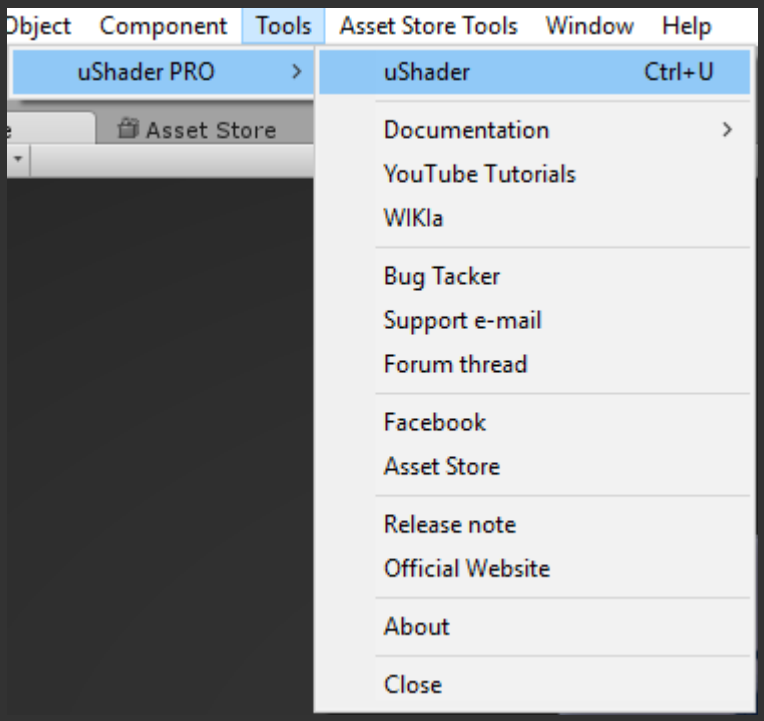
USHADER PRO

Interface

How to start uShader?

Just click on top panel "Tools/uShader PRO" and then select "uShader PRO" like on the attached screenshot.

Alternatively, you can press Ctrl + U.



Control panel, what is it?

There you can find a row of buttons for managing your project:

Play your shader (Ctrl + R)

Combine shader

Save *.usp (F5)

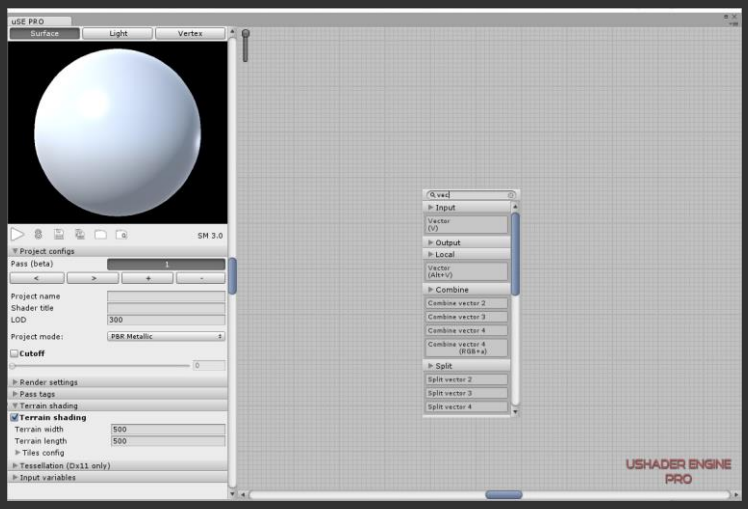
Save *.usp as..

Load *.usp

Quick load (F9)

How to create a new node?

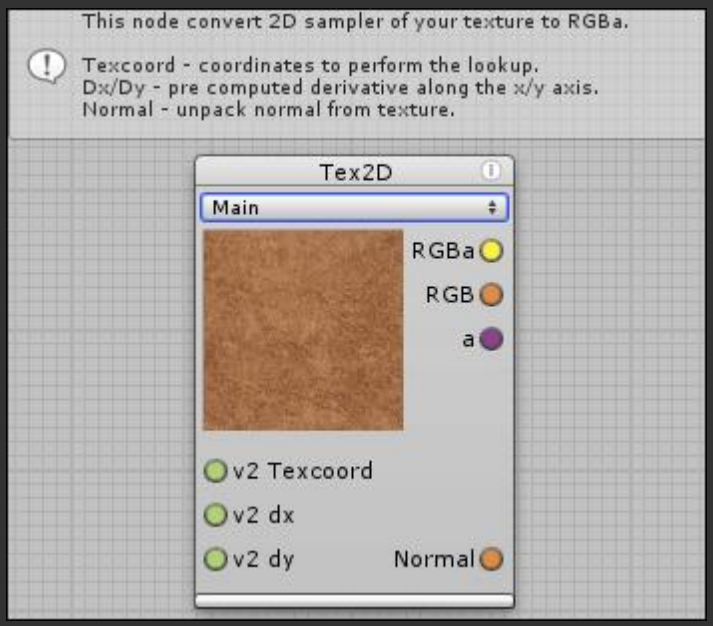
Click **RMB** on free space on the right side of editor window. Then select a node that you need. Please note that you can call nodes with hotkeys.



