

Tower Defense

2023 I2P(II) Hackathon & Miniproject 2

About Hackathon & MiniProject2

- This game is a tower defense game, the player needs to place the turrets to defend all the enemies.
- We will complete the project in stages.
- Hackathon: Fix the bugs and incompleteness.
- MiniProject2: Add new features related to the game.
- We have provided questions for you to validate your understanding of the project and the concept of OOP.



Hackathon Demo



Outline

01

**Allegro5 game
development process**

03

User Extension

02

Template: StartScene

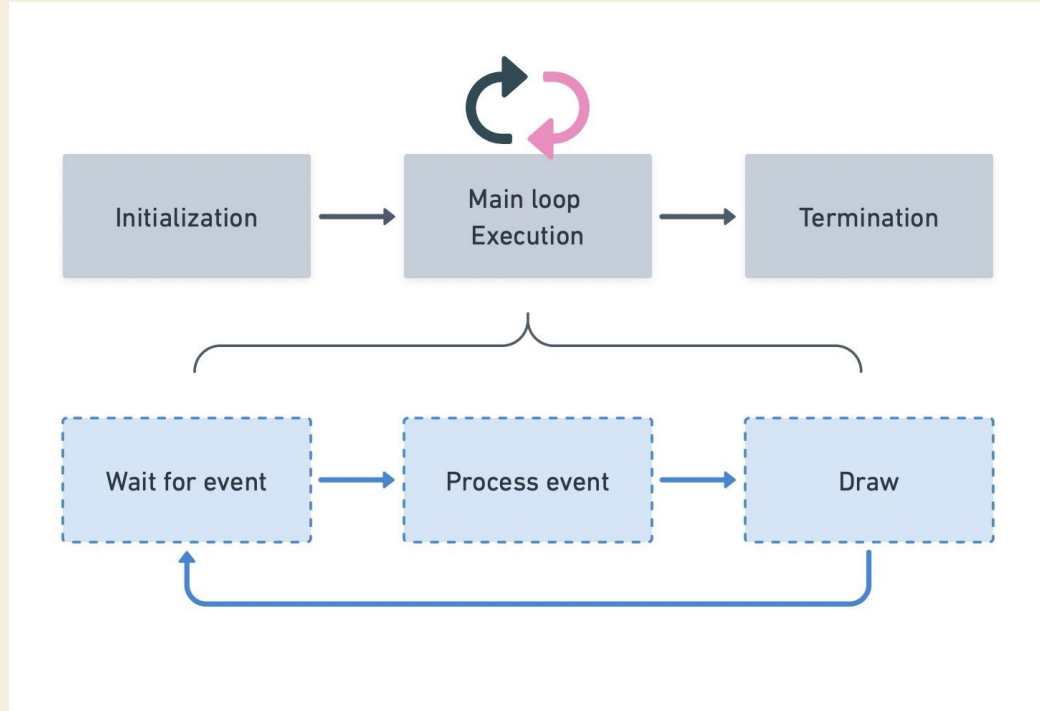
04

**Hackathon
schedule**

Allegro5 game development process

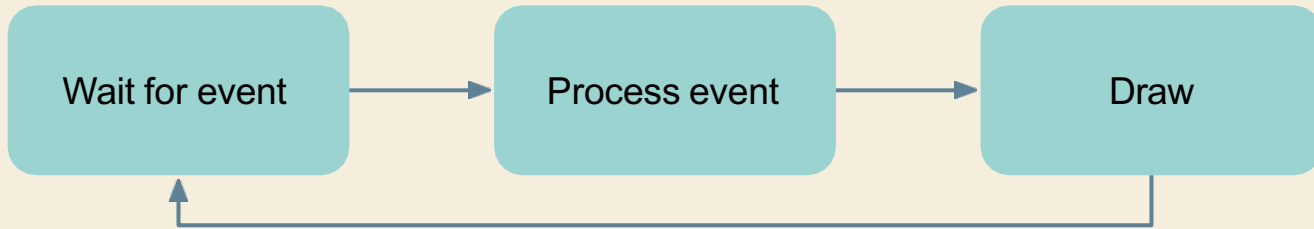
01

Main Process

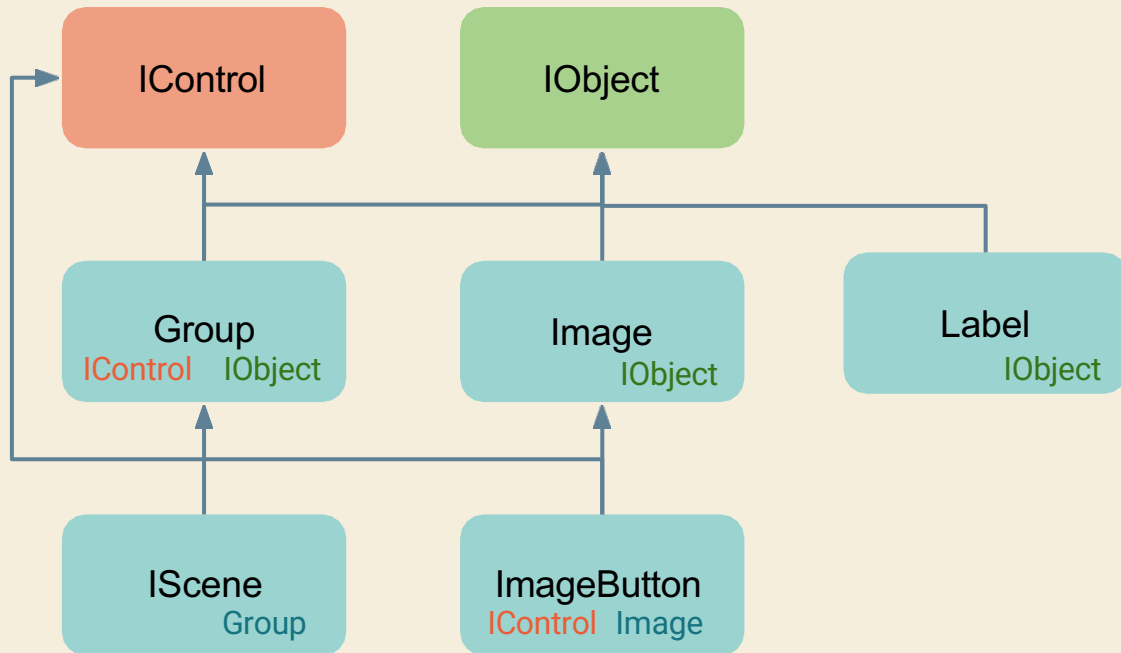


Loop execution

- Mainly consists of two parts:
 - Events: Keyboard, mouse, timer...
 - Draw: Object painting



