

## (Win32API )

### 1. Win32API 2D . WinMain/WndProc .

### 2.  
- WinMain:  
- WndProc: Win32 Game  
- Game:  
- FishingSystem: (FSM)  
- FishManager: / /  
- Sprite: GDI+/HDC  
- UI:  
- Player:  
- Shop:

### 3. Win32  
- : GetMessage/TranslateMessage/DispatchMessage  
- : WM\_CREATE, WM\_TIMER, WM\_KEYDOWN, WM\_LBUTTONDOWN, WM\_PAINT, WM\_DESTROY  
- : BeginPaint/EndPaint + HDC GDI/GDI+  
- SetTimer + InvalidateRect /

### 4. (FSM)  
Idle, Charging, Casting, Fighting, Reeling, Caught, Fail  
FishingSystem::Update() WM\_TIMER .

### 5.  
\*\*Game\*\*: Update/Render, ,  
\*\*FishingSystem\*\*: ,  
\*\*FishManager\*\*: , ,  
\*\*Sprite\*\*: Image Draw(HDC)  
\*\*UI\*\*: ,  
\*\*Player\*\*: , ,  
\*\*Shop\*\*:

### 6.  
- WM\_TIMER Game::Update()  
- Update FishingSystem, FishManager, Player  
- InvalidateRect  
- WM\_PAINT Game::Render() Sprite/

### 7.  
- Win32  
- GDI+ PNG  
- FSM 가

# FishingGame Q&A;

( )

A. Q&A; ( )

Q1. GDI+ PNG ?

A1. Sprite::Load Gdiplus::Image Graphics::DrawImage  
GDI+가

Q2. ?

A2. Game::EnsureBackBuffer CompatibleDC/Bitmap , DC BitBlt

Q3. ?

A3. main.cpp WndProc / Game . Game  
keyDown\_/keyPressed\_/keyReleased\_, mouseDown\_/mousePressed\_/mouseReleased\_  
, Update Player FishingSystem

Q4. FSM ?

A4. FSM Idle Charging( ) Casting Floating Bite Reeling Caught/Fail  
가 , biteTimer , - ,

Q5. - / ?

A5. FishManager::CheckHookCollision Inflated AABB( )  
AttachTo , FishingSystem hookedFish\_  
(catchThreshold)  
ConsumeCatch /

Q6. Rod/Line ?

A6. Rod (castPowerMax\_) 가 . Line  
(chargeRate\_), (reelSpeed\_), (lineTensionDecay\_)

Q7. / ?

A7.  $\text{base}(5/10/20) * (1 + \text{totalGold} * 0.0025)$  , 10  
Rod  $20 * \text{level}^2$ , Line  $15 * \text{level}^2$  ( ) ,  
10

Q8. ?

A8. F12 + 100 Gold, Reset, Rod+1, Line+1 ,  
HandleDebugClick

Q9. ?

A9. WM\_ERASEBKGD , BitBlt

Q10. ?

A10. ResourcePath 가 exeDir, , CWD res/textures/...  
fallback

Q11. list ?

A11. std::list hookedFish\_  
가 , 가

Q12. ?

A12. traits ( ), ( DrawImage  
, Kill , 가 . 가 GDI  
/ , DrawImage Low .

B. /

- src/main.cpp: WinMain, (WS\_EX\_COMPOSITED), , Game ,  
WM\_PAINT Game::Render .
- src/Game.h / Game.cpp: . / FSM/ /UI/ / , ,  
. . . , /
- src/Player.h / Player.cpp: / , (+ ), ( +  
) , .
- src/FishingSystem.h / FishingSystem.cpp: . / , , ,  
, / / / .
- src/Fish.h / Fish.cpp: ( , traits , / , alive/attached),  
/ / /Attach( ), .
- src/FishManager.h / FishManager.cpp: std::list , , ,  
(waterRect ± 32), Kill, (InflateRect) .
- src/UI.h / UI.cpp: / , Rod/Line , Cast Power , .
- src/Shop.h / Shop.cpp: , ( / ) .
- src/Sprite.h / Sprite.cpp: GDI+ , Draw/DrawFlippedH .

