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 the concept of OOP.

Hackathon Demo

Outline

01 Allegro5 game development process

02 Template: StartScene

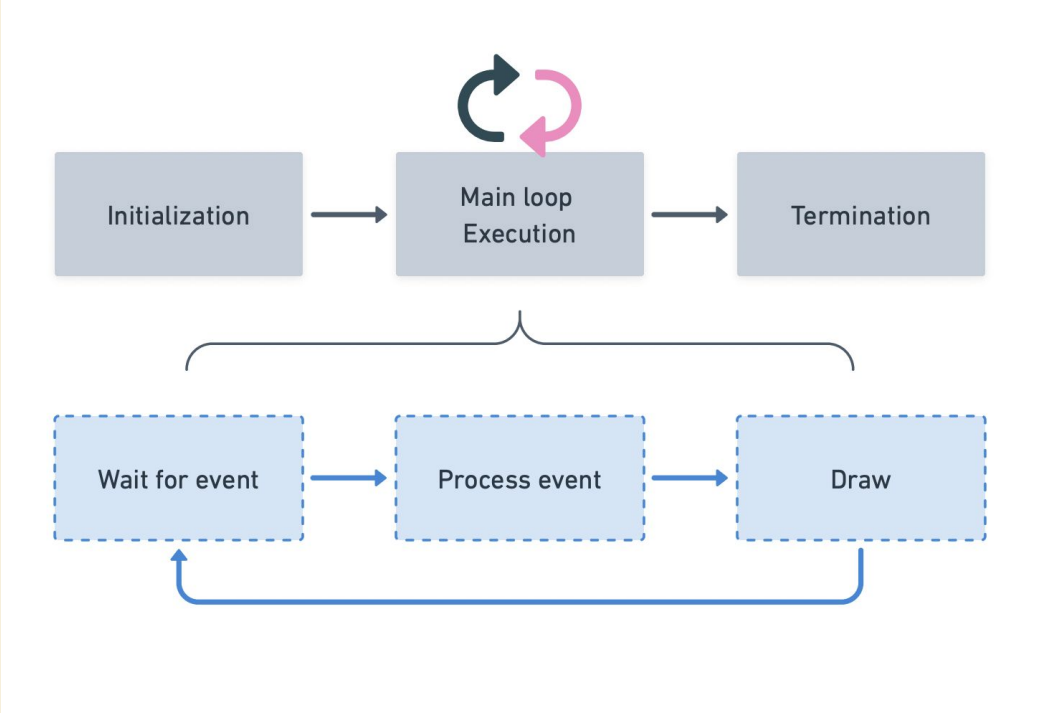
03 User Extension

04 Hackathon schedule

Allegro5 game development process

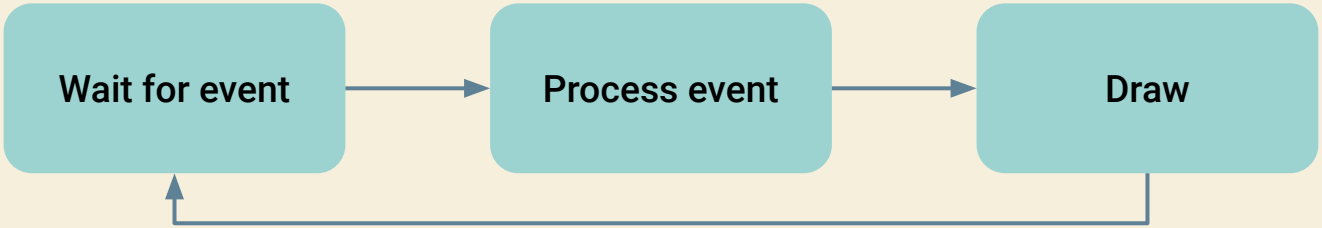
01

Main Process

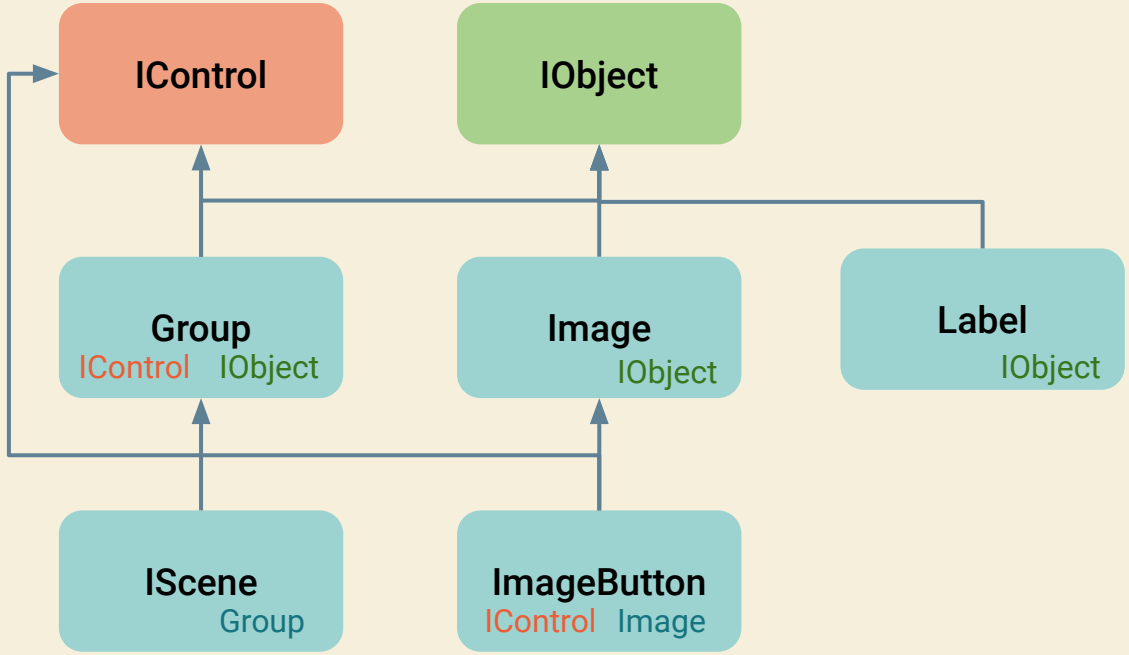


Loop execution

