Design Communication II /// ARCH 222 /// CoD/// Spring 2020
Instructor: Philip Speranza, Associate Professor
Graduate Employees: Courtney Sigloh and Cary Chu

Exercise 2.1a /// Organizational Systems: 2D Tiling

Purpose
The purpose of this exercise is to understand unit and organizational systems. **Parameters** of a unit will be altered and tiled into a 2D pattern. Geometry should be created in Rhino. Line weight, color, and layout should be added with layers in Adobe Illustrator.

operation 1 - UNIT: *Design 2D unit module in Rhino*
Begin with a **primitive unit** geometry that is easily replicated: triangle, square, or hexagon. [name this layer "organization"]
Design an **asymmetrical** geometry within the primitive unit geometry. This will be called the **unit module**. ["lines" layer]

operation 2 - ORGANIZATION: *Tile the unit module to create a pattern in Rhino*
Replicate the unit module using the **MIRROR**, **MOVE**, or **ROTATE** commands shown in lecture. With each replication, **incrementally** (using consistent values) vary the scale, rotation, or movement of a curve or point within the unit module. The variable being altered is a **parameter** of the unit module. Test this with 4 x 4 replications, experimenting with different parameters. Notice patterns that emerge **between** the unit modules, and test **iterations** of this emergent effect by changing different parameters. **Test at least [3] 4 x 4 parametric variations and print each one for Thursday.**

operation 3 - COLOR: *Add the last parameter, color, in Illustrator*
Export geometry to Illustrator, and add color as a last parameter. Incremental values for color can be opacity percentages, RGB/CMYK values and/or other. Maintain layer organization in Illustrator. Color may be applied to **strokes** and/or **fills** of closed paths. Carefully control **line weight** and **line types** (ie. solid or dashed) as an additional parameter.

Include the rules for each operation in your process by concisely describing, in minimal words and numbers, your Rhino commands (ex. "_rotate_60"). Provide values for each parametric variation in your description. Turn off the "organization" layer as a final step.

Deliverables
[1] 11" x 17" color drawing including sequential diagram steps and 9" x 9" tiling pattern.

Programs
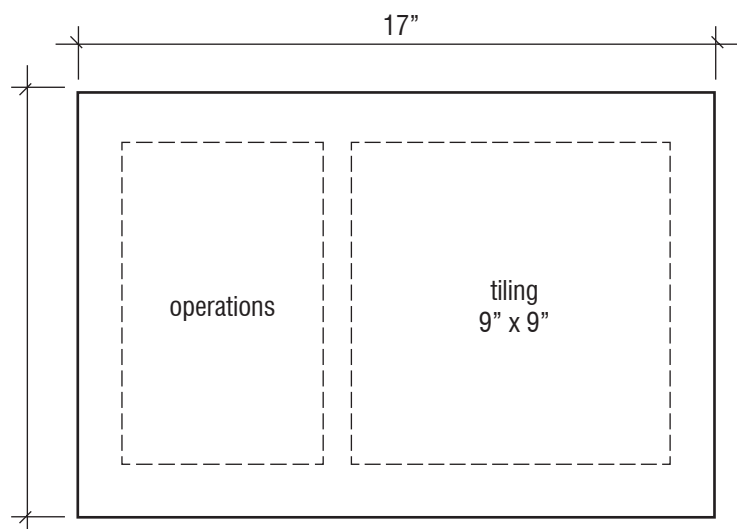Rhinoceros 3D, Adobe Illustrator

Learning Objectives
• To create analog parametric systems in Rhino.
• To effectively add line weights and explain
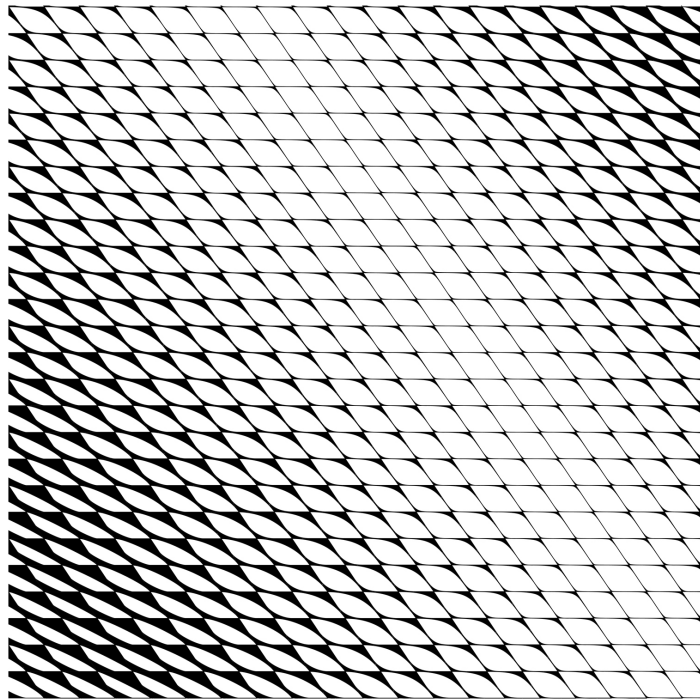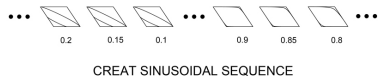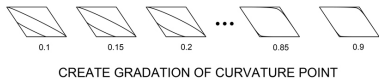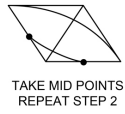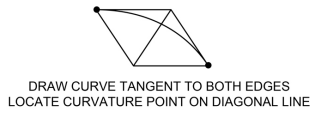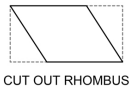 steps in text in Adobe Illustrator using layers.

