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BA COMPUTER GAMES DESIGN

ENVIRONMENT DESIGN

UV Unwrapping 3D Models



UV unwrapping

Concept of UV Unwrapping

Process of Unwrapping

- Create Camera Projection

- Select and cut edges

- Unfold UV projection

- Layout & Orientation

- Export UV Snapshot



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UV Unwrapping 3D Models

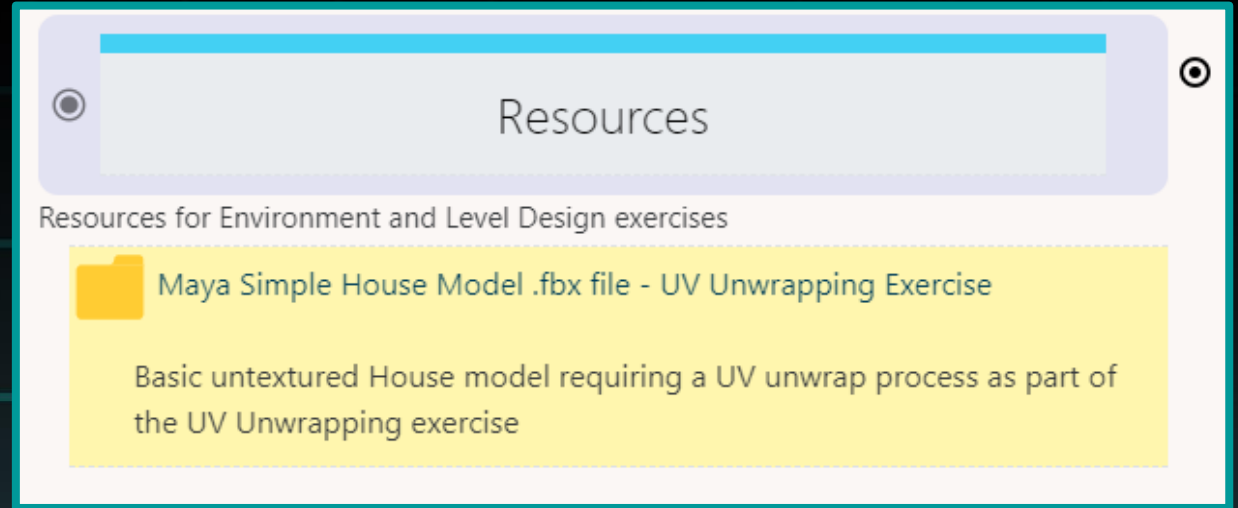
UV unwrapping

Log in to the **Environment Design Moodle page**

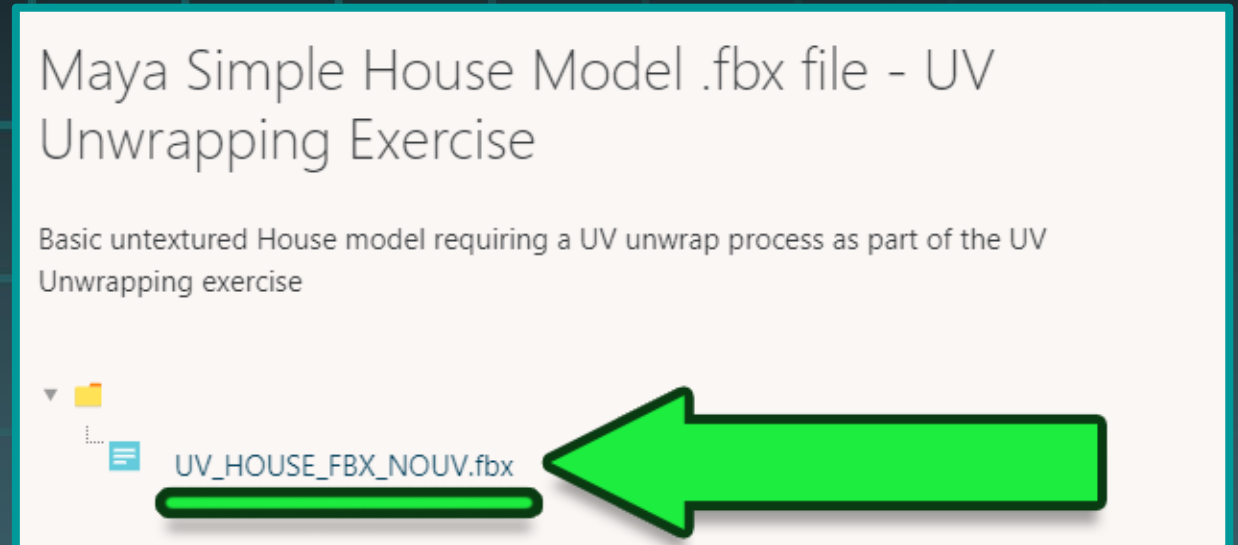
Obtain the following file:

UV_HOUSE_FBX_NOUV.fbx

Drag and drop this file into an **empty Maya scene** and create a **New Project** for this exercise.



The screenshot shows a Moodle 'Resources' page. At the top, there's a header bar with the word 'Resources' and a search icon. Below the header, a sub-header reads 'Resources for Environment and Level Design exercises'. A yellow box contains the title 'Maya Simple House Model .fbx file - UV Unwrapping Exercise' and a description: 'Basic untextured House model requiring a UV unwrap process as part of the UV Unwrapping exercise'.



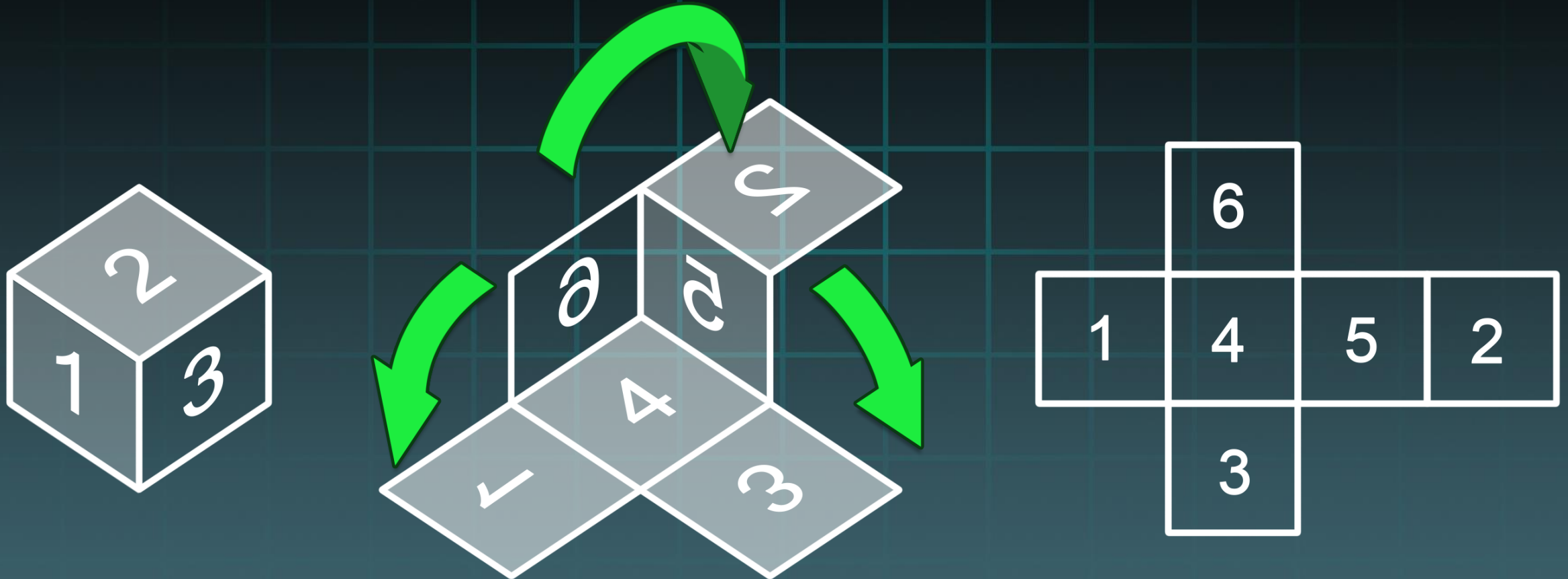
The screenshot shows the Maya file browser interface. The title is 'Maya Simple House Model .fbx file - UV Unwrapping Exercise'. The description is 'Basic untextured House model requiring a UV unwrap process as part of the UV Unwrapping exercise'. At the bottom, a file named 'UV_HOUSE_FBX_NOUV.fbx' is shown with a green arrow pointing to it, indicating it should be dragged into the scene.



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UV Unwrapping 3D Models

UV unwrapping a 3D object is essentially just 'flattening' it into 2D. Without this process we cannot apply a detailed texture to the object.





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UV Unwrapping 3D Models

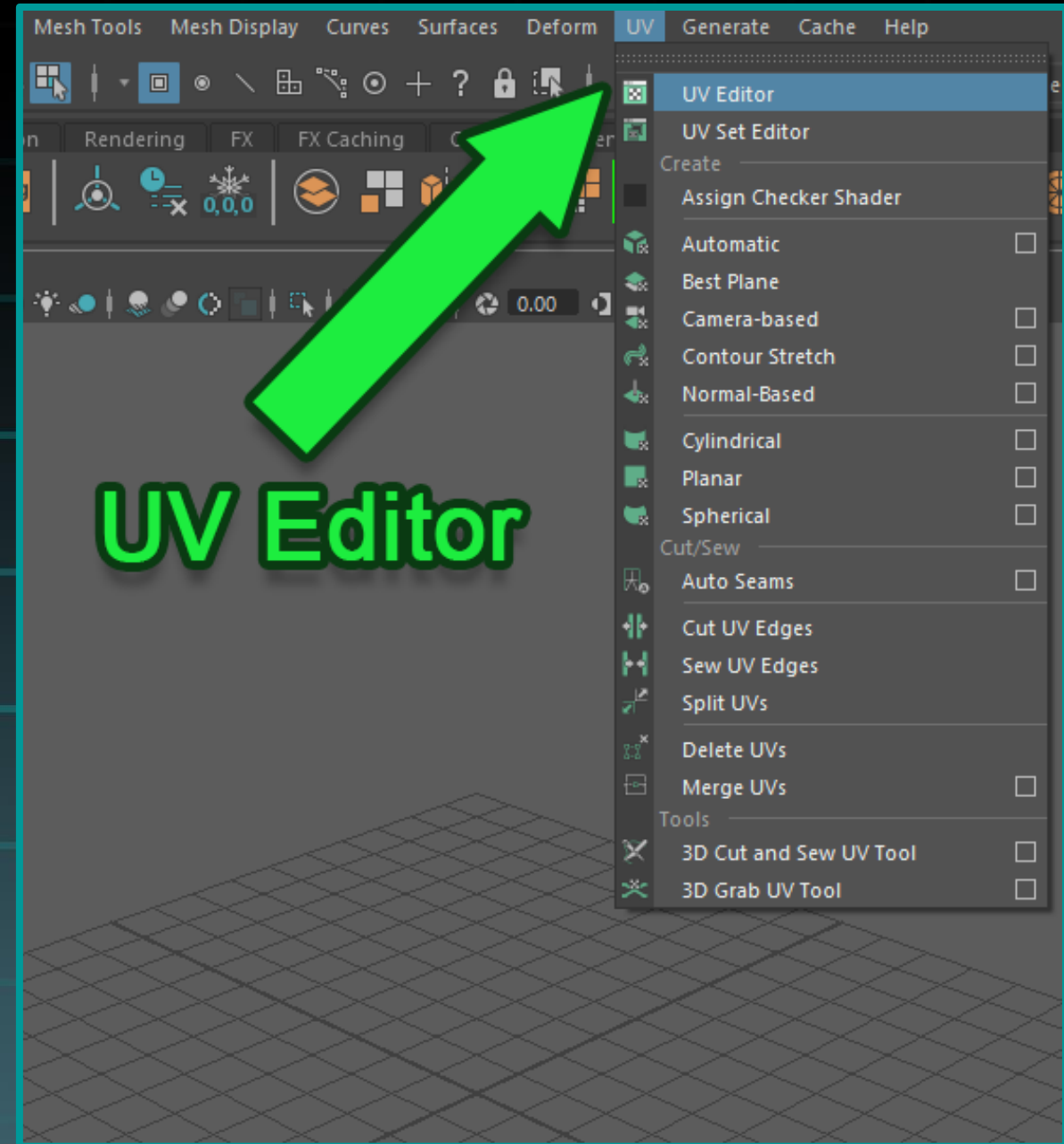
1a. Open the UV Editor

Open the **UV Editor**

UV > UV Editor

You will be working between the main Maya window (in **Component Mode**) and this **UV Editor** throughout the process.

Remember – **F8** to switch between:
Component Mode (blue) &
Object Mode (green)





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UV Unwrapping 3D Models

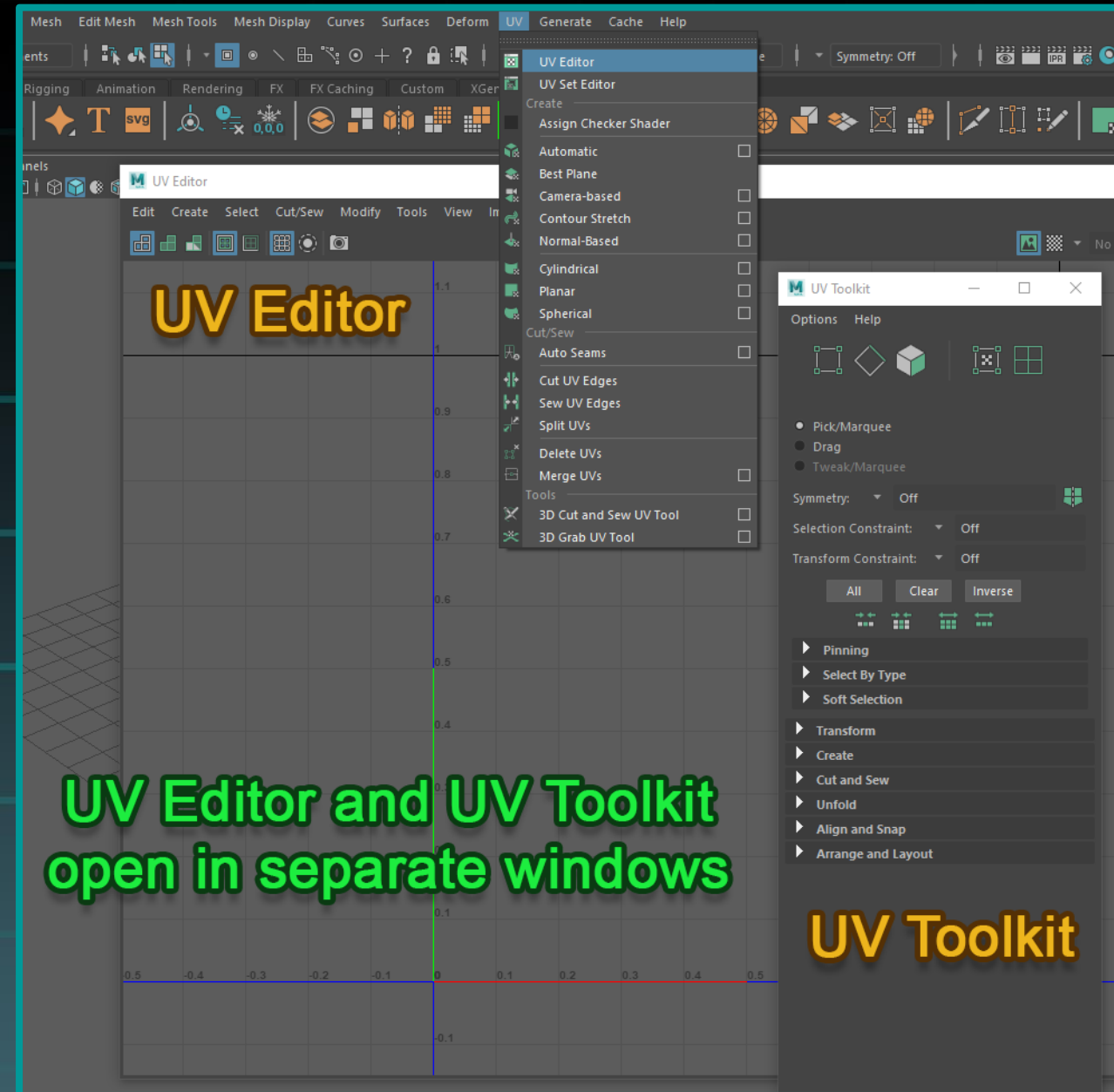
1a. Open the UV Editor

Open the **UV Editor**

UV > UV Editor

The **UV Editor** and **UV Toolkit** will open in floating windows.

