Exam Collector

Problem:

With Covid being around to stay, there is a bigger focus on preventing the spread of pathogens. Dr. Bigelow wanted us to create a contact free way to collect and sanitize exams, quizzes, homework etc. so that faculty do not come into contact with pathogens while grading exams. The solution to this problem was to create a two unit system including an incubator which would sanitize the exams and a collection unit which would be brought to classrooms to collect the exams.

Senior Design Group 4

Advisor: Dr. Bigelow

Team Members:

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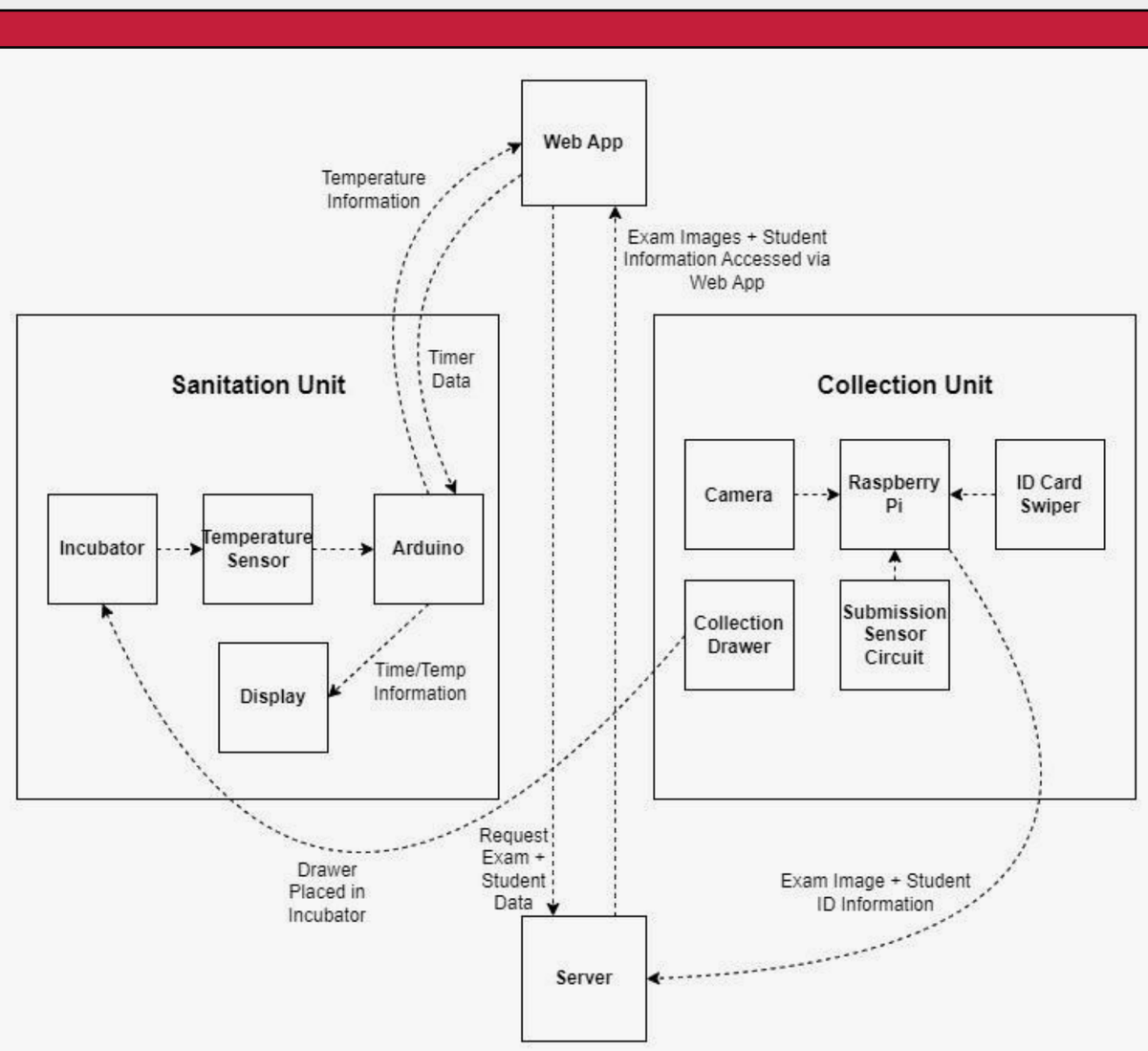
Requirements

Functional:

- Must heat Exams to 70 degrees C
- Communicate with Web App
- Record when student submits exam
- Collection unit must be lightweight

Non-Functional:

- Contact Free temperature control
- User system in Web Application
- Card Swiper functionality



Operating Environment:

The sanitation unit will be located in a room only faculty have access to. The collection unit will be brought to the exam room to collect the exams. The exams will then be brought to the sanitation unit to sanitize them.

