

HOW TO USE

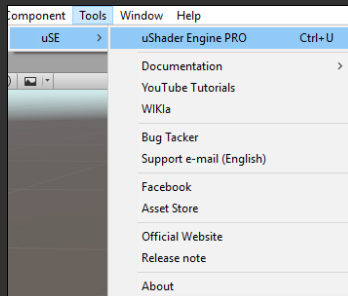
What is an “uShader Engine PRO”?

uSE is a visual nodes editor for creation shaders for Unity Engine 5.

How to start uSE?

Just click on top panel “[Tools/uSHader Engine PRO](#)” and then select “[uShader Engine PRO](#)” like on attached screenshot.

Alternatively, press a [Ctrl + U](#).



Control panel, what is it?



There you can find a main control buttons like:

Play your shader ([Ctrl + R](#))



Combine shader



Save *.usp ([F5](#))



Save *.usp as..



Load *.usp

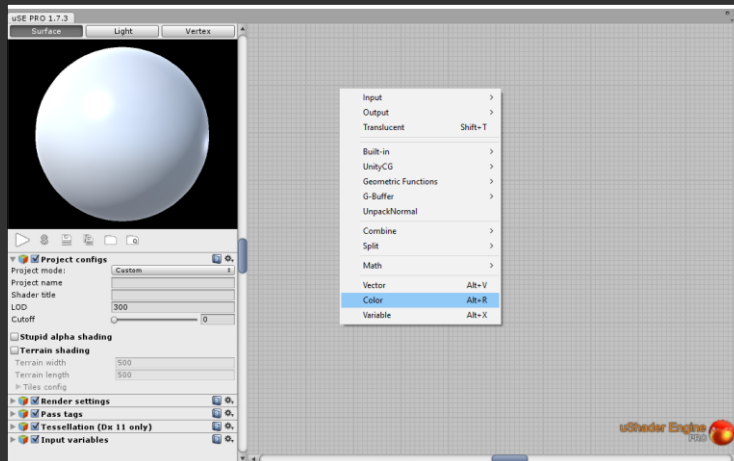


Quick load ([F9](#))



How I can create new node?

Click **RMB** on free space on the right side of editor window. Then select a node that you need on context menu.



Where I can find detail information about nodes?

Just click on node. On focused node will be spawn "info" button ([like this](#) - **i**). Drag your cursor into this button and will see pop-up window with description.



How can I copy nodes?

Hold down the CTRL and LMB. While holding select the necessary nodes. Press **CTRL + C**, to copy and **CTRL + V**, to paste.

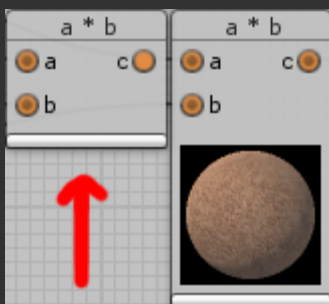
How can I change the scale of the work canvas?

In the **upper left corner** you can find the **slider** is responsible for the scale. You can also hold down the **CTRL** key and scroll the **mouse wheel**.

How can I see the result of the node?

Each node that have an output in format RGB or RGBA you can see the intermediate result.

To do this, you only need to click on the button at the bottom of the node.



Attention: Enabled preview significantly increase the time of the shader compilation, as well as stress the processor. Try to keep open only the necessary at this time previews.

How I can interact with nodes?

Every node have one or couple "**In**" or/and "**Out**".




"In" may have relationship only with one out of another node.

"Out" may have any numbers of relationships with any another nodes.

To create the relationship just click on "In" or "Out" and then click to target "Out" or "In" (it may be the same type/color).

To REMOVE relationship click on a target "Out" a then click on free space.

 This icon mean that the **In/Out** can take **Vector1**, **Vector2**, **Vector3** and **Vector4**.

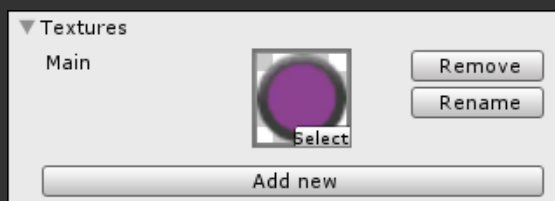
How I can create public variables like a vectors, colors, textures or cube maps?