- 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

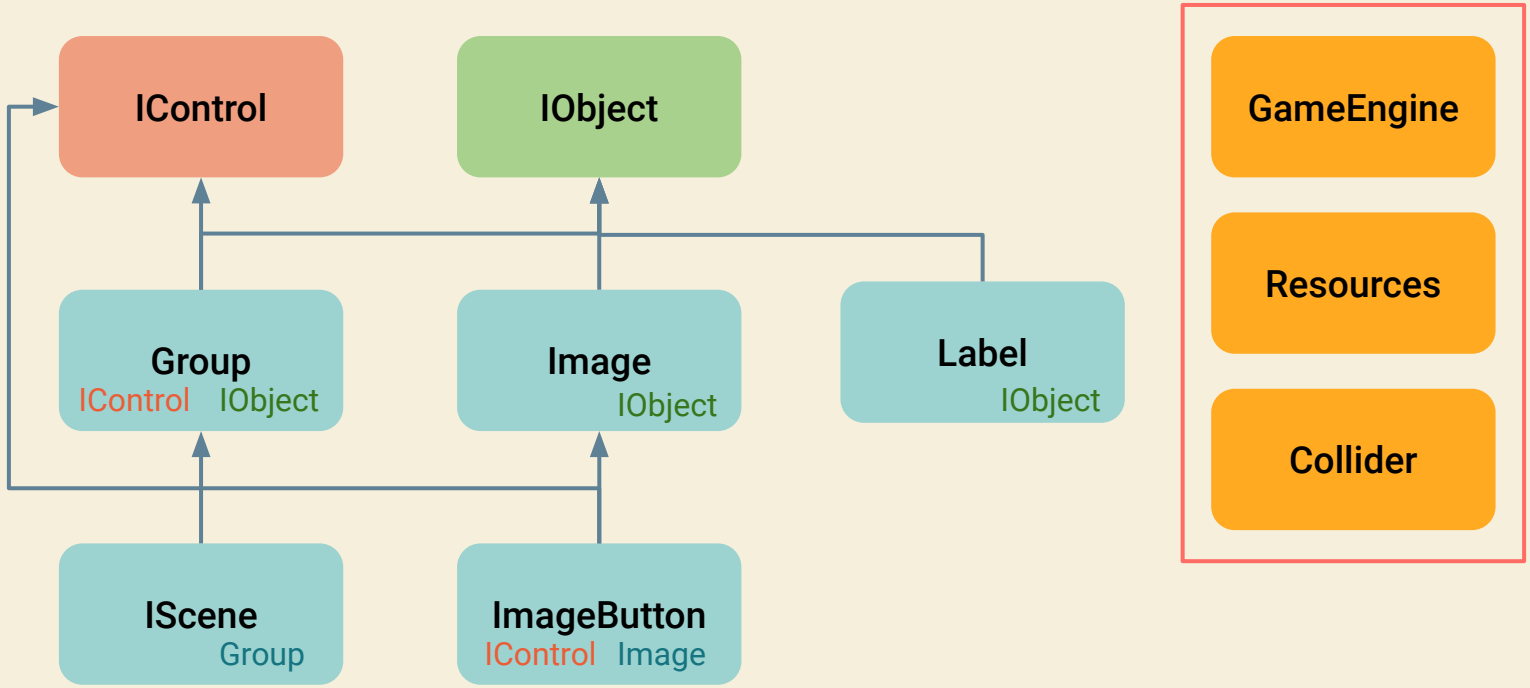
02 Label

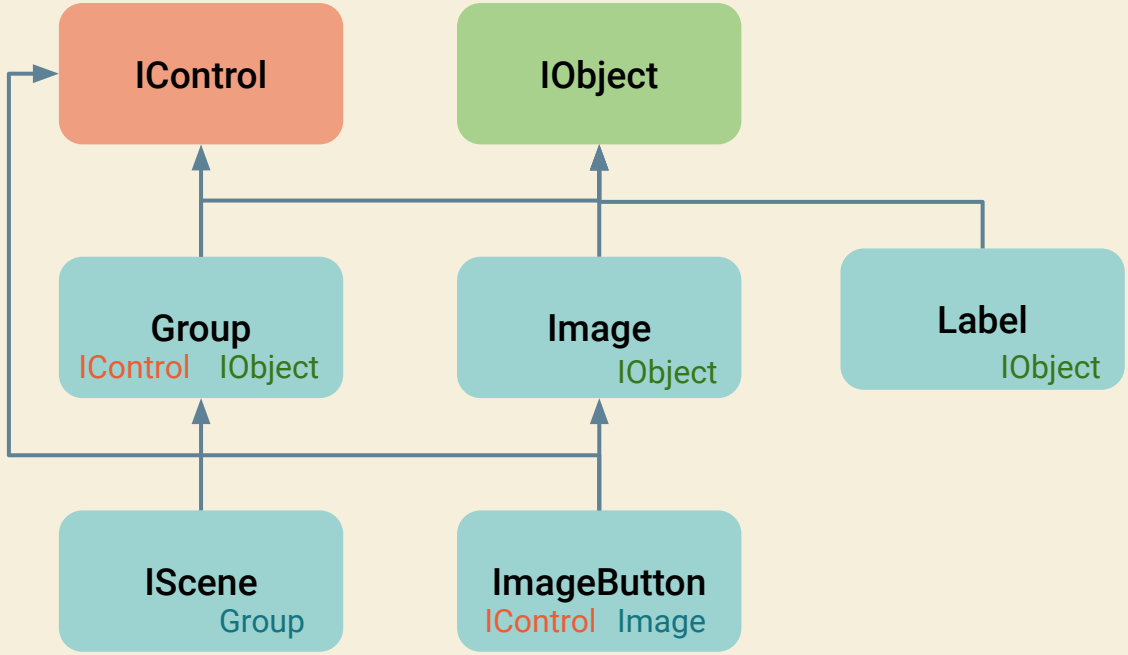
03 ImageButton

04 IScene

05 Scene Extension

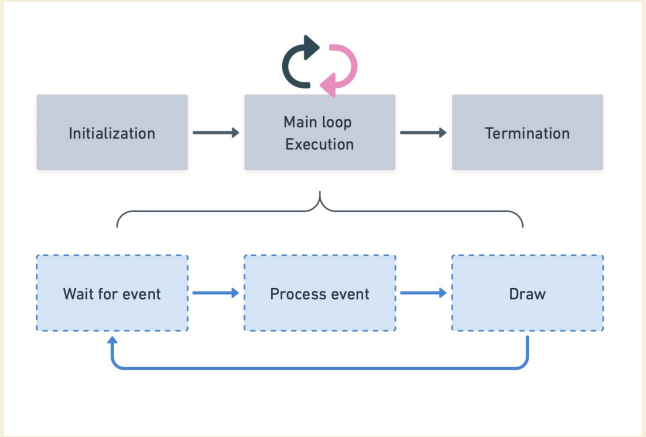
Start Scene

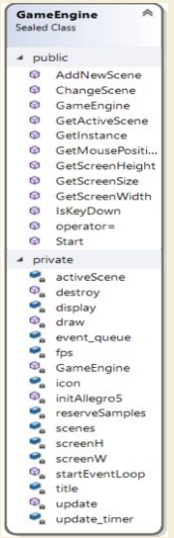

IControl
IObject
Group
IControl IObject
Image
IObject
Label
IObject
IScene
Group
ImageButton
IControl Image
GameEngine
Resources
Collider


