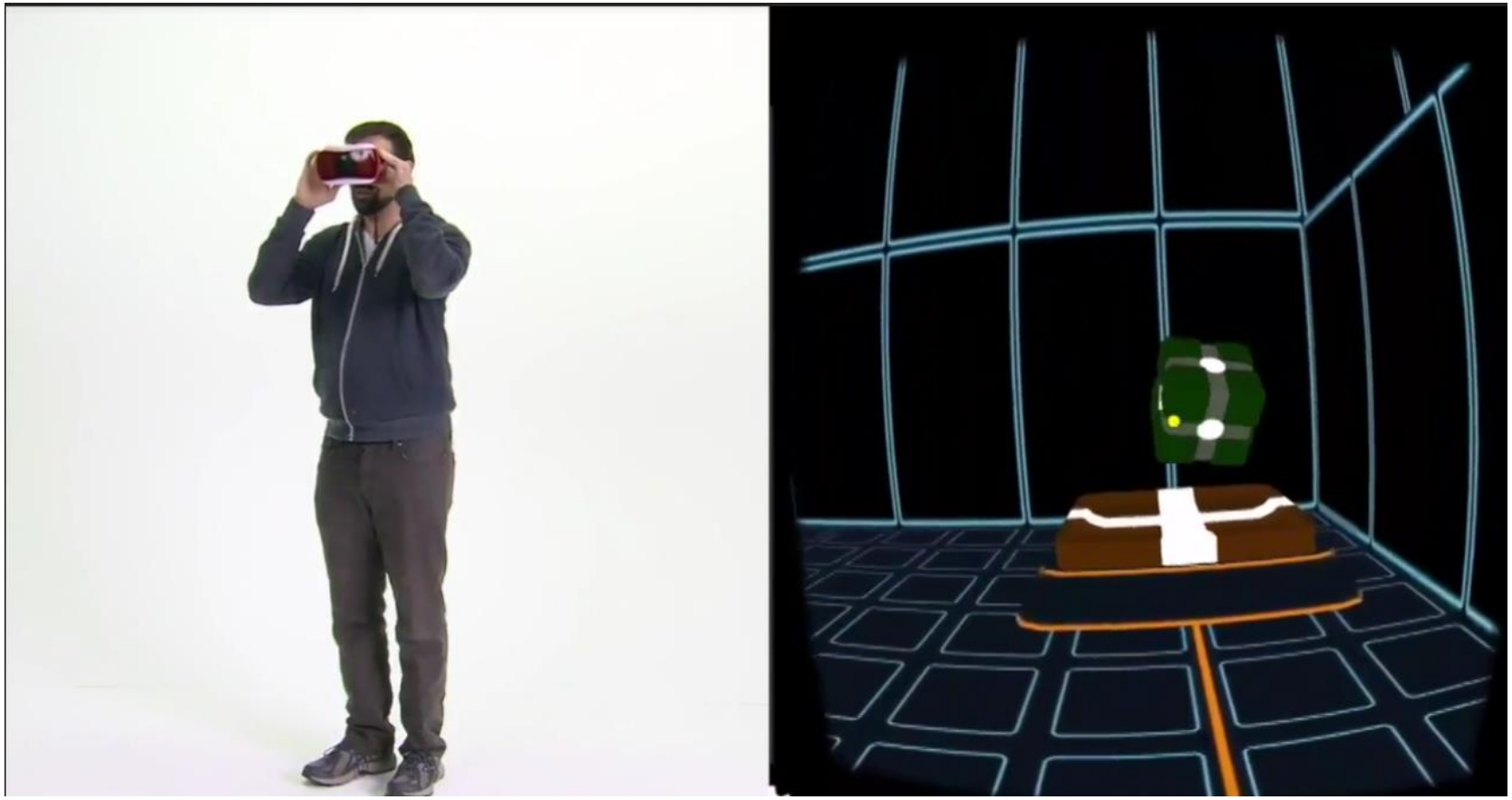
Requirement 1: use locomotion to get 5 blocks

