

# Unity Composition Manual

PiRho Soft

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# Animation Player

Animation Player is a [MonoBehaviour](#) that utilizes [Unity's Playables API](#) to play simple [AnimationClips](#) on a [GameObject](#). This is best used on objects that do not need the complexity and overhead of full fledged [AnimatorControllers](#).

See the *"FinishDoor"* object in the *"Maze2"* scene and the *"MazeJewel"* [Instruction Graph](#) in the Maze project for an example usage.

# Audio Player

Audio Player is a [MonoBehaviour](#) that utilizes Unity's Playables API to play simple [AudioClips](#) on a [GameObject](#).

See the "Maze1" scene and the "MazeKey" [Instruction Graph](#) in the Maze project for an example usage.



# Axis Input

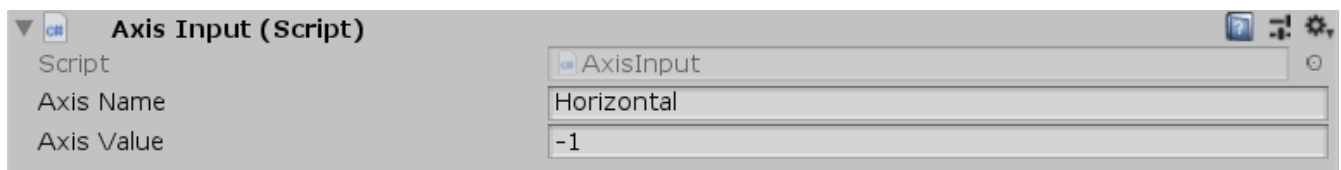
Axis Input is a [MonoBehaviour](#) that will set a value on an input axis when an object is clicked. This can be used in conjunction with the [InputHelper](#) to create virtual axes for things like on screen buttons in a mobile game that move a character directionally or to trigger actions.

See the "MazeUI" scene in the Maze project for an example usage.



Because this uses Unity's [IPointerHandler](#) interface the object must have either a [Graphic](#) or a [Collider](#) and the [Canvas](#) or [Camera](#) must have a [GraphicRaycaster](#) or [PhysicsRaycaster](#) respectively.

## Fields



Name	Description
Axis Name	The name of the input axis to set when clicked
Axis Value	The value to set the input axis to when clicked

# Bar Binding

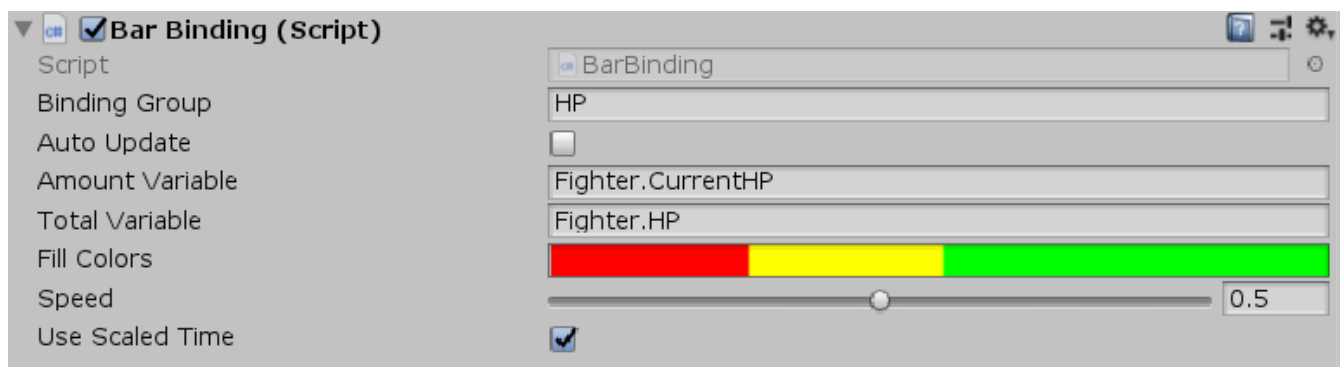
Bar Binding is a [Variable Binding](#) that will set the fill amount and blend color of a sibling [Image](#) based on bindings to two int or float variables. If *AmountVariable* or *TotalVariable* is invalid or does not return an int or float, then the image will be disabled. If speed is greater than 0.0f then changes will be animated to between values. Custom color gradients can also be set depending on the fill amount. Bar Bindings are useful for things like health and progress bars.

See the "Battle" scene in the Battle project for an example usage.



Make sure the *Image Type* property on [Image](#) is set to *Filled* for the Bar Binding to work properly.

## Fields



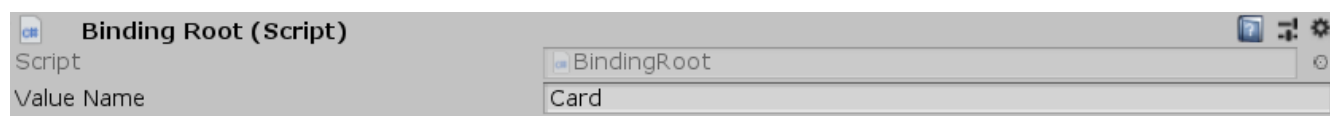
Name	Description
Amount Variable	The <a href="#">VariableReference</a> that represents the fractional amount of the fill
Total Variable	The <a href="#">VariableReference</a> that represents the total amount of the fill
Fill Colors	The <a href="#">Gradient</a> to base the blend color on
Speed	The speed at which to animate changes (in percentage of the total per second)
Use Scaled Time	Whether to base the speed off of scaled time or real time

# Binding Root

Binding Root is a [MonoBehaviour](#) that acts as a root object for all child [Variable Bindings](#) to bind data on. Binding Roots have a *Value* property that child bindings access via the *Value Name* property. *Value* can be set from a derived class such as [Object Binding Root](#) or through a [Set Binding Node](#). When accessing variables on a Binding Root, the search will cascade upward to the next Binding Root in the hierarchy with the the default variable store on the [Composition Manager](#) as the base. [Selection Controls](#) and [Menus](#) use Binding Roots on each of their child [Menu Items](#) to group each item's data.

See the "Card" prefab in the CardGame project for an example usage.

## Fields



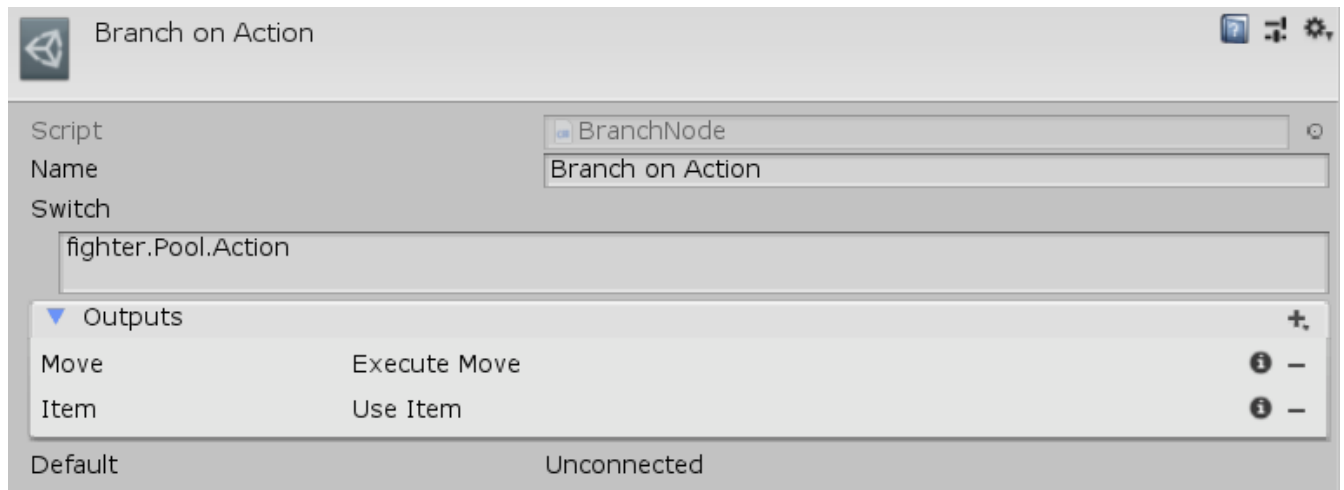
Name	Description
Value Name	The name of the variable that child <a href="#">Variable Bindings</a> can use in order to access this Binding Root's <i>Value</i> .

# Branch Node

A Branch Node is an [Instruction Graph Node](#) that will branch to any number of different nodes based on the the string evaluation of an [Expression](#). This can be thought of similar to a switch statement in C#. Create a Branch Node in the **Create › Control Flow › Branch** menu of the Instruction Graph Window.

See the node named *"Branch on Action"* on the *"Battle"* [Instruction Graph](#) in the Battle project for an example usage.

## Fields



Name	Description
Switch	The <a href="#">Expression</a> to run to determine the node to branch to
Outputs	The dictionary of names to nodes to branch to based on <i>Switch</i>
Default	The default node to go to if the value of <i>Switch</i> is not in the <i>Outputs</i> dictionary

# Break Node

A Break Node is an [Instruction Graph Node](#) that will force the most recent [ILoopNode](#) to stop running. [ILoopNode](#) is implemented by [Loop Node](#) and [Iterate Node](#). Create a Break Node in the **Create › Control Flow › Break** menu of the Instruction Graph Window.

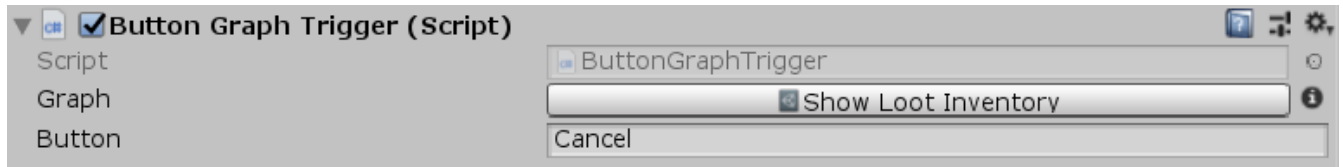
See the "*BoardLoop*" [Instruction Graph](#) in the BoardGame project for an example usage.

# Button Graph Trigger

Button Graph Trigger is an [Instruction Trigger](#) that will run its [Instruction Graph](#) when the the specified *Button* is pressed.

See the "*Loot Level*" scene in the Loot project for an example usage.

## Fields



Name	Description
Button	The name of the button that will trigger the <a href="#">Instruction Graph</a>

# Button Input

Button Input is a [MonoBehaviour](#) that will set an input button to be pressed the object is clicked on. This is useful for things like on screen buttons in a mobile game to trigger actions.

See the "Calculator" scene in the Calculator project for an example usage.



Because this uses Unity's [IPointerHandler](#) interface the object must have either a [Graphic](#) or a [Collider](#) and the [Canvas](#) or [Camera](#) must have a [GraphicRaycaster](#) or [PhysicsRaycaster](#) respectively.

## Fields




Name	Description
Button Name	The name of the button to be pressed when the object is clicked




# Call Method Node

A Call Method Node is an [Instruction Graph Node](#) can call any method on any [Object](#) provided that the parameters of the method can be stored in a [VariableValue](#). Create a Call Method Node in the **Create › Composition › Call Method** menu of the Instruction Graph Window.

## Fields



Call Method



Name

Next

Target

Object Type

Method

Output

Call Method

Unconnected

Value

Reference

player

Transform

Vector3 TransformPoint(Vector3 position)

position

Parameters

position

Value

Reference

X 10 Y 5 Z 5

Name	Description
Target	The <a href="#">VariableSource</a> to the object to get call the method on
Object Type	The type of the <a href="#">Object</a> to call the method on
Method	The method to call
Output	The <a href="#">VariableReference</a> to set the return value of the method to (if it is not void)
Parameters	A list of <a href="#">VariableSources</a> to pass as parameters to the method



# Clear Transition

A Clear Transition Node is an [Instruction Graph Node](#) that is used to manually end the current [Transition](#). Generally ending a [Transition](#) happens with the *AutoFinish* property on a [Play Transition](#) node however, in the case that a [Transition](#) needs to be ended manually this node is available. Create a Clear Transition Node in the **Create › Sequencing › Clear Transition** menu of the Instruction Graph Window.

# Click Graph Trigger

Click Graph Trigger is an [Instruction Trigger](#) that will run its [Instruction Graph](#) when it is clicked on.

See the "Card" prefab in the CardGame project for an example usage.



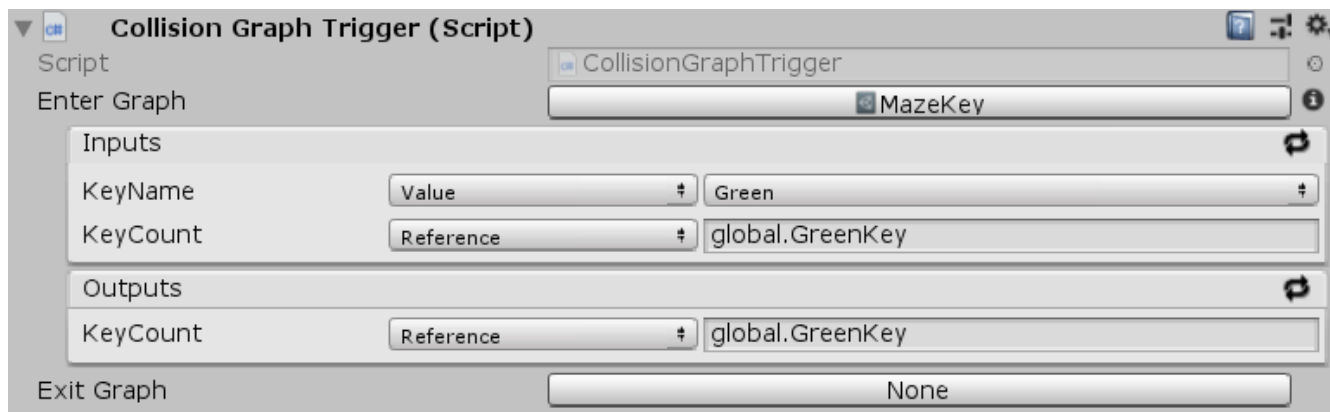
Because this uses Unity's [IPointerHandler](#) interface the object must have either a [Graphic](#) or a [Collider](#) and the [Canvas](#) or [Camera](#) must have a [GraphicRaycaster](#) or [PhysicsRaycaster](#) respectively.

# Collision Graph Trigger

Collision Graph Trigger is an [Instruction Trigger](#) that will run its [Instruction Graph](#) on collisions. Collision Graph Trigger works in conjunction with a [Collision Notifier](#) which will call the respective Enter and Exit functions on the Collision Graph Trigger.

See the "Maze1" scene in the Maze project for an example usage.

## Fields



Name	Description
Enter Graph	The <a href="#">Instruction Graph</a> to run when this object is collided with.
Exit Graph	The <a href="#">Instruction Graph</a> to run when this object is exited.

# Collision Notifier

A Collision Notifier is a [MonoBehaviour](#) used to trigger events during collisions. It works in conjunction with an [ICollisionTrigger](#) which can be implemented to receive an `Enter()` and an `Exit()` call when this object starts and stops colliding with the trigger. The [Collision Graph Trigger](#) is an example implementation of an [ICollisionTrigger](#) that can interact with a Collision Notifier.

See the *"Player" script and the "Maze1" scene* in the Maze project for an example usage.

# Command

A Command is a [Asset](#) that can be created to give access to custom [Expression](#) logic that can be reused and called from other [Expressions](#). This is useful when you have more complex logic that will be calculated in multiple locations. Commands can unify that logic so that it doesn't have to be written multiple times and changing it once changes it for all instances that use it. Create a Command through the **Create › PiRho Soft › Command** menu in the project view.



Because a Command is a "Resource" it must be placed in a folder called "Commands" as a direct subfolder of a "Resources" folder so that it can be loaded and accessed on demand.

See the "Apply Damage" [Expression Node](#) of the "BattleScratch" [Instruction Graph](#) in the Battle project for an example usage.


## Fields

Name	Description
Name	The string name of the Command that is used in an <a href="#">Expression</a> to call this command
Parameters	The list of <a href="#">Variables</a> that should be passed to this Command - these can be accessed by name in <i>Expression</i>
Expression	The <a href="#">Expression</a> that this command will run when it is called

# Comment Node

A Comment Node is an [Instruction Graph Node](#) that is used for debugging purposes. It is inert during runtime and is purely used to display custom info about how a graph is functioning. Create a Comment Node in the **Create > Debug > Comment** menu of the Instruction Graph Window.

## Fields

 Comment

Script

CommentNode

Name

Comment

Comment

This comment will be displayed in the graph window

Name	Description
Comment	The string value of the comment

# Composition Manager


The Composition Manager is a [MonoBehaviour](#) that manages the entire composition system. Because Composition Manager is a [GlobalBehaviour](#), it is created automatically the first time it is accessed so it does not need to be added to any objects in a scene. Composition Manager maintains a "global" [IVariableStore](#) that can be accessed from any [VariableReference](#) or [Expression](#) using the "global" accessor. It also maintains the "scene" [IVariableStore](#), which gives access to [GameObjects](#) in the scene by name using the "scene" accessor. [Instruction Graphs](#) can be manually run from script through the Composition Manager using the `Run()` method.

# Conditional Node

A Conditional Node is an [Instruction Graph Node](#) that branches the progression of an [Instruction Graph](#) based on the true or false evaluation of the [Expression](#), *Condition*. Create a Conditional Node in the **Create > Control Flow > Conditional** menu of the Instruction Graph Window.

See the *"HasKey"* node in "MazeDoor" [Instruction Graph](#) in the Maze project for an example usage.