Core Structure



GameEngine

Resources

Collider

Template: StartScene

02

Template

- 01** **GameEngine, Resources, Collider**
- 02** **Label**
- 03** **ImageButton**
- 04** **IScene**
- 05** **Scene Extension**

Template

01 **GameEngine, Resources, Collider**

02 **Label**

03 **ImageButton**

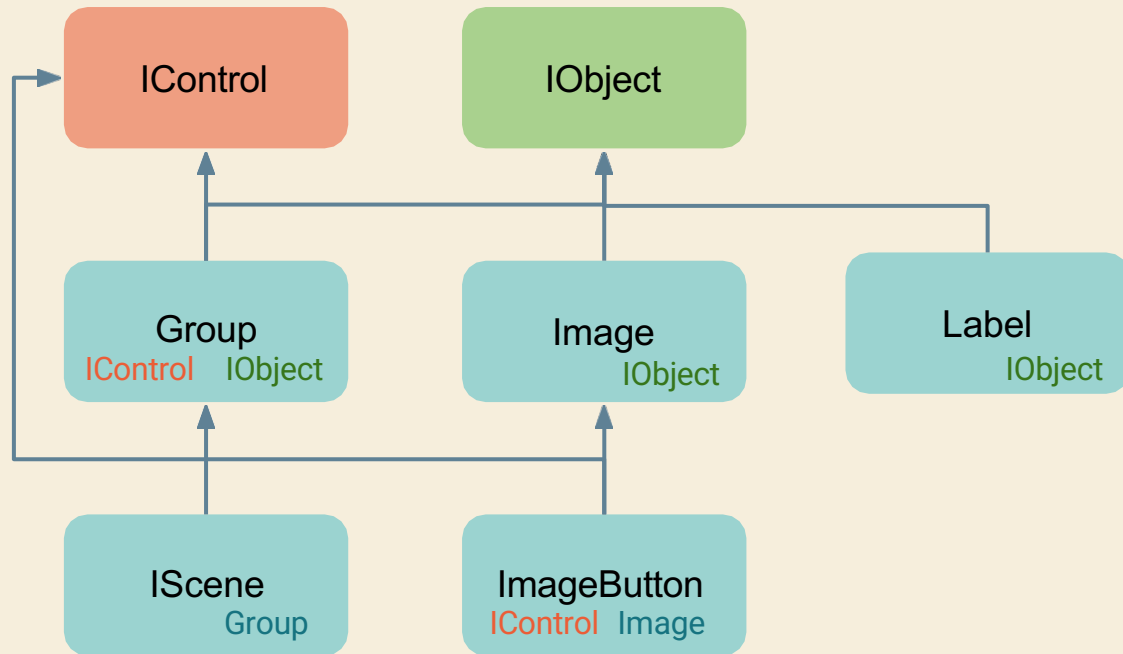
04 **IScene**

05 **Scene Extension**

Start Scene

TOWER DEFENSE

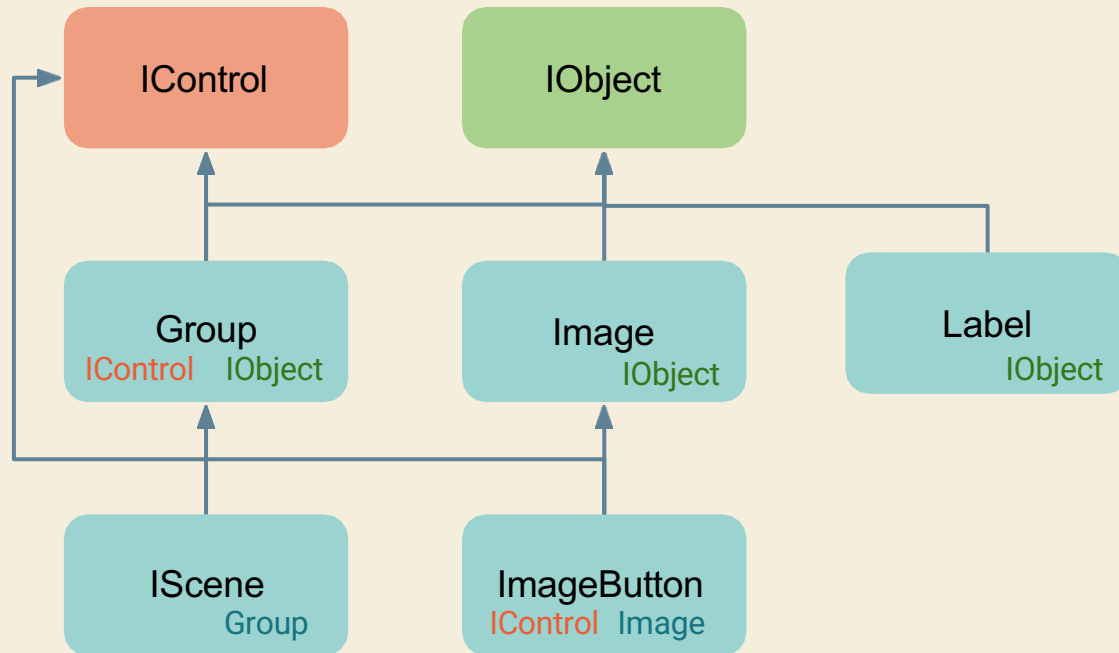
PLAY



GameEngine

Resources

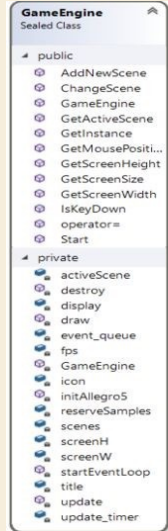
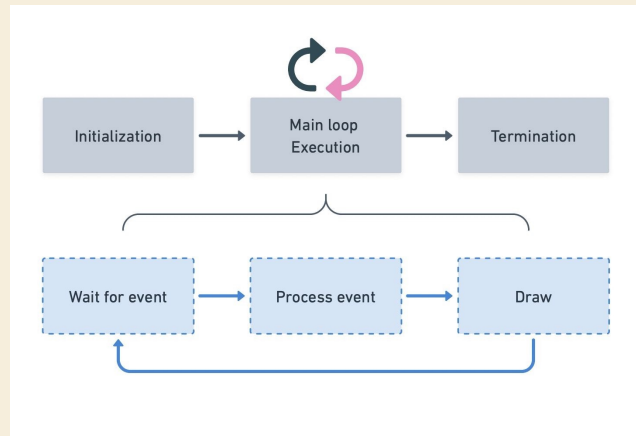
Collider



