

ART 2870 – Computers in Art Education  
Robert D. Quinn, PhD  
Project 3 Assignment – Digital Fabrication

## Assignment Information

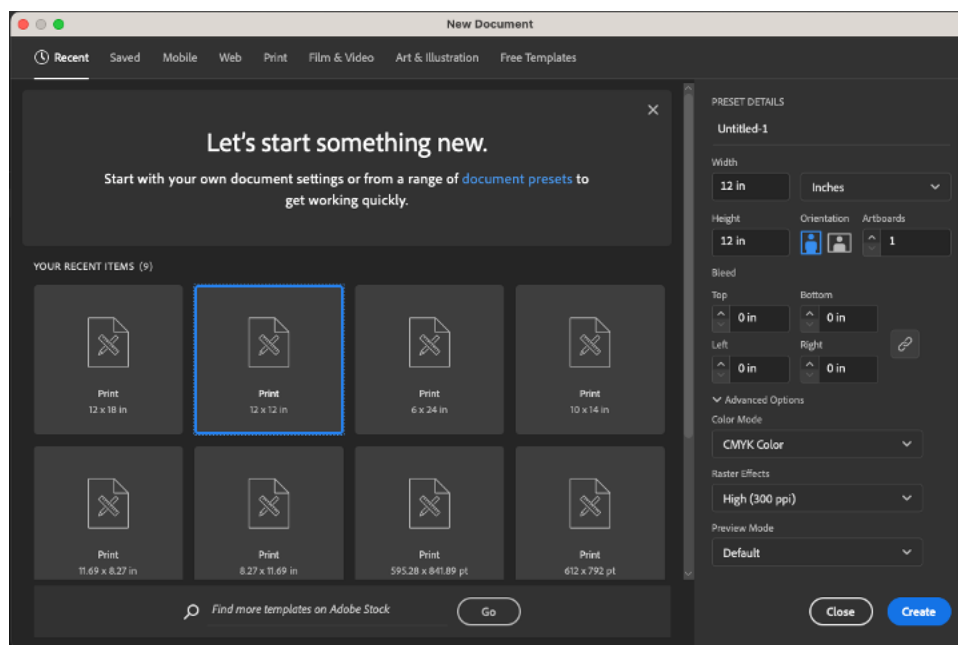
In this project, we're going to take a peek into some forms of digital fabrication to create a board game design. We'll do so through some of these approaches: vinyl cutting, 3D printing, and laser engraving. Students will design ideas for original board games. This will include board design, layout, player pieces, graphic design, etc. Students will fabricate their board games using wood or cardboard cut on the laser engravers in the SOAD Shape Lab. Students will create full size models in Illustrator that will include appropriate joints and tabs for assembly. Finished designs will be transferred to the laser engravers, cut out of stock of student choice, painted (if desired) or vinyl applied, and assembled.

