Blueprint Visual Scripting

Level Blueprints & Class Blueprints

What are Blueprints?

Visual Scripting System

- Node-based programming
- No C++ code required
- Visual logic flow
- Rapid prototyping
- Designer-friendly

Key Components

- Nodes - Individual actions
- Pins - Connections between nodes
- Variables - Data storage
- Events - Triggers
- Functions - Reusable logic

Level Blueprint vs Class Blueprint

Level Blueprint

Scope: One specific level only
Purpose: Level-specific events and logic
Access: Blueprints → Open Level Blueprint
Examples:

1. • Opening doors when level starts
2. • Triggering cutscenes
3. • Managing level sequences

Class Blueprint

Scope: Reusable across all levels
Purpose: Object templates and behaviors
Access: Content Browser → Create Blueprint
Examples:

1. • Player character controls
2. • Pickable items
3. • Enemy AI behavior

Level Blueprint Example

Automatic Door with Trigger Box

Blueprint Script:

1. **Event:** Actor Begin Overlap (TriggerBox)
   └─> Other Actor: Player Character

2. **Action:** Timeline - "Door Open"
   └─> Set Relative Location (Door)
       - Start: Z = 0
       - End: Z = 200
       - Duration: 1.5 seconds

3. **Event:** Actor End Overlap (TriggerBox)
   └─> Reverse Timeline

Level Blueprint Example

Toggle Light with Key Press

```
Blueprint Script:

1. Event: F Key Pressed

2. Variable: IsLightOn (Boolean) = false

3. Logic Flow:
   └─> Branch (IsLightOn)
       ├─> True: Set Light Intensity = 0
       │         Set IsLightOn = false
       │
       └─> False: Set Light Intensity = 5000
                  Set IsLightOn = true

4. Target: Reference to PointLight1 in level
```

Class Blueprint Example

Collectible Health Pack

Blueprint Script:

Components:
- Static Mesh - Health pack model
- Sphere Collision - Pickup trigger

Variables:
- HealAmount (Float) = 25.0
- RotationSpeed (Float) = 90.0

Event: Component Begin Overlap
└─> Cast to Character (Other Actor)
    ├─> Success:
    │   └─> Add Health (Character, HealAmount)
    │   └─> Destroy Actor (Self)
    └─> Fail: Do Nothing

Class Blueprint Example

Continuously Rotating Platform

Blueprint Script:

Components:
• Static Mesh - Platform mesh

Variables:
• RotationSpeed (Vector) = (0, 0, 45)
  // X, Y, Z rotation per second

Event: Event Tick (Delta Seconds)
└─> Get Actor Rotation
    └─> Add (Rotation, RotationSpeed * Delta Seconds)
        └─> Set Actor Rotation

Note: Delta Seconds ensures smooth rotation independent of frame rate

Class Blueprint Example

Pressable Button with Custom Event

Blueprint Script:

Variables:

- IsPressed (Boolean) = false
- PressedLocation (Vector) = (0, 0, -5)

Event: Actor On Clicked

└> Branch (NOT IsPressed)

  └> True:

    ├> Set IsPressed = true

    ├> Add Relative Location (PressedLocation)

    └> Call Custom Event: OnButtonPressed

Custom Event: OnButtonPressed

- Can be overridden in child blueprints
- Use Event Dispatcher for level blueprint communication

Blueprint Best Practices

Organization

- Use comments
- Group related nodes
- Name variables clearly
- Create functions for reusable logic
- Use folders in My Blueprint panel

Performance

- Avoid heavy logic in Event Tick
- Use timers for repeated tasks
- Cache references
- Pure functions when possible
- Minimize Cast nodes

Debugging

- Use Print String nodes
- Set breakpoints
- Watch variables
- Enable Execute pins
- Test incrementally

Essential Blueprint Nodes

Node Type	Purpose	Example Use
Event Begin Play	Runs once when actor spawns	Initialize variables, spawn effects
Event Tick	Runs every frame	Continuous movement, lookAt
Branch	If/else logic flow	Check conditions, switch states
Cast To	Check object type	Get player, verify character
Set Timer	Delayed or repeated execution	Respawn pickups, cooldowns
Print String	Debug output to screen	Show variable values, test logic
Get/Set	Read/write variables	Access health, position, states

Variables & Data Types

Basic Types

Boolean - true/false

Example: IsAlive, CanJump

Integer - Whole numbers

Example: Score, AmmoCount

Float - Decimal numbers

Example: Health, Speed

String - Text

Example: PlayerName, Message

Advanced Types

Vector - 3D coordinates (X,Y,Z)

Example: Location, Velocity

Rotator - Rotation (Pitch,Yaw,Roll)

Example: ActorRotation

Object Reference - Link to actor

Example: TargetEnemy, DoorRef

Array - List of items

Example: Inventory, EnemyList