If you have two monitors use the second monitor to position the UV Editor – it's easier to see both the 3D and UV versions of your model this way.





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UV Unwrapping 3D Models

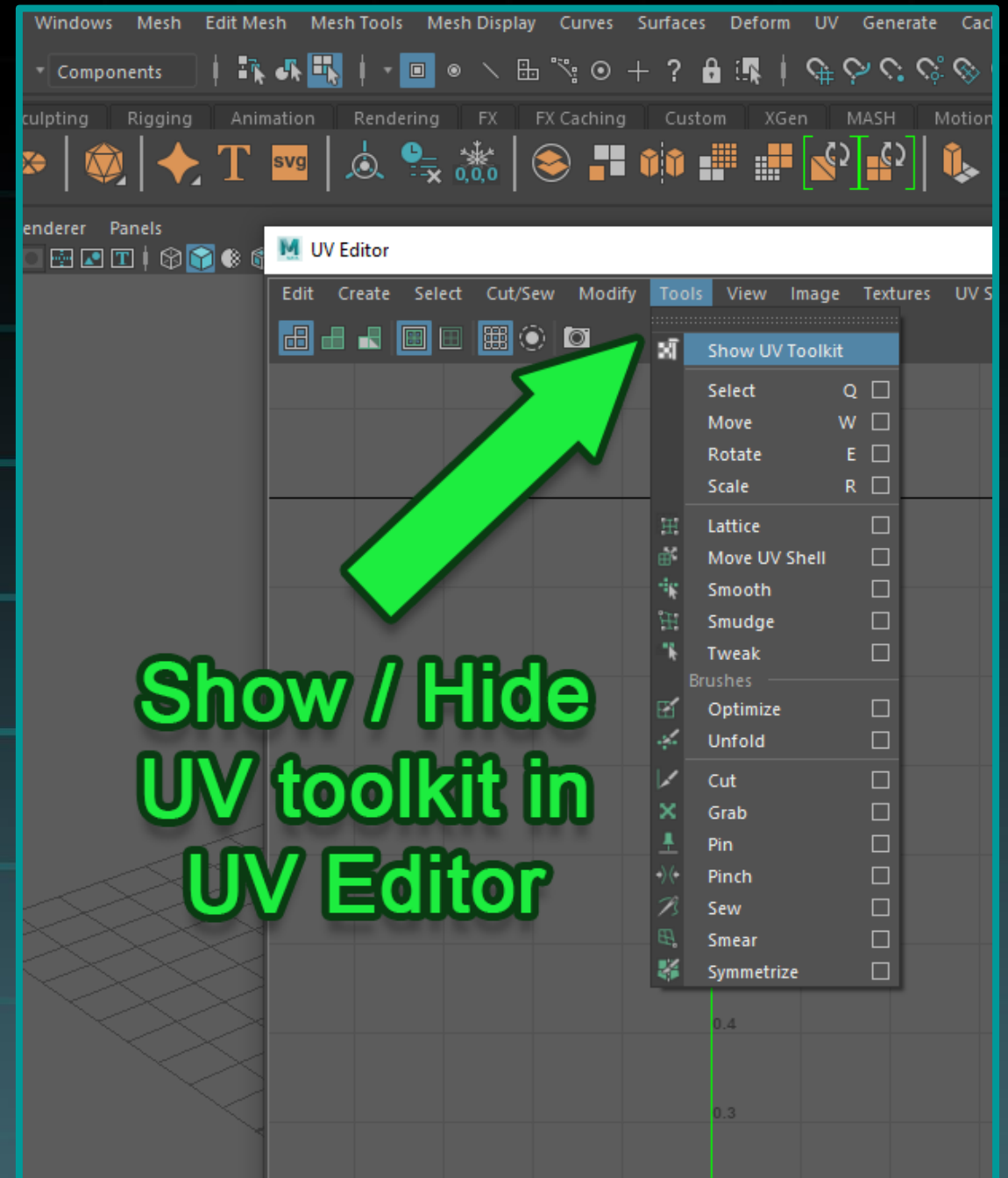
1a. Open the UV Editor

Can't see the **UV Toolkit**?

In the UV Editor go to:

Tools > Show UV Toolkit

The **UV Toolkit** should now appear in it's own floating window.



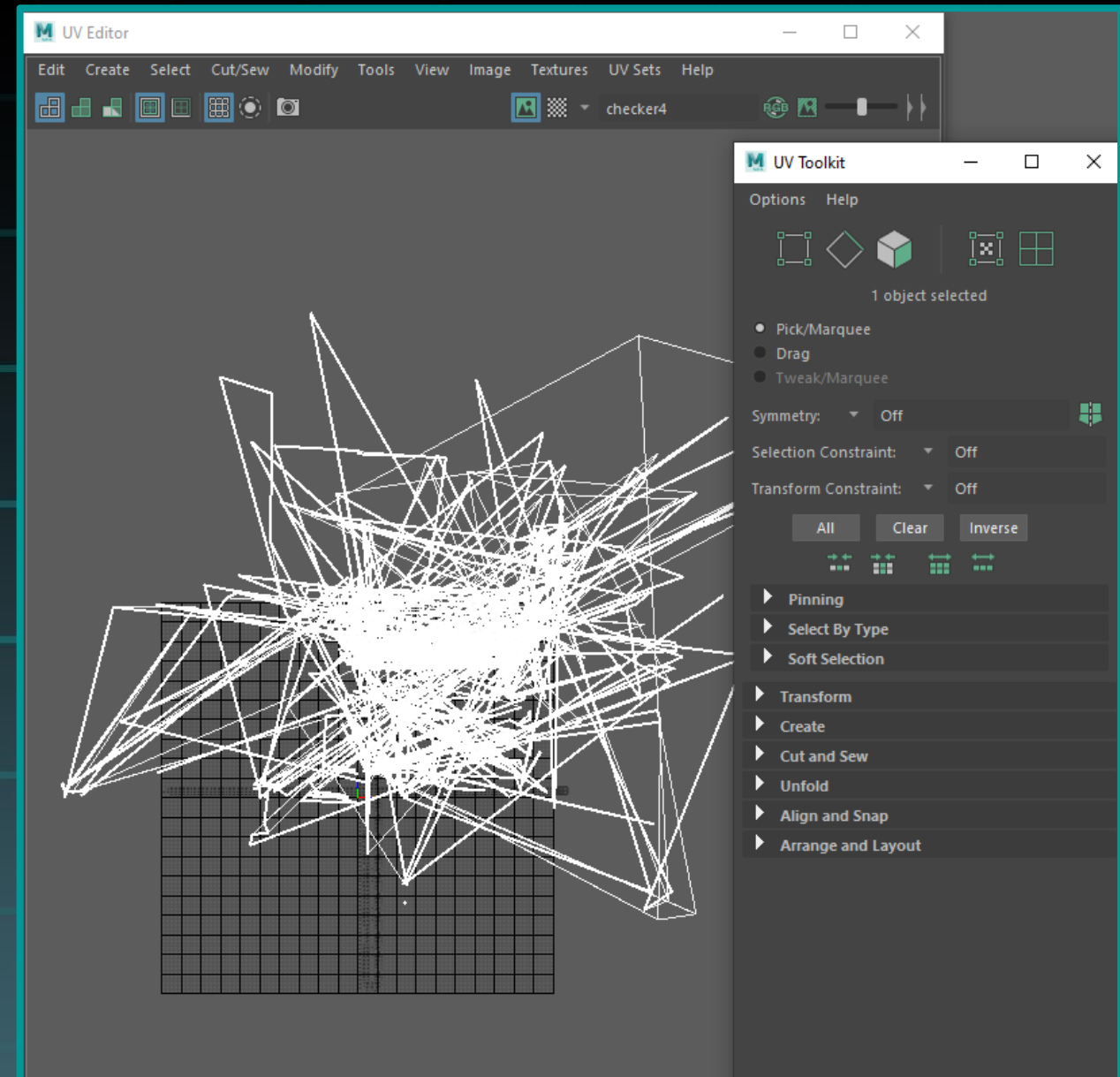


1a. Open the UV Editor

With no UV's, you may initially be presented with a **chaotic mess** in the UV Editor when you have your model selected.

THIS IS NORMAL!

You need to 'fix' this with a new UV projection – working with this current UV map would be impossible.





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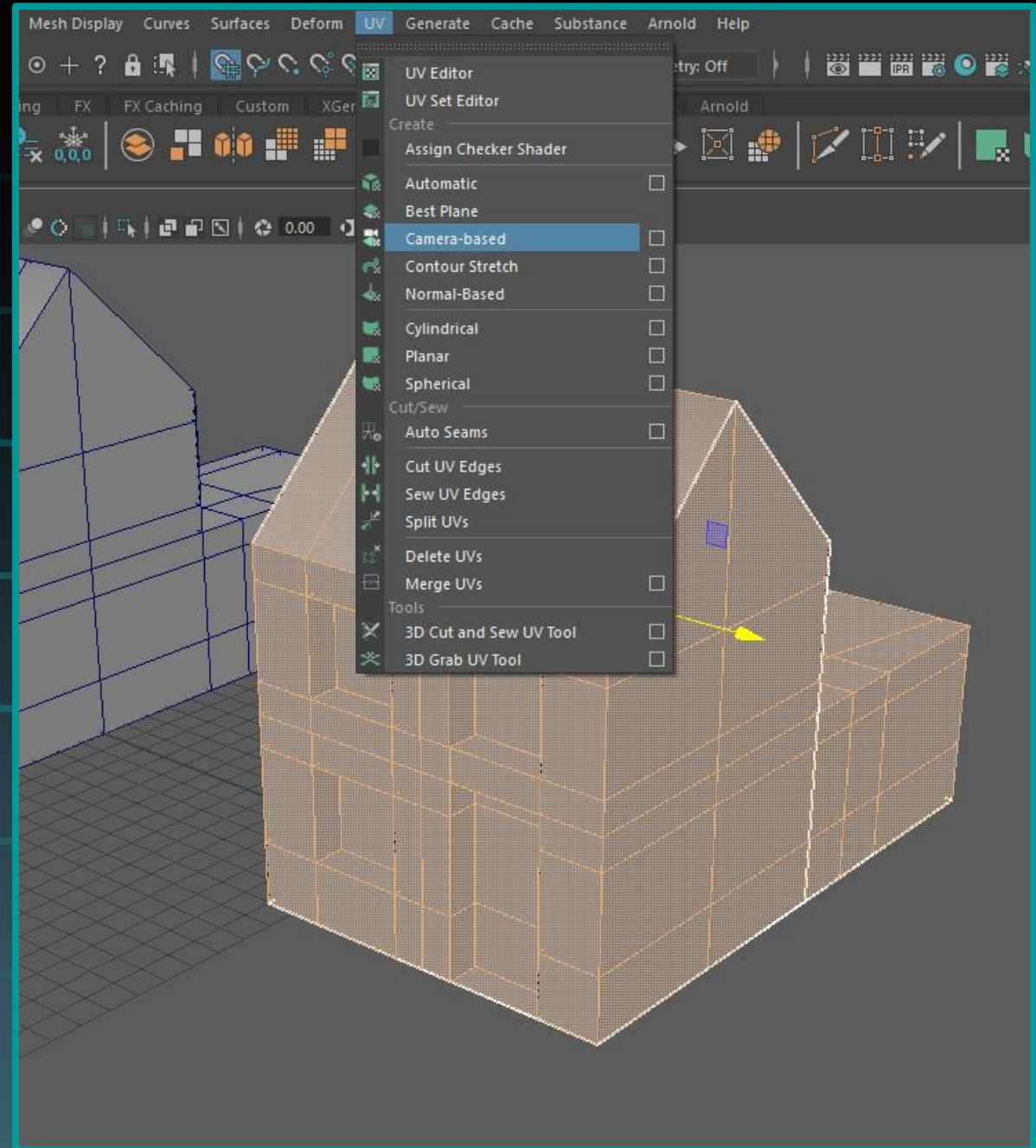
UV Unwrapping 3D Models

1b. Create new camera projection

In **Component Mode** in the main Maya window, select all of the faces of your model (click-drag with **Select Faces** tool selected).

Rotate your camera in the perspective window to an approximate three-quarter view.

Select **UV > Camera-Based**





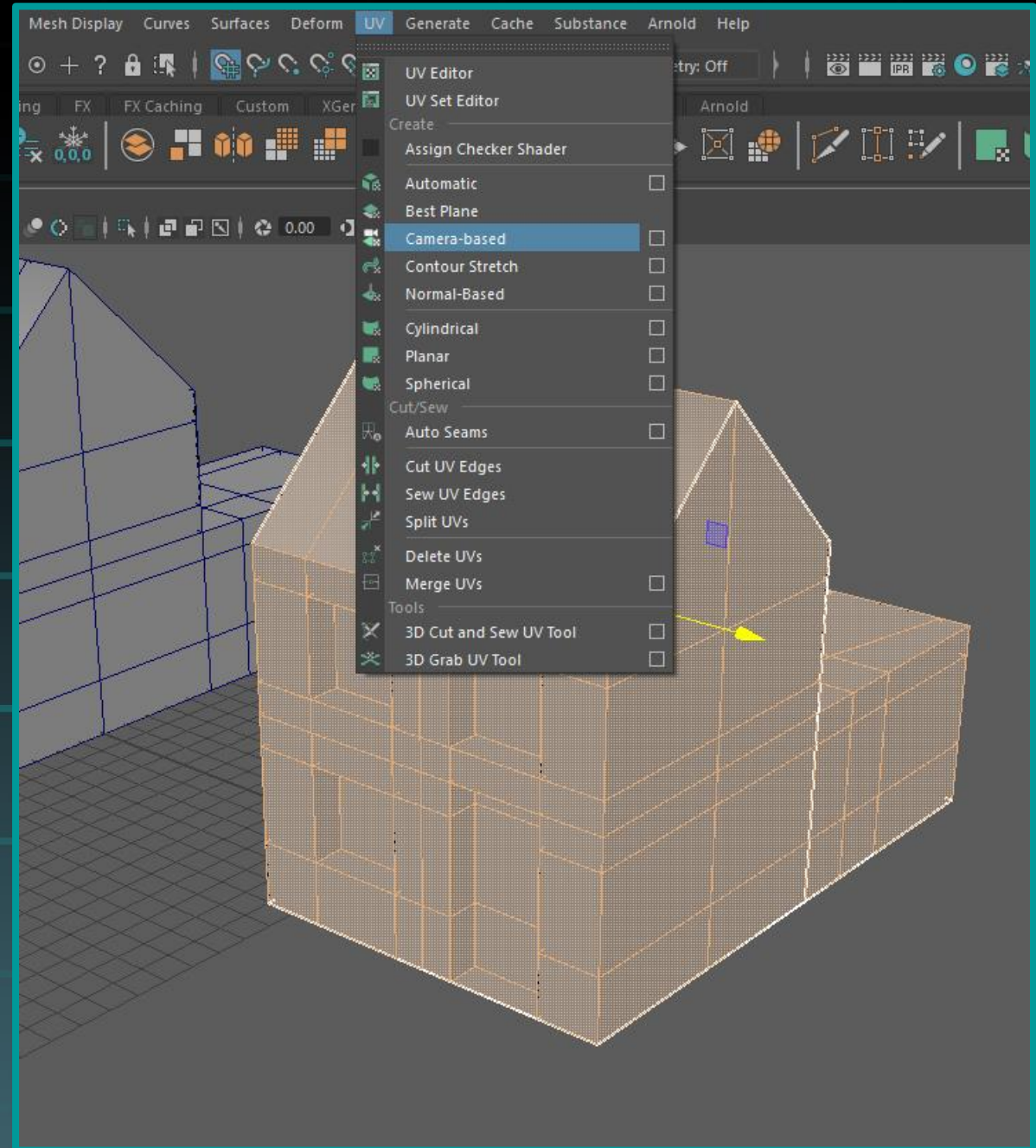
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UV Unwrapping 3D Models

1b. Create new camera projection

You have now created the first step of your UV map – which at present is **useless** – but it is a means to an end!