## VINYL CUTTING

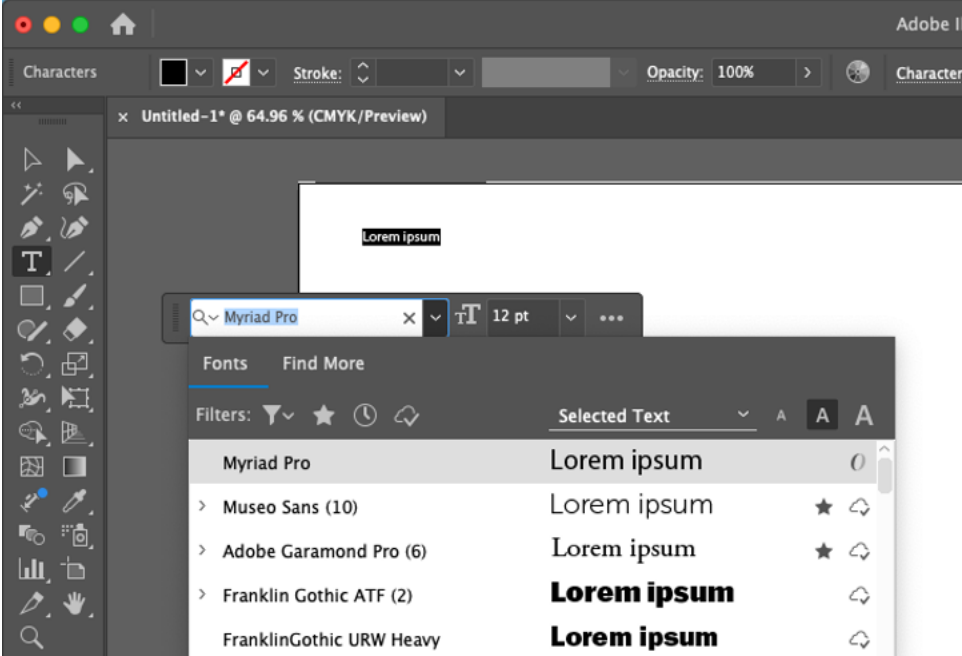
For vinyl cutting, you are going to prepare a vector graphic to make labels, graphics for gameplay, etc. Then, you will use the Graphtec machine in the Shape Lab and/or the Cricut in the Art Ed Guild "Treehouse" located in Jenkins 1341. You will use Adobe Illustrator to create the vector graphic and prepare the file for cutting.

## What to Do

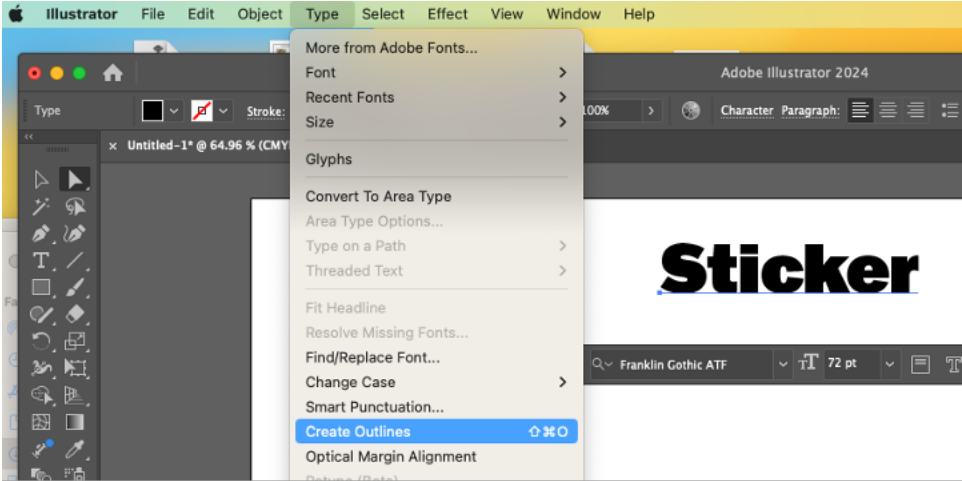
Start Adobe Illustrator. When you are greeted with the Welcome screen, you will click the *New File* button. Select the *Print 12" x 12"* template, if available, or use the *Preset Details* palette at the right of the *New Document* window (shown in following image) to set the width and height to 12". Doing so ensures that the size will be compatible with the Cricut vinyl cutter machine. Then click the *Create* button.



In the document viewer window, you will note the *Tools* palette on the left side of the blank white canvas. Select the *Text* tool and click anywhere on the canvas to insert placeholder text and you will be prompted to adjust the font family, size, and style with the drop-down menu items, as shown in the following image. Make any adjustments you want and type the text you want to include in the design.



When finished typing and adjusting the text, click the *Direct Select* tool and you will notice a single blue line appear under the text. Then, select the *Type* menu item and *Create Outlines* from the drop-down options as shown in the following image.



