Project Name – Lockheed Martin RFID Keyed Gate

Overview
Lockheed Martin approached our group with a project involving the creation of a logging system to track usage of their “Innovation Garage”. In order to log the people going into and out of the space, Lockheed envisioned a gate that uses RFID tags to grant entry and to identify the individual users. In order to monitor tool usage the lock is modular enough to mount on multiple surfaces and can be adapted for locking cabinets instead of just a gate. The locking mechanism and gate parts were to be 3D printed so that spare parts could be made and modifications to the design could be done in house by Lockheed.

Objectives
- Create a physical “gate”
- Design and implement a 3D printed, modular locking mechanism
- Store information in a database
- Create a frontend to interact with the database
- Communicate between a Raspberry Pi and an Arduino microcontroller

Approach
- Used 3D CAD to model the lock enclosure and locking mechanism
- Utilize the free 3D printing in the Library to test the design and tolerances
- Designed a system with cheap endpoints for easy scalability
- Raspberry Pi 3 houses MongoDB database to store logs and permissions as central “Hub”
- Arduinos are the microprocessors controlling the locking mechanism

Outcomes
- Created a modular locking system that logs RFID tags as the lock is open
- Creating a monitoring system does accomplishes two main tasks:
  - By gathering data on the space usage, management can fund the Innovation Garage accordingly and representatives have data to show management.
  - By locking the space and the tools within it, we restrict access to people who are not trained or authorized to enter the space or use any tools, reducing wasted materials and
restricting untrained personnel from possibly damaging equipment.