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Digital Modeling Series

Converting Project Maps to File Textures

This tutorial covers how to setup a file that can be used for augmented reality, virtual reality and online, interactive presentations. Both methods of presenting require a obj or fbx format model with textures (label image files) mapped to the plygon sets. The process involves several steps:
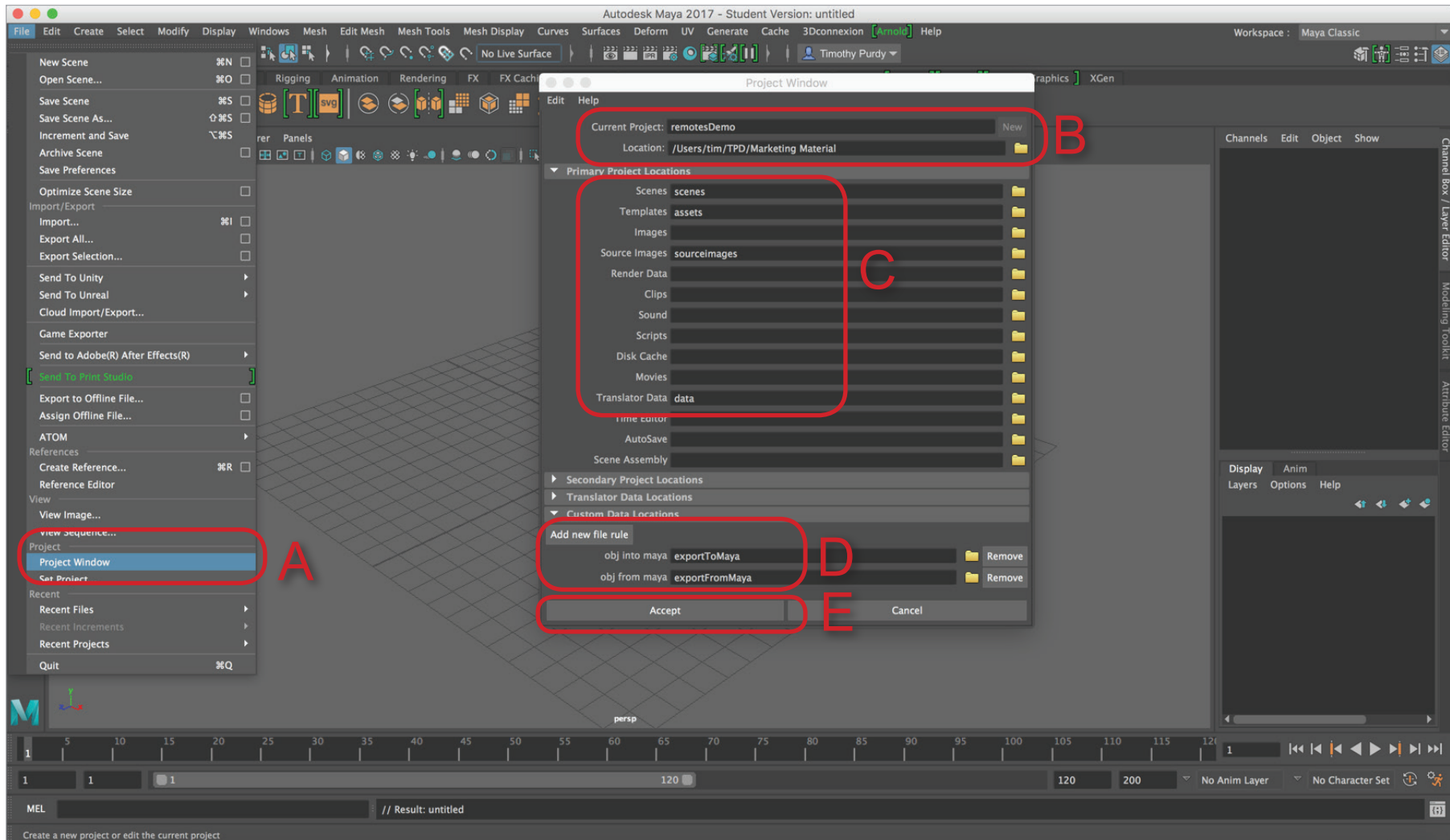
- Import the CAD model into KeyShot and setup initial materials
- Individually export each part in OBJ format
- Import OBJ files into Maya and create a group
- Setup materials including texture maps using projections
- Convert projection maps to file textures
- Export the in either OBJ or FBX format
- Compress the object, material and textures into a single file

Converting Project Maps to File Textures

Step 1

To help keep the conversion process organized, start off by creating a Maya project. Start Maya and then go to File > Project Window (A). Click the New button, define a location and name for the project (B). Not all the sub folders are needed. Use the Edit > Clear Settings to remove the sub folders. Fill back in the following sub folders (C). To help keep track of the obj files, two unique folders will be added. Open the Custom Data Loction tab and select the Add new file rule. Add the two rules indicated below (D). Click the Accept button to create the project and sub folders (E).

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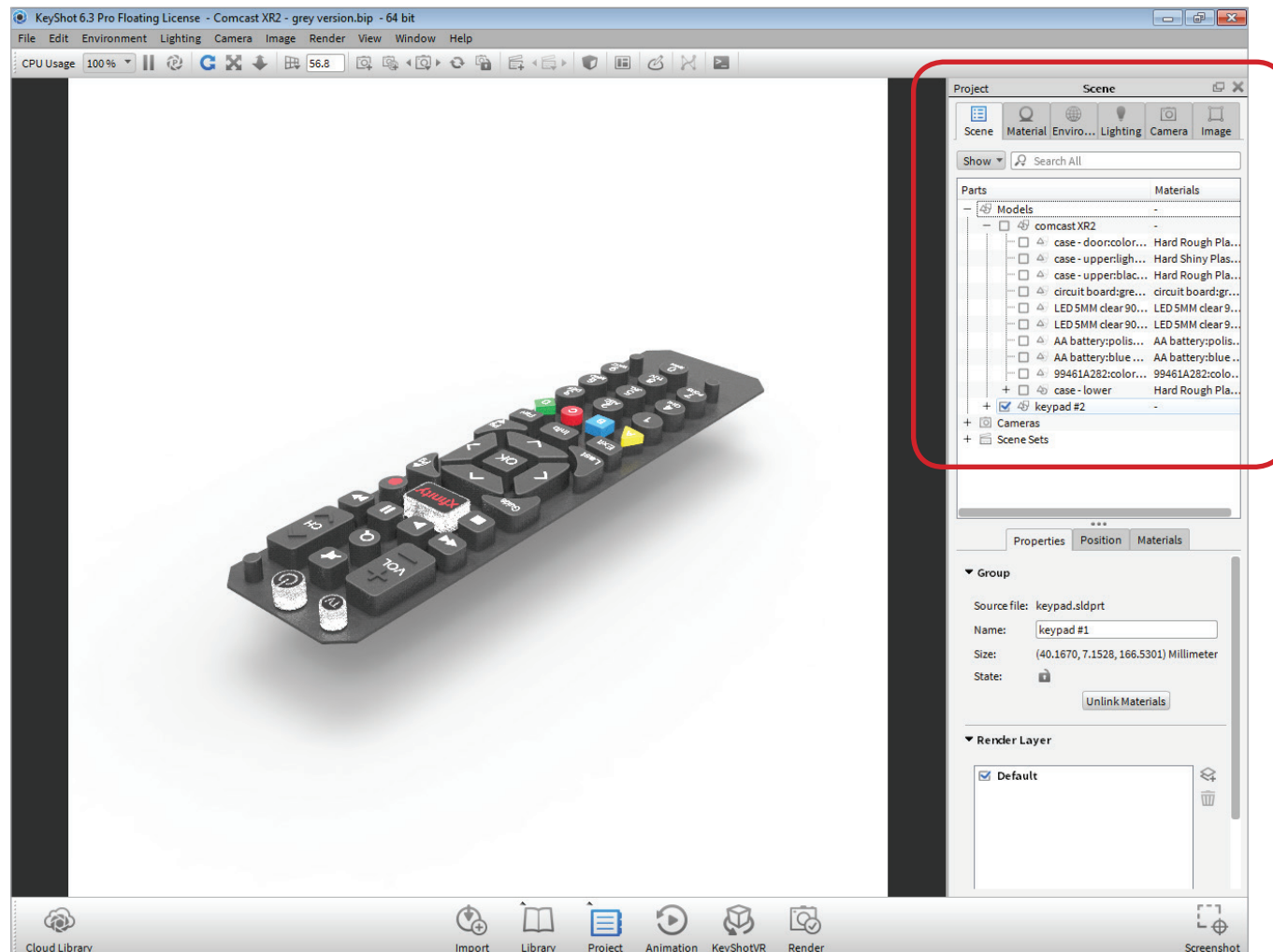
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Step 2

KeyShot will be used as a method to convert the CAD files to polygons. Other tools such as Fusion 360 and Autodesk Show-case can also export polygons. Import the model into KeyShot and setup basic materials. You actually do not need to add labels but assign materials to the different parts.

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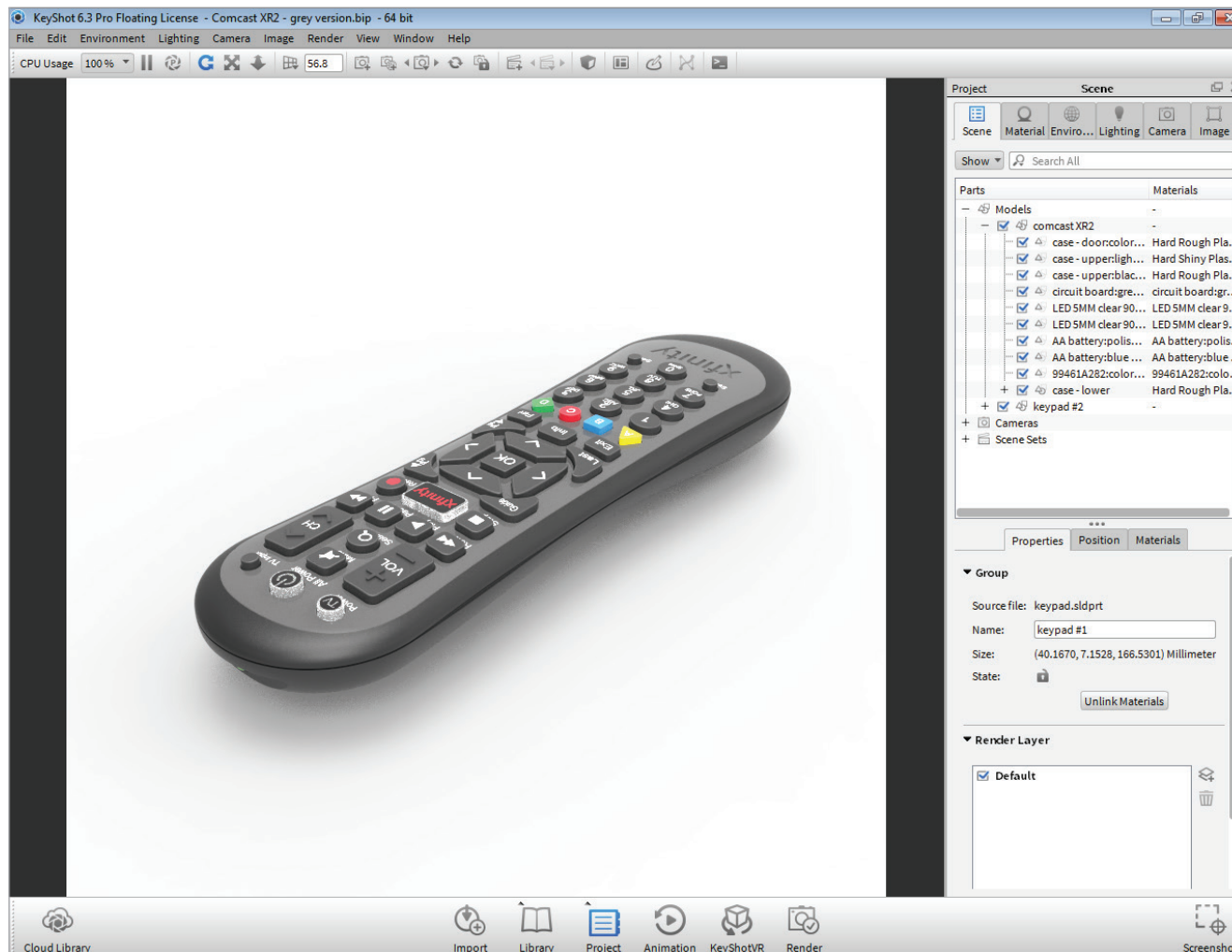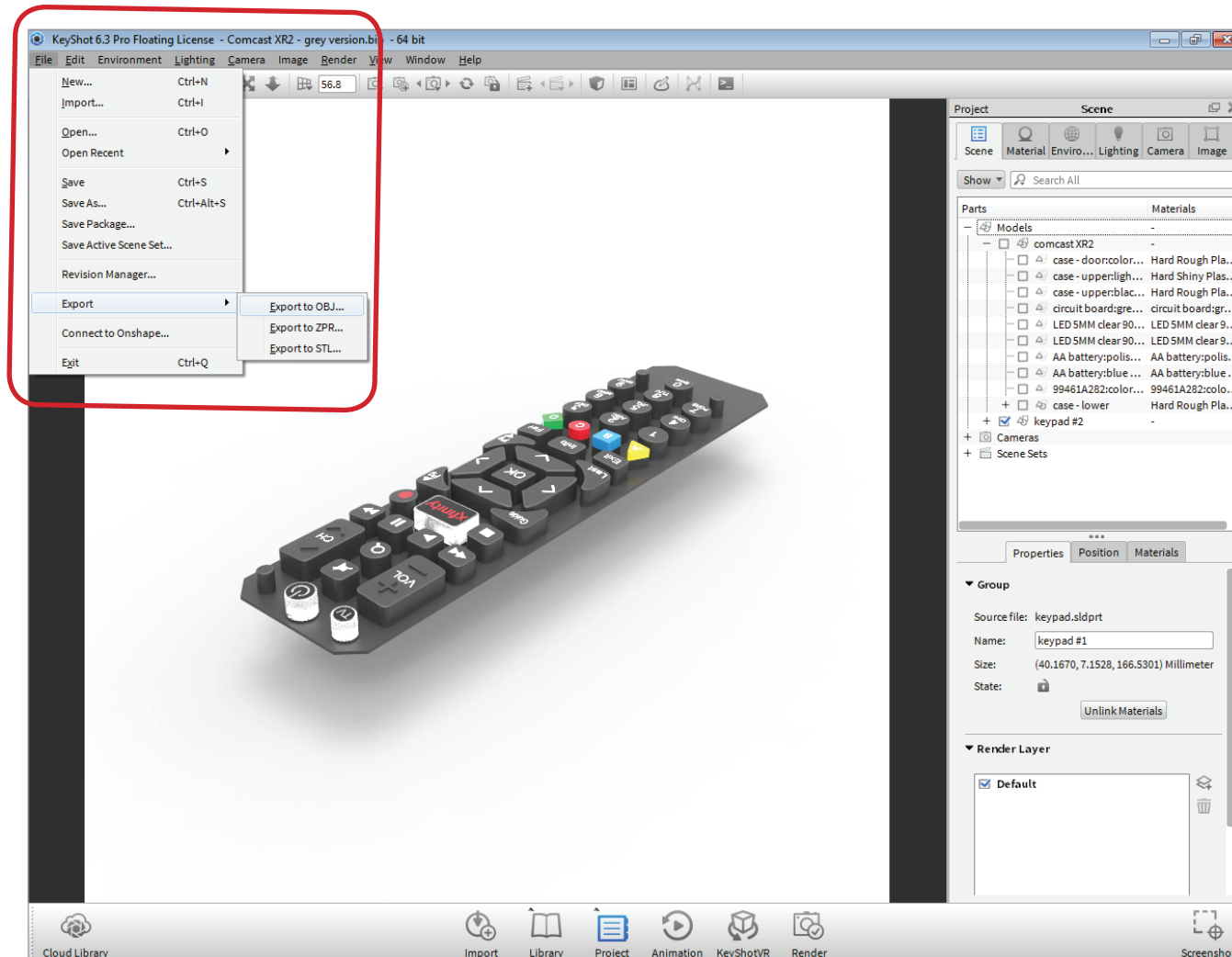
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Step 3