IControl
IObject
GameEngine
Resources
Collider
Group
IControl IObject
Image
IObject
Label
IObject
IScene
Group
ImageButton
IControl Image

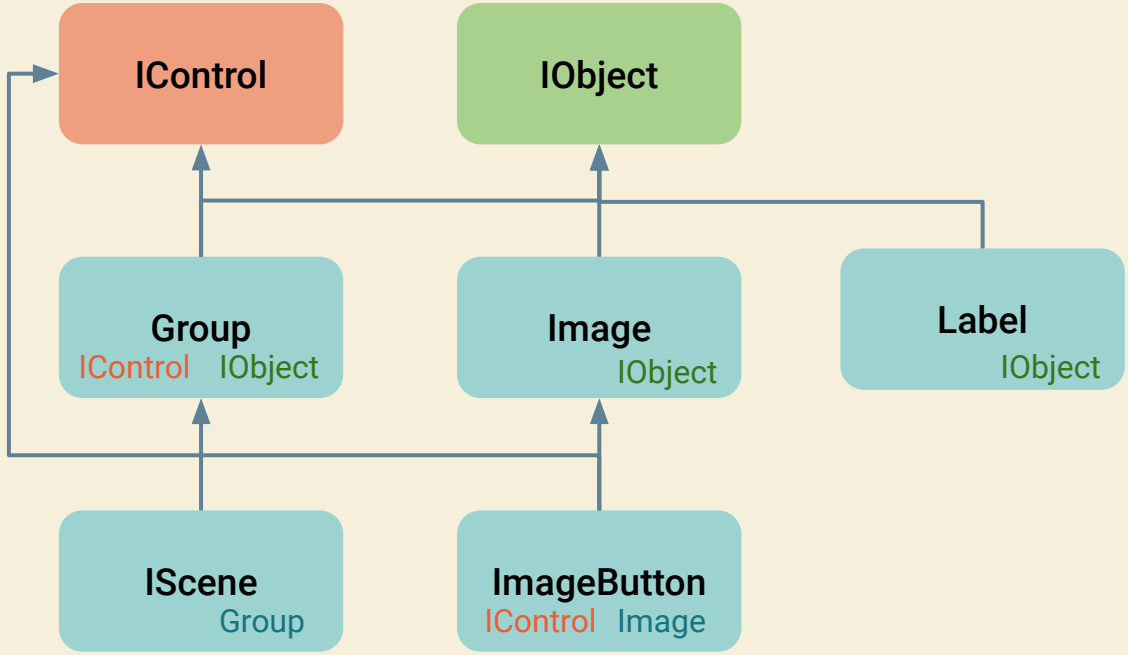
Game Engine

- 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] draw
```



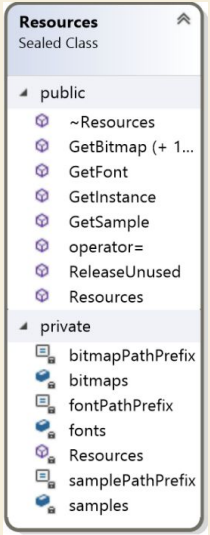
GameEngine

Resources

Collider

Resources

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

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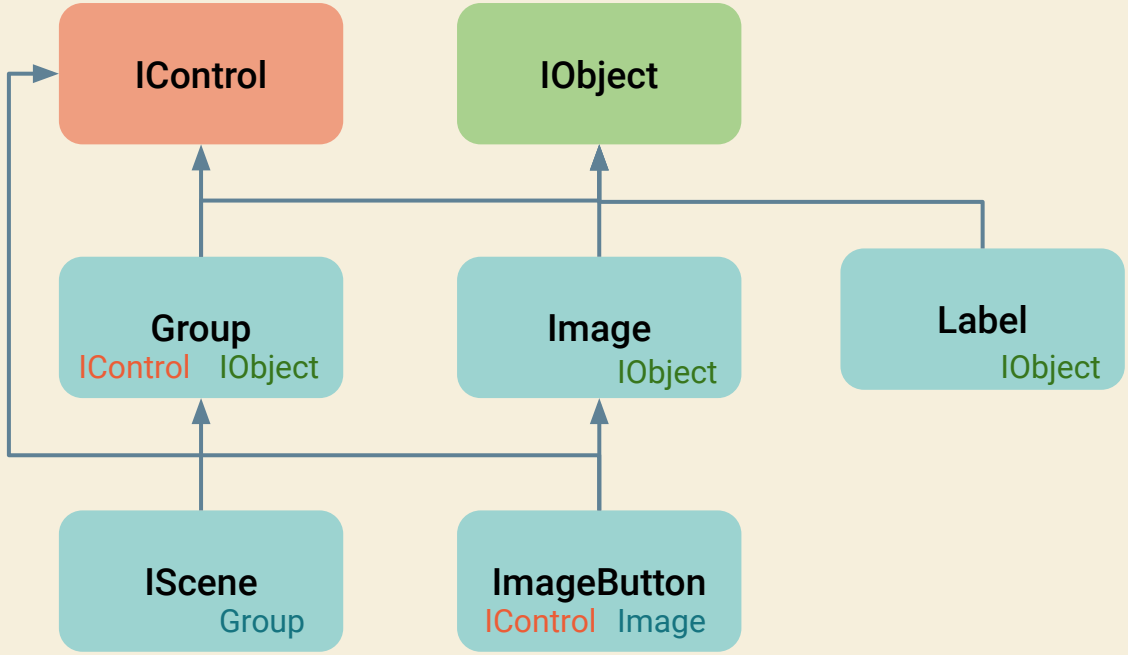
[INFO] Timer event
[INFO] Timer event
[INFO] Timer event
[INFO] draw
```


IControl
IObject
GameEngine
Resources
Collider
Group
IControl IObject
Image
IObject
Label
IObject
IScene
Group
ImageButton
IControl Image

Collider (struct)

- Calculating physical collision, overlap, point in region.

