Critical Design Review

***HotSeat:* OKAA Solutions, Team 5**

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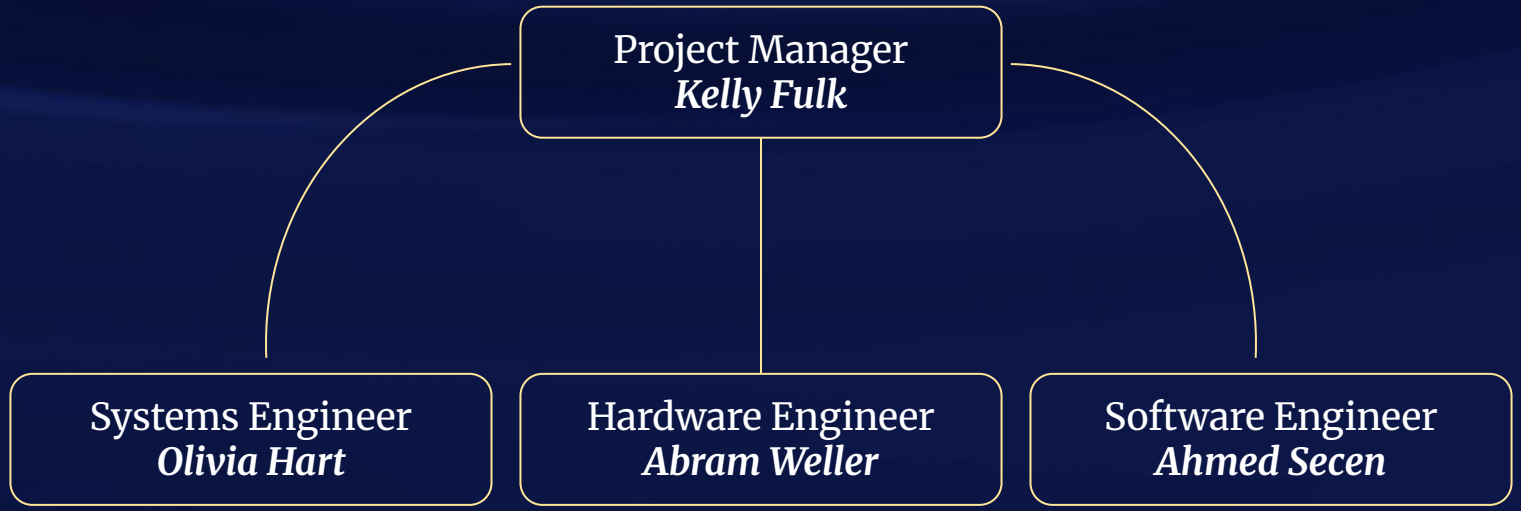
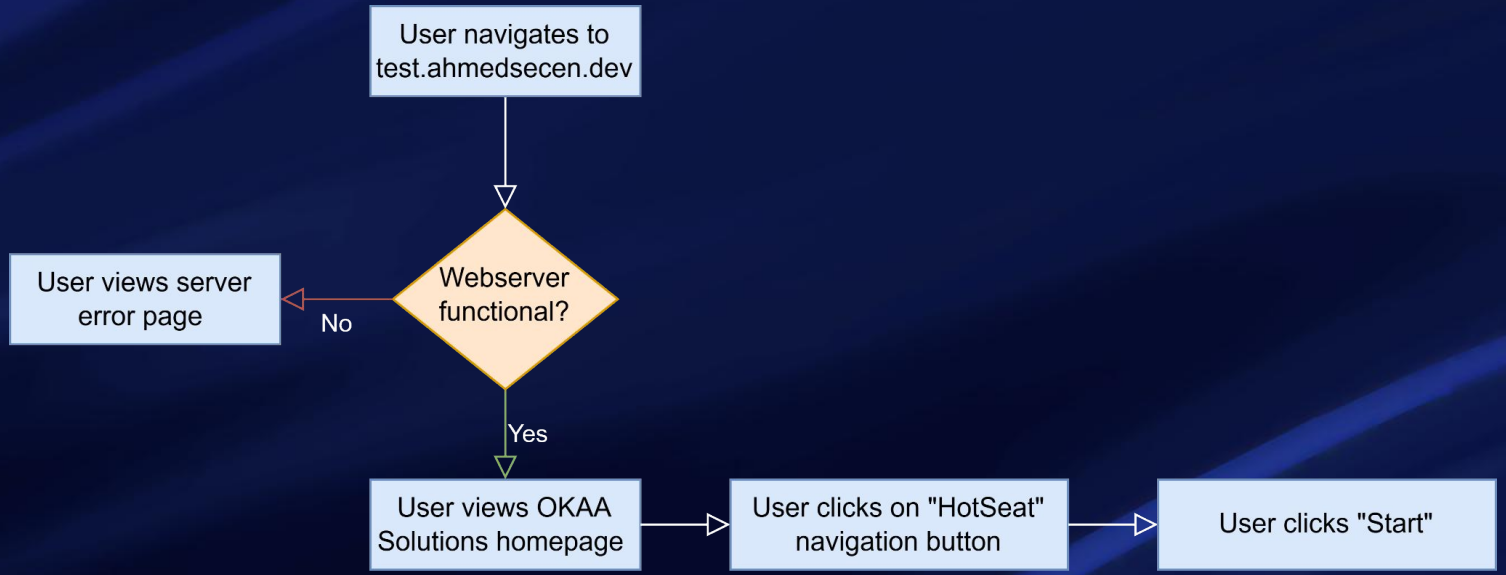
Team Organization

