

GE101 PROJECT

...

ARDUINO BASED FINGERPRINT CYCLE LOCK

OBJECTIVE

We all know how cumbersome using manual password type lock and key lock for a cycle is especially when we are regularly using it .

So we have designed a fingerprint Arduino based lock to tackle this problem and provide a efficient solution .

MATERIALS REQUIRED

- Arduino UNO & Cable
- Adafruit r307 fingerprint sensor
- 12 Volt Solenoid
- 5 Volt Single Channel Relay
- 12 Volt Adaptor
- LED
- 220 Ohm Resistor
- Breadboard
- Jumper Wire

Fingerprint sensor working

- Fingerprint sensor captures the image of the fingerprint and makes the pattern inside the memory of the fingerprint.
- The shape of the pattern will break into the binary code and then save into the memory of the fingerprint.
- For each and every fingerprint it will save the different patterns according to the fingerprint because as we know we all have different fingerprints even in our hand each fingerprint having its own unique fingerprint.
- It will never match the other finger and according to the research, the accuracy of the fingerprint is near about 98% which is good enough to secure any system.

Arduino working

- Arduino is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices.
- Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ('shields') or breadboards (for prototyping) and other circuits.
- The microcontrollers can be programmed using the C and C++ programming languages, using a standard API which is also known as the **Arduino language**, inspired by the Processing language and used with a modified version of the Processing IDE.
- The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ('shields') or breadboards (for prototyping) and other circuits.

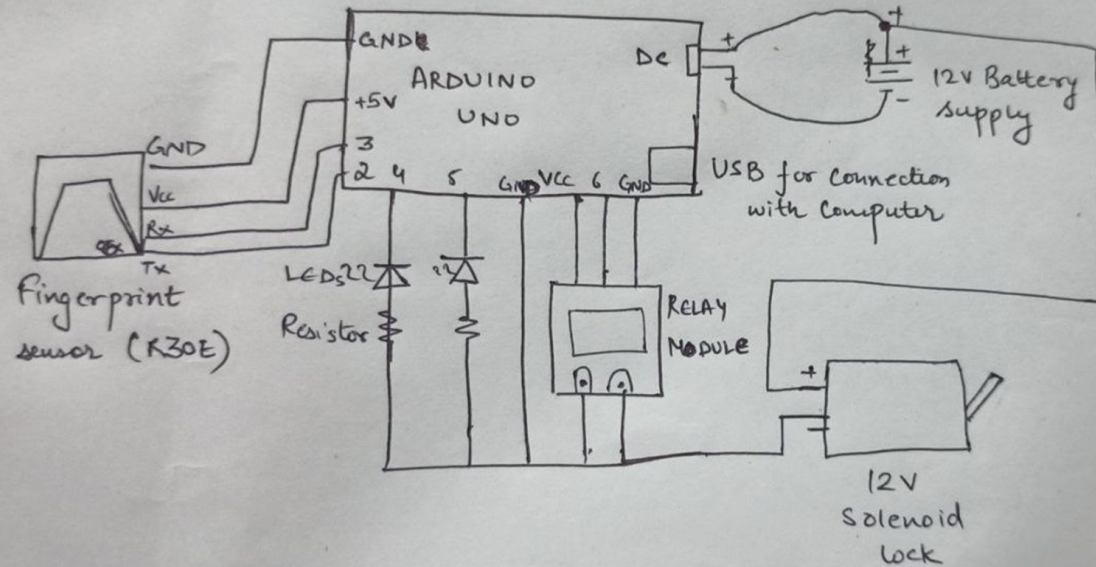
Relay Module

- This is a LOW Level 5V 2-channel relay interface board, and each channel needs a 15-20mA driver current.
- It can be used to control various appliances and equipment with large current. It is equipped with high-current relays that work under AC250V 10A or DC30V 10A.
- It has a standard interface that can be controlled directly by microcontroller.
- It relays signal between battery and arduino board.

