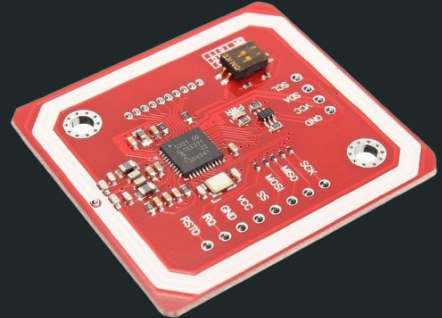# NFC Sign-In System

Team 2869

Goal: Attendance Tracking

➢ Utilizing NFC stickers for attendance allows for:
  ○ Our school limits students going to competitions so knowing attendance is necessary
  ○ Our regular attendance sheet would get misplaced as a result of being passed around to everyone
  ○ A sign in-and-out system Allows mentors to see the elapsed times of students working in the robotics lab as opposed to a yes/no per day
  ○ Less time before meetings spent on getting everyone checked for attendance
  ○ Encourages longer attendance
➢ Data Analytics:
  ○ Number of hours spent in a week or month per student
  ○ Total attendance per day (needed to report this to main office monthly)

What is NFC?

➢ NFC = **Near-Field Communication**, which is a short-range wireless technology allowing you to tap an NFC-enabled devices to another in order to transmit data.

➢ This is used in:
  ○ Contactless payments such as Apple Pay / Google Pay
  ○ Contactless credit cards
  ○ Business cards
  ○ **Identity verification (id badges)**

How we utilized this technology

➢ Our team was looking for a more efficient solution for tracking attendance in the lab

➢ We eventually settled on the idea of giving each student a small sticker with an NFC chip inside to sign-in and sign-out of the lab

➢ Built on a <u>Raspberry Pi 3B+</u> with the <u>PN532 NFC Reader</u>

 + +
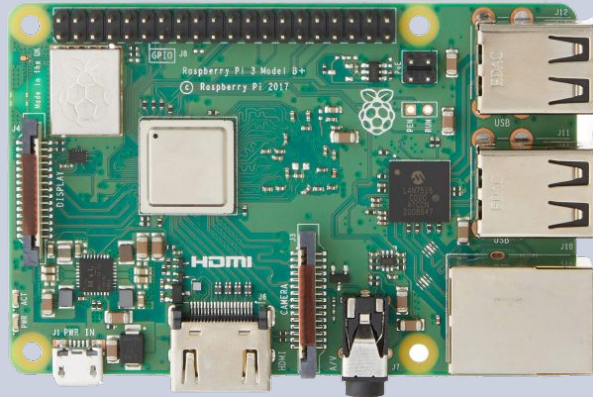
Steps followed to build

1. **Installed OS** on the Pi (Raspbian OS using Raspberry Pi Imager).

2. Soldered headers and **wired the PN532 Reader** to the Raspberry Pi pins.

3. **Enabled a wireless connection** to Raspberry Pi from a personal computer and enabled the PN532 (SSH and I2C).

4. **Installed the required libraries** and tested the NFC scanner ([Adafruit CircuitPython PN532](#)).

Steps followed to build

5. Created a setup.py file to **initialize each of NFC stickers uids** and assign them to team members (stored in names.json).

6. Created a program to **continuously scan and add verified cards to a new csv** files each day (stored as attendance/[date].csv).

7. Created a program to **combine all of the individual data** and get totals for the period of collection.

Code: NFC Tracker

```python
1 ic, ver, rev, support = pn532.firmware_version
2 print("Found PN532 with firmware version: {0}.{1}".format(ver, rev))
3
4 # Configure PN532 to communicate with MiFare cards
5 pn532.SAM_configuration()
6
7 print("Waiting for RFID/NFC card...")
8 while True:
9     # Check if a card is available to read
10     uid = pn532.read_passive_target(timeout=1)
11     # print(".", end="")
12     # Try again if no card is available.
13     if uid is None:
14         continue
15     print("Found card with UID:", [hex(i) for i in uid])
```