- GameEngine
- Resources
- Collider

Game Engine

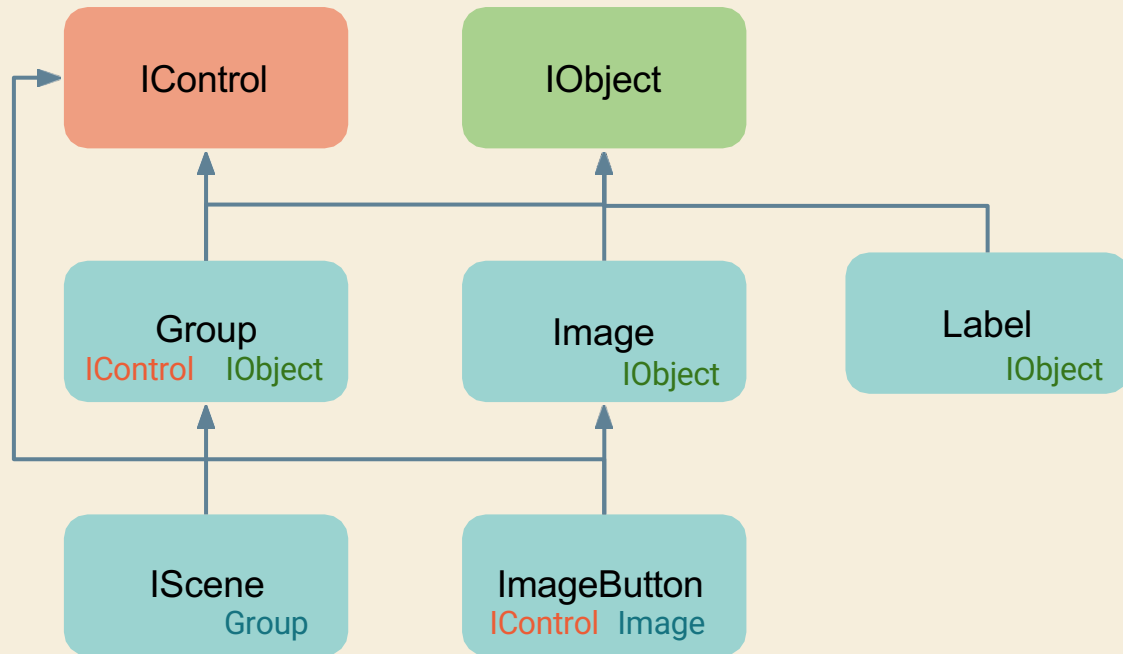
- Abstract the entire message loop
- Manage current scene and scene change



```
[INFO] Game Initializing...
[INFO] Loaded Resource<image>: resources/images/icon.png
[INFO] Loaded window icon from: icon.png
[INFO] There are total 8 supported mouse buttons
[INFO] Allegro5 initialized
[INFO] Game begin
[INFO] Loaded Resource<image>: resources/images/start_scene/out.png scaled to 400x100
[INFO] Loaded Resource<image>: resources/images/start_scene/out.png
[INFO] Loaded Resource<image>: resources/images/start_scene/in.png
[INFO] Loaded Resource<font>: resources/fonts/pirulen.ttf with size 48
[INFO] Loaded Resource<font>: resources/fonts/pirulen.ttf with size 108
[INFO] Game initialized
[INFO] Game start event loop
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] draw
```

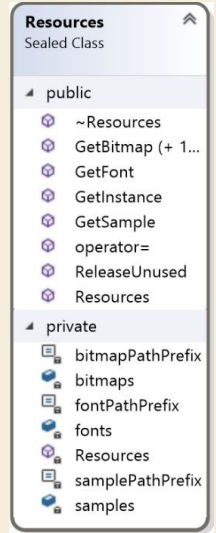
TOWER DEFENSE

PLAY



Resources

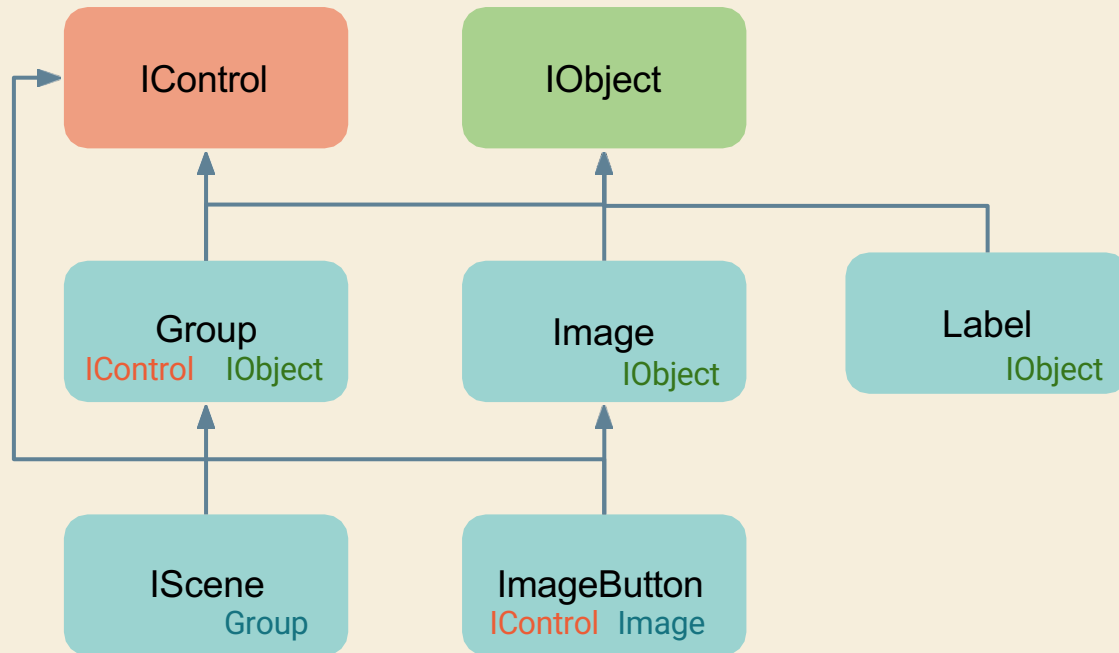
- Abstract all resources loading and destroy
- Resources can be retrieved from this class directly



```
[INFO] Game Initializing...
[INFO] Loaded Resource<image>: resources/images/icon.png
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[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] draw
[INFO] Timer event
```

TOWER DEFENSE

PLAY



- GameEngine
- Resources
- Collider

Collider (struct)

- Calculating physical collision, overlap, point in region.