To export a model that has individual parts, the parts need to be exported one at a time. Go to the top model in the Project Scene panel and turn it off. Then turn one part back on. In this example, the keyboard was made visible again.
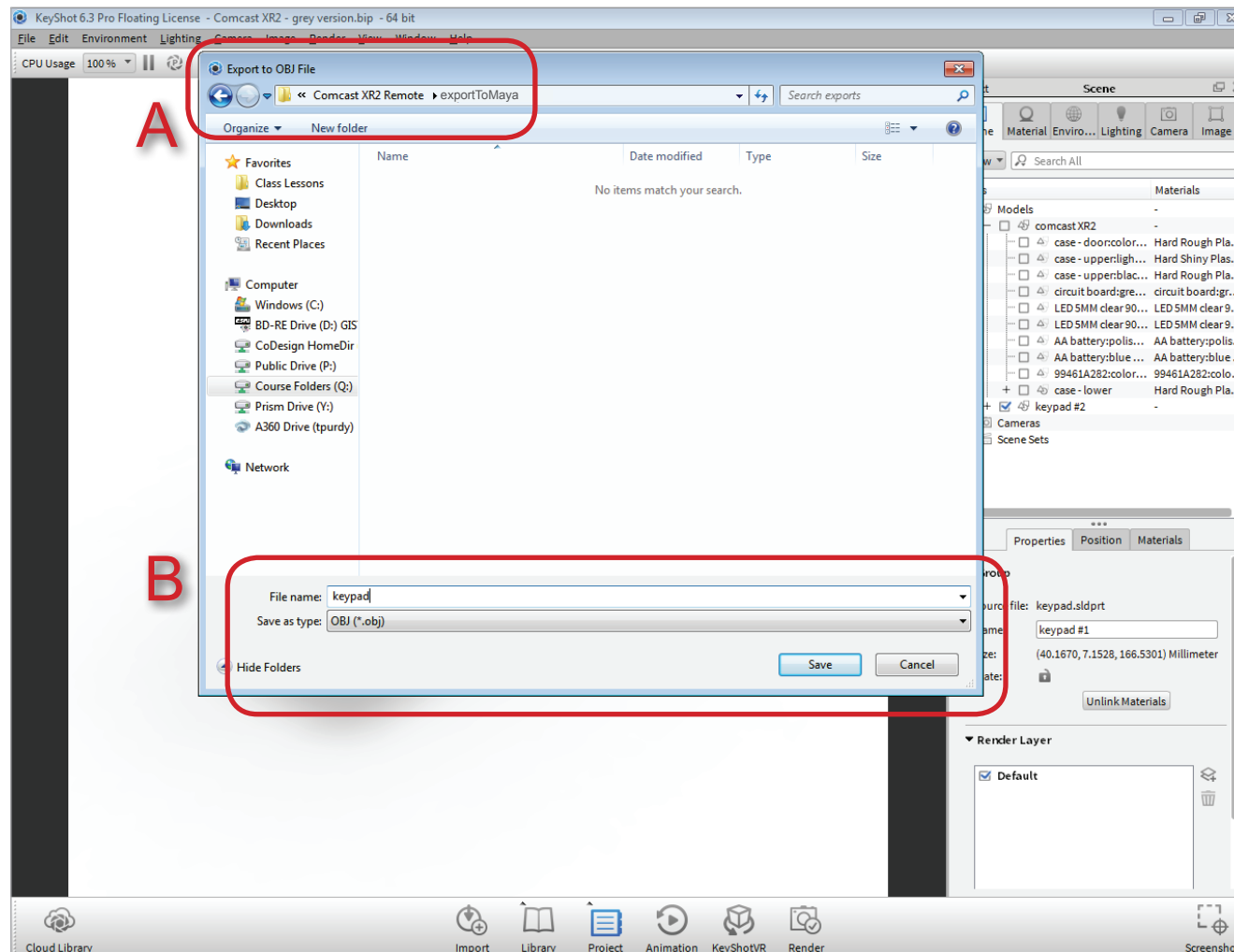
Converting Project Maps to File Textures

Step 4   Next, go to File > Export > Export to OBJ ...

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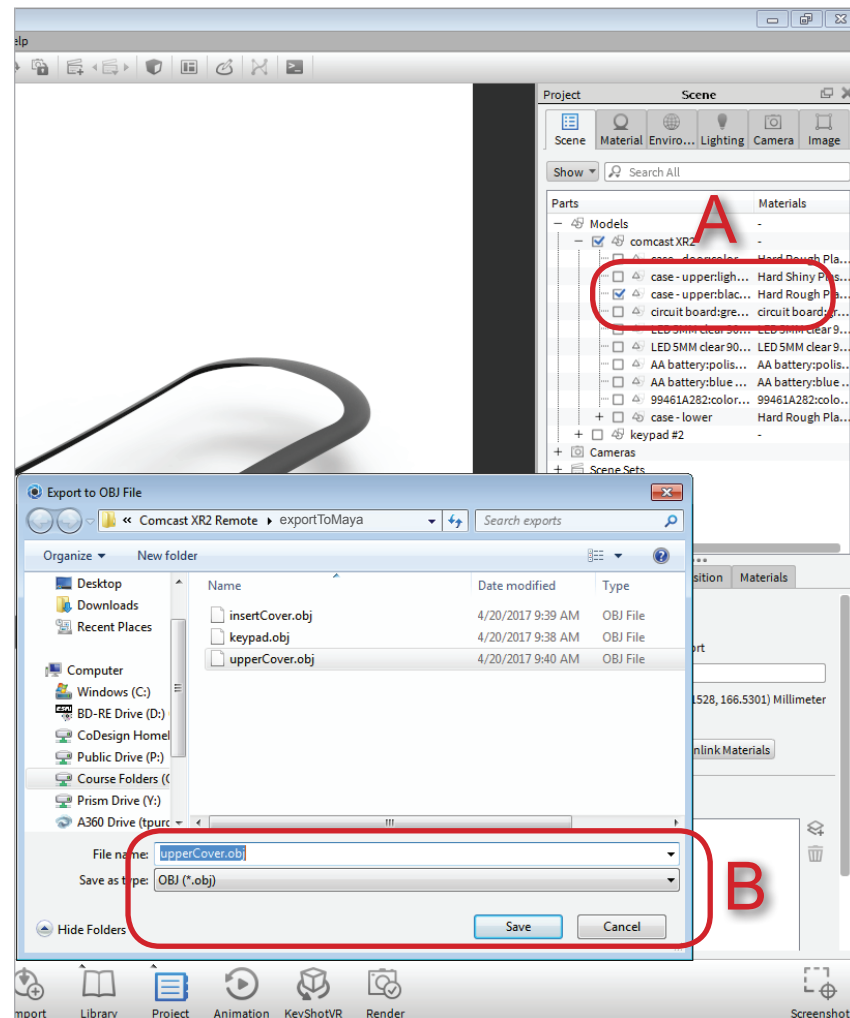
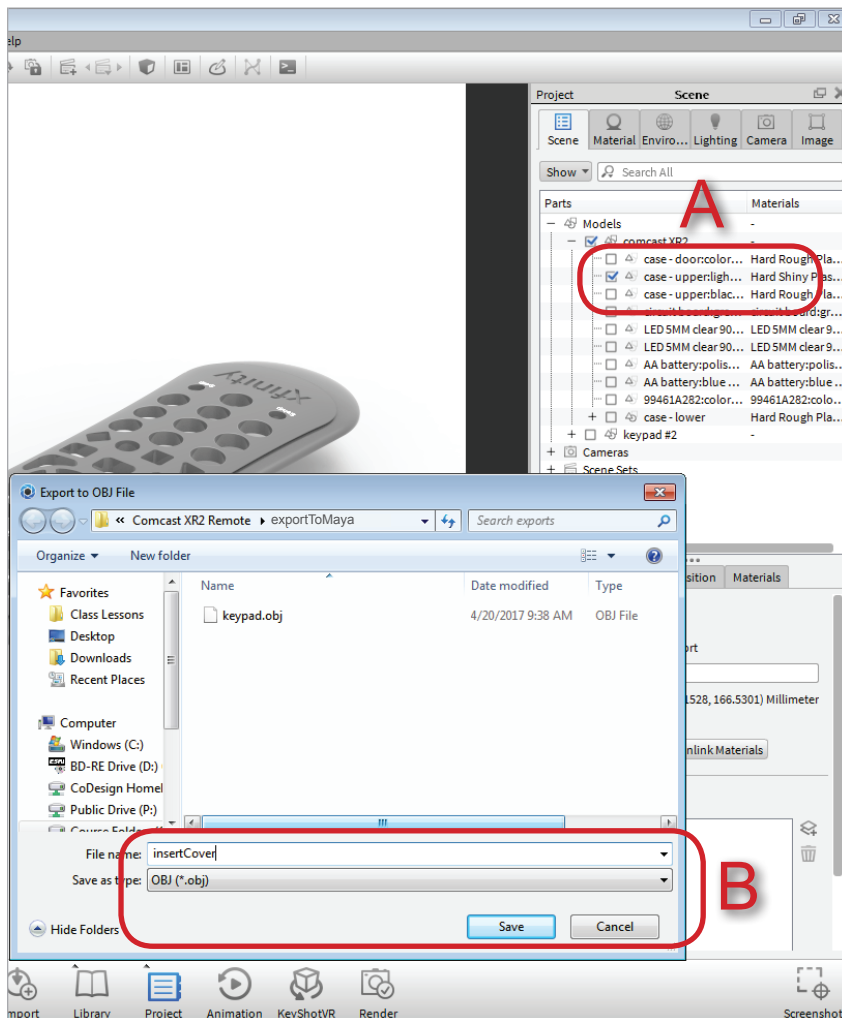# Converting Project Maps to File Textures

Step 5

It is best to export the parts into a separate folder (A). Use the exportToMaya folder created with the project. Confirm the file name, type and then choose Save.

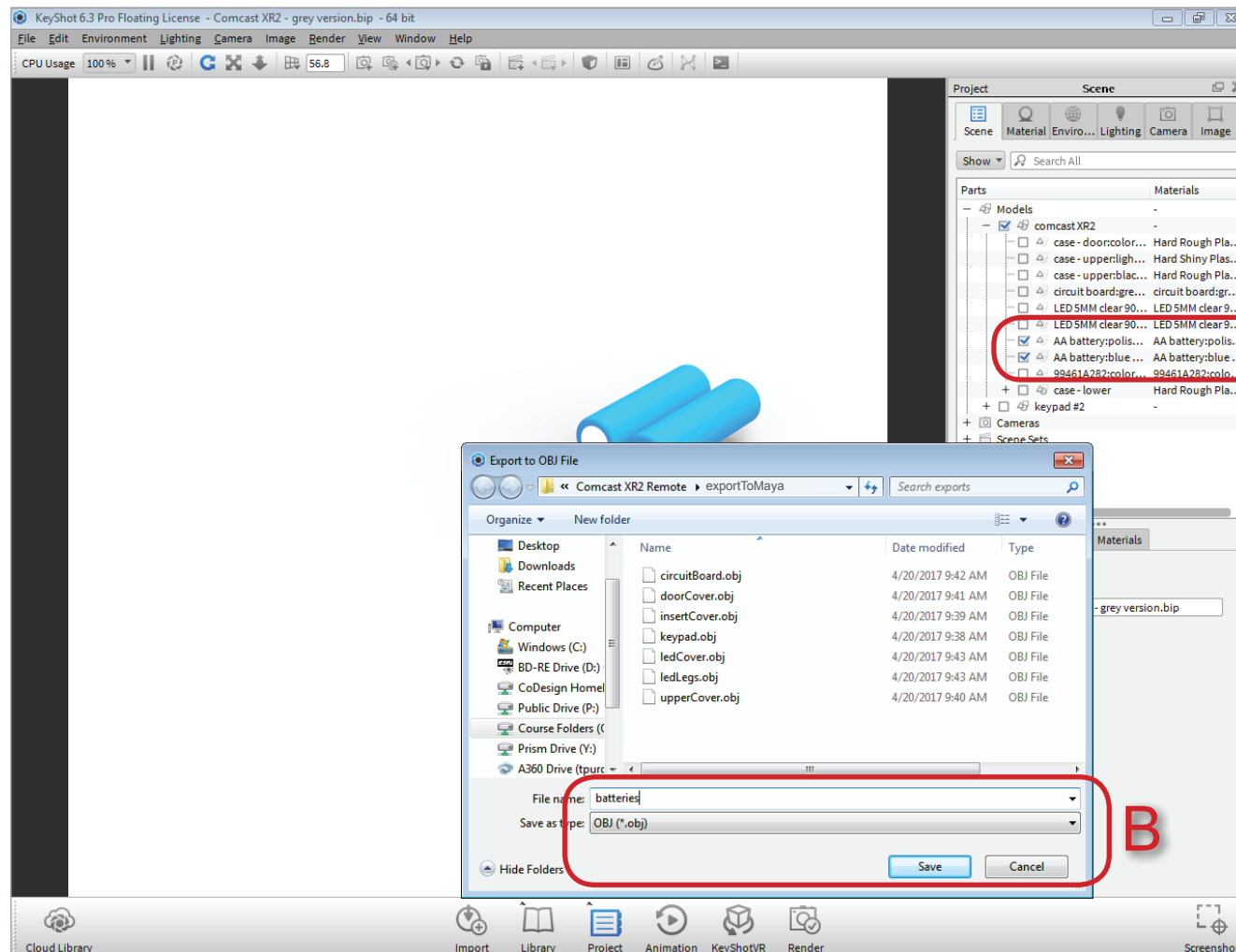# Converting Project Maps to File Textures

Step 6   If a part consist of two different materials (in this example, the upper case), make sure to export them as two separate files from KeyShot. Otherwise, Maya will import them as one mesh object (A) & (B).

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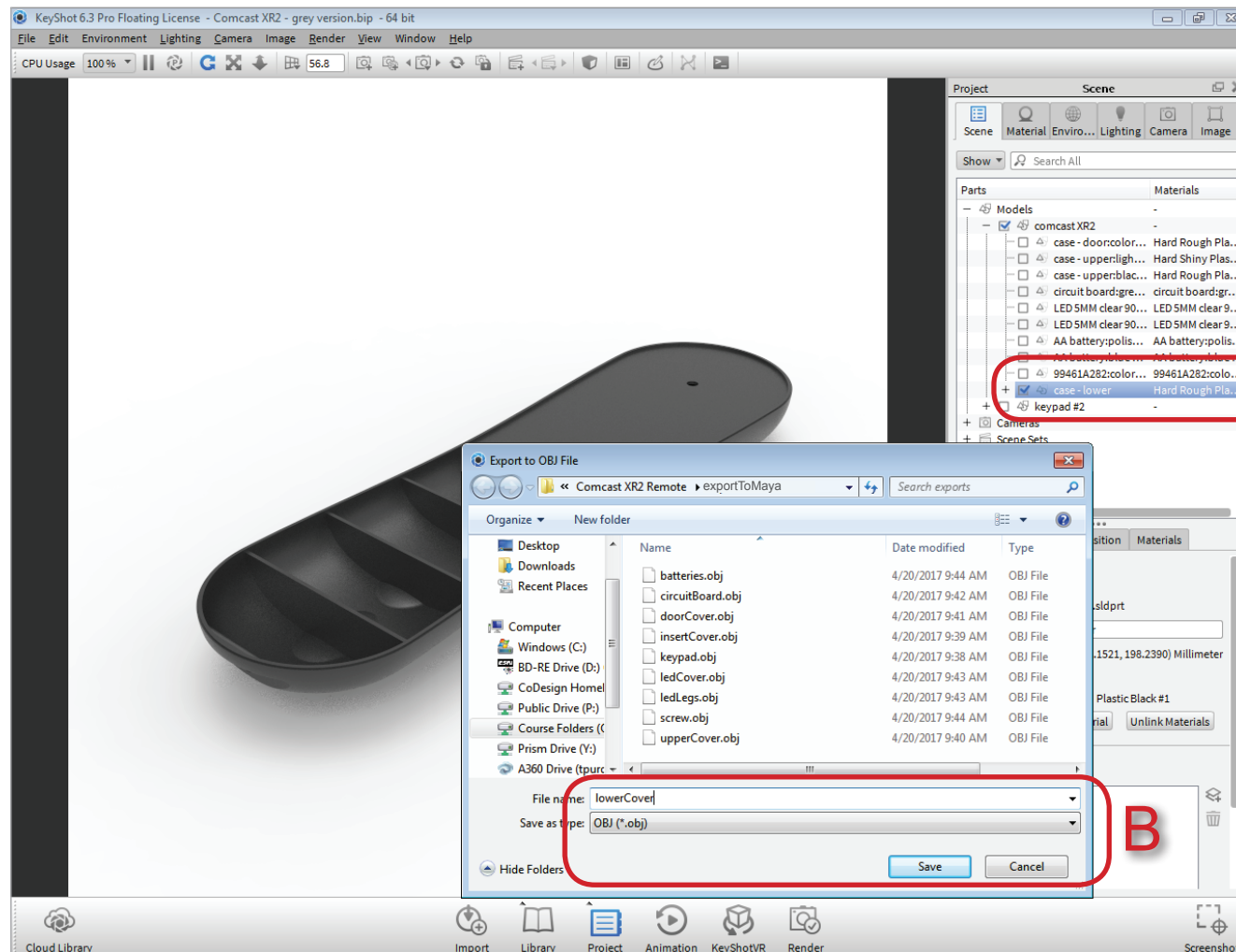# Converting Project Maps to File Textures

Step 7

Items like the batteries are best re-imported as a single battery into KeyShot. In this example, the batteries are visible as two separate objects although when exported, it will be one mesh. Texture mapping maybe more of a challenge with geometry like this.

