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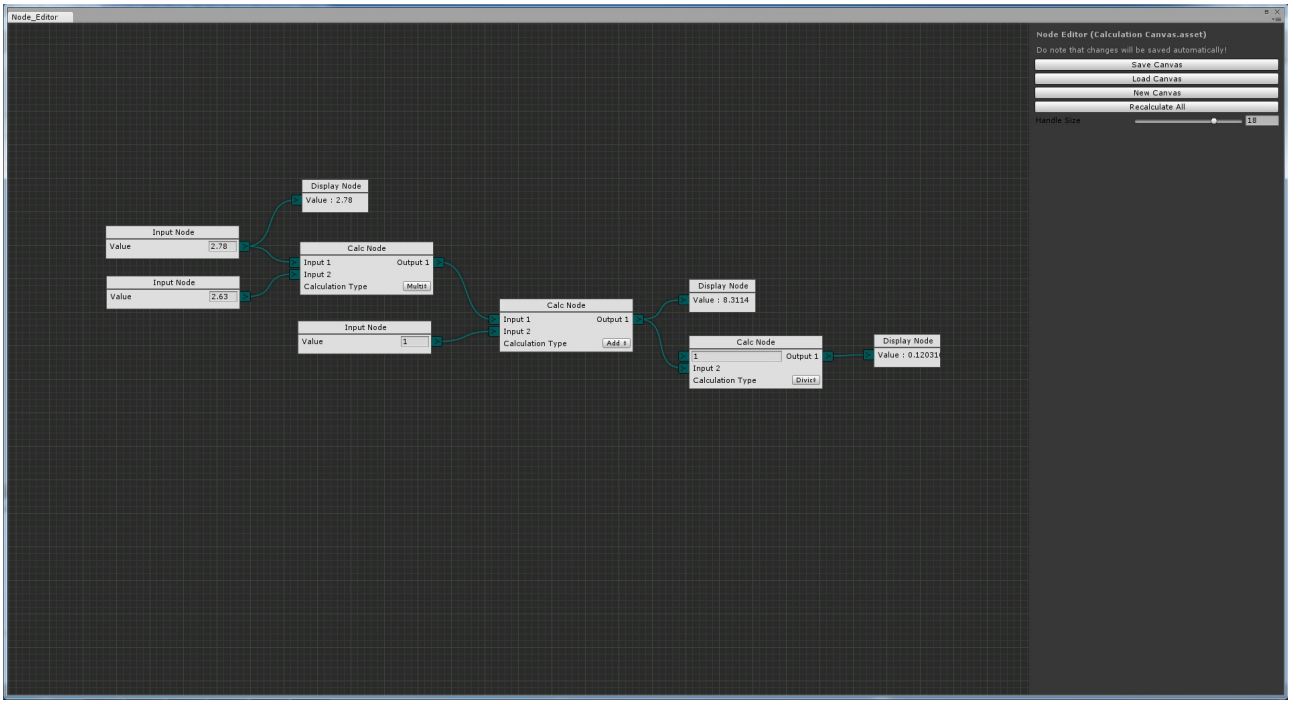
Node Editor
Documentation

by Seneral



Content

Tell me about...

Connection Type
Registering a Node

General

- Place the Node Editor inside „Assets/Plugins/Node Editor/Editor/“
- You can access it through „Window/Node Editor“
- Use context clicks!
- Example included at „/Node Editor/Editor/Saves/Calculation Canvas“

Feature Overview

- Customisable Node Editor GUI
- Reliable Calculation System adaptable to most use cases
- Convenient Drag'n'Drop Connection System
- Colored Types on Connections
- Save/Load System using Scriptable Object
- Custom Windowing System for most flexibility
- Fully documented, clean code
- Very easy implementation of custom Nodes

Code Breakdown

Let's break down the code a bit for better understanding, although the comments should get you started quickly as well.
The code is structured into 5 regions: GUI, GUI Functions, Events, Calculation and Save/Load.

GUI calls to draw every node and it's connection, as well as the side window.

GUI Functions has a lot of helper functions, but also contains *ContextCallback,* the function where you have to register your custom nodes.

Events catches the events and handles the connection system, panning and other shortcuts (for now only 'N': *Navigation* helps you find your way back). It also draws the background (on Repaint).

Calculation contains the functions used by the calculation system, and also allows for manually calculating. Primarily these functions are called in appropriate spots, for example when connecting, breaking connections, changing a value and so forth.

Save/Load has the functions to Save/Load the current Node Canvas in it.

For further details, I recommend you to read the comments. They are the most valueable source of information.

Some notes about features and their implementation:

The **Custom Windowing System** allows for more flexibilty regarding the style and any other modifications. Though, if you want to disable it, I prepared some TODOs you can check to switch over to Unity's default windows.