Select the “Input variables” tab on editor's left panel. There you can see 4 sub tabs:

- Textures
- Colors
- Cubmaps
- Numerical values



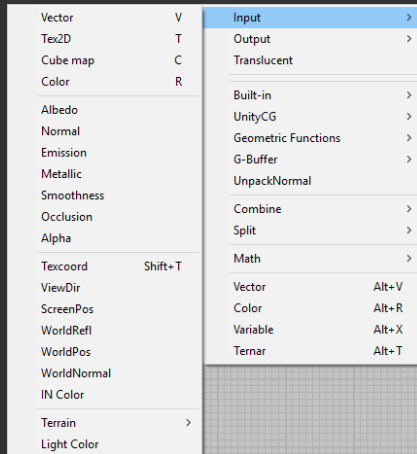
For creation, a new public variable just select your target sub tab and press “Add new” button.



In addition, here you can rename and remove the variables.

How I can add these public variables to pipeline?

Create a new node form “**Input**” sub menu with the same type like your variable (Vector, Tex2D, Cube map, Color). And then select on node your variable in drop-down list.



How I can navigate on a canvas?

Press and hold **LMB** on free space for drag a canvas.

Press and hold **Ctrl** for selecting a couple node.

Press **Del** for deleting selected node/s.

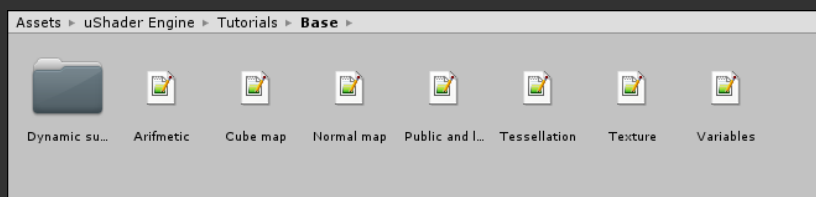
Use **Ctrl+Z** and **Ctrl+Y** for Undo/Redo.

Use **Ctrl+C** and **Ctrl+V** for Copy/Past.

Use **Ctrl+D** for duplicating.

Where I can find basic node constructions?

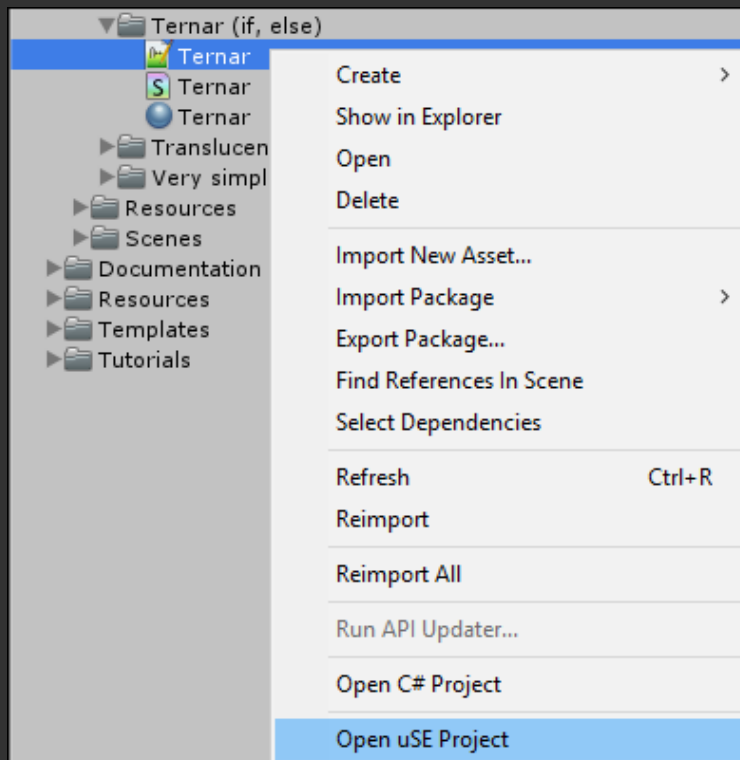
The folder “uShader Engine/Tutorials/” has a set of basic designs. Just open target project from this folder in Editor.



Attention: project from “../Dynamic Surface/” will be work only if you add the material with compiled shader from this folder to object on scene. In this case if you start game the material will be updated on real time.

Can I open a *.usp project not using an “open file dialog” in uSE?