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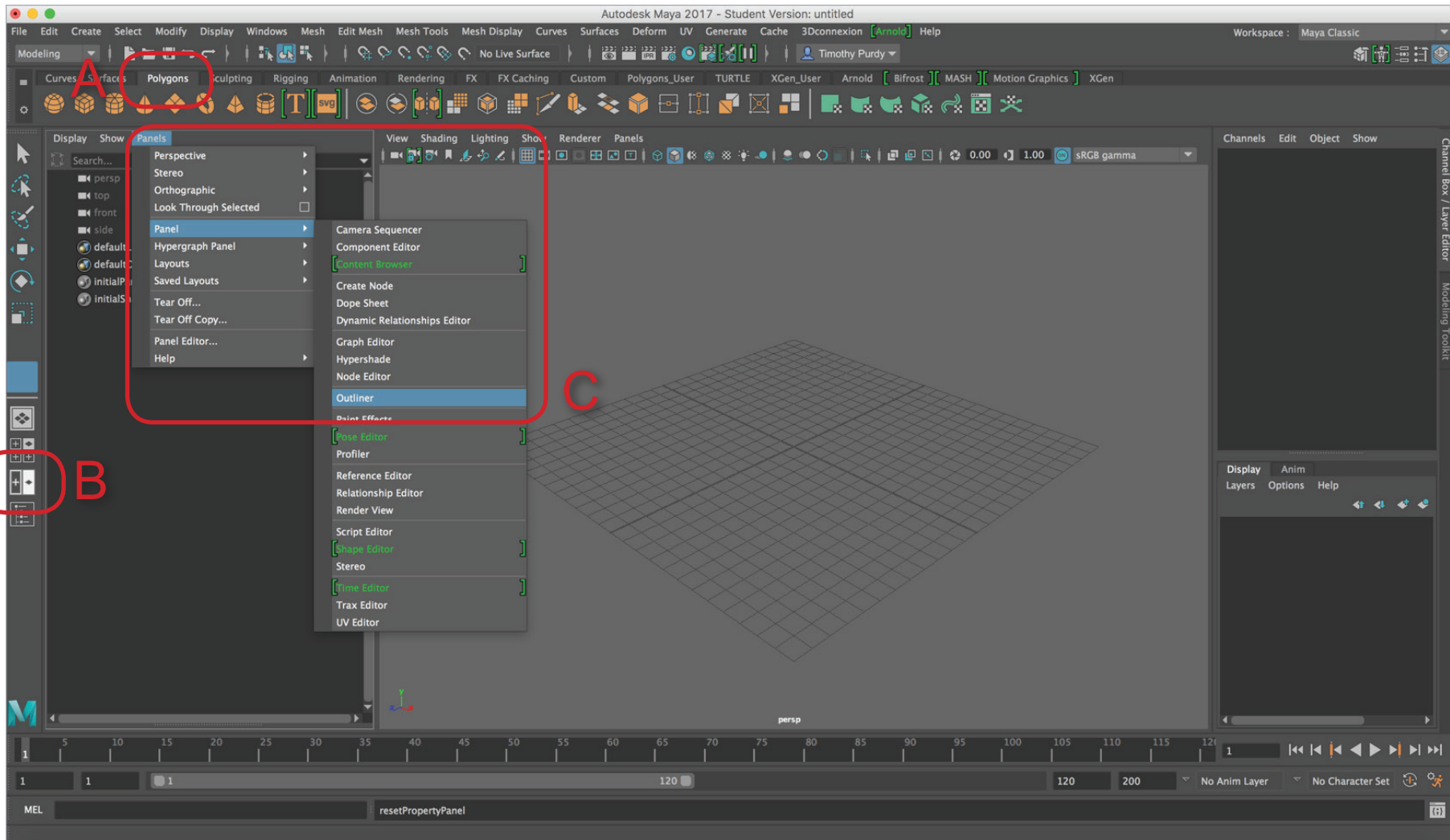# Converting Project Maps to File Textures

Step 8   Continue to work through all the parts until each one has been exported.

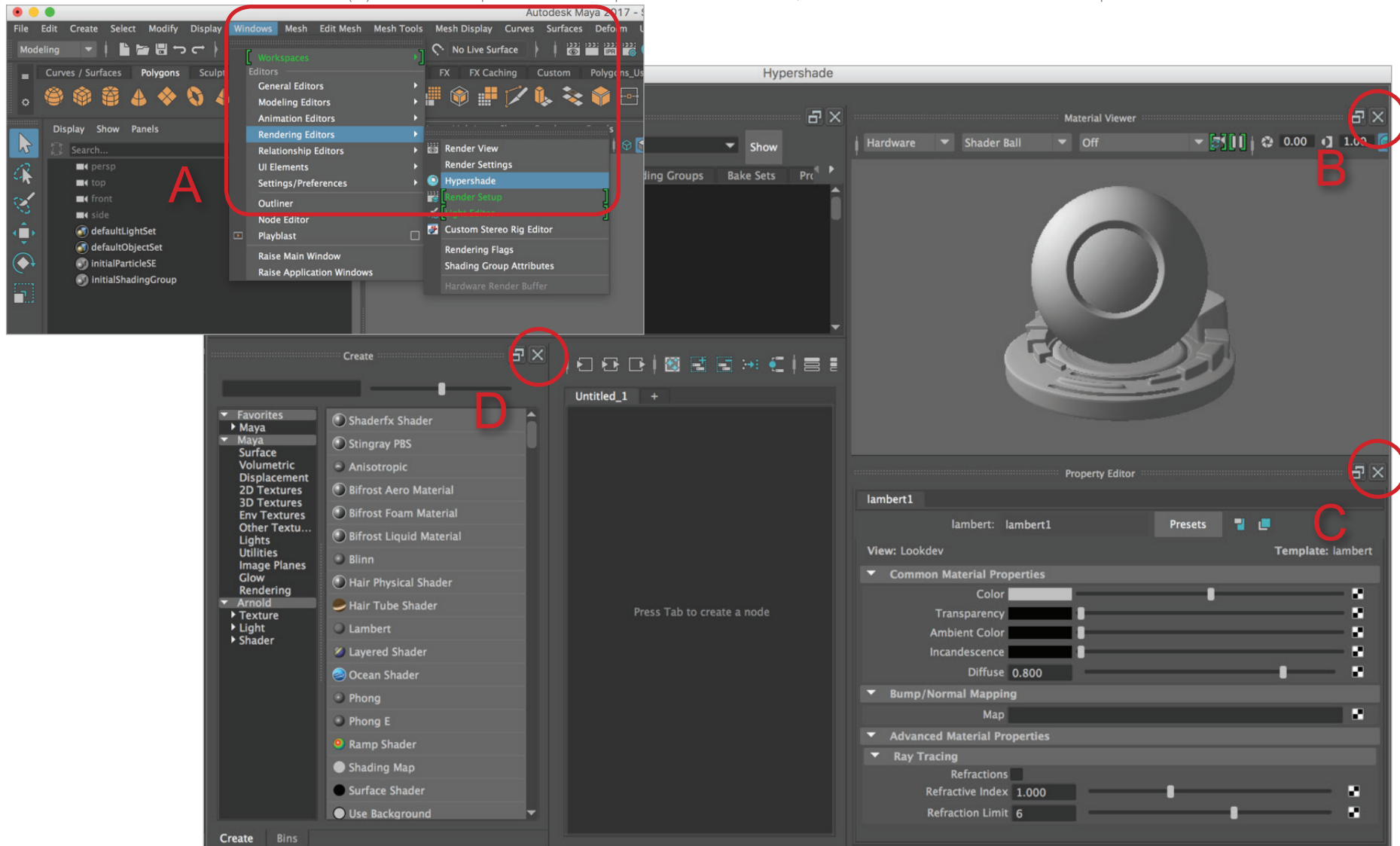# Converting Project Maps to File Textures

Step 9

The Maya interface can be overwhelling with all the menus, tools and panel layouts. The next two steps will tailor the interface for the tutorial. Most screens are shown as how they should look when finished. Select the Ploygons tab (A) to change the shelf. A majority of tools will come from this shelf. Next, change the window layout (B) to side-by-side by clicking on the side bar icon as indicated. The left panel needs to be changed to the Outliner. At the top of the left window (C), select
Panels > Panel > Outliner. Adjust the width of the panel as needed.

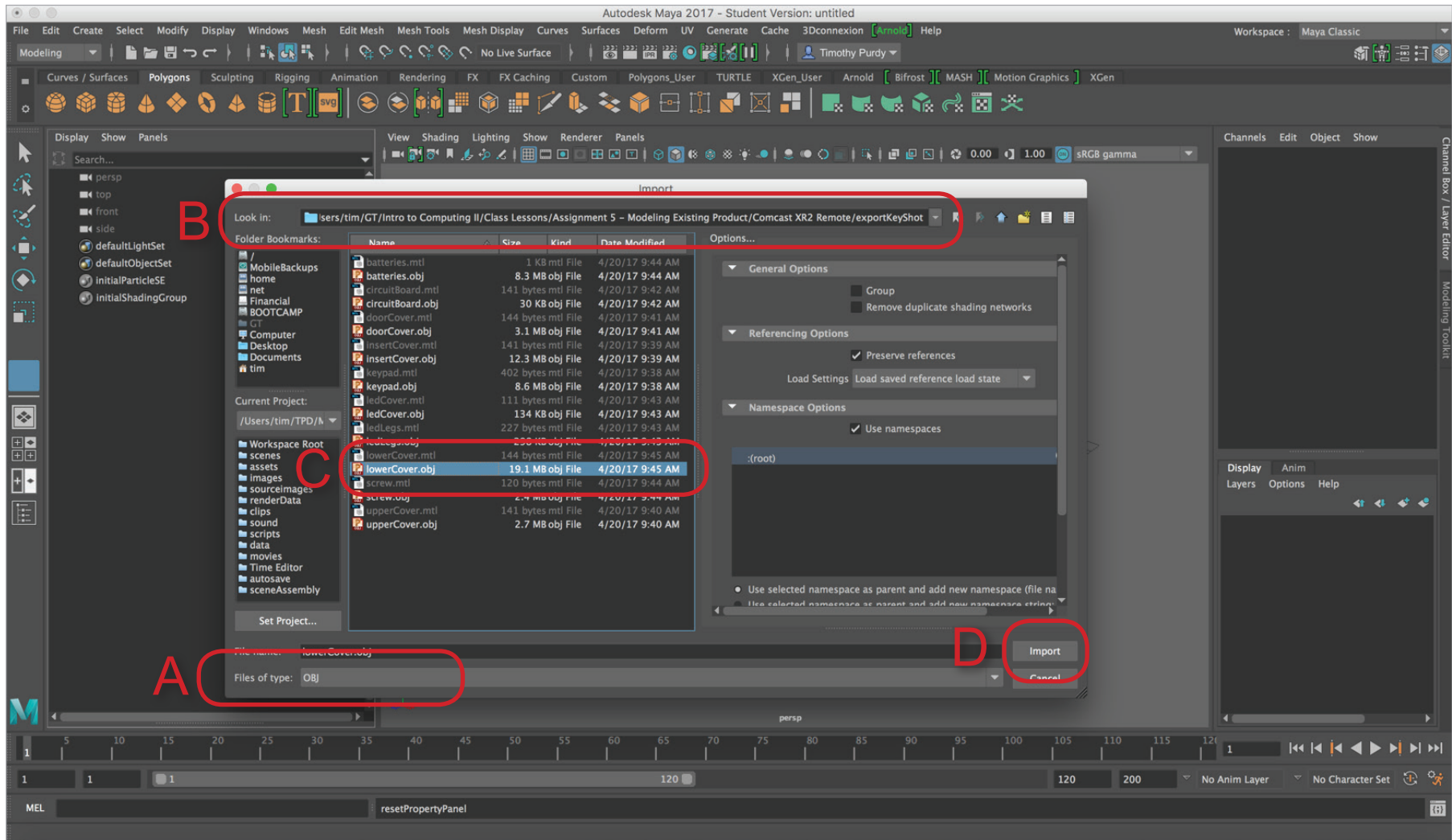# Converting Project Maps to File Textures

Step 10

The next step is to tailor the Hypershade. This window allows you to create and edit materials in Maya. Materials in Maya are called shaders. When they have input/ouput connections, this is a shader network. To open it, go to Windos > Rendering Editors > Hypershade (A). Not all the panel elements are required. Close out the Material Viewer (B), the Property (C) editors and the create Panel (D). If another panel shows up in the Create area, then close it as well. Close the panel. It will be used later.

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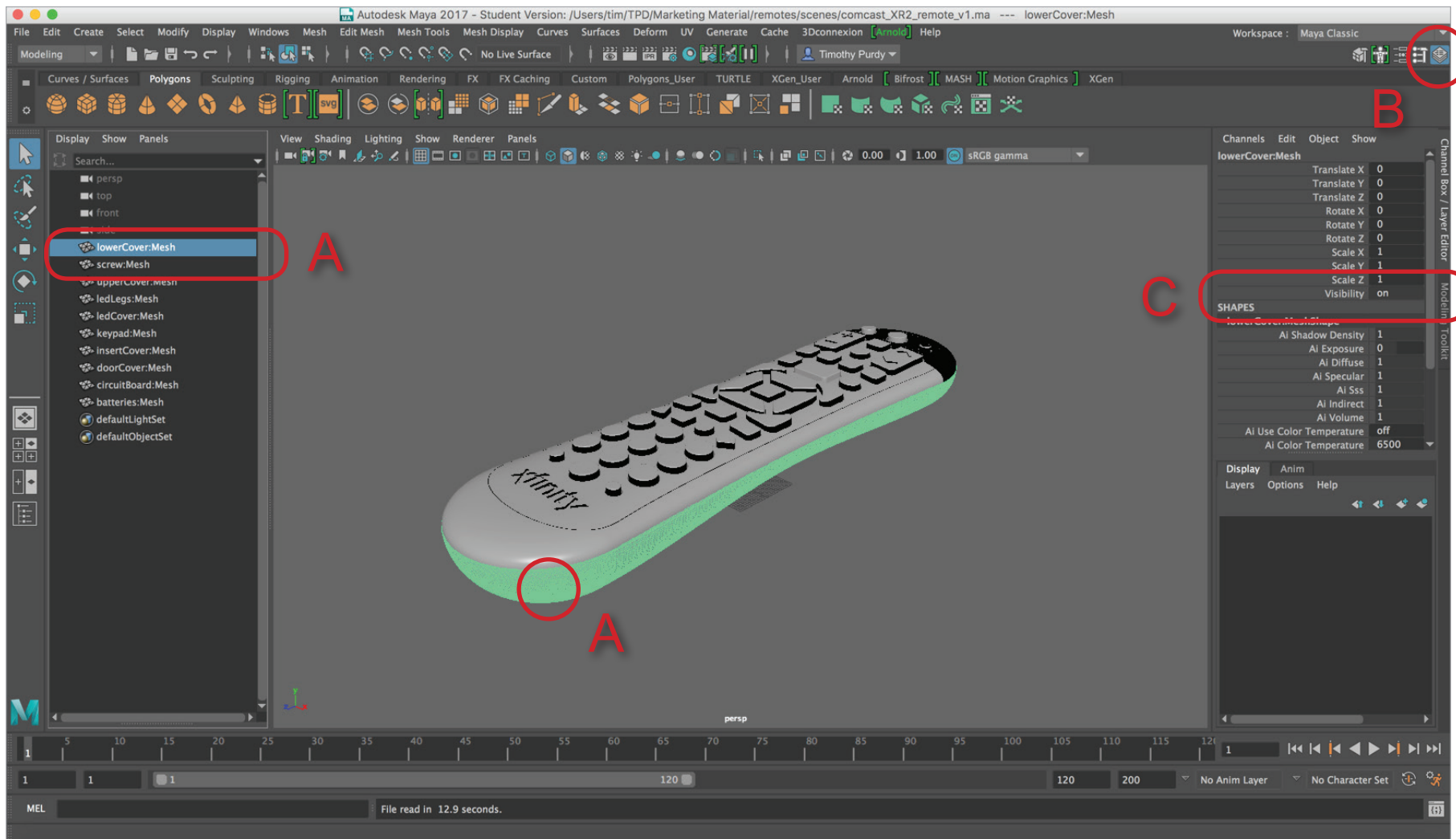# Converting Project Maps to File Textures

Step 11

In this Step, the individual OBJ files will be imported into Maya. Select File > Import. Make sure the File of Type (A) is set to the Obj format. In the "Look in" drop down menu, locate the folder where the obj files were saved (B). Pick the individual file (C) and click Import (D). To view the full object, type the "f" for fit to window. Repeat the process for the remaining obj files.