Team Organization Chart

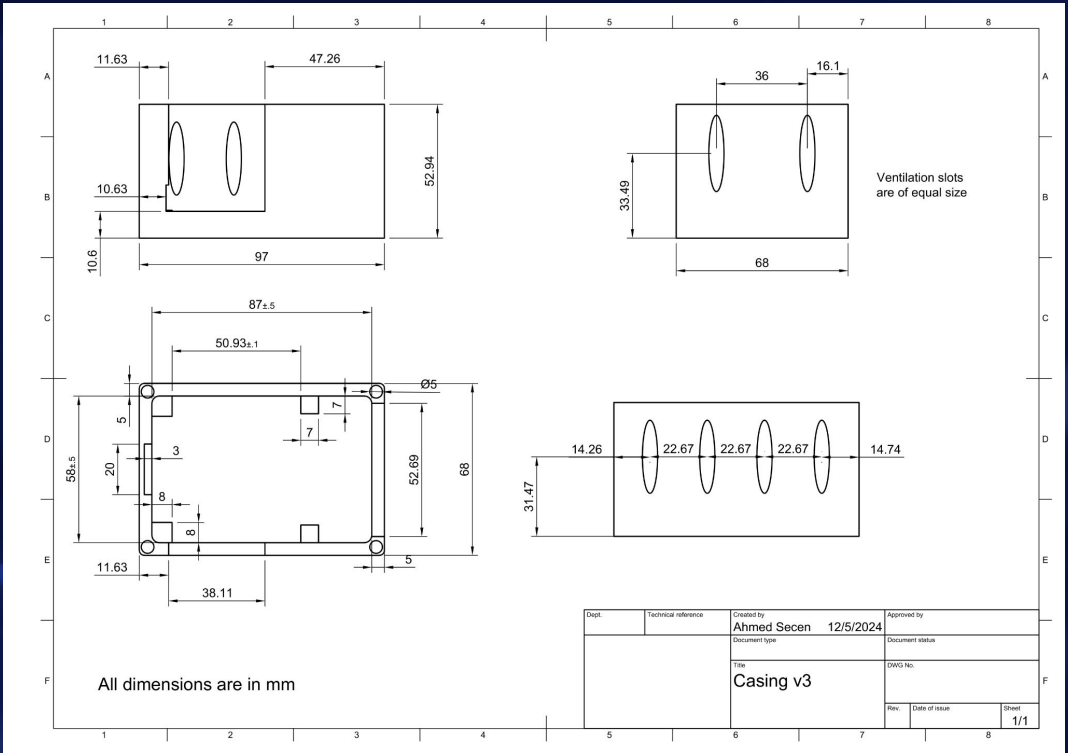


Creating HotSeat

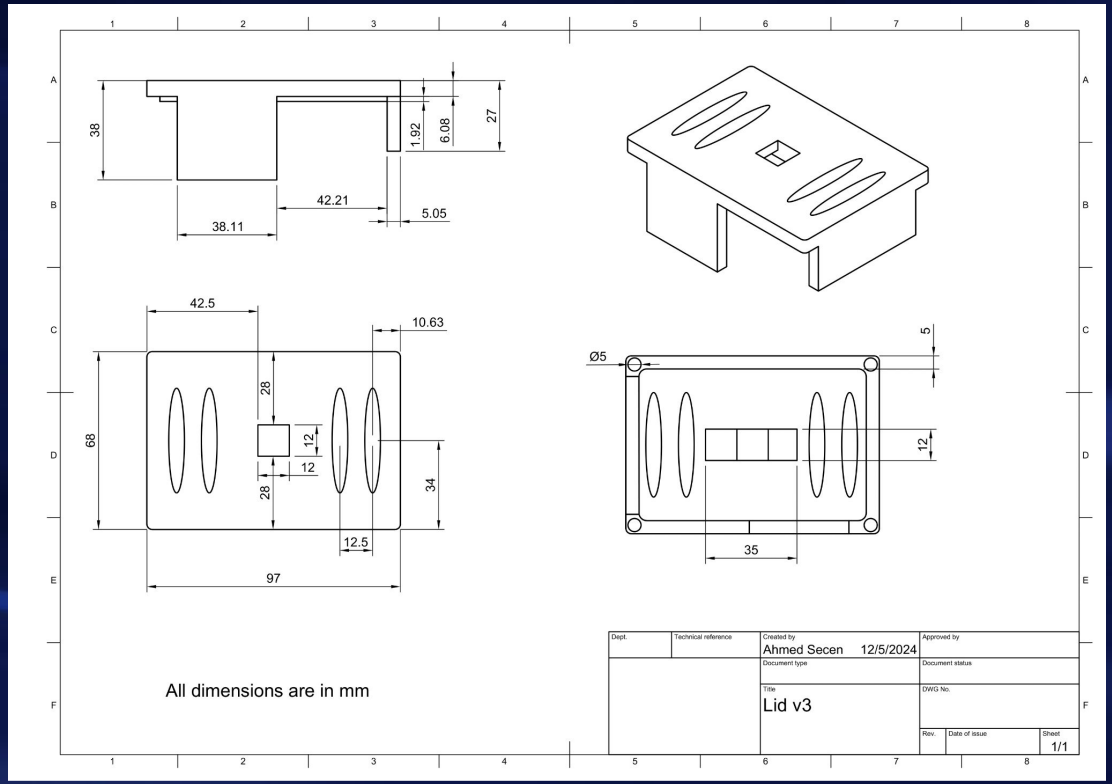
Function Block Diagram