Requirement 2: shoot a video and screen record

Bonus: tunneling effect

Locomotion

- Walking in place



Locomotion

- ArmSwing

Your task: create an interaction with controller so that your can get the blocks

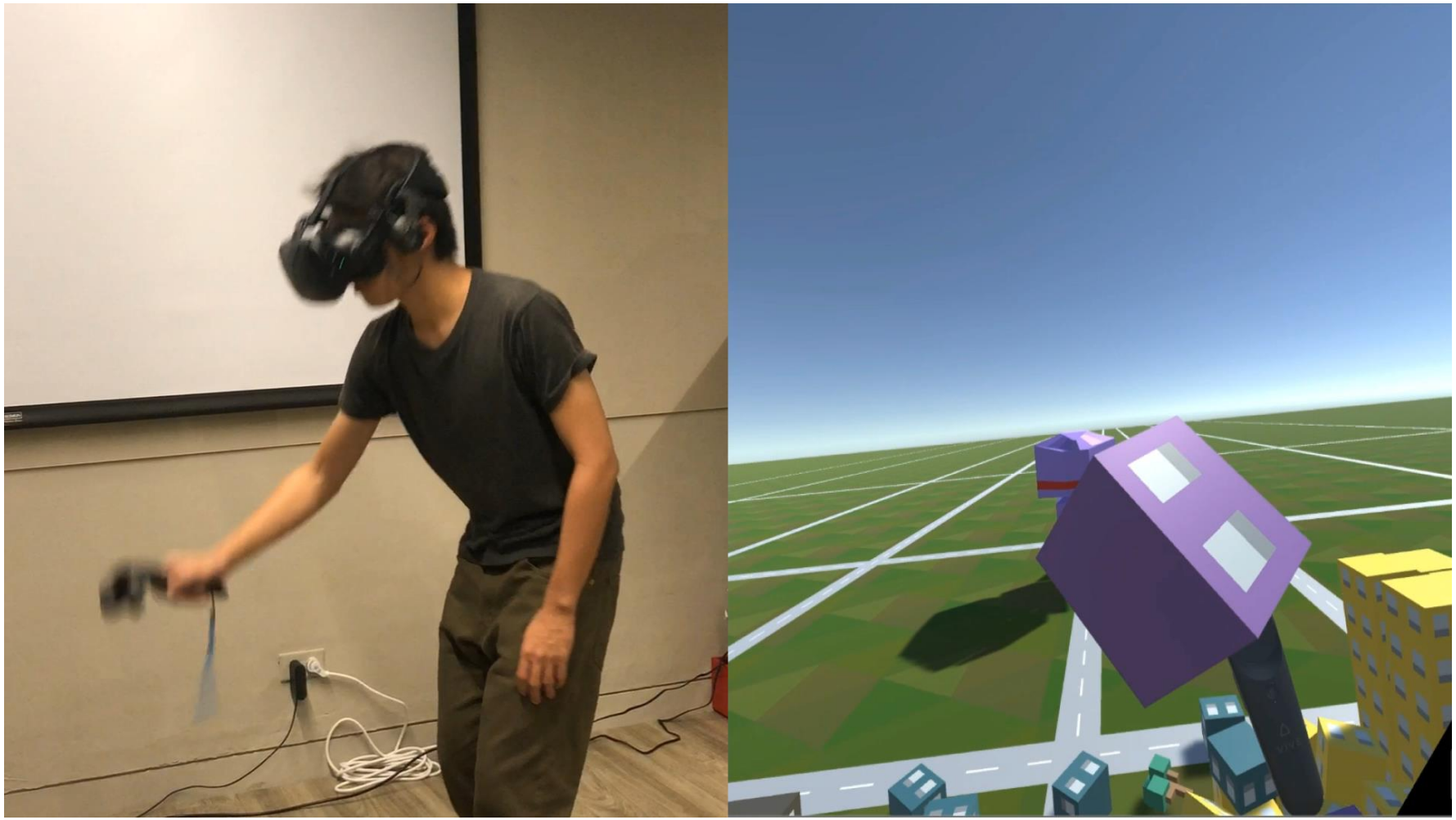
Requirement 1: use locomotion to get 5 blocks

Requirement 2: shoot a video and screen record

Bonus: tunneling effect

Edit a Video with Screen Shot and Player in Reality

- For more details, see the appendix.



Your task: create an interaction with controller so that your can get the blocks

Requirement 1: use locomotion to get 5 blocks

Requirement 2: shoot a video and screen record

Bonus: tunneling effect

Bonus: Tunneling effect

- Tunneling effect

Bonus: Tunneling effect

- Tunneling effect
- Ref: *Pinchmove: improved accuracy of user mobility for near-field navigation in virtual environments. (MobileHCI ’18).*

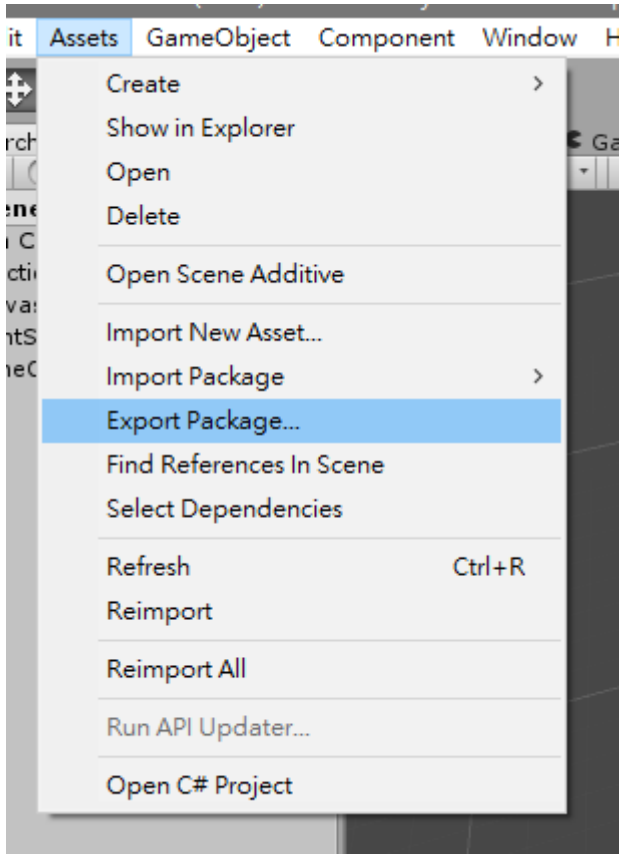
Assignment 3

- Please upload a zip file which contains:
  - The unitypackage export from your project. (The following slides will teach you how to do it)
  - A video to demonstrate your interaction and your score. (less than 30 seconds)
  - A “README” file to describe the details of your implementation.
- Deadline: 10/26 12:00

