EE/CprE/SE 491 WEEKLY REPORT 01

Start date - End date: 9/18/25-10/4/25

Group-number: sdmay26-08

Project title: GridSAFE

Client: Nellie Leaverton

Advisor: Julie Rursch

Team Members/Role:

Nellie Leaverton – Hardware & Architectural Design Lead

Jason Di Giovanni – Software and Security Lead

Brant Gicante – Software and Security Assistant

Evan Booze – Hardware & Architectural Design Assistant

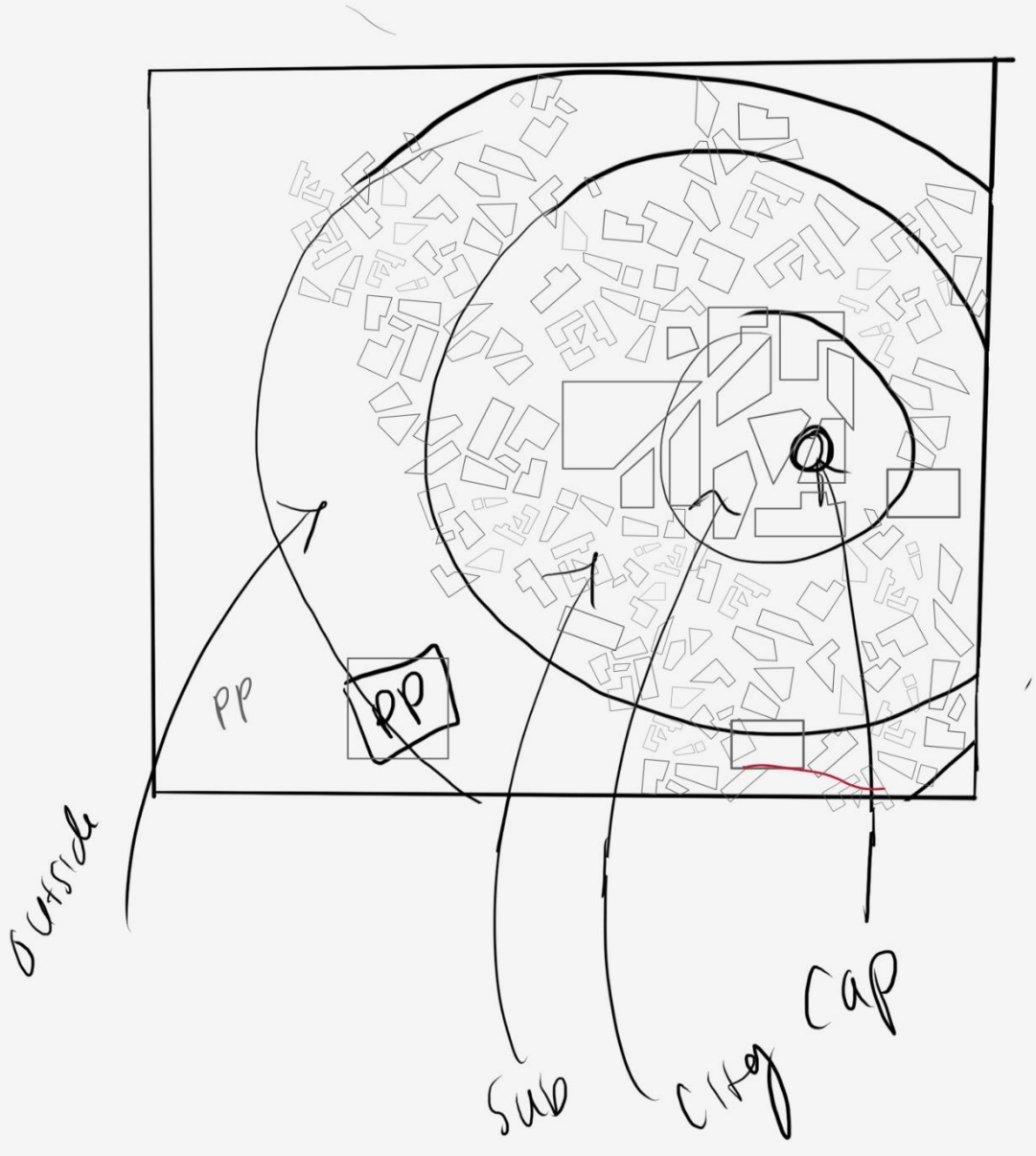
Kyle Maloney – Testing Lead & Design Assistant