Where to find more information about nodes?

Just click on node. On selected node "info" button (ⓘ) will be spawn.

Drag your cursor onto this button and a window with description will pop-up.



How to 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 to change the scale of the work canvas?

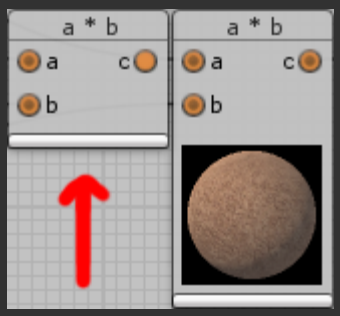
In the **upper left corner** you can find the **slider** responsible for the scale.

You can also hold down the **CTRL** key and scroll the **mouse wheel**.

How to see the result of the node?

For each node, that has an output in format RGB or RGBa, you can see the intermediate result.

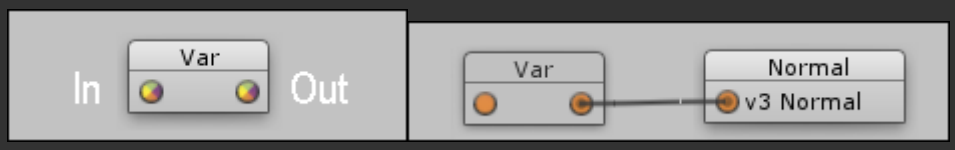
To do this, you only need to click on the button at the bottom of the node.



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

How to interact with nodes?

All nodes have one or couple "**In**" or/and "**Out**".



"In" may have a connection only with one "**Out**" of another node.

"Out" may have any number of connections with another "**In**".

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

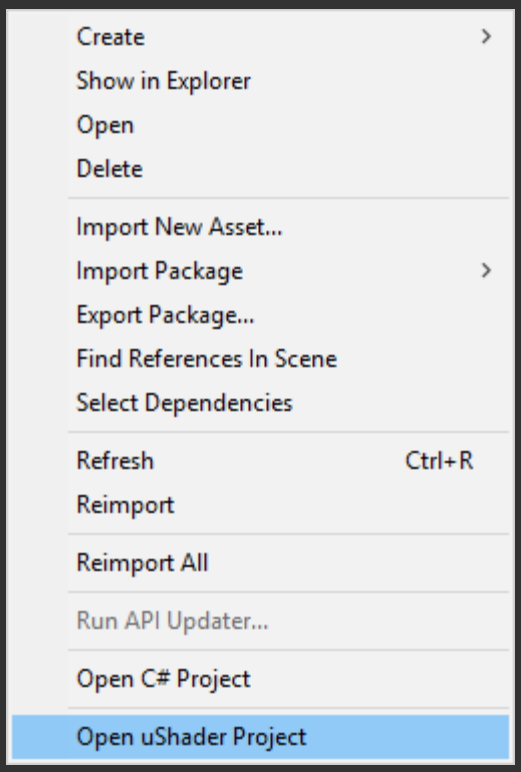
To **REMOVE** connection click on a target "**Out**" a then click on free space.

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

How to quickly open *.usp?

Just click **RMB** on you "**.usp**" file in **Project** tab and select

"**Open uShader Project**" item in context menu.



How to manage a canvas?

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

Press and hold **Ctrl** to select several nodes.

Press **Del** to delete selected node/s.

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

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

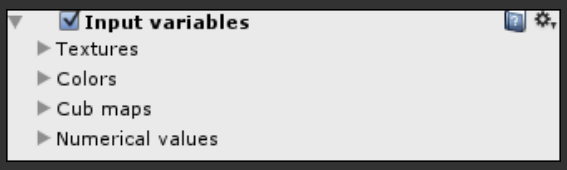
Use **Ctrl+D** for duplicating.

