

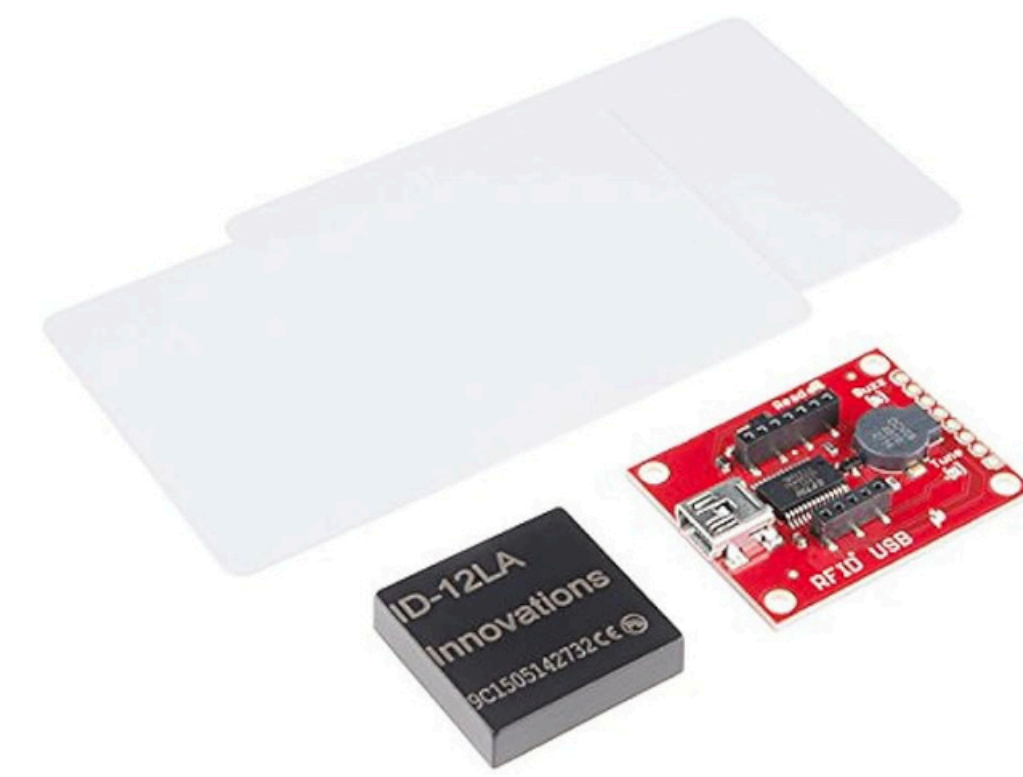
## Problem Statement

- Although parking lots are efficient, they should be better monitored. Efficiency would be increased by using a new management system, but the cost is prohibitive.
- Alternatives to improve campus security have been rejected because they would have an adverse impact on the financial situation of families of JBU students.
- To guarantee the welfare of students, the institution must strike a balance between strong security measures, economical responsibility, and ideal parking efficiency.

## RFID

Device used for project:

- Sparkfun RFID Starter kit

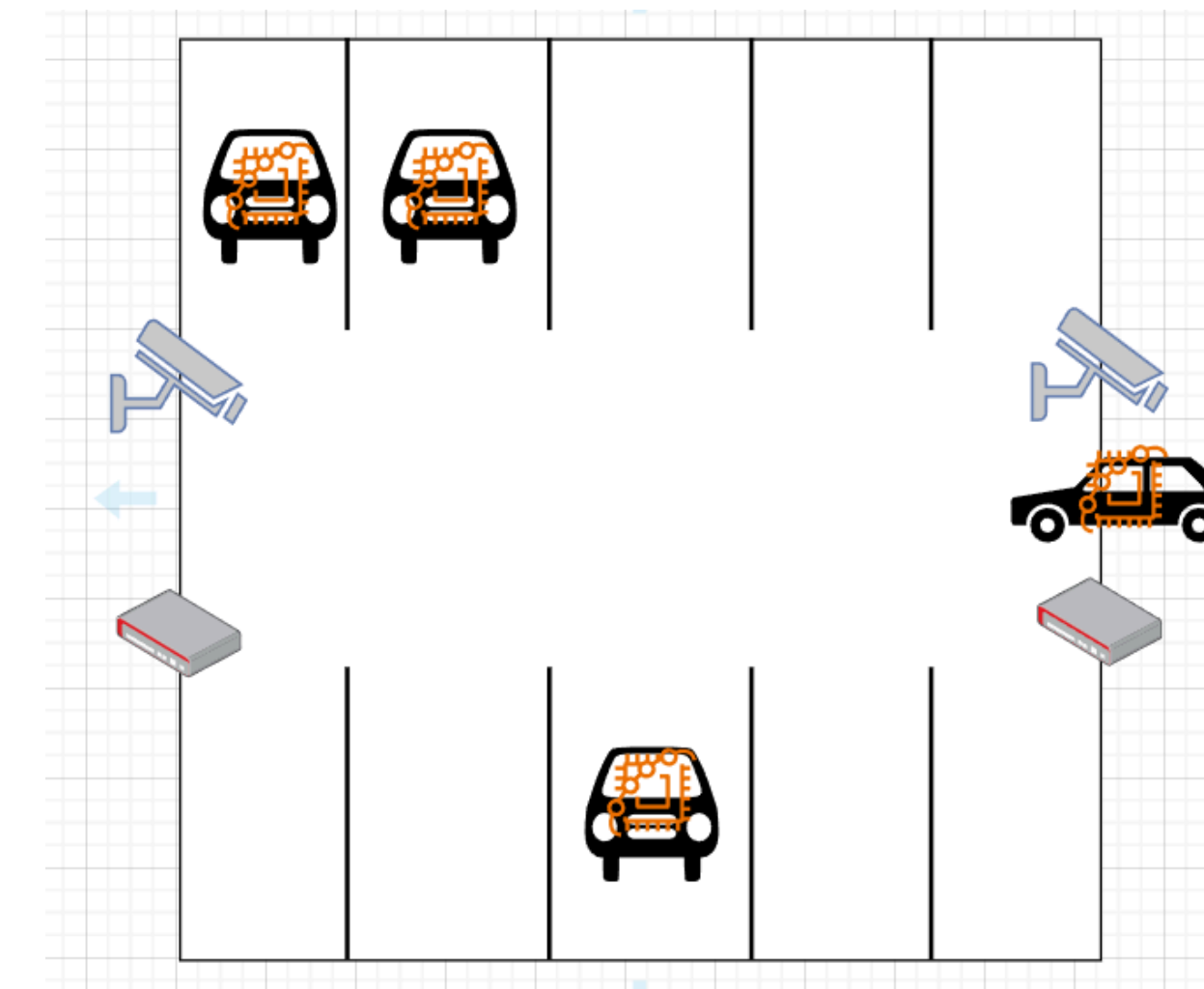


Device to use on real scale project:

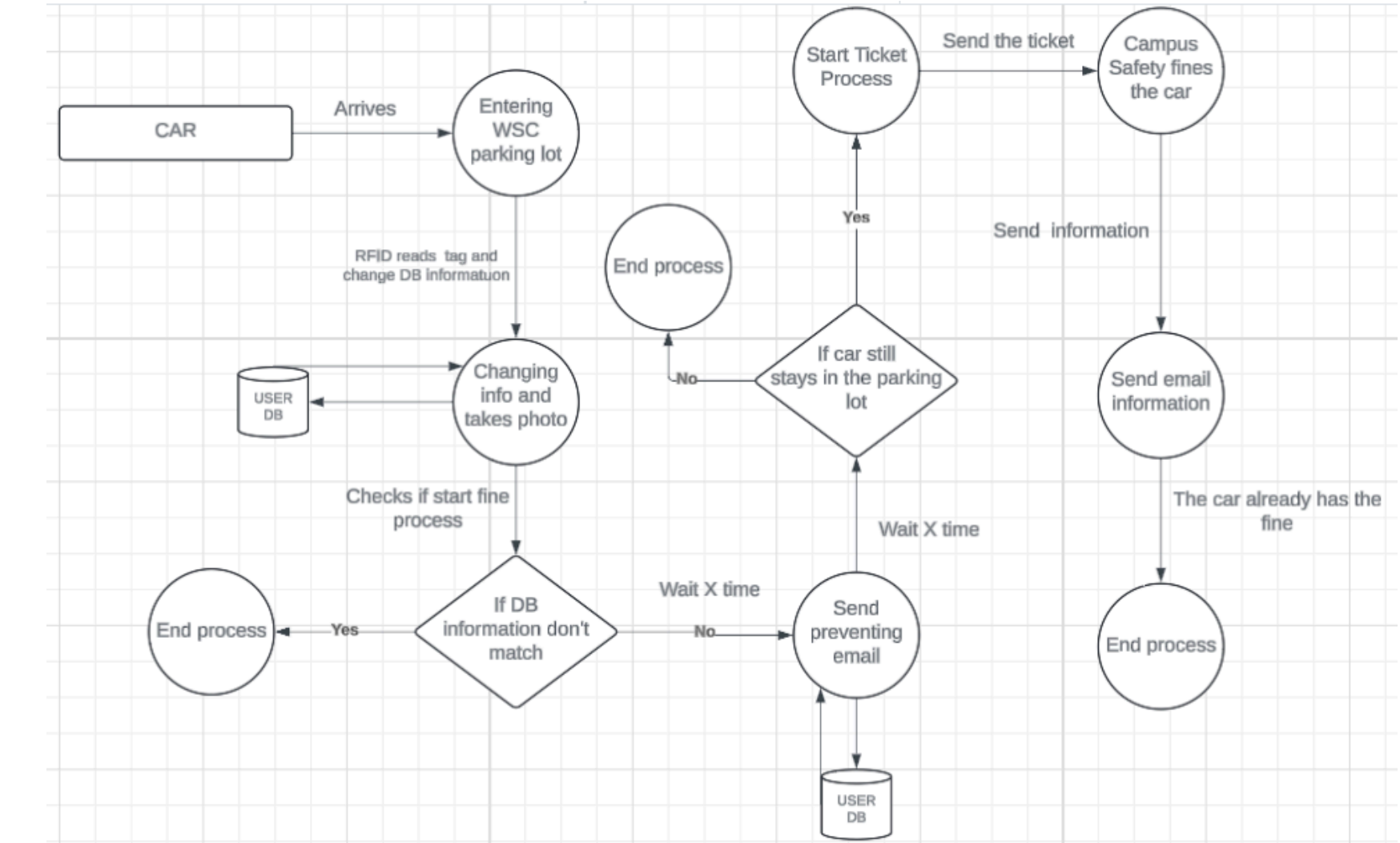
- UHF RFID IP67 Integrated Reader



## Example



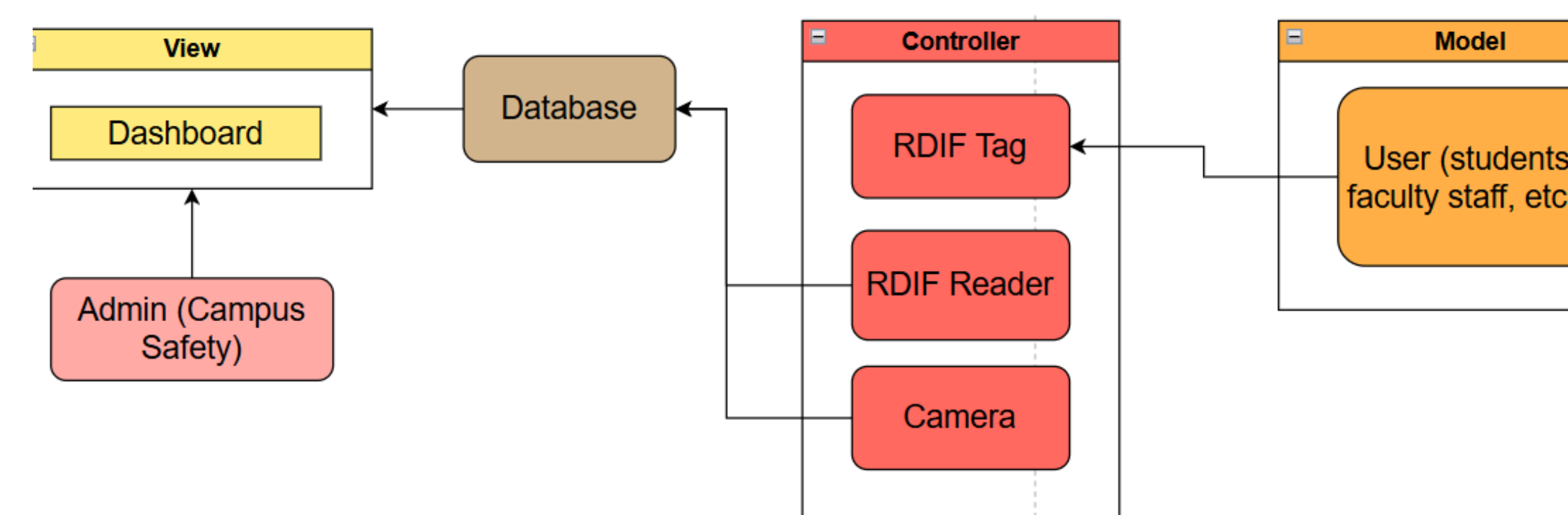
## Data Flow Diagram Lvl 1



## Solution

- Install a parking lot camera and RFID reader system that is run by students. By using student involvement instead of costly commercial technologies, this strategy would improve monitoring security and efficiency while remaining cost-effective. The method eventually supports student welfare without adding to the financial load on families by striking a balance between security requirements and financial accountability.