TOWER DEFENSE

PLAY

TOWER DEFENSE

PLAY

Template

01

GameEngine, Resources, Collider

02

Label

03

ImageButton

04

IScene

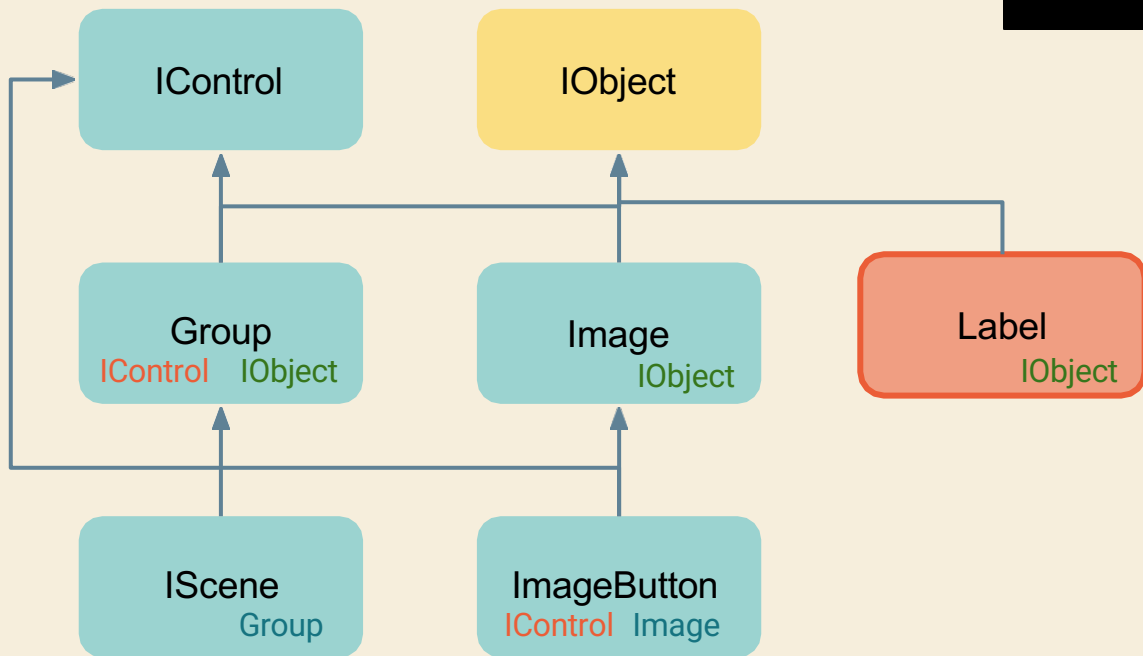
05

Scene Extension

StartScene Label



Relevant class



TOWER DEFENSE

PLAY

GameEngine

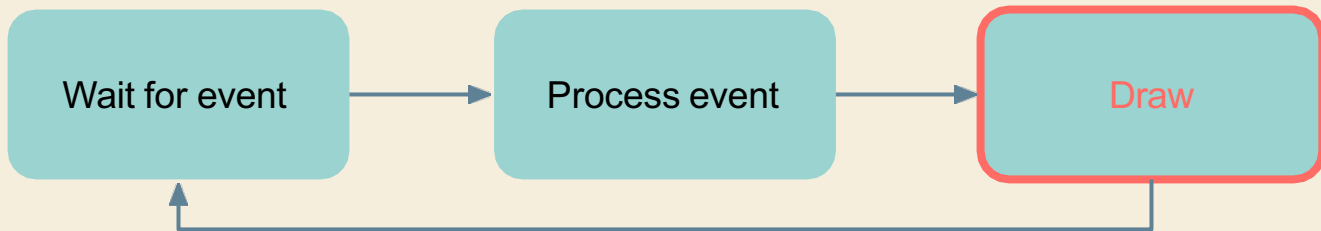
Resources

Collider

IObject

- The base class of objects that need to be drawn (i.e. show on the display)
- Main definition of **Draw()** and **Update()**

IObject 類別	
public	
~IObject	
Anchor	
Draw	
GetObjectIterat...	
IObject	
operator=	
Position	
Size	
Update	
Visible	
protected	
* IObject (+ 1 多...	
* objectIterator	

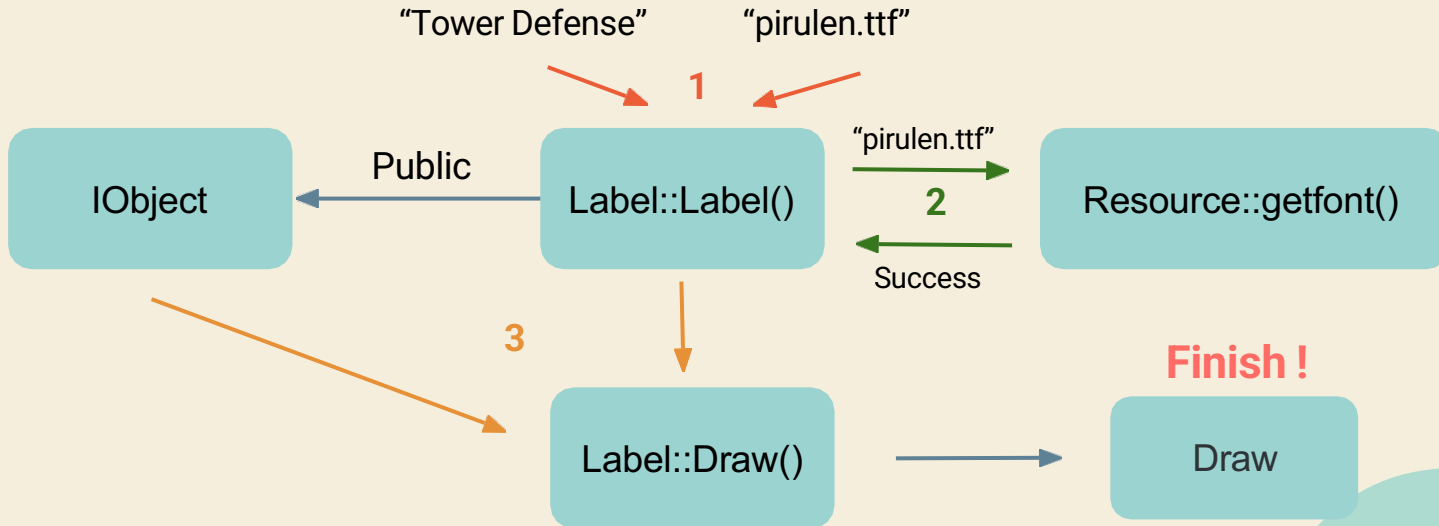


Label

- Derived from IObject class
- A simple static text object



Label (Tower defense)