- Link: https://www.dropbox.com/request/4uTEIeiMfMGPcKt88IUN

Export Package

- After all the things was done export your project to be the unitypackage.
- Assets -> Export Package…



Remind

- Assignment 2 (Personal): 10/15 23:59
- Assignment 3 (Personal, need VR): 10/26 12:00
- Midterm-project proposal: 10/23 & 25

028 VR Registration

028 VR Registration

- Link
- Available Time: Mon – Thur 18:30 – 21:30, 10/9 – 10/25
- Must register a time slot before you use.
- This is an individual assignment, register with your own name.
- Send us message if you have any question.

Appendix: Screen Record with PPT

Video editing with PPT

- PowerPoint + screen record

- video editor (e.g. iMovie).

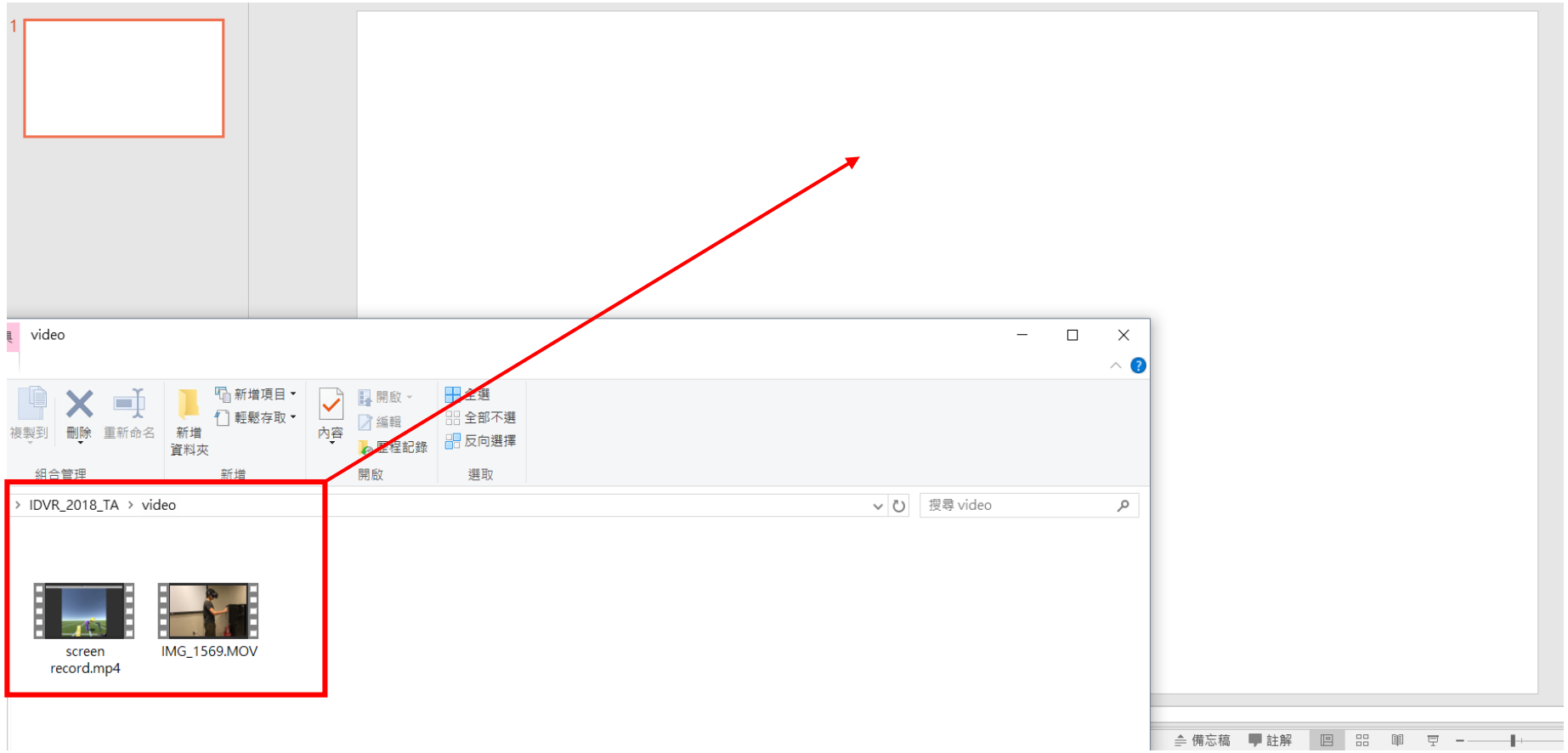
Video editing with PPT

- **PowerPoint + screen record**

- video editor (e.g. iMovie).