Anthony Nehring – Software and Security Assistant

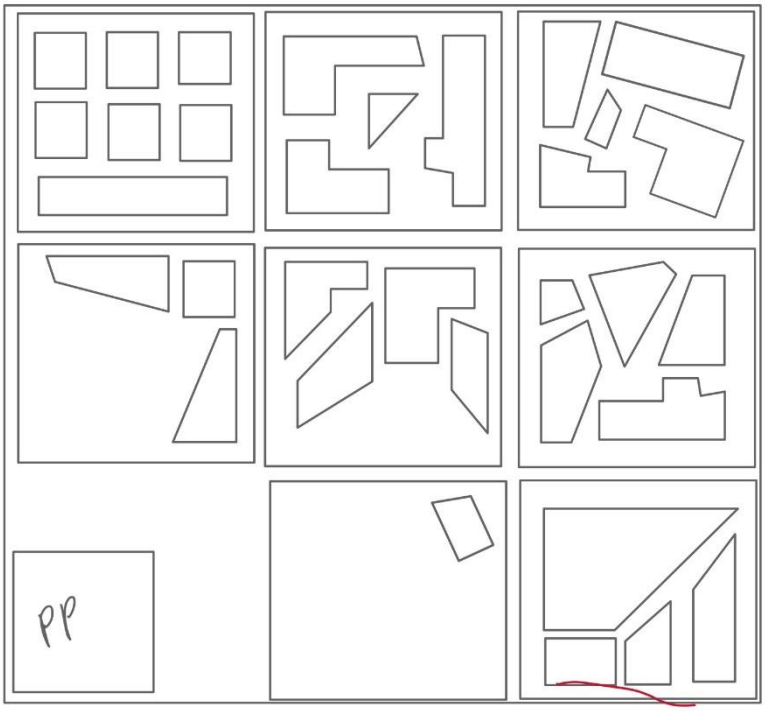
- **Weekly Summary:**
  - Over the past two weeks, we have made progress with our project's hardware, software, and security components. On the hardware side, we completed research on several CAD design tools and ultimately decided to use Blender. We discussed the city layout, finalized a design, created our first CAD model, and began printing it. In the city design discussions, we also decided on the types of buildings to include, such as the capital, skyscrapers, schools, hospitals, and apartment buildings. We selected white PLA as the printing material and researched RGB LEDs for potential integration. In the security area, we continued developing the log management component by researching log sources and structures and creating initial prototype logs. On the software side, we explored Google Firebase as a free hosting solution for JSON data and investigated potential language models for training. We also progressed toward setting up an initial ML training pipeline and ensuring compatibility with other project components. Looking ahead, we plan to purchase materials, complete SIC training for printing and woodworking, and refine our 3D building prototypes.
- **Past week accomplishments:**
  - Nellie: Started 3D designing buildings in AutoCAD/Blender.

