Flexible Cel Shader

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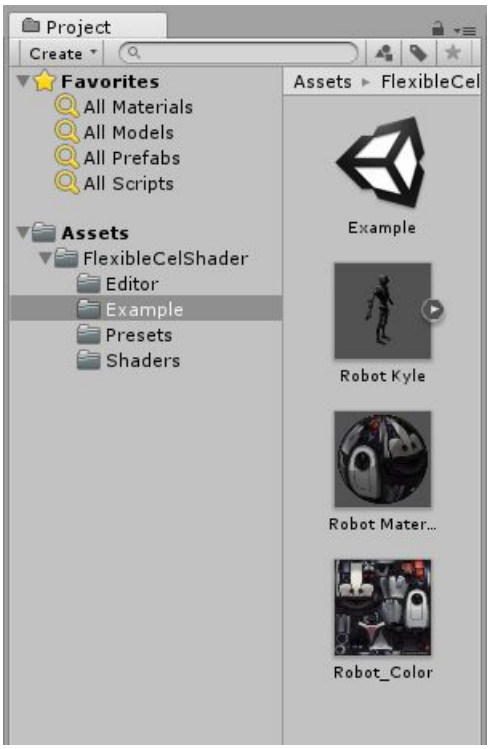
❖ What does “Flexible Cel Shader” do?

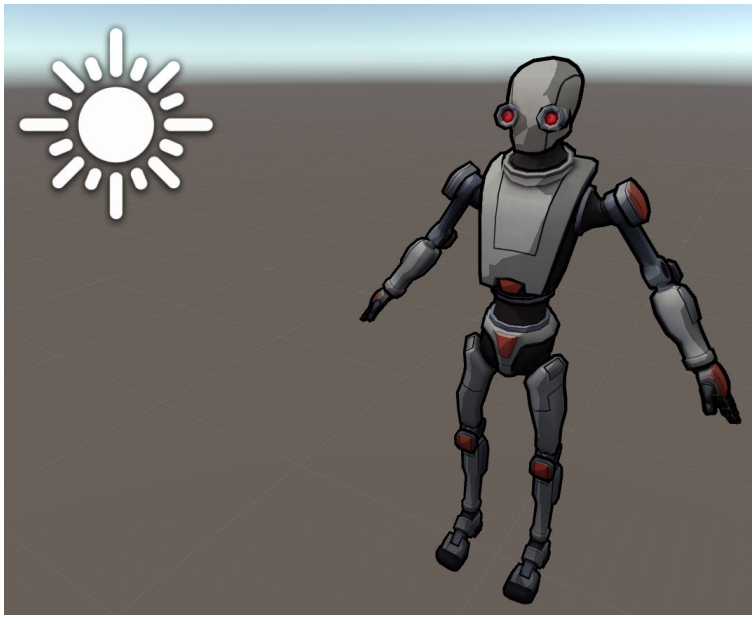
Flexible Cel Shader (FCS) allows your materials to have a cartoon-like cel shaded effect, and gives you direct control over how that effect looks without having to rely on toon ramps or any external/intermediate editors. All of the material properties that define how your material looks can easily be edited from the custom material FCS material editor. FCS also provides a preset saving and loading system that allows you to copy all the material properties from one material to another through the use of presets without having to manually copy each property individually.