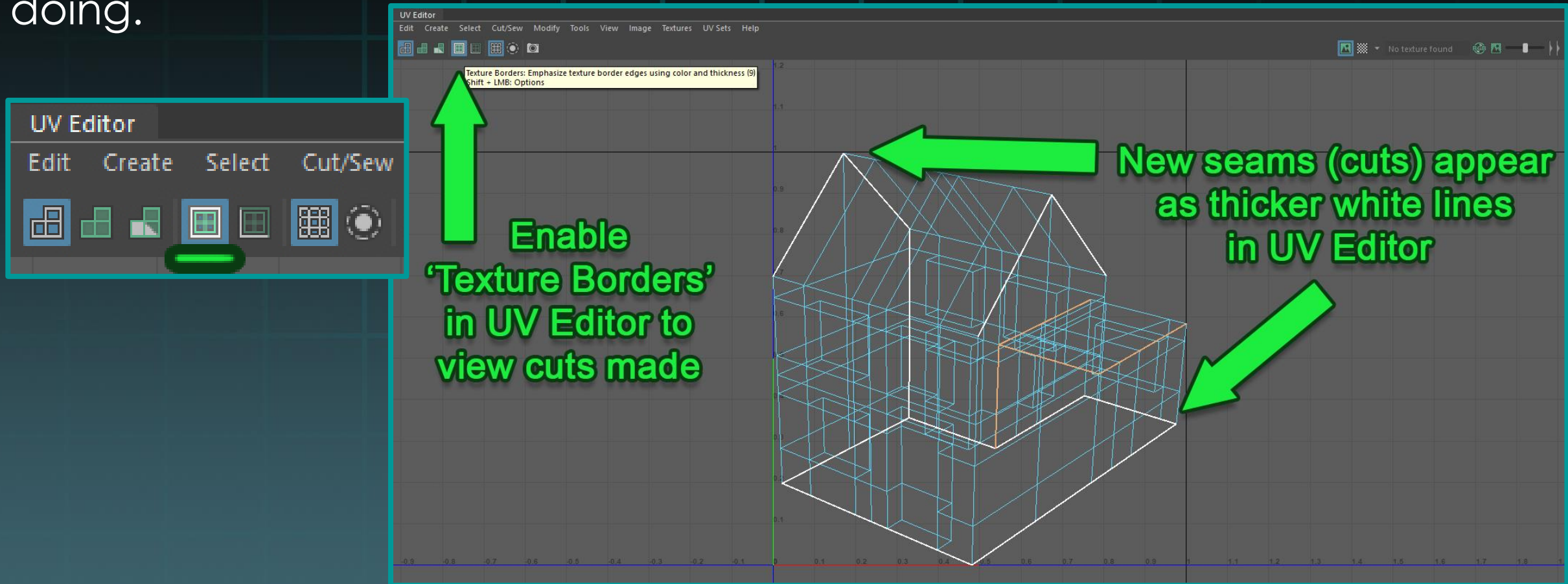
This **gets rid of all existing seams** and makes the process easier for you to observe as you create your UV map.





2. Enable Texture Borders

Selecting this option in the UV Editor allows you to see what you are doing.



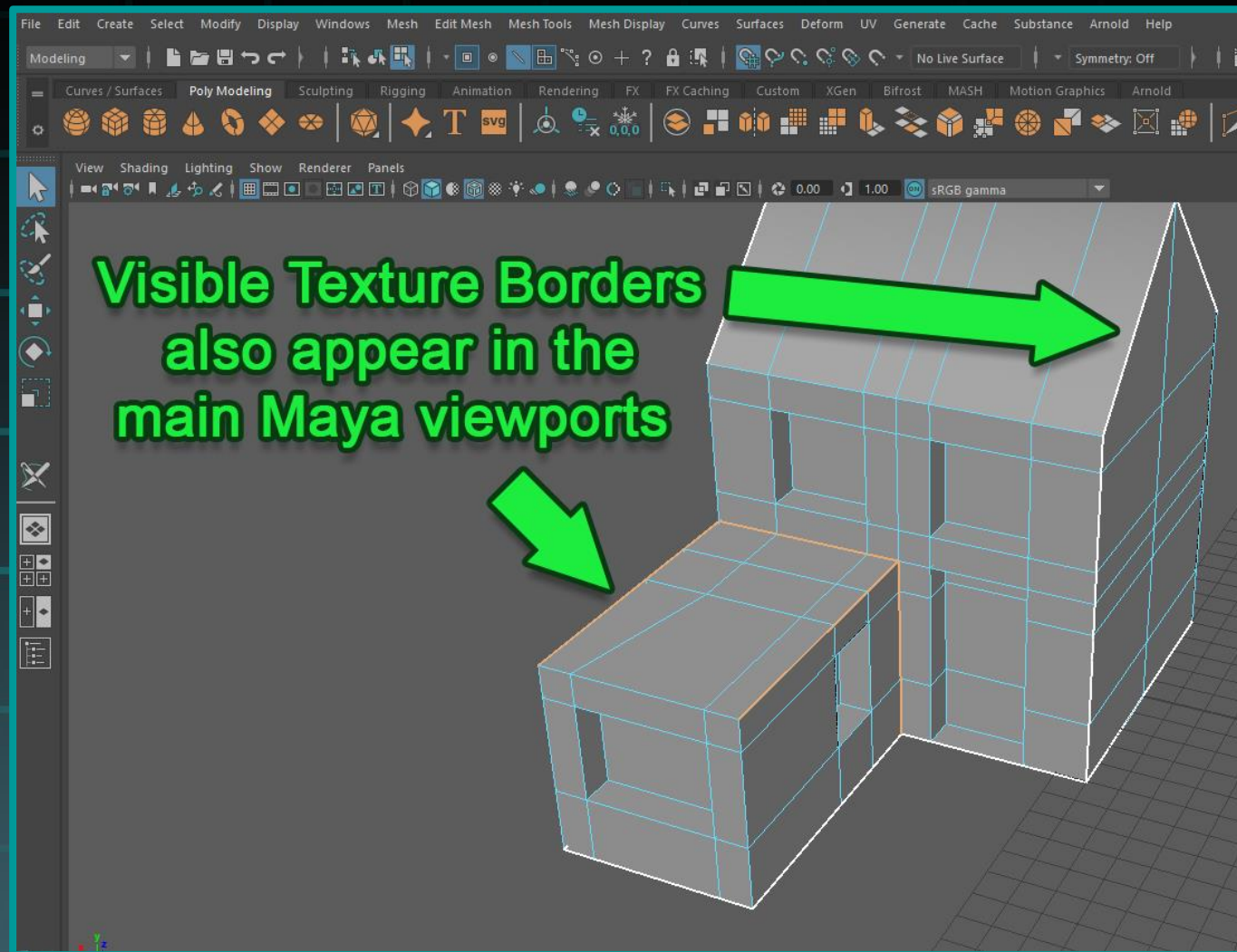


2. Enable Texture Borders

The borders you create as you cut appear as **thicker white lines**.

You **DO NOT** want to cut **EVERY** edge – only those that will help you unfold the 3D object. Plan ahead!

This takes practice – thinking in 3D will develop over time if you keep at it!

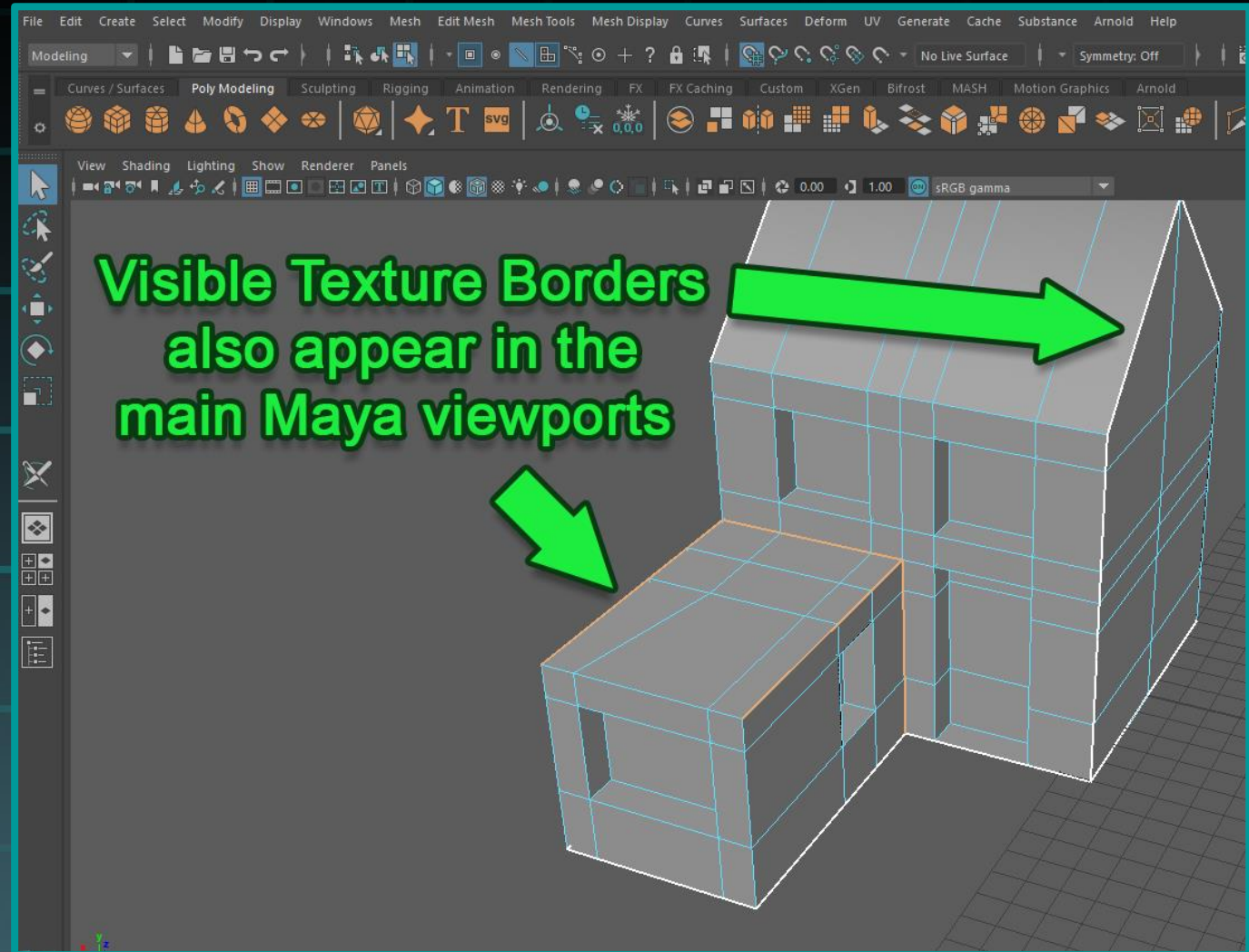




2. Enable Texture Borders

You will want to keep **logical faces together** where possible e.g. Roof components, walls, doors etc.

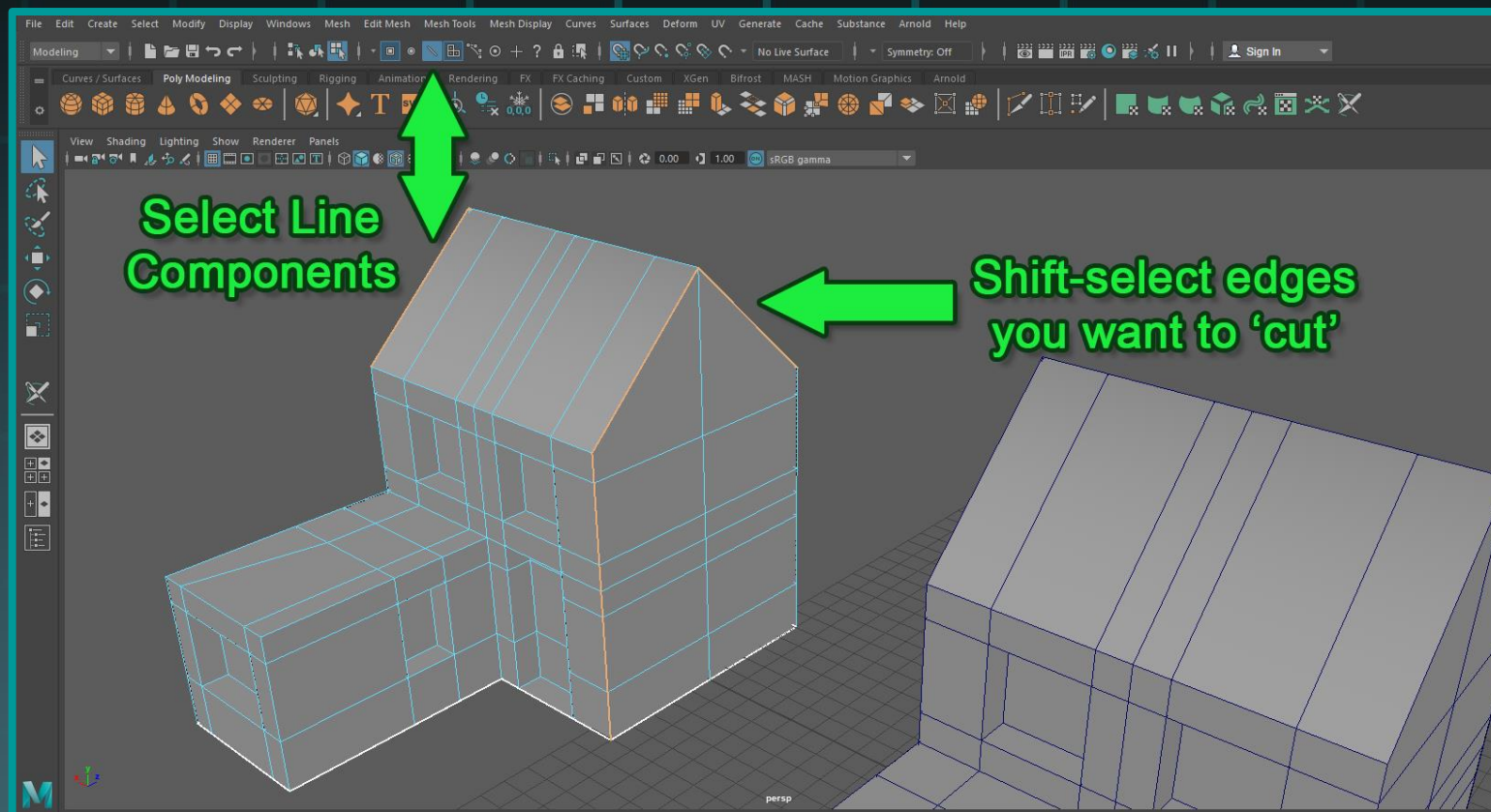
You will need to tell which **parts are which** when you apply your textures so don't make the UV too abstract!





3a. Select Edges to create seams

Using '**Select Line Components**' Shift-select edges you want to cut. Without making these cuts the UV map cannot be unfolded later on.