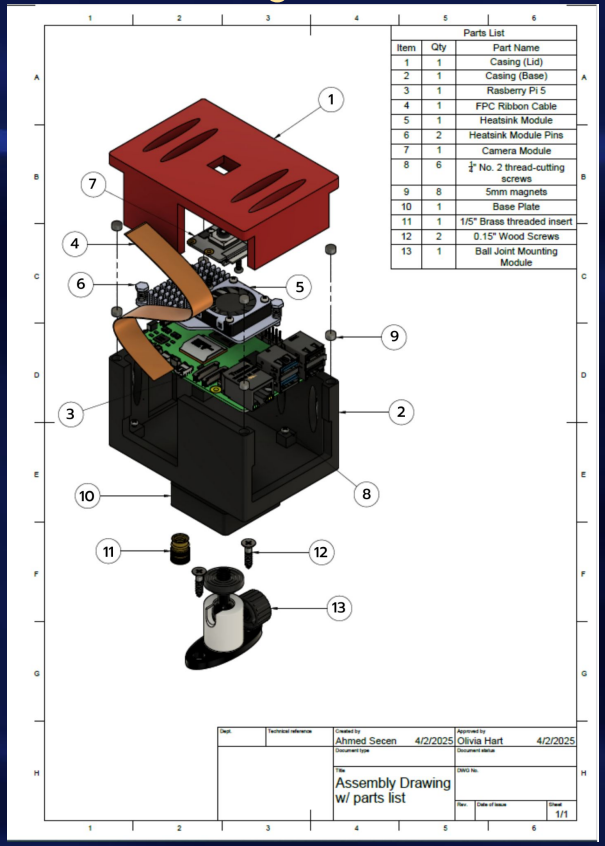
Technical Drawings



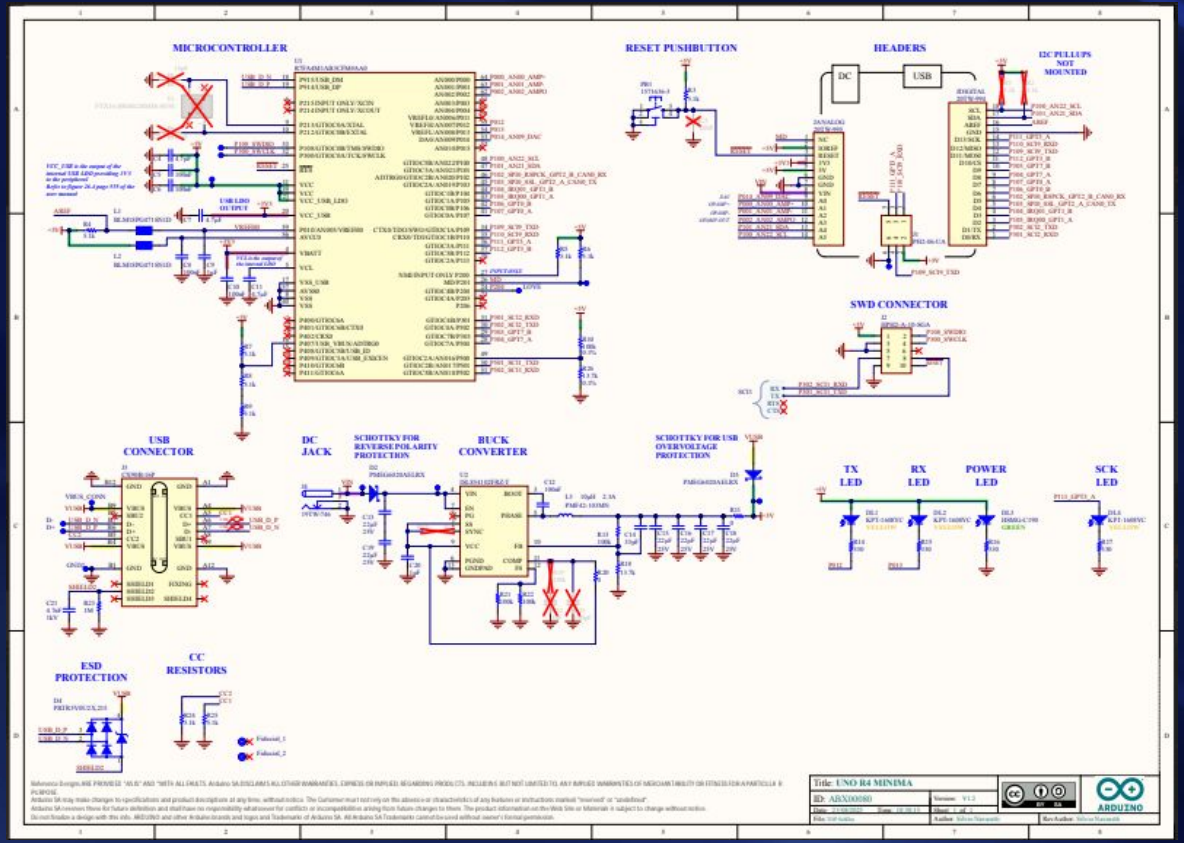
Technical Drawings