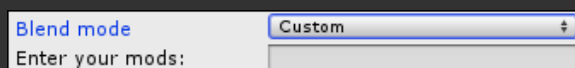
Yes! Just click **RMB** on you “**.usp**” file in **Project** tab and select a “**Open uSA Project**” item in context menu.



How I can set my own BLEND MODE?

Select the “**Render settings**” tab on editor's left panel. In drop-down list of “**Blend mode**”, select property “**Custom**”. Now you can add your own mode.

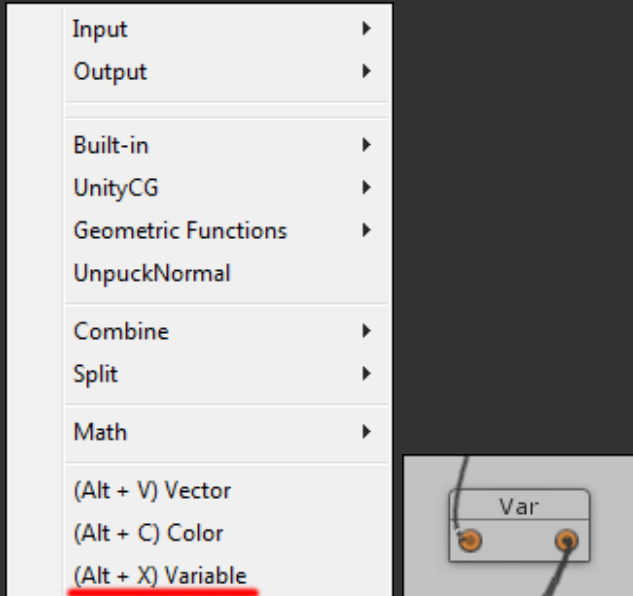
Attention: If you will make mistake in this property then the output shader will have compile error. We are not recommend to select this mode, if you do not understand as it works.



How I can optimize work of my shader?

If you see that you create a couple nodes, which you use a many time, then you can add this node group to “Var” node. In this case this group will be calculated only one time.

To do this, just click RMB and then select “Variable”.



Pipelines

On top left panel of editor, you can see 3 buttons:



Switching these tabs, you select which pipeline you want to change.

In addition, you can use shortcuts for switching:

- Shift + 1 – Surface pipeline
- Shift + 2 – Light pipeline
- Shift + 3 – Vertex pipeline

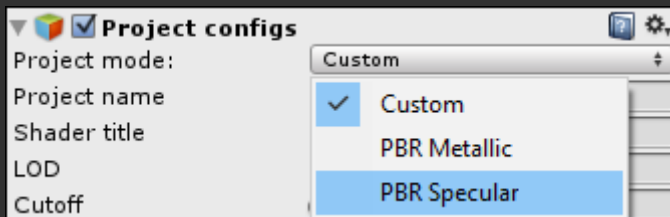
Attention: Light pipeline will work only when you using a custom light model.
More detail in next paragraph.

PBR

USE can work with 3 types of rendering modes:

- Custom
- PBR Metallic
- PBR Specular

For selecting open “**Project configs**” tab on left panel. Then select a project mode in drop-down list like on screenshot below.



PBR modes fully rewrite a light pass, so on this mode light pipeline will disabled. Also on this mode will added a couple of specifics nodes to Output and Input tabs.

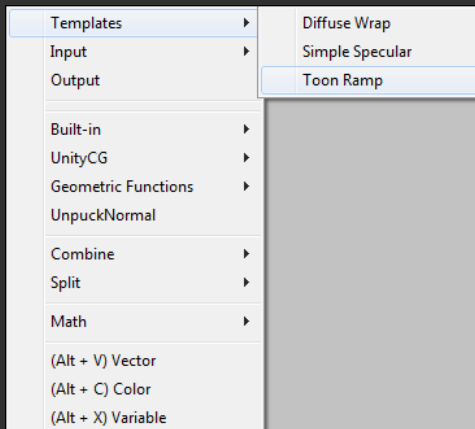
Attention: If you have a beginner skill in shader development, we strongly recommend only PBR modes.