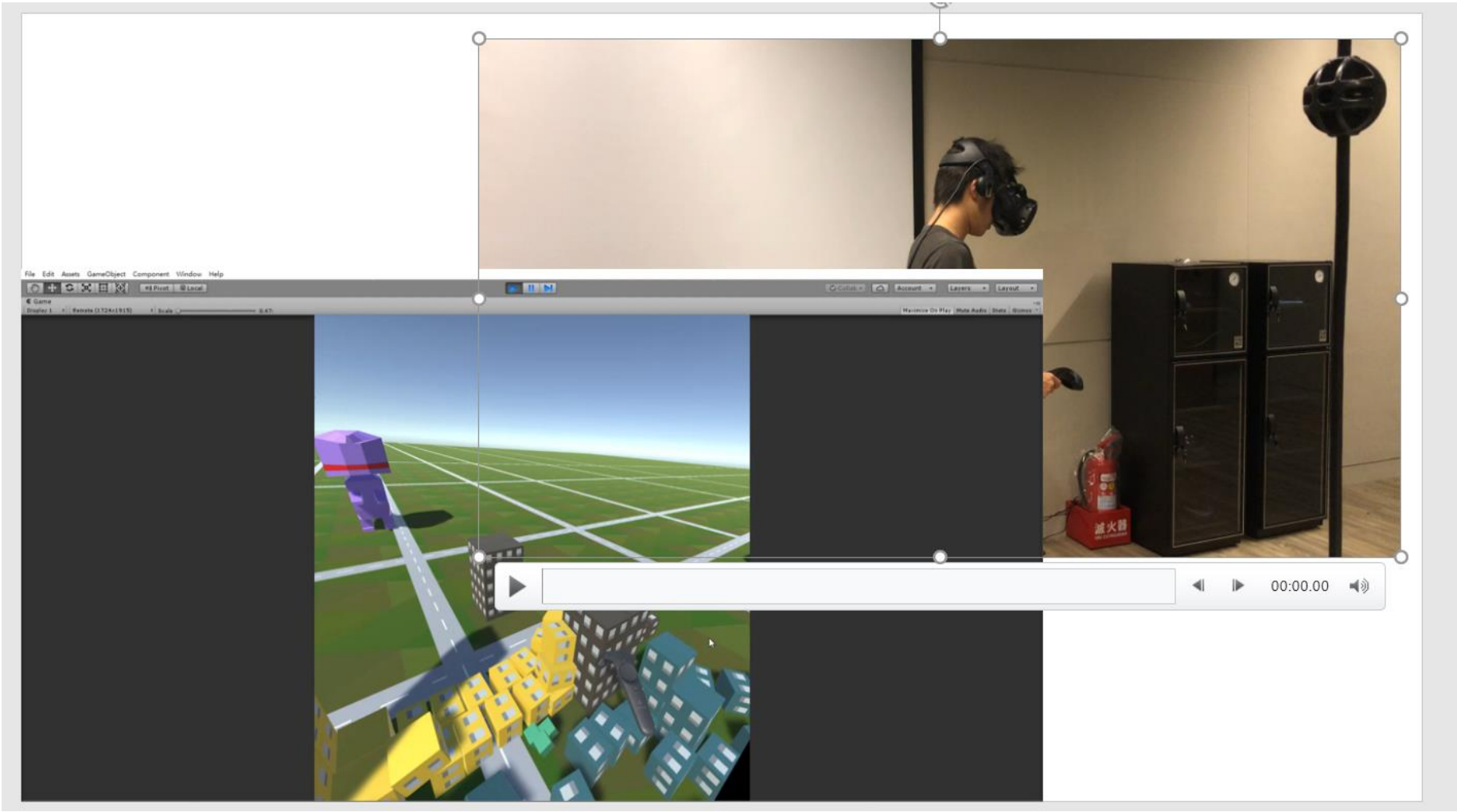
Video editing with PPT

- Import video: drag your video on the slide



Video editing with PPT

- Format > Crop: make the video into suitable size



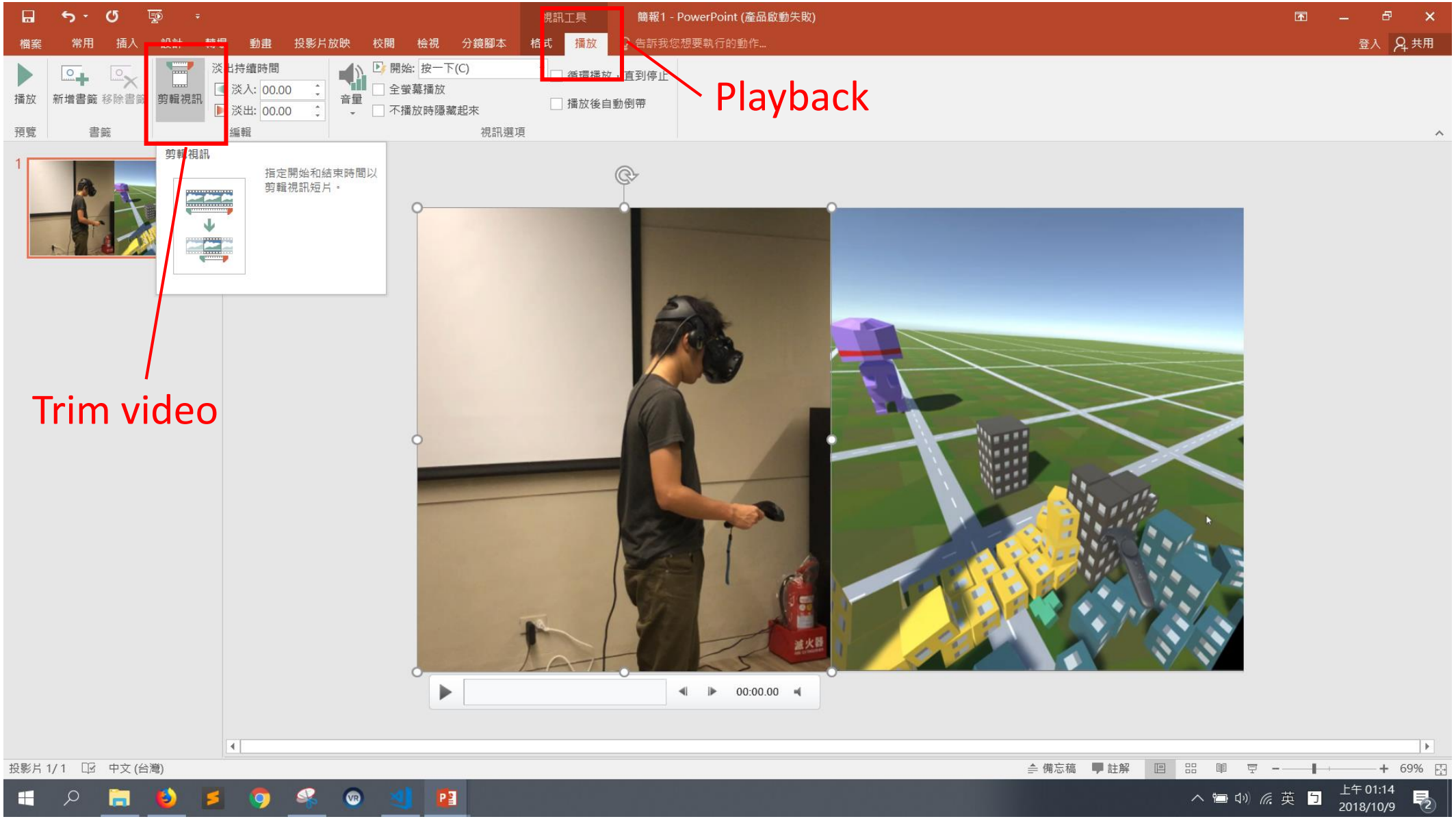