Temperature Sensor Module:

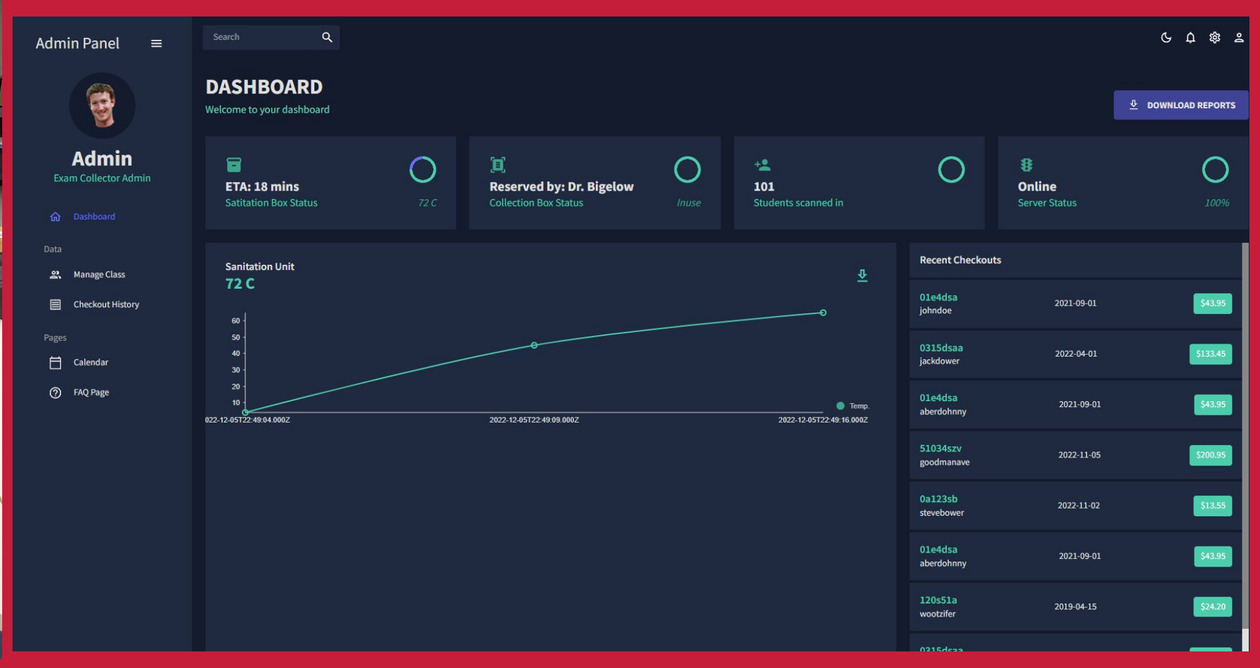
Controlled by Arduino system, Records temperature to ensure 70 degrees Celsius is consistent through heating process. Sends temperature values and timer values to Web App.

Collection Unit Module:

Controlled by RasPi system. Has card swiper functionality to take data of students who've taken test. Uses a light sensor circuit to take a picture of exam when it is inserted into the unit. Exam data is then sent to the faculty.

Web App:

Ran on a Linux Remote Server. The web app is a 3 tier website that uses React.js on the frontend and Node.js on the backend. For our Database we are going to use mysql. Functionalities include: teachers can checkout the collection/sanitation box, download exam data, See checkout History and calendar, and See Sanitation Box Status



IEEE Standards:

- ISO/IEC/IEEE International Standard Requirements for managers of information for users of systems, software, and services.
- ISO/IEC/IEEE International Standard Guidelines for the application of ISO to computer software
- ISO/IEC/IEEE International Standard Life cycle processes -- Risk management

Testing:

- Used temperature sensor in the middle of the stack of exams to ensure all pieces of paper are heated fully. Found the correct time. Coincided with data from CDC study of Covid.
- Web application used a series of Python unit tests
- Collection Box functionality was tested manually