Assignment 03

Digital Design Model

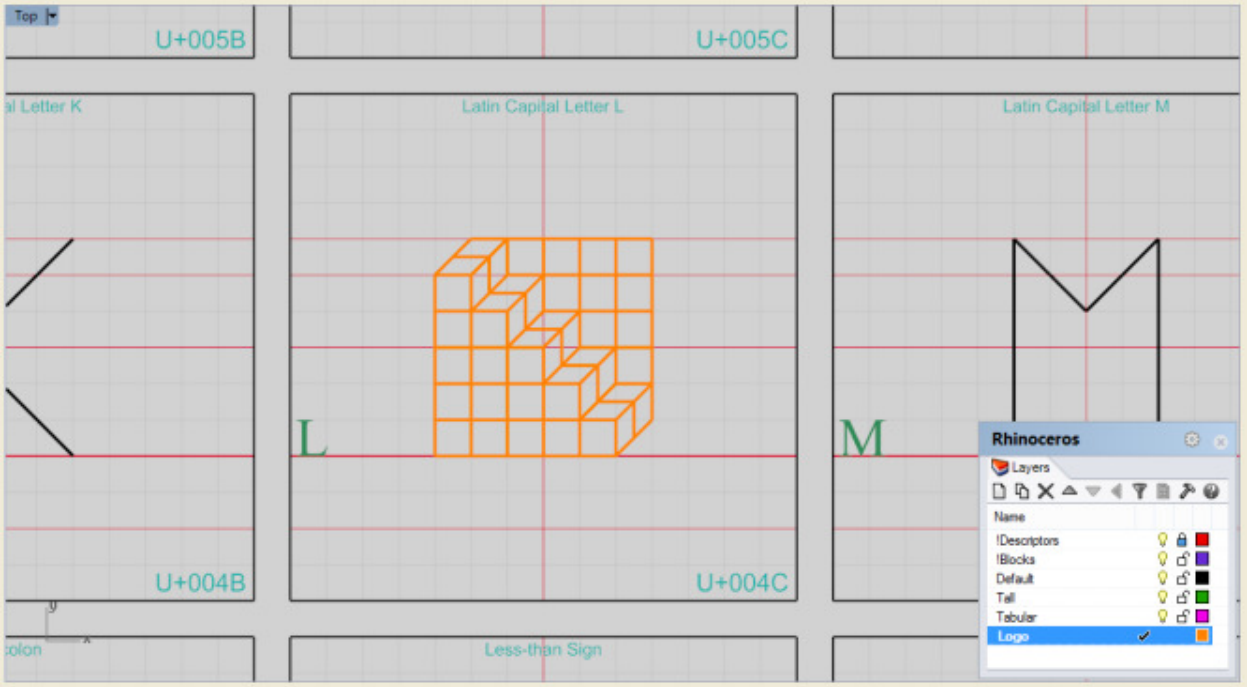
Course: Arch 565 - Advanced Computer Applications II
Due Date: Tuesday, October 21st
Weight: 25% of assignment grade

Overview

This assignment introduces students to parametric design as a method of generating adaptive architectural models. Using Rhino + Grasshopper (or equivalent parametric platforms), students will create a digital model whose geometry is controlled by parameters. The goal is to understand how relationships, rules, and variables can drive form-making and design exploration.

Objectives

- Develop a digital model that demonstrates parametric control over geometry.
- Use Grasshopper (or another parametric tool) to define relationships between design elements.
- Explore how adjusting inputs generates variations and informs architectural decisions.
- Communicate the process through diagrams, outputs, and documentation.



https://ieatbugsforbreakfast.com/2015/03/24/fabricator-font-update/

Assignment Tasks

Define Design Intent

- Choose a design problem (e.g., a façade system, roof structure, pavilion form, or spatial grid).
- Identify the key parameters (e.g., panel size, spacing, angle, curvature, density).

Build the Parametric Definition

- Create a parametric model in Grasshopper (or similar tool) with at least three adjustable parameters.
- Ensure changes in inputs produce a clear range of outputs.

Generate Design Variations

- Produce at least five distinct iterations by manipulating parameters.
- Capture outputs through diagrams or rendered views.

Document the Workflow

- Submit a short (1–2 page) report including:
  - Initial Design Sketch.
  - Screenshots of the parametric definition.
  - Images/renders of the design iterations.
  - A short reflection on how parametric methods changed your design thinking.

Deliverables

- Initial hand drawn sketch of main idea.
- Grasshopper/Rhino definition file (.gh + .3dm).
- At least five visual outputs (renders, diagrams, or drawings).
- 1–2 page illustrated workflow report (PDF).

Evaluation Criteria

Technical Proficiency (40%) - Functionality and clarity of the parametric definition.
Design Exploration (30%) - Quality and diversity of generated iterations.
Documentation (20%) - Clarity of diagrams, report, and parametric process explanation.
Craft (10%) - Professional quality of visuals and file organization.

Grading Rubric (100 points total)

Criteria	Excellent (A: 90–100)	Satisfactory (B–C: 70–89)	Needs Improvement (D–F: <70)
Technical Execution (40 pts)	Parametric definition is fully functional, well-structured, and efficient; parameters clearly control geometry with no errors.	Definition is functional but may contain minor errors or redundancies; parameters affect geometry but with limited control.	Definition is incomplete, disorganized, or largely non-functional; parameters fail to drive geometry effectively.
Workflow Complexity (30 pts)	Iterations show creativity, variety, and clear exploration of the parametric rules; outputs demonstrate strong architectural potential.	Iterations show some variety but exploration is limited or repetitive; architectural implications are modest.	Iterations are minimal, repetitive, or lack meaningful exploration; little evidence of design thinking.
Clarity of Documentation (20 pts)	Workflow diagrams and report are clear, thorough, and well-illustrated; reflections show thoughtful engagement with parametric design.	Documentation is present but basic or uneven; reflections are descriptive rather than critical.	Documentation is incomplete, unclear, or missing; reflections show little to no engagement.
Craft & Precision (10 pts)	Visual outputs (renders/diagrams) are precise, polished, and professionally presented; files are clean and organized.	Visual outputs are adequate but lack refinement; some issues with clarity or file organization.	Visual outputs are sloppy, incomplete, or unclear; files are messy or difficult to use.