❖ Getting Started



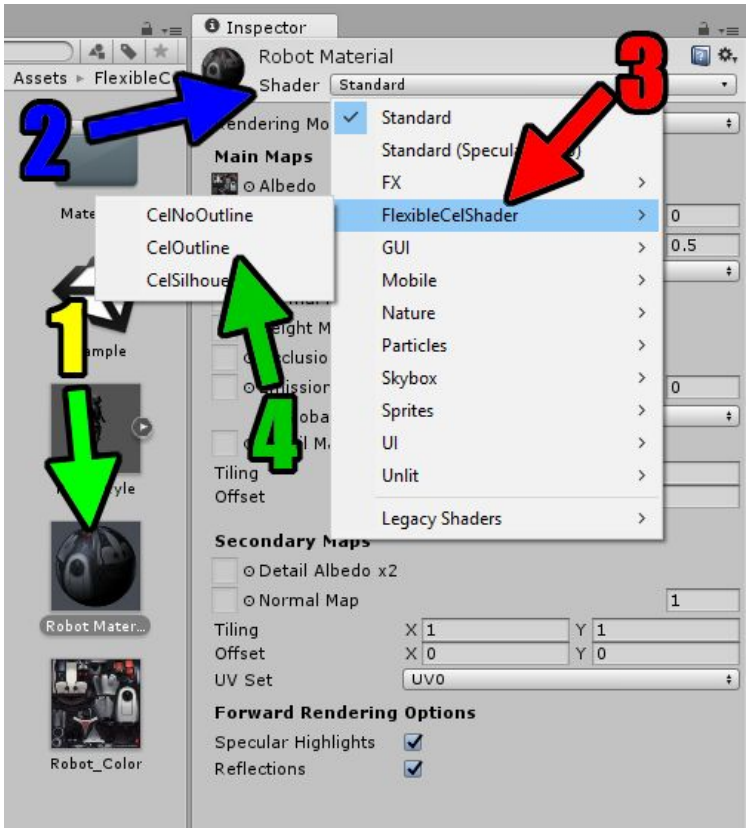
Opening the Example Scene

Once you have imported the FCS package, you may navigate to Assets/FlexibleCelShader/Example and open the “Example” scene file. You may then select the “Robot Material” file from the same folder. This will open the FCS material editor in your inspector window, allowing you to experiment with the different FCS material properties and the preset loading/saving system.



Setting Up Your Own Scene

Ensure that your scene has a directional light. This is the ONLY light that FCS will account for. Keep in mind that the directional light's rotation will affect your FCS materials, but its intensity and color will not. Instead you will tune these values in the FCS material editor.

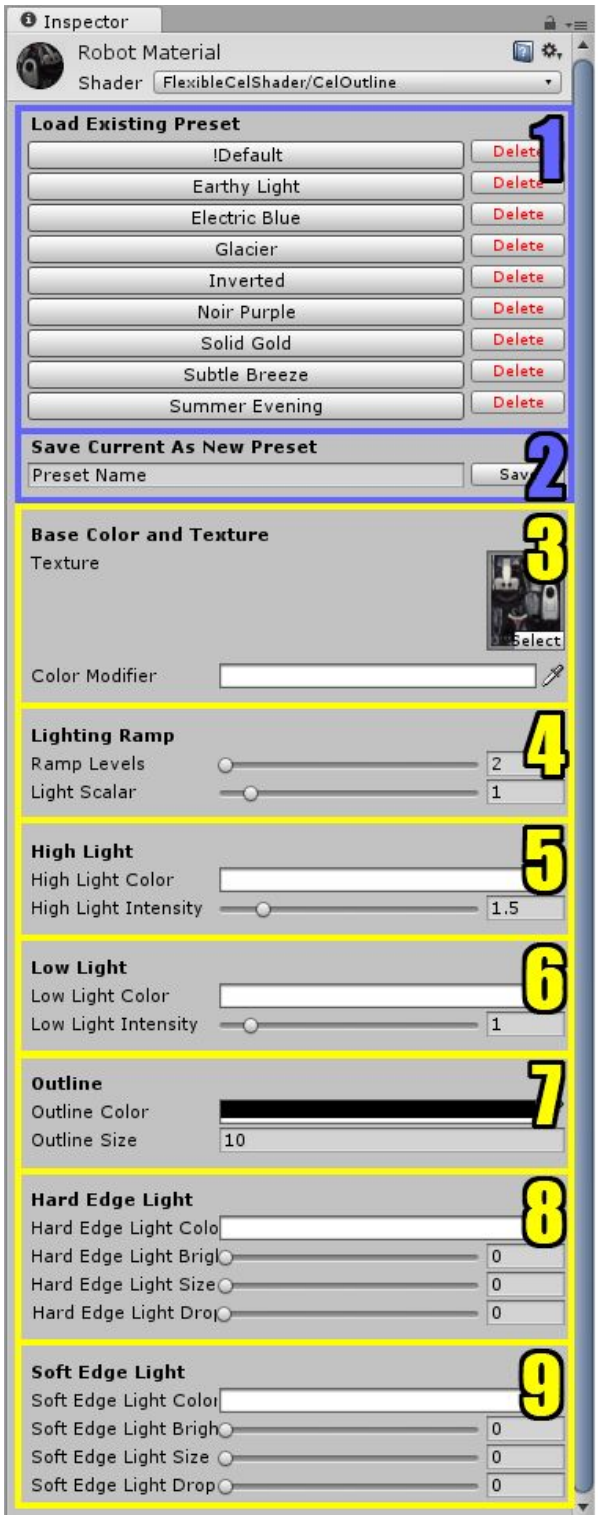


Setting a Material to Use FCS

Step 1: Select a Material
Step 2: Click on the "Shader" dropdown for the material in the Inspector tab.
Step 3: Expand the Flexible Cel Shader option.
Step 4: Click to select the desired version of the FCS shader.