Template

01 GameEngine, Resources, Collider

02 Label

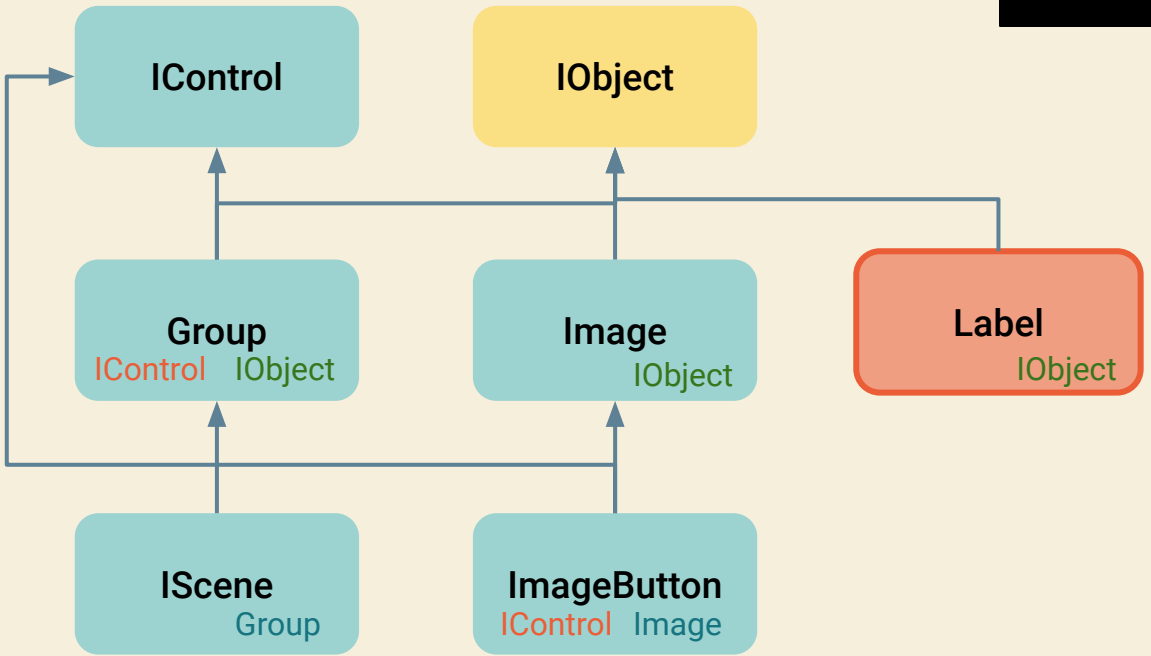
03 ImageButton

04 IScene

05 Scene Extension

StartScene Label

Relevant class



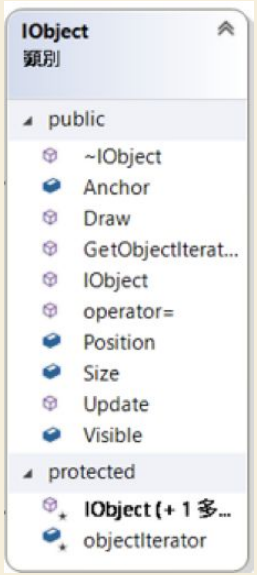
GameEngine

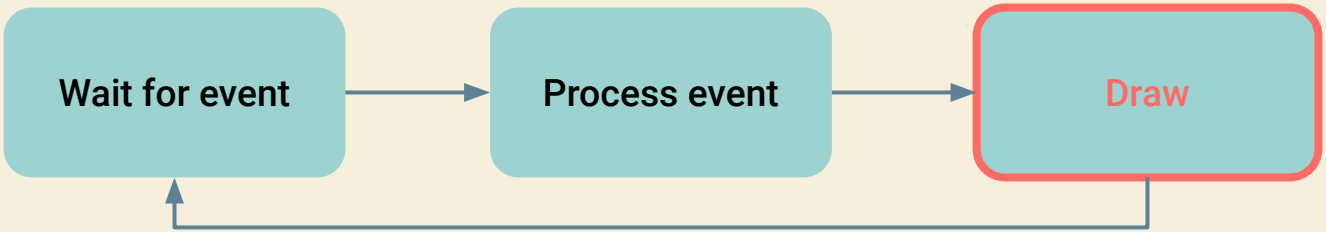
Resources

Collider

IObject

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

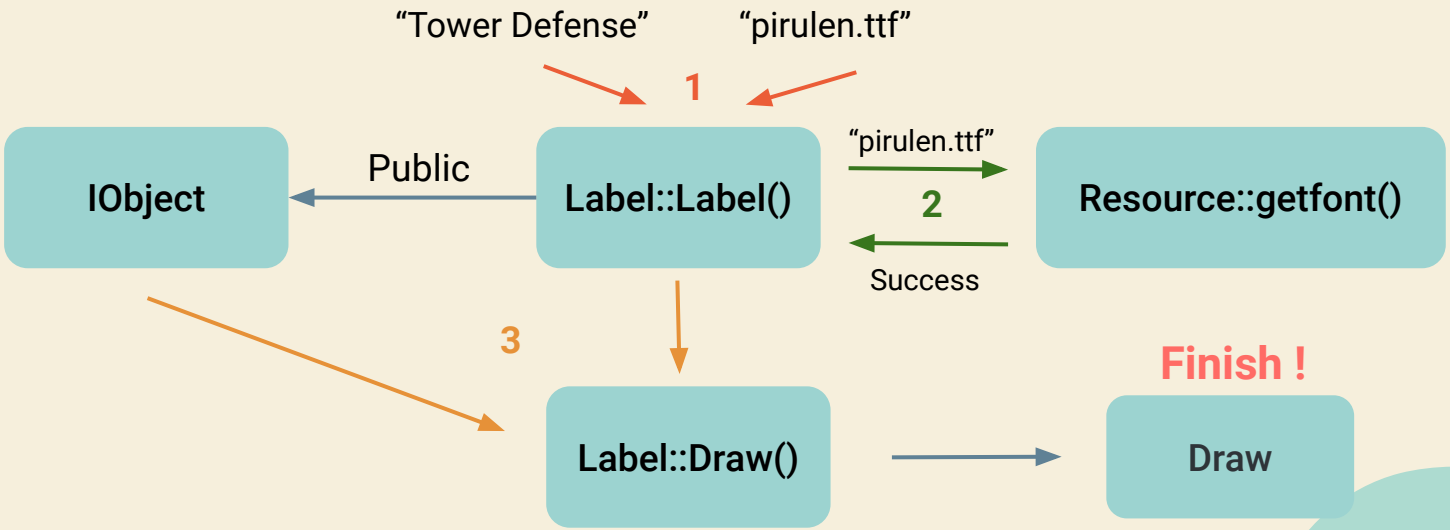




Label

Label (Tower defense)