Templates

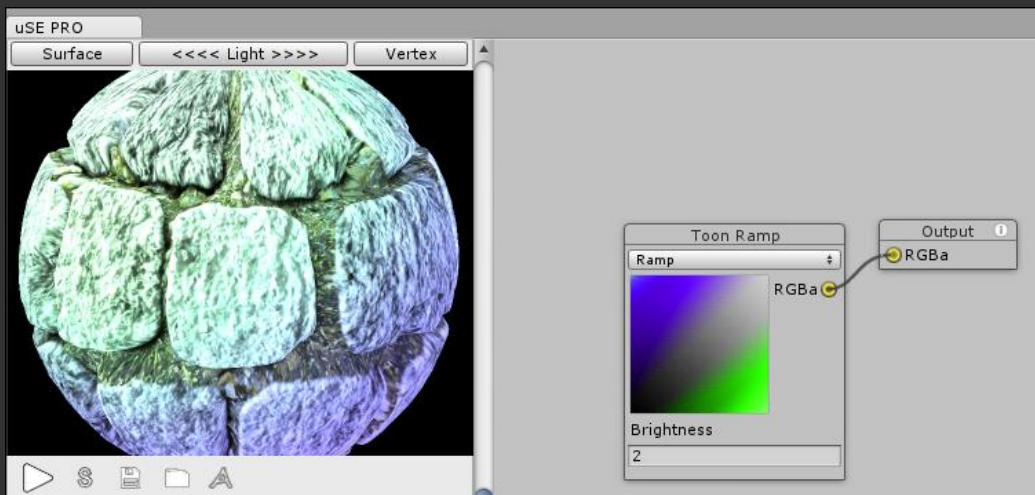
On this moment **uSE** have a 3 light model templates:

- Warp diffuse
- Simple specular
- Ramp toon

For use, just switch to the “**Light**” pipeline and create node from sub-tab “**Templates**”.



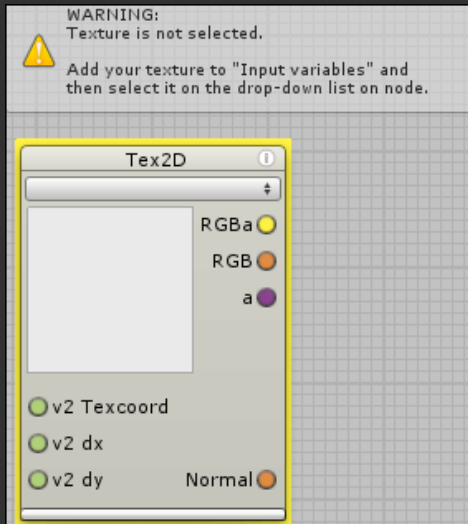
Choose a necessary template and fill it. After connect to the output node.



Warnings

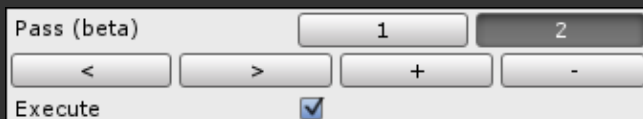
My node is highlight in yellow. How to find out what a problem?

Drag a mouse to your node. In right corner of editor, spawn a message with warning description and instruction about how you can solve this problem.



Multiple pass shading

With **uShader Engine PRO** you can create a multiple pass shaders. For this, you just need to open a **"Project configs"** tab and press to **"+"** button in pass manager.



In all additive passes, a tab **"Project configs"** will be replaced by tab **"Pass configs"**.

In this tab, you can change a unique setting for every pass.

Another tabs also have and unique values for every pass.

Also with this manager, you can **change the order** of passes (buttons **"<"** & **">"** and can disable any of this (change a state of **"Execute"**).

If you press **"-"** button you'll get a confirm message for removing this pass.

Tabs

Project info

Shader title – name of your shader that will be show on drop-down list where you will select shader for your material.

Lod – [Level of Detail](#).

Cutoff - alpha cutoff.

Render settings

Blend mode - [ShaderLab: Blending](#).

Cull & zTest & zWrite - [ShaderLab: Culling & Depth Testing](#).

Lighting & Separate specular - [ShaderLab: Legacy Lighting](#).

Alpha shading – this check-box enable alpha channel on shader. Recommend to use a Grab Pass node instead this.

Pass tags

Full info - [ShaderLab syntax: SubShader Tags](#).

Tessellation

Polygons multiplier – multiplier of polygons of your model.

Displacement – power o tessellation.

Displacement map – height map of your model.

Input variables

In this tab, you can declare public variables. After that you will be able to change their values manually or through code.

Tessellation

Attention: This will be work only on DirectX 11 or higher.

