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가

The Guerrilla Guide to Game Code

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2005 4 14

http://www.gamasutra.com/features/20050414/rouwe_01.shtml



Shellshock Nam '67

가

(

)

가

[(Bloom)],

[

(Butcher)], [(Stelly)]

Shellshock: Nam '67 (SSN67)

(Killzone)

2

SSN67

가

;

- () 가
- Model-View-Controller
- (PS2, XBOX PC)

SSN67

(Entities)

SSN67

가

가

가

가

(oil barrel)

가

가 , SSN67

가

SSN67

4x4

(overhead)

(Data Driven System) , 가 ,
 . SSN67 EntityResource

. EntityResource . NPC
:

CoreObject Class=HumanoidResource

```
{  
  Name = Ramirez  
  Model = models/soldiers/ramirez  
  Speed = 5  
  ...  
}
```

. EntityResource가

가

가

SSN67

EntityResource
가

가

. EntityResource

가

EntityResource

가

EntityResource

가

EntityResource

[DP]

EntityResource 가

(Factory Mechanism)

EntityResource

가

()

[LUA]

. LUA

AI

EntityResource

Model - View - Controller

Model - View - Controller [DP]

()

, EntityRepresentation ,

()

. SSN67

가

, Humanoid

EntityResource

. EntityResource

/

Humanoid()

가

(EntityRepresentation)

EntityRepresentation

EntityRepresentation :

- 3D
- (Particles)
- (Decals)
-
-

- (Controller Rumble)
- (Camera Shake)

EntityRepresentation

EntityRepresentation

EntityEvent

EntityEvent

ID

(Hit Message)

가

EntityRepresentation

(Message Handler)

가

EntityRepresentation

EntityRepresentation

(abstract input)

AI

, Humanoid

HumanoidController 가

HumanoidController

HumanoidAIController

HumanoidPlayerController

(PC)

(XBOX PS2)

가

Humanoid

Humanoid

MoveTo

GetDesiredSpeed

IsButtonPressed GetJoystickAxisX , AI가
 , Humanoid가 HumanoidController가
 GetUseObject Humanoid
 . AI
 , Humanoid 가
 가
 HumanoidPlayerController
 . HUD
 Humanoid HumanoidController
 HumanoidController MountedGunAIController
 MountedGunPlayerController

Model - View - Controller
 (Tank), EntityRepresentation(TankRepresentation)
 (TankController)
 TankController GetAcceleration, GetSteerDirection, GetAimTarget Fire
 . AI TankAIController
 TankPlayerController
 가

TankRepresentation 가
 가
 가 / (

가 , . SSN67 가

AI

AI

()

Humanoid

()

EntityRepresentation

(

)