- **Citations/Research:**
    - **City Design:**

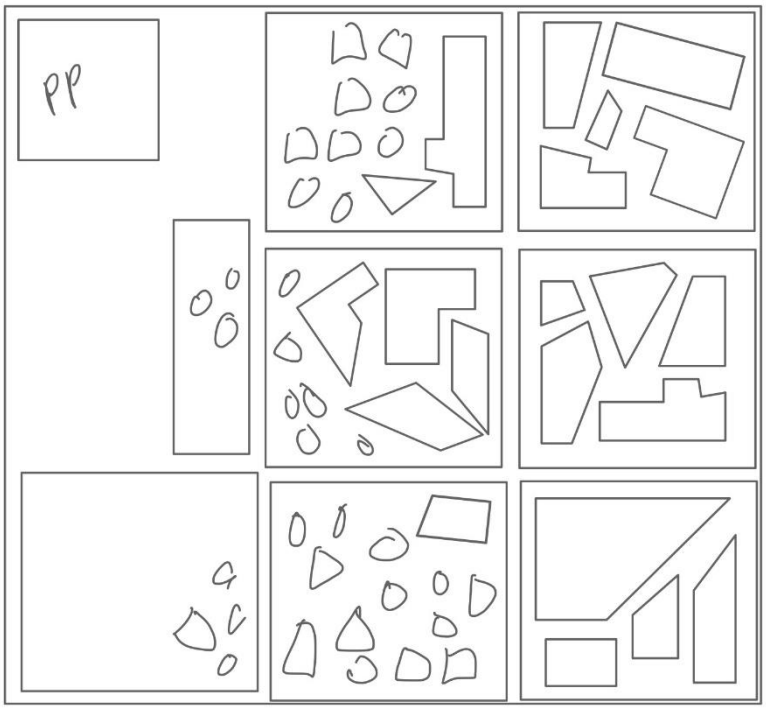

power plant
urban
city

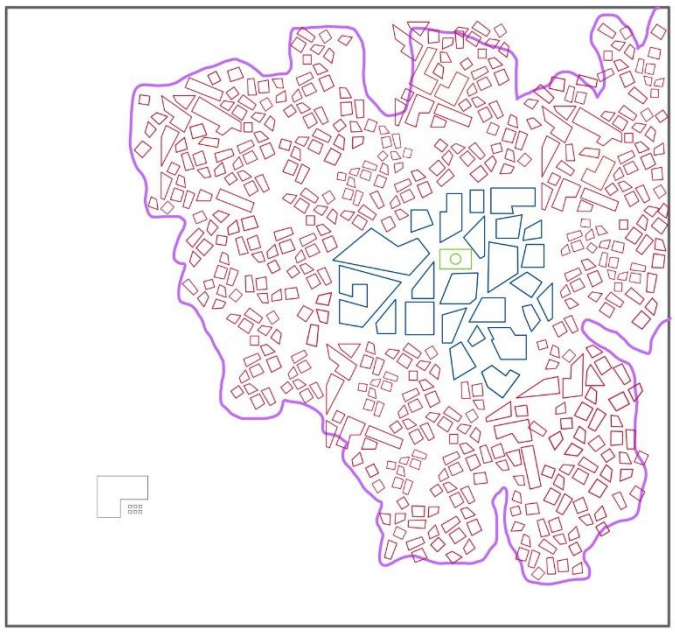

PP
PP
Outside
Sub
City
Cap

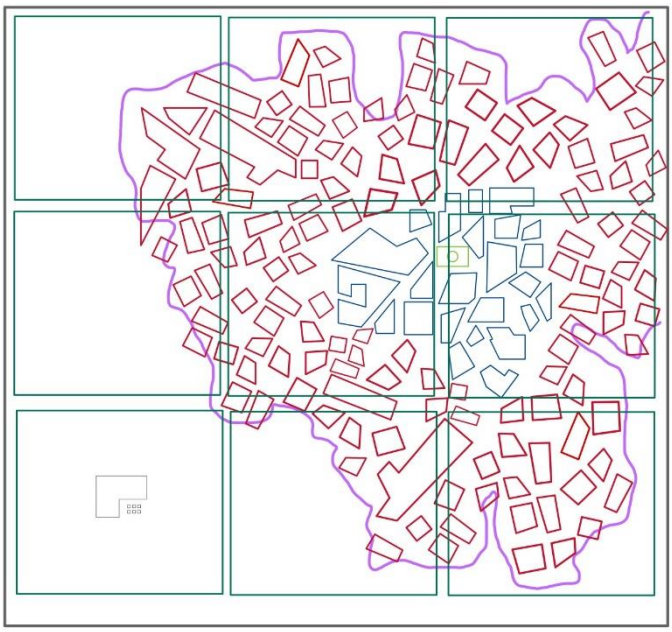
D1

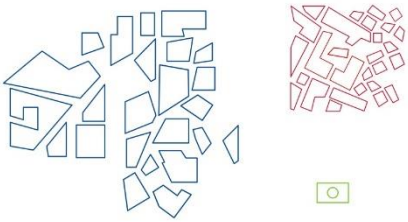


D2









D3

2.75 and D

Tallest: → 45 sky

apart 5-12

house 2

1 2

h: 10in

d: 3

→ hollow

→ how thick?