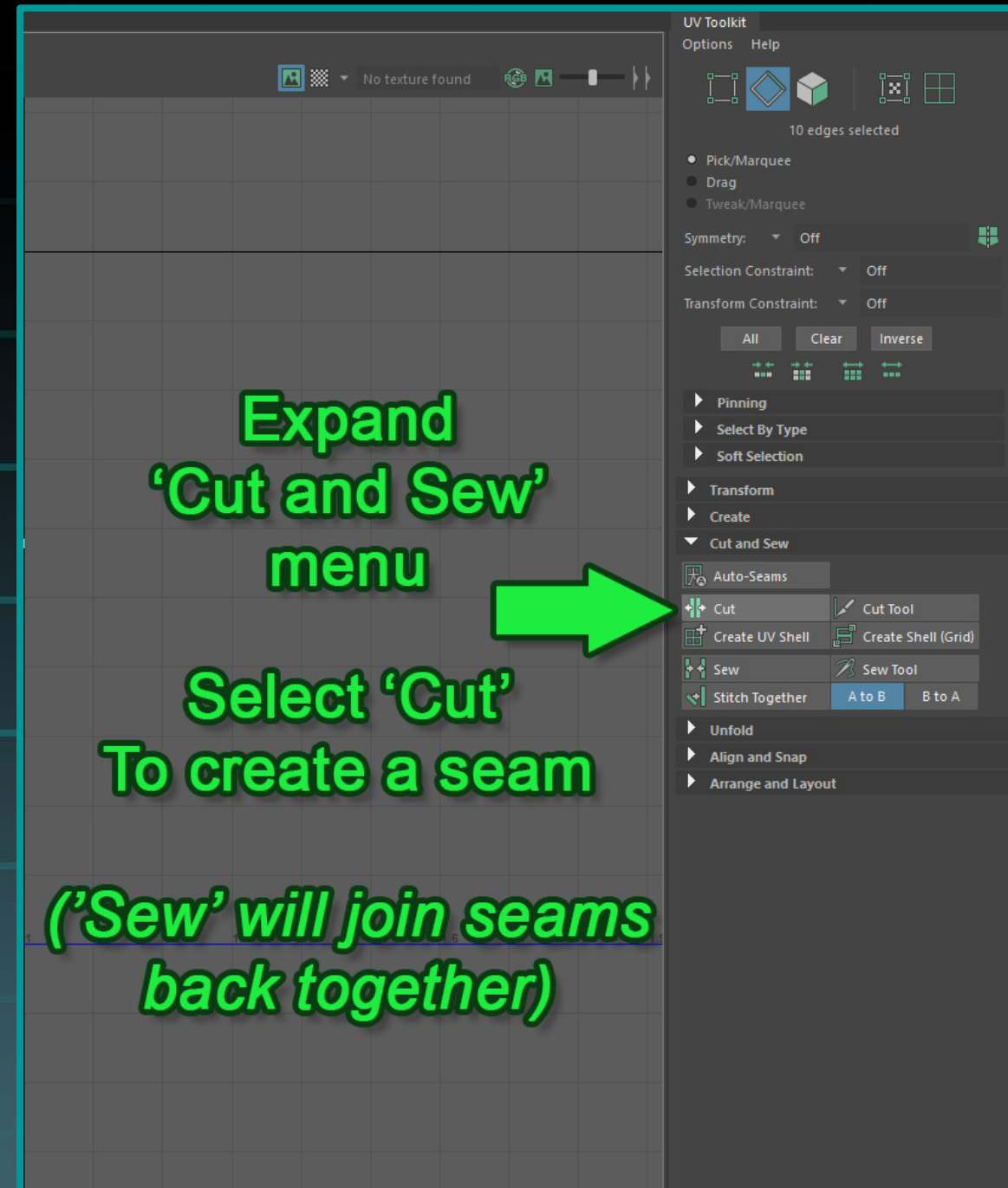
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UV Unwrapping 3D Models

3b. Cut the selected seams

In the **UV Editor**, select 'cut' in the 'Cut and Sew' menu.

This will not physically change your model – it will just inform Maya where to separate geometry when 'flattening' it later in the process.

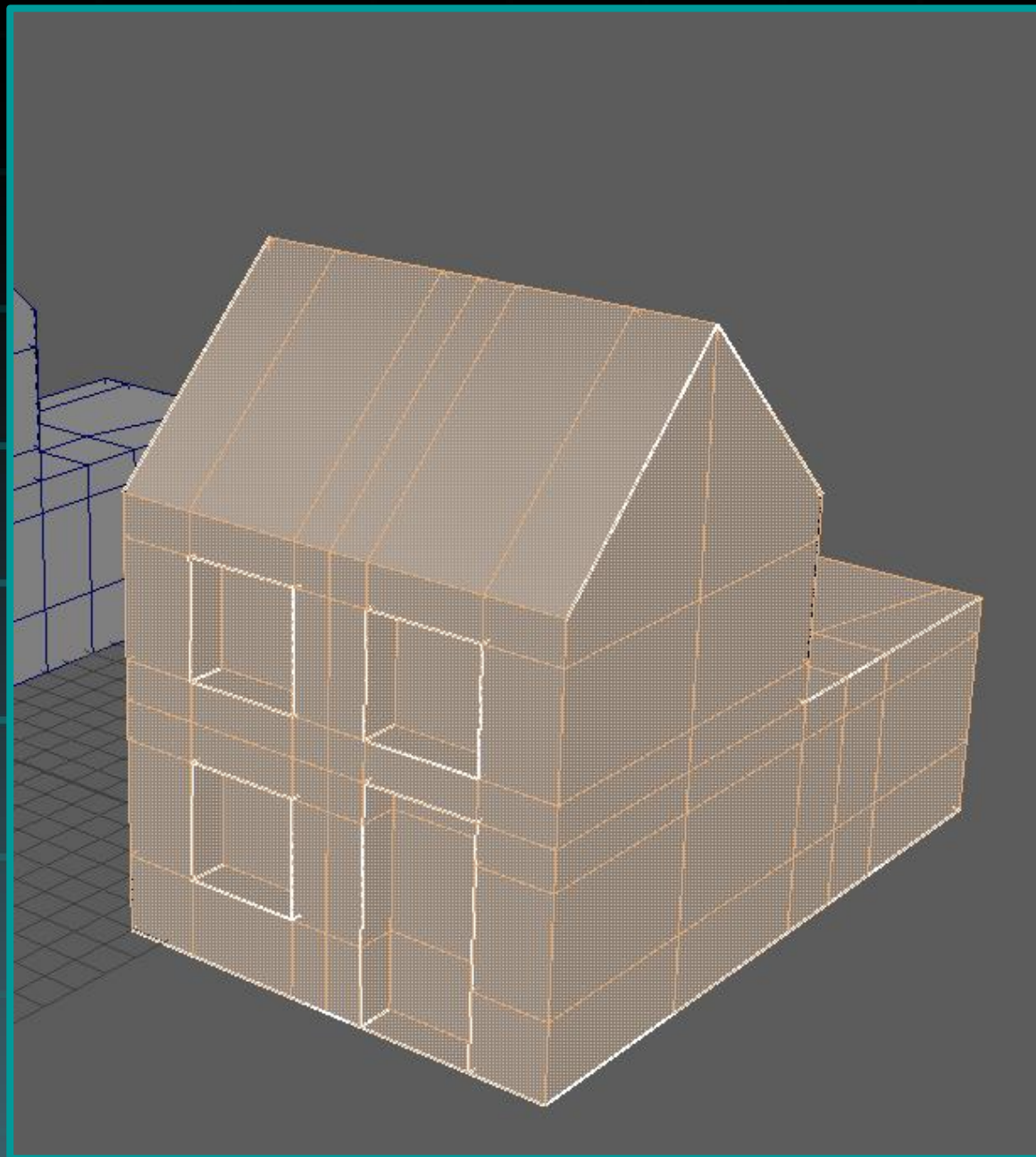




4. Unfold the model

Once you are happy with the seams created, you will use the **Unfold tool** in the **UV Toolkit** to create a 2D projection of your 3D object.

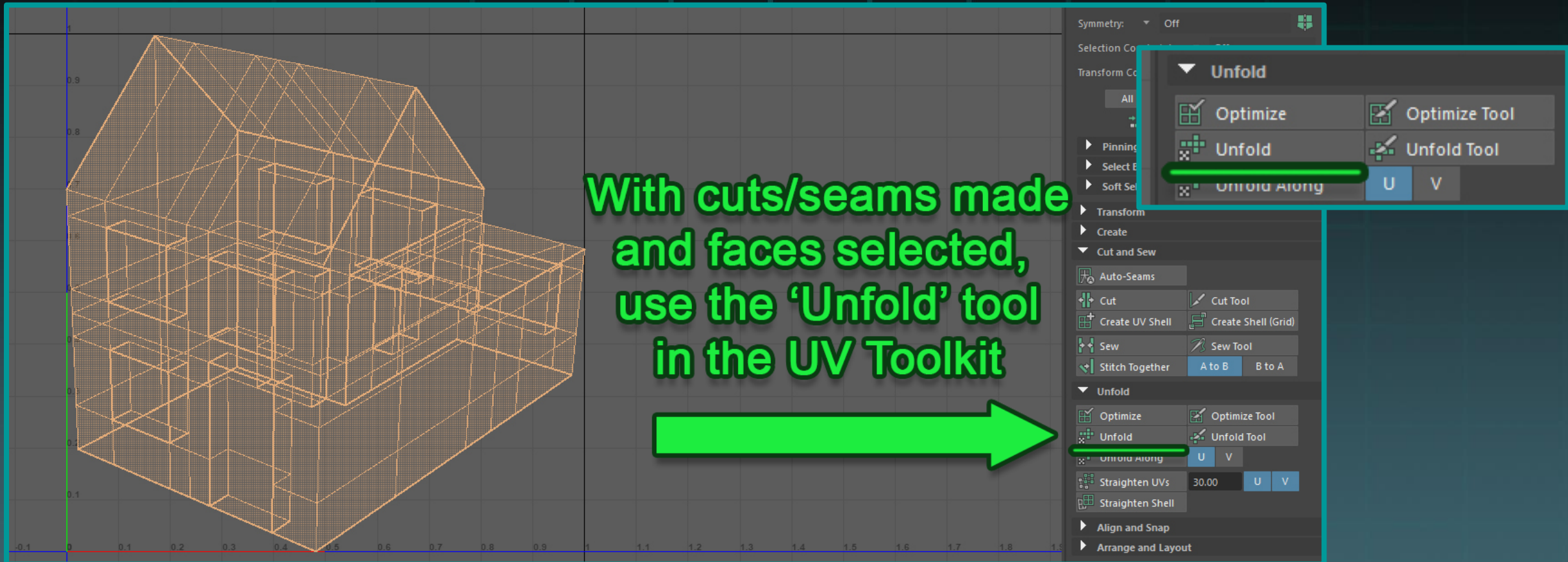
You may need to **Undo (Ctrl-Z)** and repeat this process if the projection appears to be **distorted or twisted** – in these cases, there may be conflicting connected edges that still need to be cut.





4. Unfold the model

Remember – the more you practice, the better you will get at the process.

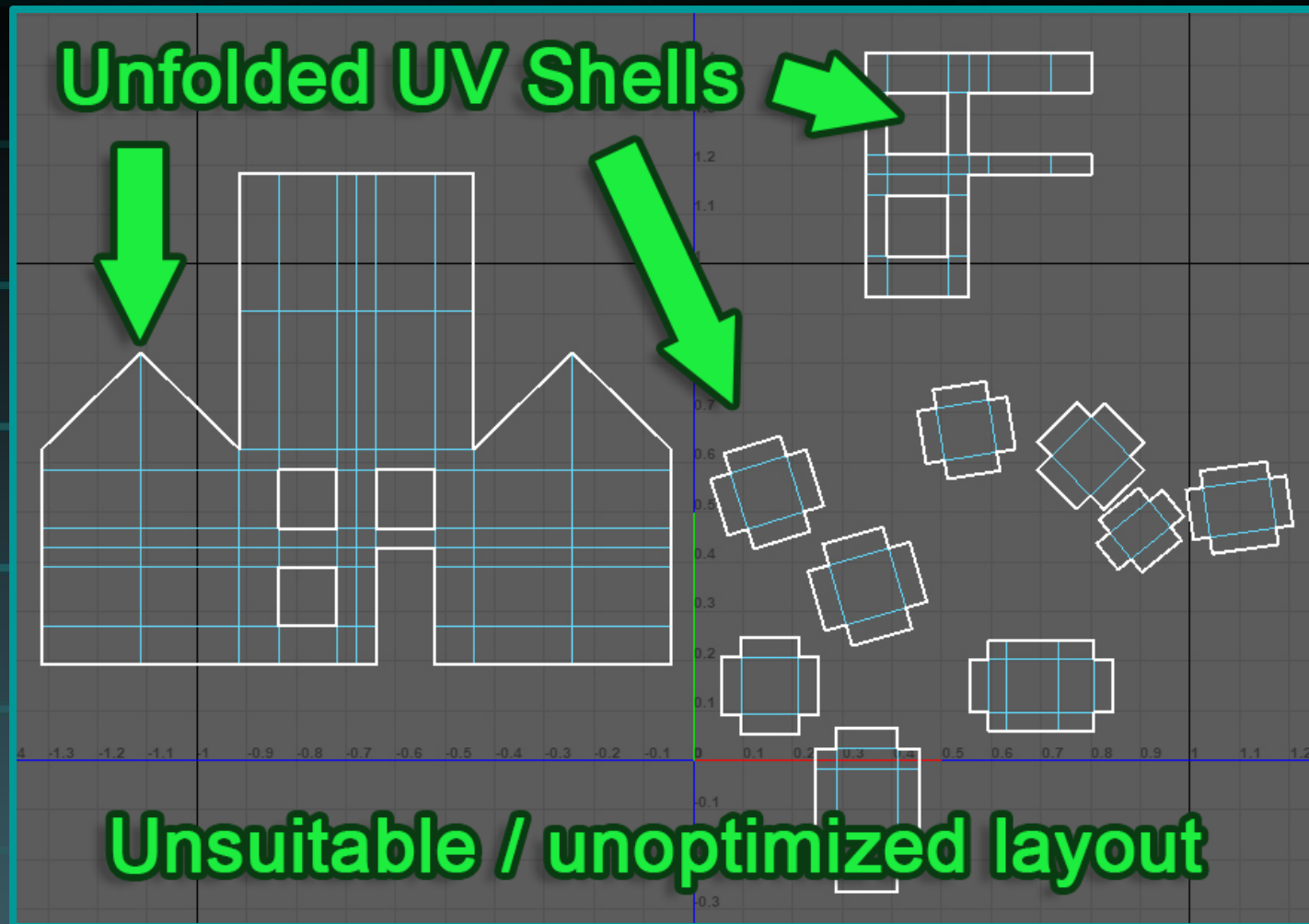




5a. UV Shells

The 3D model should now successfully be projected as a **2D Shell** (or, most likely, multiple 2D shells).

These shells **need to be arranged in the 'live' UV space** (top right grid) in order to be exported as a texture map.