- Derived from IObject class
- A simple static text object



Template

01 GameEngine, Resources, Collider

02 Label

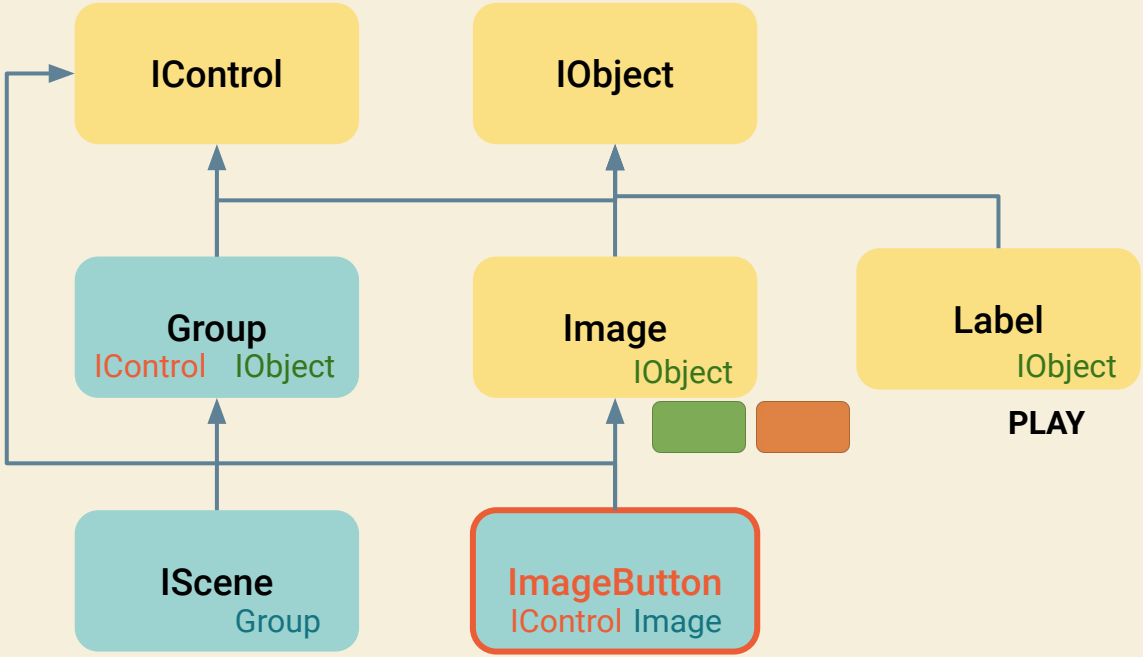
03 ImageButton

04 IScene

05 Scene Extension

StartScene ImageButton

Relevant class



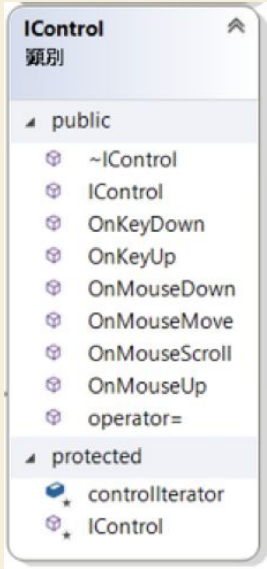
GameEngine

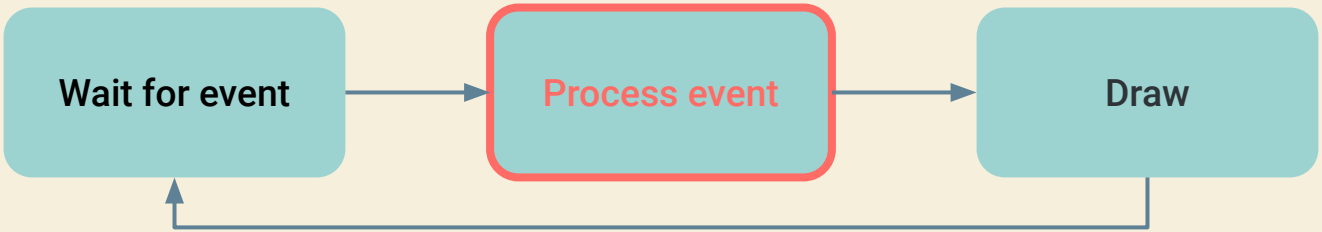
Resources

Collider

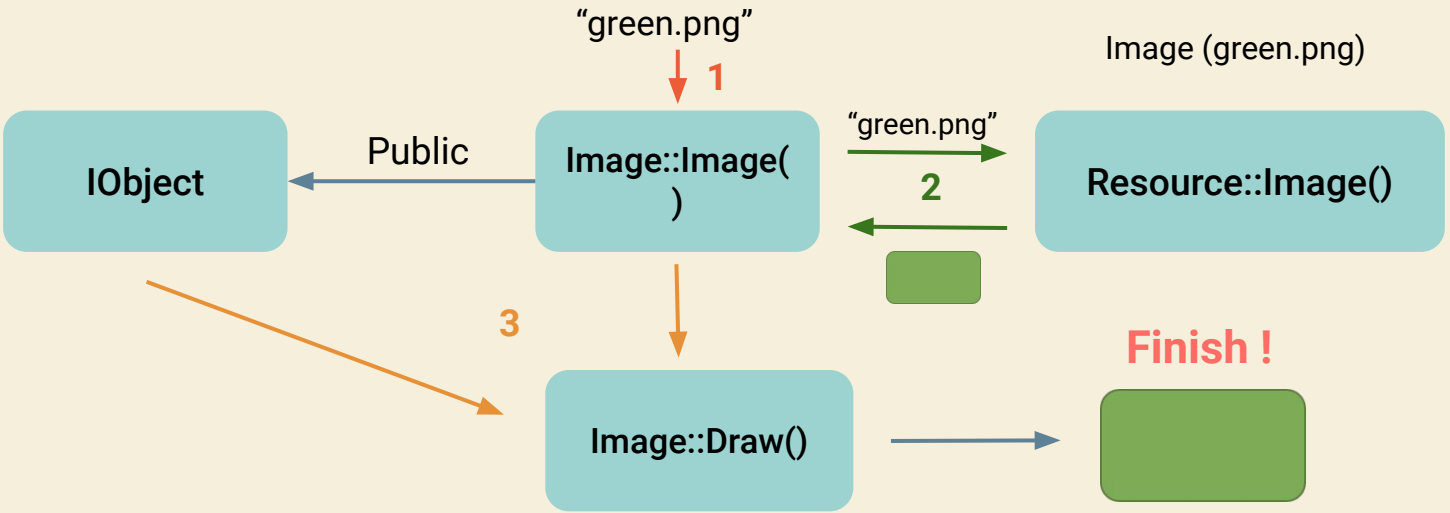