## Architecture



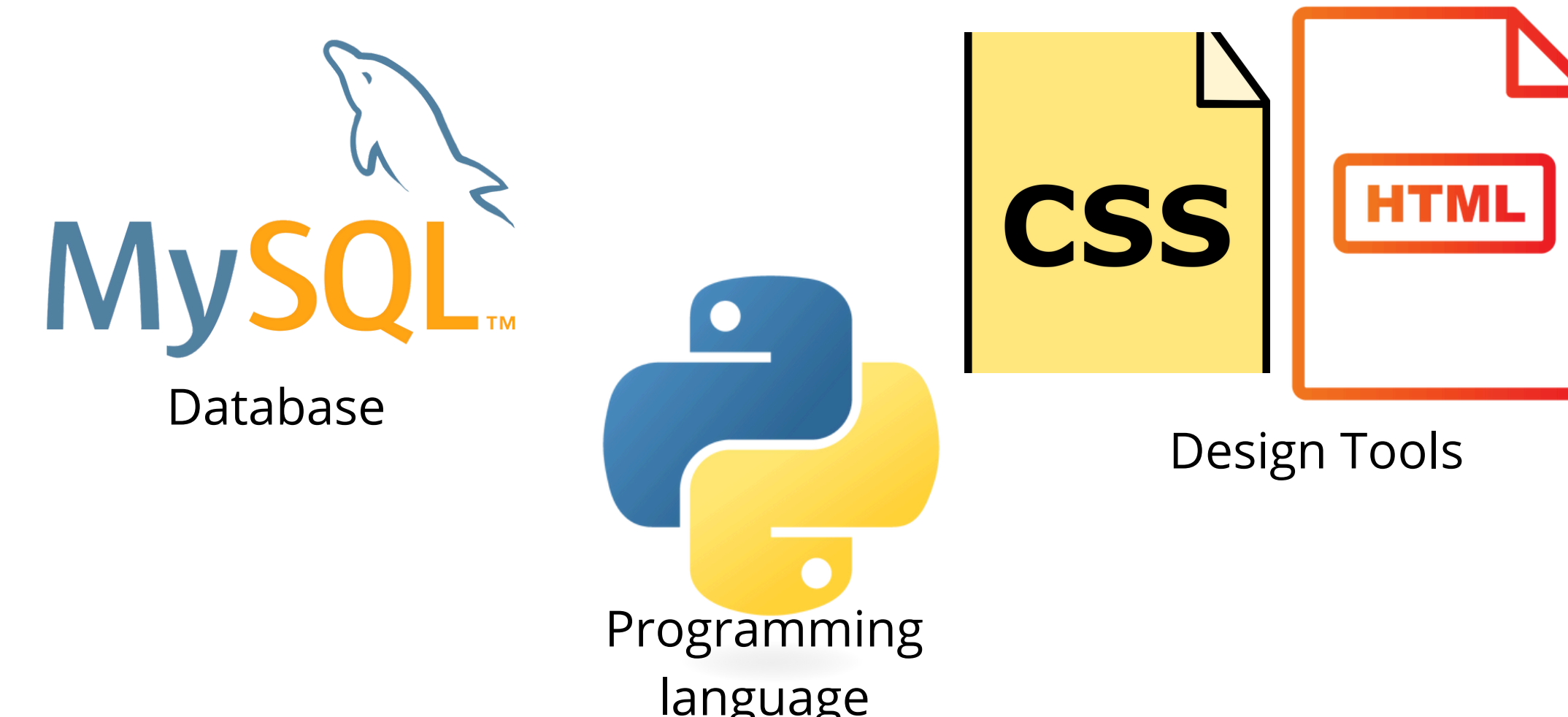
## Functional & Non-Functional Requirements

Functional Requirements		
ID	Requirement Description	Priority
FR1	The system must allow administrators to manage user and vehicle data.	High
FR2	The system must monitor vehicle entries and exits using RFID technology.	High
FR3	The system must detect unauthorized parking behavior based on RFID location data.	High
FR4	The system must allow campus security to issue parking violations to offenders.	High
FR5	The admin dashboard must display real-time data on active violations and vehicle status.	Medium
FR6	The system must generate reports of violation history per user.	Medium
FR7	The system must send notifications or emails to users who receive violations	Medium
FR8	The system must log all student vehicle activity in a secure database.	High

## Scrums

- SCRUM 1: RESEARCH AND PROJECT PLANNING
- SCRUM 2: RFID DATA PROCESSING AND MONITORING
- SCRUM 3: ADMINISTRATIVE TOOLS AND MONITORING
- SCRUM 4: TESTING AND OPTIMIZATION
- SCRUM 5: FINAL DEPLOYMENT AND ESTIMATION

## Programming tools



Non-Functional Requirements		
ID	Requirement Description	Priority
NFR1	The system must process RFID events and update the database in real time.	High
NFR2	The system must be user-friendly, especially for administrative staff on the dashboard.	Medium
NFR3	The system must be reliable, ensuring accurate tracking of vehicle movement.	High
NFR4	All user data and violation records must be securely stored in the database.	High
NFR5	The system should be scalable to support future integration with other campus services.	Low
NFR6	System response time for dashboard updates must be less than 2 seconds.	Medium

## Gantt Chart

August	September	October	November	December	January	February	March	April	May
Idea definition & meeting research	Problem Statement & Scrum Design	Technology stack & Development plan	Tool Investigation & Data Storage	System Design & Dashboard	Violation Detection Algorithms	RFID Integration & Data Processing	Notifications & Testing	Performance & Prototype Deployment	Documentation