❖ Using the FCS Material Editor

The FCS Material Editor provides material properties that adjust the look of your FCS material. It also allows you to save these properties into presets and then load that preset onto any other FCS material.



Preset Interface

Material Properties

#1 Load Existing Preset

This area will display all of your existing presets. Click the button to the left with the preset's name to immediately load that preset into your current material. (Note, you can press CTRL+Z to undo this operation). Click the "Delete" button to the right to delete that preset.

#2 Save Current As New Preset

Type in the name of your new preset in the text field on the left, then press the "Save" button to save the current material properties into a new preset. Type in the name of an existing preset to overwrite that preset.

#3 Base Color and Texture

- **Texture:** The material's texture map. This works in the same way as texture maps in any other material.
- **Color Modifier:** Tints the entire material by the specified color. Set this to white for no tinting. This works differently than the "High Light Color" and "Low Light Color" because it tints the entire object rather than an individual ramp level.

#4 Lighting Ramp

- **Ramp Levels:** Specifies the number of unique "Light Levels" this material will contain. Each ramp level will be separated from its neighbors by a hard edge, and its Color/Intensity will be interpolated between the High and Low light Color/Intensity. Set this to 2 for a simple effect with one High Light level and one Low Light level.
- **Light Scalar:** Affects the distribution of the Ramp Levels. Adjust this setting to change the location of the hard edges that separate the light levels.

#5 High Light

- **High Light Color:** Defines the color tint for the highest ramp level. This value will be interpolated to other ramp levels if there are more than 2.
- **High Light Intensity:** Defines how bright the lighting will be on the highest ramp level. This value will be interpolated to other ramp levels if there are more than 2.

#6 Low Light

- **Low Light Color:** Defines the color tint for the lowest ramp level. This value will be interpolated to other ramp levels if there are more than 2.
- **Low Light Intensity:** Defines how bright the lighting will be on the lowest ramp level. This value will be interpolated to other ramp levels if there are more than 2.

#7 Outline *(Note: these values have no effect when using the "CelNoOutline" shader)*

- **Outline Color:** Specifies the outline's color. You can adjust the alpha value of this property to control the outline's transparency.
- **Outline Size:** Defines the outline's size. This size is calculated in world space, meaning that if the camera is closer to the object, the outline will appear larger, and if the camera is further away, the outline will appear smaller.

#8 Hard Edge Light

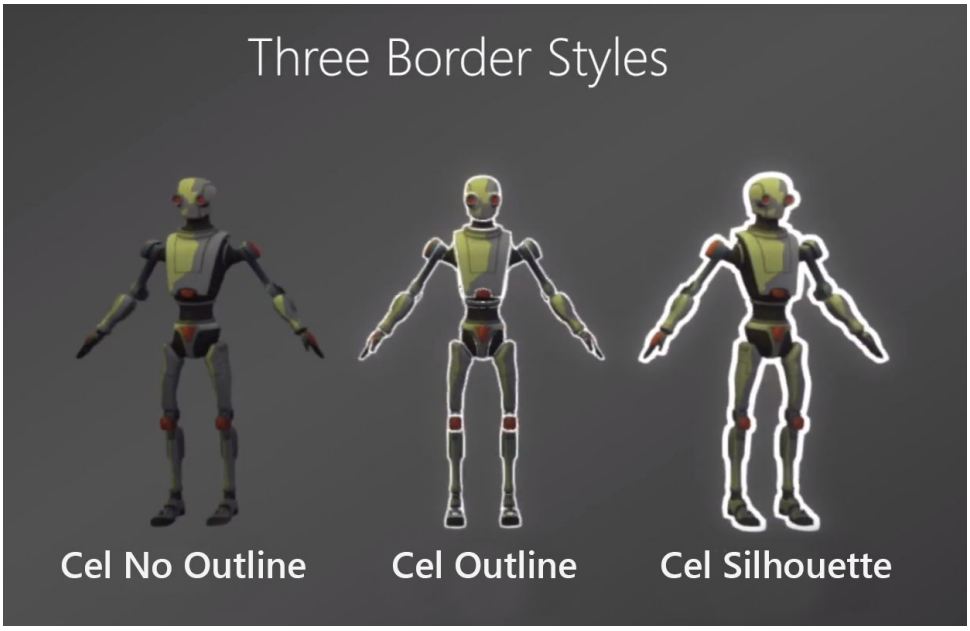
- **Hard Edge Light Color:** Specifies the color of the single-tone lighting effect around the edges of the material.
- **Hard Edge Light Brightness:** Specifies the brightness of the Hard Edge Light, can also be thought of as the transparency of the Hard Edge Light.
- **Hard Edge Light Size:** Controls how far the Hard Edge Light will extend into the central areas of the material.
- **Hard Edge Light Dropoff:** Controls how much the Hard Edge Light brightness will drop off based on the ramp level it exists in. Setting this to 0 ensures that the Hard Edge Light will be completely invisible on the lowest ramp level, while setting it to 1 will ensure that the Hard Edge Light will appear the same in the lowest and highest levels.

