EE/CprE/SE 491 WEEKLY REPORT 2   (2/10/19 – 2/15/19)

Group Number & Project Title: (5) Road Safe Phone Case
Client: Christine Shea-Hunt
Advisor: Dr. Diane Rover
Team Members/Role: (Software) Zixiao Lu, Yifei Wang, (Hardware) Kedan Xin, Yue Chen, Sarah Baratta

Weekly Summary

After meeting with the project advisor over a week ago, several uncertainties about the project details were revealed, such as restrictions that may make the end-product less marketable and so on. The object of this past week was to meet with the client to finalize these details, so that the team would have a better understanding of the client's wishes and a clearer path of what functionalities need to be implemented. After meeting with the client, there were significantly less questions about the what the end product should be like, and the team were able to research more components, such as the Arduino and locks, to incorporate into our initial design. Funding for these components was also secured from the client.

Past Week Accomplishments

Collectively, the team prepared solutions for potential limitations that stemmed from the client's first proposal. During the call with Christine, the client, ideas were bounced around as to how the product, a case to lock keys and phone, should be accessed in the case of emergency, if there should be any access to phone functions such as GPS, the size of the case itself, if there should be phone-charging capabilities, and so on. Team members also looked in to parts, and rented an Arduino from the ETG to test if it could implement a locking mechanism. Shown in Figure 1 is a general schematic of the circuit connected to the schematic. The sensor circuit has a switch that closes when an object is detected. When an object is detected, only one of the two locking systems is powered. When the object is removed, only the opposite locking system becomes locked.

Figure 1
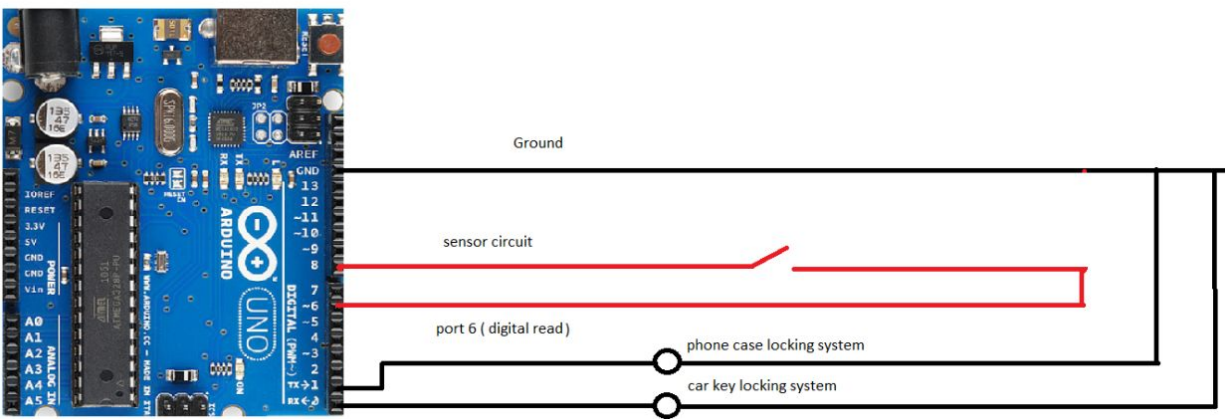
Shown in Figure 2 is the code used to describe the circuit behavior. The circuit was then built and tested, as shown in Figure 3. The LEDs were used to represent two locking mechanisms.