Template

01

GameEngine, Resources, Collider

02

Label

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ImageButton

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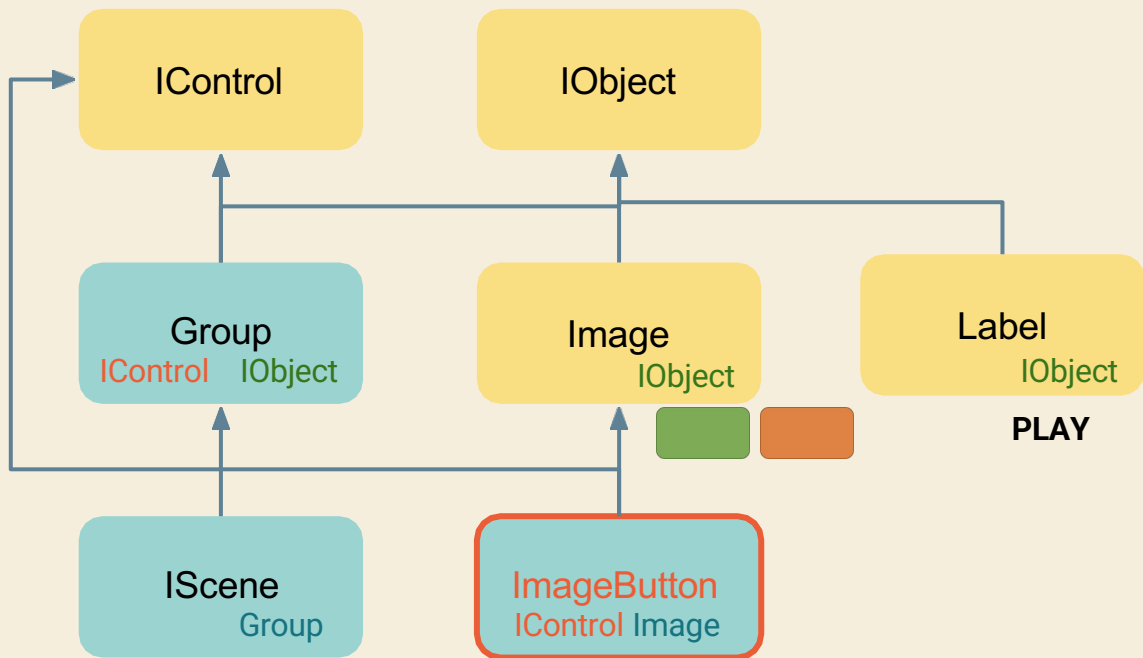
IScene

05

Scene Extension

StartScene ImageButton

 Relevant class



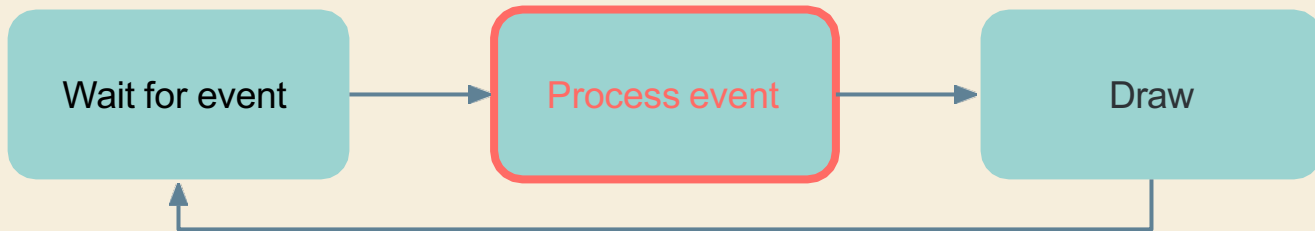
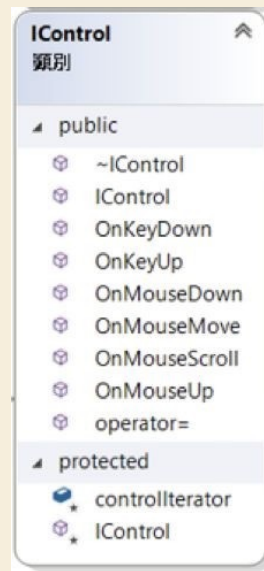
GameEngine