## Fields

 Has Key

Script

ConditionalNode

Name

Has Key

On True

Disable Door

On False

Can't Open Message

Condition

input.KeyCount > 0;

Name	Description
Condition	The <a href="#">Expression</a> to evaluate to determine the progression of the graph

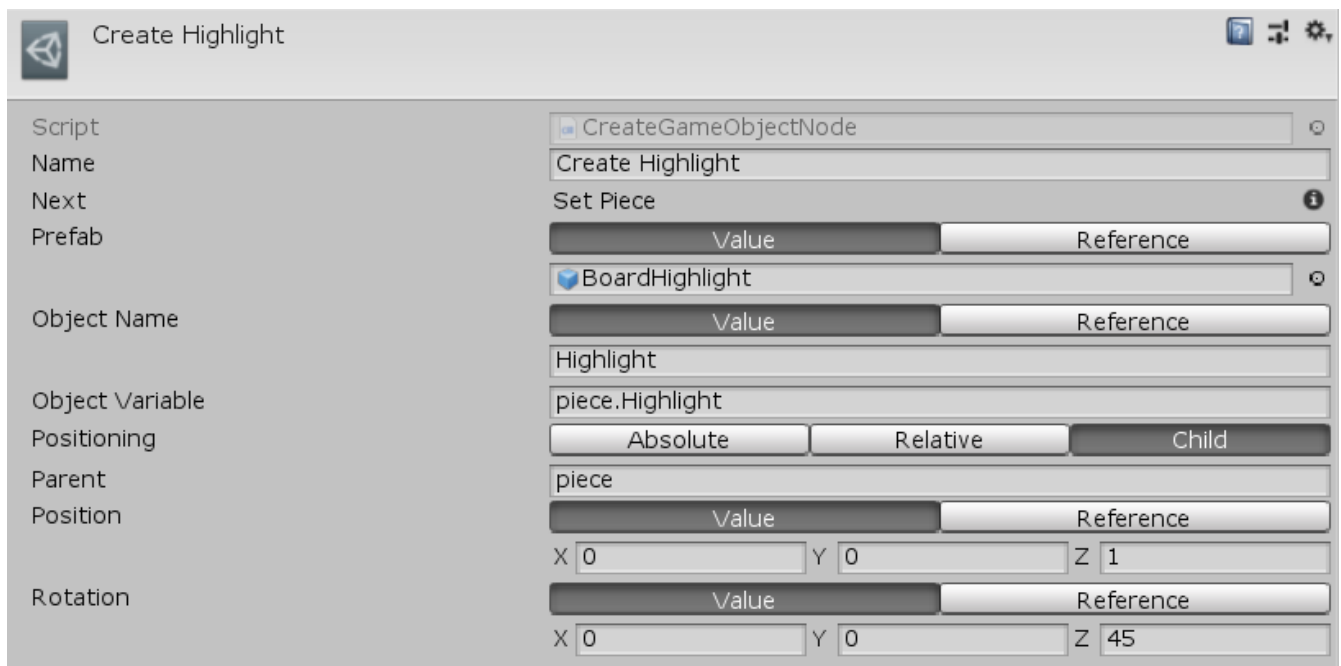


# Create Game Object Node

A Create Game Object Node is an [Instruction Graph Node](#) that will spawn a Prefab at the given Name, Position, and Rotation relative to the world, another object, or as a child object. The created object can optionally be stored in a given [VariableReference](#) so that it can be accessed later. Create a Create Game Object Node in the **Create › Object Manipulation › Create Game Object** menu of the Instruction Graph Window.

See the "Create Highlight" node on the "BoardTakeTurn" [Instruction Graph](#) in the BoardGame project for an example usage.

## Fields



The screenshot shows the 'Create Highlight' node configuration window. The fields are as follows:

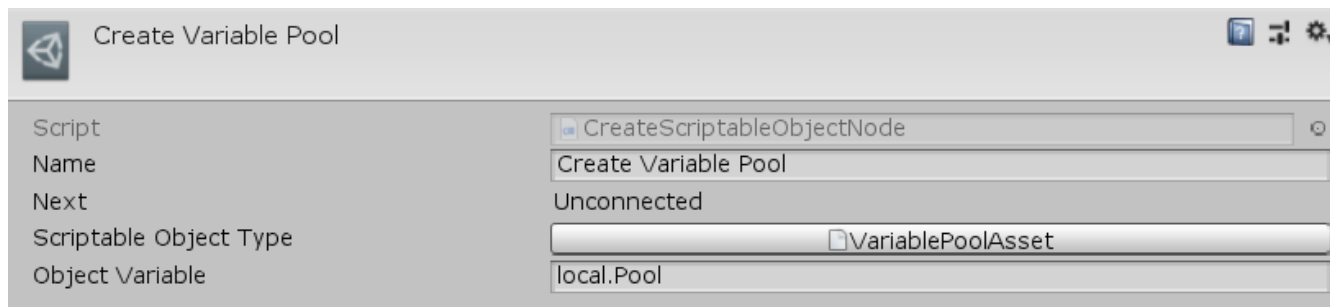
- Script: CreateGameObjectNode
- Name: Create Highlight
- Next: Set Piece
- Prefab: BoardHighlight
- Object Name: Highlight
- Object Variable: piece.Highlight
- Positioning: Child
- Parent: piece
- Position: X: 0, Y: 0, Z: 1
- Rotation: X: 0, Y: 0, Z: 45

Name	Description
Prefab	The prefab to create
Object Name	The name of the new object.
Object Variable	The <a href="#">VariableReference</a> to store the created object in
Positioning	The <a href="#">ObjectPositioning</a> to create the object at
Object	If <i>Positioning</i> is Relative, the object to position the created object relative to
Parent	If <i>Positioning</i> is Child, the object to make the parent of the created object
Position	The position of the new object - can be a <a href="#">Vector3</a> value or a <a href="#">VariableReference</a>
Rotation	The rotation of the new object - can be a <a href="#">Vector3</a> value or a <a href="#">VariableReference</a> , stored as euler angles

# Create Scriptable Object Node

A Create Scriptable Object Node is an [Instruction Graph Node](#) that will create a new instance of a [ScriptableObject](#) and store it in the given [VariableReference](#). Create a Create Scriptable Object Node in the **Create › Object Manipulation › Create Scriptable Object** menu of the Instruction Graph Window.

## Fields



Name	Description
Scriptable Object Type	The type of the <a href="#">ScriptableObject</a> to create
Object Variable	The <a href="#">VariableReference</a> to store the created object in

# Cutoff

Cutoff is an abstract implementation of a [Transition](#) that provides a custom [Shader](#) with an interface to fade, distort, and dissolve the screen image over time using an input texture. Each RGB color component of the input texture is sampled by the [Shader](#) and used to determine the output. The R and G channels determine the direction of the distortion original image (distortion) as the x and y offset respectively. Values less than 128 will be negative offset and values greater than 128 will be positive offset. The B component of the image determines the dissolve of the image with higher values being cutoff later in the transition. The Color property determines the color to fade to as time goes on or when the B component is cutoff.

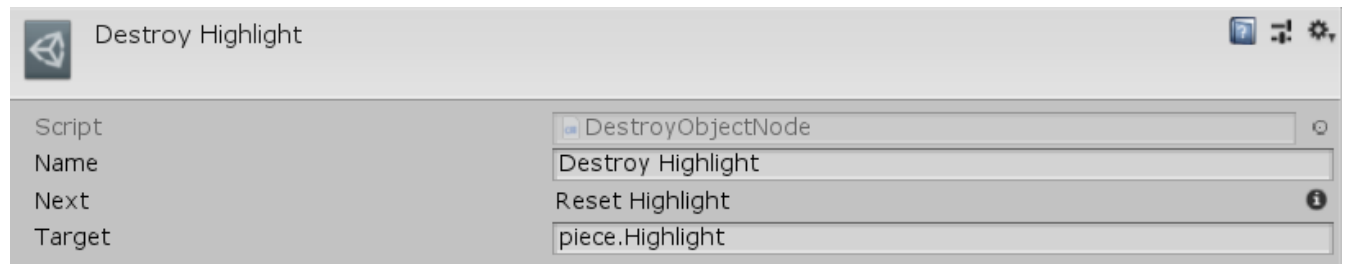
See the [Fade](#) or [Dissolve](#) classes for example implementations of a Cutoff transition.

# Destroy Object Node

A Destroy Object Node is an [Instruction Graph Node](#) that will destroy any [Object](#) that has been previously created, either by a [Create Game Object Node](#), a [Create Scriptable Object Node](#), or that is loaded in a scene. Create a Destroy Object Node in the **Create › Object Manipulation › Destroy Object** menu of the Instruction Graph Window.

See the "Destroy Highlight" node on the "BoardTakeTurn" [Instruction Graph](#) in the BoardGame project for an example usage.

## Fields




Name	Description
Target	The <a href="#">VariableReference</a> to the object to be destroyed

# Disable Behaviour Node

A Disable Behaviour Node is an [Instruction Graph Node](#) that will disable a [Behaviour](#) on the given [GameObject](#). Create a Disable Behaviour Node in the **Create › Object Manipulation › Disable Behaviour** menu of the Instruction Graph Window.

See the "Disable Player" node on the "MazeStart" [Instruction Graph](#) in the Maze project for an example usage.

## Fields

 Disable Player

Script

DisableBehaviourNode

Name

Disable Player

Next

Unconnected

Target


player

Name	Description
Target	The <a href="#">VariableReference</a> to the <a href="#">Behaviour</a> to disable

# Disable Game Object Node

A Disable Game Object Node is an [Instruction Graph Node](#) that will deactivate a [GameObject](#). Create a Disable Game Object Node in the **Create › Object Manipulation › Deactivate Game Object** menu of the Instruction Graph Window.

## Fields

 Disable Game Object

Script

Name

Next

Target

DisableGameObjectNode

Disable Game Object

Unconnected

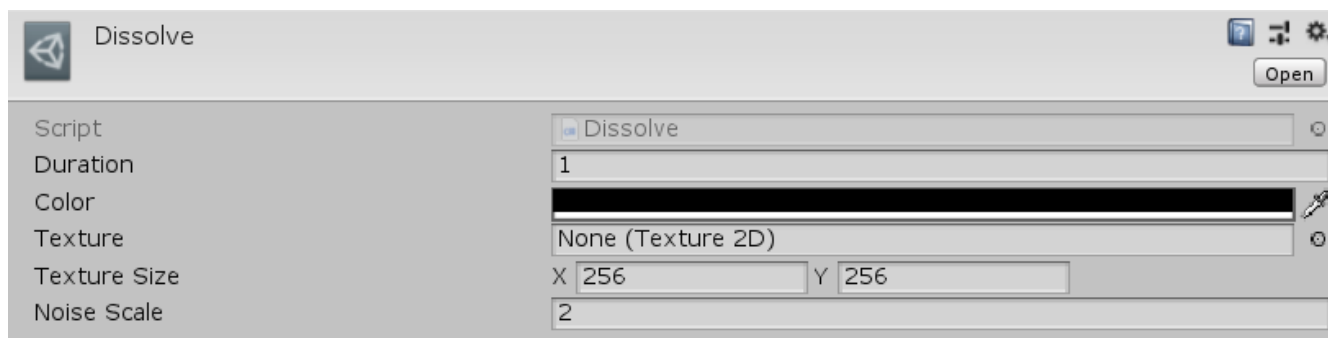
scene.Player

Name	Description
Target	The <a href="#">VariableReference</a> to the <a href="#">GameObject</a> to deactivate

# Dissolve

Dissolve is an implementation of a [Cutoff Transition](#) that will fade the screen based on an input [Texture](#) over the duration of the [Transition](#). The blue component of the texture will be read as the value of the cutoff. Higher values will take longer to dissolve - values of 0 will be *Color* right from the beginning of the [Transition](#), and values of 255 will not dissolve to *Color* until the end of the [Transition](#). If *Texture* is null, a [Texture](#) will automatically be generated with perlin noise to create a smooth looking transition. Create a Dissolve through the **Create › PiRho Soft › Transitions › Dissolve** menu in the project view.

## Fields




Name	Description
Color	The <a href="#">Color</a> of the screen to dissolve to
Texture	The input <a href="#">Texture</a> that gives the pattern of the dissolve
Texture Size	If <i>Texture</i> is null, the size of the <a href="#">Texture</a> to generate
Noise Scale	If <i>Texture</i> is null, the scale value of the perlin noise generated as the input <a href="#">Texture</a>

# Enable Behaviour Node

An Enable Behaviour Node is an [Instruction Graph Node](#) that will enable a [Behaviour](#) on the given [GameObject](#). Create an Enable Behaviour Node in the **Create › Object Manipulation › Enable Behaviour** menu of the Instruction Graph Window.

See the "Enable Player" node on the "MazeStart" [Instruction Graph](#) in the Maze project for an example usage.

## Fields

 Enable Player

Script

EnableBehaviourNode

Name

Enable Player

Next

Unconnected

Target

player

Name	Description
Target	The <a href="#">VariableReference</a> to the <a href="#">Behaviour</a> to enable



# Enable Binding

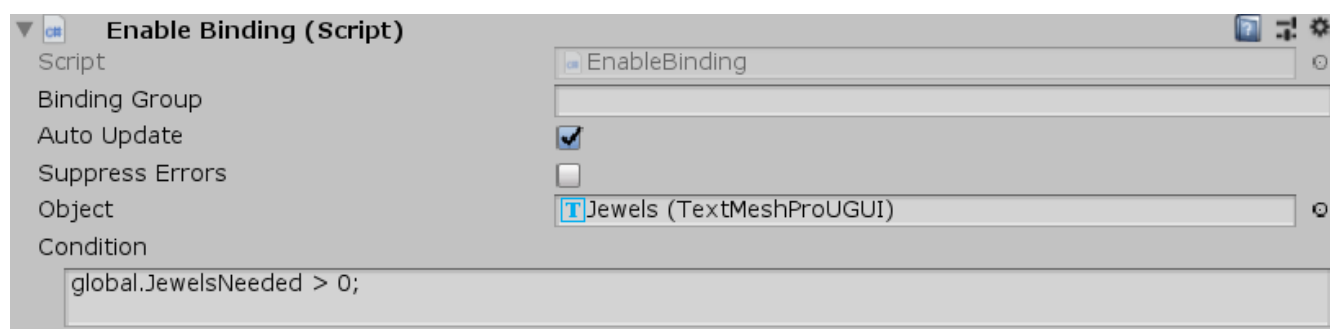
Enable Binding is a [Variable Binding](#) that will enable or disable an [Object](#) based on the evaluation of an [Expression](#). *Object* must be a [GameObject](#), [Behaviour](#), or [Renderer](#) as these are the only [Object](#), types that Unity allows to be enabled and disabled. If *Condition* is invalid or does not return a bool, then the object will be disabled.



If *Object* is set to this binding or the [GameObject](#) that has this binding, then the *AutoUpdate* flag will not function as this binding will not receive `UpdateBinding()` calls from the [Composition Manager](#)

See the "MazeUi" scene in the Maze project for an example usage.

## Fields




Name	Description
Object	The <a href="#">GameObject</a> , <a href="#">Behaviour</a> , or <a href="#">Renderer</a> to enable or disable based on <i>Condition</i>
Condition	The <a href="#">Expression</a> that determines whether <i>Object</i> will be enabled or disabled

# Enable Game Object Node

An Enable Game Object Node is an [Instruction Graph Node](#) that will activate a [GameObject](#). Create an Enable Game Object Node in the **Create › Object Manipulation › Activate Game Object** menu of the Instruction Graph Window.

## Fields

 Activate Player

Script

EnableGameObjectNode

Name

Activate Player

Next

Unconnected

Target

scene.Player

Name	Description
Target	The <a href="#">VariableReference</a> to the <a href="#">GameObject</a> to activate

# Enable Graph Trigger

Enable Graph Trigger is an [Instruction Trigger](#) that will run its [Instruction Graph](#) when this object becomes enabled (in its `OnEnable()` message).

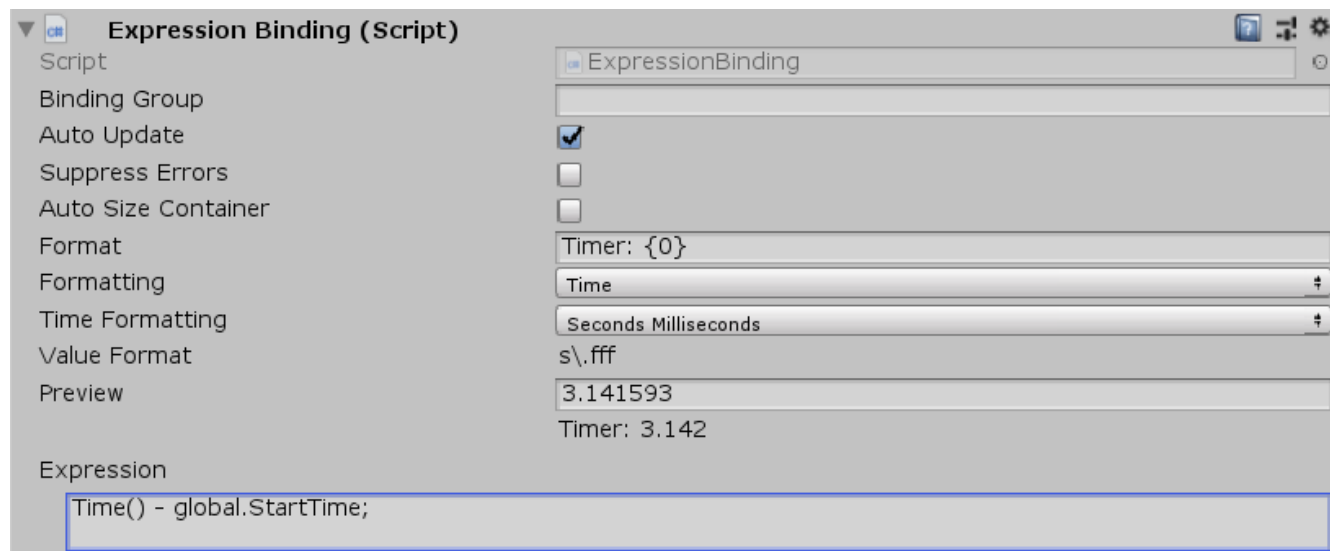
See the "Gate" objects in the "*Maze3*" scene of the Maze project for an example usage.

# Expression Binding

Expression Binding is a [String Binding](#) that will run an [Expression](#) and bind its output as the displayed string. If *Expression* evaluates to a float or an int, then customized [Formatting](#) can be applied. If *Expression* is invalid, then the text component will be disabled.

See the "MazeUi" scene in the Maze project for an example usage.

## Fields



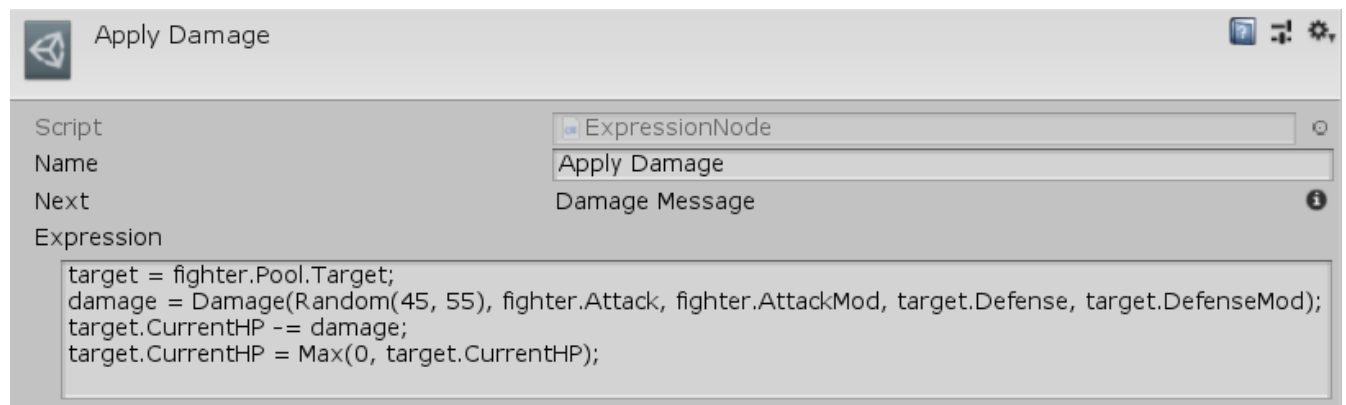
Name	Description
Formatting	The <a href="#">Formatting</a> settings for the text if <i>Expression</i> is an int or a float
Expression	The <a href="#">Expression</a> to evaluate to determine the text

# Expression Node

An Expression Node is an [Instruction Graph Node](#) that runs an [Expression](#). Create an Expression Node in the **Create › Composition › Expression** menu of the Instruction Graph Window.