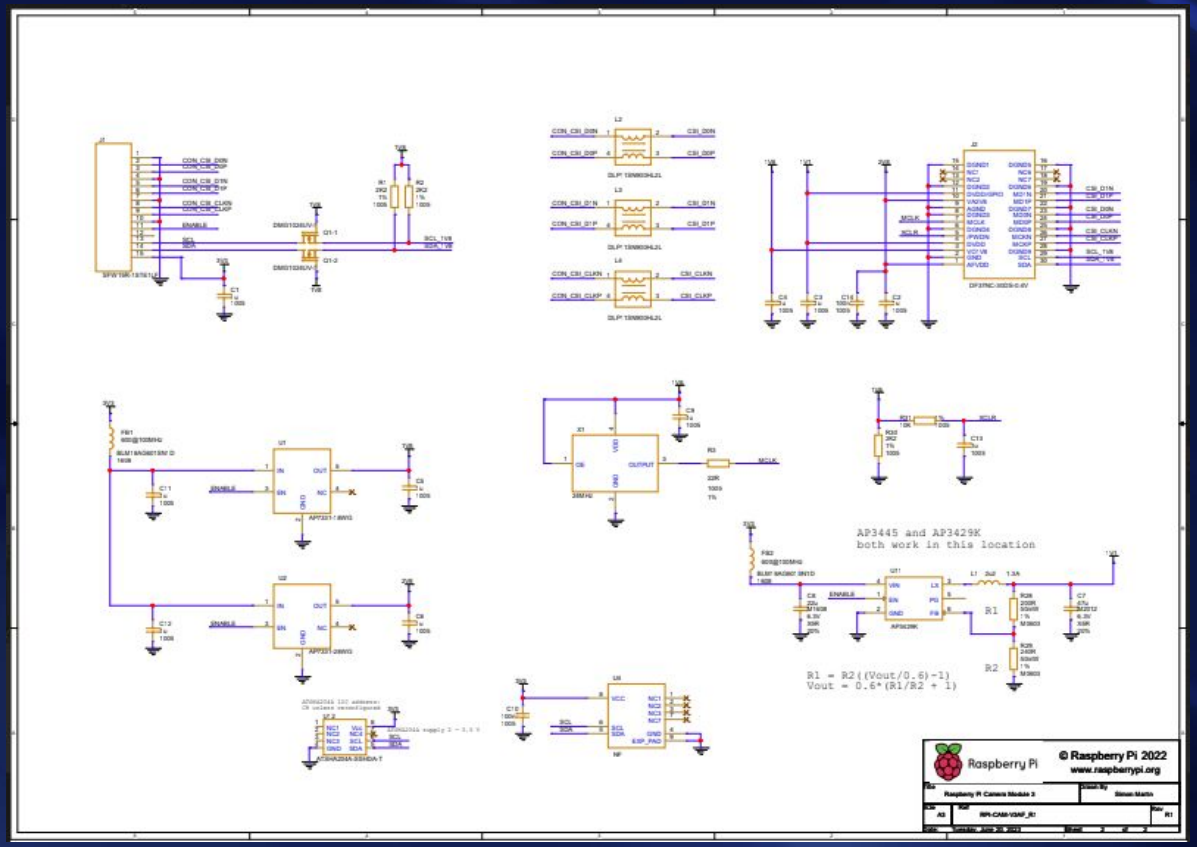
Assembly Drawing



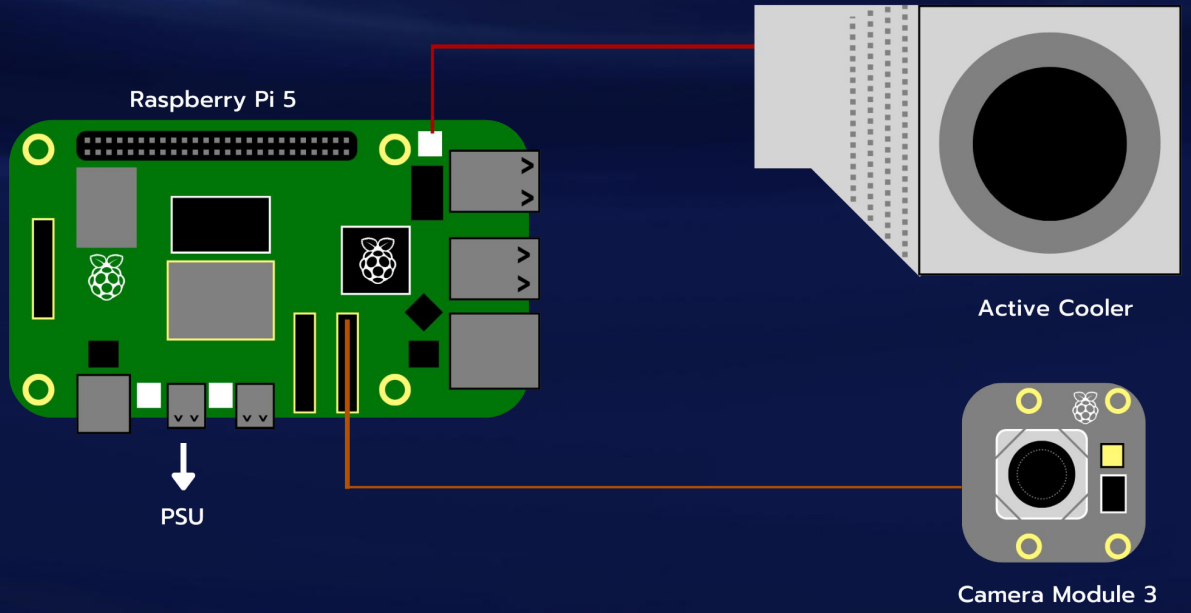
Raspberry Pi 5 Electrical Schematic