Resources

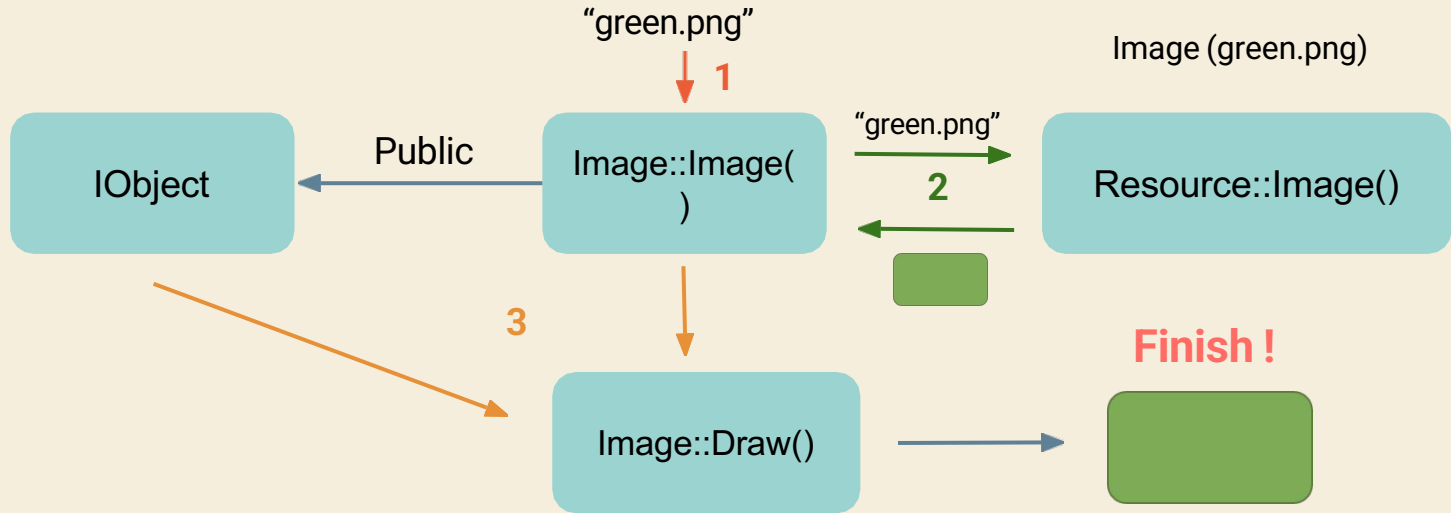
Collider

IControl

- The base class of objects that can process event



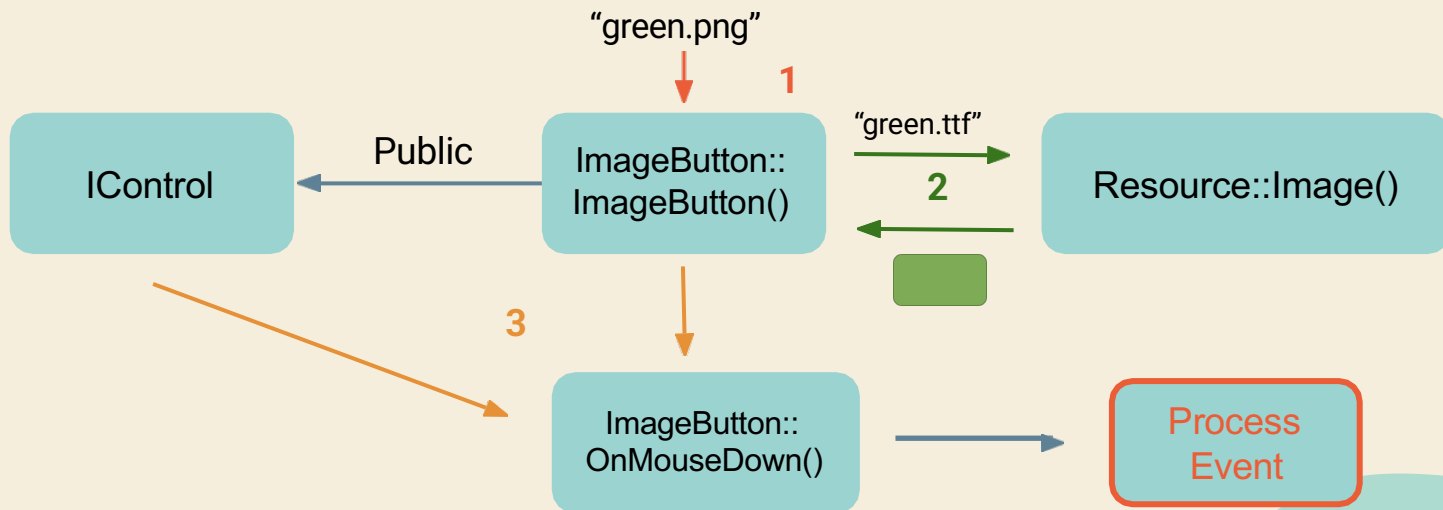
Image



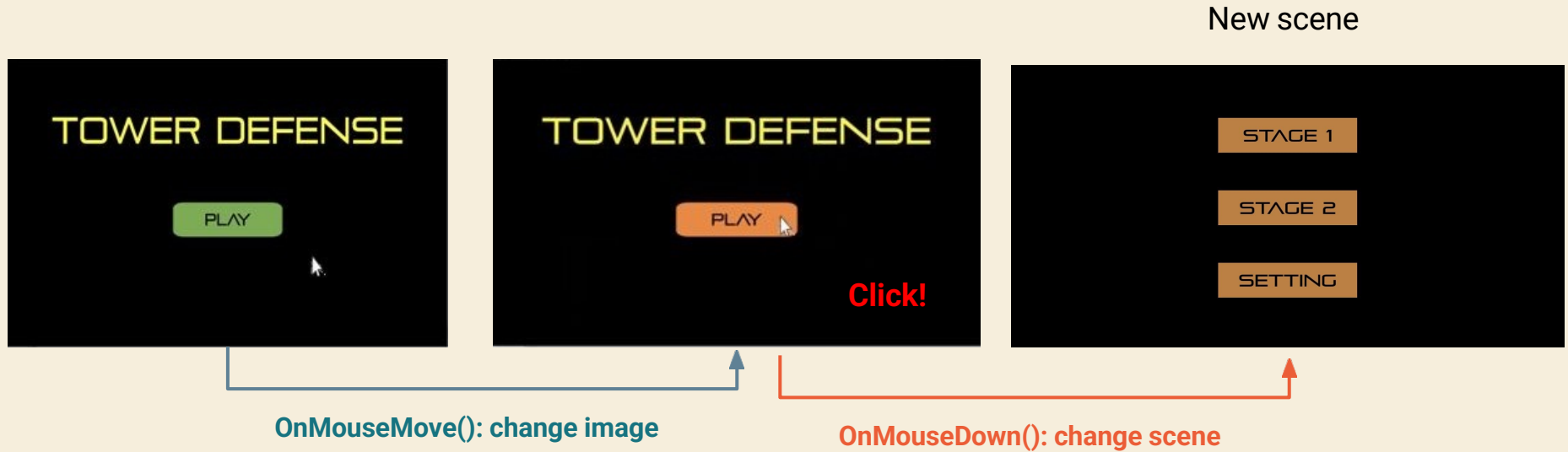
ImageButton



- Derive from IControl, Image
- A clickable button which processes events when the mouse enters/leaves.



ImageButton (Cont'd)