3

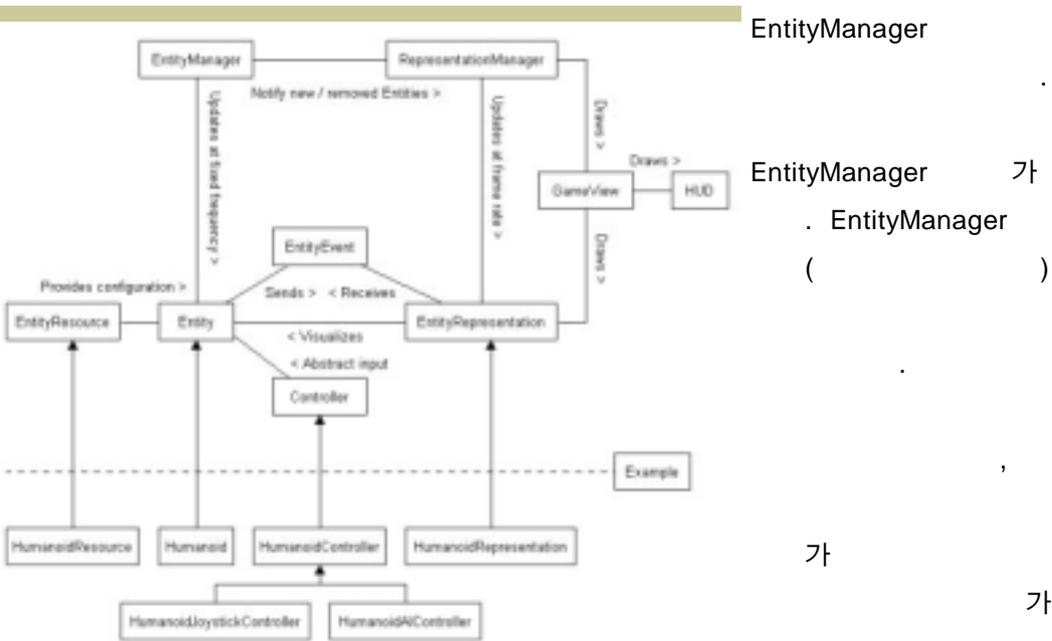
가

AI가

EntityRepresentation

EntityRepresentation

1 SSN67



EntityManager

EntityManager 가

EntityManager

()

가

가

가

1: 가

Humanoid

EntityManager

RepresentationManager 가 (visibility) (spatial hierarchy) EntityRepresentation 가 가 EntityManager EntityRepresentation

1 RepresentationManager GameViews . GameView 가 EntityRepresentation RepresentationManager

HUD 2D . SSN67

가 NTSC 30 , PAL 25 SSN67 60 15Hz

15Hz EntityManager , (가 AI) AI ray casting AI /

AI AI 가 SSN67 가 VSYNC AI

가 () 15 1 1/15 가 2 1/15 가 (profiler)

(interpolation) 가 .

1 1/15

가

1 1/15

SSN67

(skinned model)

(pseudo code)

(helper)

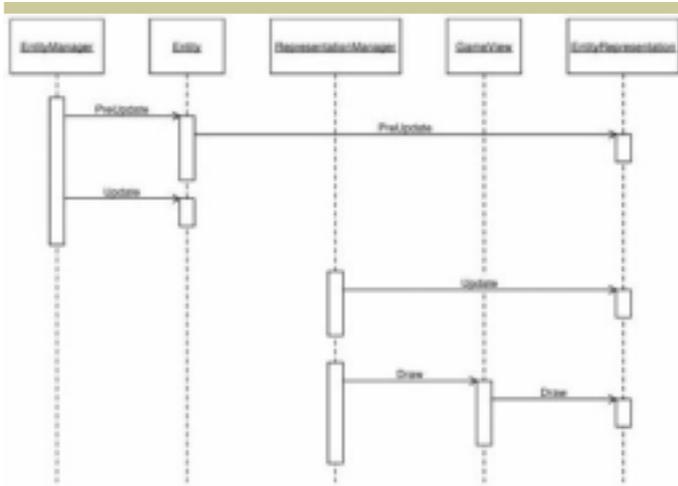
가 .

```
// Function called by the EntityManager to store the previous state
// of the Entity for interpolation
void ExampleEntity::PreUpdate(float FixedFrequencyTime)
{
    // Store the previous world matrix
    PreviousWorldMatrix = CurrentWorldMatrix
    // Store the previous array of bone matrices
    PreviousBoneMatrices = CurrentBoneMatrices
    // Notify our EntityRepresentation
    EntityRepresentation->PreUpdate(FixedFrequencyTime)
    // Reset changed flag for next frame
    Changed = FALSE
}
// Function called by the EntityManager after PreUpdate to
// update the state of the Entity
void ExampleEntity::Update(float FixedFrequencyTime)
{
    // Update game state (animations, position, etc.)
    ...
    // The EntityRepresentation needs to know if anything changed this frame
    // that requires interpolation
```