IControl

- The base class of objects that can process event



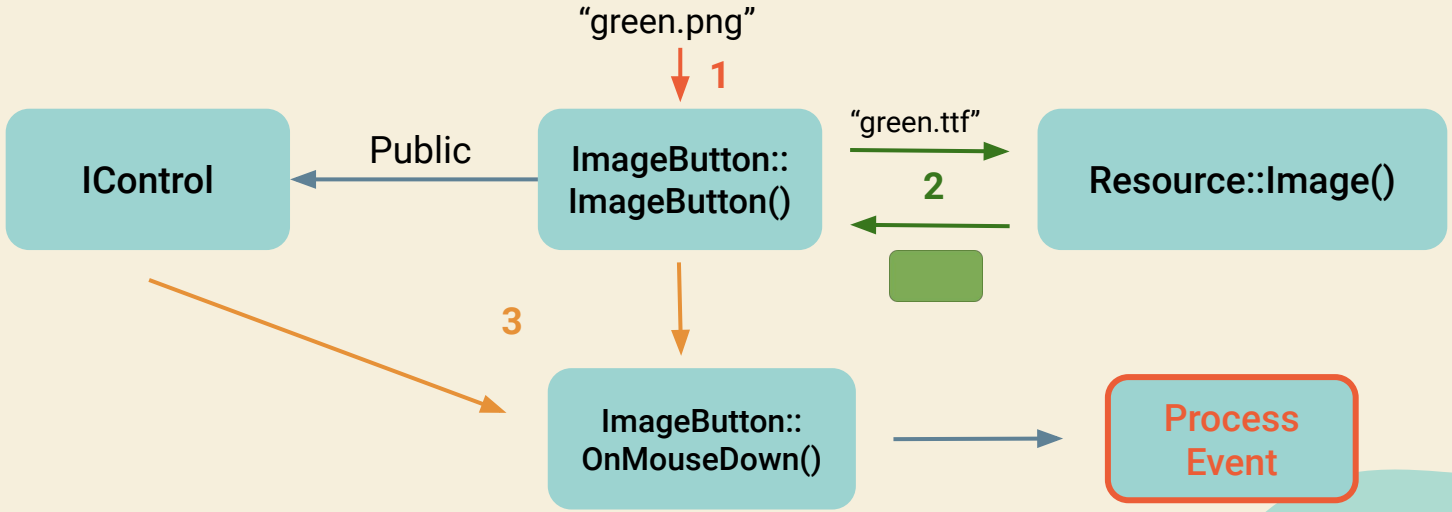


Image


“green.png”
1
Image (green.png)
IObject
Public
Image::Image( )
“green.png”
2
Resource::Image()
3
Finish !
Image::Draw()

ImageButton

- Derive from IControl, Image
- A clickable button which process events when mouse enter / leave.



ImageButton (Cont'd)