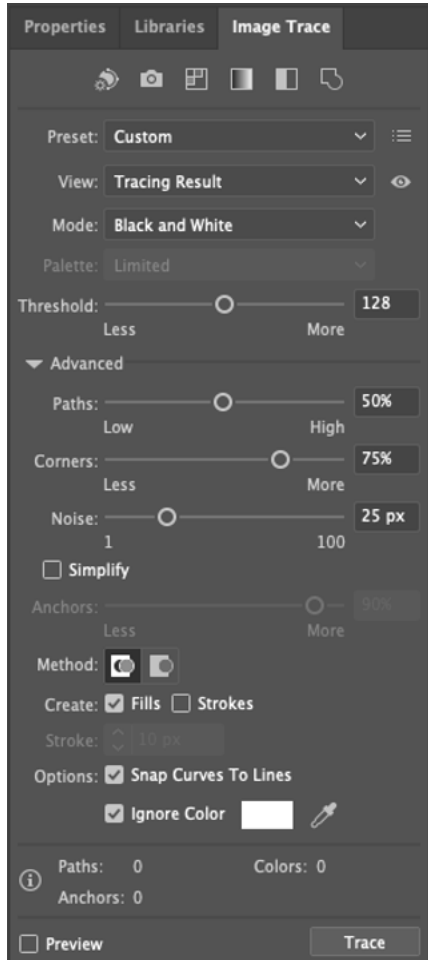
Now the text is prepped for vinyl cutting. You can draw any kind of shapes, lines, or designs you would like in Illustrator for your sticker design. If you want to place an existing image into your design, you can search it using a Google Images search or import your own art. To import images from a Google Images search, single click on the thumbnail of an image search result that you like to view the source file. Attempt to download the image by holding the Control key down while clicking the image (or right-click on a two-button mouse) of the source file. Choose the *Save Image As...* option and choose the destination of the download making sure to name it so you can locate it later!

In Illustrator, choose *File>Place* from the menu to initiate a Place function and locate the file you downloaded. After selecting the file, you will notice your cursor change into an icon containing a thumbnail image of the file you are placing. Click anywhere on the canvas to execute the Place function. You will see the image on the canvas and you can move it to your desired location in the design.



To convert the image to vectors, you will need to complete an *Image Trace* function. With your image still selected, click on the *Image Trace* tab palette at the right hand side of the screen. Click the chevron next to the word *Advanced* to reveal the full array of Image Trace settings. Using the image shown below, set the parameters of the Image Trace function accordingly. You'll need to make sure the *Mode* drop-down field is selected as *Black and White* and check the *Ignore Color* button. You can certainly adjust any of the other parameters you might like. You can always check the *Preview* button to see how the Image Trace will affect the image. However, you will have to uncheck the *Preview* button to make the *Trace* button available for use. If you uncheck the *Preview* button. Insure the

parameters are set as you require to generate your desired result. Then click the *Trace* button to execute the function.



After you click *Trace*, you'll see that the options bar at the top of the screen is populated with the *Expand* button. You will need to click this button to finalize the vector preparation of the image. See the image for the way the options bar should appear after completing the *Image Trace* function.



Export the file as a SVG for the Cricut and save it as a native Illustrator file (AI) for the Graphtec vinyl cutter.