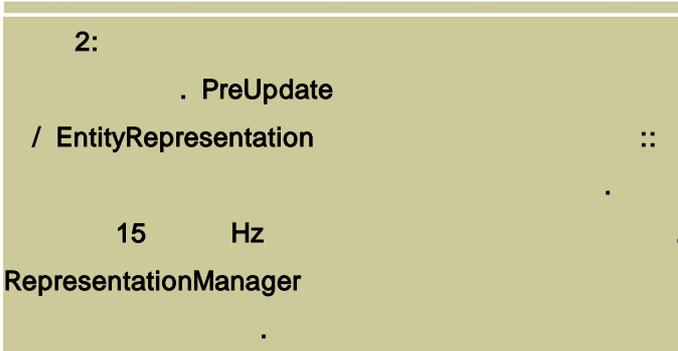
```

    if (CurrentWorldMatrix or CurrentBoneMatrices changed)
        Changed = TRUE
}
// Function called by Entity::PreUpdate to store the previous state
// of the EntityRepresentation for interpolation
void ExampleEntityRepresentation::PreUpdate(float FixedFrequencyTime)
{
    // This flag indicates of for the next 1/15 th second the EntityRepresentation
needs to interpolate
    MustInterpolate = Entity->Changed
    // Note the current time
    LastChangedTime = FixedFrequencyTime
}
// Function called by the Representation manager to update the state
// of the EntityRepresentation
void ExampleEntityRepresentation::Update(float RealTime)
{
    if (MustInterpolate)
    {
        // Calculate the interpolation fractor, the factor will be in the range [0, 1]
        float Factor = Min((RealTime - LastChangedTime) /
/ FixedFrequencyTimeStep, 1)
        // Use spherical linear interpolation for the world matrix
        WorldMatrix = SLERP(Entity->PreviousWorldMatrix, Entity->CurrentWorldMatrix,
Factor)
        // Use linear blending for the array of bone matrices
        BoneMatrices = (1 - Factor) * Entity->PreviousBoneMatrices + Factor * Entity-
>CurrentBoneMatrices
    }
    else
    {
        // We're not interpolating so we can simply use the current Entity // state
        WorldMatrix = Entity->CurrentWorldMatrix
        BoneMatrices = Entity->CurrentBoneMatrices
    }
}
}

```



(world matrix)
 (spherical
 linear interpolation (SLERP)) ,
 (bone matrix)
 (linear interpolation)



가

가 15Hz 가 (bounding box)

15Hz

LOD

15Hz

N

(15 / N)Hz

가

가

N = 1

N

가

EntityRepresentation 1

N

EntityRepresentation

(interpolation factor)

LOD

가

(side effect)

가 SSN67 가
 , () 가
 EntityRepresentation
 EntityRepresentation .
 가 , ,
 가 180 가 . To
 solve these problems simply turn off interpolation for one update by setting
 PreviousWorldMatrix = CurrentWorldMatrix and PreviousBoneMatrices =
 CurrentBoneMatrices (interpolation) .

Model-View-Controller EntityRepresentation
 가 .
 가 ,
 가 .
 Model-View-Controller (deterministic game)
 (controller input + random seed)
 가 .
 가 (EntityRepresentation) 가
 가 .

Model-View-Controller 가
 가 가
 . SSN67 가 .

SSN67
 가 .

- [SSN67]: *Shellshock: Nam '67* – Developed by Guerrilla, published by Eidos (<http://www.shellshockgame.com/>)
- [Bloom]: *Stranger's Wrath* – Charles Bloom – Speech at game|tech 2004 (http://www.cbloom.com/3d/game_tech_04.zip)
- [Butcher]: *Halo 2* – Chris Butcher – Speech at game|tech 2004 (<http://www.game-tech.com/>)
- [Stelly]: *Half Life 2* – Jay Stelly – Speech at game|tech 2004 (<http://www.game-tech.com/>)
- [DP]: *Design Patterns: Elements of Reusable Object-Oriented Software* - Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides (<http://www.amazon.com/exec/obidos/ASIN/0201633612/002-1551927-3481617>)
- [LUA]: The LUA scripting language (<http://www.lua.org/>)