Video editing with PPT

- Format > Crop: make the video into suitable size

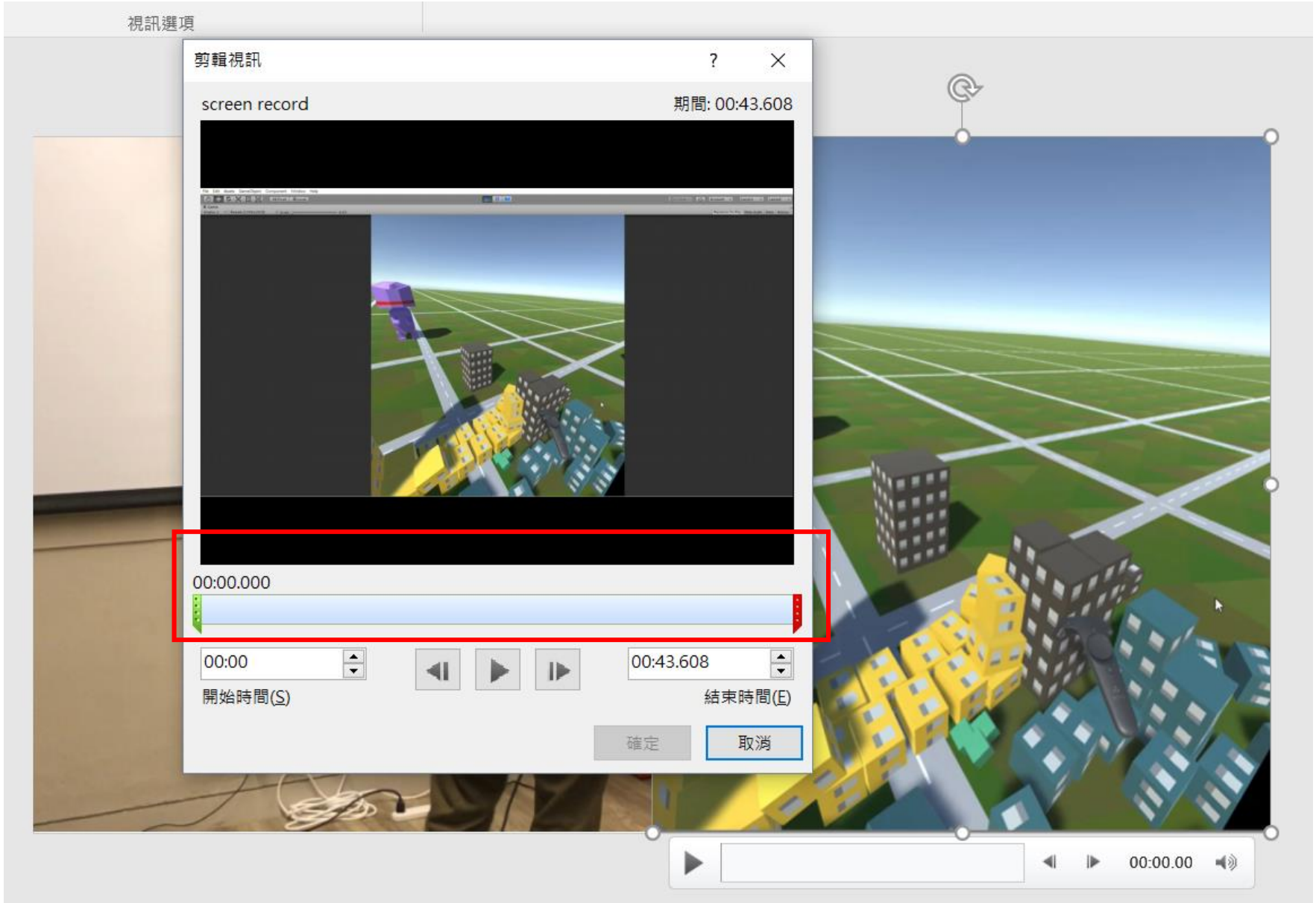
Video editing with PPT

- Remove sound

Trim the video

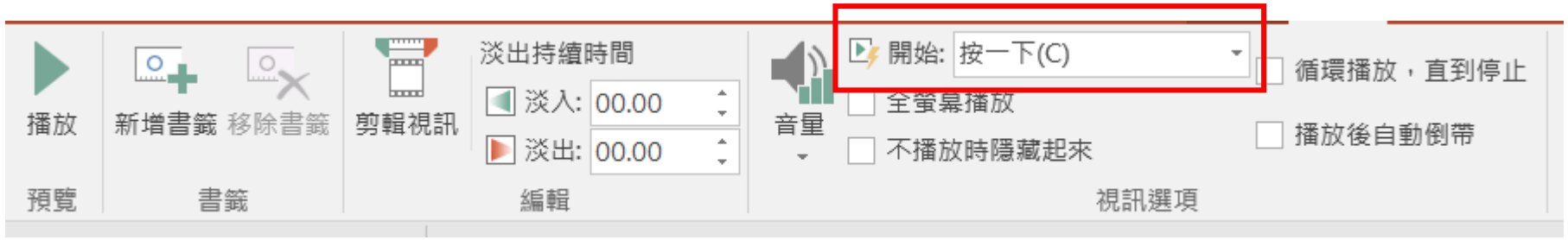