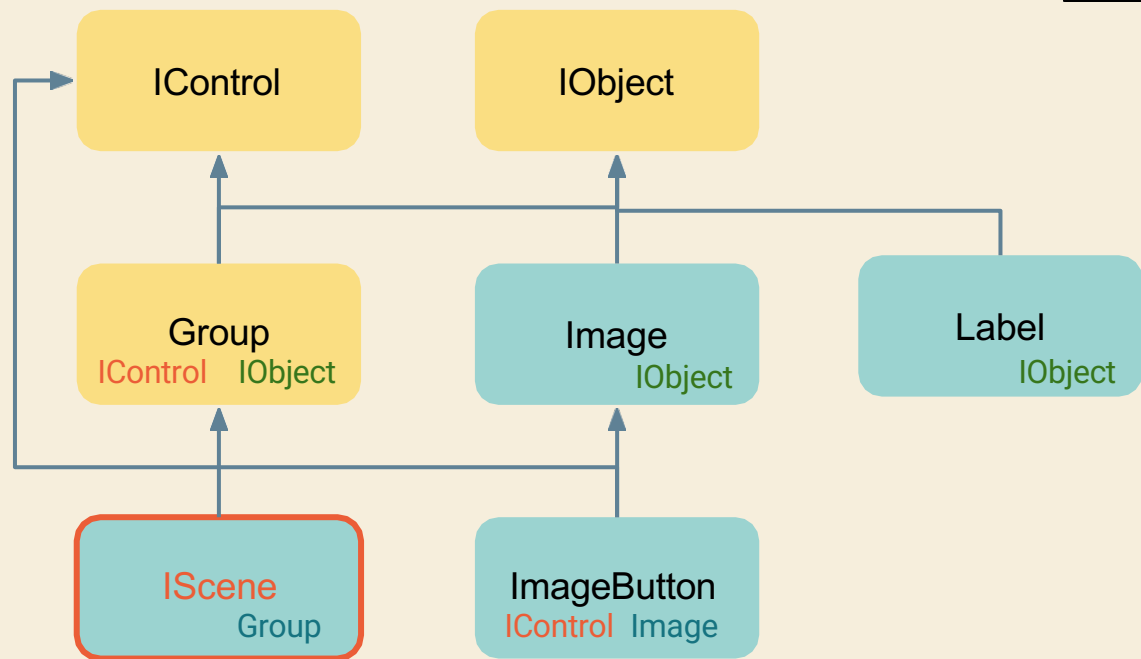


Template

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StartScene IScene

 Relevant class



TOWER DEFENSE

PLAY

GameEngine

Resources

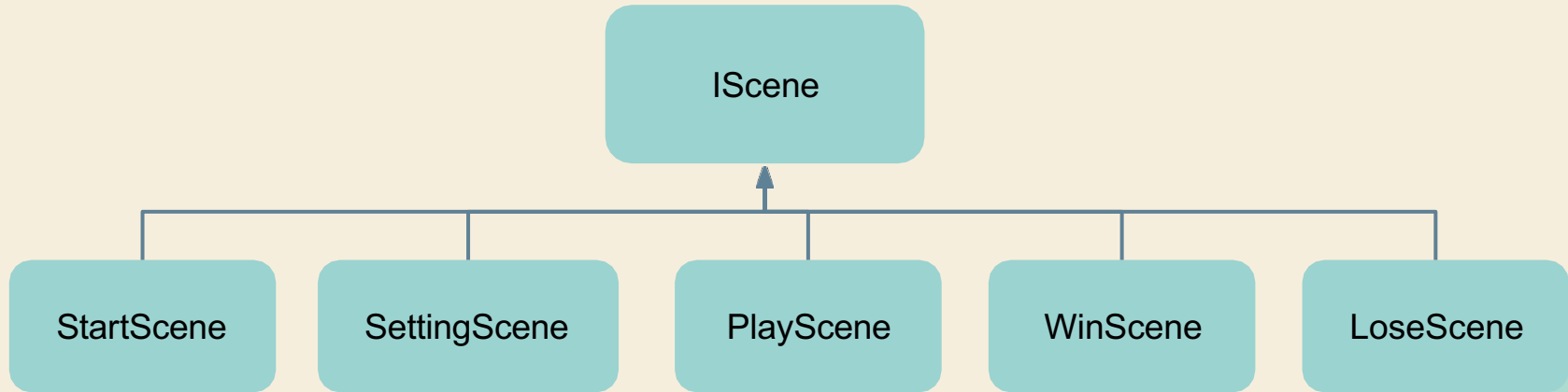
Collider

Group

- A class that contains objects/controls.
- The derived class of IObject and IControl are stored in an individual list respectively to manage.

IScene

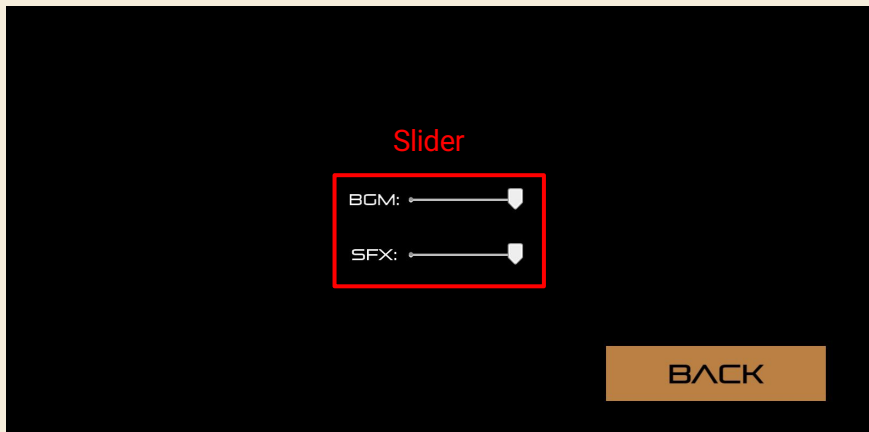
- Encapsulates a scene
- It **must** be inherited and customized



Template

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Scene Extension



Enemy (User definition)