Variables and constructions

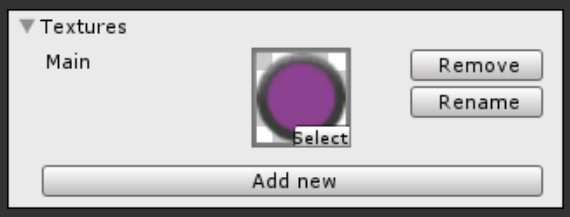
How to create public variables? Vector, color, texture, cubemap

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

- Textures
- Colors
- Cubemaps
- Numerical values



To create a new public variable just select your target sub tab and press "**Add new**" button.



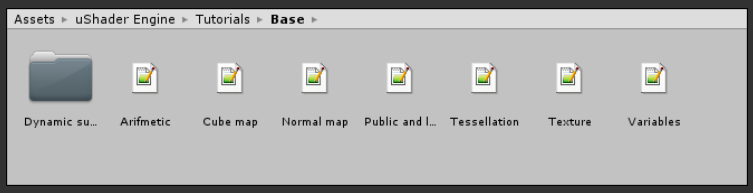
Please note that you can **rename** and **remove** your variable.

How to add these public variables on canvas?

Create a new node form "**Input**" sub menu with the same type as your variable (**Vector**, **Tex2D**, **Cube map**, **Color**). Then select your variable in drop-down list.

Where to find basic node constructions?

The folder "uShader Engine/Tutorials/" has a set of basic designs. Just open target project in Editor.



Attention: projects from "../Dynamic Surface/" directory will work only after the addition of a compiled shader to object on scene and the start of "Play" mode.

Shader Optimization

If you see that you created a set of nodes which are used several times, then you can declare this group as variable via a "**Var**" node. In this case this group will be calculated only once.

To do this, just click **RMB** and then select "**Variable**".

Pipelines

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

By switching these tabs, you select the pipeline which you will edit.

In addition, you can use hotkeys:

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

Attention: Light pipeline will work only if the custom light model mode is on. More information in next paragraph.

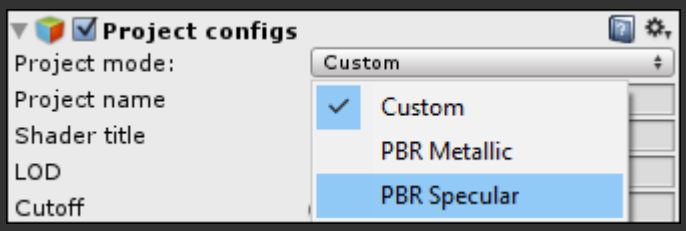
PBR

Physically Based Rendering

uShader can work with 3 types of rendering modes:

- Custom
- PBR Metallic
- PBR Specular

To select, open "**Project configs**" tab on left panel. Then select a project mode in drop-down list as in the screenshot below.



PBR fully rewrites a light pass, so in these modes **light pipeline** will be disabled.

Also in these modes, a couple of specific nodes will be added to **Output** and **Input** tabs.

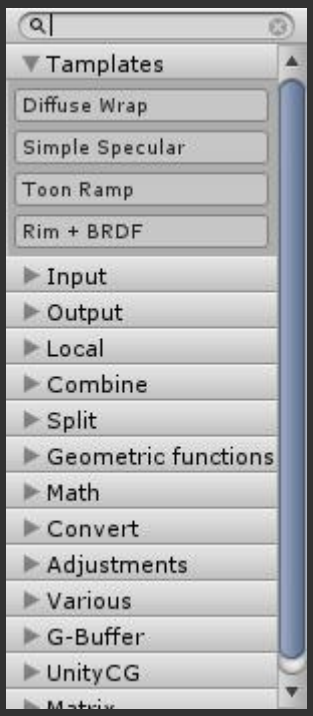
Attention: If you have a basic skill of shader development, we strongly recommend using only PBR modes.