T M TH

Thin : $\frac{1}{32}$

medium : $\frac{1}{16}$

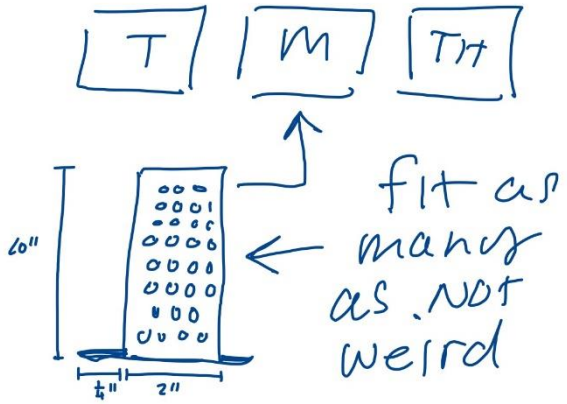
thick : $\frac{1}{8}$

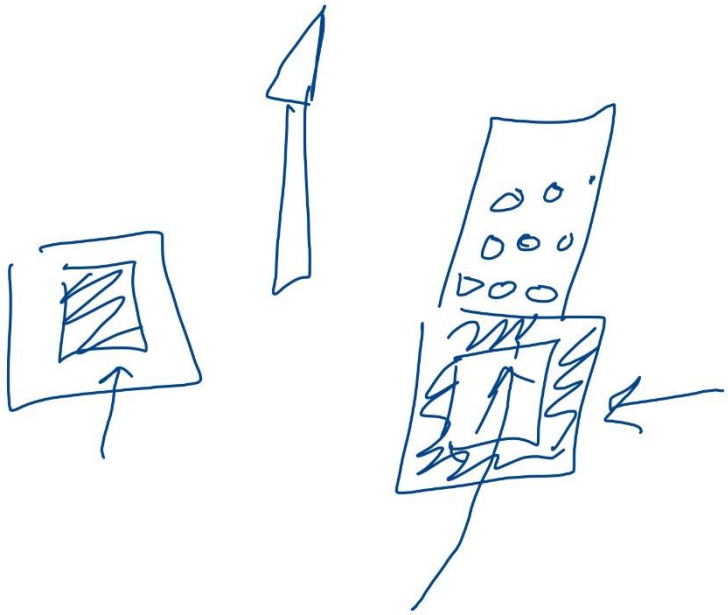
} thickness

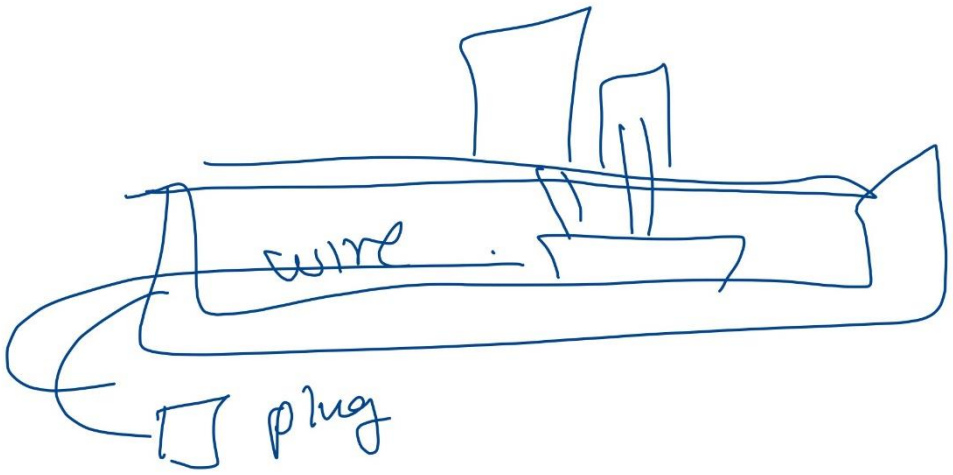
economic

height : 10 in

1 x w : 2 x 2







PLA : W, Translucent

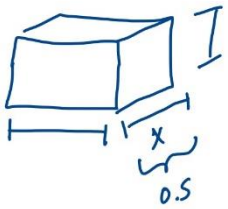
lighting : mirco leds

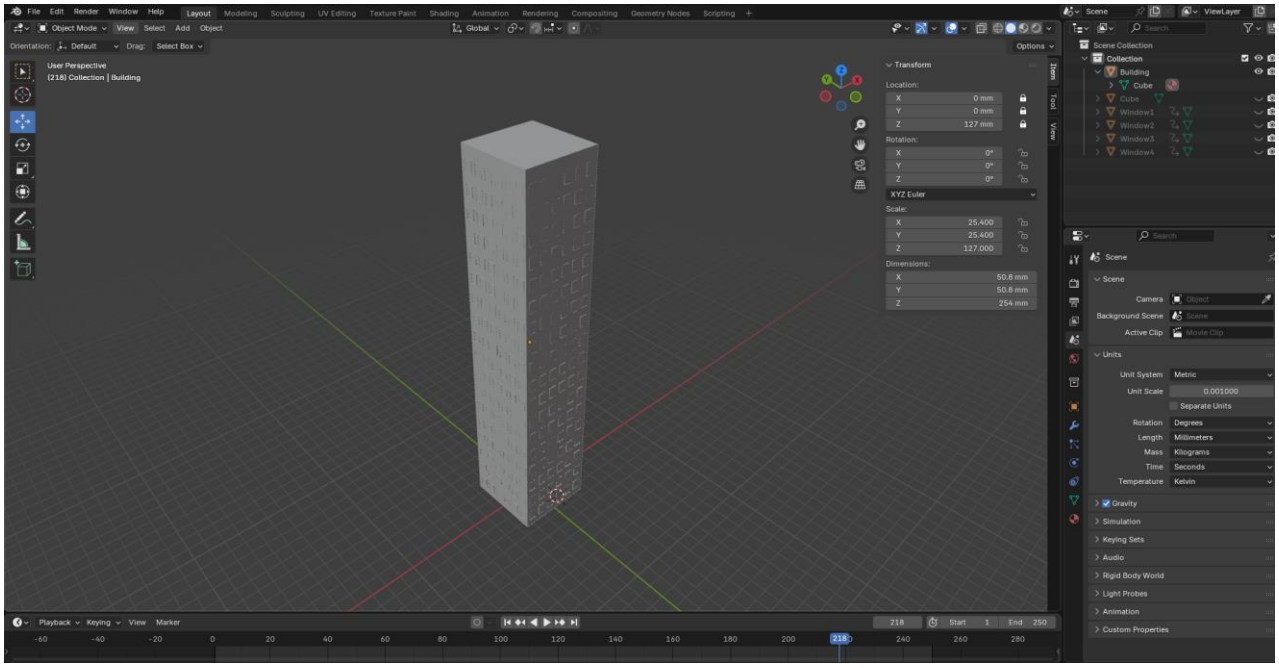
coppercure, eltrica tape

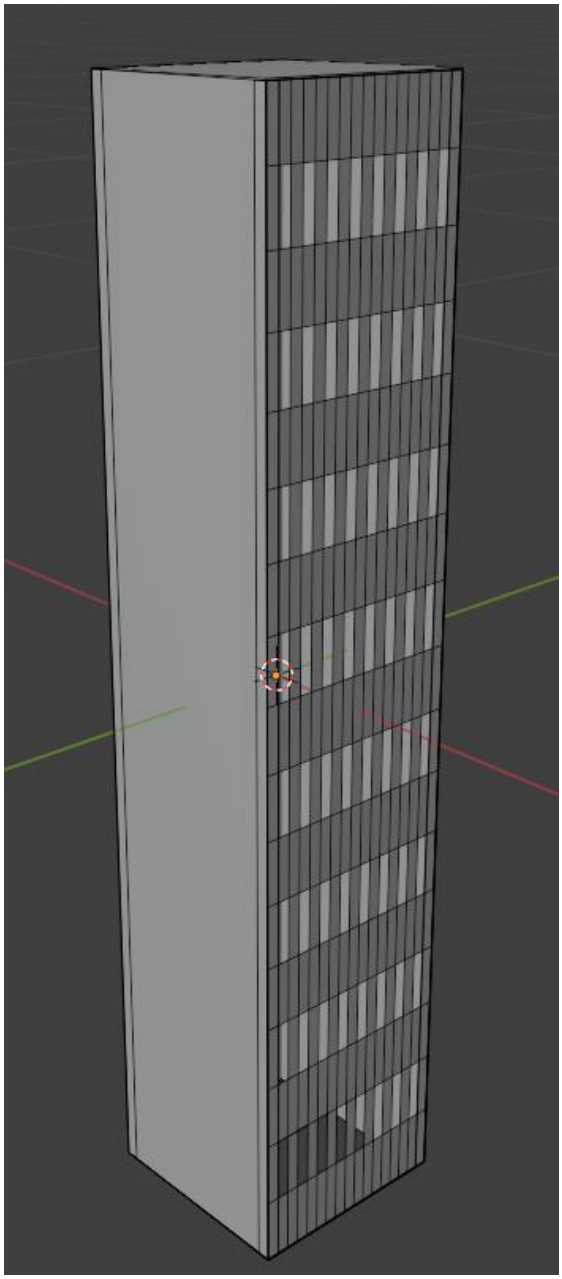
→ sand
→ exacto knifes)