See the *"Apply Damage"* node in "BattleScratch" [Instruction Graph](#) in the Battle project for an example usage.

## Fields





Name	Description
Expression	The <a href="#">Expression</a> to run

# Fade

Fade is an implementation of a [Cutoff Transition](#) that will fade the screen to a static [Color](#) over the duration of the [Transition](#). Create a Fade through the **Create › PiRho Soft › Transitions › Fade** menu in the project view.

## Fields


 Fade




Script

Duration

Color

 Fade

1



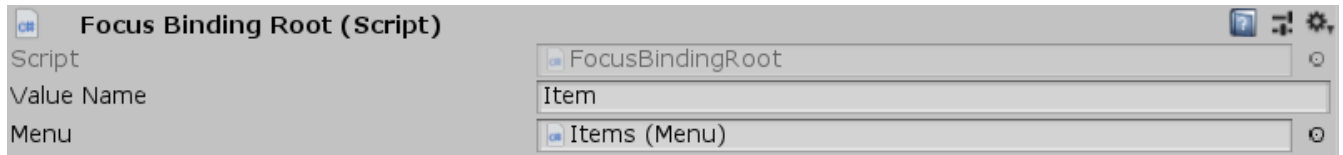
Name	Description
Color	The <a href="#">Color</a> to fade to

# Focus Binding Root

Focus Binding Root is a [Binding Root](#) that references a [Menu](#) in the scene and uses that [Menu's](#) currently focused [Menu Item](#) as the binding variables for the child [Variable Bindings](#).

See the *"Description"* object in the *"Shop"* scene of the Shop project for an example usage.

## Fields



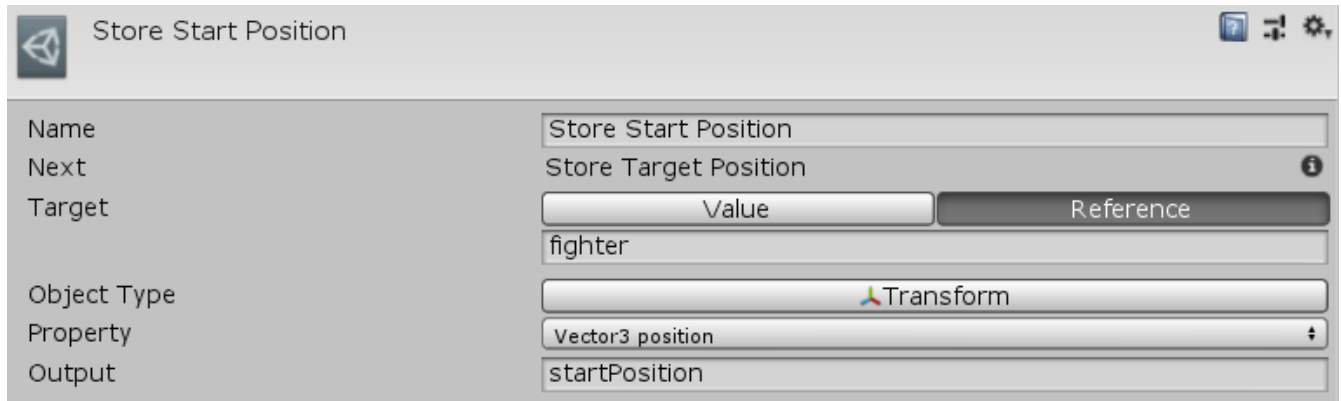
Name	Description
Menu	The <a href="#">Menu</a> whose focused item to use for binding variables

# Get Property Node

A Get Property Node is an [Instruction Graph Node](#) that can retrieve and store any property or field on any [Object](#) provided that the type of the property or field can be stored in a [VariableValue](#). Create a Get Property Node in the **Create › Composition › Get Property** menu of the Instruction Graph Window.

See the *"Store Start Position"* node on the *"BattleScratch"* [Instruction Graph](#) in the Battle project for an example usage.

## Fields



Name	Store Start Position
Next	Store Target Position ⓘ
Target	<div>ValueReference</div> fighter
Object Type	<div>Transform</div>
Property	<div>Vector3 position</div>
Output	startPosition

Name	Description
Target	The <a href="#">VariableSource</a> to the object to get the value from
Object Type	The type of the <a href="#">Object</a> to get the value from
Property	The property to get
Output	The <a href="#">VariableReference</a> to store the value in

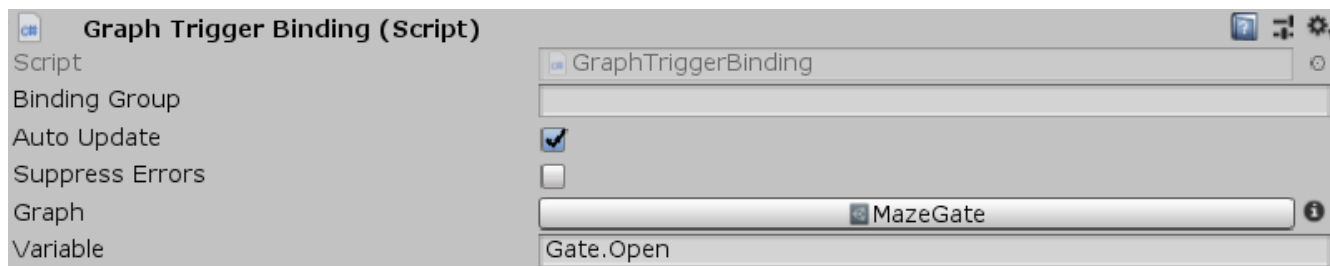


# Graph Trigger Binding

Graph Trigger Binding is a [Variable Binding](#) that runs an [Instruction Graph](#) when a given [VariablesReference](#) changes. *Graph* will always run the first time `UpdateBindings()` is called and it will not run again if it is already running.

See the "*Maze3*" scene in the Maze project for an example usage.

## Fields




Name	Description
Graph	The <a href="#">Instruction Graph</a> to run when <i>Variable</i> changes
Variable	The <a href="#">VariablesReference</a> to watch for changes in

# Hide Control Node

A Hide Control Node is an [Instruction Graph Node](#) that will deactivate an [Interface Control](#). Create a Hide Control Node in the **Create › Interface › Hide Control** menu of the Instruction Graph Window.

See the "Hide Timer" node on the "MazeEnd" [Instruction Graph](#) in the Maze project for an example usage.

## Fields

 Hide Timer

Script

Name

Next

Control

HideControlNode

Hide Timer

Set Finished

scene.Timer

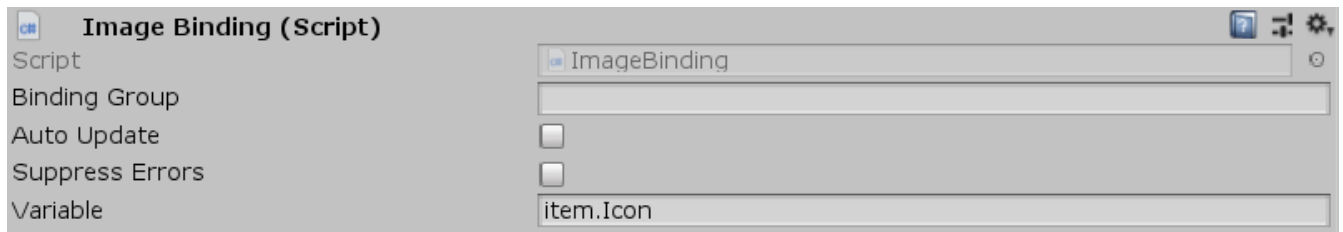
Name	Description
Control	A <a href="#">VariableReference</a> to the <a href="#">Interface Control</a> to hide

# Image Binding

Image Binding is a [Variable Binding](#) that will set the [Sprite](#) of a sibling [Image](#) based on the given [\[reference/variable-reference.html/VariableReference\]](#). If *Variable* is invalid, then the image will be disabled.

See the "*Loot Item Display*" prefab in the Loot project for an example usage.

## Fields

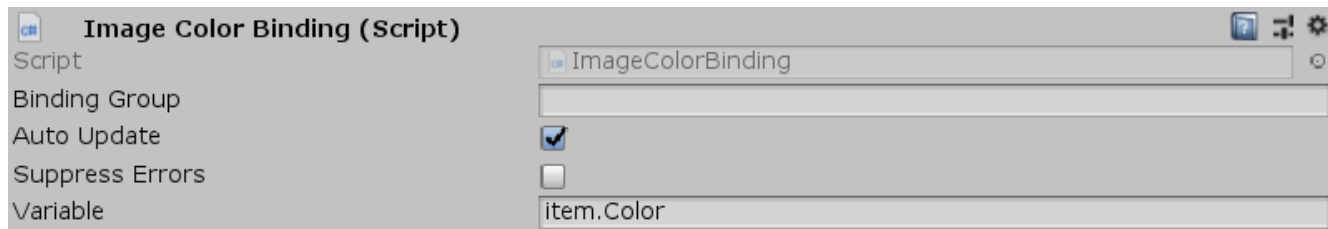


Name	Description
Variable	A <a href="#">VariableReference</a> to the <a href="#">Sprite</a> to display

# Image Color Binding

Image Color Binding is a [Variable Binding](#) that will set the blend color of a sibling [Image](#) based on the given [VariableReference](#). If *Variable* is invalid, then the image will be disabled.

## Fields



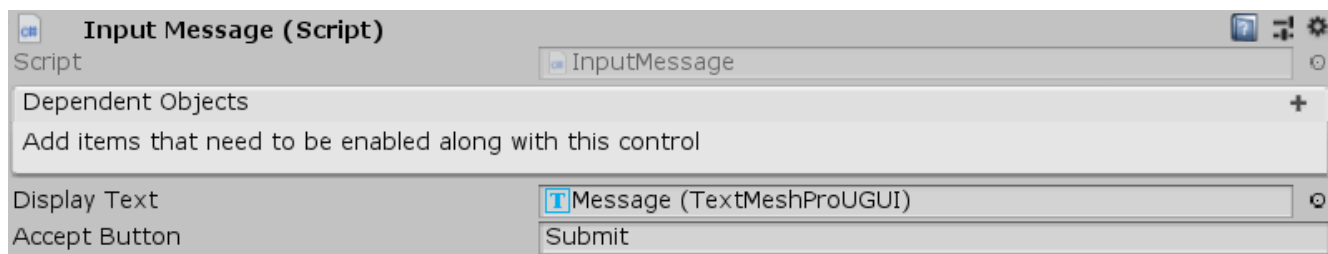
Name	Description
Variable	A <a href="#">VariableReference</a> to the <a href="#">Color</a> to use as the blend color

# Input Message

Input Message is an implementation of [Message Control](#) that waits for an input before finishing.

See the "MazeUI" scene in the Maze project for an example usage.

## Fields



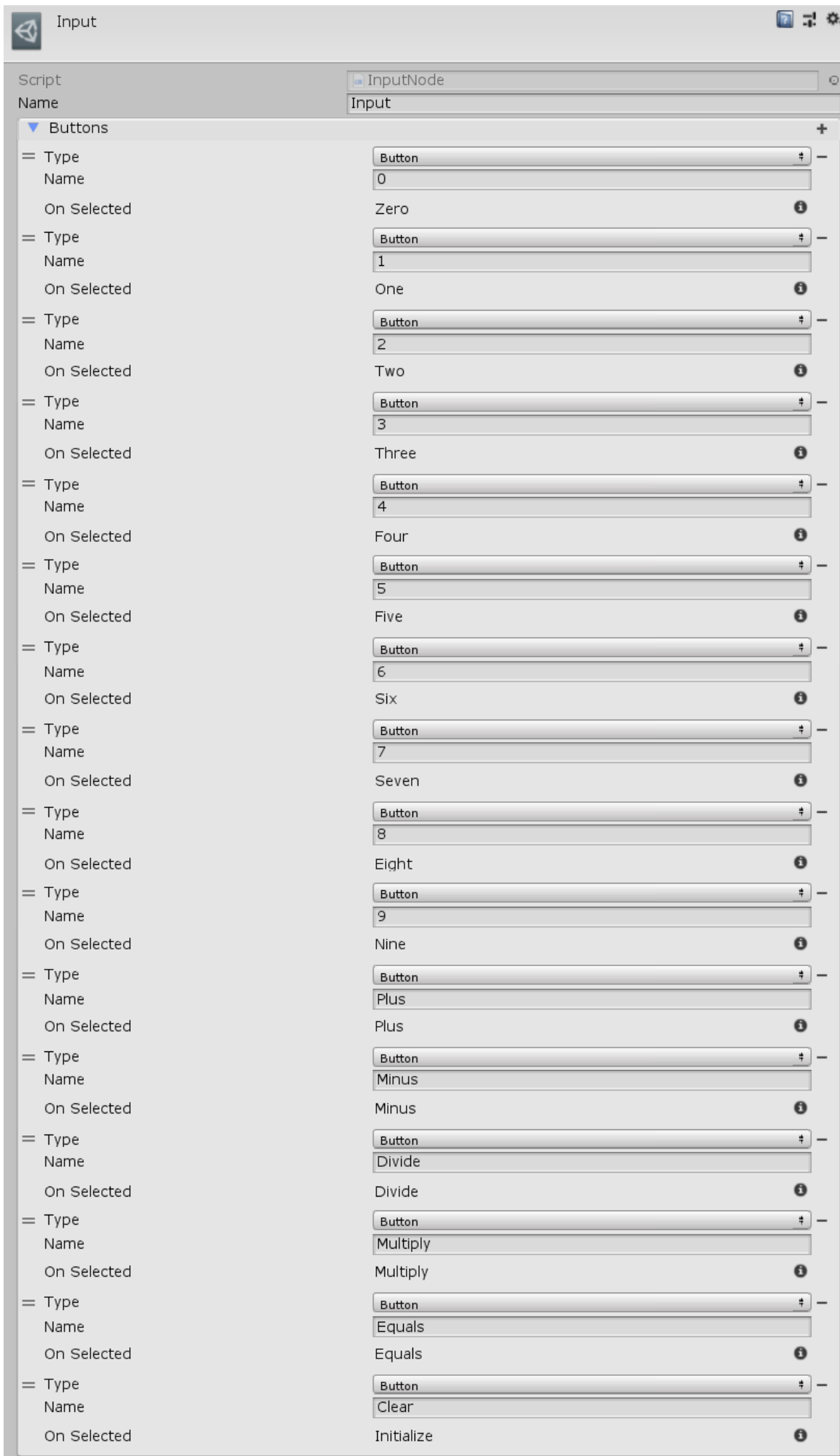
Name	Description
Accept Button	The string name of the button to wait to be pressed

# Input Node

An Input Node is an [Instruction Graph Node](#) that will wait to continue to the next node until an input is received. Any number of buttons, keys, or axes can be added to listen for input from, each specifying their own node to branch to. Each input specifies whether it is an Axis, Button, or Key. An Axis specifies the value that input axis must reach before triggering. Create a Branch Node in the **Create › Interface › Input** menu of the Instruction Graph Window.

See the "*Calculator*" [Instruction Graph](#) in the Calculator project for an example usage.

## Fields



Name	Description
Buttons	The list of button infos to listen for
Type	The <a href="#">ButtonType</a> to listen for - Axis, Button, or Key
Name	If Axis or Button, the name of the corresponding input to listen for
Value	If Axis, the magintude the axis must reach before being triggered
Key	If Key, the <a href="#">KeyCode</a> to listen for



# Instruction

Instruction is the base [Asset](#) from which all [Instruction Graph](#)'s derive. The Instruction class defines the [VariableDefinitions](#) of the Context and Inputs and Outputs used inside the [Instruction Graph](#).

# Instruction Graph

An abstract [Asset](#) that is the main component of the composition system. Create graphs and use the Instruction Graph Window to build [Nodes](#) that execute actions, and create connections to traverse through each node sequentially, similar to a flow chart. An Instruction Graph can have Input [Values](#) that are passed in from the calling object and Output [Values](#) that it returns to the calling object. All graphs have a *Context* [\[reference/variable-value.html\]](#) which is usually set to the object that originally ran the graph. Edit the definitions for the [Definitions](#) for the *Context*, *Inputs*, and *Outputs* in the inspector for an Instruction Graph, and each of them will automatically be cast to the correct type in script. Built in Instruction Graph types are the [Simple Graph](#), [Scoped Graph](#), and the [Mockup Graph](#) (used for prototyping).

## Fields

MazeDoor

Open

Open Editor

Context Name

door

Context Definition

Object

Constraint

GameObject

▼ Inputs

KeyCount

Int

Constraint

☐

KeyName

String

Constraint

Red

Green

Blue

Yellow

▼ Outputs

KeyCount

Int

Constraint

☐

Process

Has Key

i

▼ Nodes

Has Key

i

Door Disappear

i

Decrement Keys

i

Can't Open Message

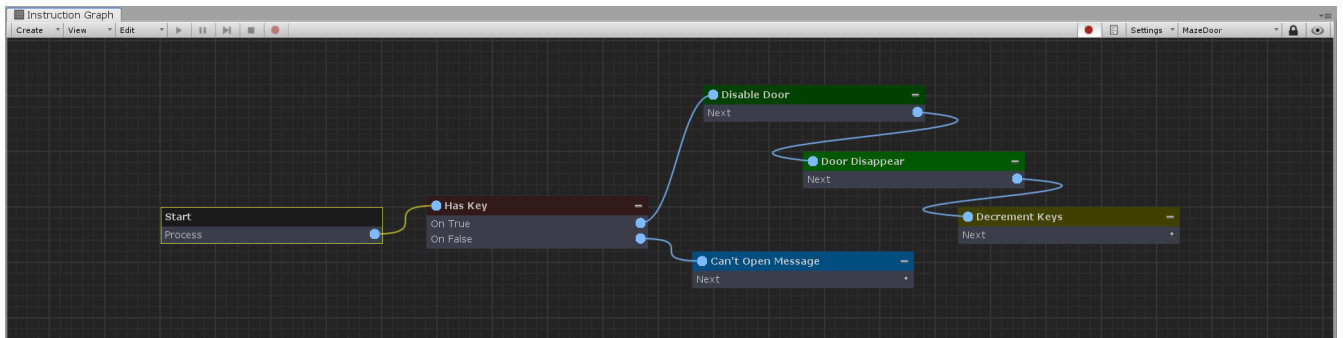
i

Disable Door

i

Name	Description
Context Name	The string name of the context <a href="#">Value</a> to be accessed in <a href="#">Expressions</a> and <a href="#">VariableReferences</a>
Context Definition	The <a href="#">VariableDefinition</a> to cast the context <a href="#">Value</a> to when the Instruction is run

Name	Description
Inputs	The list of <a href="#">VariableDefinitions</a> that describes the inputs into the Instruction
Outputs	The list of <a href="#">VariableDefinitions</a> that describes the outputs from the Instruction



# Instruction Graph Node

An abstract [Asset](#) that is the main component of an [Instruction Graph](#). This base class has no functionality itself appart from helper methods that may be called from derived classes (see [Reference](#)). To implement custom functionality for a node, simply derive and implement the `Run()` method.