Trim the video



Play Video Automatically

Change the way of starting video from “Click” to “Automatically”



Make videos play at same time

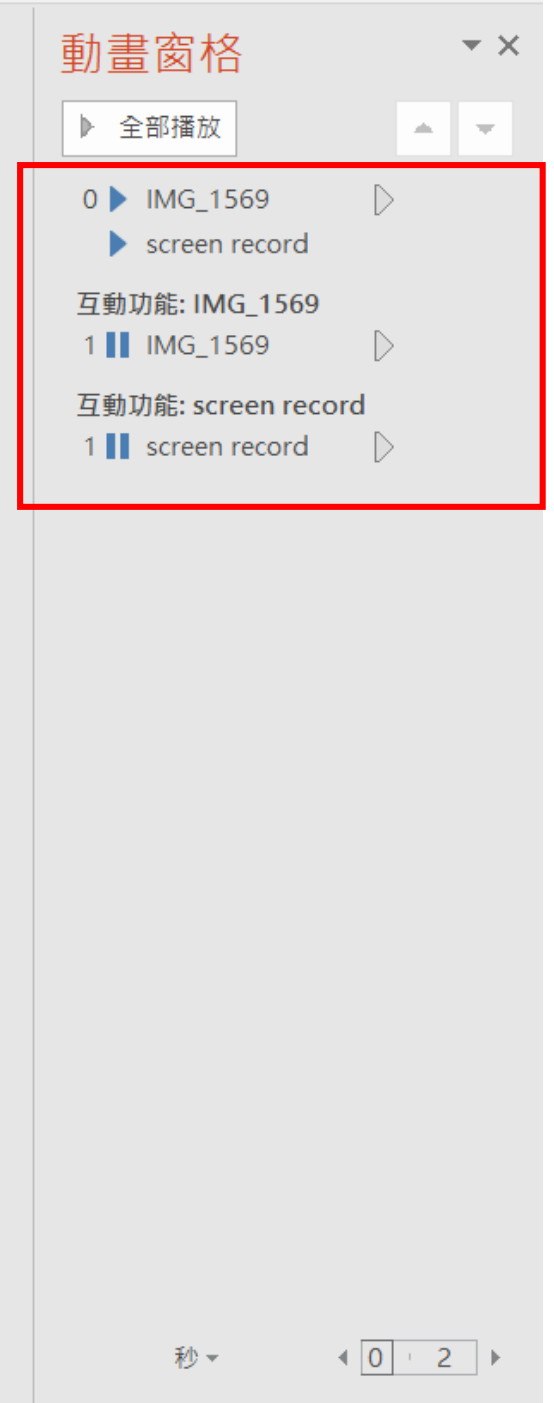
- Next, you can find a window in the animation tab.