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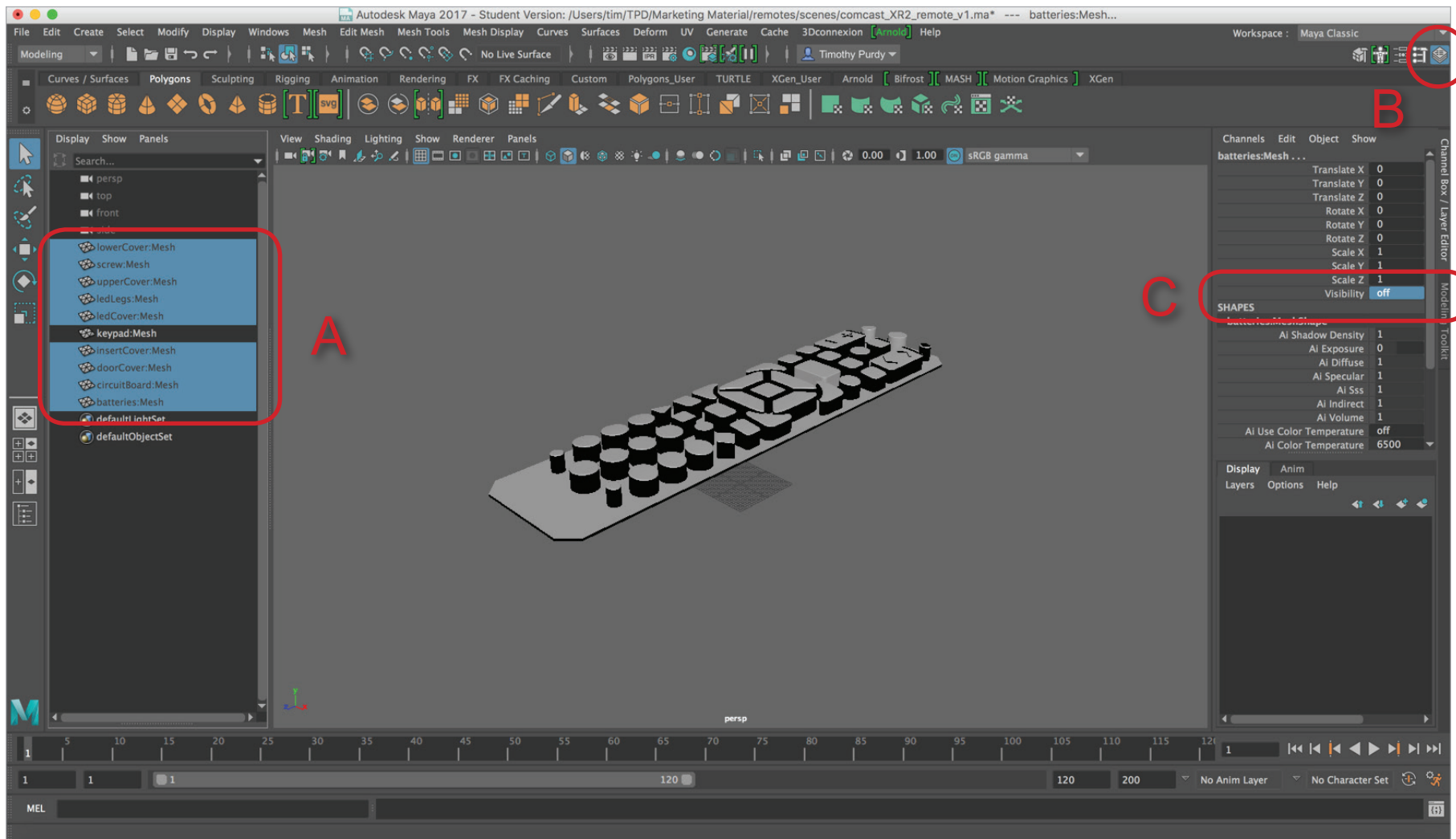# Converting Project Maps to File Textures

Step 12

This view of the Maya interfaces shows that all the obj files have been imported. To select geometry, either use the Outliner in the left panel or click on it in the prespective window (A). Attributes can be changed by using the Channel box. If the Channel box is not visible, click on the far right icon (B). If you wanted to turn off the visibility of an object or multiply objects, highlight the "on" text in the Visibility channel and enter 0 and hit return (C).

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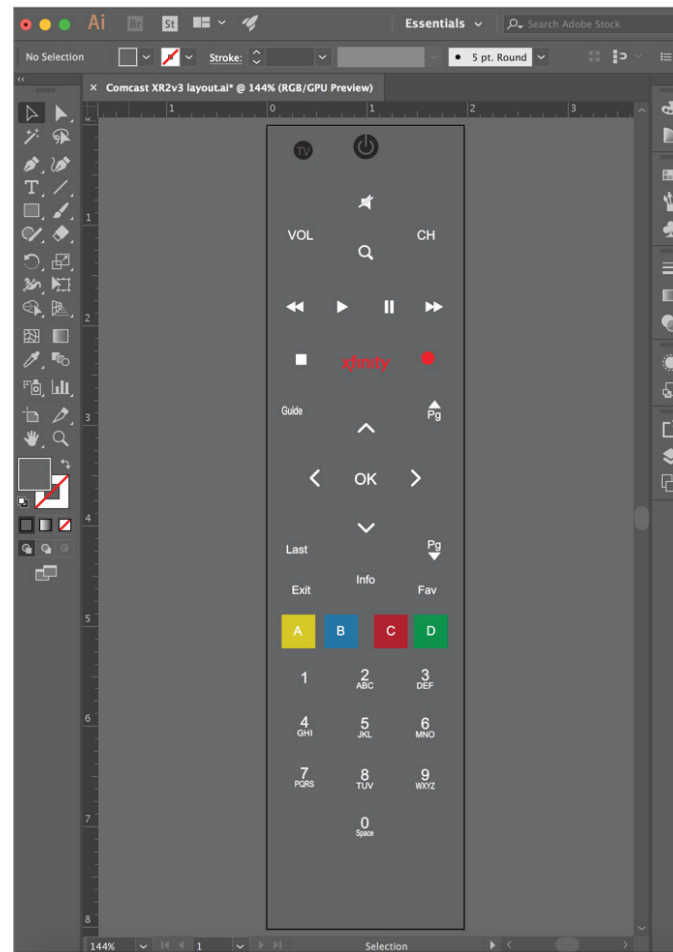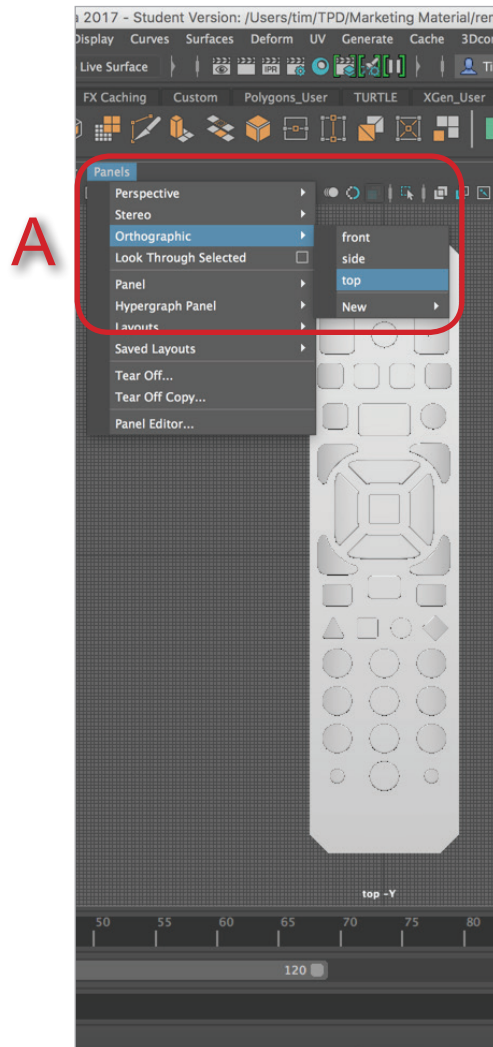# Converting Project Maps to File Textures

Step 12   To focus on texture mapping the keypad, select all the objects in the Outliner except for the keypad (A). Attributes for multiply objects can be changed by using the Channel box. If it is not visible, click on the far right icon (B). Highlight the "on" text in the Visibility channel and enter 0 and hit return (C).

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Step 14

To get a size reference for the keypad graphics, switch to the Top view (A) and make a screen capture. Use this reference image to layout the keypad graphics in the correct location (B). In this example, Illustrator was used to create the keypad graphics. Add in a background box with a color fill that matches the default color for the keypad. Note: The keypad graphics file should match the reference file size (C). Export the graphics out as an png format. Make sure the resolution is high enough. In this example, the vertical direction was exported above 2000 pixels per inch.
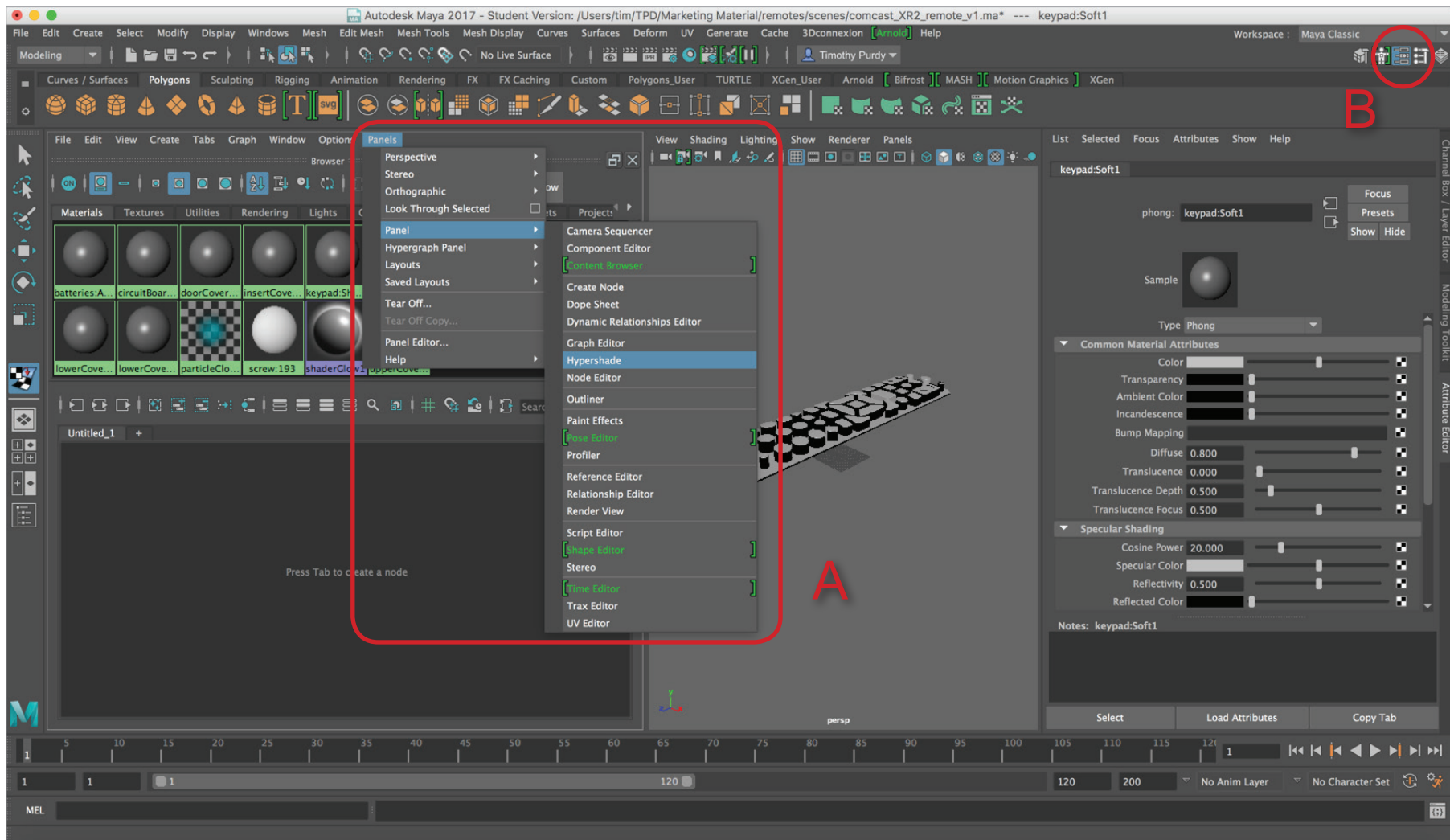

A

B

C

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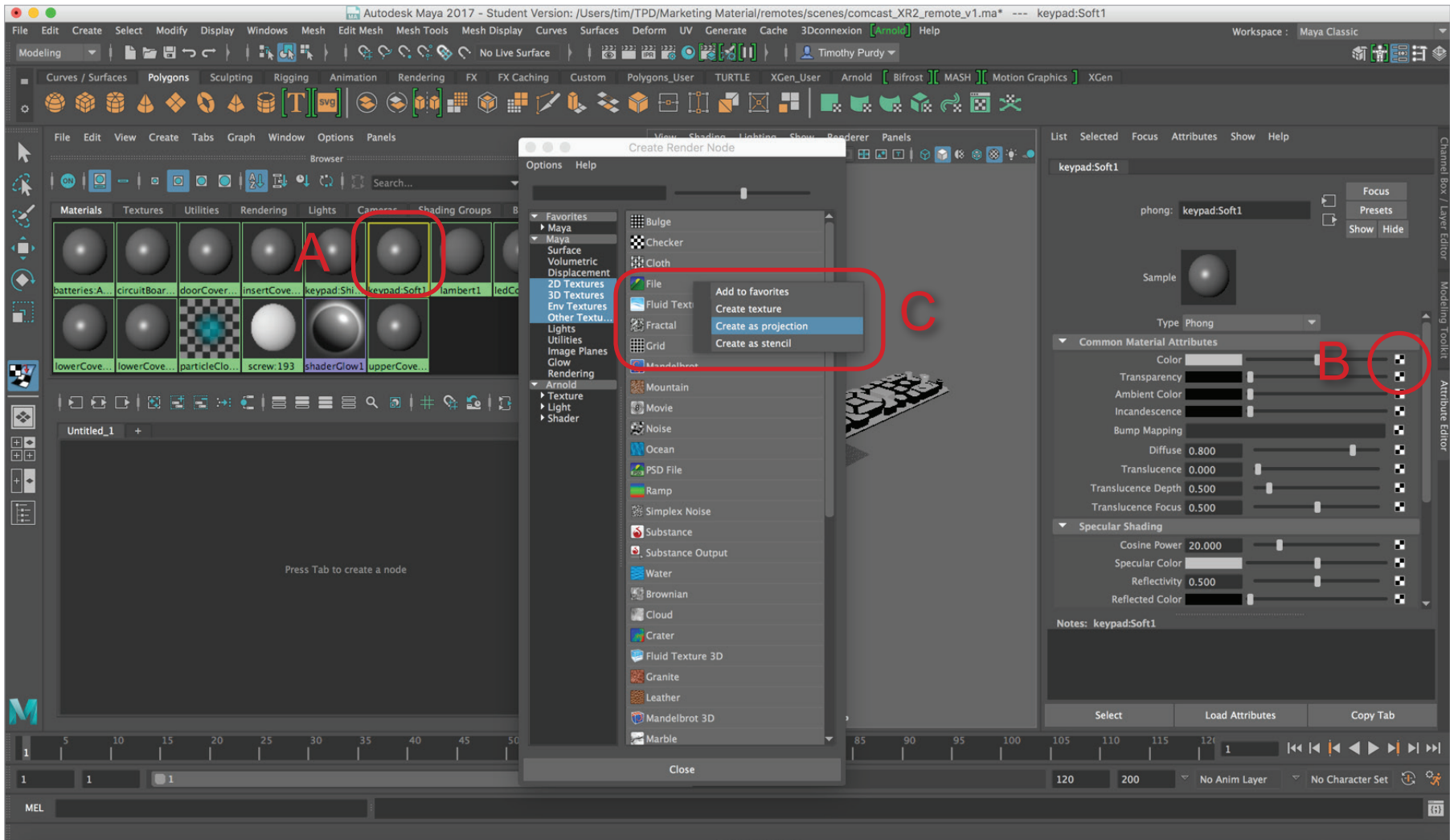
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Step 15   To project the image file onto the graphics, setup the interface with the Hypersade and Attribute editor. in the left panel, go to Panels > Panel > Hypershade(A). The Attribute editor can be open by clicking on the icon in the upper, left corner of the interface (B).