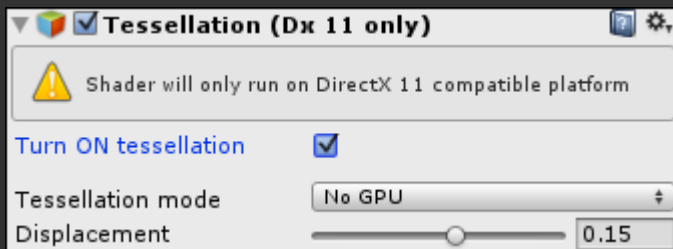
How I can add tessellation to my shader?

It's very easy. Just turn on tessellation on "Tessellation".

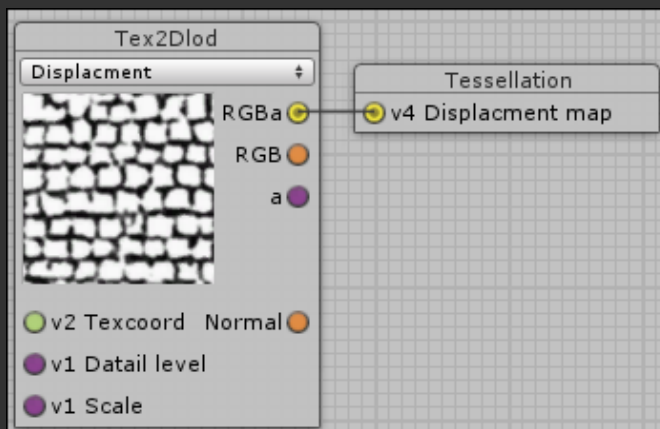
Next, chose the best for you tessellation mode in drop-down list.

- **No GPU** – tessellation without increasing a number of vertices.
- **Fixed amount** – a most required to hardware mode. Get a max quality. Recommend for creating screenshots.
- **Distance based & Edge length based** – the best modes on the ratio cost / quality. Have an almost similar effect.
- **Phong** – type of tessellation that can significantly improve the quality of the low-poly model.

Fields "Displacement" and "Phong strength" is responsible for the volume level. Fields "Polygons multiplier" and "Edge length" is responsible for increasing the degree of detail of the object.



After setting, click the "Vertex" pipeline, create a node "Tessellation", and connect your height map to it.



Terrain shading

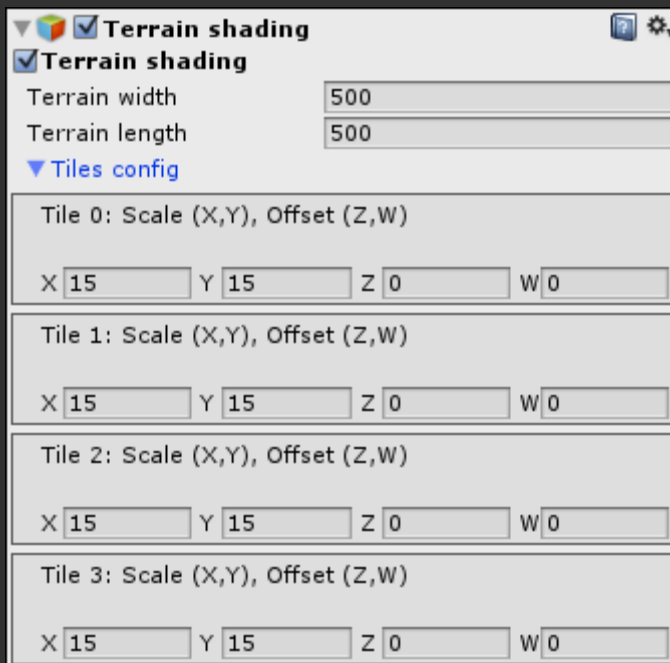
Terrain shading in Unity require a special type of shaders.

However, do not worry, **uSE** do almost all work without you!

At first step, you must enable a “**Terrain shading**” on the left panel in “**Terrain shading**” tab.