Label

STAGE 1

\$1500

LIFE 10

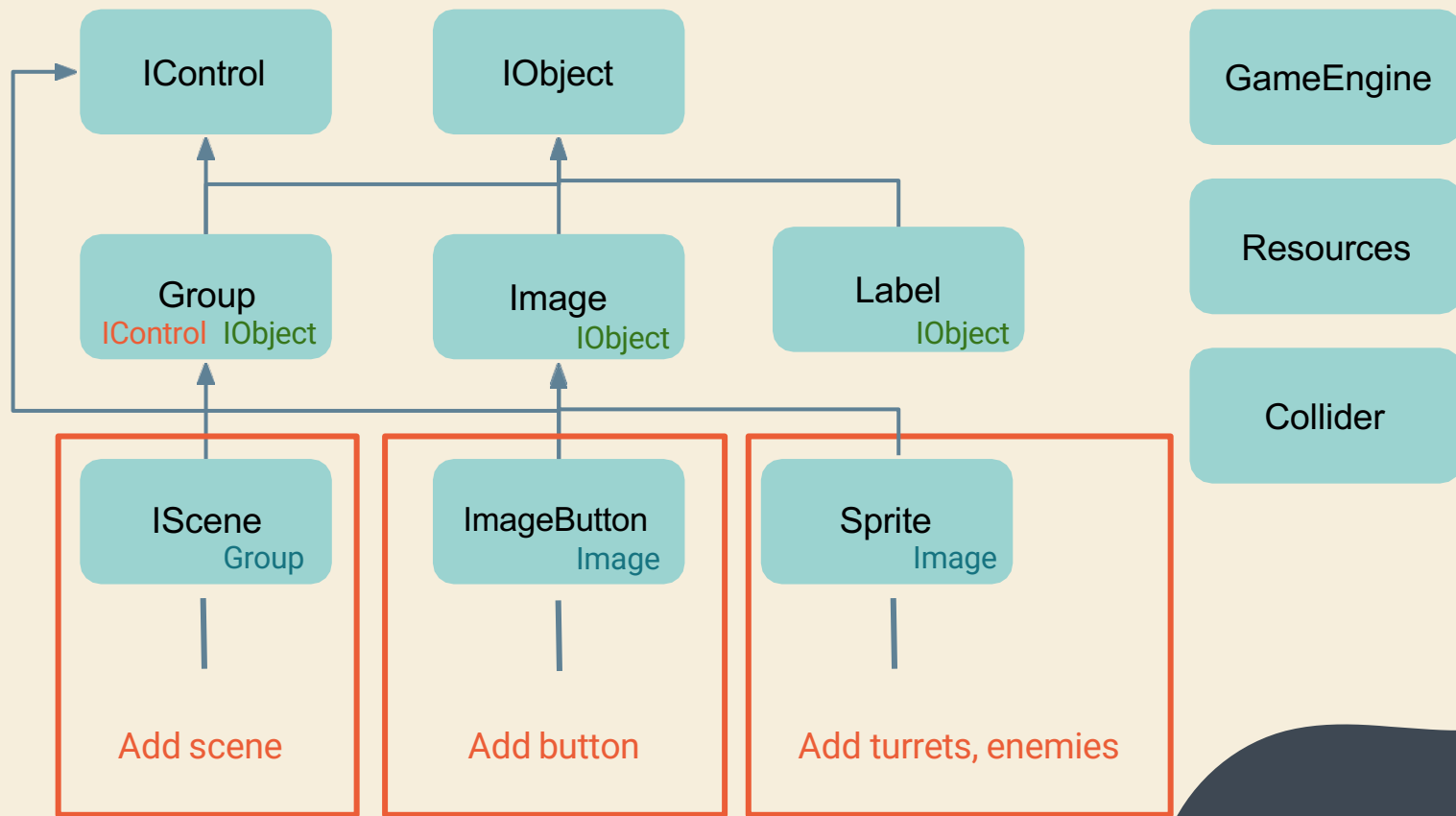


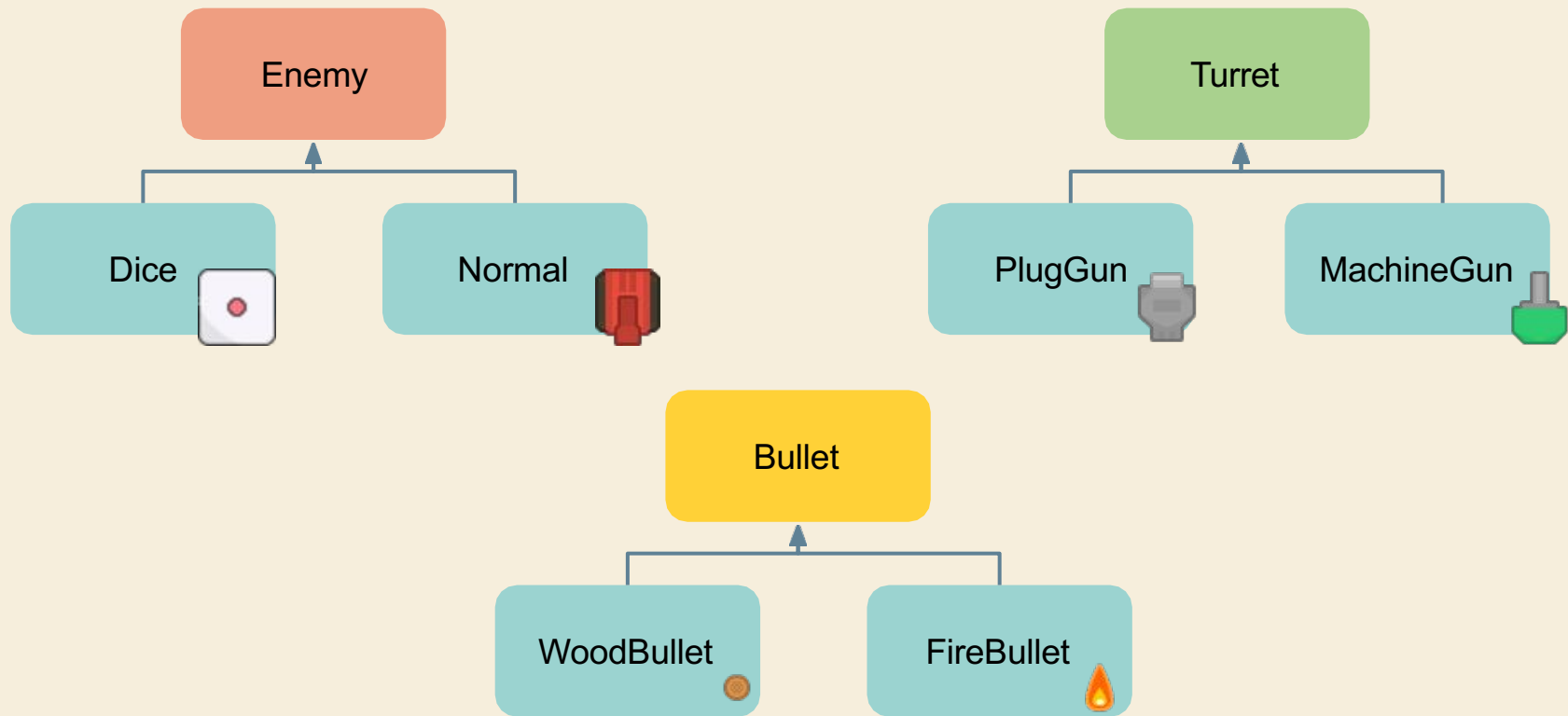
ImageButton

User Extension

03

User extension








Hackathon schedule

04



Hackathon schedule (5/13)



9:00 - 10:00

Hackthon & Mini-Project2 tutorial



10:00 - 12:00

QA time



12:00 - 13:00

Rest



13:00 - 17:30

QA time & Demo

Some details of hackathon



- During the QA time, you can directly join the Teams.
- Otherwise, please type in chat first to make sure TA is online, then join the Teams.
- Each student has **5 mins** to demo the hackathon, and TAs will only score by your demonstration, so make sure you prepare before the demo.
- For more details, please check the spec of the hackathon.