Figure 2

```
int buttonState;
void setup() {
  // put your setup code here, to run once:
  pinMode(0,OUTPUT);
  pinMode(1,OUTPUT);
  pinMode(8,OUTPUT);
  pinMode(6,INPUT);

}

void loop() {
  // put your main code here, to run repeatedly:
  digitalWrite(8, HIGH);
  buttonState = digitalRead(6);
  Serial.print(buttonState);
  if(digitalRead(6) == HIGH)
  {
    digitalWrite(1,LOW);
    digitalWrite(0, HIGH);
  }
  else if(digitalRead(6) == LOW)
  {
    digitalWrite(0,LOW);
    digitalWrite(1, HIGH);
  }
}
```

Figure 3
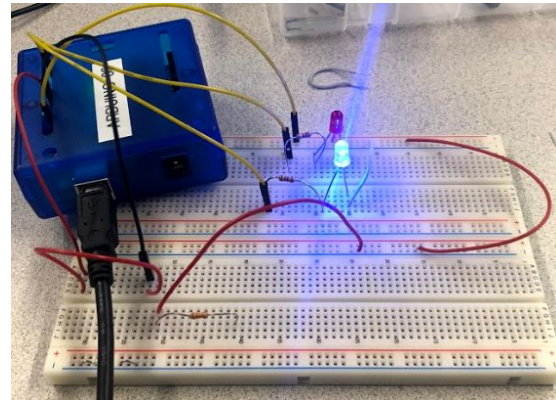
Described below is what each individual team members worked on:

Zixiao Lu: Worked with Yifei to research tutorials on how to use the Arduino (coding syntax and basic functionality), wrote the code for the experimental circuit using the Arduino, and meet/discussed with the client.

 Yifei Wang: Built the physical circuit that was hooked up to the Arduino, meet/discussed with the client, assisted Kedan with researching an object detection sensor, and assisted Zixiao Lu with researching how to use the Arduino.

Kedan Xin: Assisted other team members with testing the experimental Arduino circuit, researched different physical locks to use for the case, researched a magnetic proximity sensor for phone/key detection, and meet/discussed with the client.

Yue Chen: Designed the initial circuit for the phone case locking mechanism, researched microcontrollers to implement the design, assisted team members with testing it with the Arduino, and meet/discussed with the client.

Sarah Baratta: Arranged a meeting time with and discussed project plans the client, wrote meeting minutes, researched potential ways to do object recognition for the keys/phone using object recognition, such as machine learning through a Raspberry pi, TensorFlow, and camera.

Pending Issues

Team members are contemplating using and have started using unfamiliar parts, such as the Arduino. Thus, additional time is spent in learning about the parts before using them. The team is being quite cautious as to avoid investing in parts that will not work in the design later own.

Individual Contributions Table

Name	Individual Contributions	Hours This Week	Hours Cumulative
Zixiao Lu	Arduino research, writing circuit code, client meeting	7	7
Yifei Wang	Arduino and object detection research, building circuit on PCB, client meeting	7	7
Kedan Xin	Arduino circuit assistance, magnet proximity research, client meeting	7	7
Yue Chen	Design/research of the Arduino circuit and construction assistance, client meeting	7	7
Sarah Baratta	Meeting arrangement and summary, object recognition research	6	6

Plans for the Upcoming Week

As a group, parts we plan to use will be run by the advisor to see what opinions she may have regarding the team's choices or if there are perhaps better alternatives to how the team is currently approaching the project. Also, the emergency access for the phone/key case does not have a solution yet. The team has plans for creating a functioning emergency button, but the client wants there to be a somewhat tedious way to reset the box so that drivers will not be inclined to use the button whenever desired. Thus, the team will investigate ways to solve this issue, possibly through some sort of QR code scanner on the case. Together, the team will also continue to develop and finalize the project plan. Individual plans are as follows:

Zixiao Lu: Try to figure out a method for resetting the lock after emergency button is used.

Yifei Wang & Sarah Baratta: Discuss the best sensor with Kedan, and begin to design the physical case. Investigate if 3D printing is affordable and how to access it on campus.

Kedan Xin: Discuss the best type of object detection/recognition sensor for the project with Yifei and Sarah. Once chosen, find and order the part online. Also, find and order small locks that can be used in the circuit/case.

Yue Chen: Order an Arduino for the project, and incorporate new parts of the project into schematics.