New scene

OnMouseMove(): change image

OnMouseDown(): change scene

Template

01 GameEngine, Resources, Collider

02 Label

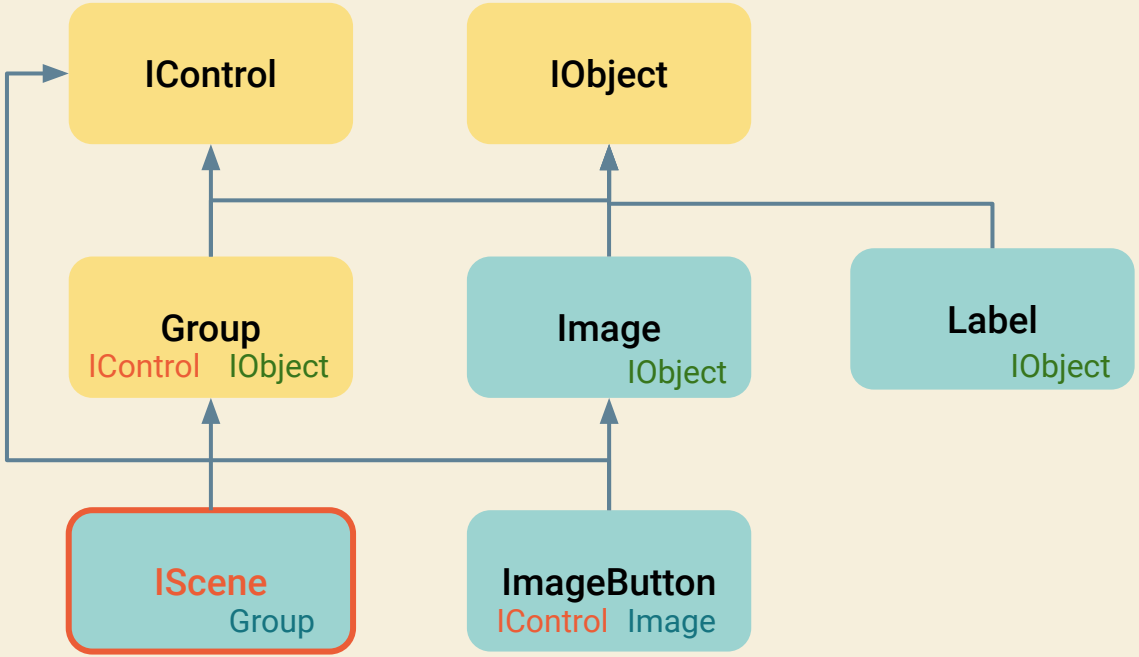
03 ImageButton

04 IScene

05 Scene Extension

StartScene IScene

Relevant class



GameEngine

Resources

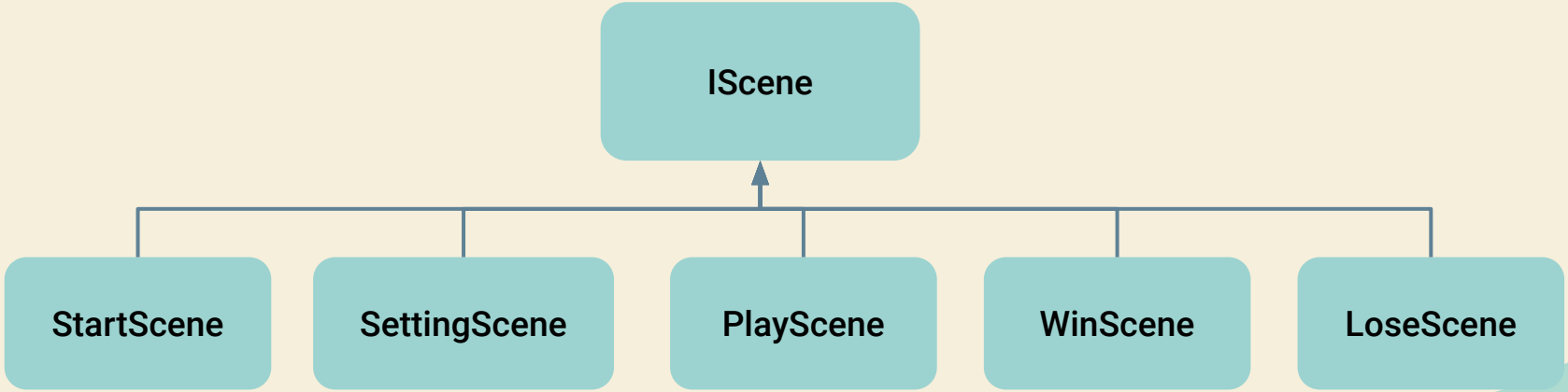
Collider

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

01 GameEngine, Resources, Collider

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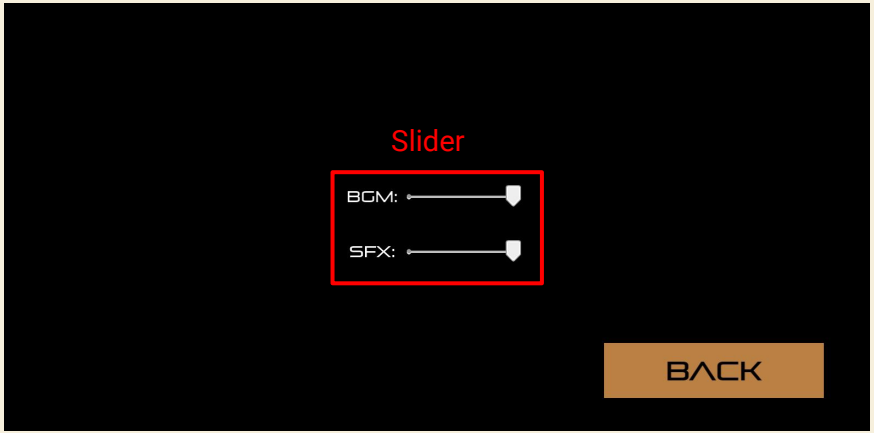
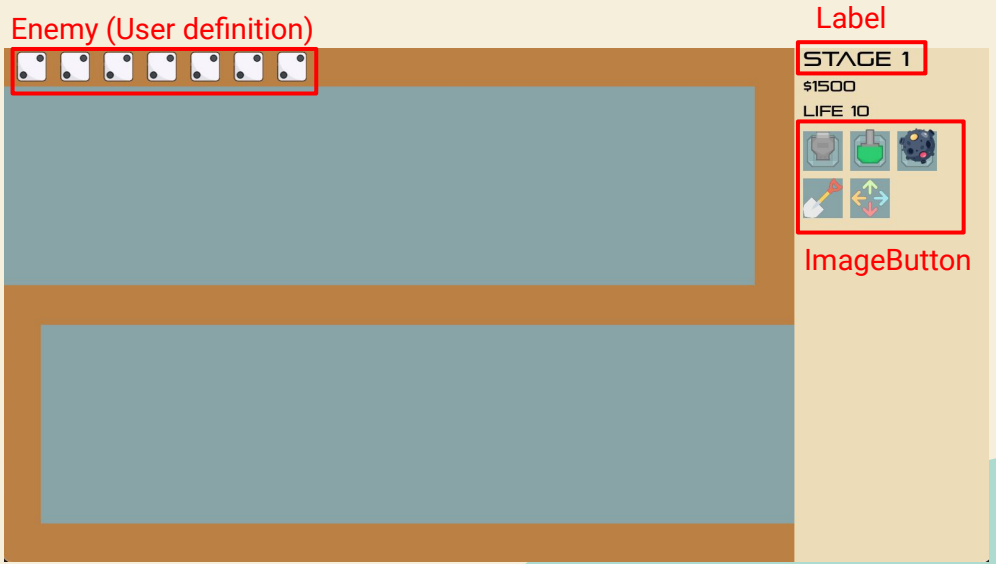
05 Scene Extension