Animation

Animation pane

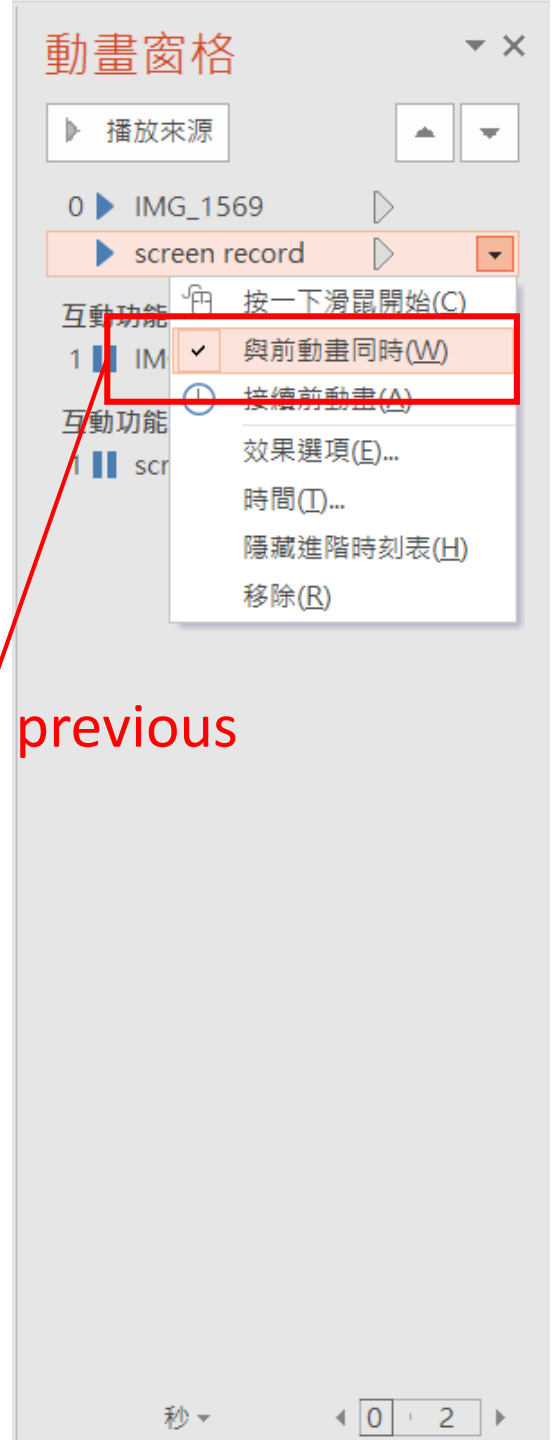
Make videos play at same time

- The play order of your video will show in animation pane



Make videos play at same time

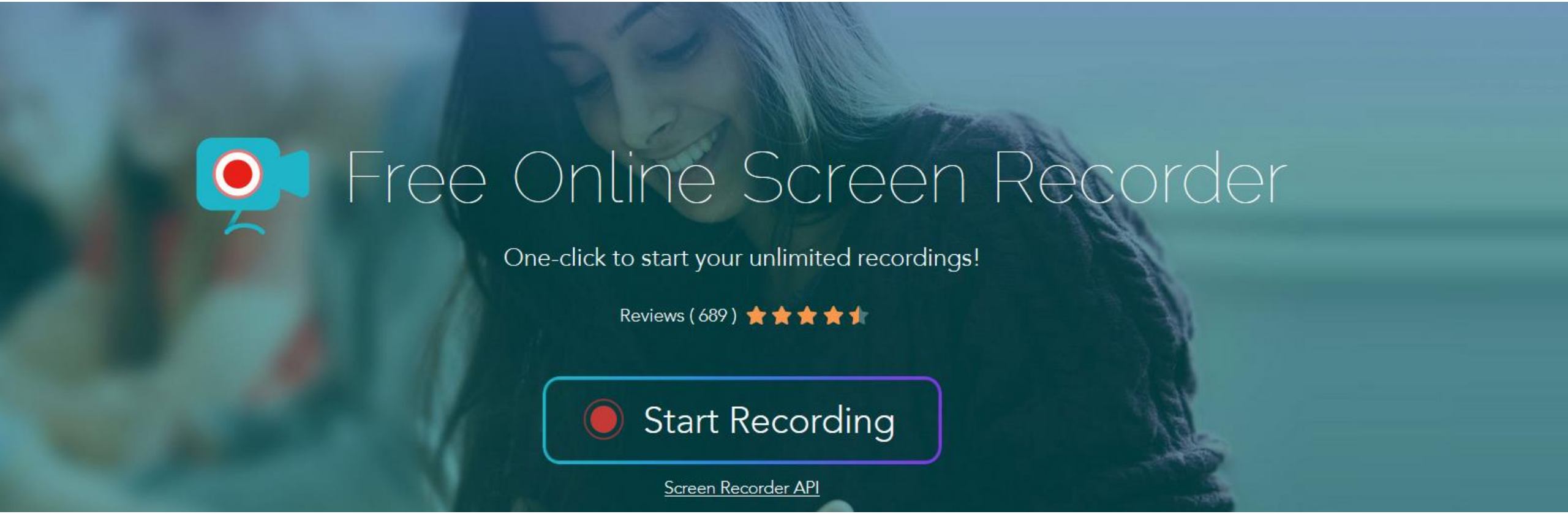
- The play order of your video will show in animation pane
- Right click > Start with previous
- Play your slides, the videos should play at same time.