## Fields

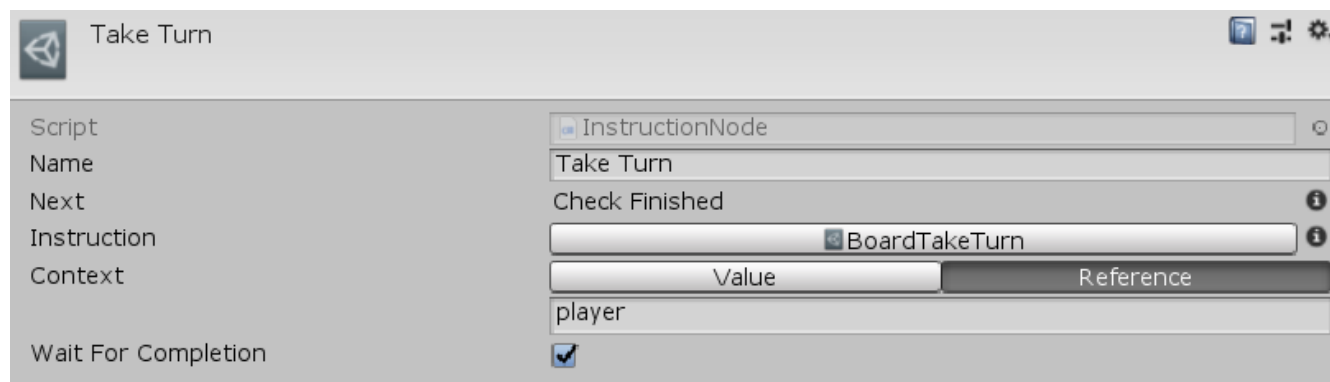
Name	Description
Name	A friendly name used to identify this node

# Instruction Node

An Instruction Node is an [Instruction Graph Node](#) that executes a different [Instruction Graph](#). Intruction Nodes can pass in a new *Context* object to *Instruction* and optionally *WaitForCompletion* of the called [Instruction Graph](#) before moving on to the next node. Create an Instruction Node in the **Create › Composition › Instruction** menu of the Instruction Graph Window.

See the *"Take Turn"* node on the "BoardLoop" [Instruction Graph](#) in the BoardGame project for an example usage.

## Fields




Name	Description
Instruction	The <a href="#">Instruction Graph</a> to execute
Context	A <a href="#">VariableValueSource</a> to the context object to be passed to <i>Instruction</i>
Wait For Completion	Whether to wait until <i>Instruction</i> is finished running before moving on to the next node

# Instruction Reference Node

An Instruction Reference Node is an [Instruction Graph Node](#) that executes a different [Instruction Graph](#) based on a [VariableReference](#). Intruction Reference Nodes can pass in a new *Context* object to *Instruction* and optionally *WaitForCompletion* of the called [Instruction Graph](#) before moving on to the next node. Create an Instruction Node in the **Create › Composition › Instruction - Reference** menu of the Instruction Graph Window.

See the "Execute Move" node on the "Battle" [Instruction Graph](#) in the Battle project for an example usage.

## Fields

 Execute Move

Script

Name

Next

Instruction

Context

Wait For Completion

InstructionReferenceNode

Execute Move

Sequence

fighter.Pool.SelectedMove.Instruction

Value

Reference

fighter

☒

Name	Description
Instruction	A <a href="#">VariableReference</a> to the <a href="#">Instruction Graph</a> to execute
Context	A <a href="#">VariableValueSource</a> to the context object to be passed to <i>Instruction</i>
Wait For Completion	Whether to wait until <i>Instruction</i> is finished running before moving on to the next node

# Instruction Trigger

Instruction Trigger is a [MonoBehaviour](#) that stores an [Instruction Graph](#) for derived classes or other objects to run manually. Instruction Trigger itself will never trigger *Graph* on its own, only from derived classes when their desired conditions are met and the `Run()` method is called. Provided implementations of the Instruction Trigger are [Start Graph Trigger](#), [Enable Graph Trigger](#), [Click Graph Trigger](#), and [Button Graph Trigger](#).

See the *"Shop"* scene and the *"Player"* script in the Shop project for an example usage.

## Fields



Name	Description
Graph	The <a href="#">Instruction Graph</a> to run for this Instruction Trigger

# Interface Control

Interface Control is a [MonoBehaviour](#) to be attached to UI objects so that they be manually shown and hidden with the [Show Control Node](#) and the [Hide Control Node](#). When loaded an Interface Control always starts inactive until `Activate()` is called. In addition, an Interface Control can maintain a list of [GameObjects](#) that are activated and deactivated along with this control.

See the *"Timer"* object in the *"MazeUI"* scene in the Maze project for an example usage.

## Fields



Name	Description
Dependent Objects	The list of <a href="#">GameObjects</a> activated and deactivated along with this control

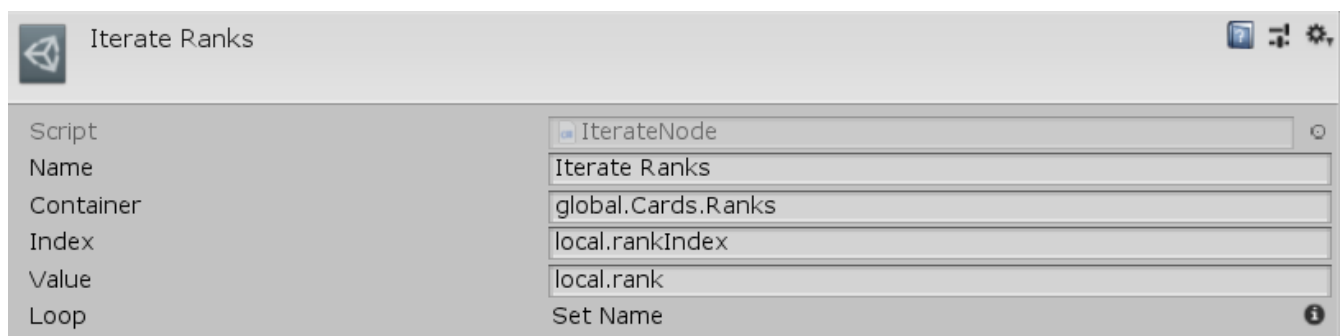


# Iterate Node

An Iterate Node is an [Instruction Graph Node](#) that implements [ILoopNode](#). It repeatedly runs the next nodes in the graph for each item in the [VariableReference](#), *Container*. *Container* can store either an [IVariableStore](#), or an [IVariableList](#). Each iteration through the loop will store the index of the item in the [VariableReference](#), *Index*, and the value of the item in the [VariableReference](#), *Value*. Create an Iterate Node in the **Create › Control Flow › Iterate** menu of the Instruction Graph Window.

See the *"Iterate Ranks"* node on the *"Load Game"* [Instruction Graph](#) in the CardGame project for an example usage.

## Fields



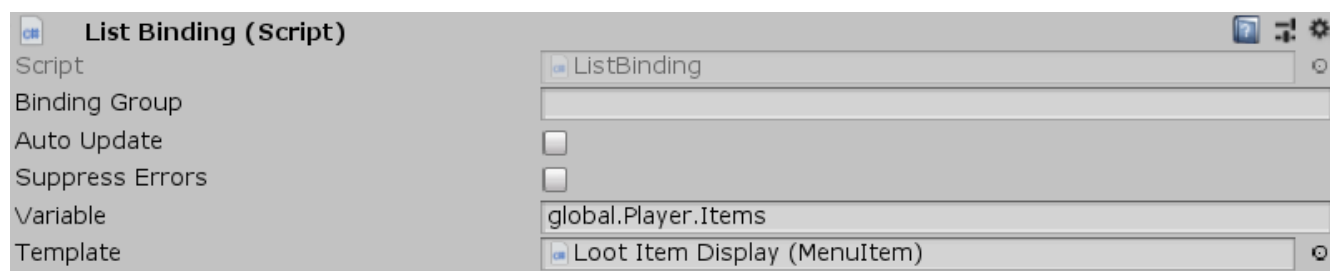
Name	Description
Container	A <a href="#">VariableReference</a> to the <a href="#">IVariableStore</a> or <a href="#">IVariableList</a> to be iterated
Index	A <a href="#">VariableReference</a> to store the index of the item being iterated over
Value	A <a href="#">VariableReference</a> to store the value of the item being iterated over

# List Binding

List Binding is a [Variable Binding](#) that will create child [GameObjects](#) based on *Template* for each [Value](#) in the [VariableReference](#), *Variable*. *Variable* must store either an [IVariableStore](#), or an [IVariableList](#). Each *Template* item is instantiated as a [Binding Root](#) with its *Value* set to the corresponding item in the store or list. A List Binding is best used in conjunction with a [Menu](#) to populate it with [Menu Items](#).

See the *"ItemsMenu"* and *"EquipmentMenu"* objects in the *"Loot Menu"* scene of the Loot project for an example usage.

## Fields



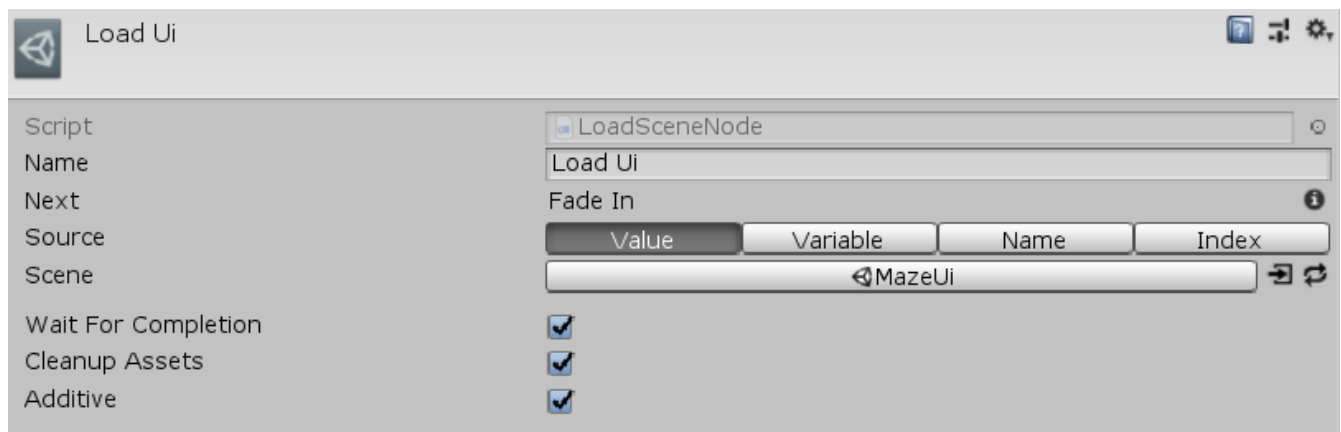
Name	Description
Variable	A <a href="#">VariableReference</a> to the <a href="#">IVariableStore</a> or <a href="#">IVariableList</a> that child objects should be created for
Template	The prefab (must contain a <a href="#">Binding Root</a> ) to use for instantiated child objects

# Load Scene Node

A Load Scene Node is an [Instruction Graph Node](#) that will load a new [Scene](#). The scene to be loaded can be based on a [SceneReference](#), string name, build index, or a [VariableReference](#) to a string name or build index. If *WaitForCompletion* is specified, the graph will not move to the next node until the scene has fully completed loading. Create a Load Scene Node in the **Create › Sequencing › Load Scene** menu of the Instruction Graph Window.

See the *"Load UI"* node on the *"MazeStart"* [Instruction Graph](#) in the Maze project for an example usage.

## Fields




Name	Description
Source	The <a href="#">SourceType</a> to load the scene based off of
Scene	If Value, the <a href="#">SceneReference</a> to load
Scene Variable	If Variable, the <a href="#">VariableReference</a> to a string name or build index of the scene to load
Scene Name	If Name, the string name of the scene to load
Scene Index	If Index, the build index of the scene to load
Wait For Completion	Whether to wait until the scene has completed loading before moving to the next node
Cleanup Assets	Whether to call <a href="#">UnloadUnusedAssets()</a> after the new scene is loaded
Additive	Whether to load the scene as <a href="#">Additive</a> or <a href="#">Single</a>

# Log Node

A Log Node is an [Instruction Graph Node](#) that is used for debugging purposes. It logs a [Message](#) when the node is executed. Create a Log Node in the **Create › Debug › Log** menu of the Instruction Graph Window.

## Fields

 Log

Script

LogNode

Name

Log

Message

Hello World

Next

Unconnected

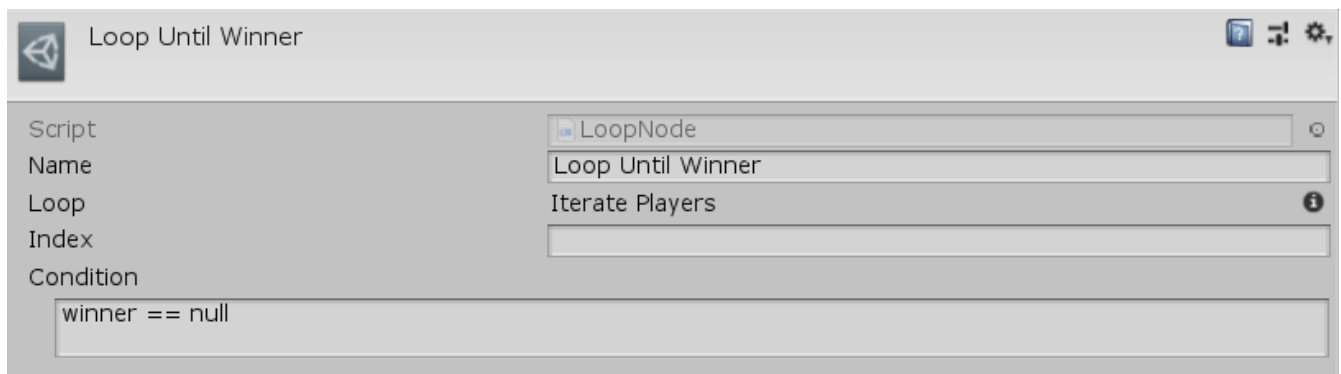
Name	Description
Message	The <a href="#">Message</a>

# Loop Node

An Iterate Node is an [Instruction Graph Node](#) that implements [ILoopNode](#). It repeatedly runs the next nodes in the graph until the evaluation of the [Expression](#), *Condition* is false. Each iteration through the loop will store the index of the item in the [VariableReference](#), *Index*. It can be thought of like while loop in script. Create an Iterate Node in the **Create › Control Flow › Iterate** menu of the Instruction Graph Window.

See the *"Loop Until Winner"* node on the *"BoardLoop"* [Instruction Graph](#) in the BoardGame project for an example usage.

## Fields



Name	Description
Index	A <a href="#">VariableReference</a> to store the number of times the loop has run
Condition	The <a href="#">Expression</a> to evaluate to determine if the loop should continue

# Material Animation

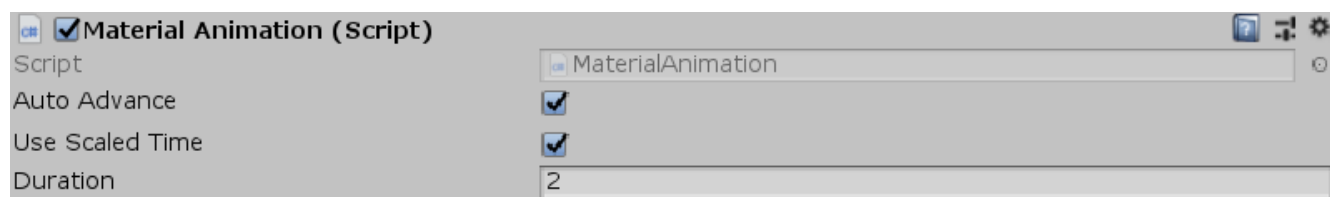
Material Animation is a [MonoBehaviour](#) that will animate a float property named `"_Progress"` on the [Material](#) of a sibling [Renderer](#) from 0 to 1. If *AutoAdvance* is set then when the behaviour is enabled, the `"_Progress"` property of the [Material](#) will increment every frame over the time, *Duration*. If *AutoAdvance* is not set then *Progress* can manually be set either from script or through an [AnimationClip](#) and the [Material](#) will automatically be updated.



The [Shader](#) must have a float property named `"_Progress"`

See the *"Scratch"* prefab in the Battle project for an example usage.

## Fields



Name	Description
Auto Advance	Whether to automatically start the animation when the behaviour becomes enabled
Progress	If <i>AutoAdvance</i> is false, the value to set the <code>"_Progress"</code> property on the <a href="#">Material</a> to
Use Scaled Time	If <i>AutoAdvance</i> is true, whether to use <a href="#">DeltaTime</a> or <a href="#">UnscaledDeltaTime</a> to advance <i>Progress</i>
Duration	If <i>AutoAdvance</i> is true, the amount of time (in seconds) the animation will take to occur

# Menu

A Menu is a [MonoBehaviour](#) that provides an interface for adding, removing, selecting, and focusing child [Menu Items](#). On its own a Menu is mostly just a container for its child [MenuItems](#) and requires either a [List Binding](#) or a [Selection Control](#) to populate it, and a [Menu Input](#) to control selection, and focusing. See the *"MazeUi"* scene in the Maze project for an example usage.

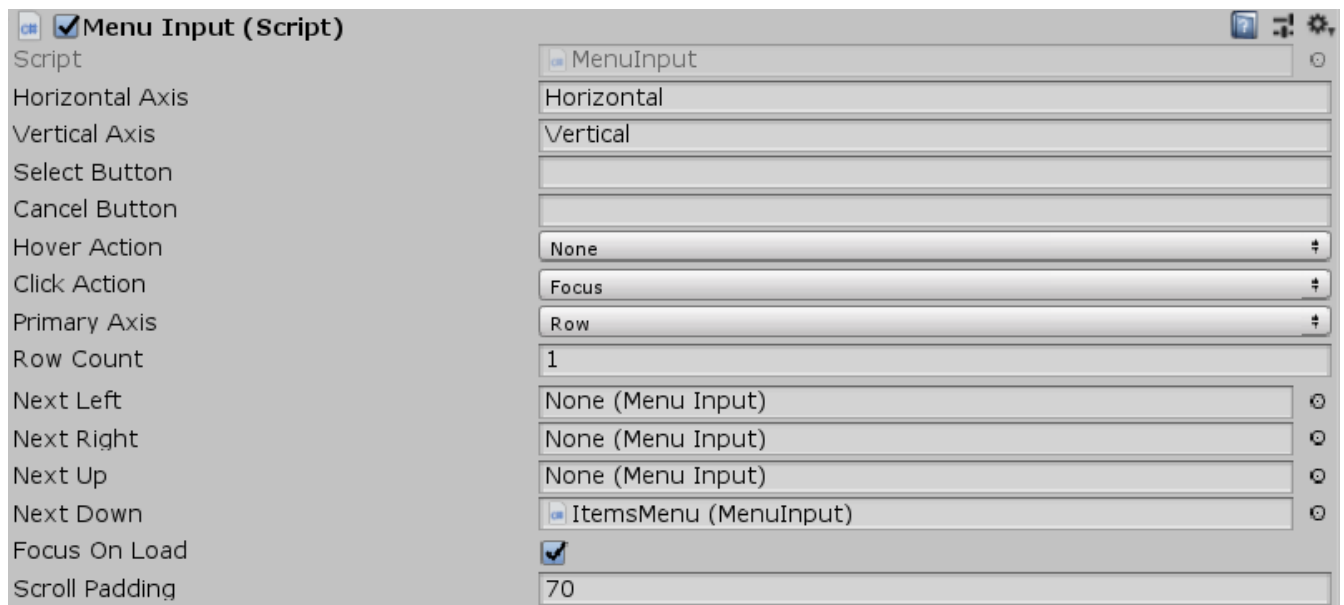
See the *"EquimentMenu"* and *"ItemsMenu"* objects in the *"Loot Menu"* scene of the Loot project for an example usage.