1) WinMain

- GDI+ Startup
- (WS\_EX\_COMPOSITED )
- Game::Initialize
- Game
- 가 Game::Update
- WM\_PAINT Game::Render , InvalidateRect

2) Game

- (waterRect)
- : boat.png, fishes/fish\_03/07/12
- Player/FishManager
- / FishingSystem
- UI/Shop
- (EnsureBackBuffer)

3)

- WndProc / Game::OnKeyDown/OnKeyUp/OnMouse...
- Game keyDown\_/keyPressed\_/keyReleased\_ mouseDown\_/mousePressed\_/mouseReleased\_  
/
- F12 , S
- / , FSM

4) (Game::Update)

- Player.Update:
- FishManager.Update: , ,
- FishingSystem.Update: FSM / / / / , -
- FishManager.CheckHookCollision: Fish
- FishingSystem.ConsumeCatch: / Game , totalGold/score/messages

- 
- 1 pressed/released

5) (Game::Render)

- DC
- ( / )
- (waterRect ± 32px )
- ( / / )
- Player( )
- UI.Render: / / /
- Shop.Render:
- /F12
- BitBlt

FSM

- : Idle Charging Casting Floating Bite Reeling Caught/Fail
- Charging: (Rod )
- Casting: / /
- Floating: / , FishManager
- Bite: Reeling, Fail
- Reeling: , - Attach, -

Caught

- Caught/Fail: Idle
- / /

- Traits score/money/speed/tensionAdd/size per - frame

- : +4px ~ - 40px Y , /
- Update: bounds alive=false
- Render: waterRect ± 32px DrawImage
- : AABB InflateRect , Fish
- Attach: , Fish::AttachTo FishingSystem

hookedFish\_

/

- ResourcePath: exe res/textures/...
- , fallback
- : Game::EnsureBackBuffer CompatibleDC/BMP ,

- WM\_ERASEBKGND
- /

- : base(5/10/20) \* (1 + totalGold\*0.0025), 10 late - game 가
- : Rod 20\*level^2, Line 15\*level^2, 10 曲
- : F12 gold, , 가

- Traits per - frame
- DrawImage
- Kill
- GDI

C. 가 Q&A;

Q13. (dt) ?

A13. dt( ms )  
, Game::Update(dt) . Player, FishingSystem, FishManager dt \*

dt , FPS가 가 .

Q14. / ?

A14. WM\_SIZE Game::OnResize ,  
(waterRect) UI (EnsureBackBuffer) .

Q15. ( , ) ?

A15. nullptr ,  
DrawImage + .  
가 .

Q16. ?

A16. 가 가 .

-  
-  
- (biteTimer)  
-  
, .

Q17. 가 가 ?

A17. FishingSystem ,  
Fish/FishManager , UI UI .  
, 가 가 .

Q18. ?

A18. .

- , 가  
- Bite/Reeling ( , ) 가  
- Shop bait, luck, auto - reel 가  
- UI / , 가  
가 , 가 .

( 가 )

1. ?

Win32 (WinMain, WndProc) ,

WndProc ,

- Game: , Update/Render,
- FishingSystem: (FSM)
- FishManager: / /
- UI: /
- Player:
- Shop: /
- Sprite: HDC

Win32 Win32 가 ,

2. Win32 (WinMain, WndProc) ?

- WinMain:
- : GetMessage , TranslateMessage DispatchMessage

WndProc WM\_CREATE, WM\_TIMER, WM\_KEYDOWN, WM\_LBUTTONDOWN,  
WM\_PAINT, WM\_DESTROY ,  
Game

- )
- WM\_TIMER Game::Update()
  - WM\_PAINT Game::Render()
  - WM\_KEYDOWN/WM\_LBUTTONDOWN Game::OnKeyDown/OnMouseDown(...)

