nclab
Learning for Industry 4.0

3D Modeling Project #7

TANGRAMS

Tangrams are an ancient puzzle that is simple, yet full of possibilities.

Before You Start

Go to the Creative Suite, open a new PLaSM project, and save it as Project-7 in the folder course-3D-projects/.

Project Goal

The goal of this project is to create a tangram of your own choice! There are thousands of tangrams on the web, enter "tangram solutions" in a search engine to see them.

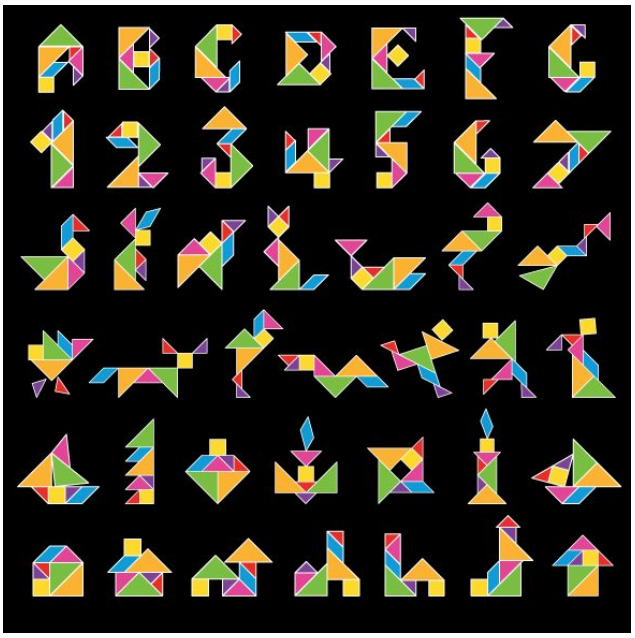


Fig. 1: Different tangram solutions

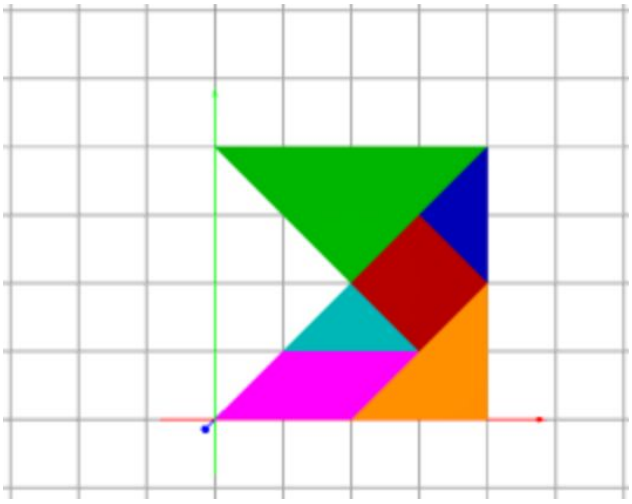
Making a Tangram

You can use the built-in TANGRAM() commands in NCLab to create tangram pieces.

Enter the following commands and SHOW() each object.

```
g = TANGRAM1()
y = TANGRAM2()
b = TANGRAM3()
r = TANGRAM4()
c = TANGRAM5()
p = TANGRAM6()
o = TANGRAM7()
```

You should see the following result:



Tangrams were invented in China, the Chinese name for a tangram means “seven boards of skill”. These seven pieces can be arranged into a variety of shapes. Try rearranging the pieces of the tangram within NCLab’s Creative Suite to form shapes like those seen in *Figure 1.*

Printing Your Tangram

In order to prepare your tangram for 3D printing, you will need to move each piece of the tangram so that no sides are touching. For example, the following code will separate objects `g` and `y`.

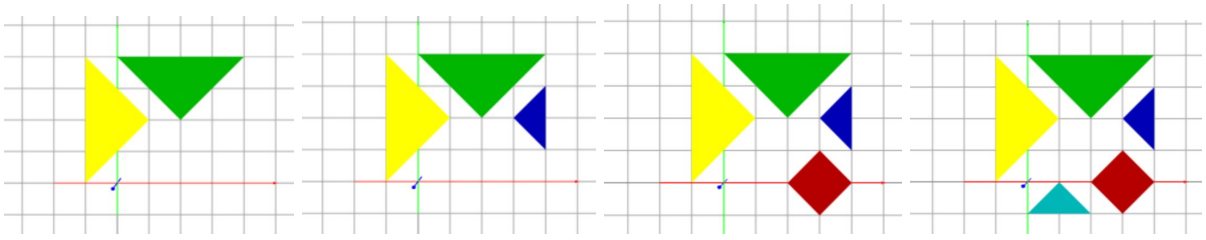
```
# g is a triangle at points [2,2], [0,4], and [4,4]
g = TANGRAM1()

# y is a copy of g that is rotated -90 degrees
y = TANGRAM2()

# We move object y to create a gap
MOVE(y, -1, X)

SHOW(g,y)
```

Work to fit all the pieces in the smallest area while ensuring that none of the pieces are touching. This can be quite a puzzle of its own!



Project Checklist

Your project will be finished when:

1. You have finished your 3D model.
2. You have separated the pieces of your tangram for 3D printing.
3. Your program is saved as Project-7 in folder course-3D-projects/.