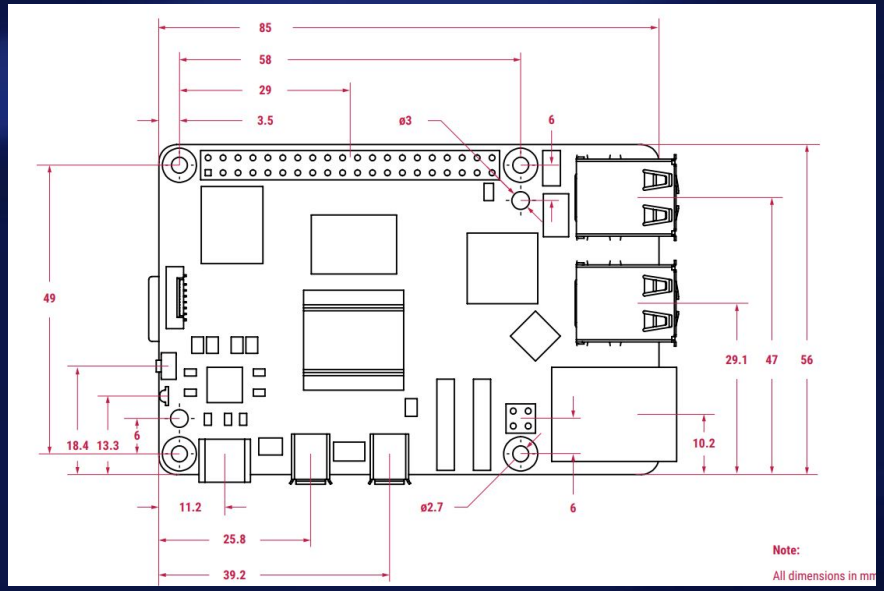
Camera Module 3 Electrical Schematic

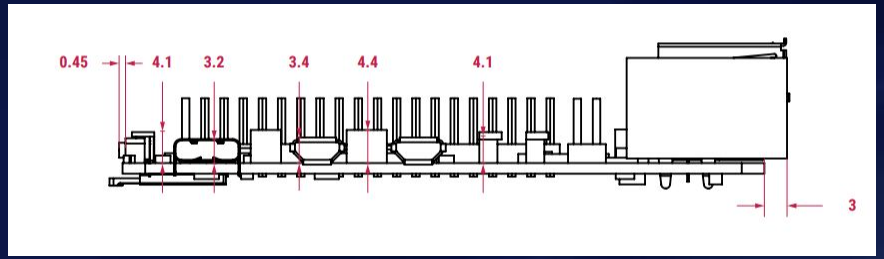


Wiring Diagram



PCB Layout





Note:

All dimensions in mm

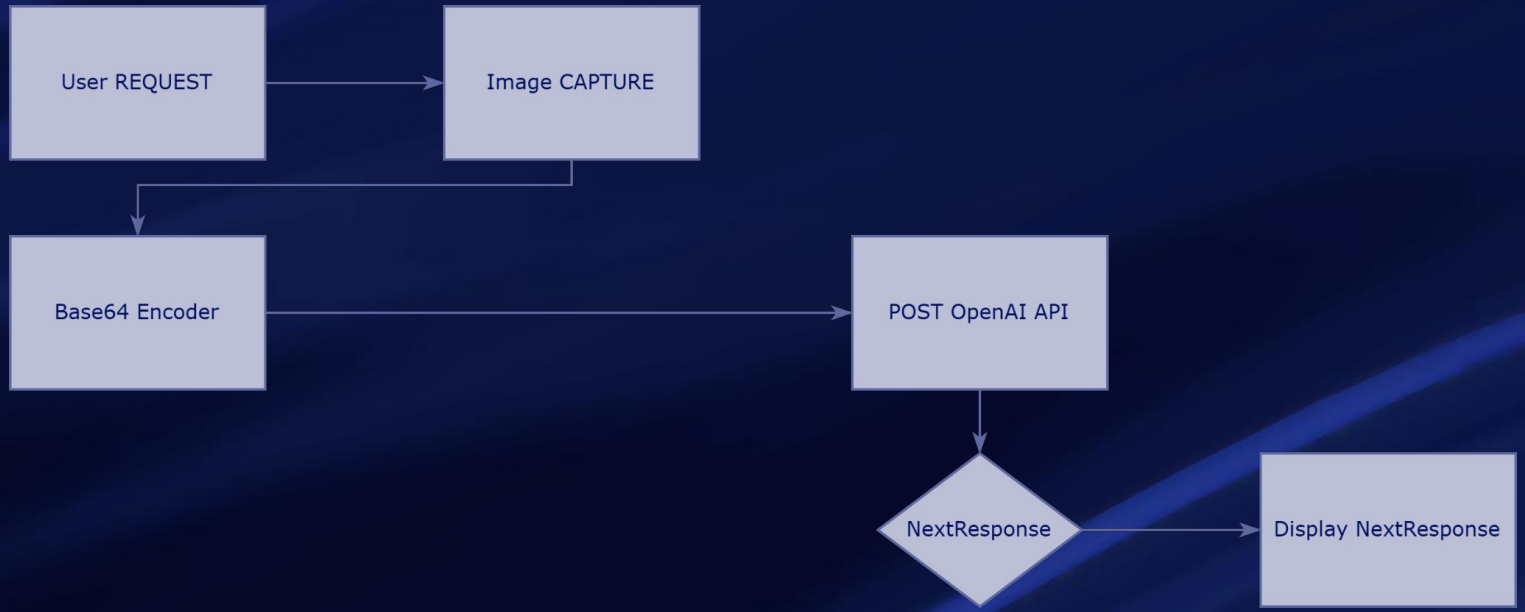
All dimensions are approximate and for reference purposes only. The dimensions shown should not be used for producing production data

The dimensions are subject to part and manufacturing tolerances

Not all of the board components are shown. Please reference a physical board for representation of componentry