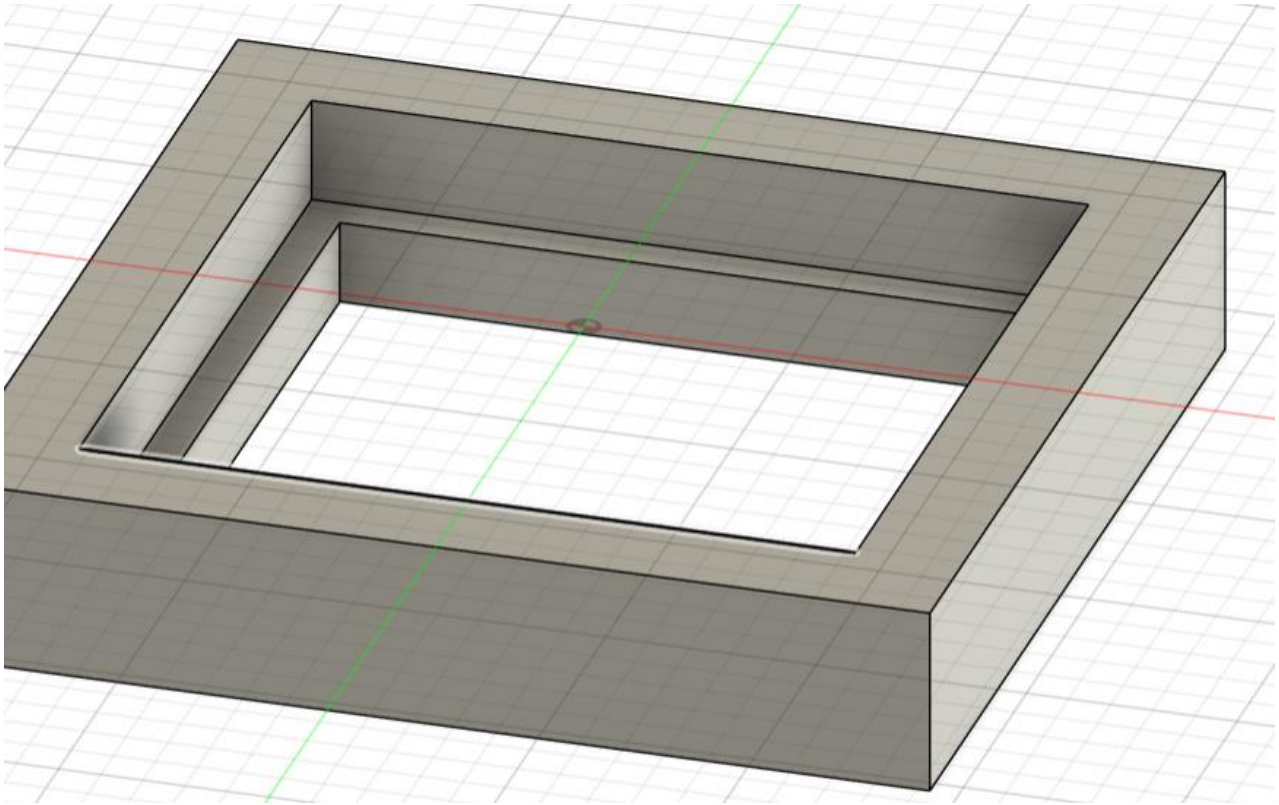
→

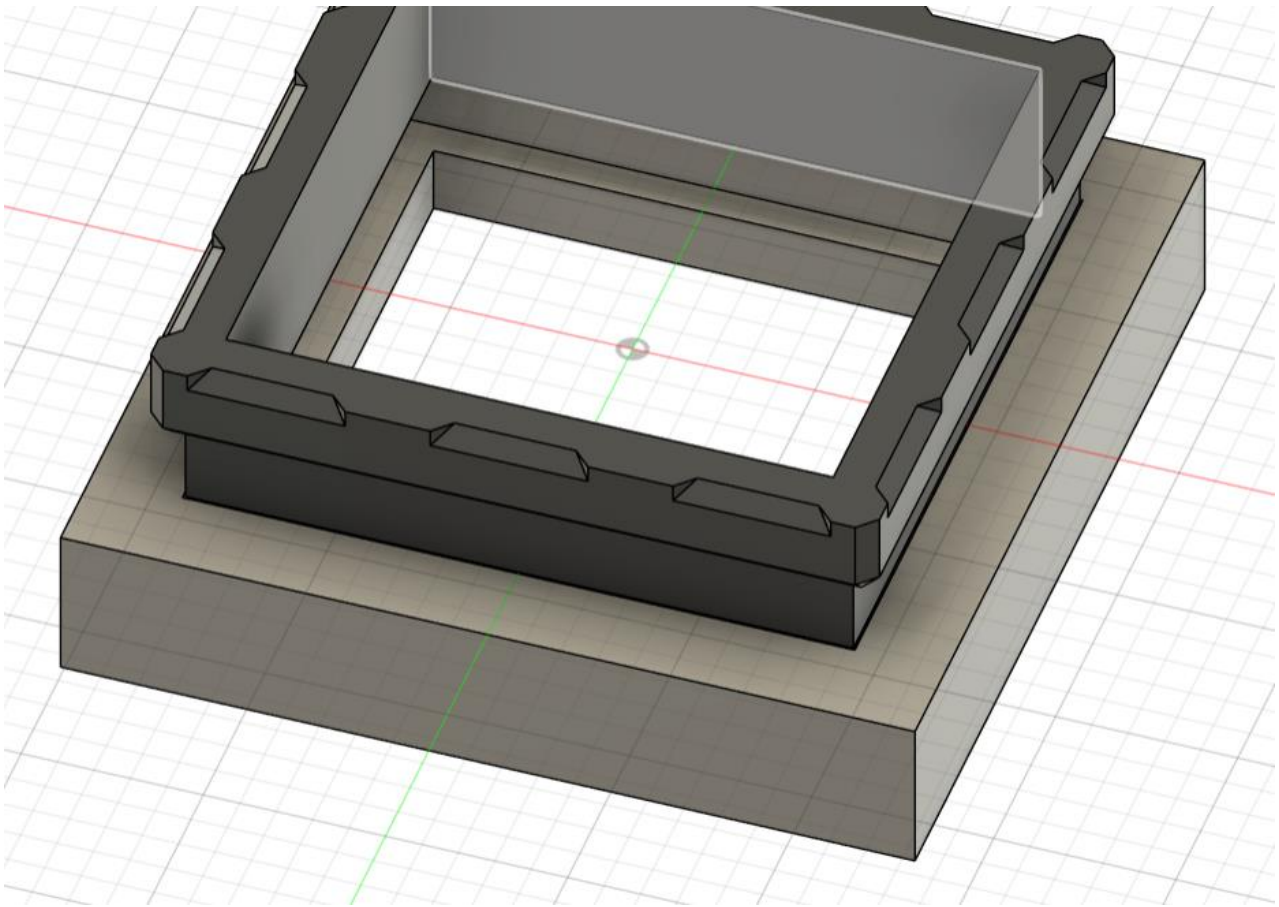
Primer in SIC