Scene Extension

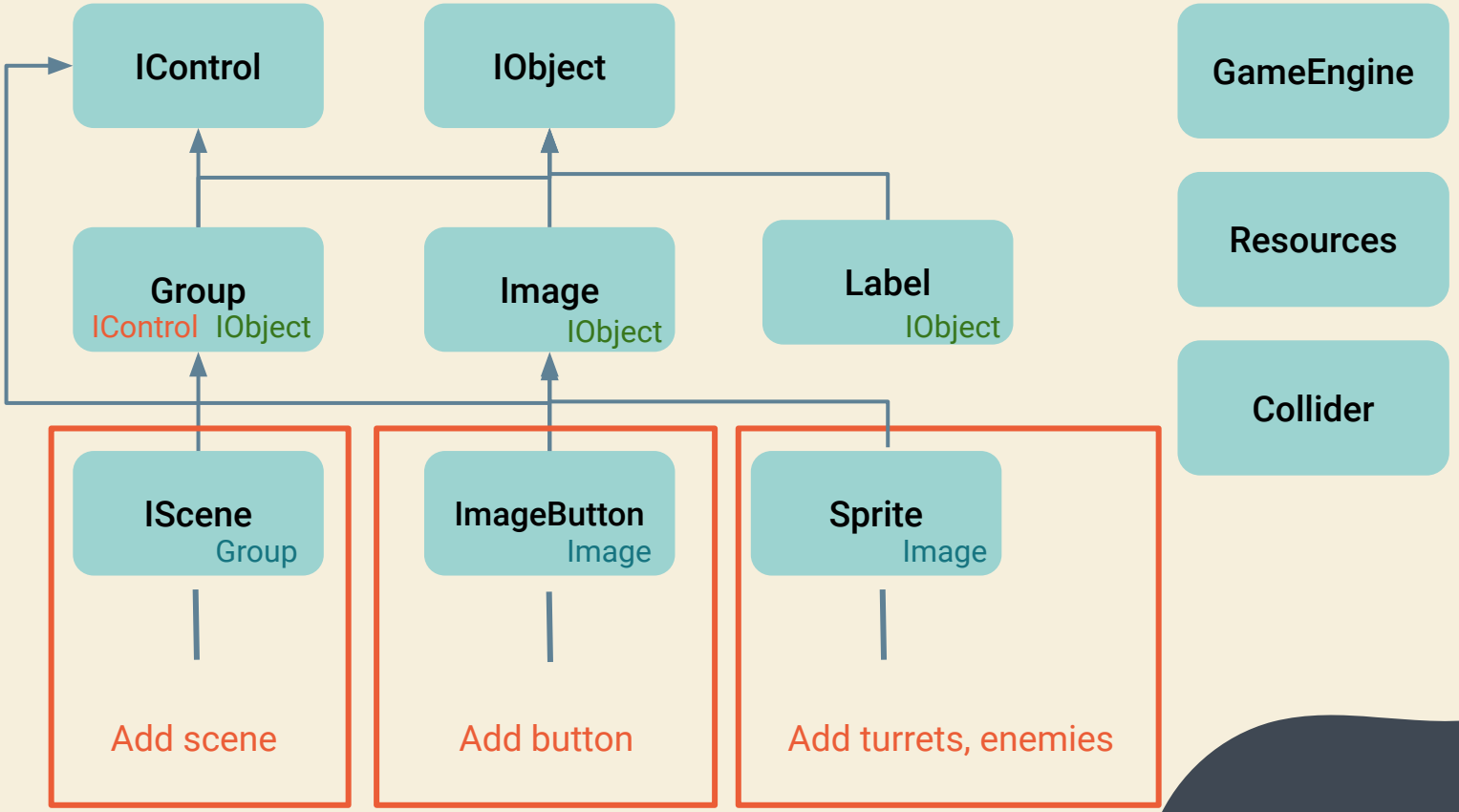


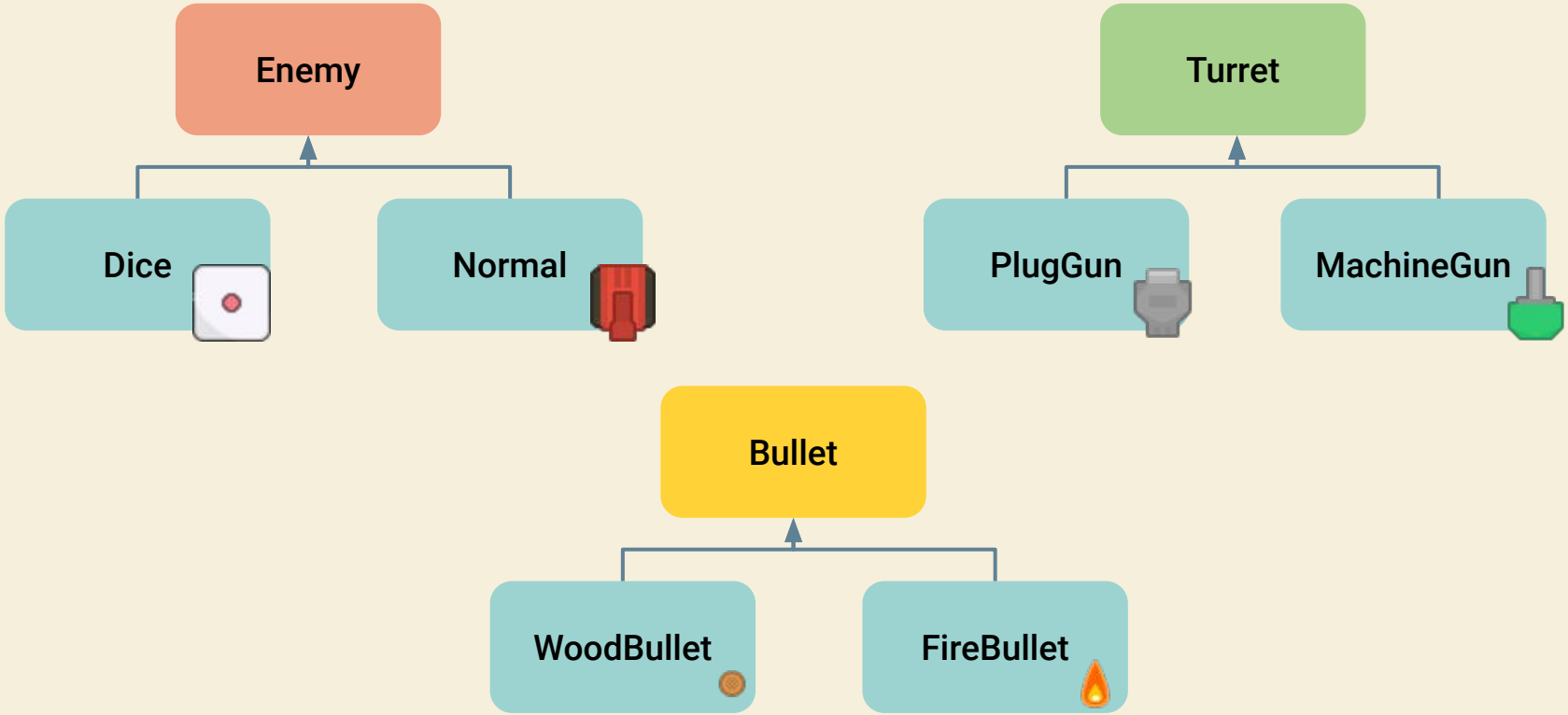


User Extension

03

User extension




Enemy
Dice
Normal
Turret
PlugGun
MachineGun
Bullet
WoodBullet
FireBullet

Hackathon schedule

04

Hackathon schedule (5/13)

10:00 - 11:00	QA time
12:00 - 13:00	Demo (morning session)
14:30 - 16:00	QA time
16:30 - 17:30	Demo (afternoon session)

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 have 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.