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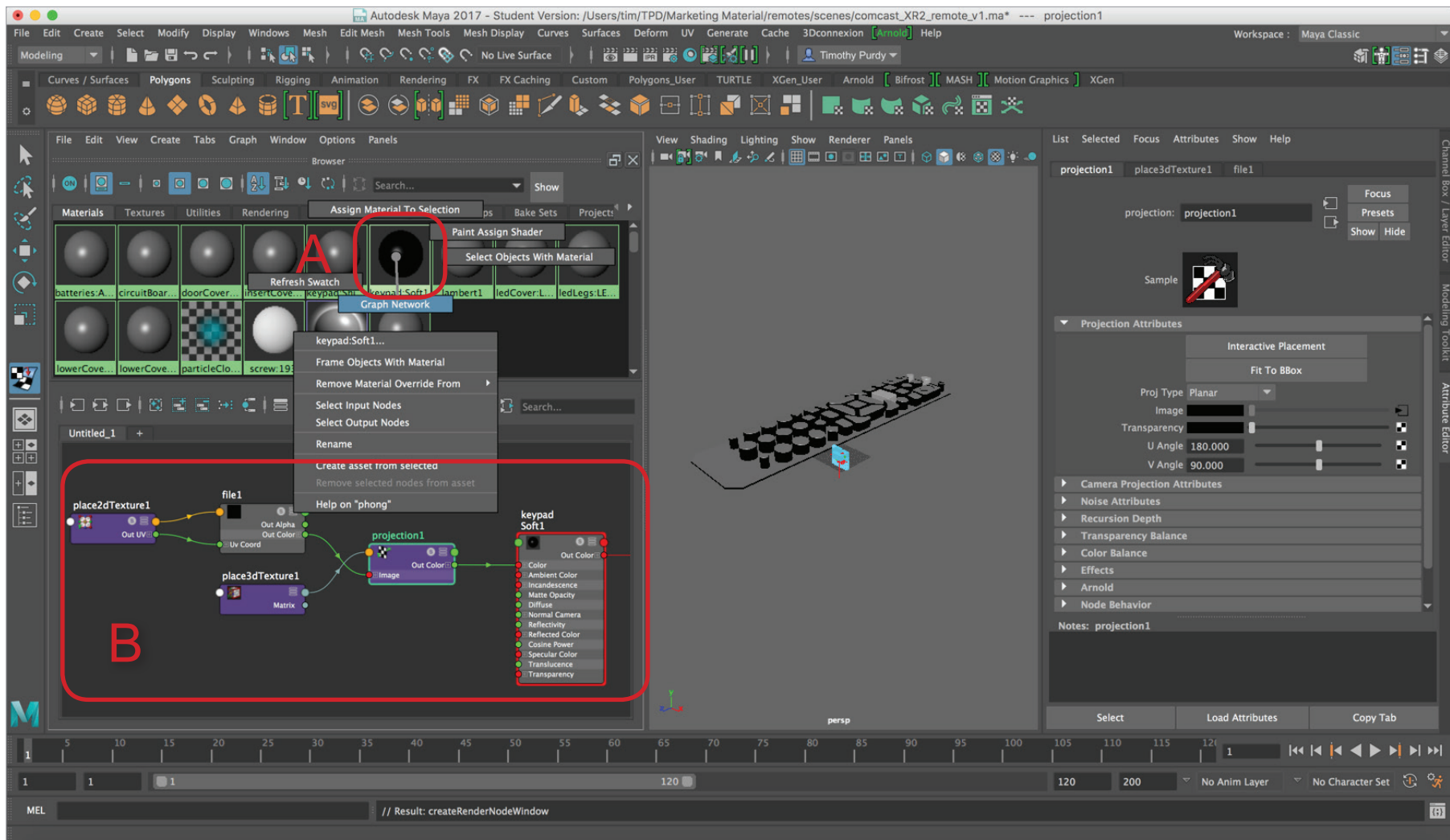# Converting Project Maps to File Textures

Step 16 In this step, a Projection map will be created on the Color channel.   Start by selecting the material already assigned to the key-pad object (A). This will load the selected material into the Attribute editor. Next, click on the checker icon to the right of the Color channel (B). This will open the Create Render Node panel. Right mouse click on the File texture source and choose Create a projection (C).

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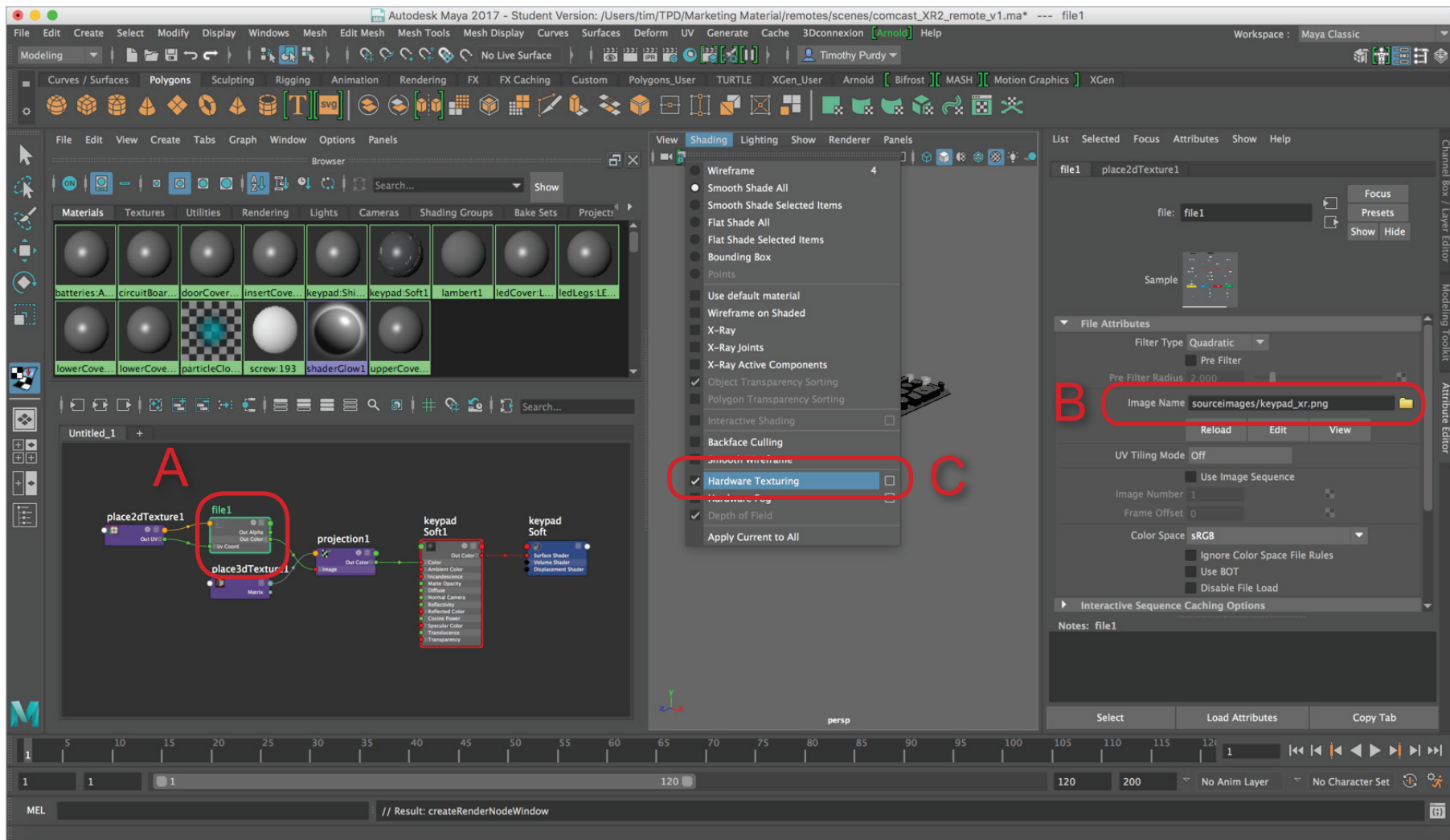# Converting Project Maps to File Textures

Step 17

To review the shading network that was created in the previous step, right-mouse click on the keypad shader ball (A). The shading network should be frame within the editing window below (B). Use the regular window scroll and zoom tools to better zoom in and frame the left side of the shader network.

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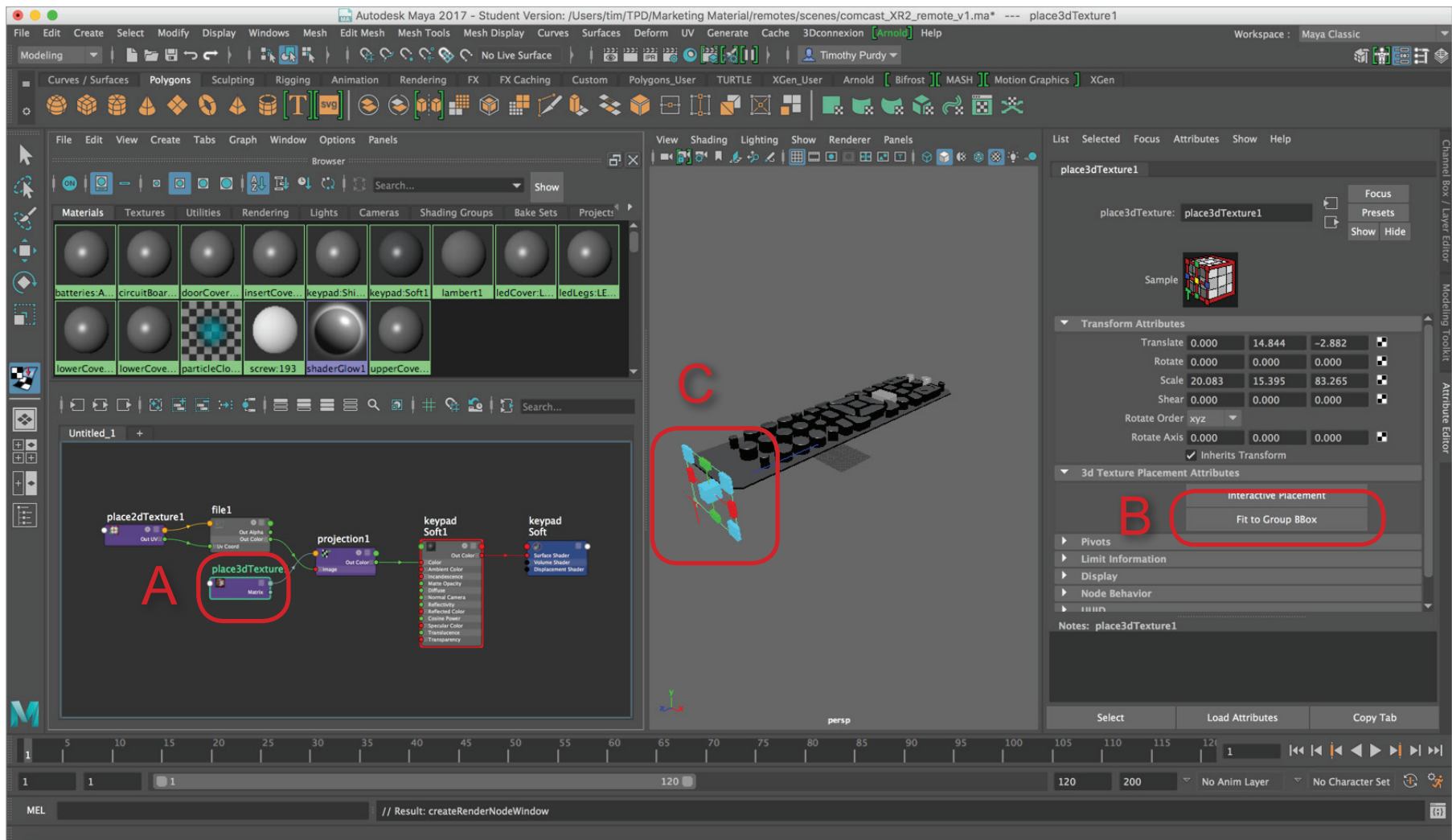# Converting Project Maps to File Textures

Step 18

In this step, the image file will be selected and loaded into the shader network. Click on the "file1" node in the editing window (A). Click on the folder icon as indicated and navigate to the sourceimages folder (B). Textures, labels, decals should be placed into the sourceimage folder that is part of the project folders setup at the begining. Turn on the Hardware Texturing for the prespective. In the prespective window, select Shading > Hardware Texture (C). Some of the texture should be visible on the keypad.

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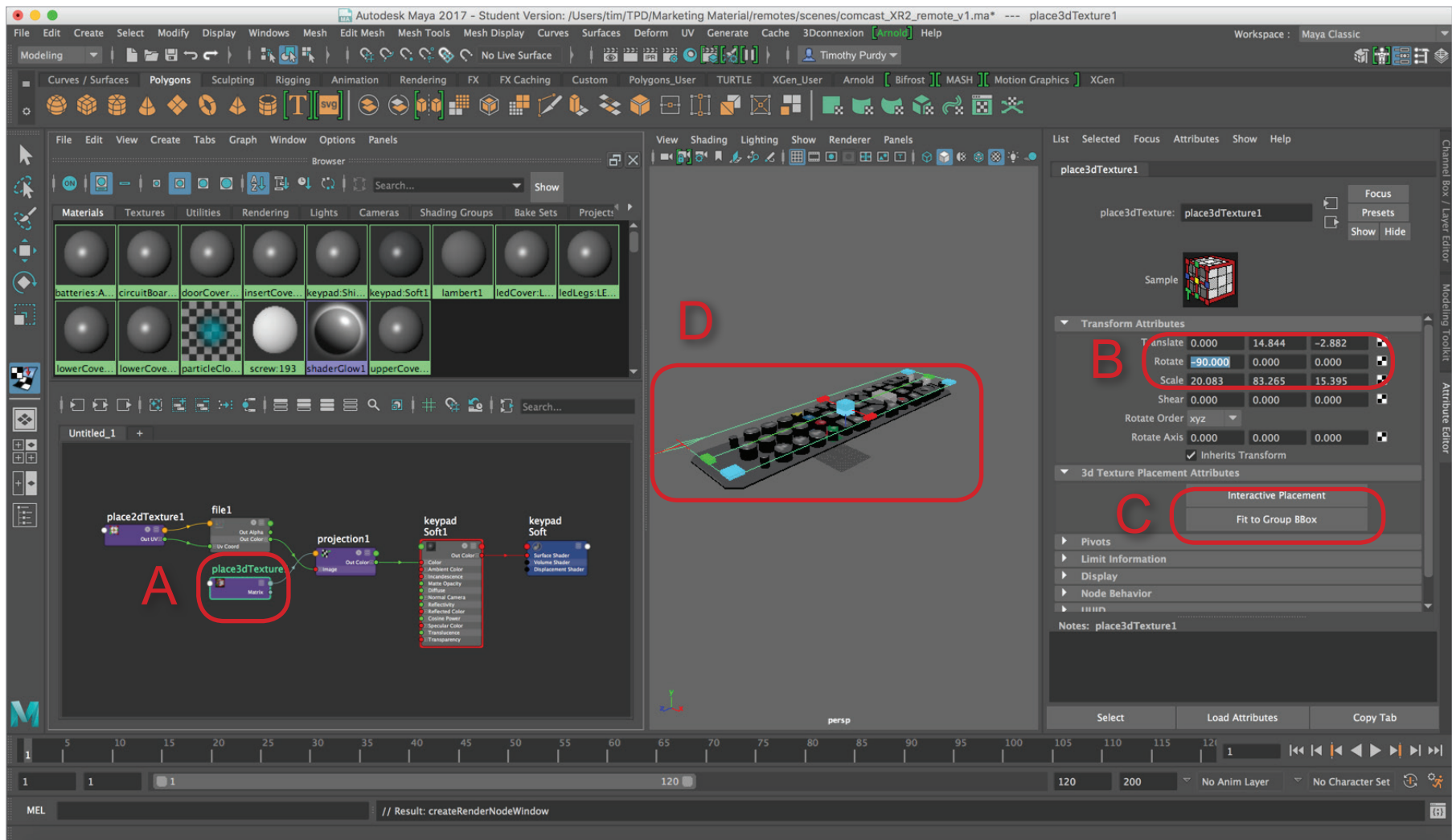# Converting Project Maps to File Textures

Step 19   In this step, the Projection map will be adjusted to fit the 3D form.   Click on the "place3DTexture1" node int the editing window (A). This will load the selected node into the Attribute editor. Next, select the "Fit to Group BBox" button (B). The projection icon will reshape to fit the bounding box of the 3D form (C). In this example, the projection icon is not oriented correctly. It needs to be rotated and then resized again. The next step will show you haw to do this.