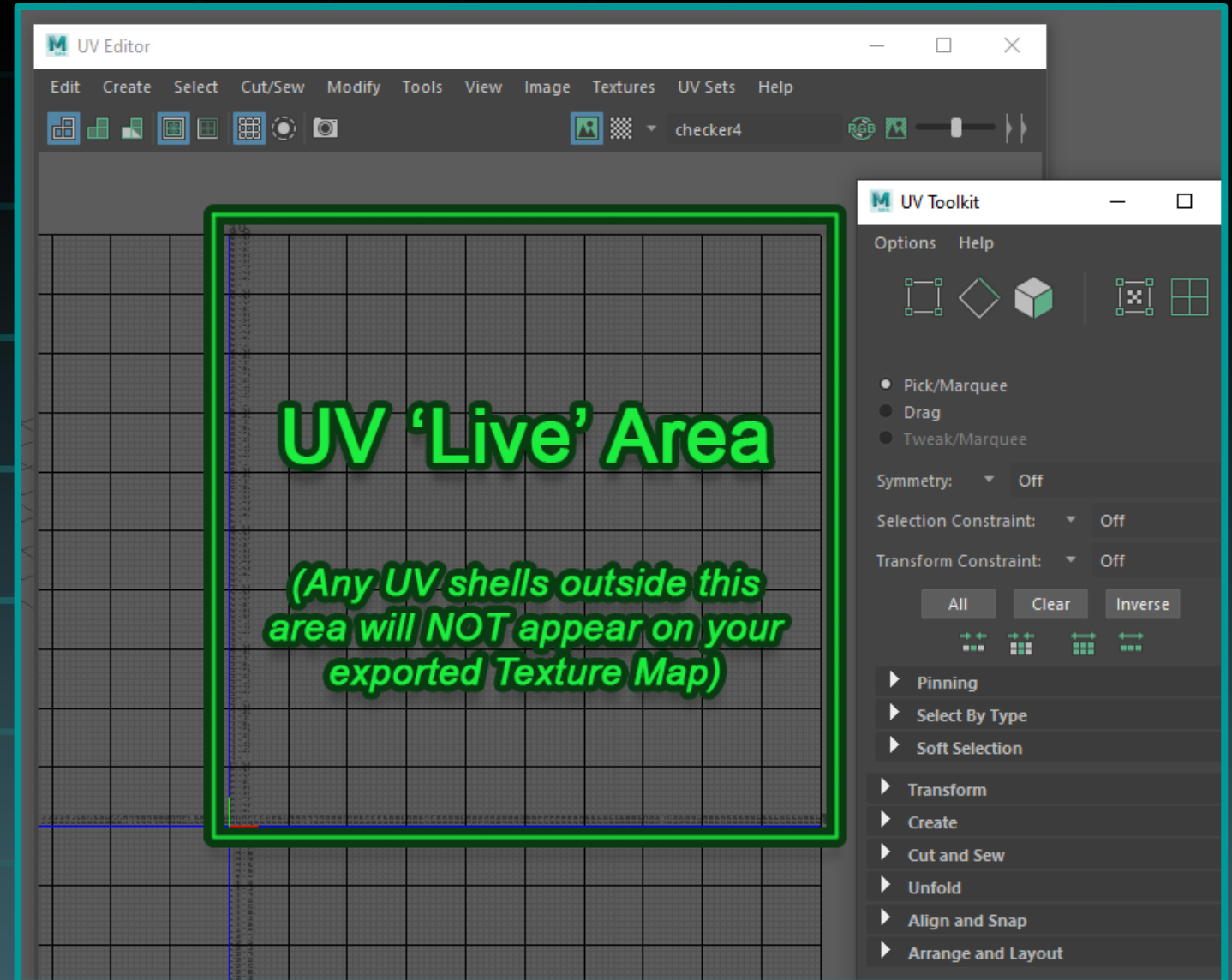




5b. UV Layout: Live Area

The 3D model should now successfully be projected as a **2D Shell** (or, most likely, multiple 2D shells).

These shells **need to be arranged in the 'live' UV space** (top right grid) in order to be exported as a texture map.



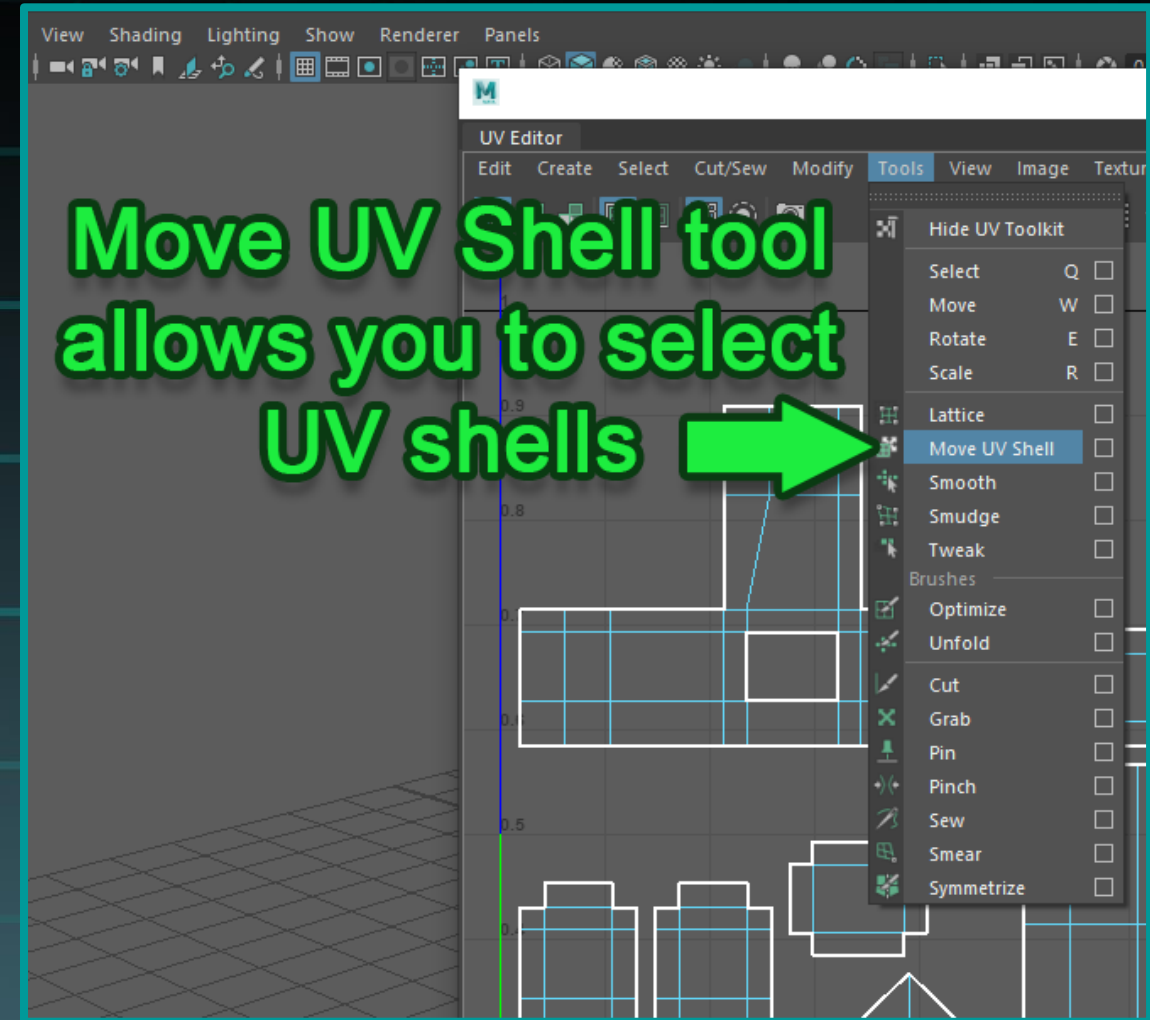


5c. UV Layout: Move UV Shells

To adjust the layout of UV shells you will be switching between **Object Mode** and **Component Mode** in the main Maya window (F8).

In the **UV Editor**, you need to be able to select **UV shells**. This can be done by selecting the following:

Tools > Move UV Shell

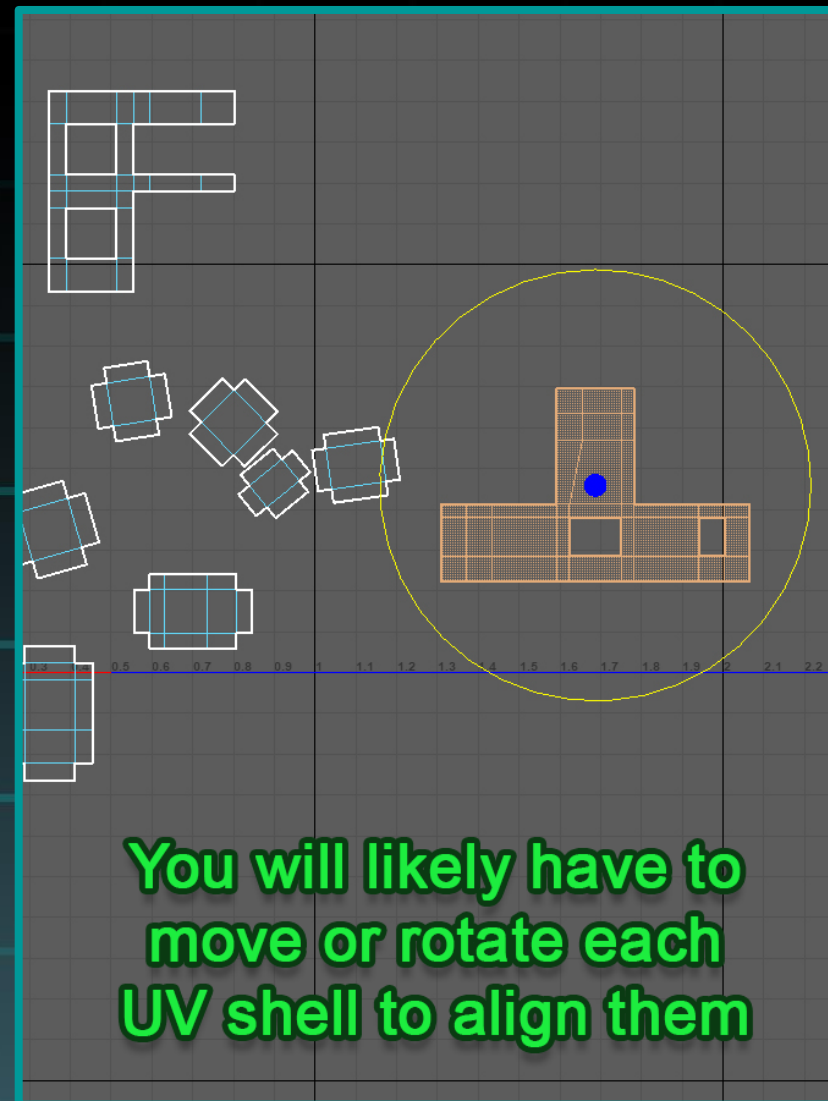




5c. UV Layout: Move UV Shells

Note that you can use the **scale**, **rotate** and **translate** tools from Maya on **UV Shells** to arrange them as you wish.

In order to do this with UV shells you must switch to **Object Mode** in the main Maya window (F8).



= Translation



= Rotation



= Scale

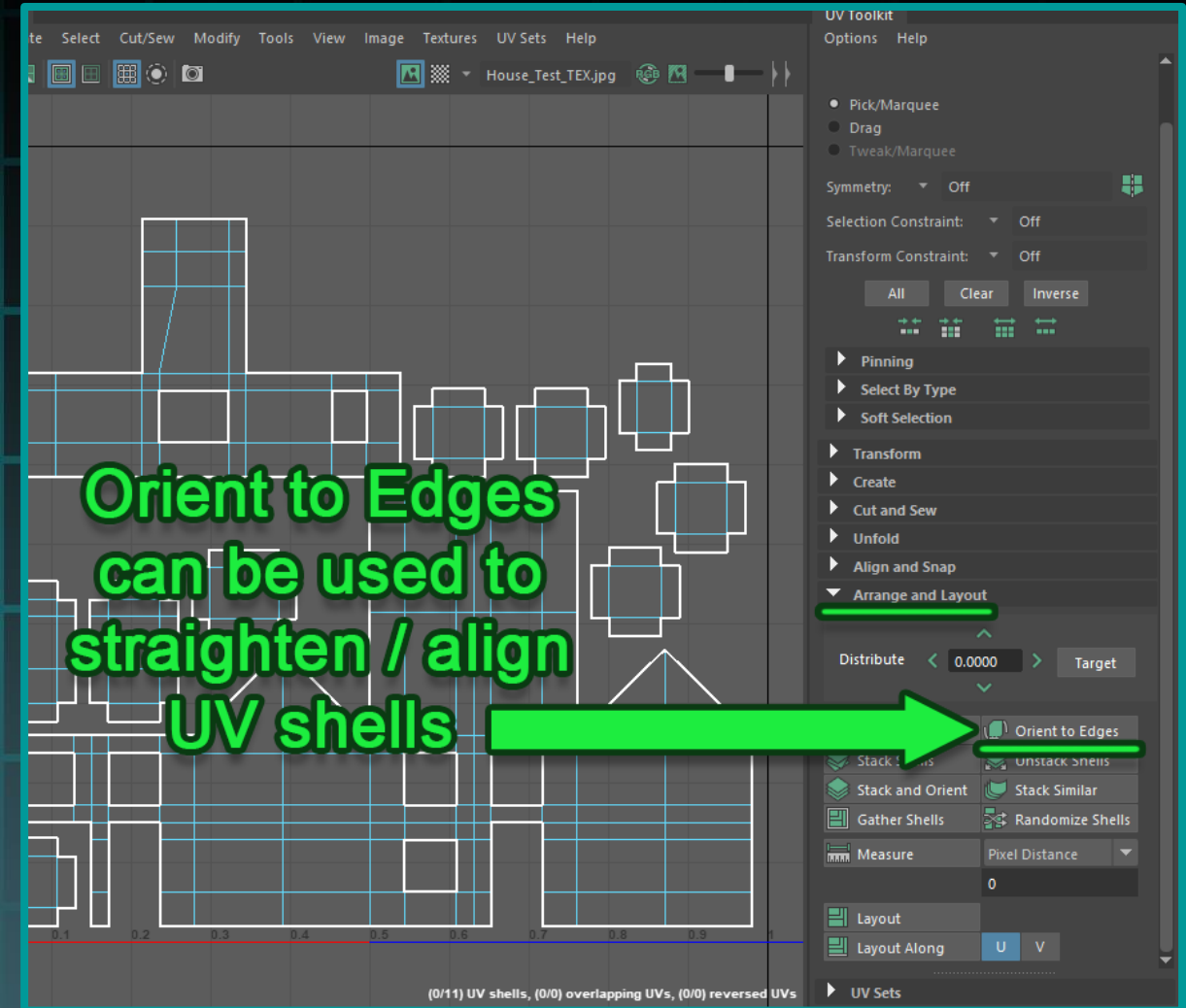


5d. UV Layout: Orientation

Tools such as the **Orient To Edges** can be used to align UV Shells.

Orient to Edges needs you to be in **Component Mode** – select an external edge of one of your UV shells to align it with the X or Y axis.

You may need to rotate and adjust further – it all depends on the complexity of the model.

