

```

# # (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
, PNG 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. base(5/10/20) * (1 + totalGold*0.0025) , 10
Rod 20*level^2, Line 15*level^2 () ,
10

Q8. ?

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

Q9. ?

A9. WM_ERASEBKND , BitBlt

Q10. ?

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

Q11. list ?

A11. std::list hookedFish_ 가 , ,

Q12. ?

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

B. /

- src/main.cpp: WinMain, (WS_EX_COMPOSED), 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) .

1) WinMain

- GDI+ Startup
- (WS_EX_COMPOSED)
- 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) *
dt, 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 ?
A17. FishingSystem ,
Fish/FishManager , UI UI
, 가 가

Q18. ?
A18.
- , 가
- Bite/Reeling (,) 가
- Shop bait, luck, auto - reel 가
- UI / , 가 , 가

(가)

1. ?

Win32 (WinMain, WndProc),

WndProc

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

, 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

4. Game ?

Win32 InvalidateRect + WM_PAINT
Game::Render() 가

WM_PAINT 가 ,
UI/ / / /

- WM_PAINT BeginPaint Game::Render(hdc) EndPaint

Game::Render

- 1)
- 2)
- 3) (/ /)
- 4)
- 5) UI/Shop/

BitBlt

5. Win32 ?

Win32

- : GetMessage, TranslateMessage, DispatchMessage
- : WM_CREATE, WM_TIMER, WM_KEYDOWN, WM_LBUTTONDOWN,
WM_PAINT, WM_DESTROY
- : BeginPaint/EndPaint, HDC GDI/GDI+
- : SetTimer/WM_TIMER
- : InvalidateRect WM_PAINT
- : WM_SIZE /

, Win32가 / ,

6. GDI+ ?

PNG GDI+

- Sprite::Load Gdiplus::Image* PNG
- Sprite::Draw(HDC hdc, int x, int y)
Gdiplus::Graphics graphics(hdc);
graphics.DrawImage(image, x, y, width, height);

HDC GDI+ Graphics ,
Win32/HDC
GDI+

7. ?

Win32 (WM_KEYDOWN/WM_KEYUP/WM_LBUTTONDOWN)
Game

- WndProc /
- Game::OnKeyDown/OnKeyUp/OnMouseDown/OnMouseUp(...)
- Game keyDown_/keyPressed_/keyReleased_,
mouseDown_/mousePressed_/mouseReleased_ /

- ' (Pressed)'
- ' (Down)'

FSM UI/Shop

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

Win32 가 ,

10. ' / ?
Win32API (WinMain, , WndProc, HDC)
(, , UI,)

Win32 , 가


```

## ## # 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*level², Line 15*level²
-       (F12): Gold+100, Reset, Rod+1, Line+1

## ## # 4.6      &
DC/BMP           BitBlt
WM_ERASEBKND

## ## # 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,
               , Interpolation High

## # # 6.
· FSM ·      .     .     .     .     .

## # # 7.
-       : std::list
- GDI      가     :
-       :      , fallback
-       : DrawImage      ,
               , Interpolation Low,
               , Interpolation High

```

```
# # # 8.  
- GDI  
- ( / )  
- , /  
- / /  
- /AI  
  
# # #  
Win32/GDI+ FSM  
  
# # # : Q&A;  
- GDI+ ? DrawImage PNG  
- ? BitBlt, WM_ERASEBGND  
- ? Win32 Game  
- FSM ? . .  
- - ? Inflated AABB Attach  
- ? Rod= , Line= /  
- / ? ,  
- ? F12  
- ? ResourcePath  
- ? std::list  
- ? , , Kill,
```