#9 Soft Edge Light

- **Soft Edge Light Color:** Specifies the color of the smooth-gradient lighting effect around the edges of the material.
- **Soft Edge Light Brightness:** Specifies the brightness of the Soft Edge Light, can also be thought of as the transparency of the Soft Edge Light.
- **Soft Edge Light Size:** Controls how far the Soft Edge Light will extend into the central areas of the material.
- **Soft Edge Light Dropoff:** Controls how much the Soft Edge Light brightness will drop off based on the ramp level it exists in. Setting this to 0 ensures that the Soft Edge Light will be completely invisible on the lowest ramp level, while setting it to 1 will ensure that the Soft Edge Light will appear the same in the lowest and highest levels.

❖ Border Styles

FCS Provides three different shaders, each with a unique border style:



Cel No Outline

Does not render any borders. This shader does not use an extra draw call for the outline and will completely ignore the “Outline Color” and “Outline Size” properties.

Cel Outline

Draws outlines around all parts of the mesh. This shader uses one extra draw call. Try to keep outline sizes relatively small to avoid obstructing the rest of the mesh.

Cel Outline

Draws outlines only around the very outermost part of your mesh. This shader uses one extra draw call. This outline will always be drawn being the mesh so you may set it as large as you like without obstructing the mesh.

Outline Artifacts With Flat Faces

In order to avoid unwanted artifacts, ensure that you smooth the faces of your model (or if you do not have access or do not know how to do this, you can navigate to your model’s import settings: https://docs.unity3d.com/410/Documentation/Components/FBXImporter-Model.html and then move to the drop down marked “Normals” select “Calculate” then move to the slider marked “Smoothing Angle” turn it up all the way, and then finally click apply. Unity will then automatically calculate smooth normals for your mesh.)

Outline Artifacts With Back Faces

Outlines are drawn using backfaces. This means that you must ensure that your model does not expose back faces directly to the camera because they will be rendered with the outline color instead of culled. For example, if you have a character wearing a kilt, make sure that there are front faces on both the outer layer and inner layer of the kilt.

❖ Adjusting FCS Files

Deleting Files

After importing the Flexible Cel Shader package into your project, any of the files found under FlexibleCelShader/Example can be safely deleted. All other files are required to provide the full functionality of FCS.

Moving Files

You may choose to move the FCS files wherever you like within your project’s hierarchy. However, in order to move the FCS files without losing the preset functionality, you must open “PresetHelper.cs” in FlexibleCelShader/Editor and update the preset path variable on line 13:

```
public readonly static string PresetDirectoryPath = Application.dataPath + "/FlexibleCelShader/Presets/";
```

The highlighted text determines where FCS will look for the preset files. This path is relative to your root Assets folder. For Example, if you move the Assets/FlexibleCelShader folder to Assets/ThirdPartyTools/FlexibleCelShader then you must update this variable to be:

```
public readonly static string PresetDirectoryPath = Application.dataPath + "ThirdPartyTools/FlexibleCelShader/Presets/";
```