# Menu Input

Menu Input is a [MonoBehaviour](#) that should be attached as a sibling of a [Menu](#) to handle the behaviour of input, focusing, selecting, and scrolling, through [Menu Items](#).

See the *"EquipmentMenu"* and *"ItemsMenu"* objects in the *"Loot Menu"* scene of the Loot project for an example usage.

## Fields



Name	Description
Horizontal Axis	The name of the input axis to use for horizontal movement
Vertical Axis	The name of the input axis to use for vertical movement
Select Button	The input button to use to select the currently focused <a href="#">Menu Item</a>
Cancel Button	The input button to use to cancel the <a href="#">Menu</a> or <a href="#">Selection</a>
Hover Action	The <a href="#">Action</a> to take when a <a href="#">Menu Item</a> is hovered over
Click Action	The <a href="#">Action</a> to take when a <a href="#">Menu Item</a> is clicked on
Primary Axis	Whether the <a href="#">Menu Items</a> are arranged by Row or by Column
Row Count	The number of rows in the menu
Column Count	The number of columns in the menu
Next Left	The menu to transfer input to when moving past the left side of this menu
Next Right	The menu to transfer input to when moving past the right side of this menu
Next Up	The menu to transfer input to when moving past the top of this menu
Next Down	The menu to transfer input to when moving past the bottom of this menu
Focus On Load	Whether to enable input for this menu when it first loads



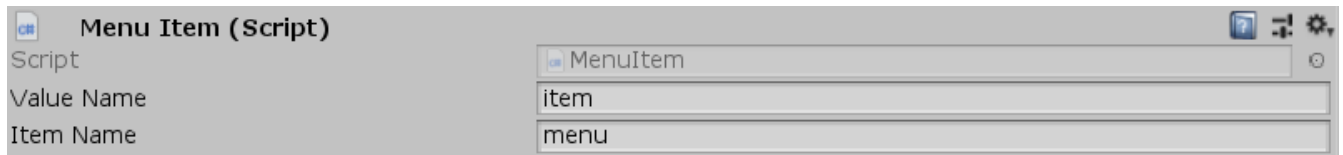
Name	Description
Scroll Padding	The distance between the edge of the scroll viewport and the <a href="#">Menu Item</a> when focusing on a new a new item

# Menu Item

Menu Item is a [Binding Root](#) that is used for objects that can be selected as part of a [Menu](#). In addition to the [Binding Root's](#) *ValueName* field which exposes the [Value](#) that the Menu Item was created from, it exposes the *ItemName* field which gives access to the data of the Menu Item itself. [Value's](#) that can be accessed by child [Variable Bindings](#) through *ItemName* are *Index*, *Column*, *Row*, *Label*, and *Focused*.

See the "*Loot Item Display*" prefab in the Loot project for an example usage.

## Fields



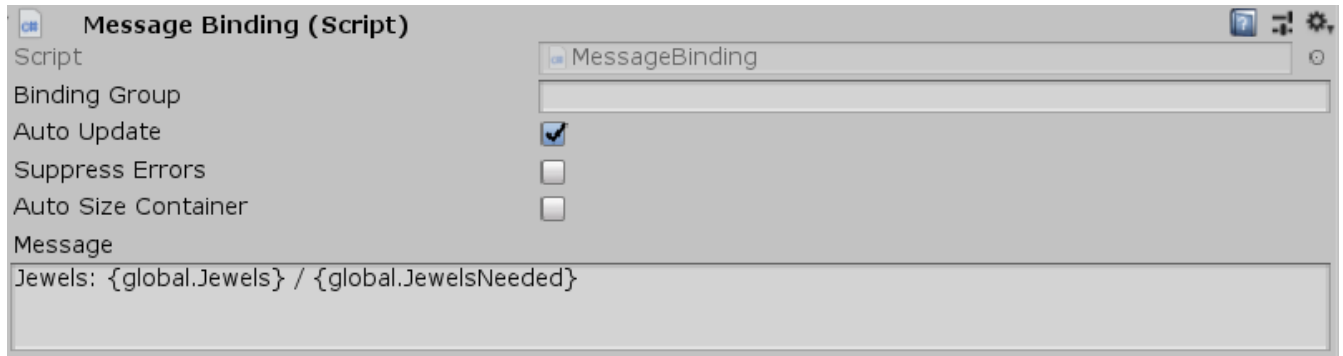
Name	Description
Item Name	The string name used to access this Menu Item's properties by child <a href="#">Variable Bindings</a>
Index	The index of this Menu Item in the menu
Column	The column this Menu Item occupies in its menu
Row	The row this Menu Item occupies in its menu
Label	The string name used to identify the Menu Item
Focused	Whether this Menu Item is currently focused

# Message Binding

Message Binding is a [String Binding](#) that binding will display a [Message](#) on a sibling [TextMeshPro](#) component, using the this binding's [Binding Root](#) as the variables to resolve the [Message](#).

See the *"Timer"* object in *"MazeUi"* scene of the Maze project for an example usage.

## Fields



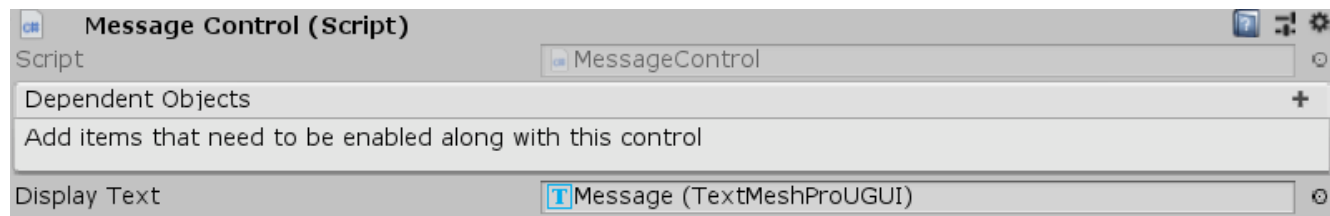
Name	Description
Message	The <a href="#">Message</a> to display

# Message Control

A Message Control is an [Interface Control](#) that shows a string of text on a [TextMeshPro](#) component when prompted to. A Message Control usually is activated, shown, and deactivated by a [Message Node](#).

See the *"Message"* object in *"Board"* scene of the BoardGame project for an example usage.

## Fields



Name	Description
Display Text	The <a href="#">TextMeshPro</a> component to display the <a href="#">Message</a> on

# Message Node

A Message Node is an [Instruction Graph Node](#) that will tell a [Message Control](#) to show a [Message](#). Showing a [Message](#) will automatically activate the [Message Control](#) and will hide it when the [Message](#) is complete if *AutoHide* is true. If *AutoHide* is false then a [Hide Control Node](#) must be used to deactivate it. Create a Message Node in the **Create › Interface › Message** menu of the Instruction Graph Window.

See the "*Shop*" [Instruction Graph](#) in the Shop project for an example usage.

## Fields

Level Message

Script

MessageNode

Name

Level Message

Next

Show Timer

Control

scene.Message

Wait For Completion

☒

Auto Hide

☒

Wait Time

0

Message

{input.LevelName}<br><size=50%>(Press Enter To Start)

Name	Description
Control	A <a href="#">VariableReference</a> to the <a href="#">Message Control</a> that should display <i>Message</i>
Wait For Completion	Whether to wait for <i>Message</i> to finish being displayed before moving on to the next node
Auto Hide	Whether to deactivate <i>Control</i> when <i>Message</i> is finished being displayed
Wait Time	If <i>AutoHide</i> is true, the amount of time (in seconds) to wait before deactivating <i>Control</i>
Message	The <a href="#">Message</a> to display>>

# Mockup Graph

A Mockup Graph is an implementation of an [Instruction Graph](#) usually used for storyboarding and prototyping in conjunction with [Mockup Nodes](#). A Mockup Graph can be customized to have any number of entry points and are useful to create as a visual template that is turned into a real [Instruction Graph](#) later.

## Fields

MockupGraph

Open

Open Editor

Context Name

context

Context Definition

Empty

▼ Inputs

List is Empty

▼ Outputs

List is Empty

▼ Entry Points

+

= Name

Entry One

-

Node

Unconnected

= Name

Entry Two

-

Node

Unconnected

▼ Nodes

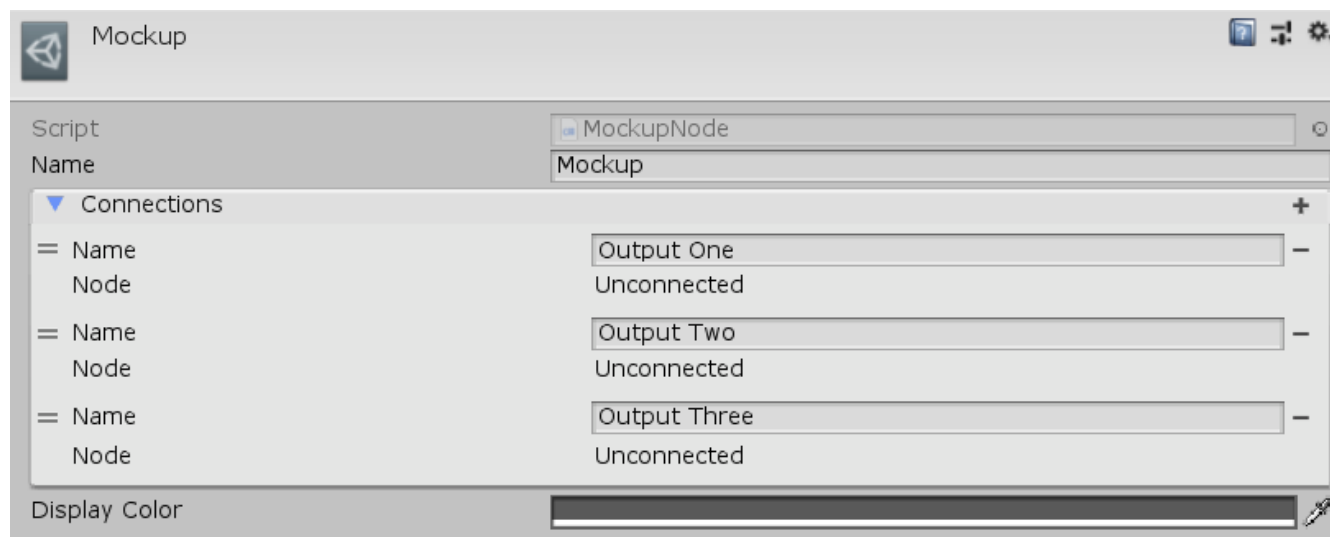
Use the Instruction Graph Window to add nodes to this graph

Name	Description
Entry Points	The list of starting <a href="#">Nodes</a> that this graph enters into

# Mockup Node

A Mockup Node is an [Instruction Graph Node](#) usually used in conjunction with a [Mockup Graph](#) for the purpose of storyboarding and prototyping. A Mockup Node can have any number of output *Connections* to other nodes. Create a Mockup Node in the **Create › Debug › Mockup** menu of the Instruction Graph Window.

## Fields



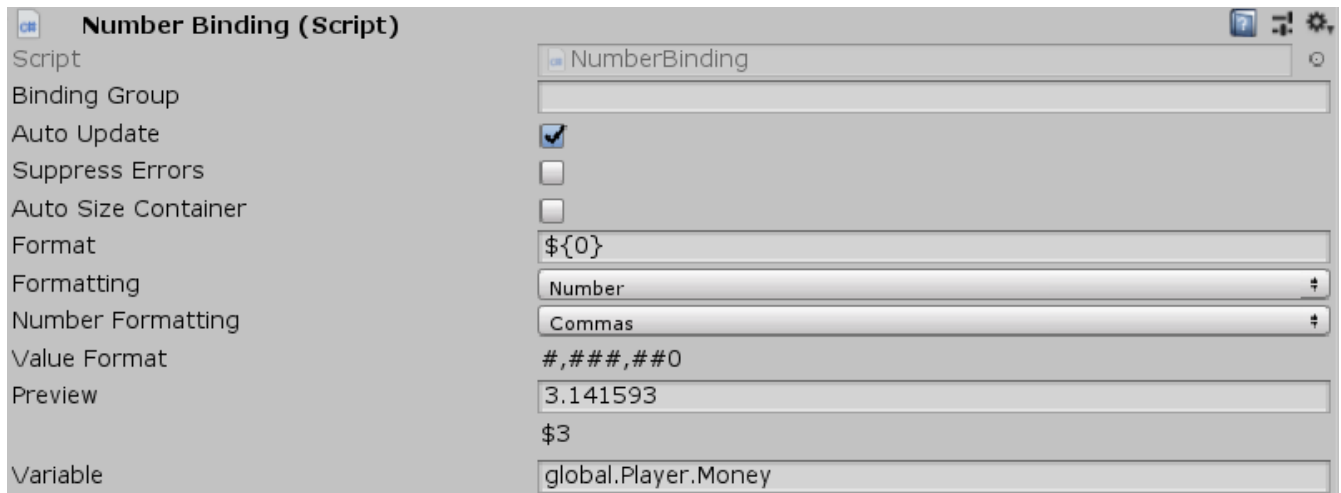
Name	Description
Connections	The list of outputs to other nodes that this node has
Display Color	The <a href="#">Color</a> to display this node as in the Instruction Graph Window

# Number Binding

Number Binding is a [String Binding](#) that will bind text based on a [VariableReference](#) to an int or float with customized [Formatting](#) applied. If *Variable* is invalid or does not return an int or float, then the text component will be disabled.

See the "Amount" object in the "Shop" scene of the Shop project for an example usage.

## Fields



The screenshot shows the Unity Inspector for a **Number Binding (Script)** component. The left sidebar lists the following fields: Script, Binding Group, Auto Update, Suppress Errors, Auto Size Container, Format, Formatting, Number Formatting, Value Format, Preview, and Variable. The right pane shows the corresponding values: Script is set to `NumberBinding`; Binding Group is empty; Auto Update is checked; Suppress Errors and Auto Size Container are unchecked; Format is `${0}`; Formatting is set to `Number`; Number Formatting is set to `Commas`; Value Format is `###,##0`; Preview shows `3.141593` and `$3`; and Variable is `global.Player.Money`.

Name	Description
Format	The <a href="#">Formatting</a> to display the number with
Variable	The <a href="#">VariableReference</a> to retrieve the number from

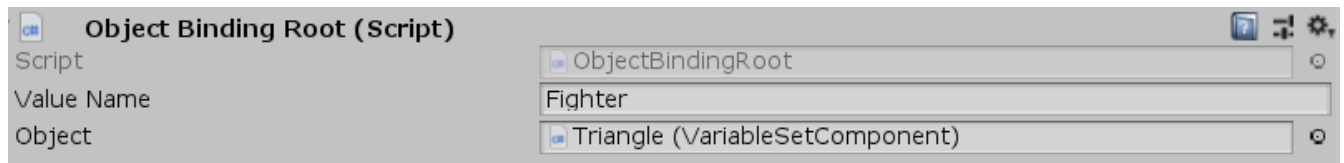


# Object Binding Root

Object Binding Root is a [Binding Root](#) that references a specific [Object](#) and uses it as the binding variables for the child [Variable Bindings](#).

See the *"TriangleDisplay"* and *"HexagonDisplay"* objects in the *"Battle"* scene of the Battle project for an example usage.

## Fields







Name	Description
Object	The <a href="#">Object</a> to use as a binding for child <a href="#">Variable Bindings</a>

# Pixelate

Pixelate is a [Transition](#) that will gradually pixelate the screen over the duration of the [Transition](#). Create a Pixelate through the **Create › PiRho Soft › Transitions › Pixelate** menu in the project view.

## Fields

 Pixelate




Open

Script

Duration

Max Amount

 Pixelate

1

100


Name	Description
Max Amount	The maximum amount of pixelation

# Play Animation

Play Animation Node is an [Instruction Graph Node](#) that tells an [Animation Player](#) to play an [AnimationClip](#). Create a Play Animation Node in the **Create › Animation › Play Animation** menu of the Instruction Graph Window.

See the *"Play Finish Animation"* node on the *"MazeJewel"* [Instruction Graph](#) of the Maze project for an example usage.

## Fields

 Play Finish Animation

Script

Name

Next

Animation Player

Animation

Wait For Completion

PlayAnimation

Play Finish Animation

Unconnected

scene.FinishDoor

ValueReference

MazeFinish


☒

Name	Description
Animation Player	A <a href="#">VariableReference</a> to the <a href="#">Animation Player</a> to play the clip on
Animation	The <a href="#">AnimationClipSource</a> of the <a href="#">AnimationClip</a> to play
Wait For Completion	Whether to wait for <i>Animation</i> to finish playing before moving on to the next node

# Play Animation State

Play Animation State Node is an [Instruction Graph Node](#) that tells an [Animator](#) to [Play\(\)](#) a state. Create a Play Animation State Node in the **Create › Animation › Play Animation State** menu of the Instruction Graph Window.

## Fields

 Play Animation State

Script

Name

Next

Animator

State

PlayAnimationState

Play Animation State

Unconnected

player

Value

Reference

Idle


Name	Description
Animator	A <a href="#">VariableReference</a> to the <a href="#">Animator</a> to play the state on
State	A <a href="#">StringVariableSource</a> to the name of the state to play

# Play Effect




A Play Effect Node is an [Instruction Graph Node](#) that will spawn a prefab at the given Name, Position, and Rotation relative to the world, another object, or as a child object. The created effect can optionally be stored in a given [VariableReference](#) so that it can be accessed later. This differs from a standard [Create Game Object Node](#) in that a Play Effect Node can *WaitForCompletion* of the effect and destroy it when it is finished. The created effect object is queried for [ParticleSystem](#) and other components that implement [ICompletionNotifier](#) to determine when the effect is finished. Create a Play Effect Node in the **Create › Animation › Play Effect** menu of the Instruction Graph Window.

See the "Play Jewel Sparkle" node on the "MazeJewel" [Instruction Graph](#) in the Maze project for an example usage.