Dimensions may be subject to change

Programming Algorithm Flowchart

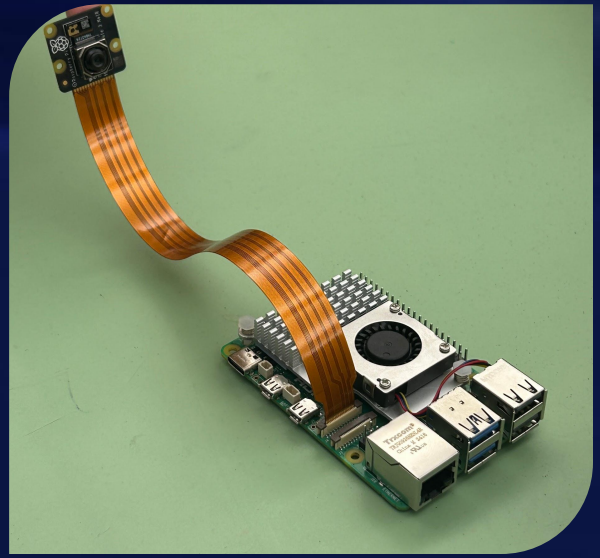


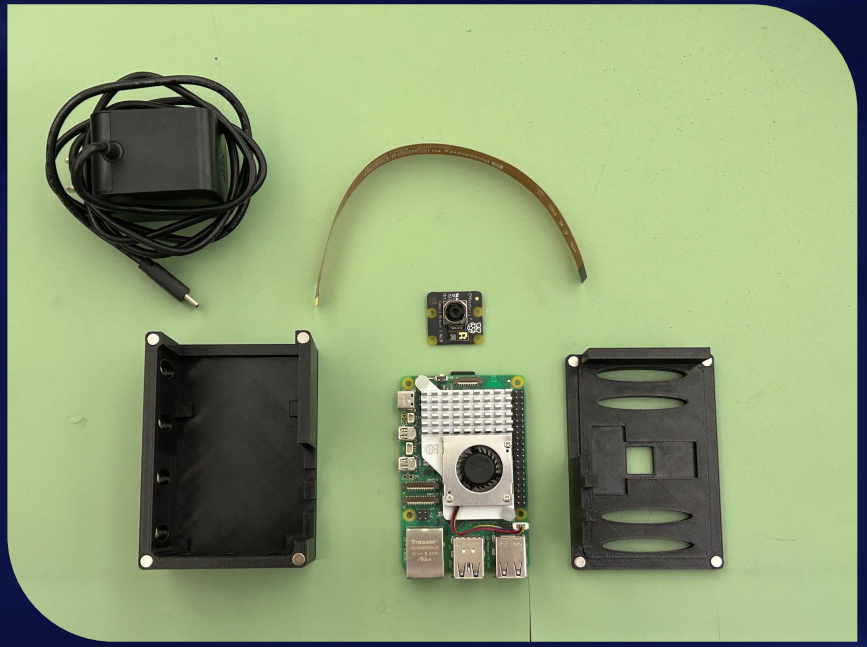
Bill of Materials- Semester Two

Item	Category	Unit Cost	Total Cost
Cerpourt Threaded Inserts	Hardware	$3.66	$3.66
Camera Swivel Joint	Hardware	$8.90	$8.90

Total: $12.56

Build and Assembly Record

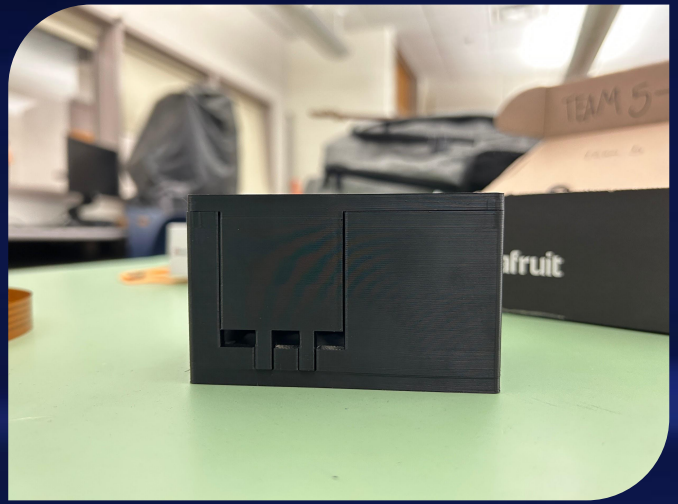




Build and Assembly Record

Form

- **SYSTEM HOUSING** should be printed with PETG filament
- **SYSTEM** should not exceed 200 grams
- **SYSTEM** should be contained in a 3d printed **HOUSING** 97mm±3mm x 67mm±3mm x 59mm±3mm (Length x Width x Height)



Fit

- **SYSTEM** should be mounted semi-permanently to the wall via self tapping screws.
- **SYSTEM** should remain mounted for at least 3 years.

Function

- **SYSTEM** should detect an **OCCUPANT** in a chair from 15 ft away
- **SYSTEM** should detect chair data upon **USER** request with a maximum latency of 1 second.
- **SYSTEM** should be able to detect 2 **OCCUPANTS** with an accuracy of ± 1
- **SYSTEM** should be powered via wired 5.1V 5A power.