Templates

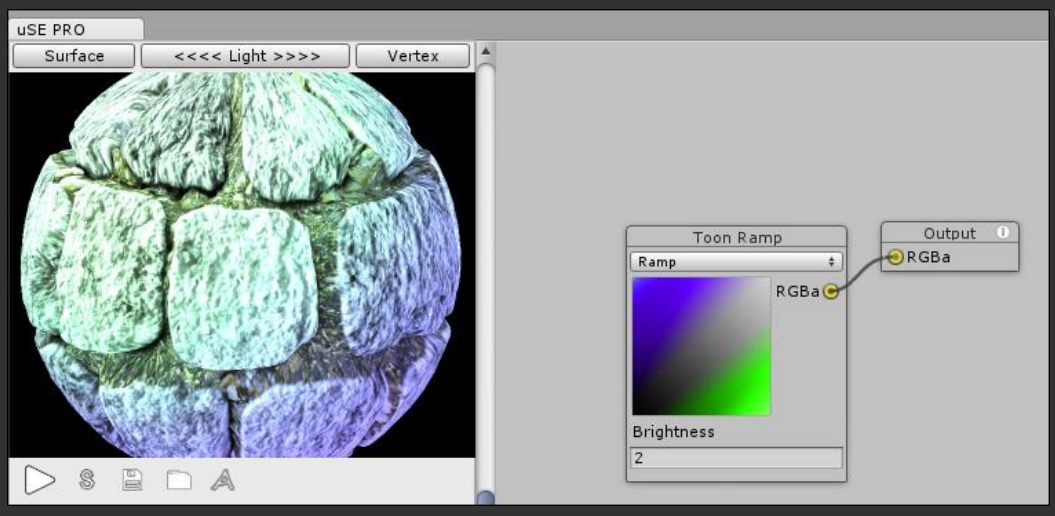
At the moment **uShader** has 3 light model templates:

- Warp diffuse
- Simple specular
- Ramp toon

To use them, just switch to the "**Light**" pipeline and create node from sub-tab "**Templates**".



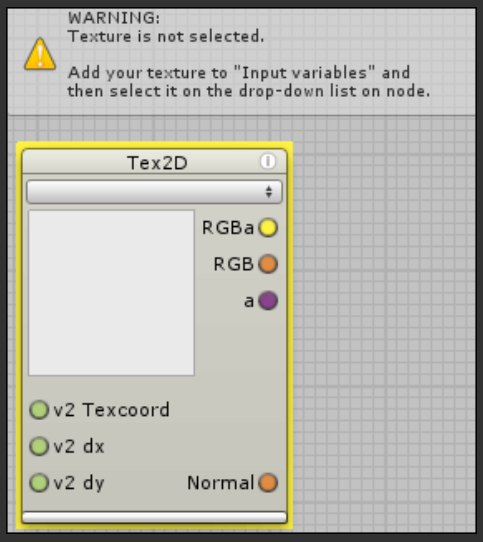
Choose a necessary template and fill it. Then connect it to the output node.



Warnings

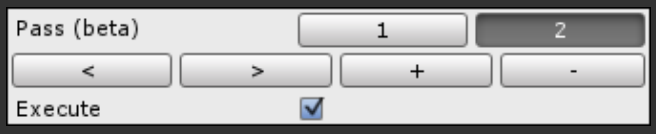
Yellow highlight of a node. Warnings correction

Drag a mouse to your node. In the right corner of editor, a message will spawn with a warning description and instructions on fixing.



Multiple pass shading

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



In all additional passes, a tab "Project configs" ш replaced by tab "Pass configs".

In this tab, you can set unique settings for every pass. Other tabs also have a unique value for each of the passages.

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

If you press "-" button you'll get a confirmation window of removing the pass.

Tabs

Project info

Shader title – name of your shader that will be shown on drop-down list when a shader is added to a material.

Lod – Level of Detail.

Cutoff - alpha cutoff threshold.

Render settings

Blend mode - ShaderLab: Blending.

Cull & zTest & zWrite - ShaderLab: Culling & Depth Testing.

Lighting & Separate specular -ShaderLab: Legacy Lighting.

Alpha shading – this check-box enables basic alpha shading in your shader.

Pass tags

Full info - ShaderLab syntax: SubShader Tags.

Tessellation

Polygons multiplier – multiplier of polygons of your model.

Displacement – power of tessellation effect.

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 work only on DirectX 11 or higher.

How to add tessellation to a shader?

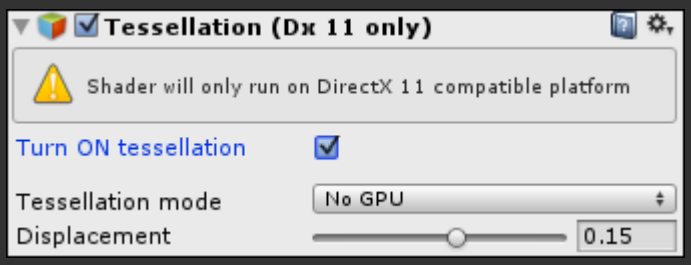
It's very easy. Just turn on tessellation on "**Tessellation**".