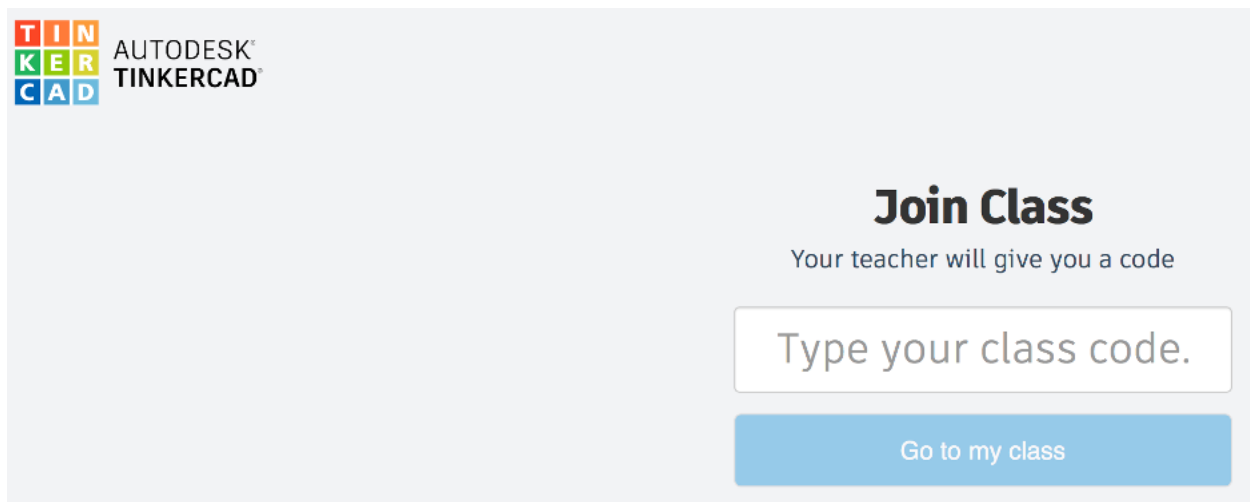
### 3D PRINTING

Students will create playing pieces for the games they designed and laser cut. Designs will then be replicated on the 3D printers at the Isley Innovation Hub. Pieces can be hand painted, if students desire. For 3D printing, we will use the free web-based software, Tinkercad. Available at [www.tinkercad.com](http://www.tinkercad.com) this software allows you to generate virtual 3D designs and helps you prepare the designs for physical output, such as through a 3D

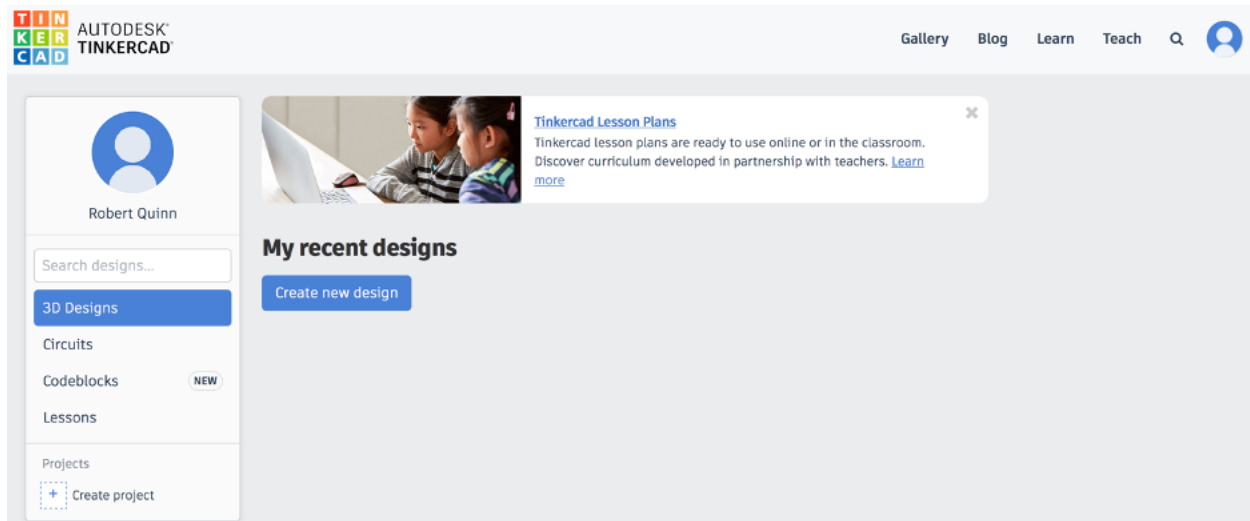
printer. We'll follow that line of thinking as we learn about and develop a project in Tinkercad.