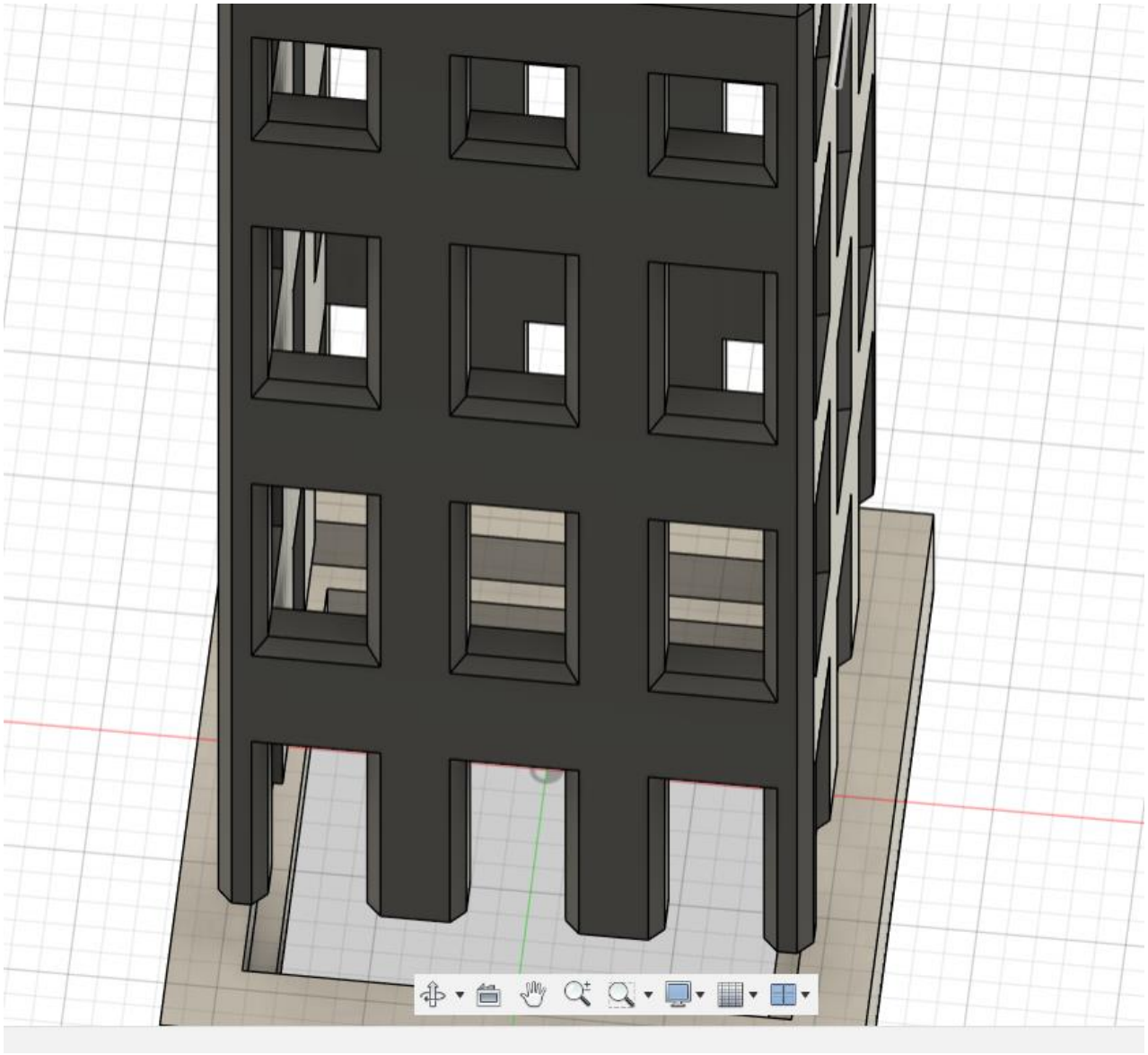






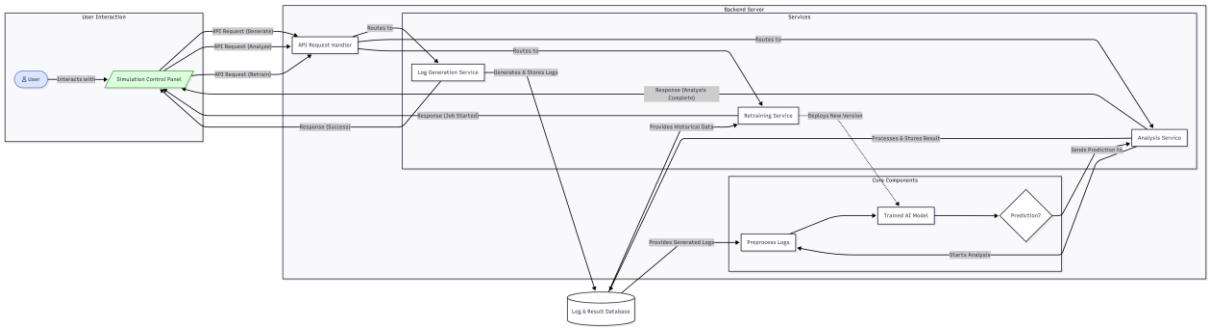