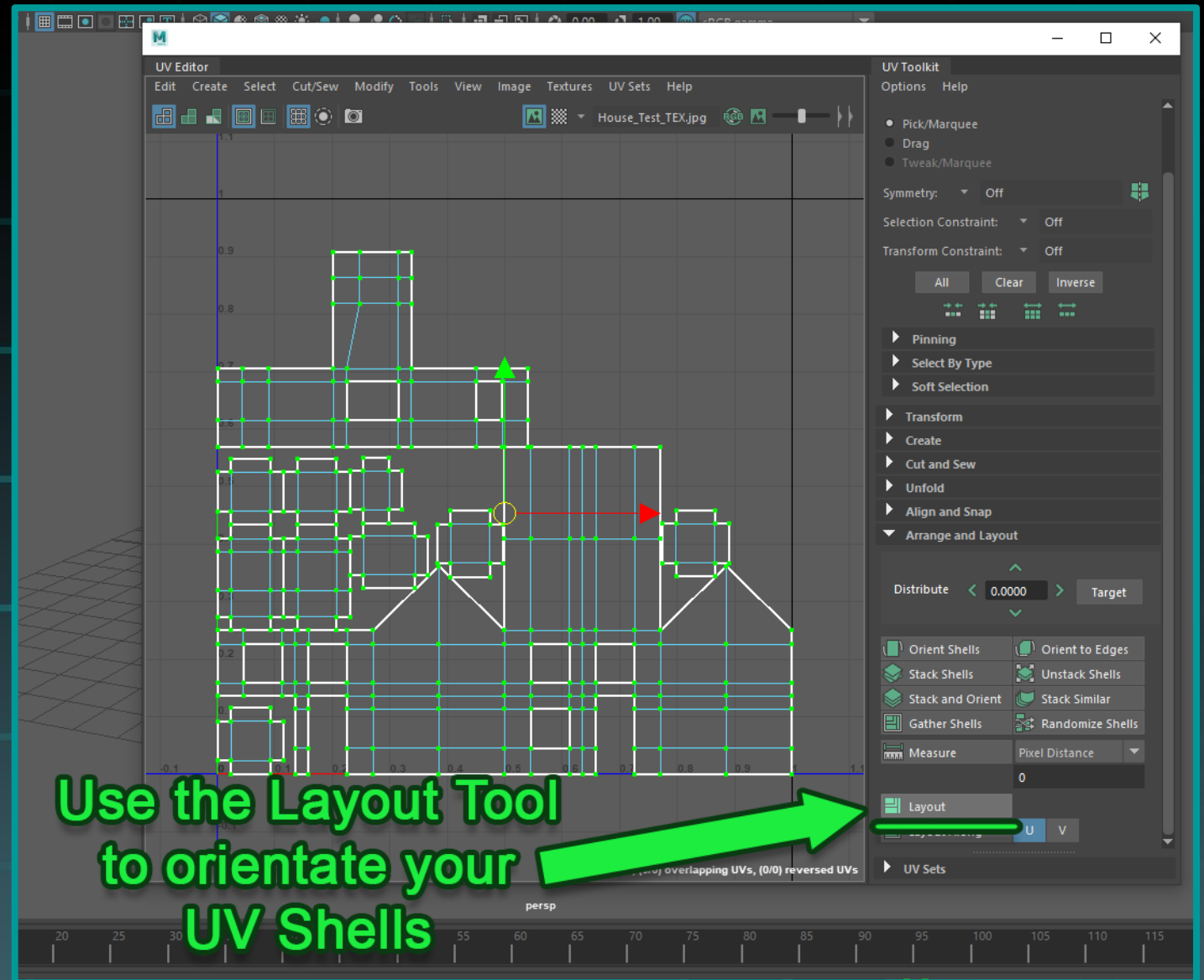




5e. UV Layout: Layout Menu

To complete the Layout process, we need to **arrange all UV shells within the live area.**

This can be done by hand but a good alternative is to use the Layout Tool in the **UV Toolkit / UV Editor.**



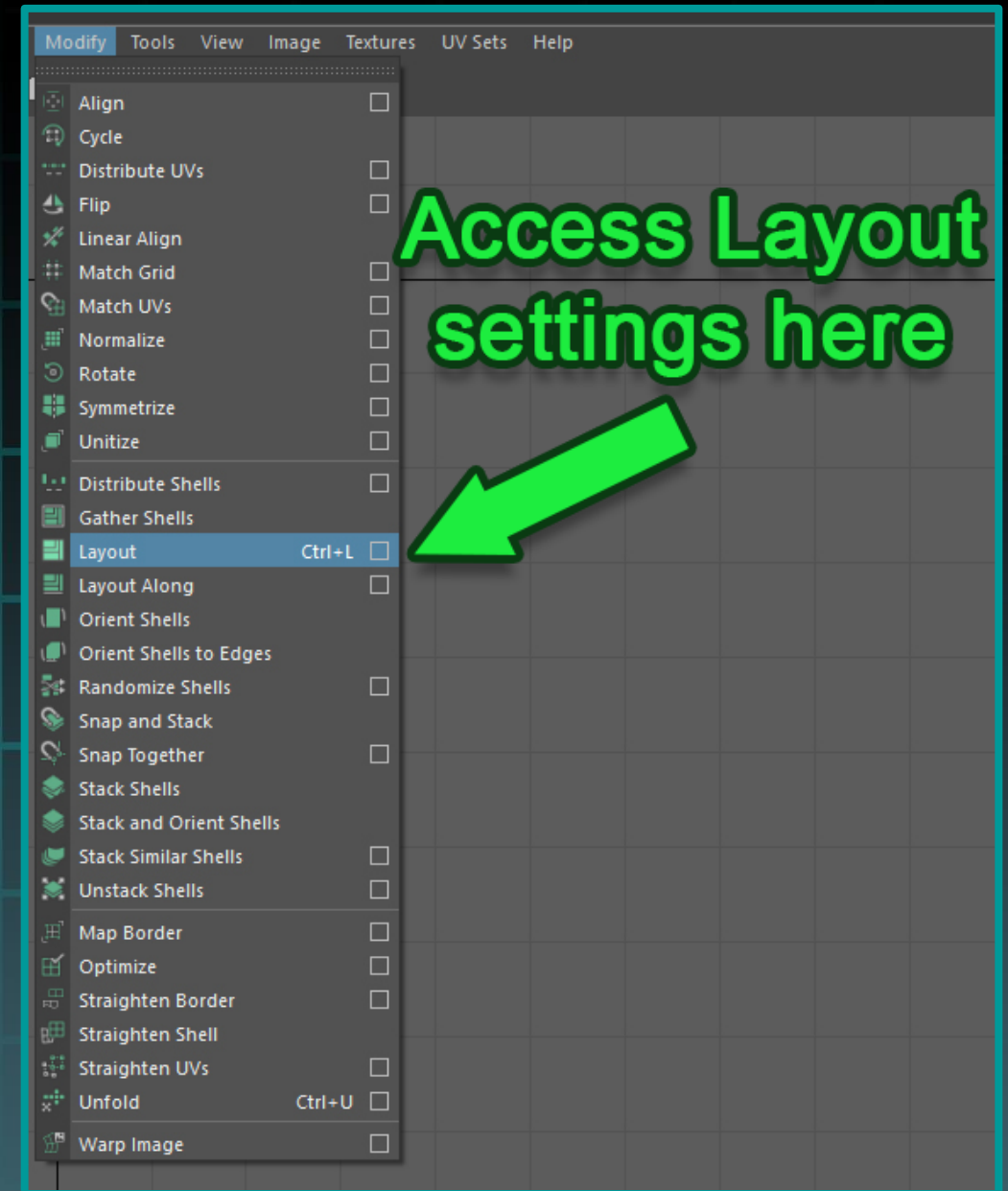


5e. UV Layout: Layout Menu

As with most tools in Maya, the **Layout tool will have to be configured** in the **UV Editor** order for it to work effectively.

If you experience issues with layout, it is likely that **options here have not been set correctly**. Bear this in mind if you switch workstations during projects!

In UV Editor: **Modify > Layout**

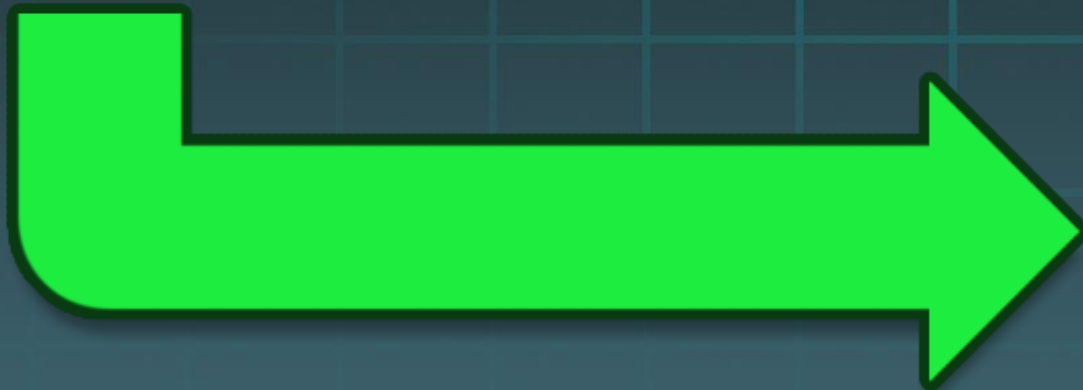




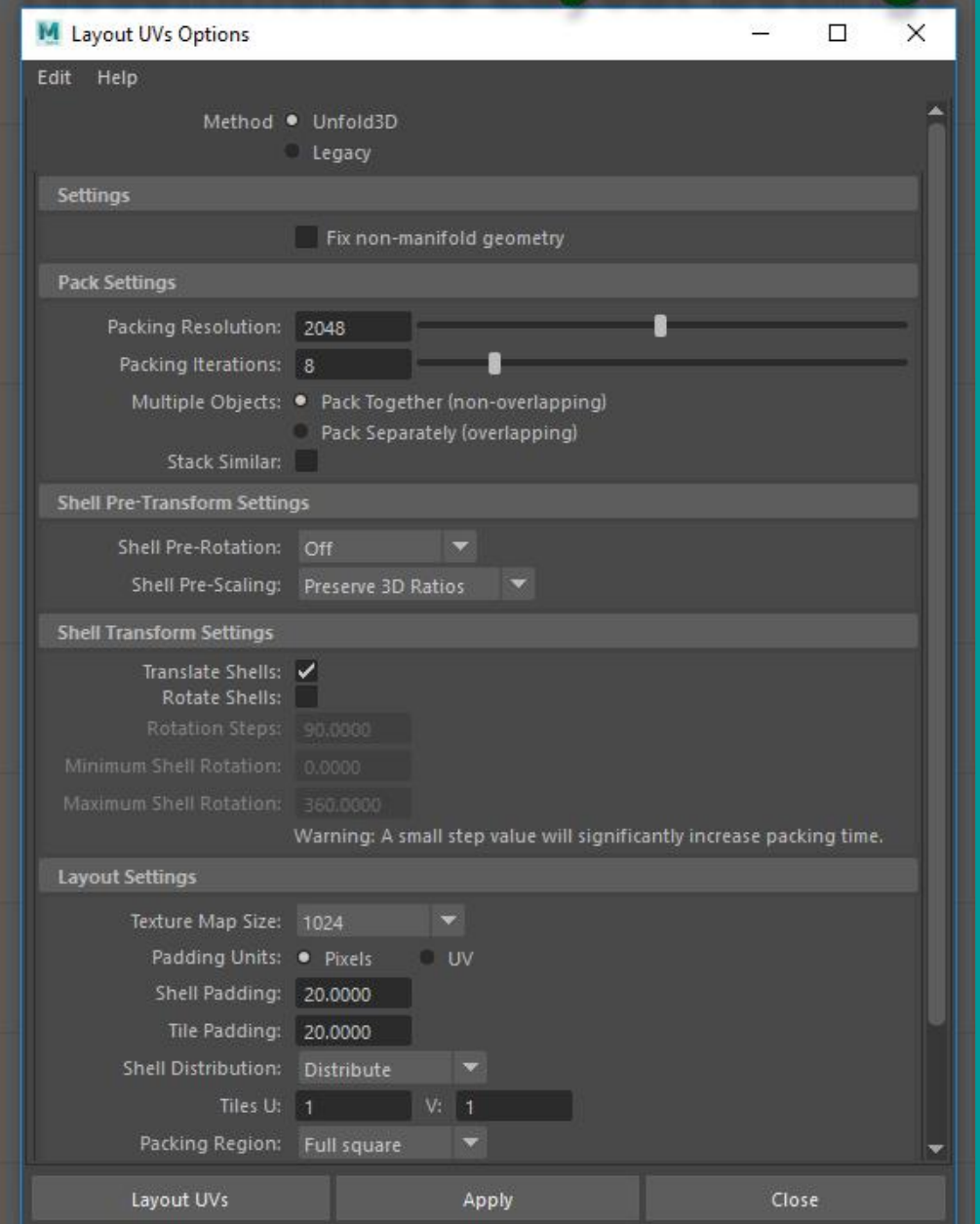
5e. UV Layout: Layout Menu

Some of the **values in this menu need to be changed** in order for the UVs to be arranged properly.

The setup featured on this slide should allow your UV shells to be scaled and spaced proportionately.



Recommended Layout Settings

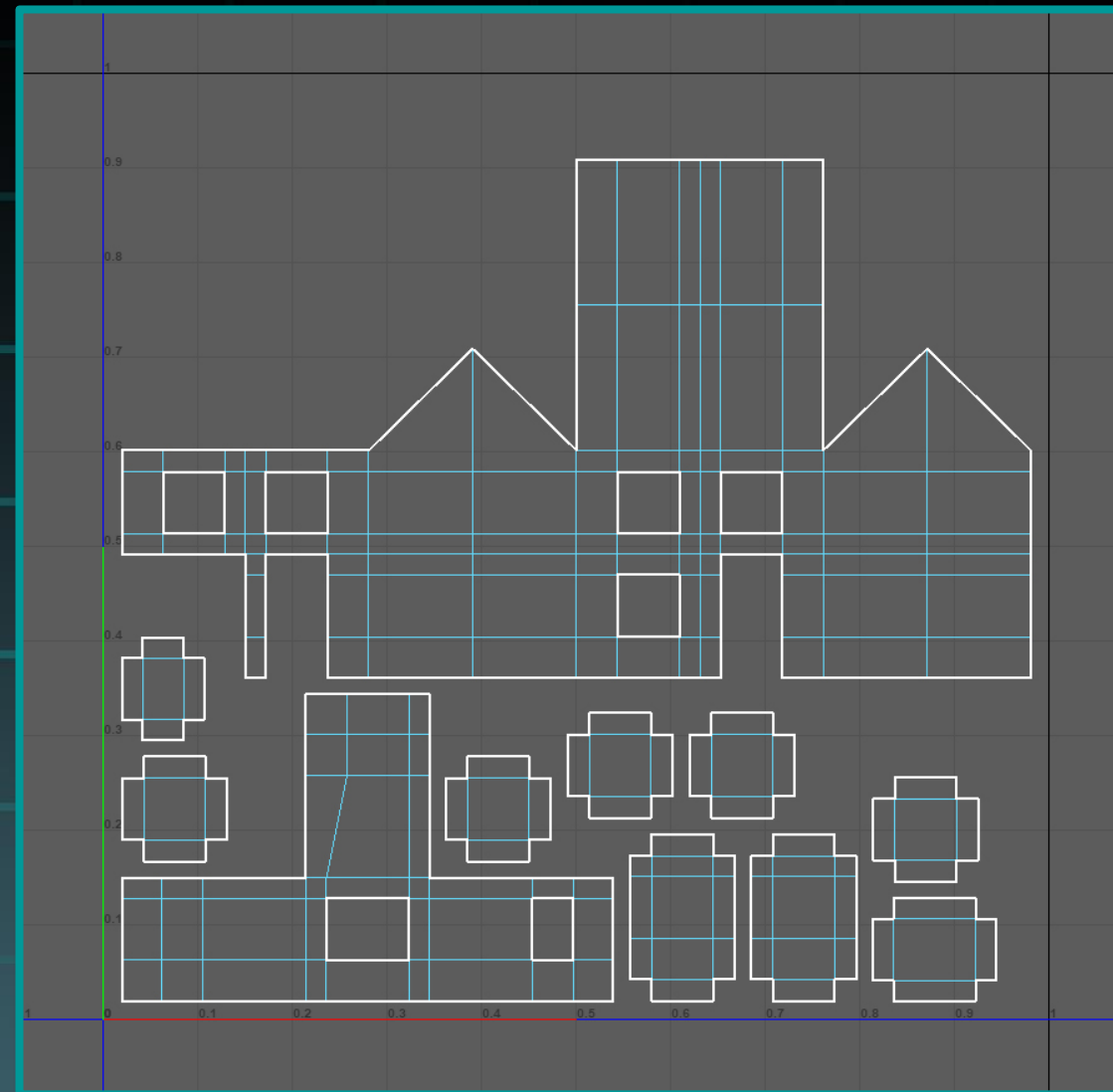




5e. UV Layout: Layout Menu

Select '**Layout UVs**' in the bottom left of the menu once the settings have changed and Maya will calculate the optimal layout for you.

If your UV Shells are clean and well organised you should see something similar to the layout shown here.