WndProc , Game

3. (FSM) ?

if/else ,

Idle Charging Casting Floating Bite Reeling Caught/Fail  
, FishingSystem::Update()

- 
- 가 가 ,
- / 가 , 가

4. Game ?

Win32 InvalidateRect + WM\_PAINT  
Game::Render() 가

WM\_PAINT 가 ,  
UI/ / / /

8. / FSM ?

WM\_TIMER Game::Update() FishingSystem::Update()  
 FishManager::CheckHookCollision()

- FishingSystem
- FishManager /
- CheckHookCollision AABB InflateRect ,
- Fish::AttachTo(hookPos) ,
- FishingSystem hookedFish\_
- Reeling Caught ,
- Game::OnCatch /

9. ?

가 가

- FishingSystem ,
- Fish/FishManager
- / / Game/Player/Shop
- UI UI

가 , 가 ,  
 Win32

10. ' / ' ?

Win32API (WinMain, , WndProc, HDC )  
 , ( , , UI, ) ,

Win32 , 가



## -

### (Abstract)

Win32 API GDI+ 2D , , ,  
, PNG , / , ,  
, , , , , ,  
.

### 1.

#### 1.1

Win32 API 가 2D , GDI+ PNG / .  
, / , , / .

#### 1.2

- ( )  
- FSM  
- Rod/Line  
- (F12)

### 2.

- : Windows, Win32 API, GDI+  
- / : C++17, Unicode  
- : CMake, MSVC(Win32)  
- : PNG (res/textures)  
- : Rod/Line 10  
- :

### 3.

#### 3.1

- main.cpp: WinMain, , Game  
- Game: . . .  
- Player: , ,  
- FishingSystem: FSM(Idle Charging Casting Floating Bite Reeling Caught/Fail)  
- Fish: traits , /  
- FishManager: . . (list )  
- UI: / / / /  
- Shop:  
- Sprite: GDI+ Draw/DrawFlipped

#### 3.2

Player/FishingSystem/Shop FishManager FishingSystem  
/ Game ConsumeCatch BitBlit

### 4.

#### 4.1

WM\_KEYDOWN/UP, WM\_LBUTTONDOWN/UP, WM\_MOUSEMOVE Game::On...  
keyDown/keyPressed/keyReleased . F12 ,

S .

#### ### 4.2 FSM(FishingSystem)

- Idle Charging:
- Charging Casting: ( = . )
- Floating/Bite: biteTimer Bite, Reeling
- Reeling: , Attach
- Fail: 1.0
- Caught/Fail ResetLine  
: Rod( ), Line( / . )

#### ### 4.3 (Player)

#### ### 4.4 (Fish, FishManager)

- traits : . . . .
- : +4px~ - 40px
- : / , Kill
- : waterRect ± 32 DrawImage
- : Inflated AABB

#### ### 4.5 UI/ /

- UI: / , ,
- : =Rod 20\*level<sup>2</sup> , Line 15\*level<sup>2</sup>
- (F12): Gold+100, Reset, Rod+1, Line+1

#### ### 4.6 &

DC/BMP BitBlt .  
WM\_ERASEBKGDND .

#### ### 4.7

Sprite::Load PNG , exeDir/ /CWD . fallback .

#### ### 4.8 /

: base\*(1 + totalGold\*0.0025), 10 .  
Rod/Line 가 10.

#### ### 5.

- traits
- 
- Kill
- 
- 가 : Pen/Brush , Interpolation Low,

#### ### 6.

· FSM · . . . . .

#### ### 7.

- : std::list
- GDI 가 :
- : , fallback
- : DrawImage ,

### 8.

- GDI
- ( / )
- , /
- / /
- /AI

###

Win32/GDI+

FSM

### : Q&A;

- GDI+ ? DrawImage PNG
- ? BitBlt, WM\_ERASEBKGD
- ? Win32 Game
- FSM ? . . .
- - ? Inflated AABB Attach
- ? Rod= , Line= /
- / ? ,
- ? F12
- ? ResourcePath
- ? std::list
- ? , , Kill,