Evaluation Criteria:
• Proficiency in 2D geometry in Rhino 3D.
• Ability to use Adobe Illustrator to effectively
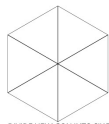   complete a drawing for presentation.

Schedule:
Assigned: Tuesday, April 21
Upload Due: Monday, April 27, 11:59PM

17"

11"

operations

tiling
9" x 9"

CUT OUT RHOMBUS

DRAW CURVE TANGENT TO BOTH EDGES
LOCATE CURVATURE POINT ON DIAGONAL LINE

TAKE MID POINTS
REPEAT STEP 2

0.1   0.15   0.2   ···   0.85   0.9

CREATE GRADATION OF CURVATURE POINT

···   0.2   0.15   0.1   ···   0.9   0.85   ···   0.8

CREAT SINUSOIDAL SEQUENCE

COLOR AND ALIGN SEQUENCES

1

DIVIDE HEXAGON INTO SIX TRIANGLES.

DELETE ALL BUT ONE TRIANGLE.
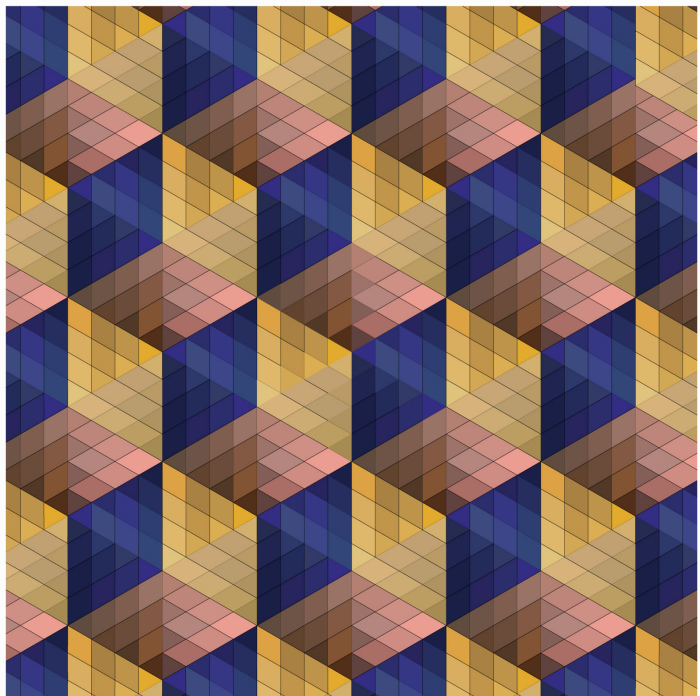
3"

CONNECT MIDPOINTS, FORMING THREE NEW TRIANGLES.

CONNECT MIDPOINTS AGAIN.

DELETE LINES.
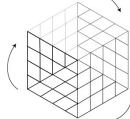
ROTATE TRIANGLE 60° CLOCKWISE UNTIL HEXAGON IS FORMED.

2

3   FIX LINE WEIGHTS, APPLY COLOR, AND TILE HEXAGONS.

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Exercise 2.1b /// Organizational Systems: 2D Tiling with Grasshopper
Use the Rhino Grasshopper definition template on the server to create iterations of a tiling pattern (not necessarily 2.1a).

Purpose
The purpose of this exercise is to learn Grasshopper! This is digital parametric design.

Deliverables
[1] 8 1/2" x 11" black and white series diagram using the template below. Please crop a JPG for the website upload.
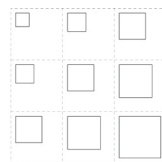
Programs
Grasshopper, Rhino, Illustrator

Learning Objectives
• To create digital parametric systems in Grasshopper
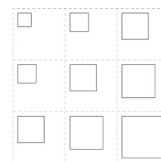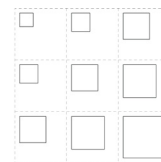• Grasshopper: organization, parameters, "bake" to Rhino

Schedule:
Assigned: Tuesday, April 21
Upload Due: Monday, April 27, 11:59PM
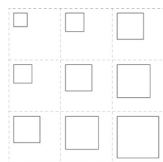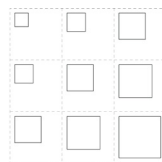
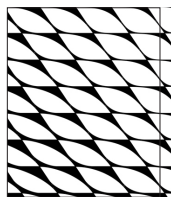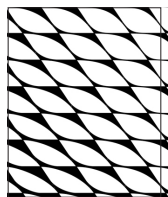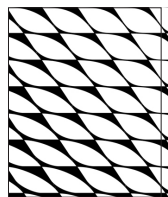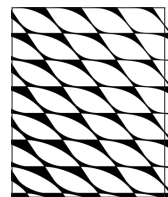| iteration 1 | iteration 2 | iteration 3 | iteration 4 | iteration 5 |

Rectangle / Circle Series
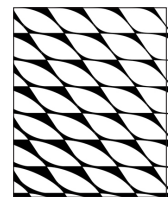

| iteration 1 | iteration 2 | iteration 3 | iteration 4 | iteration 5 |

Rhino Curve, 3D or Points to Surface, Series (**optional**)