The **GUI Textures and Styles** are intended to be replaced. I provided some default texture work but depending on your extension, you probably want to replace them.

Implementation of custom Nodes

The Node Editor Framework is designed for you to have the least work possible to create your Node Editor based Editor Extension.
Thus, creating your own nodes is fairly easy. This section lines out which steps you have to perform in order to implement a simple node.

First, create a new class inheriting from Node similar to the one below. Give it three functions *Create*, *NodeGUI* and *Calculate* with these signatures and content.

```
using UnityEngine;
using UnityEditor;
using System.Collections;

[System.Serializable]
public class ExampleNode : Node
{
    public static ExampleNode Create (Rect NodeRect)
    {
        ExampleNode node = CreateInstance<ExampleNode> ();
        return node;
    }

    public override void NodeGUI ()
    {

    }

    public override bool Calculate ()
    {
        return true;
    }
}

```

We start with **Create**:
This static member is the function that inits your node. Set the name and the rect of it.
Also, call *node.Init* to initiate the base function at the very end.

```
public static ExampleNode Create (Rect NodeRect)
{
    ExampleNode node = CreateInstance<ExampleNode> ();

    node.name = "Example Node";
    node.rect = NodeRect;

    node.Init ();
    return node;
}
```

Let's then **register** it in the *NodeEditor.ContextCallback* function inside the *GUIFunctions* region. The piece of code could look like this:

```
case "exampleNode":
    ExampleNode.Create (new Rect (mousePos.x, mousePos.y, 100, 50));
    break;
```

It's called from a context menu, so we have to add it there as well. It can be found in the *Events* region, 'Right click on empty canvas -> Editor Context Click':

```
menu.AddItem(new GUIContent("Add Example Node"), false, ContextCallback, "exampleNode");
```

Add it somewhere after where the other nodes are registered.
That's it! You registered your custom node!

Of course, we need some Inputs and Outputs of our Node. Our *ExampleNode* will have one Input, one Output. Let's add them just before *node.Init ()*:

```
NodeInput.Create (node, "Value", TypeOf.Float);
NodeOutput.Create (node, "Output val", TypeOf.Float);
```

In both *NodeInput* and *NodeOutput*, you have to pass the parent node, the name (which you may override later in the GUI) and the Type of the connection.

The **Type** (TypeOf) is an enum of types that you use in your Extension. To add a type, you have to edit it's source at the top of *Node_Editor.cs:*

```
public enum TypeOf { Float }
```

Then, register it in the *Node_Editor.typeData* Dictionary (→ *Node_Editor.checkInit*), choosing a color and textures:

```
typeData = new Dictionary<TypeOf, TypeData> ()
{
    { TypeOf.Float, new TypeData (Color.cyan, InputKnob, OutputKnob) }
};
```

Those textures will be tinted with the color for you.

The **NodeGUI** function draws you GUI:

```
public override void NodeGUI ()
{
    GUILayout.Label ("This is a custom Node!");
}
```

Of course, we additionally want to display our Inputs and Outputs. So we add something like this:

```
GUILayout.Label ("Input");
if (Event.current.type == EventType.Repaint)
    Inputs [0].SetRect (GUILayoutUtility.GetLastRect ());
```

And with the Output respectively. Basically, your have to pass the rect of your GUI Input/Output GUI control to SetRect, in order to update the rect of the knob drawn at the left/right edge of the node respectively.

The **Calculate** function performs the calculation related things. It's called whenever a change in values or dependecies was performed.
Often functions like *base.allInputsReady*, *base.hasNullInputs* or *base.hasNullInputValues* are used to check whether you are ready to calculate your stuff.
Note that, if you are not ready, you have to return false, and it will try to solve this at a later stage.

For now, ExampleNode just calculates the Product of Input and 5f:

```
public override bool Calculate ()
{
    if (!allInputsReady ())
        return false;
    Outputs [0].value = (float)Inputs [0].connection.value * 5;
    return true;
}
```

Note the way input and output values are accessed and the use of *allInputsReady.*

Conclusion

I really hope Node Editor helps you as I intended it to do. The same goes for this documentation, and as this is my first one I'd like to hear feedback about it;)

- Did you still have questions after reading this and studying the code?
- What would you see improved in the doc formally? Appearance?
- Did the examples explained what you needed to know?

Of course, if you made an Editor Extension using this, I'd really like to hear about it;)

Regarding licensing: You're free to use this code in any way you want, no restrictions. But I would be happy if you wouldn't claim it as your own and publish it elsewhere without doing any significant changes to it:)

You're also free to contribute your changes and updates to the **GitHub repository** hosted by Baste (Thanks!). I just ask you to not use auto-formatter which will result in everything proposely changed;)

Any major updates on this will still be posted in my **post** here though.

Thanks for your attention!
Have fun and be always productive,

Seneral