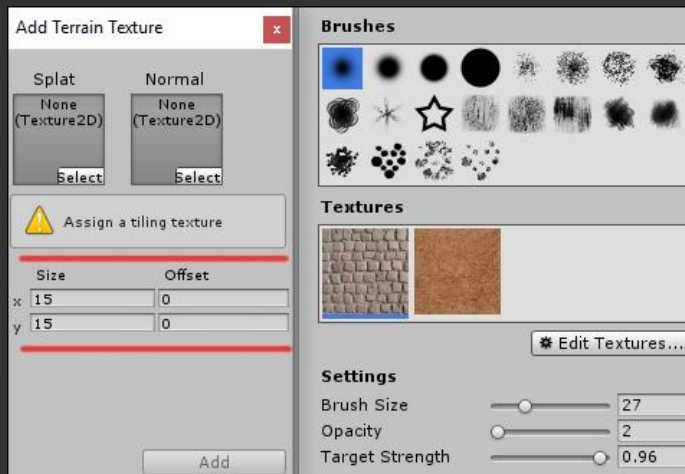
Now you must configure settings of your terrain.

- Width
- Length
- Tiles config
 - Scale
 - Offset



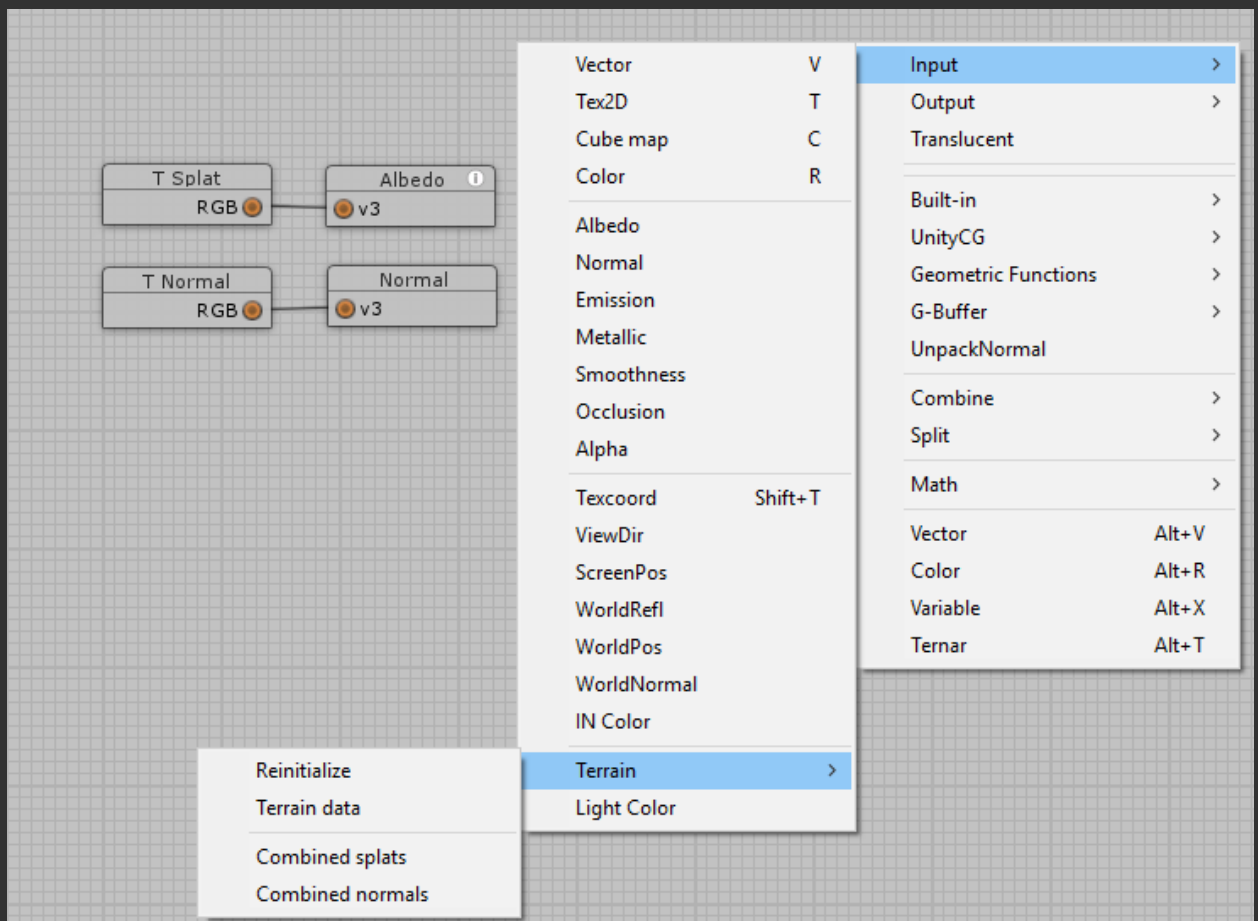
Terrain width and length you can find out if you will select your target **terrain**, click on “**gear**” icon. Find on fields named as “**Terrain width**” and “**Terrain length**” and just copy a values to **uSE**.