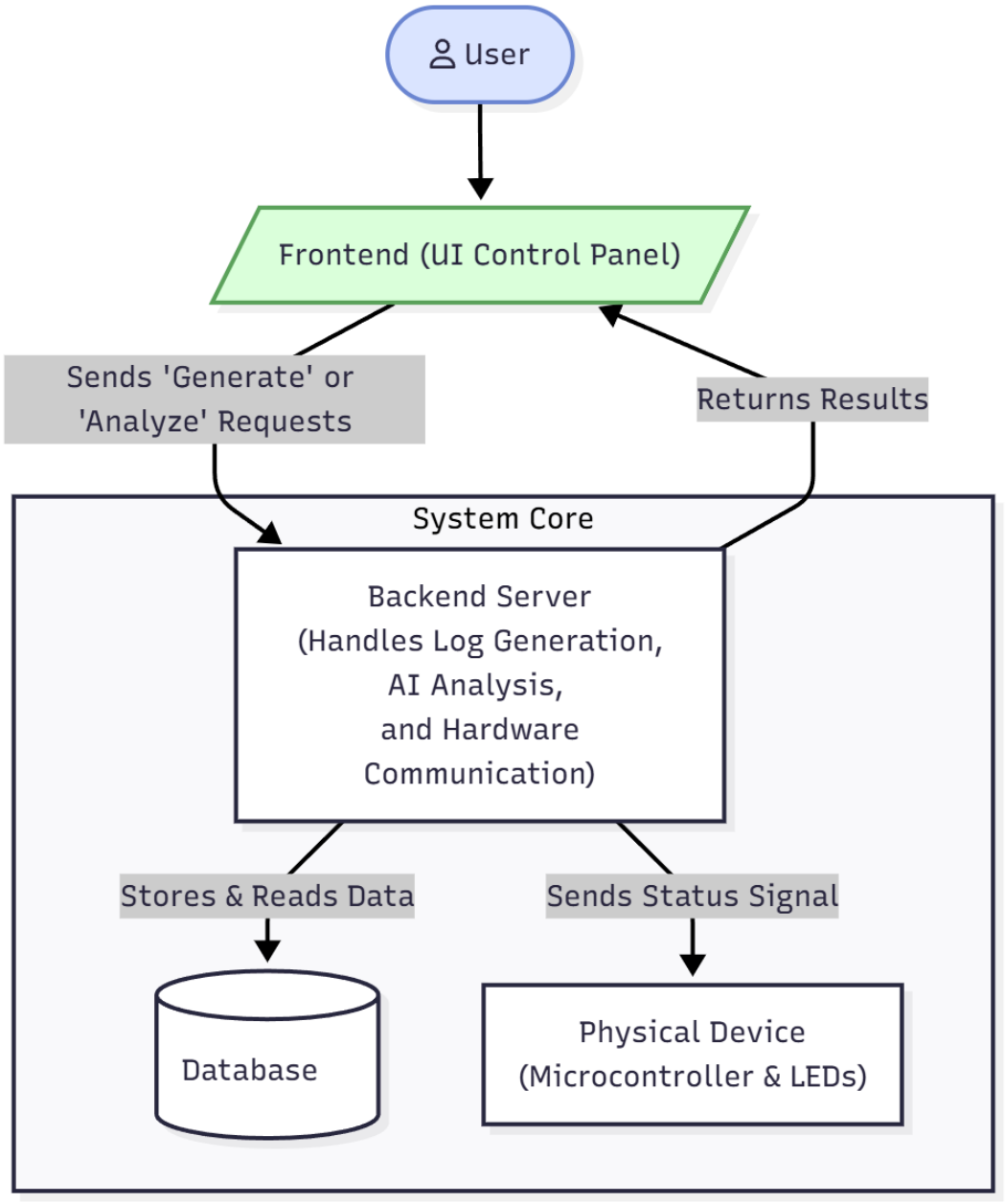




(Note: need to make square windows to mimic that of a skyscraper)