Example Input Data

Code: Compilation of Data

```python
def findTimes(csv):
    rows = csv.split("\n")
    allPeople = {}
    for row in rows:
        if row[0] == "N":
            continue
        split = row.split(",")
        name = split[0][10:-2]
        time = split[1]
        try:
            allPeople[name].append(time)
        except:
            allPeople[name]=[time]
    print allPeople
    for key in allPeople:
        totalTime = 0
        if(len(allPeople[key]) == 1):
            totalTime = 30
        else:
            for i in range(0,len(allPeople[key]),2):
                try:
                    totalTime += time_dif(allPeople[key][i], allPeople[key][i+1])
                except:
                    totalTime += 0
        allPeople[key] = [allPeople[key], totalTime]
    outcsv = "Name,Elapsed Time,All Times\n"
    for key in allPeople:
        outcsv+=key +","+ str(allPeople[key][1]) + ", " + str(allPeople[key][0])[1:-1]+"\n"
    return outcsv
```
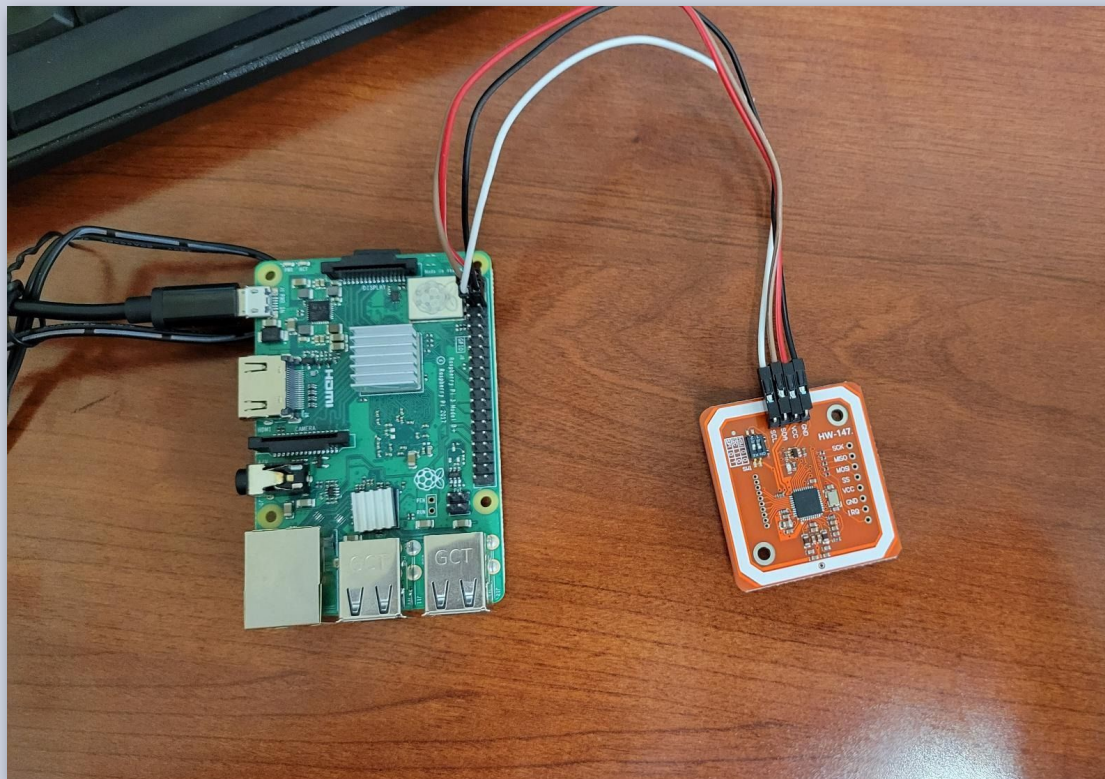
```python
def time_dif(time1,time2):
    h1 = int(time1[:2])
    m1 = int(time1[3:])
    h2 = int(time2[:2])
    m2 = int(time2[3:])
    if(h1 == h2):
        return m2-m1
    else:
        return ((h2-h1-1)*60 + (60-m1) + m2)
```

Example Output Data

Name	Elapsed Time (min)	All Times:			
Person 1	605	5:40	7:45	10:12	18:12
Person 2	40	16:00	16:40		
Person 3	30	13:53			
Person 4	102	11:42	13:24		

Hardware Demo

Thank You!

Any Questions?