Model working

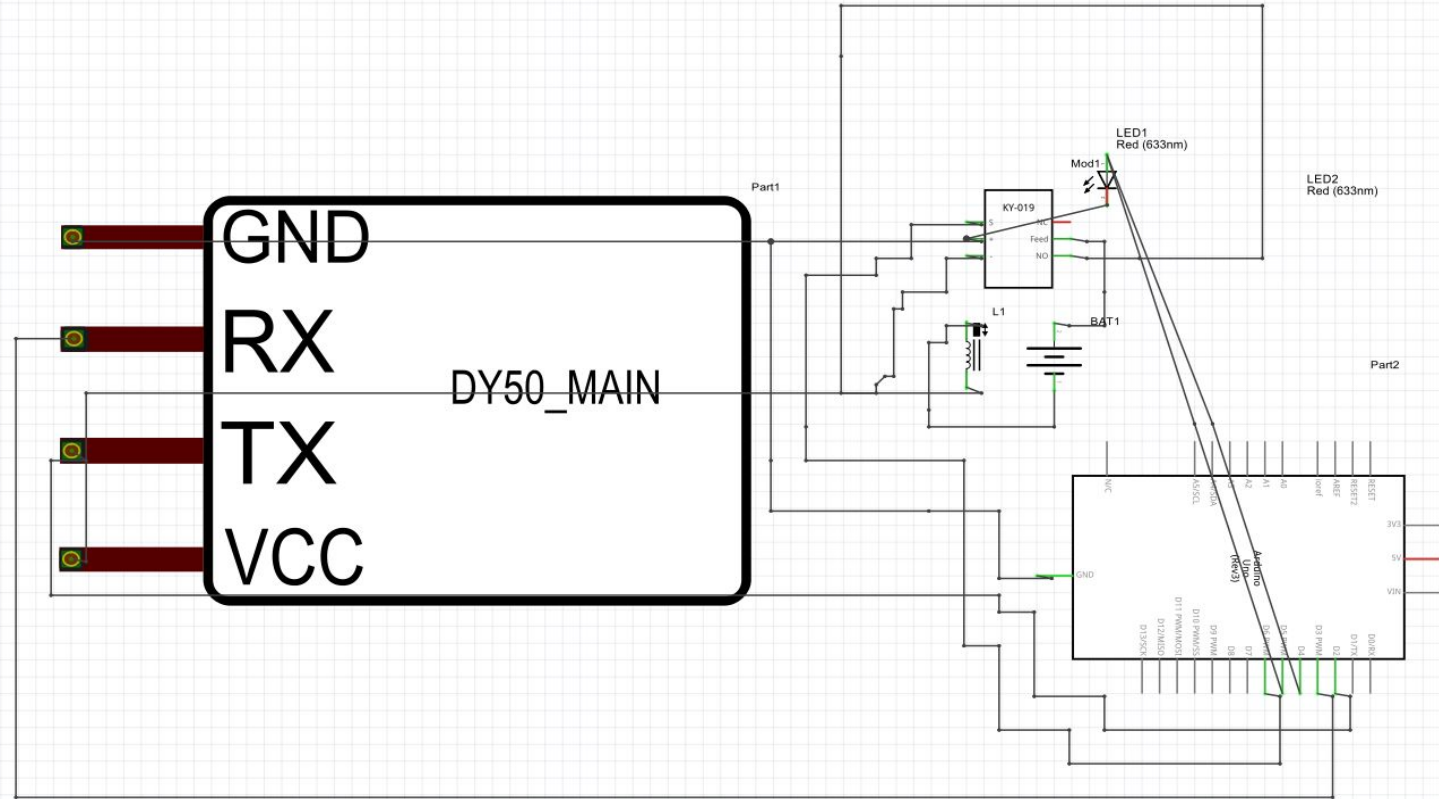
- Arduino-based fingerprint cycle lock working is very simple and easy.
- The fingerprint sensor is interfaced with the Arduino Uno
- First, we have to enroll the fingerprint to the fingerprint sensor and saved our fingerprint sensor.
- It can save 137 fingerprints if we talk about the R307 scanner.
- It saves your fingerprint data into the inbuilt memory. and we use this data in our database.
- Then we compare this saved file with every finger scanned on the scanner

Rough Circuit sketch



MODEL CIRCUIT

SCHEMATIC CIRCUIT



Connection Chart

| | | | | |
|-----------------|------------------|-------------------------|------------|------------------|
| Arduino UNO | | FingerPrint Sensor | | |
| +5V | | VCC (+ 5 Volt) | | |
| GND | | GND (Ground) | | |
| 3 Pin | | RX Pin | | |
| 2 Pin | | TX Pin | | |
| Arduino UNO | | 5V single channel Relay | | |
| +5 Volt | | VCC | | |
| GND | | GND | | |
| 6 Pin | | IN (Input Pin) | | |
| 12 Volt Adaptor | | 5V single channel Relay | | 12 Volt Solenoid |
| | | Normally Open | | Positive (+) |
| Positive | | Common | | |
| | | Normally Closed | | |
| Negative | | | | Negative (-) |
| Arduino UNO | LED 1 | LED 2 | Resistor 1 | Resistor 2 |
| 5 Pin | Anode Terminal | | | |
| 4 Pin | | Anode Terminal | | |
| GND | | | Terminal 1 | Terminal 1 |
| | Cathode Terminal | Cathode Terminal | Terminal 2 | Terminal 2 |

Arduino Code

<https://github.com/charu0811/GE101-PROJECT-.git>