### What to Do

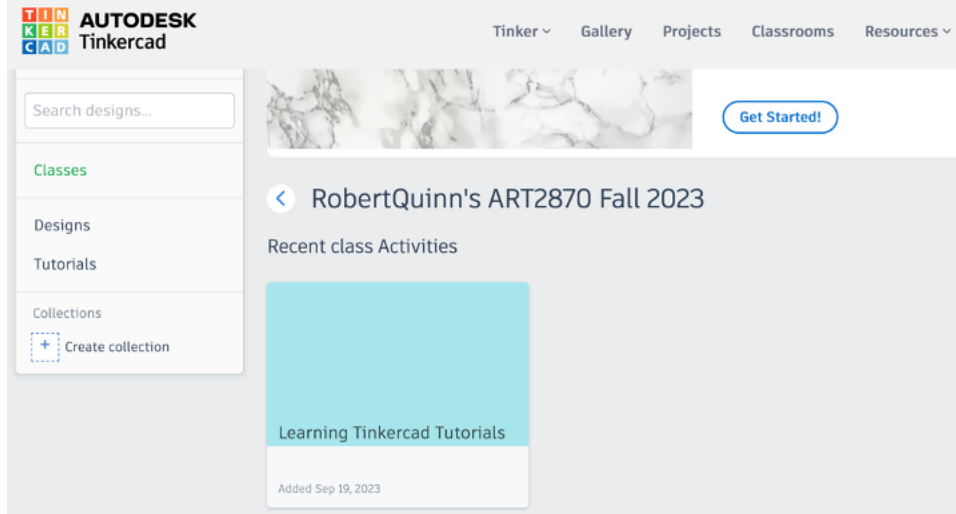
Use your class code to start your account creation process in Tinkercad and join our class. Go to <https://www.tinkercad.com/joinclass>



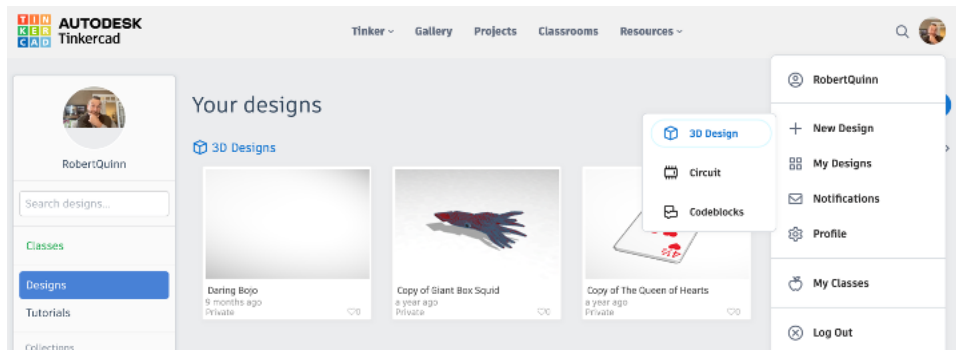
Enter your class code, as found in the relative announcement in Canvas to join the class I have created for you. Enter the **Nickname**, also found in the relative announcement in Canvas, to be logged into your dashboard.



You will click the *Classes* button on the left-hand navigation menu, then click the activity I have created for you called “Learning Tinkercad Tutorials” to begin a series of 12 simple tutorials to help you get acclimated to the way Tinkercad works.



After completing all tutorials, click the *Projects* button at the top of the screen. Choose any of the Projects listed and complete it. You can view more Projects by clicking the *Load More* button at the bottom of the screen. Make sure to customize it to make it your own! Alternatively, if you don't like any of the Projects in Tinkercad, search the Thingiverse (<https://www.thingiverse.com>) or a similar 3D model repository to select an object to customize as your own. Download the files associated with the model and import them into Tinkercad after starting a new design workplane. To do this, click your profile icon at the top right corner of the screen and select the *New Design* button and the *3D Design* button. Click Import and select the model files you downloaded from the model repository.



We'll export and print the object(s) you make with one of the 3D printers at the Isley Innovation Center. Click the Export button and select the .STL button.