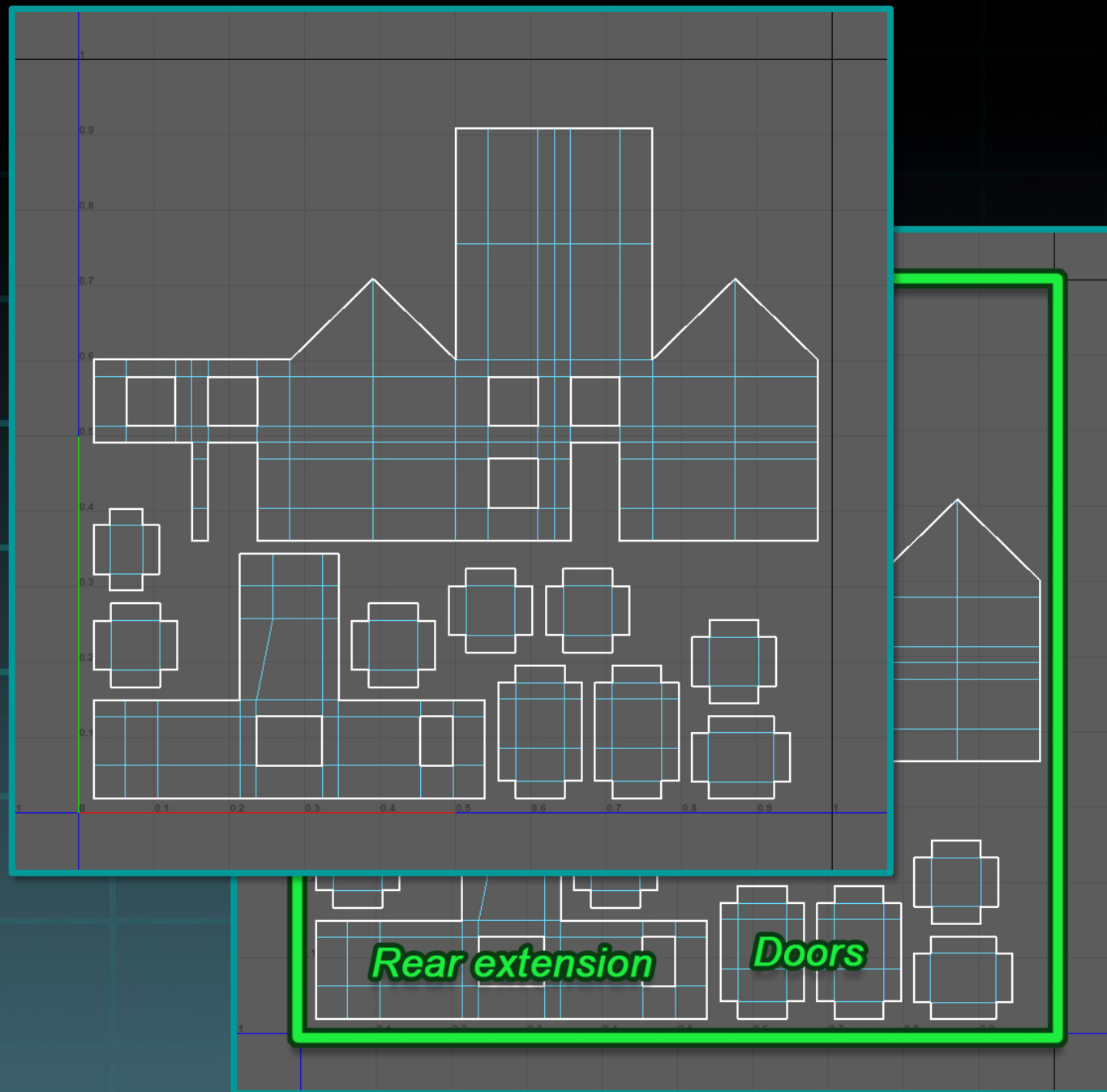




5f. UV Layout: Essential Info

Example of a **proportionately scaled** UV map with good use of space:

Sometimes you will not need to have all UV shells set to the same scale. This is usually personal preference.

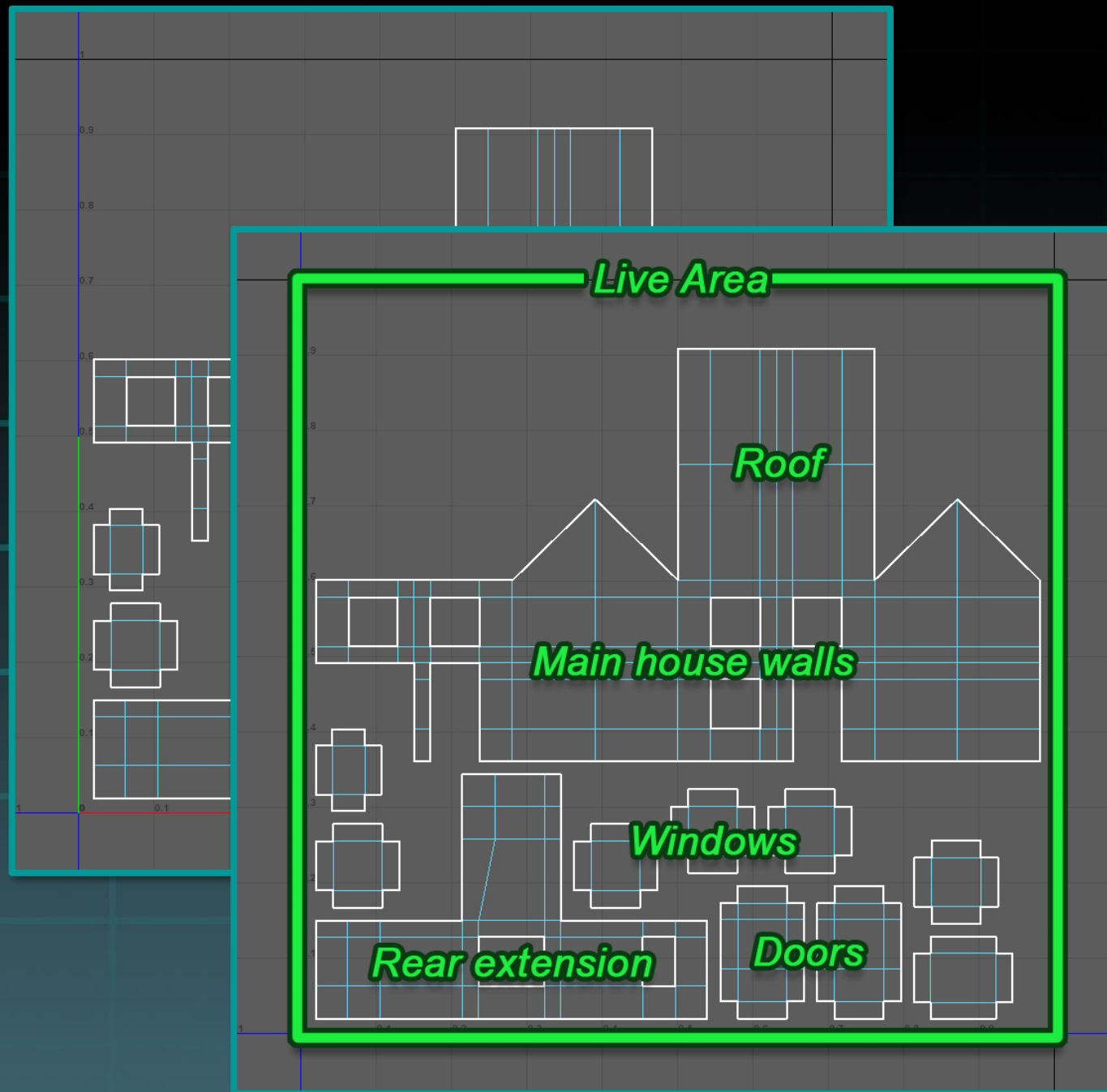




5f. UV Layout: Essential Info

Example of a **proportionately scaled** UV map with good use of space:

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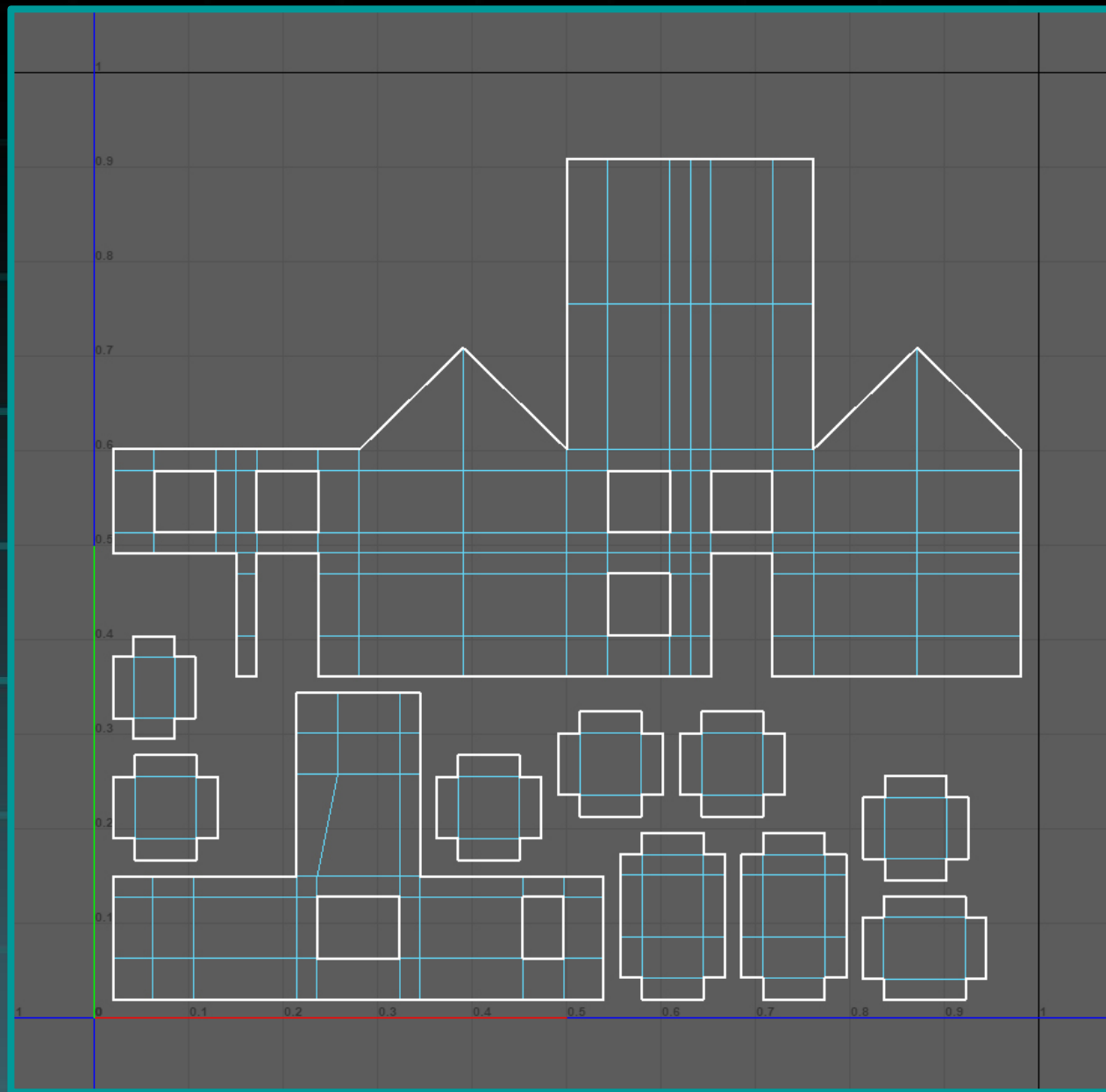


5f. UV Layout: Essential Info

Efficient UV Layout is ESSENTIAL.
You should aim to **use as much of the live space as possible!**

Remember:

The **larger the UV shell** on the texture map, the **higher the resolution**.





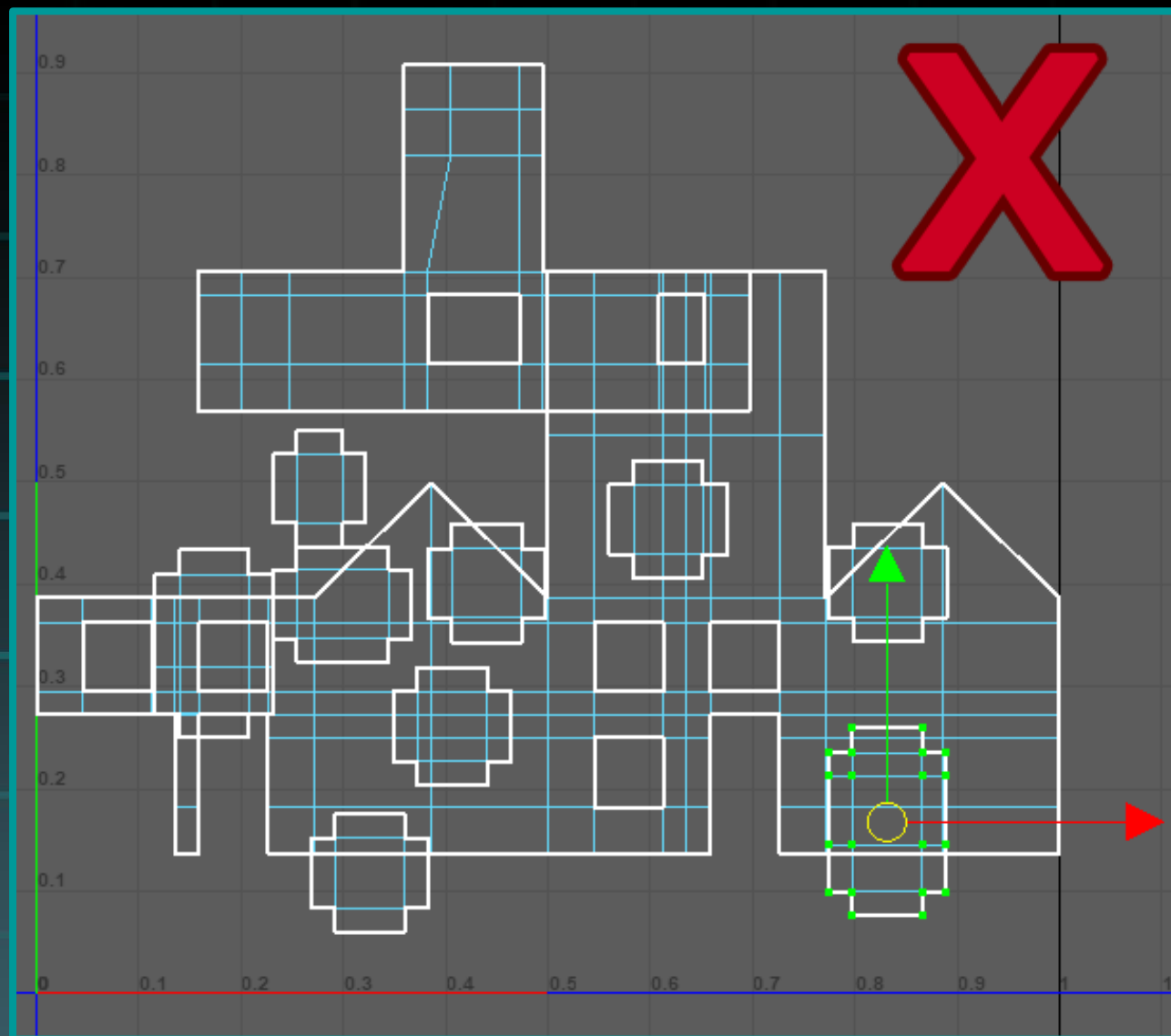
5f. UV Layout: Essential Info

NOTE: **UV shells cannot overlap or share the same live space** – if they do, the texture map will apply to **any** UV shell in that space.