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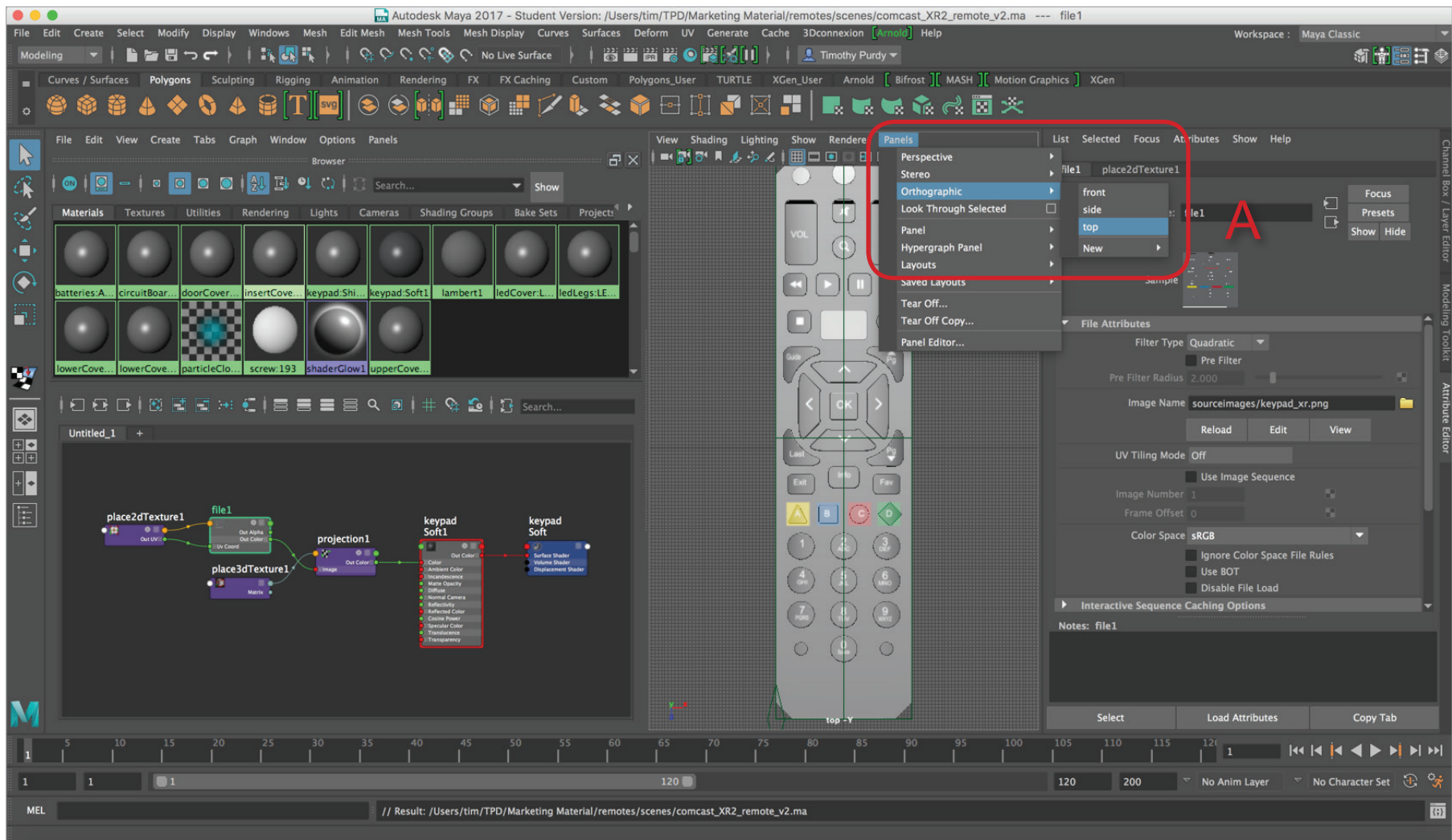# Converting Project Maps to File Textures

Step 20 With the "place3DTexture1" node selected (A), type in "-90" degrees in the first column of the Rotate parameter in the Attribute editor (B). This will orient the projection icon correctly for this example. Next, select the "Fit to Group BBox" button again (C). The projection icon will reshape to fit the bounding box of the 3D form (D).

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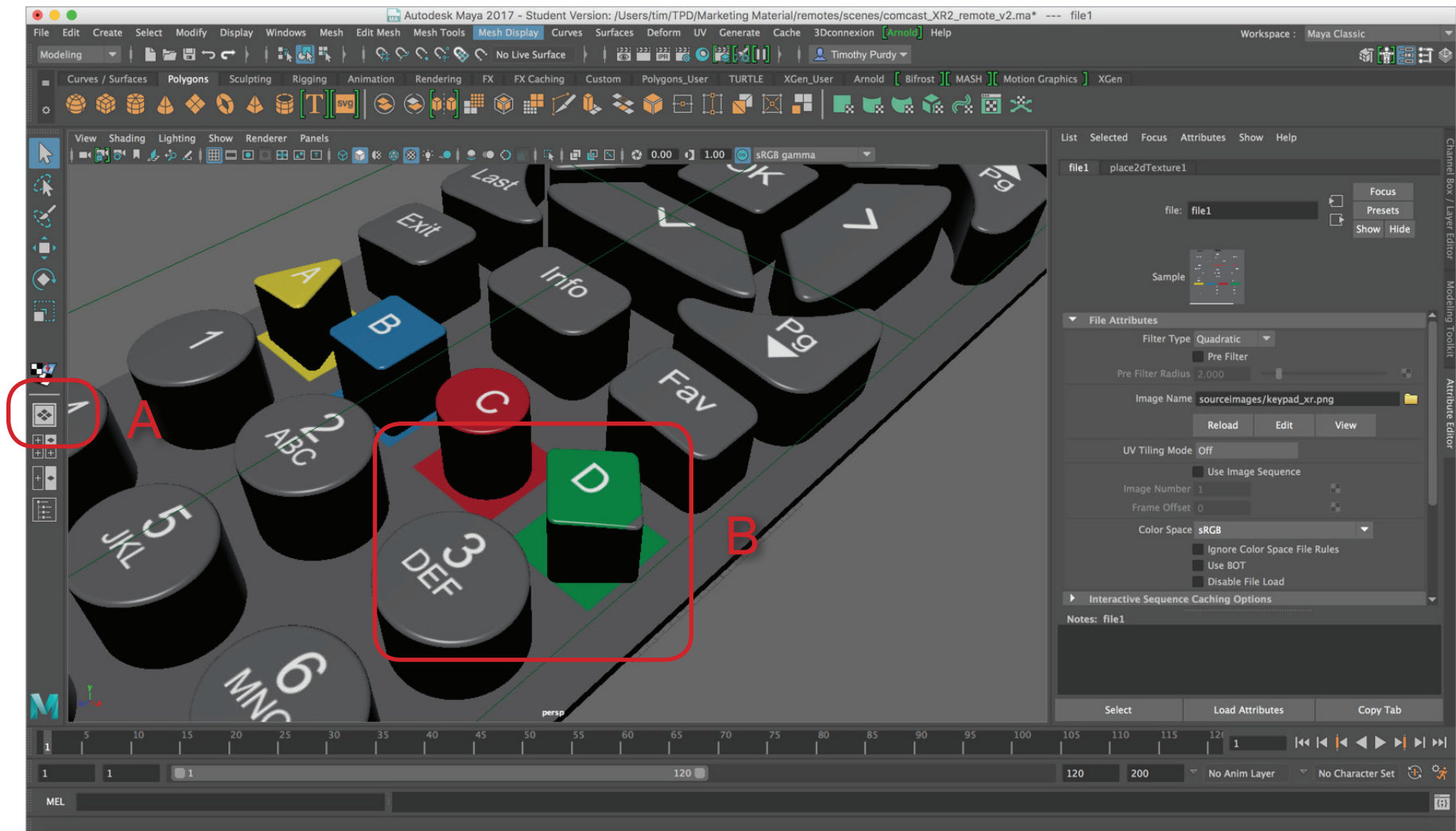# Converting Project Maps to File Textures

Step 21   Even if you used the reference image to size and place the graphics, usually tweeks of some type (overall and/or local translation or scaling) maybe required. Switch to the top orthographic view, Panels > Orthographic > top (A), to see how the graphics map onto the buttons.

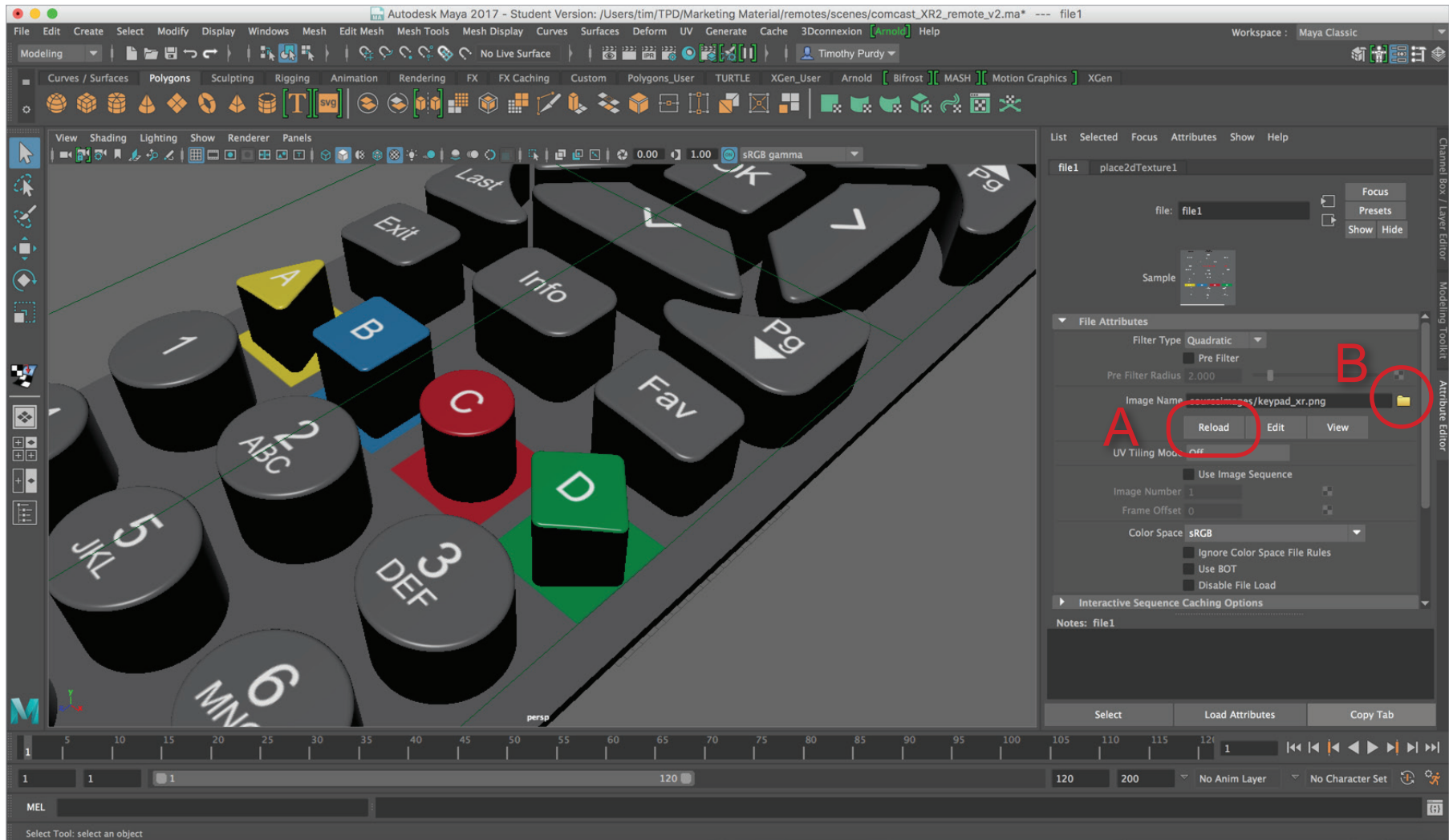# Converting Project Maps to File Textures

Step 22   In this view, the prespective window has been returned to the middle window and Hypershade has been closed. A quick short-cut is the single icon on the far left of the interface (A). Notice the graphics do not look centered on the buttons and the green background does not cover the button properly (B).

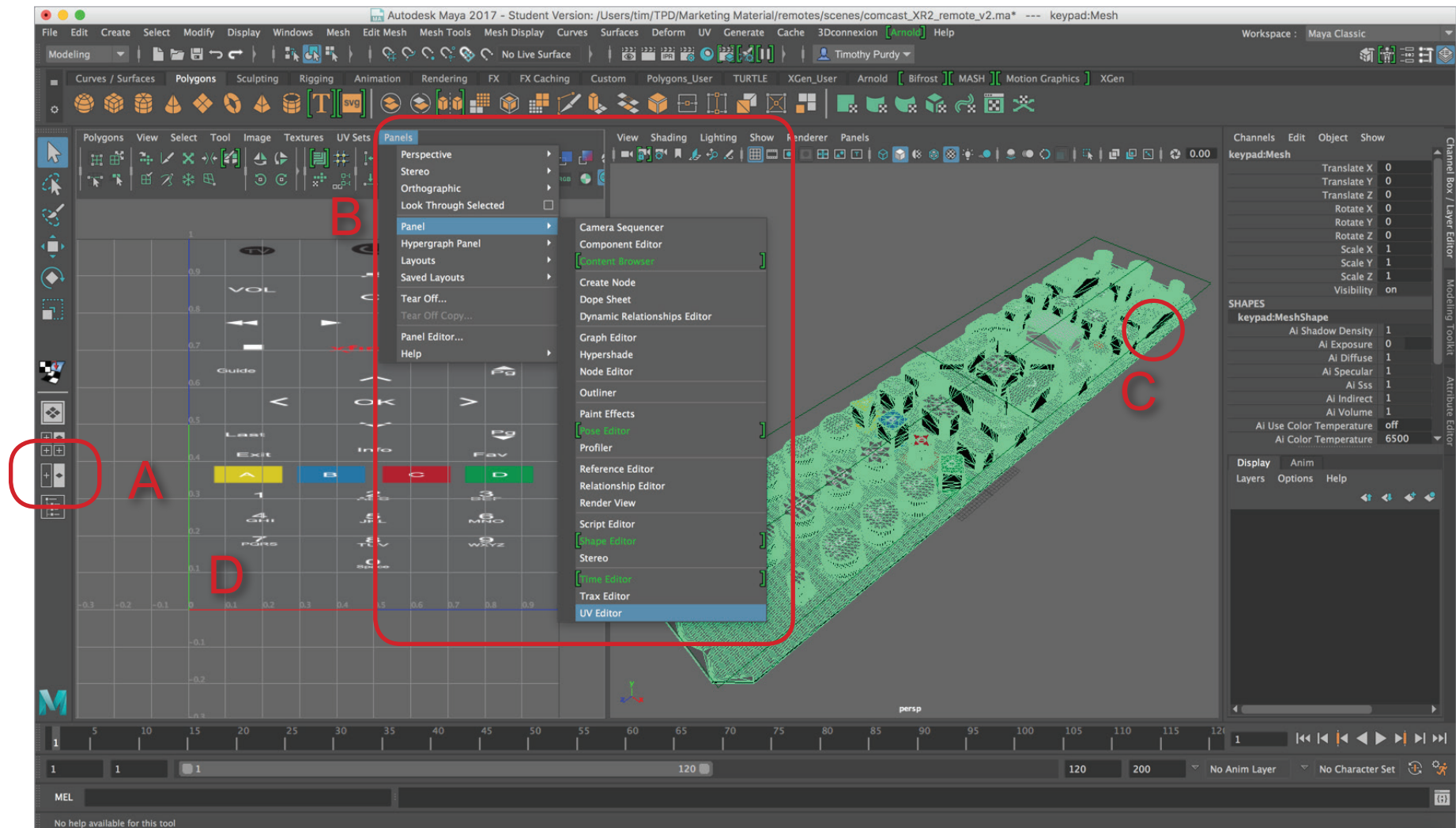# Converting Project Maps to File Textures

Step 23   To make corrections, the texture map image was tweeked. After the texture map was saved out, either use the Reload button (A) or select the folder icon (B) and select the texture map in the sourceimage folder. Notice that the graphics has been fixed.

