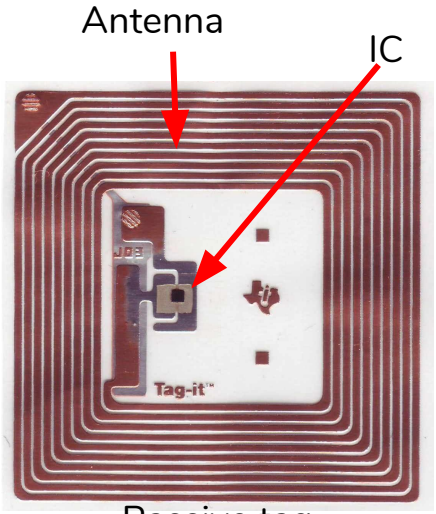
RFID Basics Workshop

What is RFID?

- Stands for Radio-Frequency Identification
- System for scanning a card/tag and and performing certain physical actions based on data contained in a database
- Similar to the function of barcodes, but uses radio waves rather than optical sensors to transmit data

How does RFID work?

- **Passive tags**
  - Passive RFID tags have an antenna and an integrated circuit (IC)
  - The RFID reader sends a signal which is picked up by the antenna in the tag and converted to energy
  - That energy is used by the IC to send a signal back to the reader
- **Active tags**
  - Active RFID tags have an internal power source (a battery)
  - Have a much longer range than passive tags, but also more expensive and bigger
  - There are two types of active tags
    - **Transponders** wait to receive a signal from a reader, then sends back a signal
    - **Beacons** repeatedly send out a signal (every few seconds) without waiting for a signal from a reader



Passive tag

Active tags

RFID Applications

- Monitoring Inventory
- Scanning into buildings/rooms
- Location Tracking
- E-ZPass
- Much more!

GOAL

Build a simple RFID reader and program it with an Arduino to power LEDs when it reads the tag.

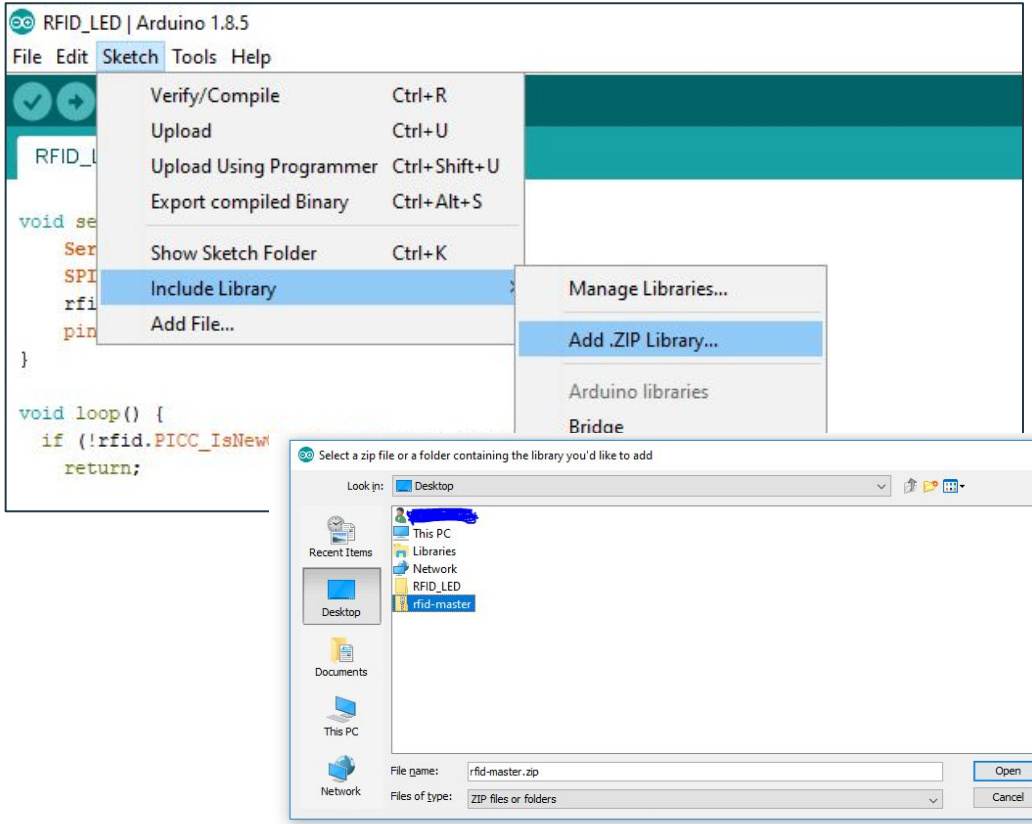
Download the code and library

Code: **bit.ly/RFIDcode**

Library: **bit.ly/RFIDlib**

Open Arduino, Import Library

- Type in Arduino in Start Menu
- Open Arduino
- Click Sketch > Include Library > Add .ZIP Library….
- Select where you saved it