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

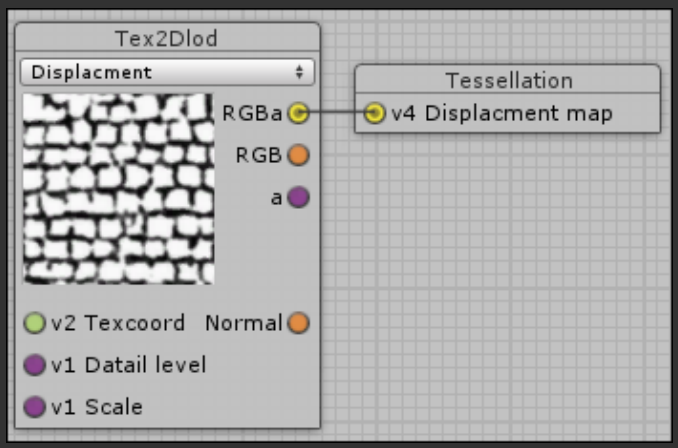
- **No GPU** – tessellation without increasing vertex count.
- **Fixed amount** –most hardware demanding option. Provides the highest quality. Recommended for creating screenshots.
- **Distance based** & **Edge length based** – the best options of tessellation by the ratio cost / quality. Have an almost similar effect.
- **Phong** – type of tessellation that can significantly improve the quality of low-poly models.

"**Displacement**" and "**Phong strength**" fields, you can adjust the effect volume.

"**Polygons multiplier**" and "**Edge length**" fields are responsible for increasing the degree of detail of the object.



After configuring the settings, go to "**Vertex**" pipeline, create a "**Tessellation**" node, and connect your height map to it.



Terrain shading

How to work with it?

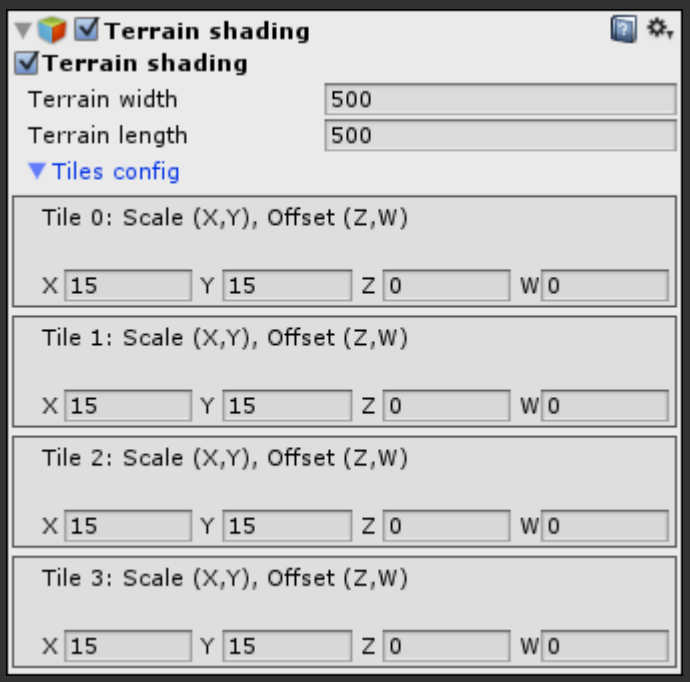
Terrain shading in Unity requires a special type of shaders.

However, don't worry, **uShader** will do almost all work for you!

First, you must enable "**Terrain shading**" on the left panel in "**Terrain shading**" tab.

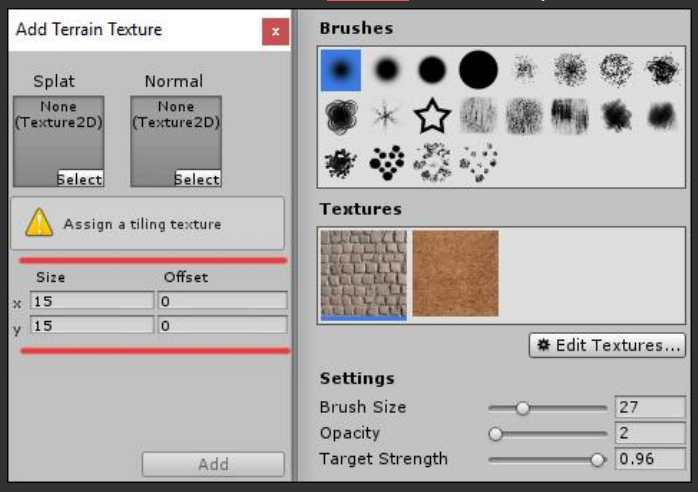
Now you can configure settings of your terrain.