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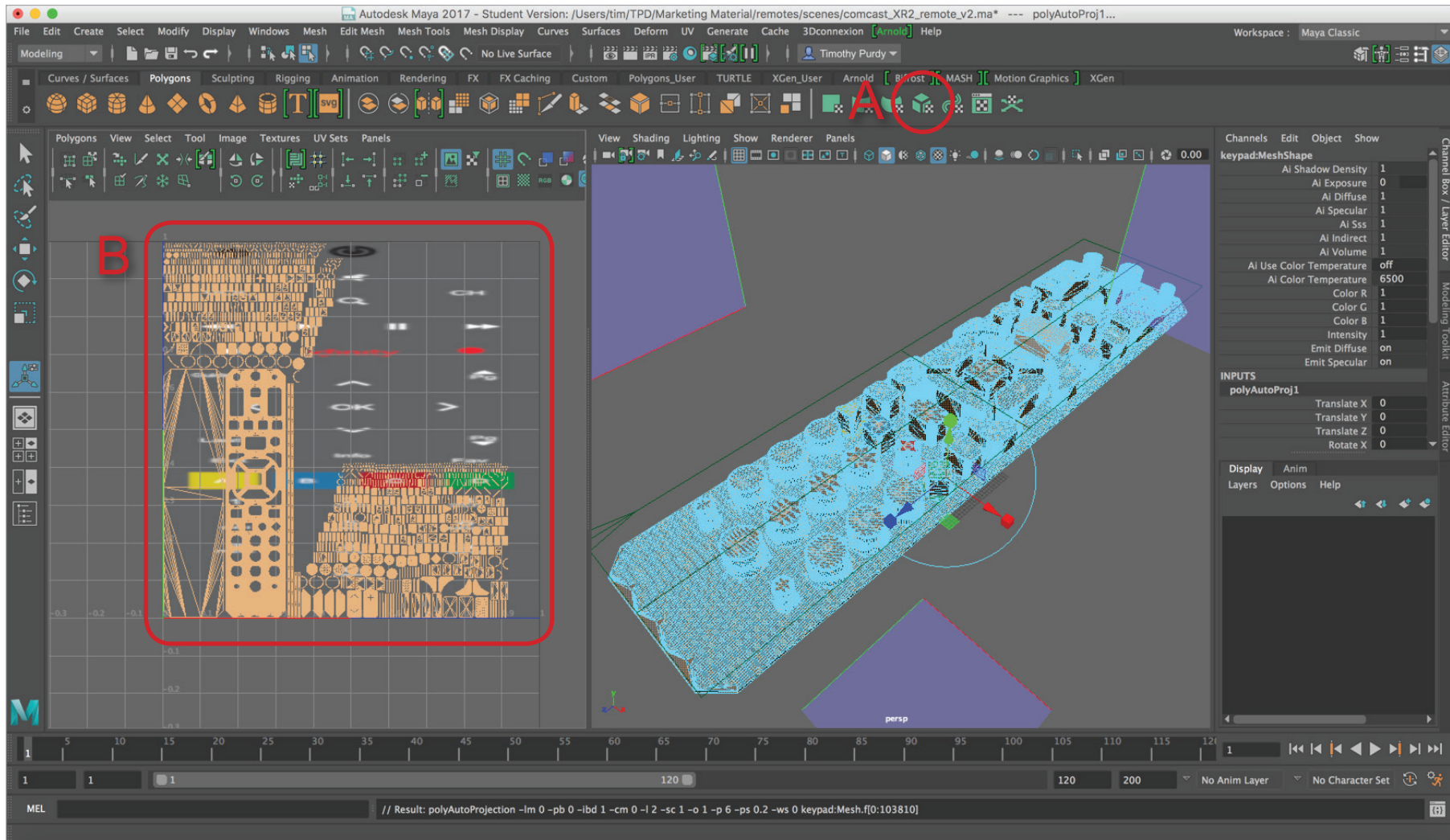
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Step 24 Once the texture map is corrected, the next step is to convert it from a projection map to a file map on the individual plygons. Start by switching back to the two panel view (A). Change the left panel to the UV Editor (B). Select the keypad object in the prespective window (C). At this point, only the current texture image appears in the upper right corner of the UV editor graph (D).

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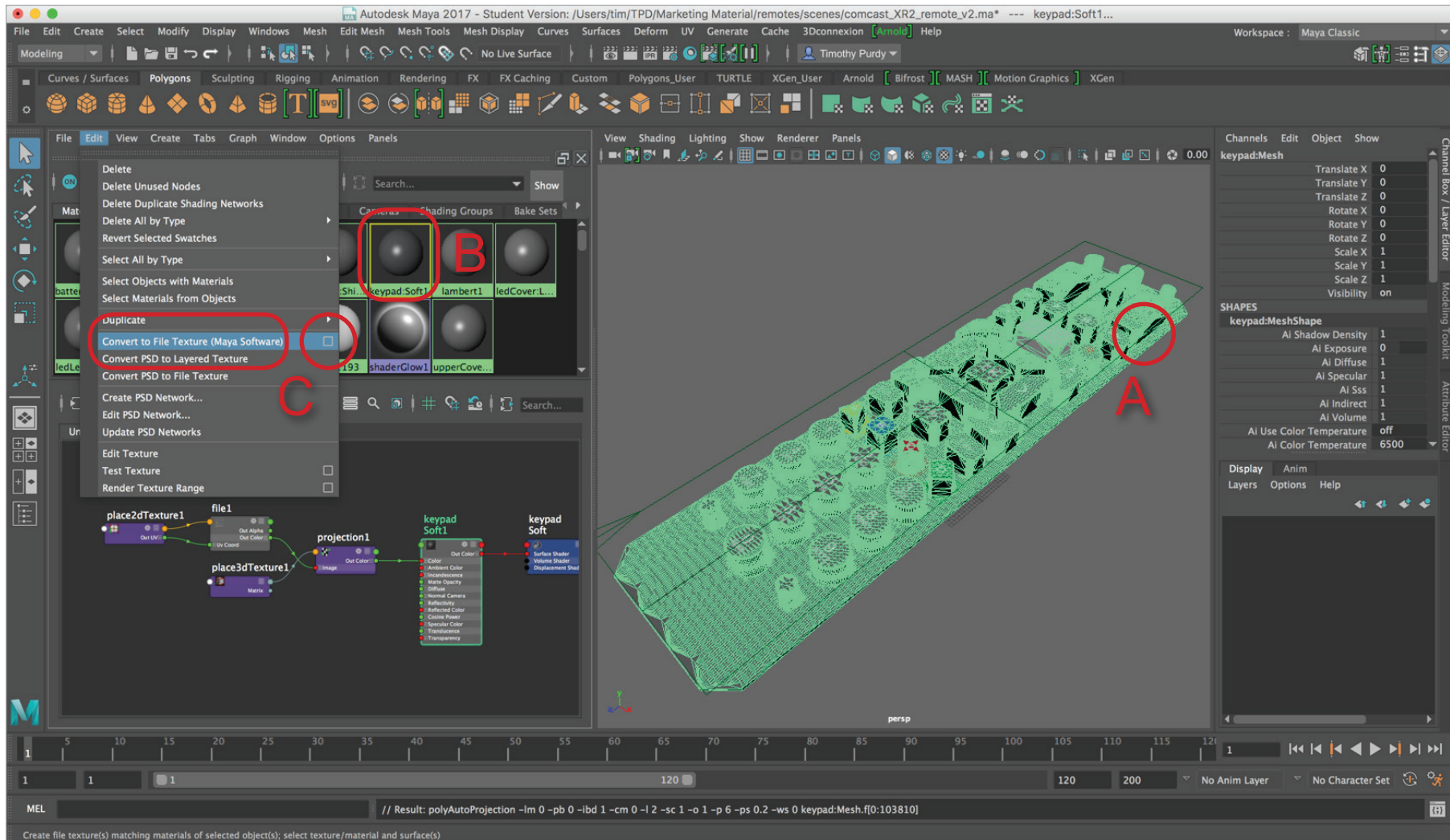# Converting Project Maps to File Textures

Step 25 Create an texture mapping for the ploygon set. On the Polygons shelf, select the Automatic Mapping icon (A). Make sure the keypad object is selected prior to selecting the icon. You should now see the ploygon sets laid out in the upper, right corner of the UV editor graph (B).

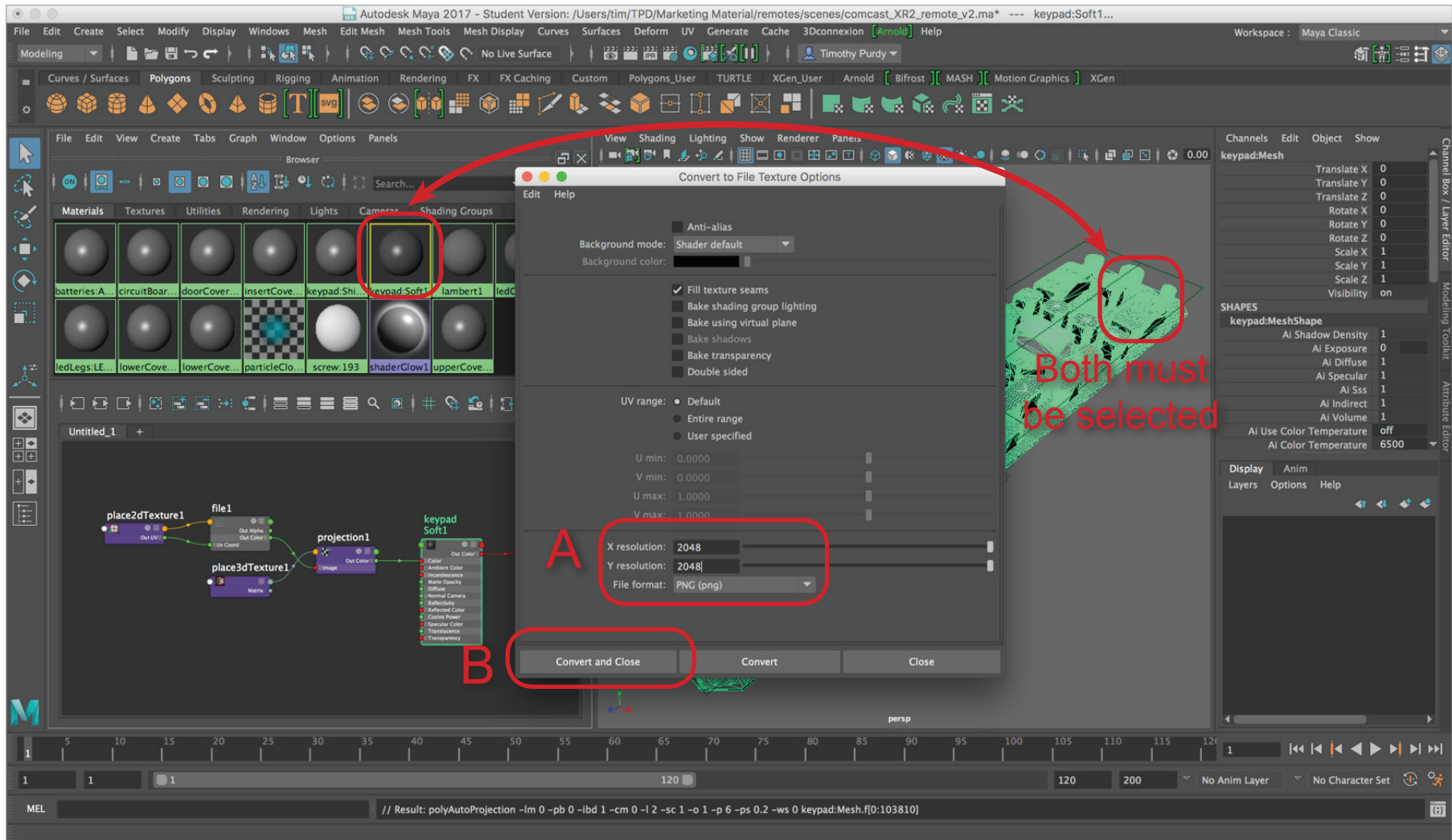# Converting Project Maps to File Textures

Step 26

Now it is time to convert the projection map to file texture. Switch back to the Hypershade in the left panel (Panels > Panel > Hypershade). Unselect the gemoetry by clicking on an exmpty area inthe garden and then repick it (A). Make sure it highlights in green. If not, face selection maybe still active. Right-mouse click on the geometry and select Object from the upper right corner of the marking menu. Next, shift select the icon for the shader that is assigned to the keypad. From the left panel menus, choose Edit > Convert to File Texture option box (C). Make sure to click on the square box at the end of the menu to open the option box for this tool.

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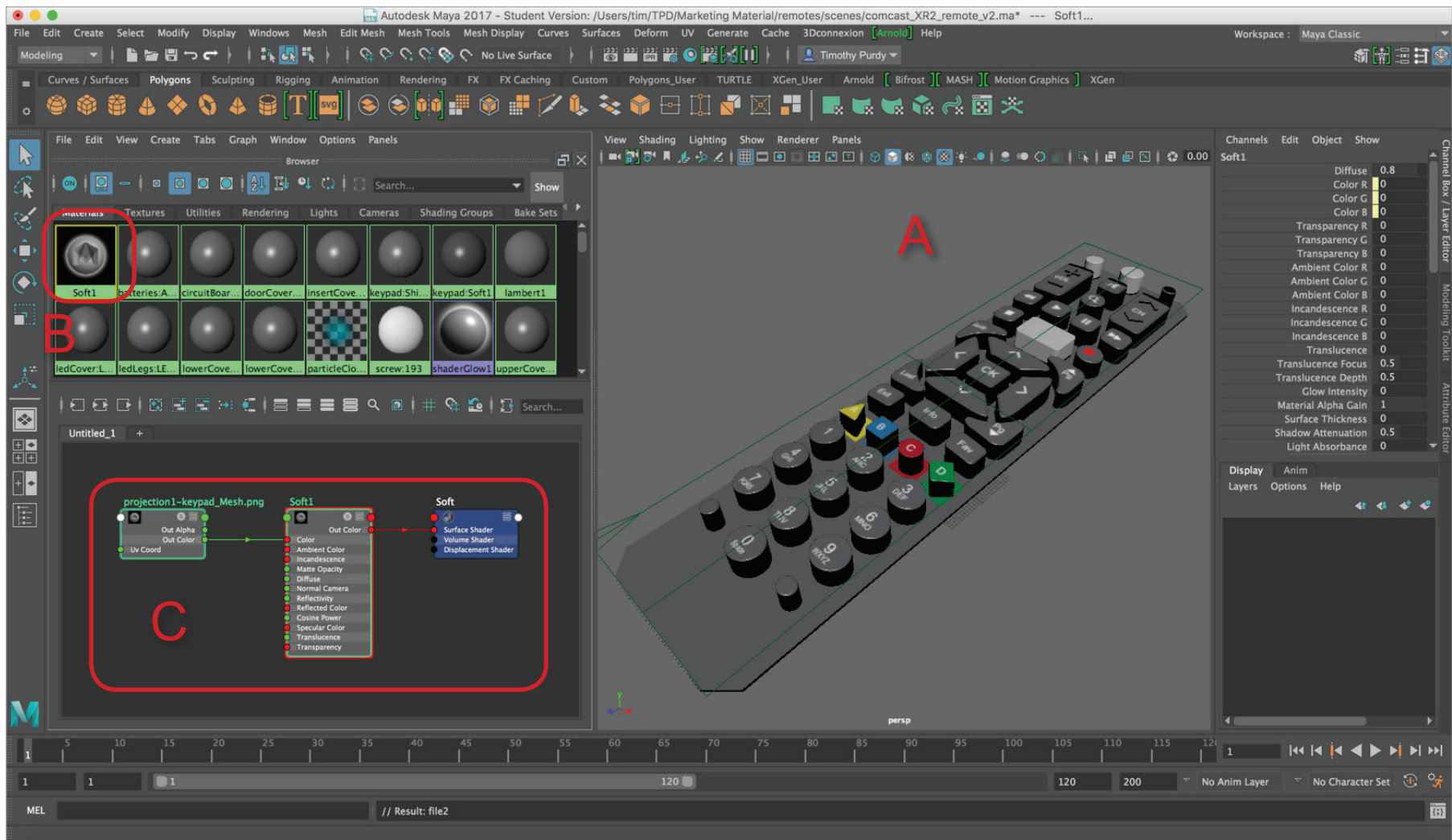
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Step 27

In the Convert to File Texture Options box, scoll down to the X & Y Resolution (A). This controls how large of a file that is created during this process. Start off by making a large file (2048 x 2048 pixels). The file resolution can easily be reduced using Photoshop or similar program if it is too large for interactive or VR/AR projects. Select also the PNG for the File Format. Select Convert and Close (B). The program make take several seconds to complete the process.