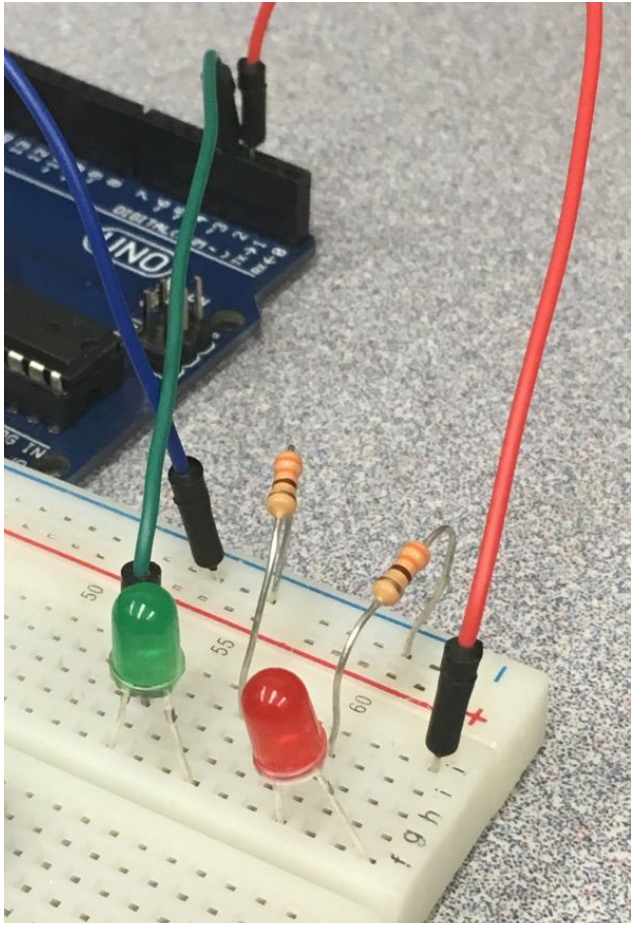


Materials Needed????

- Arduino Uno
- USB cable
- 2 - 330 Ohm resistors
- Wires
- Breadboard
- 2 LEDs
- 1 key fob
- 1 key card

Build the circuit: Step 1

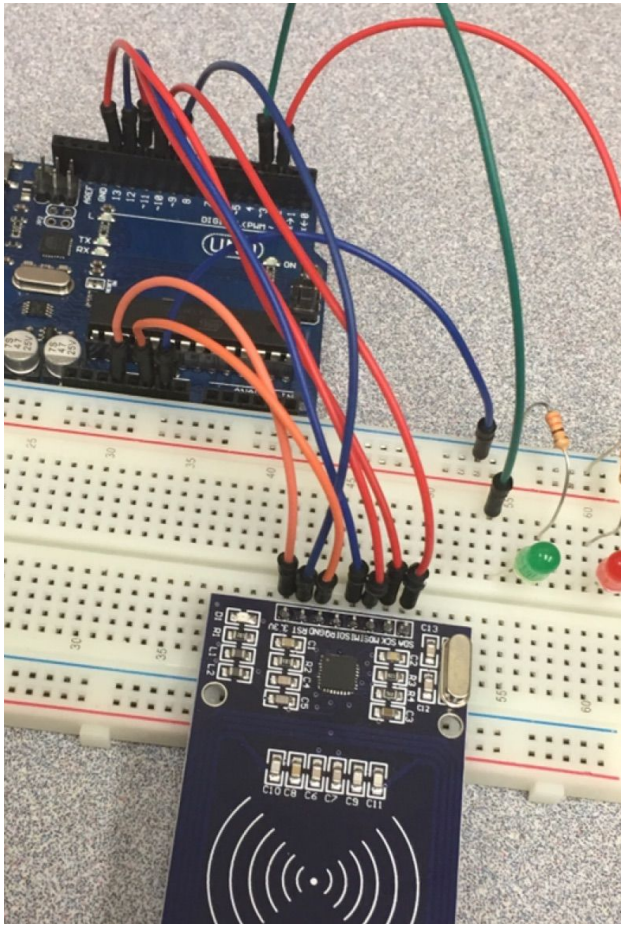
- Connect Arduino GND to blue rail with wire
- Resistors (330 Ohm - orange orange brown) - connect one end to GND rail, the other end to negative (shorter) leg of LED
- Wires - connect one end to positive (longer) leg of LED and the other to Arduino pins 2 and 3



Build the circuit: Step 2

- Make the following connections:

RFID-RC522	Arduino
SDA	Pin 10
SCK	Pin 13
MOSI	Pin 11
MISO	Pin 12
GND	GND
RST	Pin 9
3.3V	3.3V



Find your tag/card’s ID

- Once the code is uploaded to the Arduino, open the serial monitor
- Tap your card to the RFID reader, and “Tap card key: xx:xx:xx:xx”
- Put the “xx:xx:xx:xx” string after “#define HEX_ID_1” (include the quotes around the address
- Repeat for the tag and paste “define HEX_ID_2”