Tiles “**Offset**” and “**Scale**” it is parameters that you setting when you adding new textures in “**Brush**” tab on your **terrain**.



In next step, we must bind our **terrain inputs** to our **outputs**.

For this click **RMB** and add to canvas 2 nodes in “**Input\Terrain**” tab that marked as “**Compined ...**”



Now your shader will be able to work with four textures that you add to your terrain.

These nodes send a correct blending result texture of your terrain as input to your shader. You can send it to output as on a screenshot, or change it, as you want before that.

All textures and normal maps getting from terrain tails.

If you want to use a **Tessellation** on you terrain just select a **Vertex** pipeline and add to your canvas a "**Terrain disp**" node from **Input** tab.

Do not forget to enable a **Tessellation**, as was notice on **last paragraph**.



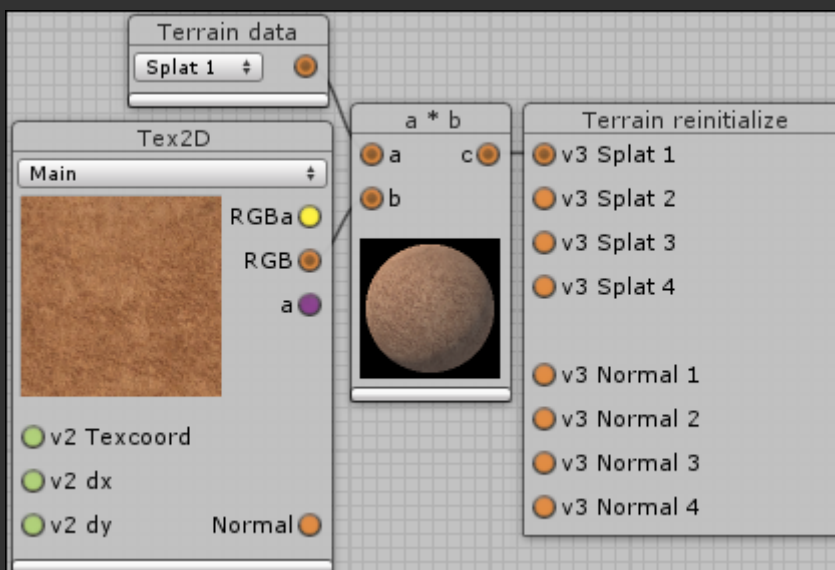
After combining of shader, you find on your **material** a 4 texture fields for displacement maps of all of 4 tiles of your terrain. Drag and drop your maps to this field and your terrain will have a new detail relief.

How can I change the values of the input textures?

To do this, you only need in the tab "**Input\Terrain**" select node "**Reinitialize**".

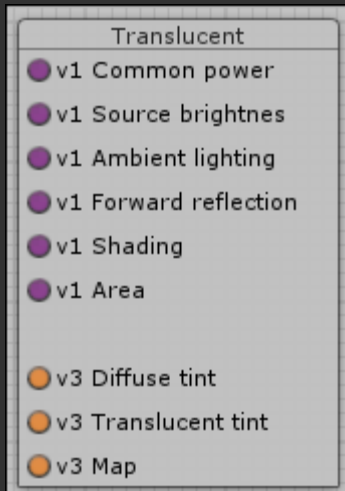
Using a combination of this node and the node "**Terrain data**" in the same tab, you can reinitialize the input values.

The example in the screenshot below.



Translucent bodies

For start, you must add to canvas a “**Translucent**” node. For this on “**Surface**” pipeline, click **RMB**.



After this you just need to initialize all fields on this node.

Attention: A translucent post-processing will be calculated after all shader calculation.

Common power – power of translucent effect.

Source brightness – brightness of light source.

Ambient lighting – power of lighting of backward surface.

Forward reflection – power of light reflection of forward surface.

Shading – power of shading.

Area – size of spot area of lighting source.

Diffuse tint – additive tint of diffuse.

Translucent tint – additive tint of translucence area.

Map – translucency map. **Black** not translucent. **White** fully translucent power.