- Backend/System architecture:





- **Pending issues:**
  Will ISU be able to host VMs needed / host the network needed for our project for creating real logs?
- **Individual contributions:**

- **Nellie:** Created and finalized 3D designs in Blender for the project's architectural layout, determined the appropriate type of PLA for printing, and began researching micro-LEDs for integration into the model's lighting system.
- **Jason:** Created example logs for both normal and anomalous activity. Discussed with group members and decided to begin building a true network that we can get real logs from and "attack"
- **Brant**: created possible 3d prints for the base structure and layouts for the building in fusion. Used cura to splice the 3d print into something that can be sent to the printer for use.
- **Anthony:** Brought up ways to the group on how to make logs more complex in the future if we desire to. Brought up how to set up the idea of using three different colored LEDs green, red and the addition of yellow – for signaling malware got in but it was detected. Ongoing research into setting up a network needed for our project.
- **Evan:** Worked with Nellie to conceptualize and design layouts for the model city. Consulted on the preliminary design for the tallest building of the city for lighting testing purposes. Modeled the design of the tallest building in Blender and consulted with Brant on alternative designs for the building with physical 3D printing constraints in mind.
- **Kyle:** Started writing baseline code that will be edited in the future to fill our needs. Skeleton code for training, log generation, predicting, and the API have all been made and will be completed when I have more information on what exactly I need to make. Using an old led project I will refactor it to ensure it works in this project and has a simple but efficient UI to test and program the behavior. Created a few diagrams to show how the backend will operate and how the data flows.

NAME	**Individual Contributions**	**Hours this week**	**HOURS cumulative**
Nellie Leaverton	• Research Small Scale City Models • Built a 3D design of a skyscraper • Researched lighting for Small Scale Models • Decided on WHITE PLA • Started prototyping • Meet with Evan and Brant to start Prototyping • Make weekly meeting notes	8	22
Brant Gicante	• Made 3d building possible • Adjusted values and dimensions for 3d building • Spliced a model and looked up PLA to use for the print • Have a protype ready but not yet printed (I need time to get Iowa State certs first)	7	9
Evan Booze	• Researched Small Scale City Models	3	6

	• Created a 3D design of the tallest building in Blender • Met with Nellie and Brant on prototyping of the city • Met with Nellie on design specifications of the model city and possible dimensions for the tallest building		
Jason Di Giovanni	• Research more attacks and endpoints • Write example logs	2	11
Kyle Maloney	• Started writing skeleton code for core components (AI training, log generation, AI testing, API) • Began refactoring previous led project to work for this • Started planning the backend architecture and created diagrams to show the flow of data	6	9
Anthony Nehring	• Researching into the various types of logs needed for our project. • Looking into ways to possibly expand the logging into the future.	3	6

- **Comments and extended discussion:**

  N/A

- **Plans for the upcoming week:**

  - **Brant Gicante:** Adjust the 3d model to have more square windows (maximize possible) to mimic a skyscraper. send the prototype to the printer once PLA has been purchased. Print and display the prototype for Nellie, and Evan. Complete the iowa state 3d printer labs. Use the bamboo 1.75mm PLA 3d printer and get certified. (all of this is alternative to whether I finish my robotics 3d prints first)
  - **Evan Booze:** Research potential programmable RGB LEDs to use to begin testing lighing the prototype tallest building. Find suitable vendors to purchase RGB LEDs in bulk for testing purposes. Begin researching designs for other buildings to be used in the model city.
  - **Nellie Leaverton:** Review the prototype, purchase lighting components, evaluate how the lighting interacts with the PLA, and continue prototyping with wall thicknesses and building designs.
  - **Kyle Maloney:** Communicate with team members and make progress on editing the skeleton code. Finish refactoring led project so it will work properly for this use case. Begin setting up training pipeline and testing it on my computer.

- **Jason Di Giovanni:** Researching the log prototype for the MITRE framework and continue researching general logs.
- **Anthony Nehring:** Researching how logs can look like for each part of the MITRE attack framework as well, what normal logs will look like, and anomalous but non malicious logs can look like too.

- **Summary of weekly advisor meeting:**

  We did not have a meeting with our advisor this week. Our next meeting is 10/16/25.

Grading criteria

Each weekly report is worth 10 points. Scores will be awarded as follows:

- **8 – 10**: Progress for your project seems to be suitable. Documentation and hours reported by team members are adequate.
- **6 – 8**: There is scope of improvement both in your report and your project progress. Can consult with instructor/TA after class for further inputs.
- **< 6**: Please talk to instructors/TA after class hours about any difficulties that you/your team is facing.

Each weekly report should be unique in that they have a unique set of supporting details for your contributions. So please do not just copy your reports from the previous week. In addition, please avoid any personal pronouns (he, she, I, you). Try to keep your reports as neat as possible.