Milestone 1:

Smart Bin/IOT Bin Project

Specification:

A rubbish bin that contains various sensors that provide information to cleaning staff on the status of the bin. For example a level meter using an ultrasonic sensor will be able to sense when the waste in the bin has reached a certain level. When the bin is full cleaning staff will be notified via a notification on a phone and the bin can be cleaned.

Features:

* Auto Open/Close lid
* Notifications on bin's status provided to cleaning staff.
* App that finds nearest smart bin.
* Reward System. Described below

In addition to the level sensor described above the bin will also utilize a reward system for people who throw their trash away. Potentially a store, like a coffee shop, may have QR codes or a special barcode on their coffee cups. When a customer buys a cup and then proceeds to throw it away in a Smart bin the Bin will read the code on the cup. This tells the bin that the cup bought by this specific customer is being thrown away and then generates points on the customers rewards card for that specific store. These points can then be used to get free cups of coffee or other rewards like discounts. This reward feature is used to incentivise the throwing away of rubbish rather than leaving it in public places.

Prototype Implementation:

* IR Sensor or Ultrasonic sensors to gauge the level of the bin. IR sensors may also be used to track outside movement so if someone is in close proximity to the bin it will open the lid.
* NFC can also be used to identify the trash being thrown away.
* Wifi must be used to communicate reward system data to a server.
* Both Arduino and Raspberry Pi will be used.
  + Arduino to control sensors on the bin itself
  + Raspberry Pi is used to handle NFC and network communications, as well as stores bin locations and user account information.

Anticipated Difficulties:

* How to link the customer data to the item being bought. When the piece of trash is being thrown away, the bin must link up to the specific account of the customer who bought the item in the first place. Figuring out a way to do this easily and effectively without too much burden on the store itself is difficult.
* Setting up Raspberry Pi to relay customer data from the bin to a data base. How does the information stored in a QR code get read and then sent to a database using the Raspberry Pi.
* Creating incentives for merchants to use this system.
* Designing a robust bin that can handle day to day usage on the streets.
* How to store GPS locations of bins and send that data to an app used by customers.

Member Responsibilites:

Joshua and Brenden: Hardware implementation. What sensors to use, Design of bin, Setting up an NFC reader on the bin etc.

Patrick and Elias: Software implemntation. Database to store cusomer data. Relyaing bin level information to cleaning staff etc.