You can prevent overlap in the **Move UV Shell Tool** options:

Tools> Move UV Shell Tool

Then tick '**Prevent Overlap**'





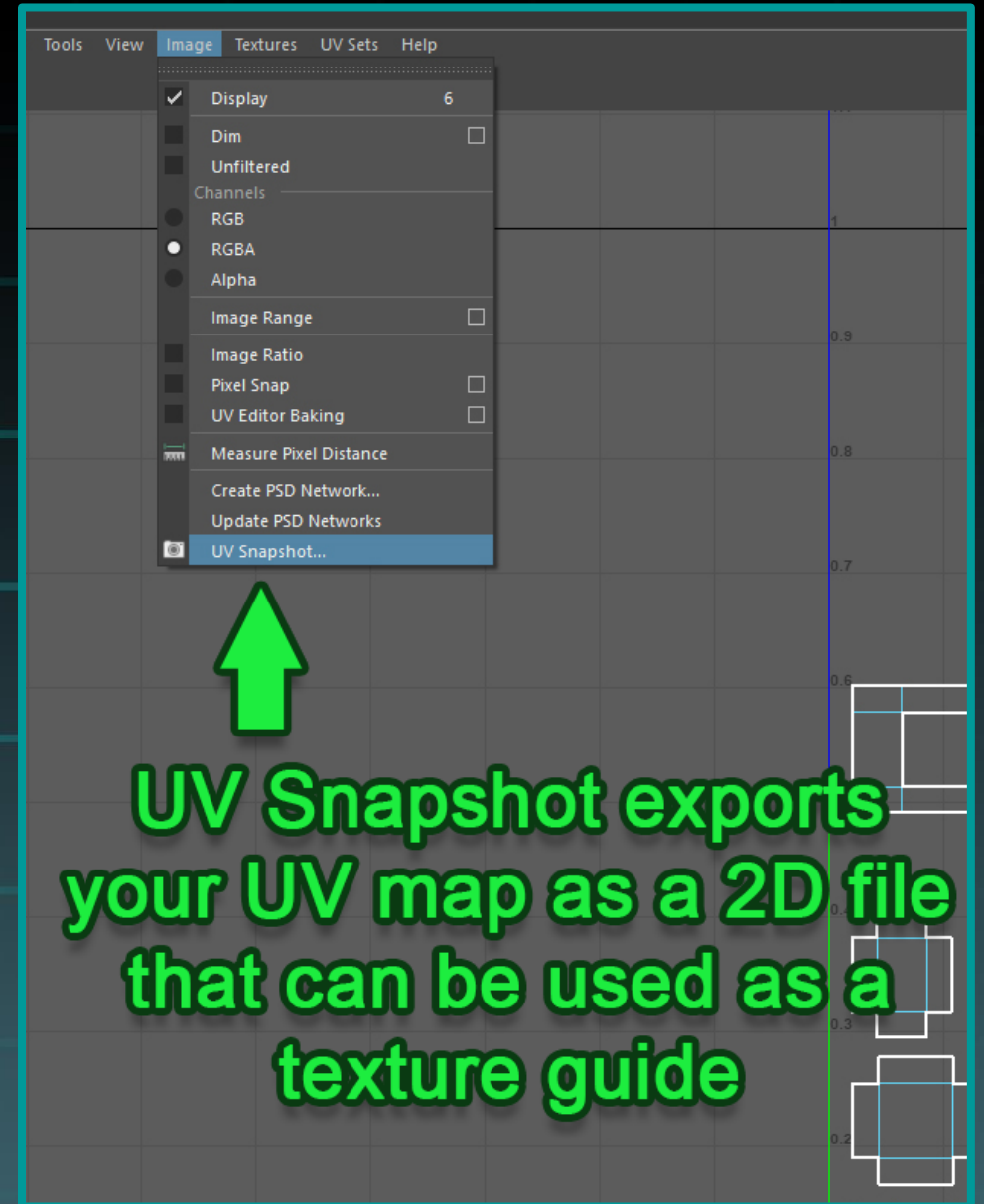
6. Export UV Snapshot (Texture map)

Once you are happy with the orientation and spacing of your UV shells, you can export the selection as a **UV Snapshot**.

In the **UV Editor**, go to:

Image > UV Snapshot

Here you will be able to pick a file type and location. This can then be modified in 2D paint packages such as Photoshop.





6. Export UV Snapshot (Texture map)

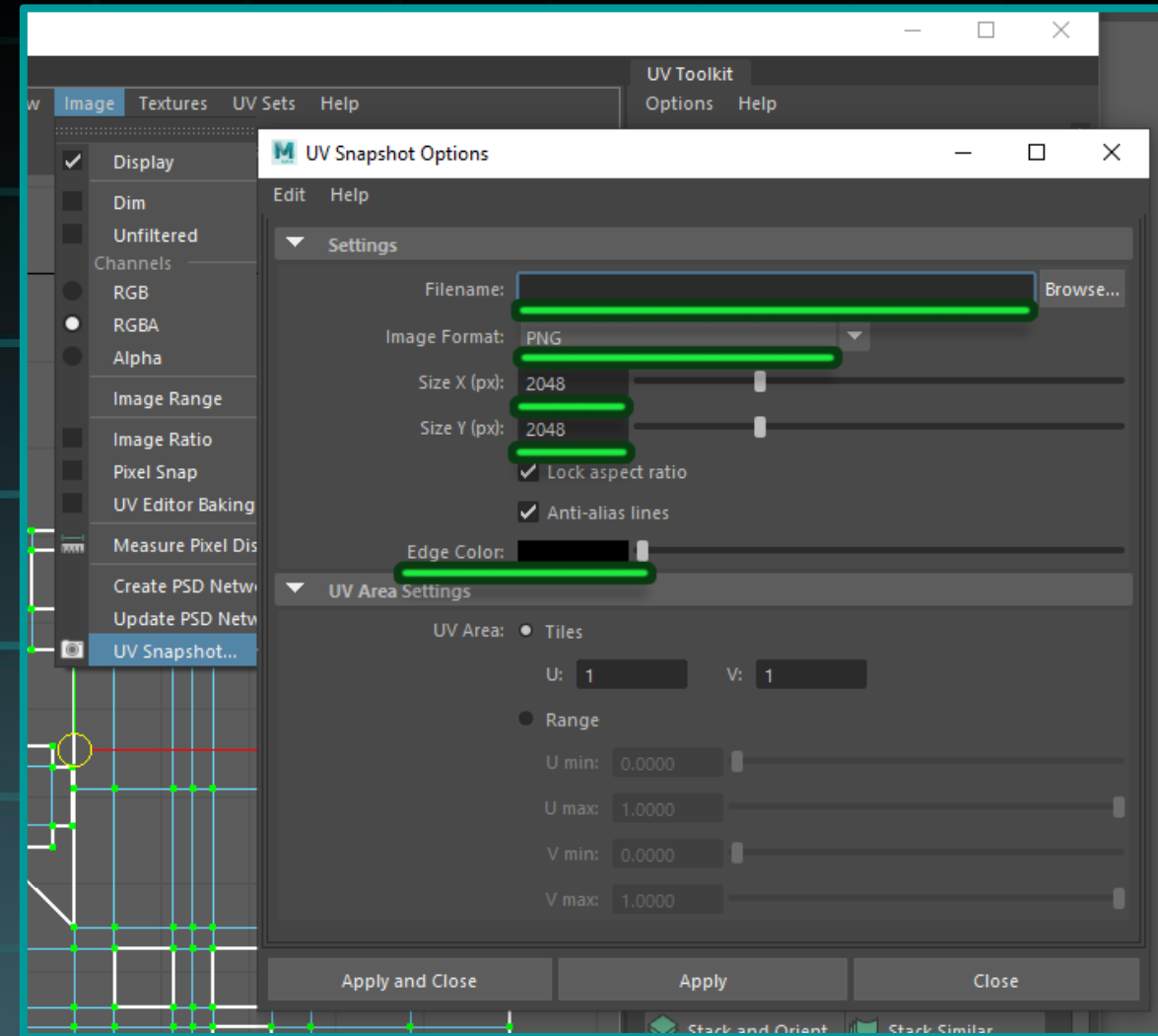
For a useable 2D Texture map, use the following settings:

Image Format: **PNG**

Size X: **2048**

Size Y: **2048**

Edge colour can be anything you want, but using black is best to begin with.

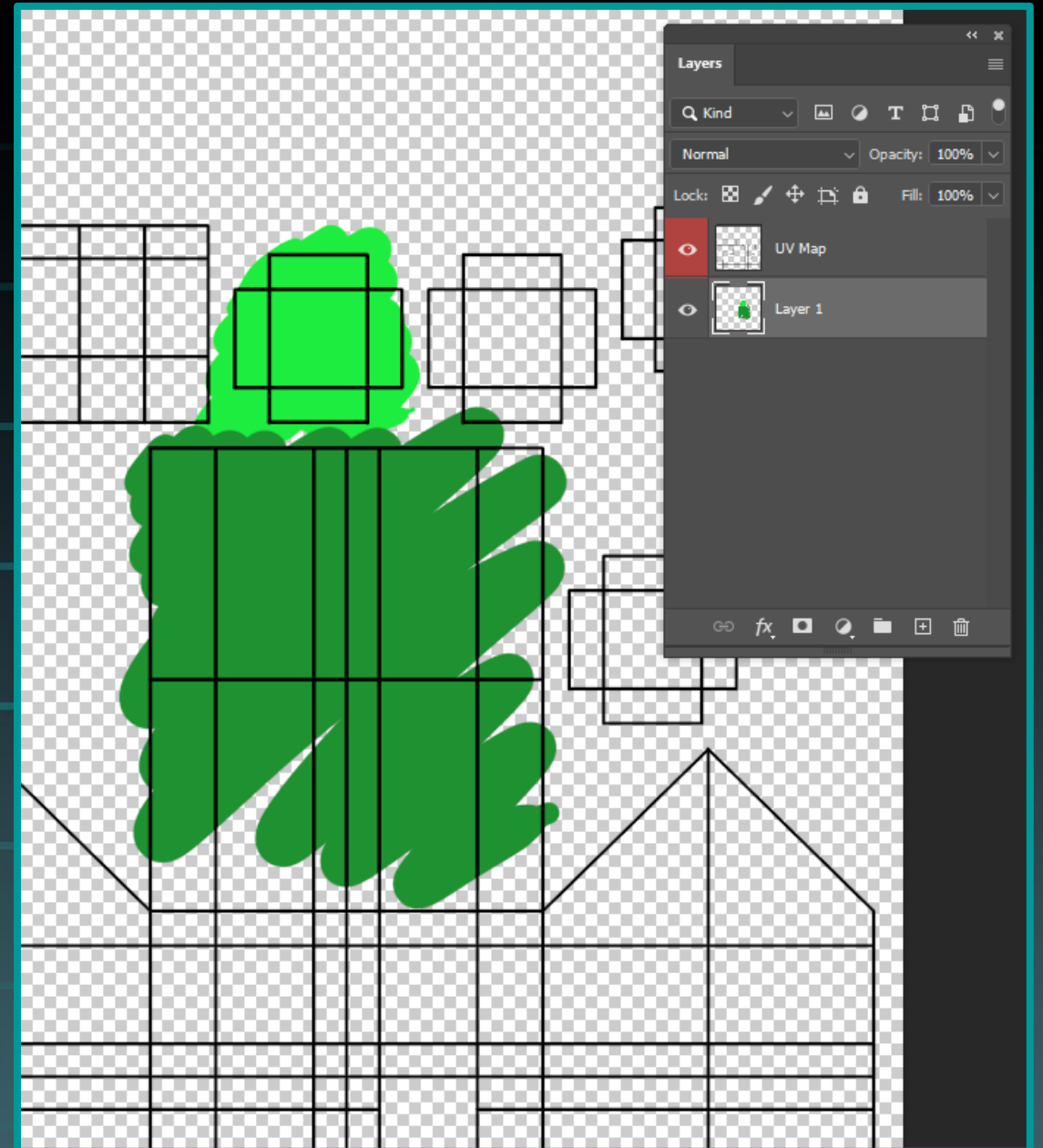




6. Export UV Snapshot (Texture map)

As **PNGs have transparency**, it is easy to get started on textures in programs such as **Photoshop**.

Make sure you **create and work on separate layers** – not the UV map layer itself. If you do not do this, the exported wireframe will show on your model as part of the texture.





6. Export UV Snapshot (Texture map)

Please note that exporting a map is **not necessarily needed for programs such as Substance Painter** – this follows a different process where the .fbx file of your UV unwrapped asset will be used instead.



7. Create your texture map using the UV Snapshot

Using any 2D tool of choice, **apply textures to your house model.**

You can **digitally paint original textures** or **source reference images online and edit them.**

Again, this is an area where practice makes perfect – you will quickly learn what methods work best if you persevere!

Most reference images will need to be manipulated in some fashion to be useable – particularly if you want to make **repeating patterns, tiled textures** or have images that aren't affected by their original light sources.



ENVIRONMENT DESIGN

UV Unwrapping 3D Models

Student Exercise:

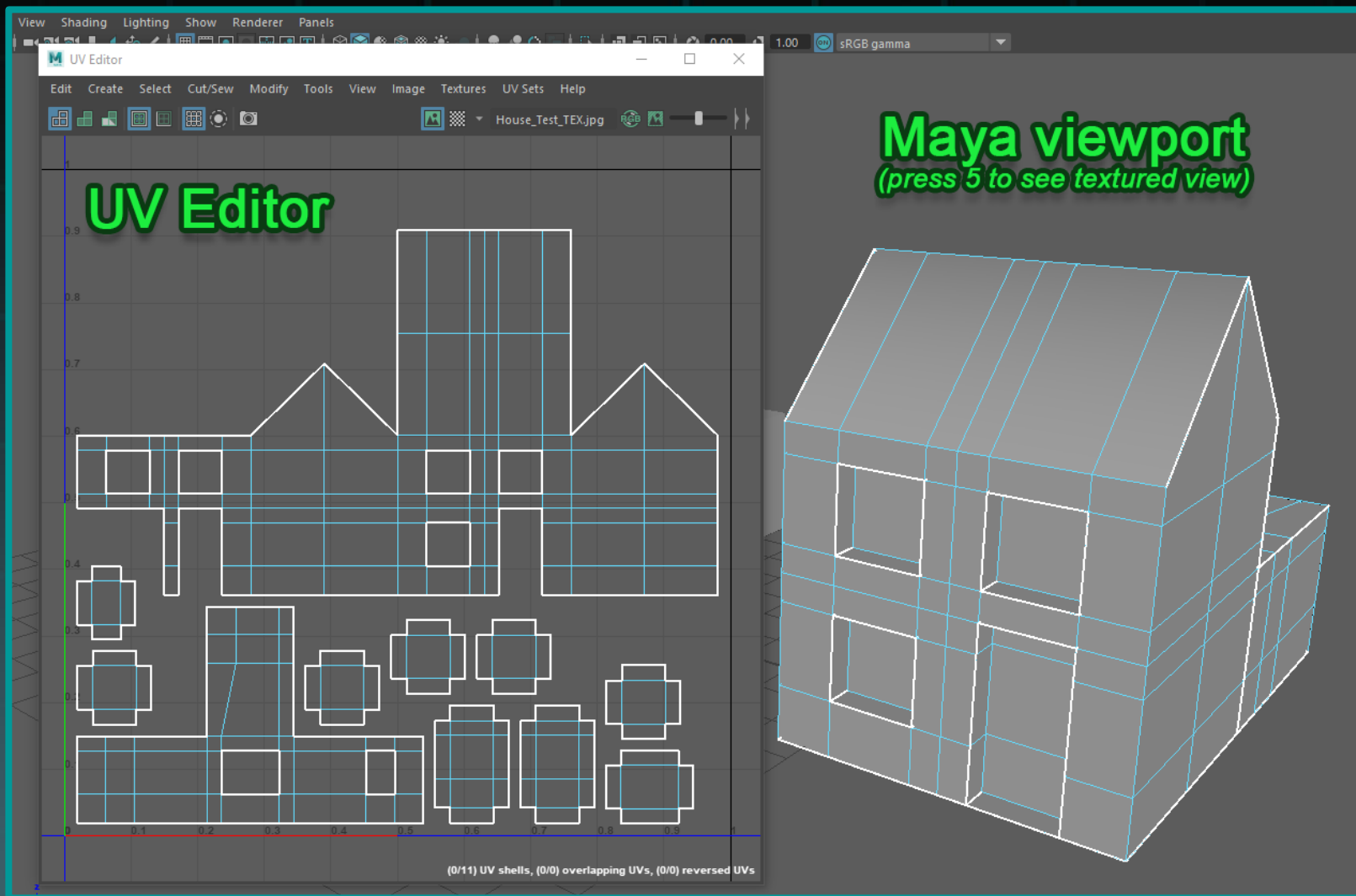
Create your texture map using your UV Snapshot



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UV Unwrapping 3D Models

Successful UV Unwrap - Wireframe





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UV Unwrapping 3D Models

Remember:

**SAVE YOUR WORK
AND SAVE IT OFTEN!**



Further Assistance

[Maya Help: UV Editor overview](http://help.autodesk.com/view/MAYAUL/2018/ENU/?guid=GUID-73BF7546-3BF2-44F3-9192-15A024CEC173)

<http://help.autodesk.com/view/MAYAUL/2018/ENU/?guid=GUID-73BF7546-3BF2-44F3-9192-15A024CEC173>



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