Design Plan Presentation

Small Equipment Checkout Locker Software

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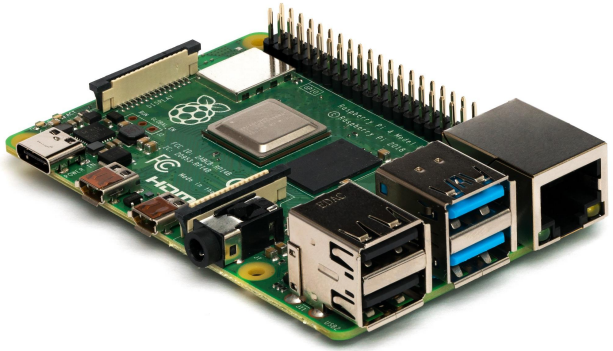
Broader Context

Area	Description	Examples
Public health, safety, and welfare	Our project affects the mental health of students. By providing a way to access equipment outside of ETG's business hours, students will be less stressed about making their project deadlines.	By providing a way to access equipment outside of ETG's business hours, students will be less stressed about making their project deadlines.
Global, cultural, and social	Our project affects the social community of the ECpE department at ISU by improving access to learning tools and materials.	Students could check out tools for classes after ETG closes.
Environmental	Our project can indirectly help the environment by reducing waste. There are not many environmental impacts associated with this project.	Reduce waste associated with item storage
Economic	With our project we will be helping ECPE save hundreds of work hours every semester. Renting equipment at ETG takes a lot of time that staff could be using for projects they may be working on, this project will take care of that. This will also help the student save money since they won't have to rely on buying their own equipment if they need it after ETG is closed.	By reducing the interactions between ECPE students, ETG staff will be able to handle any complex requests they may get and work on any other projects they may have as well. Students won't have to depend on ETG hours or having their own equipment if they need something for a class. This will help the student save money and time as well.

User Needs

- ECpE students need to access materials to work on projects outside of ETG staff hours
  - There is currently no way to get this access
- ETG staff need a way to provide students with materials after close
- ETG staff are extremely busy and do not always have time to assist students



Prior Work/Solution

- Amazon Hub Lockers: When users order something from Amazon, they can have it shipped to the nearest/desirable Amazon hub locker. When their package is delivered, they will receive an email containing a unique code and instructions to pick up their package at the chosen location. Once they enter this unique code, a locker will open so they can grab their package and leave.

Technical Complexity

- Several different components that must communicate with each other and follow industry standards
  - Webpage front-end
    - Uses Javascript, HTML, and CSS
    - Needs to be compatible with both browsers, mobile devices, and a touch screen display
  - Backend Server
    - Uses a Flask API and python to communicate with database and hardware
  - Database
    - MariaDB to store data for the application
- This ensures the project will be as modern as possible without sacrificing reliability

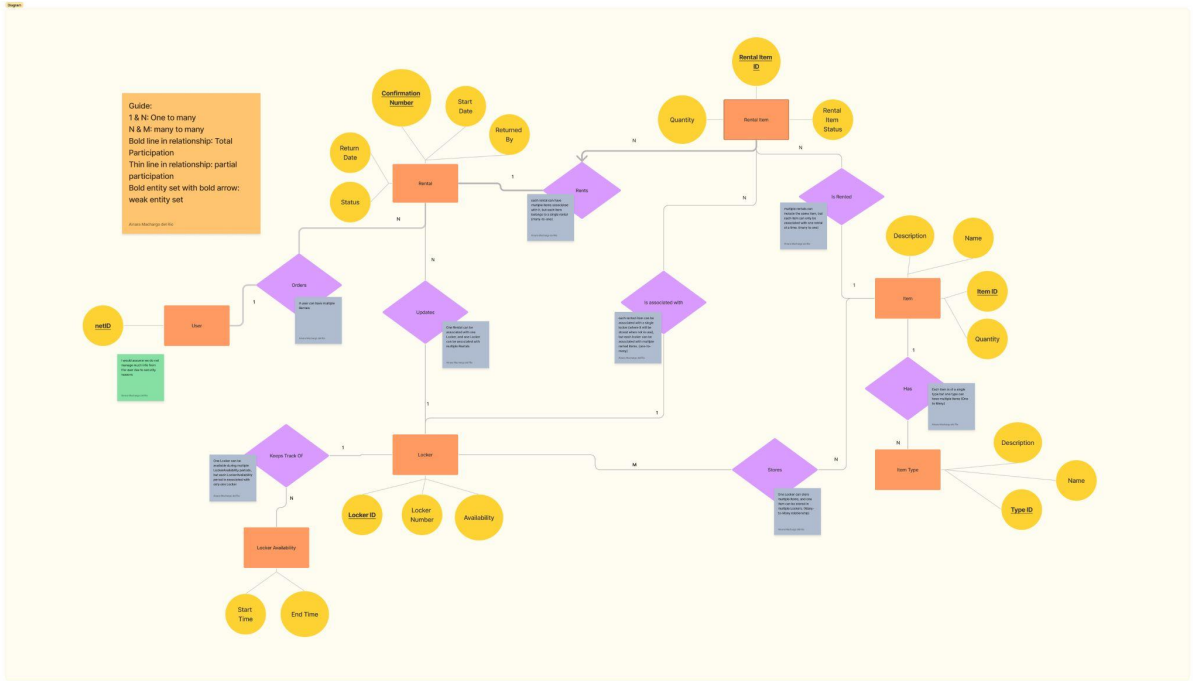
Design Exploration

- Host the server on the Raspberry Pi itself or on a separate server?
  - How to make sure the project is as reliable as possible
- What type of database should we use?
  - There are several viable options
- How can we reliably interact with the hardware?
  - Reliability is the key factor

Proposed Design - So far we have:

- Developed the front end to match the ISU HTML/CSS template
- Developed a Flask API capable of remotely opening and closing the locker door
- Laid out the database schema
- Configured the Raspberry Pi to run the application and tested that it can operate the hardware
- Refined our existing design to improve reliability after noticing potential issues and raising concerns with our client

Design Visualization



Areas of Concern and Development

- The biggest concern is what types of disasters or system failures do we need to plan for in the project. This affects how we will approach the high level design.
    - Currently, for the issue of system failure and backups, we plan to have a server to store backups that will be updated daily. We have already consulted with our client and advisor and they agree that this would be an adequate solution for our problem.