- Width
- Length
- Tiles config
- Scale
- Offset



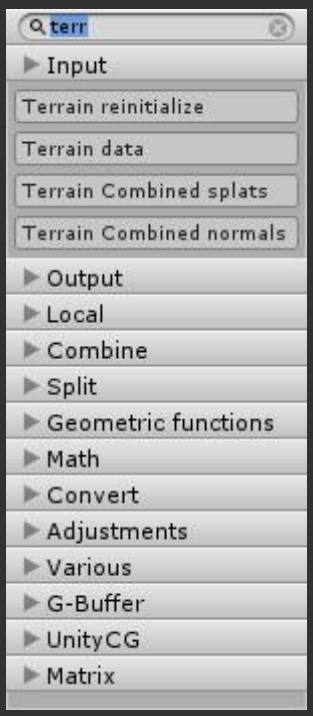
You can find terrain width and length by selecting your target **terrain** and clicking on "**gear**" icon. Find fields named **Terrain width**" and "**Terrain length**" and just copy values to **uShader**.

Values of "**Offset**" and "**Scale**" tiles are parameters that you configure when you add a new texture in "**Brush**" tab to your **terrain**.



On the next step we must bind our **terrain inputs** to our **outputs**.

To do this, click **RMB** and add 2 nodes in "**Input**" tab that are marked as "**Terrain Compined …** " to canvas.



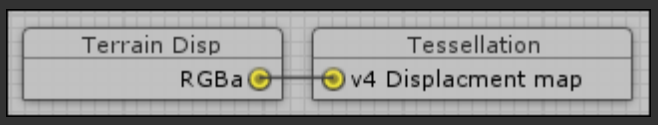
Now your shader is able to work with four textures that you will add to your terrain.

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

All textures and normal maps are taken from terrain tiles.

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

Do not forget to enable **Tessellation**, as mentioned in **last paragraph**.



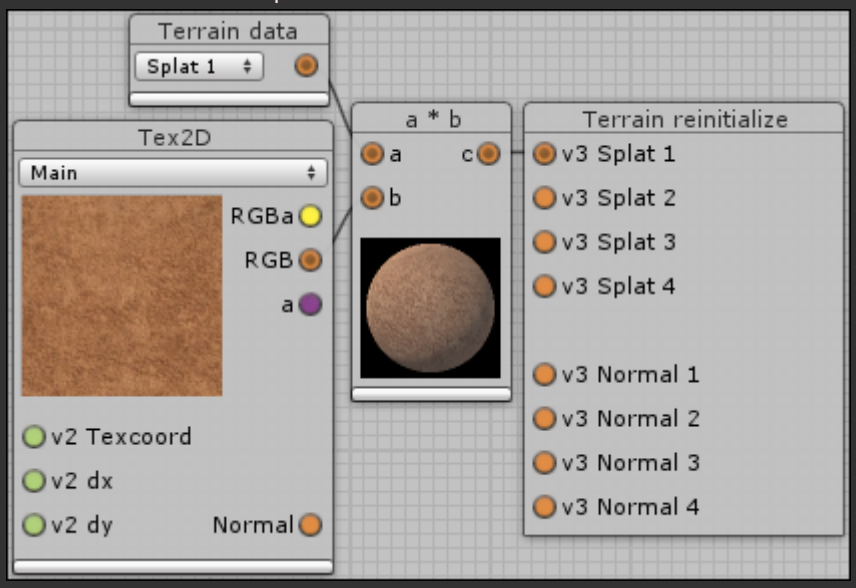
After shader assembly, you will find on your **material** 4 texture fields for all of 4 tiles of your terrain. Drag and drop your height maps to this field to get a new detailed relief.

How to change the values of the input textures?

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

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

The example is in the screenshot below.



Translucent bodies

First, you must add to canvas a "**Translucent**" node. To do this, click **RMB** on "**Surface**" pipeline.

After that, you just need to initialize a node.

Attention: translucency processing will occur after all shader calculations.

Common power – power of translucency.

Source brightness – brightness of light source.

Ambient lightning – power of lightning of back surface.

Forward reflection – power of light reflection of front surface.

Shading – shading.

Area – size of the light source area.

Diffuse tint – an additional dispersion tint.

Translucent tint – an additional translucent shade.

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