Prototype Test Result and Evaluation

3.1.2 Weight: Pass

3.1.3 Housing: Pass

3.2.1 Range: Pass

3.2.2 Latency: Pass

3.2.3 Quantity Detectable: Pass

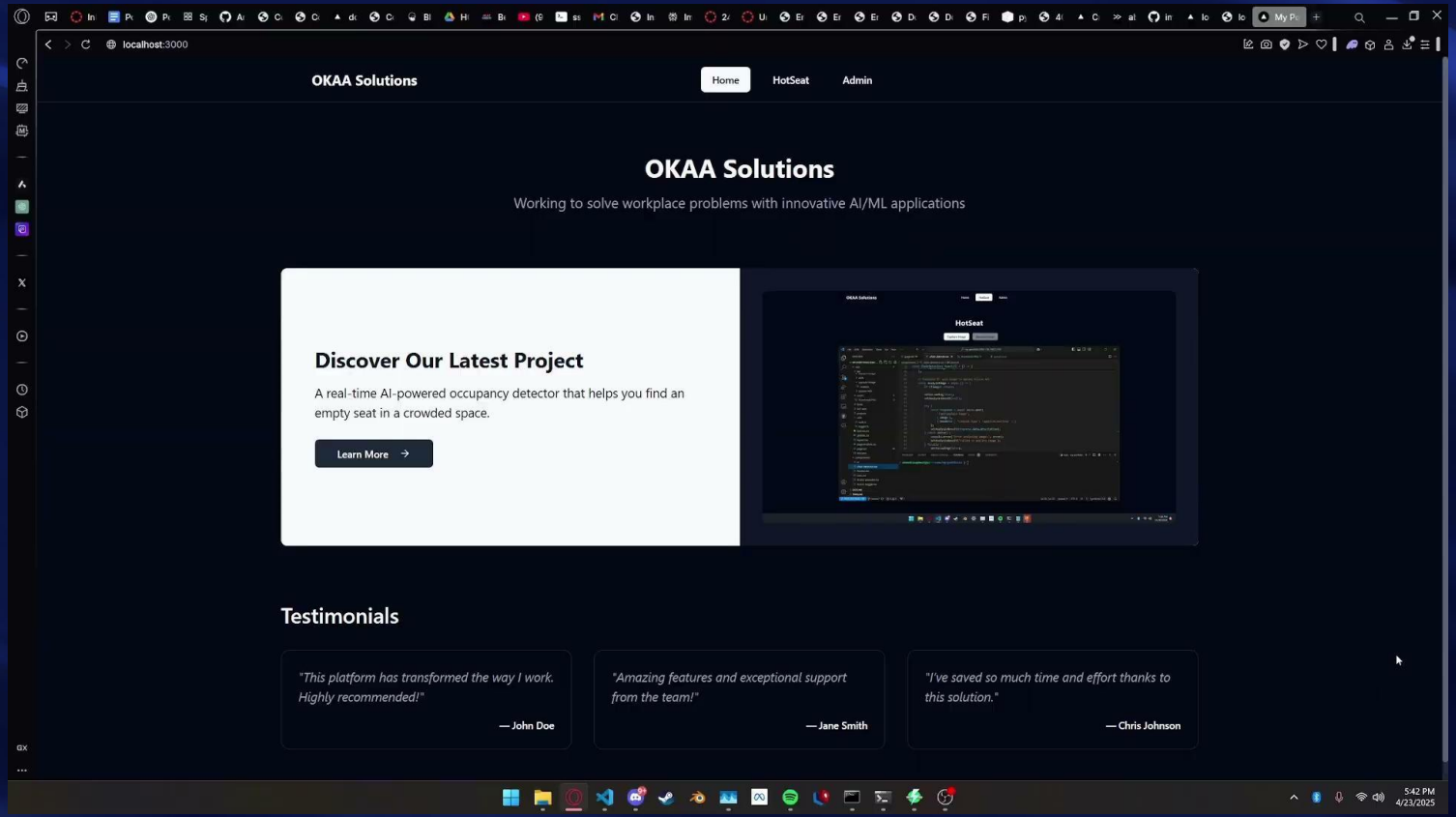
4.1.1 Operating Temperature: Pass

4.1.3 Lifetime: Pass

4.2.1 Failure Rate: Pass

4.10.1 Environmental Impact: Pass

Demonstration



Demonstration

Chair Occupancy Detection

Progress

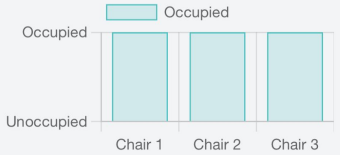
✓ Image Capture

✓ Image Analysis

Complete

Analysis Result

3 out of 3 chairs are currently occupied (100.00%)



Start Again

Demonstration

Chair Occupancy Detection

Progress

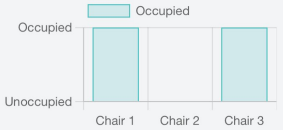
✓ Image Capture

✓ Image Analysis

Complete

Analysis Result

2 out of 3 chairs are currently occupied (66.67%)



Start Again

Demonstration

Chair Occupancy Detection

Progress

✓ Image Capture

✓ Image Analysis

Complete

Reflection

- Development of mounting system
  - Streamlined design from PDR
    - Keyhole mount replaced with screws
  - Issues with threaded inserts
    - Purchased wrong thread width
- Reprint of housing
  - Accommodation for mounting system
- Finalized test procedure documentation
  - Maintaining references between documents

Thank You

Any Questions?