## Fields



Play Jewel Sparkle



Script

PlayEffect

Name

Play Jewel Sparkle

Next

Unconnected

Effect

Value

Reference

MazeJewelDisappear

Effect Name

Value

Reference

Spawned Effect

Effect Variable

Positioning

Absolute

Relative

Child

Object

jewel

Position

Value

Reference

X 0

Y 0

Z 0

Rotation

Value

Reference

X 0

Y 0

Z 0

Wait For Completion

☐

Destroy On Complete

☒

Name	Description
Effect	The prefab of the effect object to create
Effect Name	The name of the new object
Effect Variable	The <a href="#">VariableReference</a> to store the created object in
Positioning	The <a href="#">ObjectPositioning</a> to create the object at
Object	If <i>Positioning</i> is Relative, the object to position the created object relative to
Parent	If <i>Positioning</i> is Child, the object to make the parent of the created object
Position	The position of the effect - can be a <a href="#">Vector3</a> value or a <a href="#">VariableReference</a>

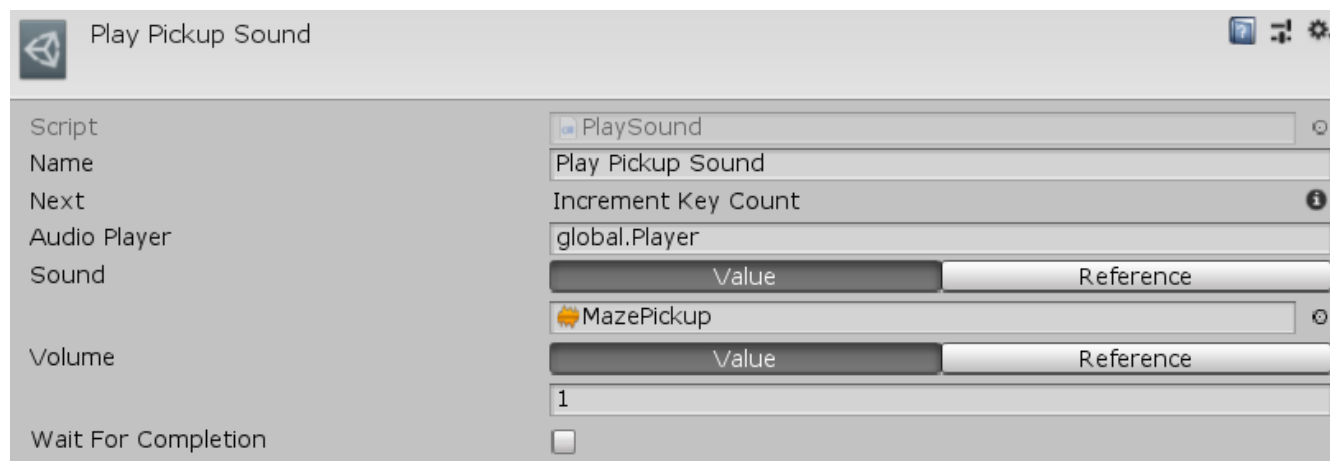
Name	Description
Rotation	The rotation of the effect - can be a <a href="#">Vector3</a> value or a <a href="#">VariableReference</a> , stored as euler angles
Wait For Completion	Whether to wait until the effect has finished playing before moving on to the next node
Destroy On Complete	Whether to destroy the created effect when it has finished playing

# Play Sound

Play Sound Node is an [Instruction Graph Node](#) that tells an [Audio Player](#) to play an [AudioClip](#). Create a Play Sound Node in the **Create › Animation › Play Sound** menu of the Instruction Graph Window.

See the *"Play Pickup Sound"* node on the *"MazeKey"* [Instruction Graph](#) of the Maze project for an example usage.

## Fields

 Play Pickup Sound

Script

PlaySound

Name

Play Pickup Sound

Next

Increment Key Count


Audio Player

global.Player

Sound

Value

Reference

 MazePickup

Volume

Value

Reference

1

Wait For Completion

☐

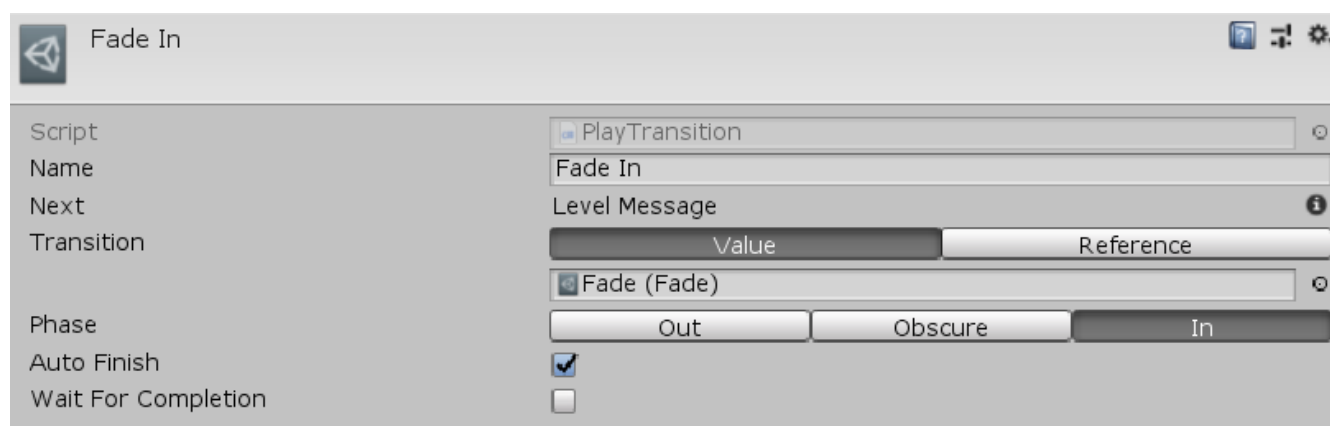
Name	Description
Audio Player	A <a href="#">VariableReference</a> to the <a href="#">Audio Player</a> to play the sound on
Sound	The <a href="#">AudioClipSource</a> of the <a href="#">AudioClip</a> to play
Volume	The <a href="#">FloatVariableSource</a> of the volume to play the sound at
Wait For Completion	Whether to wait for the <i>Sound</i> to finish playing before moving on to the next node

# Play Transition

A Play Transition Node is an [Instruction Graph Node](#) that tells the [Transition Manager](#) to begin a [Transition](#). If the *AutoFinish* field is set then the [Transition](#) will complete automatically once its phase is completed, otherwise, either a new [Transition](#) needs to be started or a [Clear Transition Node](#) needs to be used. A standard example for when *AutoFinish* should be false would be to maintain the blank screen after fading out while loading the next scene then fading back in when the loading is done. Create a Play Transition Node in the **Create › Sequencing › Play Transition** menu of the Instruction Graph Window.

See the "*MazeStart*" [Instruction Graph](#) in the Maze project for an example usage.

## Fields



The screenshot shows the 'Fade In' node configuration window. On the left is a list of fields: Script, Name, Next, Transition, Phase, Auto Finish, and Wait For Completion. On the right, the corresponding values are set: Script is 'PlayTransition', Name is 'Fade In', Next is 'Level Message', Transition is 'Fade (Fade)', Phase is 'In' (selected from 'Out', 'Obscure', 'In'), Auto Finish is checked, and Wait For Completion is unchecked.

Name	Description
Transition	The <a href="#">TransitionVariableSource</a> of the <a href="#">Transition</a> to play
Phase	The <a href="#">TransitionPhase</a> to play
Auto Finish	Whether or not the <a href="#">Transition</a> should end when it is completed or maintain its visual state until a new one is started
Wait For Completion	Whether to wait until the <a href="#">Transition</a> is finished before moving on to the next node




# Reset Tag

Reset Tag Node is an [Instruction Graph Node](#) that calls `ResetTag()` on an object that implements [IVariableReset](#). Usually this used to reinitialize variables on a [VariableSetComponent](#). Create a Reset Tag Node in the **Create › Composition › Reset Tag** menu of the Instruction Graph Window.

See the *"Reset Stats"* node on the *"Battle"* [Instruction Graph](#) of the Battle project for an example usage.

## Fields

 Reset Stats

Script

ResetTag

Name

Reset Stats

Next

Initialize Variables

Object

fighter

Tag

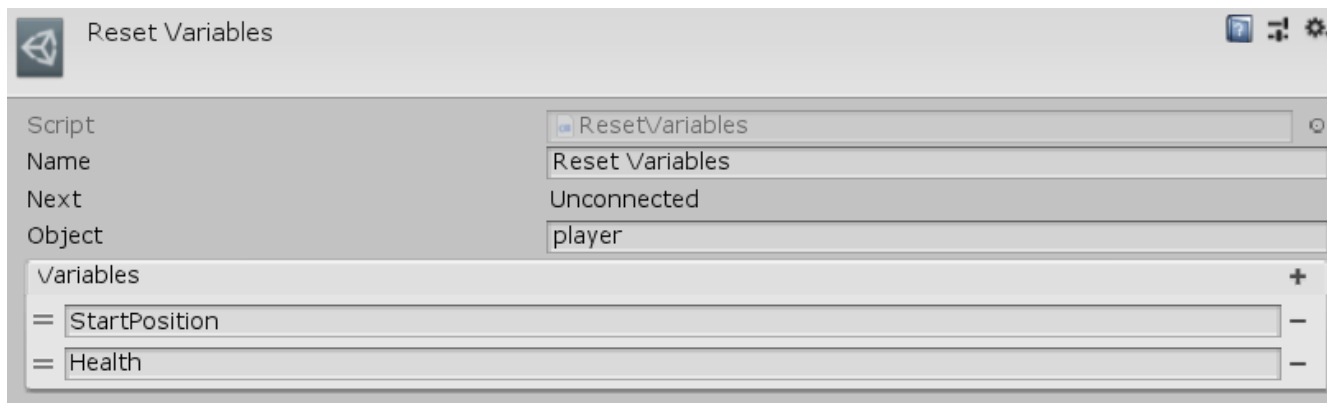
Reset

Name	Description
Object	A <a href="#">VariableReference</a> to the <a href="#">IVariableReset</a> object to call <code>ResetTag()</code> on
Tag	The string name of the tag to reset

# Reset Variables

Reset Variables Node is an [Instruction Graph Node](#) that calls `ResetVariables()` on an object that implements [IVariableReset](#). Usually this used to reinitialize specific variables on a [VariableSetComponent](#). Create a Reset Variables Node in the **Create › Composition › Reset Variables** menu of the Instruction Graph Window.

## Fields




Name	Description
Object	A <a href="#">VariableReference</a> to the <a href="#">IVariableReset</a> object to call <code>ResetVariables()</code> on
Variables	The list of string names of the variables to reset

# Run Timeline

Run Timeline Node is an [Instruction Graph Node](#) that tells a [PlayableDirector](#) to [Play\(\)](#) a [Timeline](#). Create a Run Timeline Node in the **Create › Animation › Run Timeline** menu of the Instruction Graph Window.

## Fields

 Run Timeline

Script

Name

Next

Director

Timeline

Mode

Wait For Completion

RunTimeline

Run Timeline

Unconnected

fighter

ValueReference

fighter.AttackTimeline

None

☒

Name	Description
Director	A <a href="#">VariableReference</a> to the <a href="#">PlayableDirector</a> to run the <a href="#">Timeline</a> on
Timeline	The <a href="#">TimelineVariableSource</a> to run
Mode	The <a href="#">WrapMode</a> to use
Wait For Completion	Whether to wait for the <a href="#">Timeline</a> to finish before moving on to the next node

## Scoped Graph

A Scoped Graph is an implementation of [Instruction Graph](#) with three sequential entry points for [Nodes](#), *"Enter"*, *"Process"*, and *"Exit"*. This is useful for organization of nodes that should have parity of actions when they are starting and finishing (such as disabling and reenabling objects).

See the *"MazeStart"* [Instruction Graph](#) in the Maze project for an example usage.

# Selection Control

A Selection Control is an [Interface Control](#) that creates and shows a list of child [Menu Items](#) on a sibling [Menu](#) to be selected from when prompted. A Selection Control usually is activated, shown, and deactivated by a [Selection Node](#). A Selection Control works a [Menu Input](#) which will manage input for changing focus and selecting an item.

See the *"Selection"* object in *"Shop"* scene of the Shop project for an example usage.

# Selection Node

A Message Node is an [Instruction Graph Node](#) that will tell a [Message Control](#) to show a [Message](#). Showing a [Message](#) will automatically activate the [Message Control](#) and will hide it when the [Message](#) is complete if *AutoHide* is true. If *AutoHide* is false then a [Hide Control Node](#) must be used to deactivate it. Create a Message Node in the **Create › Interface › Message** menu of the Instruction Graph Window.

See the "Level Message" node on the "MazeStart" [Instruction Graph](#) in the Maze project for an example usage.

## Fields

The screenshot shows the Unity Inspector for a **Buy Selection** node of type **SelectionNode**. The node's configuration is as follows:

- Script:** SelectionNode
- Name:** Buy Selection
- On Canceled:** Hide Items
- Control:** scene.Items
- Selected Item:** selectedItem
- Selected Index:** selectedIndex
- Is Selection Required:** ☐
- Auto Hide:** ☐

There are two expandable sections for **Items**:

- Item 1:**
  - Variables:** shop.Inventory
  - Source:** Asset
  - Template:** ShopBuySelection (MenuItem)
  - Label:** Inventory
  - Expand:** ☒
  - On Selected:** Confirmation
- Item 2:**
  - Variables:** (empty)
  - Source:** Asset
  - Template:** ShopSelection (MenuItem)
  - Label:** Back
  - Expand:** ☐
  - On Selected:** Hide Items

Name	Description
Control	A <a href="#">VariableReference</a> to the <a href="#">Selection Control</a> that should display <i>Items</i>
Selected Item	A <a href="#">VariableReference</a> to store the <a href="#">Value</a> of the selected item in
Selected Index	A <a href="#">VariableReference</a> to store the index of the selected item in
Is Selection Required	Whether or not the selection can be canceled (no item is selected)
Auto Hide	Whether to deactivate the <i>Control</i> once the selection has been made

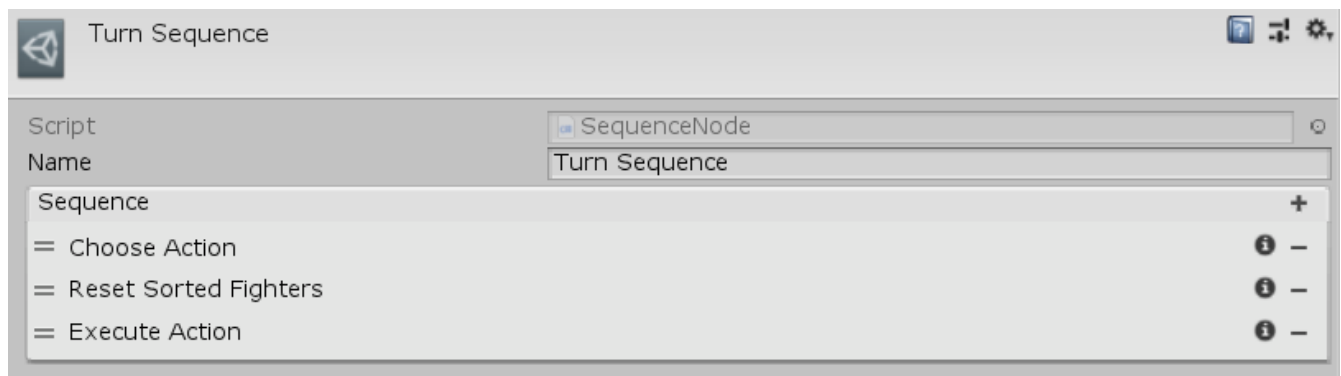
Name	Description
Items	The list of <a href="#">Selection Items</a> that will appear in the selection

# Sequence Node

A Sequence Node is a [Instruction Graph Node](#) that implements [ISequenceNode](#). It will run each of its child nodes in sequential order. This is useful for organizational purposes or to continue the execution of a graph after a node that does not have an end connection (like an [Iterate Node](#)). Create a Sequence Node in the **Create › Control Flow › Sequence** menu of the Instruction Graph Window.

See the "Battle" [Instruction Graph](#) in the Battle project for an example usage.

## Fields



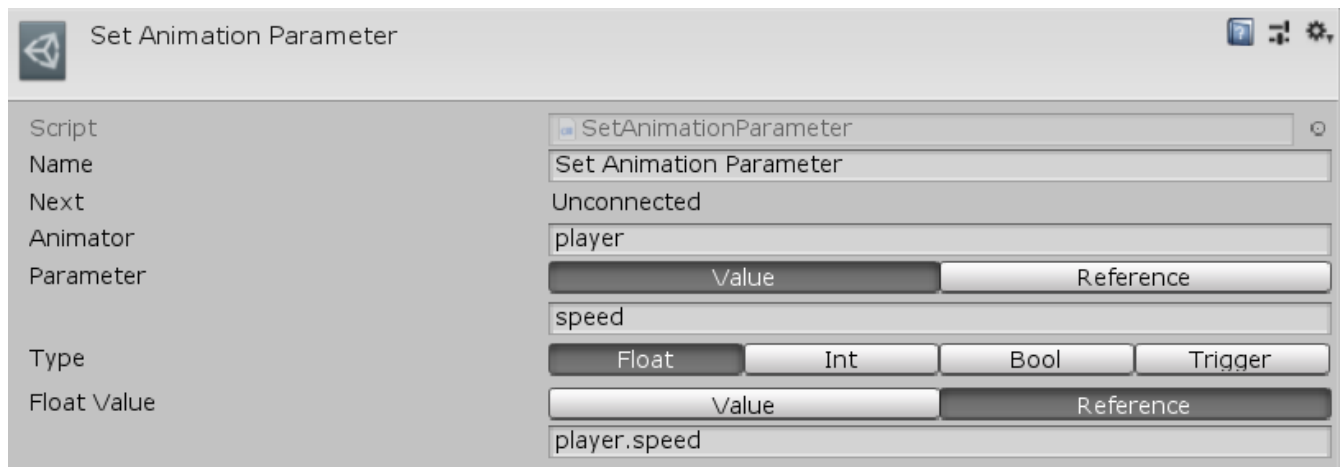
Name	Description
Sequence	The list of <a href="#">Nodes</a> to execute in sequential order



# Set Animation Parameter

Set Animation Parameter Node is an [Instruction Graph Node](#) that sets the value of an [AnimationParameter](#) on an [Animator](#). Create a Set Animation Parameter Node in the **Create > Animation > Set Animation Parameter** menu of the Instruction Graph Window.

## Fields







Name	Description
Parameter	A <a href="#">StringVariableSource</a> to the name of the parameter to set
Type	The <a href="#">Type</a> of parameter to set
Animator	A <a href="#">VariableReference</a> to the <a href="#">Animator</a> to set the parameter on
Bool Value	If <i>Type</i> is Bool, a <a href="#">BoolVariableSource</a> to the value of the bool to set
Int Value	If <i>Type</i> is Int, a <a href="#">IntVariableSource</a> to the value of the int to set
Float Value	If <i>Type</i> is Float, a <a href="#">FloatVariableSource</a> to the value of the float to set



# Set Binding Node

Set Binding Node is an [Instruction Graph Node](#) that sets the [Value](#) of a [Binding Root](#) to the resolved [VariableReference](#), *Binding*. Create a Set Binding Node in the **Create › Interface › Set Binding** menu of the Instruction Graph Window.

See the *"Set Card Binding"* node on the *"Load Game"* [Instruction Graph](#) in the CardGame project for an example usage.

## Fields

 Set Card Binding   

Script	 SetBindingNode 
Name	Set Card Binding
Next	Unconnected
Object	local.card as BindingRoot
Binding	local.card


Name	Description
Object	The <a href="#">VariableReference</a> to the <a href="#">Binding Root</a> to set the binding on
Binding	The <a href="#">VariableReference</a> to set as the binding

# Set Property Node

A Set Property Node is an [Instruction Graph Node](#) used to set any property or field on any [Object](#) provided that the type of the property or field can be stored in a [VariableValue](#). Create a Set Property Node in the **Create › Composition › Get Property** menu of the Instruction Graph Window.