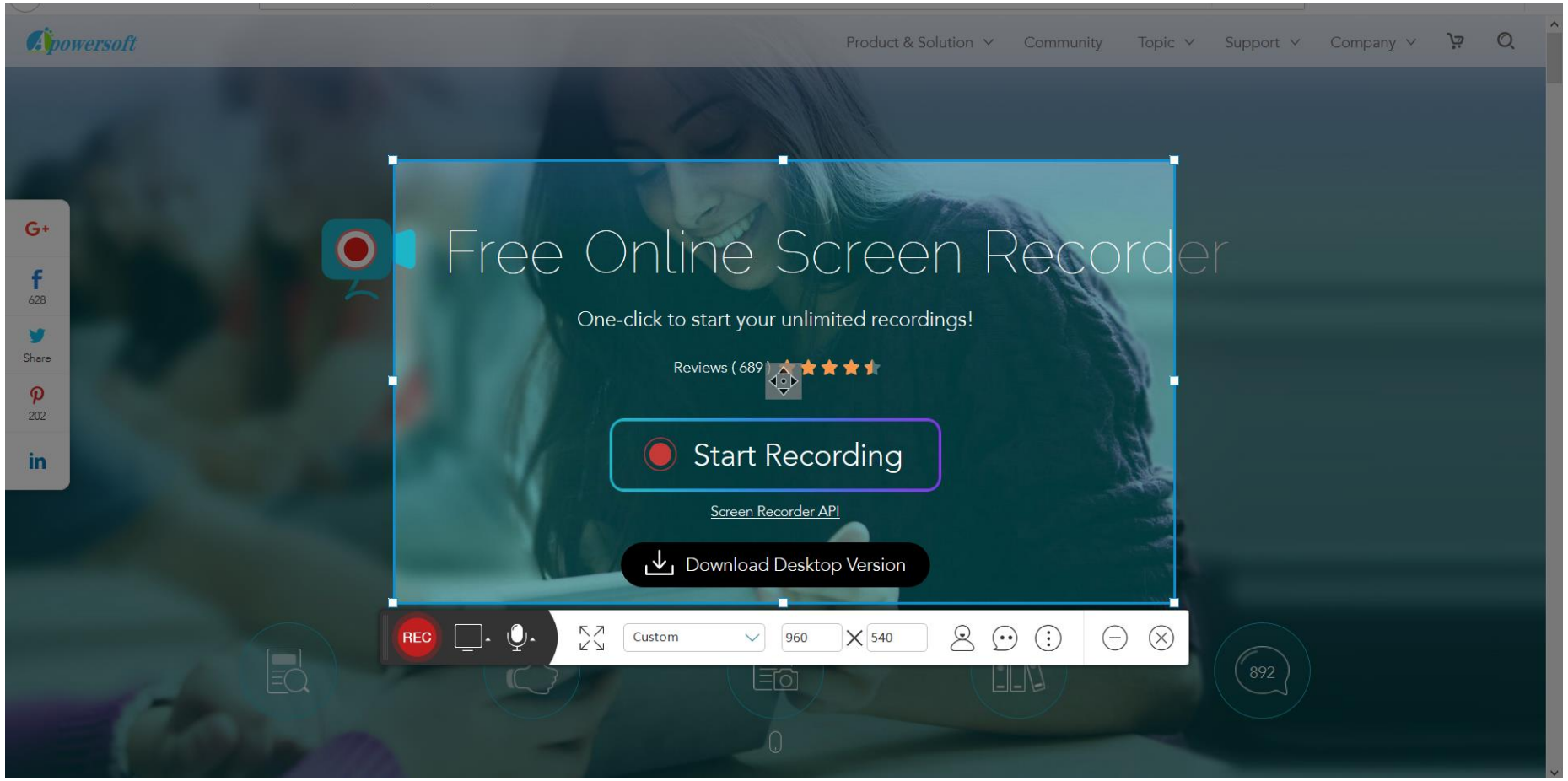


Start with previous

Do the Screen Record

- https://www.apowersoft.tw/free-online-screen-recorder



Do the Screen Record

- Press the start recording, a small pane pops out.
- Press the REC to do screen recording.