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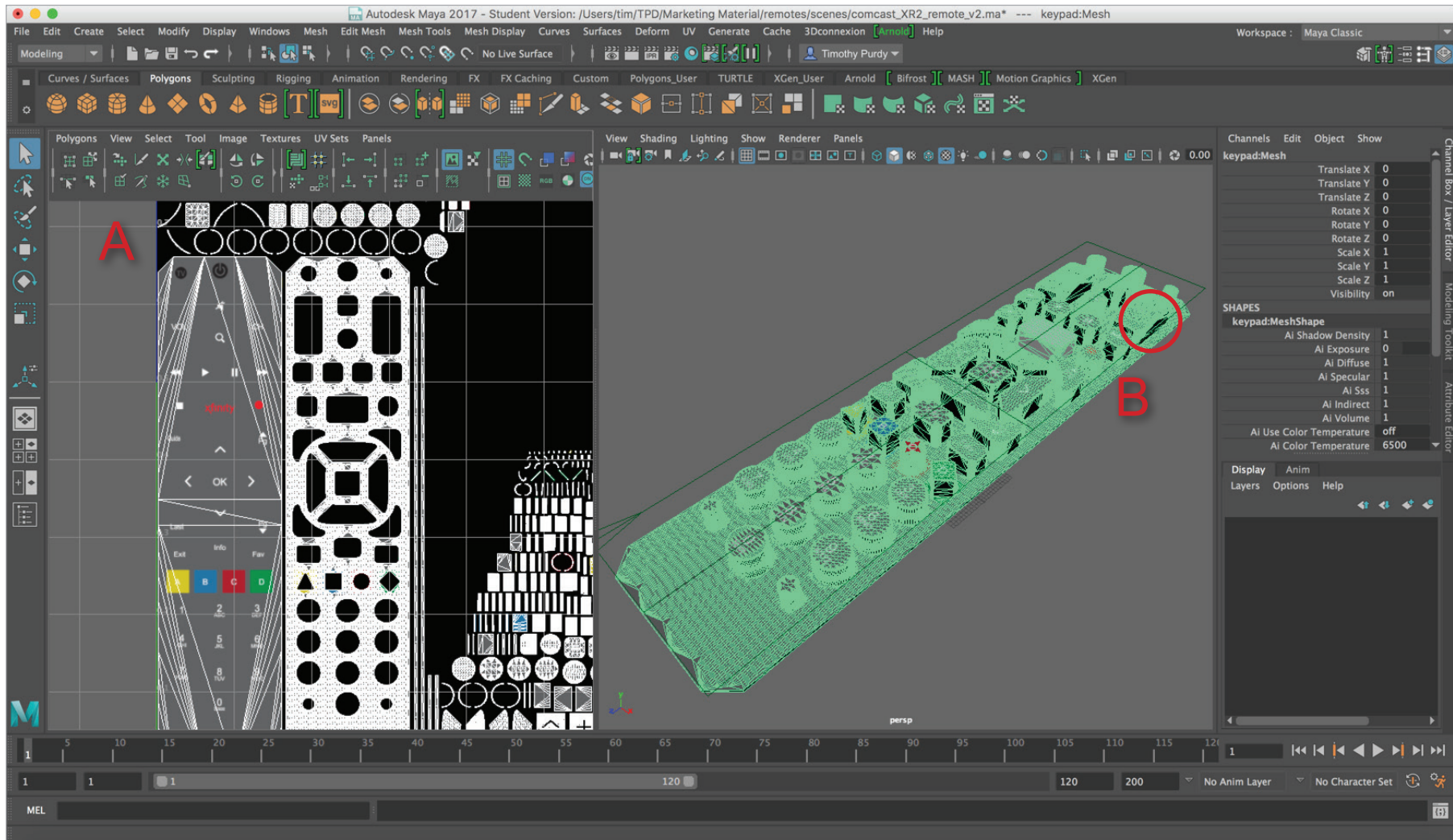# Converting Project Maps to File Textures

Step 28   Visiually, the prespective window shoud look the same (A). There will be a new shader icon in the upper sections of the Hyper-shade (B). Right-mouse click on it and choose Graph Network. Notice that a simple network has been create (C).

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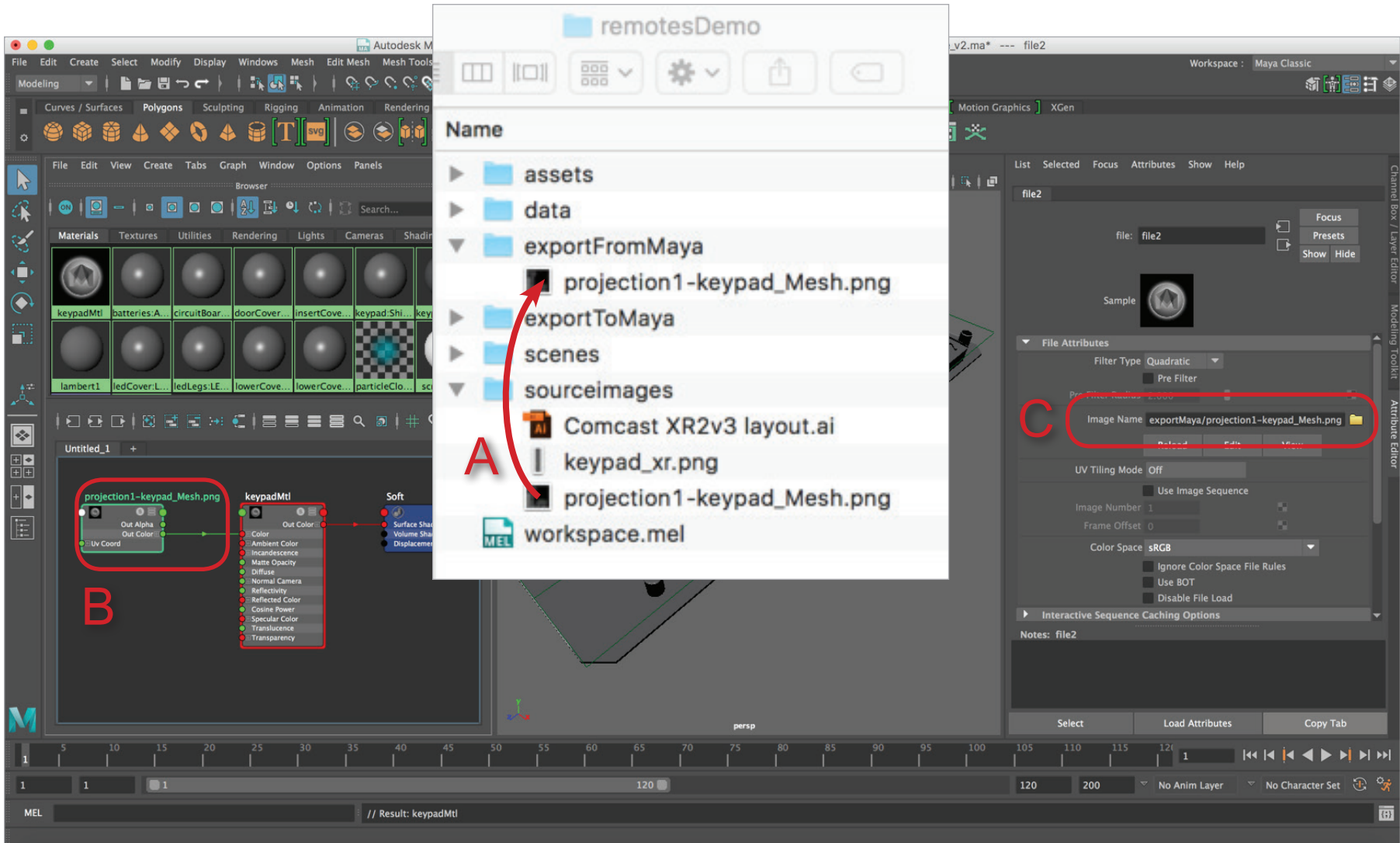# Converting Project Maps to File Textures

Step 29   Switch the left panel back to the UV Editor (Panels > Panel > UV Editor) (A). Select the keypad object in the prespective window (B). Notice how the ploygon sets have now been mapped to an image that has been pieced together.

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Step 30

Before exporting the geometry, the texture image created in Step 27 needs to moved and reassigned. In the project folder created at the first step, copy the image, "projection1-keypad_Mesh.png", into the exportFrom Maya folder (A). Next, select the file texture in the Hypershade editor (B) and then click on the folder and select the copy in the exportFromMaya folder (C).

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Step 31 Make the geometry that was hidden earlier visible again. Switch the left panel back to the Outliner and select the invisible geometry (A). Type in "1" in the Visibility channel to make all them visible at once (B.

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Step 32 Select all the geometry objects in the Outliner (A) and go to File > Export Selection ... (B).

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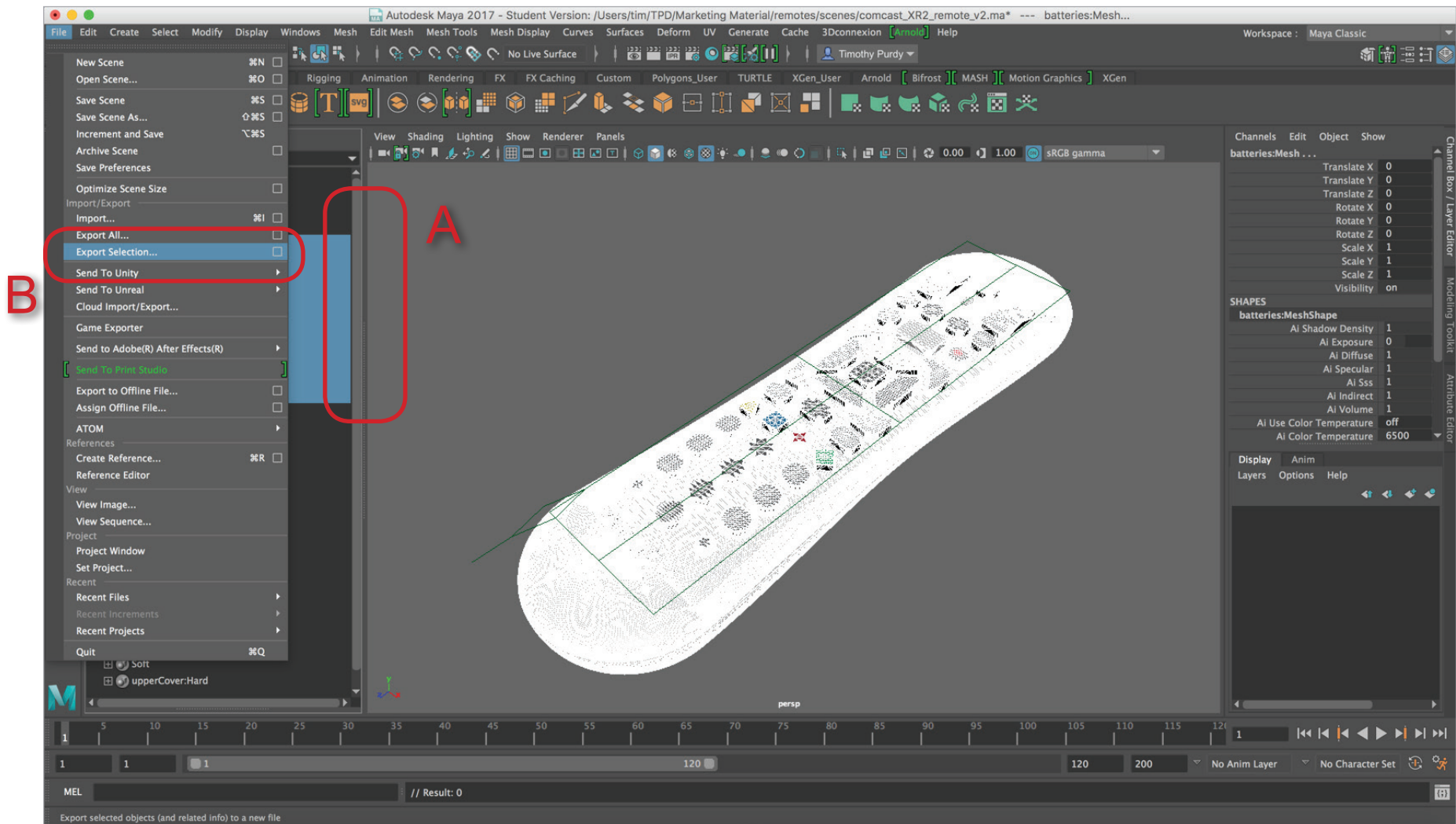
Converting Project Maps to File Textures

Step 33   Set the "Look In" folder to the exportFromMaya folder (A), name the file and then change the "Files of type" to Objexport (B). Make sure all the options are turn on (C) and select Export Selection button.

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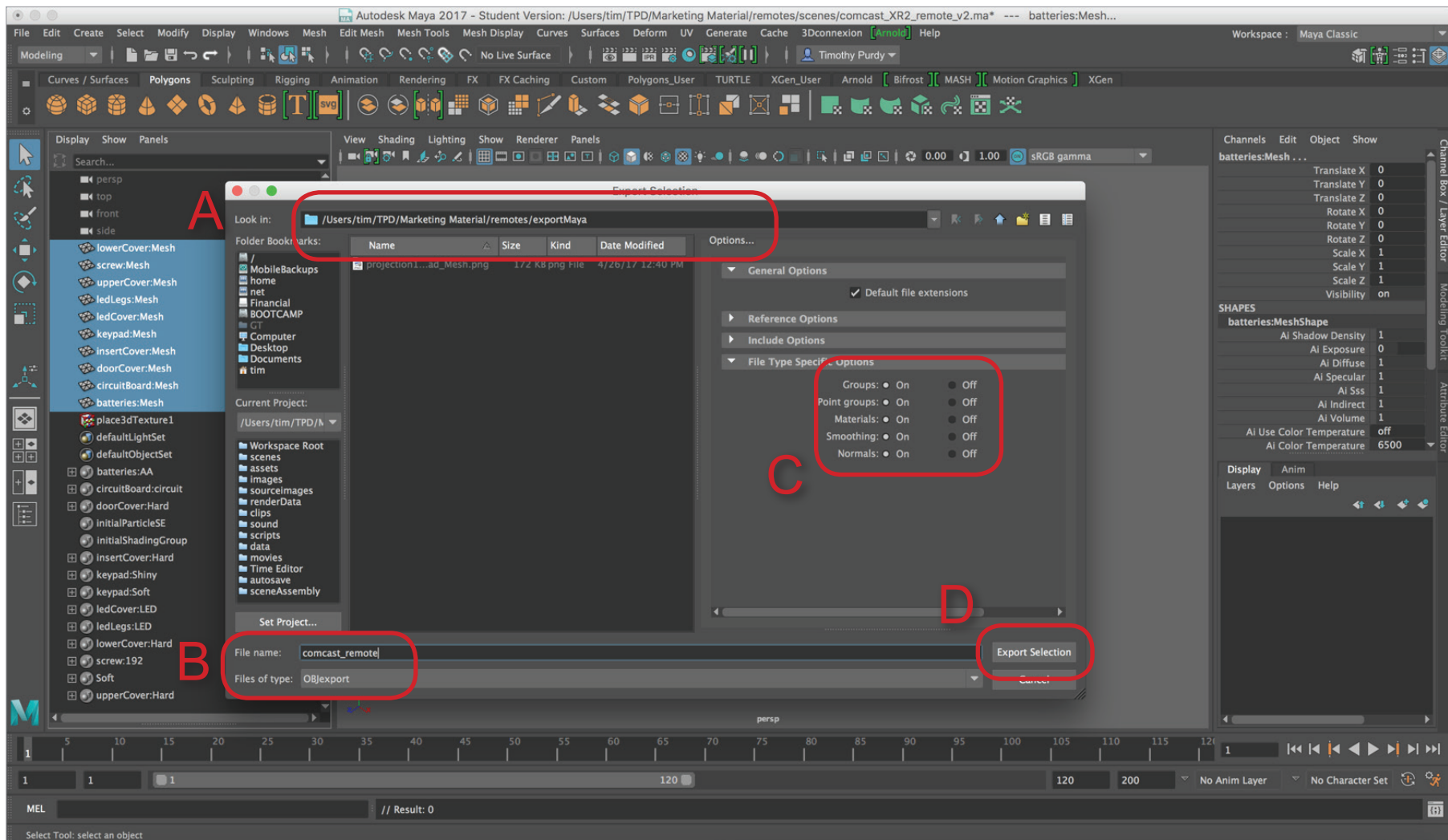
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Step 34 The final steps involves making a compressed file (.ZIP) from the exported files. This is the file that is used to upload to the inter-active presentation or AR/VR programs. Select the obj, mtl and any texture image files (A) and compress them into a zip file. Only the zip file needs to uploaded.

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