See the *"Move To Open"* node on the *"MazeGateStart"* [Instruction Graph](#) in the Maze project for an example usage.

## Fields

 Move To Open

Name

Next

Target

Object Type

Property

Value

Move To Open

Unconnected

Value

Reference

gate

Transform

Vector3 position

Value

Reference

gate.OpenPosition

Name	Description
Target	The <a href="#">VariableSource</a> to the object to set <i>Value</i> on
Value	The <a href="#">VariableValue</a> to set the property to

Unresolved directive in manual.adoc - include::manual/set-variable-node.adoc[]

# Show Control Node

A Show Control Node is an [Instruction Graph Node](#) that will activate an [Interface Control](#). Create a Show Control Node in the **Create › Interface › Show Control** menu of the Instruction Graph Window.

See the "Show Timer" node on the "MazeStart" [Instruction Graph](#) in the Maze project for an example usage.

## Fields

Show Timer

Script

ShowControlNode

Name

Show Timer

Next

Set Start Time

Control

scene.Timer

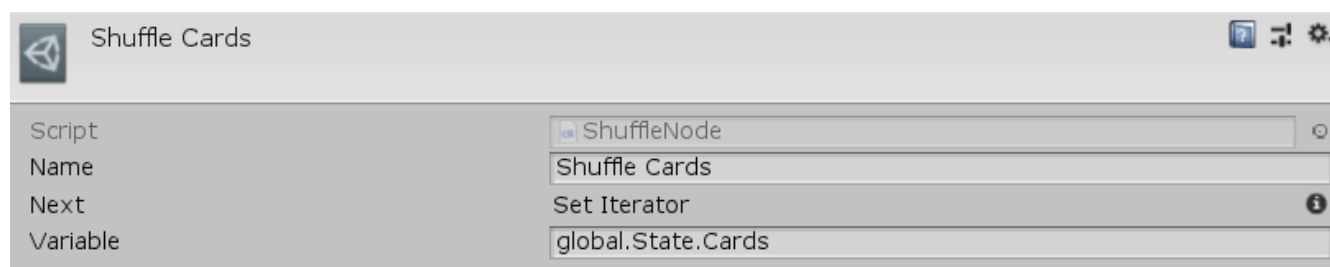
Name	Description
Control	A <a href="#">VariableReference</a> to the <a href="#">Interface Control</a> to show

# Shuffle Node

A Shuffle Node is an [Instruction Graph Node](#) that will shuffle an [IVariableList](#). Create a Shuffle Node in the **Create** › **Composition** › **Shuffle** menu of the Instruction Graph Window.

See the *"Shuffle Cards"* node on the *"Shuffle Cards"* [Instruction Graph](#) in the CardGame project for an example usage.

## Fields



Name	Description
Variable	A <a href="#">VariableReference</a> to the <a href="#">IVariableList</a> to shuffle

# Simple Graph

A Simple Graph is the most basic implementation of an [Instruction Graph](#) and should be sufficient for most use cases. A Simple Graph has a single entry point *Process* with no other special behaviour.

# Sort Node

A Shuffle Node is an [Instruction Graph Node](#) that will shuffle the given [VariableList](#), *List*. If each [Value](#) in *List* is an [IVariableStore](#), then they can be sorted by [Values](#) on that [IVariableStore](#) (similar to *System.Linq*'s *SortBy()*.*ThenBy()* methods). Create a Sort Node in the **Create › Composition › Sort** menu of the Instruction Graph Window.

See the "*Sort Fighters*" node on the "*Battle*" [Instruction Graph](#) in the Battle project for an example usage.

## Fields



Name	Description
List	A <a href="#">VariableReference</a> to the <a href="#">VariableList</a> to sort
Sort By Property	Whether to sort each <a href="#">Value</a> in <i>List</i> by itself or by properties on it (if it is an <a href="#">IVariableStore</a> )
Sort Conditions	If <i>SortByProperty</i> is true, then a list of <a href="#">VariableReferences</a> on each item in <i>List</i> to sort by sequentially

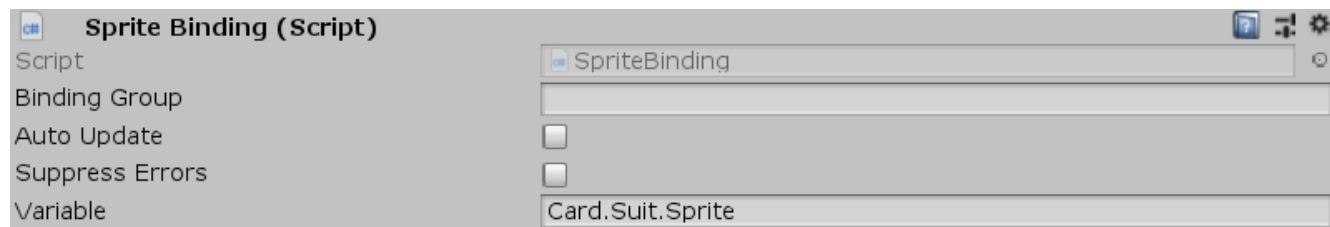


# Sprite Binding

Sprite Binding is a [Variable Binding](#) that will set the [Sprite](#) of a sibling [SpriteRenderer](#) based on the given [\[reference/variable-reference.html/VariableReference\]](#). If *Variable* is invalid, then the renderer will be disabled.

See the "Card" prefab in the CardGame project for an example usage.

## Fields



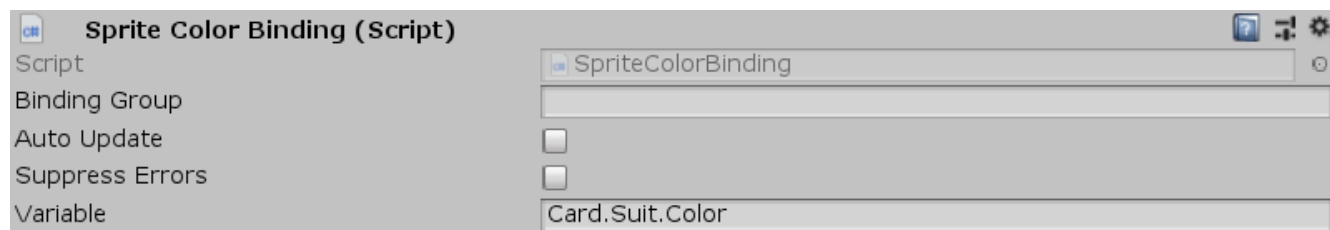
Name	Description
Variable	A <a href="#">VariableReference</a> to the <a href="#">Sprite</a> to display

# Sprite Color Binding

Sprite Color Binding is a [Variable Binding](#) that will set the blend color of a sibling [SpriteRenderer](#) based on the given [VariableReference](#). If *Variable* is invalid, then the renderer will be disabled.

See the "Card" prefab in the CardGame project for an example usage.

## Fields



Name	Description
Variable	A <a href="#">VariableReference</a> to the <a href="#">Color</a> to use as the blend color

# Start Graph Trigger

Start Graph Trigger is an [Instruction Trigger](#) that will run its [Instruction Graph](#) when this object is loaded (in its `Start()` message).

See the "Player" object in the "*Maze1*" scene of the Maze project for an example usage.

# String Binding

String Binding is an abstract [Variable Binding](#) that should be derived from in order to bind string data for display on a sibling [TextMeshPro](#) component. The [TextMeshPro](#) container can be optionally set to fit the size of the bound text. Example implementations of a String Binding are [Expression Binding](#), [Message Binding](#), [Number Binding](#), and [Text Binding](#).

## Fields

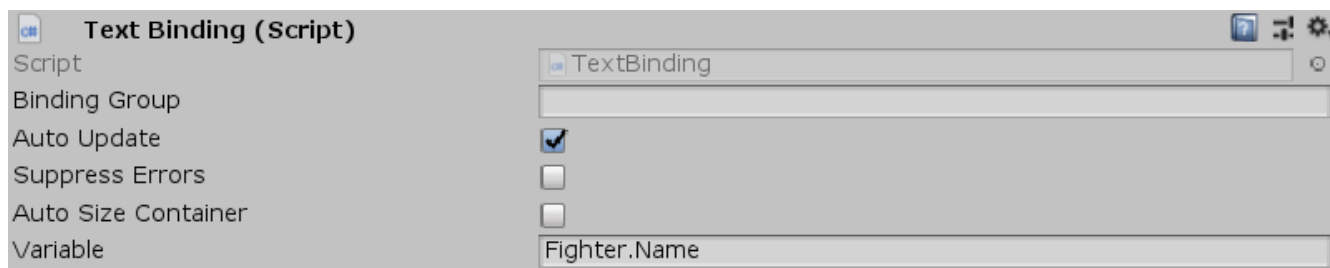
Name	Description
Auto Size Container	Whether to size the <a href="#">TextMeshPro</a> container to fit the bound text.

# Text Binding

Text Binding is a [String Binding](#) that will bind text based on a [VariableReference](#). If *Variable* is invalid then the text component will be disabled.

See the *"Name"* objects in the *"Battle"* scene of the Battle project for an example usage.

## Fields



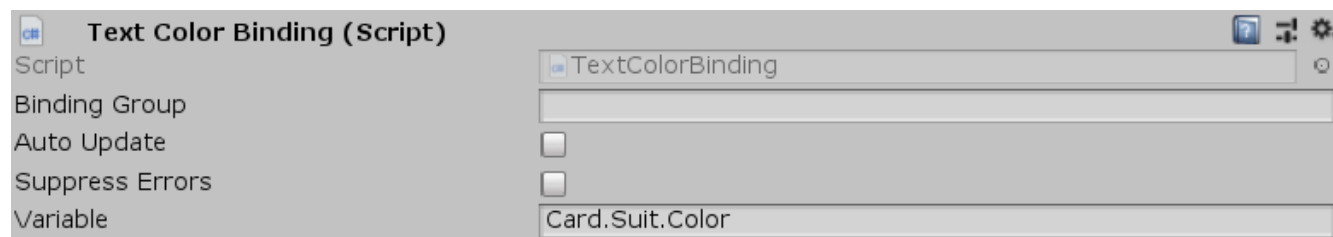
Name	Description
Variable	The <a href="#">VariableReference</a> to retrieve the text from

# Text Color Binding

Text Color Binding is a [Variable Binding](#) that will set the color of a sibling [TextMeshPro](#) component based on the given [VariableReference](#). If *Variable* is invalid, then the text will be disabled.

See the "*Card*" prefab in the CardGame project for an example usage.

## Fields



Name	Description
Variable	A <a href="#">VariableReference</a> to the <a href="#">Color</a> to use

# Text Input Binding

Text Input Binding is a [Variable Binding](#) that will receive input on a sibling [TextMeshProInputField](#) component assign the text to the [VariableReference](#), *Variable*. This is a two-way binding so if `UpdateBindings()` is called on this [Variable Binding](#), then the displayed text will also be updated.

## Fields

Name	Description
Variable	The <a href="#">VariableReference</a> to retrieve/set the input field's text on

# Time Scale Node

A Time Scale Node is an [Instruction Graph Node](#) that is used to set Unity's [TimeScale](#). This can be useful for pausing. Create a Time Scale Node in the **Create › Sequencing › Time Scale** menu of the Instruction Graph Window.

## Fields

Name	Description
Time Scale	A <a href="#">FloatVariableSource</a> to the time scale to set



# Transform Node

Transform Node is an [Instruction Graph Node](#), that will animate a [Transform](#) component toward a *TargetPosition*, *TargetRotation*, and *TargetScale*. Targets can be specified to be relative to the current *Transform* or in world space. Animation can happen instantly or at either a speed or over a duration. If the target [Transform](#) has a [Rigidbody](#) attached to it then the animation will use its corresponding movement methods to maintain its state in the collision system. **Create** › **Sequencing** › **Transform Object** menu of the Instruction Graph Window.



If the *Transform* cannot reach its destination (due to collisions or other circumstances) then the node will never cease its execution

See the "Move" node on the "MazeGate" [Instruction Graph](#) in the Maze project for an example usage.

## Fields

Name	Description
Transform	The <a href="#">VariableReference</a> to the <a href="#">Transform</a> to enable
Use Relative Position	If set <i>TargetPosition</i> will specified relative to the initial <i>Transform</i>
Use Relative Rotation	If set <i>TargetRotation</i> will specified relative to the initial <i>Transform</i>

Name	Description
Use Relative Scale	If set <i>TargetScale</i> will specified relative to the initial <i>Transform</i>
Target Position	The <a href="#">Vector3VariableSource</a> to the target position of <i>Transform</i>
Target Rotation	The <a href="#">Vector3VariableSource</a> to the target rotation (in euler angles) of <i>Transform</i>
Target Scale	The <a href="#">Vector3VariableSource</a> to the target position of <i>Transform</i>
Animation Method	The <a href="#">Type</a> of animation to use
Wait For Completion	Whether to wait until <i>Transform</i> reaches the destination before moving on to the next node
Duration	If <i>AnimationMethod</i> is <i>Duration</i> , a <a href="#">FloatVariableSource</a> to the amount of time (in seconds) it takes to reach the destination
Move Speed	If <i>AnimationMethod</i> is <i>Speed</i> , <a href="#">FloatVariableSource</a> to the speed the <i>Transform</i> will move
Rotation Speed	If <i>AnimationMethod</i> is <i>Speed</i> , <a href="#">FloatVariableSource</a> to the speed the <i>Transform</i> will rotate
Scale Speed	If <i>AnimationMethod</i> is <i>Speed</i> , <a href="#">FloatVariableSource</a> to the speed the <i>Transform</i> will change size

# Transition

A Transition is an [Asset](#) used to create post processing effects on a [Camera](#), usually used during scene changes to hide, obscure, then reshow the screen. Transition itself is an abstract class that should be derived from to achieve the desired effects. Transitions operate using [Shaders](#), set by derived classes using the `SetShader()` method. Transitions have three [Phases](#), Out, Obscure, In, with each one being initiated separately, usually by a [Play Transition Node](#). For example implementations of a Transition see the [Fade](#), [Dissolve](#), and [Pixelate](#) Transitions.

## Fields

Name	Description
Duration	The amount of time this Transition will take to complete.

# Transition Manager

The Transition Manager is a [MonoBehaviour](#) that manages the transition post-processing system. Because Transition Manager is a [GlobalBehaviour](#), it is created automatically the first time it is accessed so it does not need to be added to any objects in a scene. The Transition Manager works in conjunction with [Transition Renderers](#), attached to [Cameras](#) to render post processing effects onto the screen. Generally, [Transitions](#) are started by a [Play Transition Node](#), however, they can be run from script using the `RunTransition()` or `StartTransition()` method. The methods are both [IEnumerators](#) and should be called using the `MonoBehaviour.StartCoroutine()` method. `RunTransition()` will fully run the given [Phase](#) of the [Transition](#), ending it once it has finished, while `StartTransition()` will run the [Transition](#) until the end without clearing, maintaining its final state until `EndTransition()` is called or a new [Transition](#) is started. << Only a single [Transition](#) can be running at a time.

# Transition Renderer

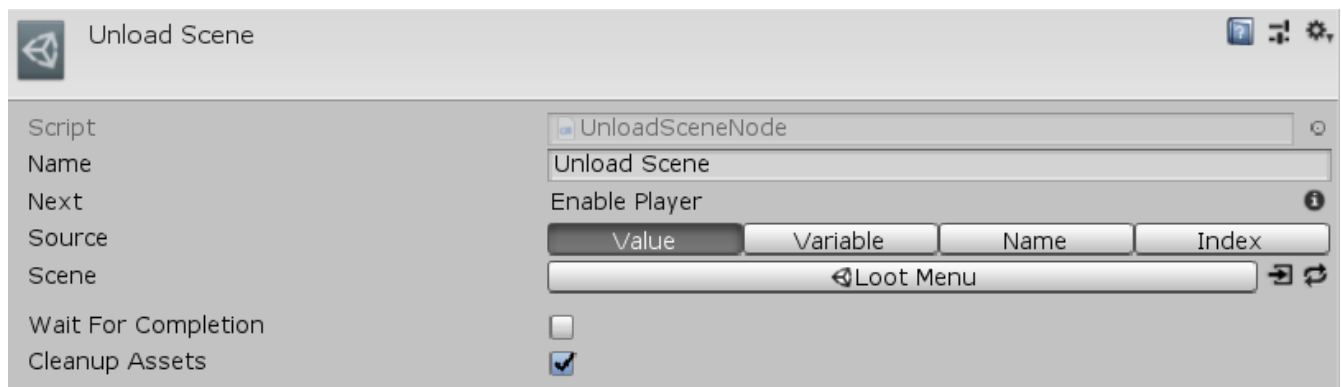
Transition Renderer is a [MonoBehaviour](#) to be attached to a [Camera](#) in order to have the camera's contents rendered as part of a [Transition](#)'s post-processing.

# Unload Scene Node

An Unload Scene Node is an [Instruction Graph Node](#) that will unload [Scene](#). The scene to be unloaded can be a [SceneReference](#), string name, build index, or a [VariableReference](#) to a string name or build index. If *WaitForCompletion* is specified, the graph will not move to the next node until the scene has fully completed unloading. Create an Unload Scene Node in the **Create › Sequencing › Unload Scene** menu of the Instruction Graph Window.

See the "Unload Scene" node on the "Hide Loot Inventory" [Instruction Graph](#) in the Loot project for an example usage.

## Fields



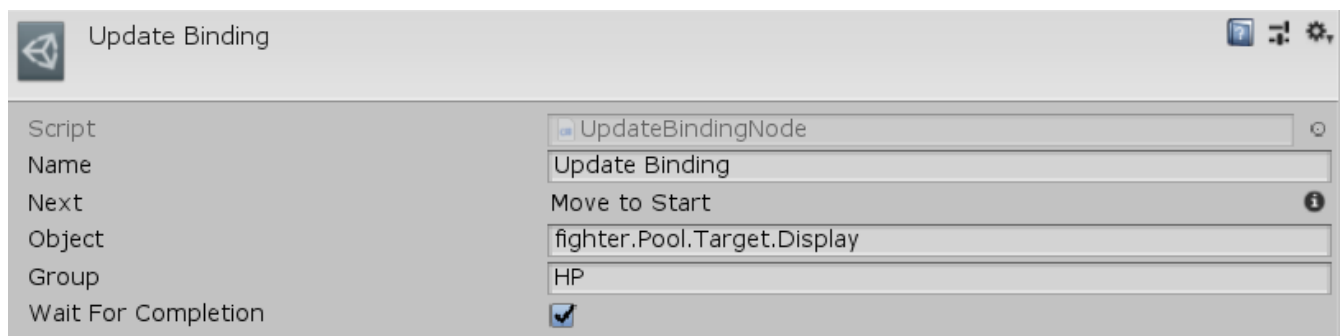
Name	Description
Source	The <a href="#">Source Type</a> to unload the scene based off of
Scene	If Value, the <a href="#">SceneReference</a> to unload
Scene Variable	If Variable, the <a href="#">VariableReference</a> to a string name or build index of the scene to unload
Scene Name	If Name, the string name of the scene to unload
Scene Index	If Index, the build index of the scene to unload
Wait For Completion	Whether to wait until the scene has completed unloading before moving to the next node
Cleanup Assets	Whether to call <a href="#">UnloadUnusedAssets()</a> after scene is unloaded

# Update Binding Node

Update Binding Node is an [Instruction Graph Node](#) that tells the binding root [Binding Root](#), *Object* to update its [VariableBindings](#). If *Object* is an [Interface Control](#) then each of the control's *DependentObjects* will also have its bindings updated. If any of the bindings utilize animation (such as [Bar Binding](#)) and *WaitForCompletion* is set, then the graph will not move to the next node until the binding animation is finished. Use the *Group* string to identify only the [VariableBindings](#) with the cooresponding *BindingGroup* to update. Create an Update Binding Node in the **Create** > **Interface** > **Update Binding** menu of the Instruction Graph Window.

See the "Update Binding" node on the "BattleScratch" [Instruction Graph](#) in the Battle project for an example usage.

## Fields



Name	Description
Object	The <a href="#">VariableReference</a> to the <a href="#">Binding Root</a> to set the binding on
Group	The string name of the <i>BindingGroup</i> to update - if empty, all <a href="#">VariableBindings</a> will be updated
Wait For Completion	Whether to wait for the completion of any binding animations before moving on to the next node

# Variable Binding

A Variable Binding is an abstract [MonoBehaviour](#) used to bind data from the composition system, usually via [VariableReferences](#) to visual elements in the scene. By default a Variable Binding has access to the [Composition Manager](#)'s "global" and "scene" [IVariableStores](#). If a Variable Binding has a parent or parents with a [Binding Root](#) then they can access the *Value* property on those [Binding Roots](#) via their *ValueName* property. Variable Bindings can be categorized into groups with the *BindingGroup* property so that only certain bindings will update when they are prompted to (usually by an [Update Binding Node](#). If *AutoUpdate* is set then Variable Bindings will update automatically every frame. Most Variable Bindings will disable their corresponding visual element if they fail to retrieve their data and report the error, however, sometimes this may be intended behaviour so if set, *SuppressErrors* will hide those errors. Some example implementations of a Variable Binding are [Enable Binding](#), [Image Binding](#), and [String Binding](#).

## Fields

Name	Description
Binding Group	The string name of the group this binding belongs to
Auto Update	Whether to automatically update this binding every frame
Suppress Errors	Whether to hide errors reported from invalid variable access

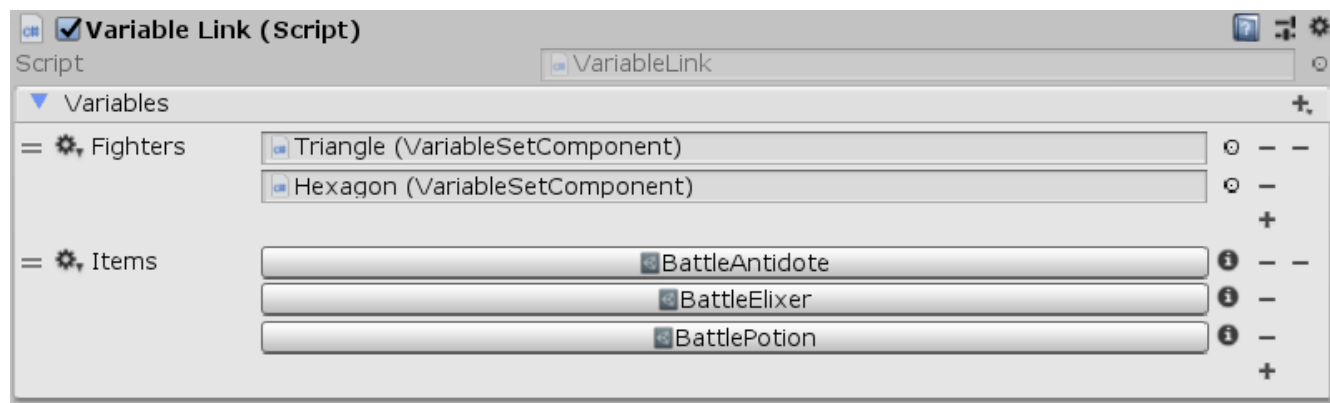


# Variable Link

A Variable Link is a [MonoBehaviour](#) used to add [Variables](#) to the [Composition Manager](#)'s global [Variable Store](#).

See the "Main Camera" object in the "Battle" scene of the Battle project for an example usage.

## Fields



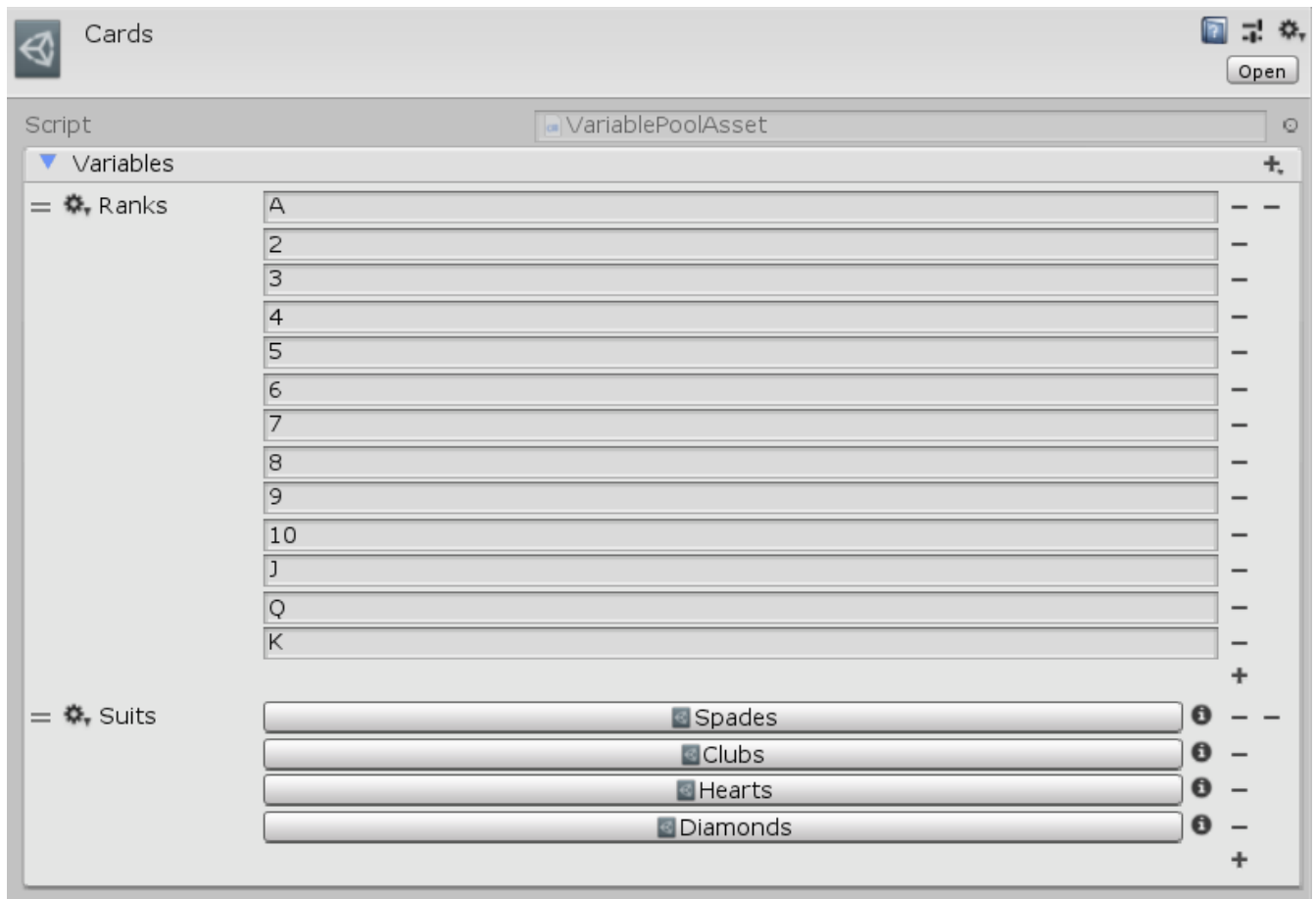
Name	Description
Variables	A <a href="#">Variable Pool</a> , each of whose <a href="#">Variable Values</a> will be added to the global store

# Variable Pool Asset

A Variable Pool Asset is a [ScriptableObject](#) that adds a [Variable Pool](#) to the asset. This allows it to have a list of [Variables](#) without being constrained by a [Variable Schema](#). Create a Variable Pool Asset through the **Create > PiRho Soft > Variable Pool** menu in the project view.

See the *"Loot Equipment Pickup"* prefab in the Loot project for an example usage.

## Fields



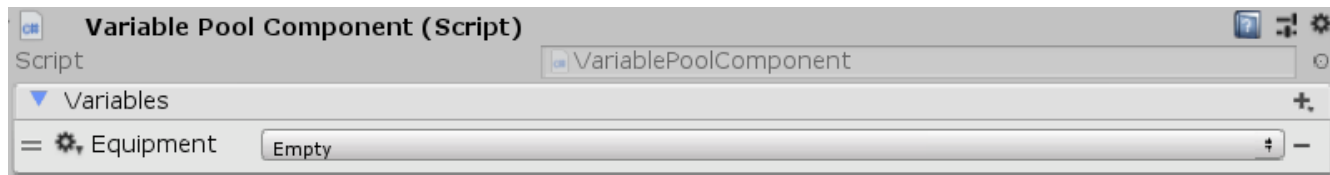
Name	Description
Variables	The <a href="#">Variable Pool</a> of <a href="#">Values</a> that can be set, stored, and accessed on this object

# Variable Pool Component

A Variable Pool Component is a [MonoBehaviour](#) that adds a [Variable Pool](#) to the object. This allows it to have a list of [Variables](#) without being constrained by a [Variable Schema](#).

See the *"Loot Equipment Pickup"* prefab in the Loot project for an example usage.

## Fields



Name	Description
Variables	The <a href="#">Variable Pool</a> of <a href="#">Values</a> that can be set, stored, and accessed on this object

# Variable Schema

A VariableSchema is an [Asset](#) used to define the variables that are available to an [IVariableStore](#) object, usually a [Variable Set Component](#) or [Variable Set Asset](#). This improves the editor experience for working with those object types along with enforcing constraints so typos or other mistaken accesses can be caught and reported at runtime. Create a Variable Schema through the **Create › PiRho Soft › Variable Schema** menu in the project view.

## Fields

BoardPlayer

Open

Script

VariableSchema

Initializer Type

Expression

Tags

Add tags to categorize variables (usually for resetting and persistance)

Definitions

Name

String

Constraint

Red

Yellow

Green

Blue

Initializer

"Red"

Pieces

List

Constraint

Object

VariableSetComponent

SelectedPiece

Object

Constraint

VariableSetComponent

StartingSpace

Int

Constraint

☒ Between 0 and 35

Initializer

0

FinishSpace

Int

Constraint

☒ Between 0 and 35

Initializer

StartSpace - 2

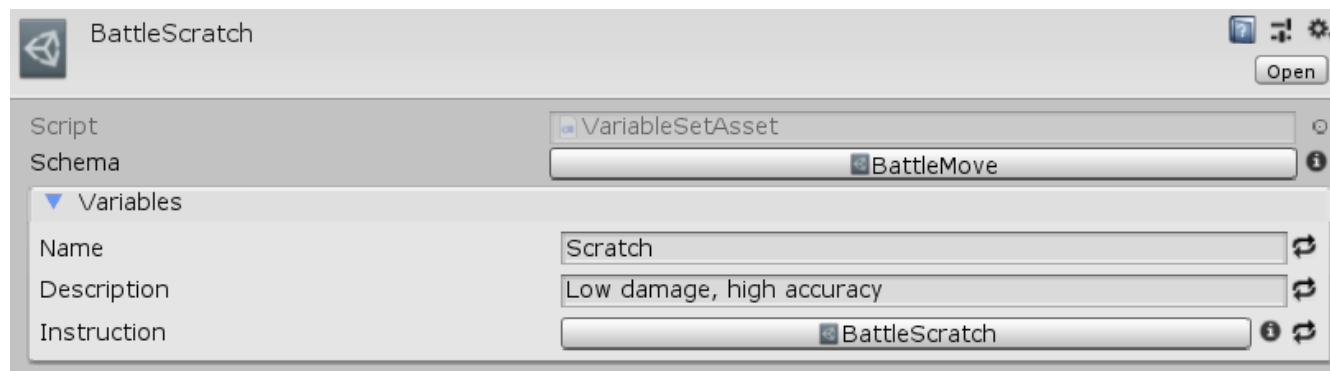
Name	Description
Initializer Type	Whether to initialize the variables in that use this schema with an <a href="#">Expression</a> or a default value
Tags	A list of strings than can be used to categorize each variable in the schema - usually so that they can be reinitialized or saved later

# Variable Set Asset

A Variable Set Asset is a [ScriptableObject](#) that adds a [Variable Set](#) to the asset. This allows it to have a list of [Variables](#) that are defined by a reference to a [Variable Schema](#). A derived class of Variable Set Asset can use the [MappedVariableAttribute](#) to add its fields and properties to the *Variables* list in addition to those defined by *Schema*. Create a Variable Set Asset through the **Create › PiRho Soft › Variable Set** menu in the project view.

See the assets in the *"Moves"* and *"Items"* folders in the Battle project for an example usage.

## Fields



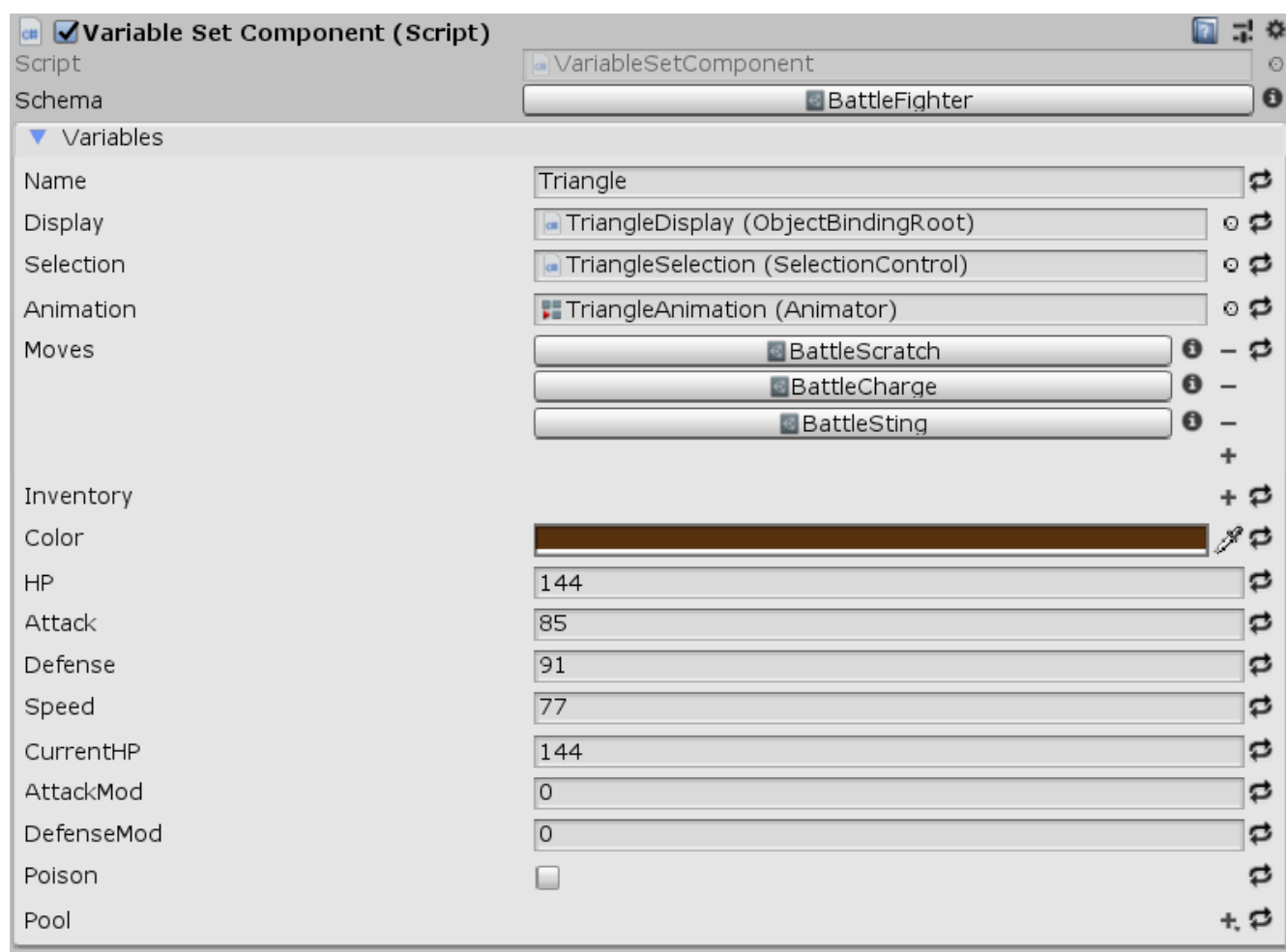
Name	Description
Schema	The <a href="#">Variable Schema</a> to use for this <a href="#">Variable Set</a>
Variables	The list of <a href="#">Variables</a> mapped from <i>Schema</i> and derived script classes

# Variable Set Component

A Variable Set Component is a [MonoBehaviour](#) that adds a [Variable Set](#) to the object. This allows it to have a list of [Variables](#) that are defined by a reference to a [Variable Schema](#). A derived class of Variable Set Component can use the [MappedVariableAttribute](#) to add its fields and properties to the *Variables* list in addition to those defined by *Schema*.

See the *"Triangle"* and *"Hexagon"* objects in the *"Battle"* scene of the Battle project for an example usage. See the *"Player"* script in the Maze project for an example implementation that uses [mapped variables](#).

## Fields




Name	Description
Schema	The <a href="#">Variable Schema</a> to use for this <a href="#">Variable Set</a>
Variables	The list of <a href="#">Variables</a> mapped from <i>Schema</i> and derived script classes

# Wait Node

A Wait Node is an [Instruction Graph Node](#) that waits for an amount of time (scaled or realtime) before continuing on to the next node. Create a Wait Node in the **Create › Sequencing › Wait** menu of the Instruction Graph Window.

See the "*BoardTakeTurn*" [Instruction Graph](#) in the BoardGame project for an example usage.

## Fields

 Wait

Script

Name

Next

Time

Use Scaled Time

WaitNode

Wait

Unconnected

Value

Reference

0.1

☒

Name	Description
Time	A <a href="#">FloatVariableSource</a> to the value of the amount of time to wait
Use Scaled Time	If true, use <a href="#">WaitForSeconds()</a> - if false, <a href="#">WaitForSecondsRealtime()</a>

# Yield Node

A Yield Node is an [Instruction Graph Node](#) that yield for one frame before continuing on to the next node. This is useful for long running processes whose execution needs to happen across frames or for idling a graph until a certain condition is met in a [Loop Node](#). Create a Yield Node in the **Create** › **Control Flow** › **Yield** menu of the Instruction Graph Window.

See the "*BoardTakeTurn*" [Instruction Graph](#) in the BoardGame project for an example usage.