# A Fingerprint based Voting Machine using Arduino

## To make voting simple, secure, quicker, accurate

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# Introduction

| | |
|---|---|
| Arduino based | 2 communicating devices |
| Acknowledgement Unit | Voting Machine |
| $I^2C$ Serial Communication | EEPROM IC storage |
| Fingerprint Module | 16x2 LCD Display |

## Objectives:

- To setup a Fingerprint ID scheme
- To setup a candidate mapping scheme
- To setup a voter mapping scheme
- To setup a data storage scheme

# Operating Modes

- **Data Loading**
- **Fingerprint Verification**
- **Checking Voter Validity**
- **Vote Casting**
- **Information Writing**

# Flow Order

Start devices, load data, initialize ◂

Check match status, check ‘voted’ status ◂

Activate Voting Machine, cast vote ◂

Write vote data, mark voter ◂

# Hardware Devices

Arduino Nano
Fingerprint Module
256kb EEPROM ICs
16x2 LCD Display
$I^2C$ Module
Other Circuit Elements

**Arduino Nano:** µController based on ATmega328p, C/C++ programming, 32kB program memory, I/O

**R307 Fingerprint Module:** scan, store, match, retrieve, 128 IDs, 512b template string, SComm, flash memory

**24LC256 EEPROM IC:** 32kB capacity, $I^2C$ SComm

**WH1602B1 16x2 LCD:** 16x2 segments, 5x8 segment size, memory buffer

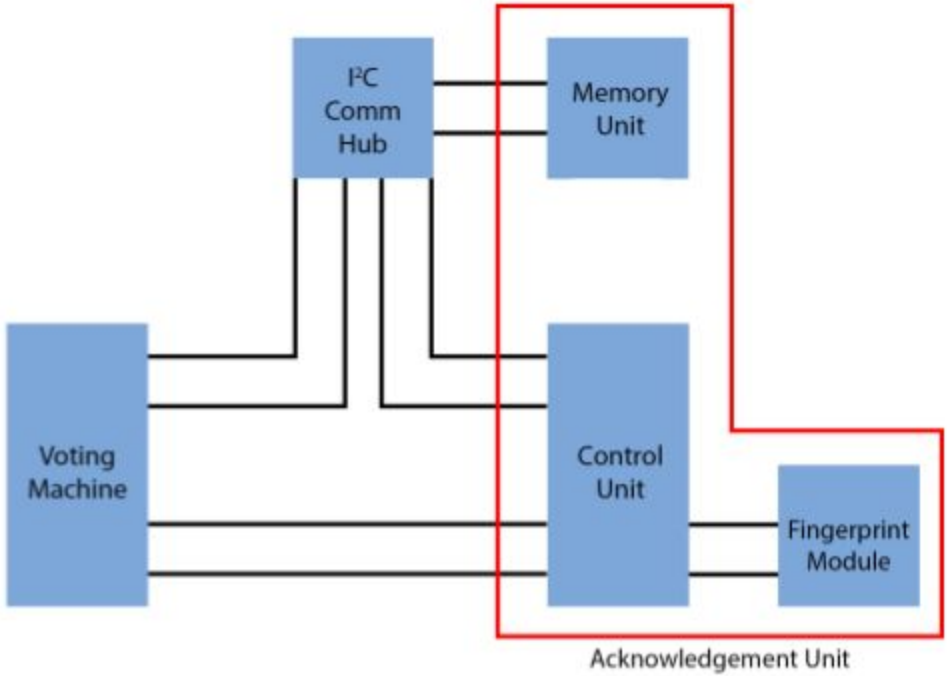
**$I^2C$ Module:** Parallel to Serial, SDA, SCL

# The Setup

## Units:

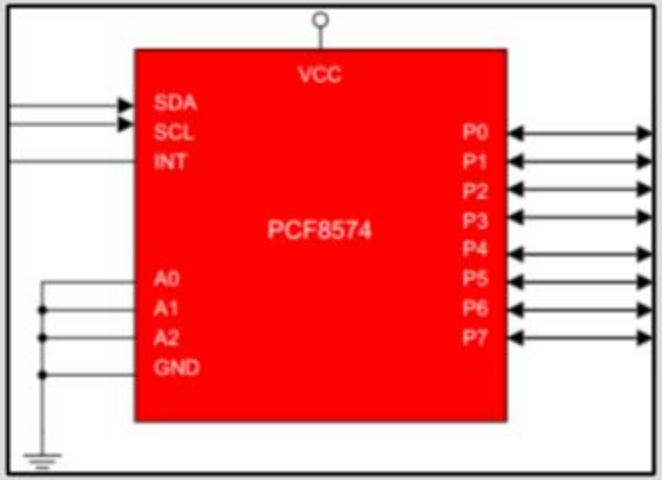
- Voting Machine
- Acknowledgement Unit: CU, MU, FM
- $I^2C$ Communication Hub

## State Order:

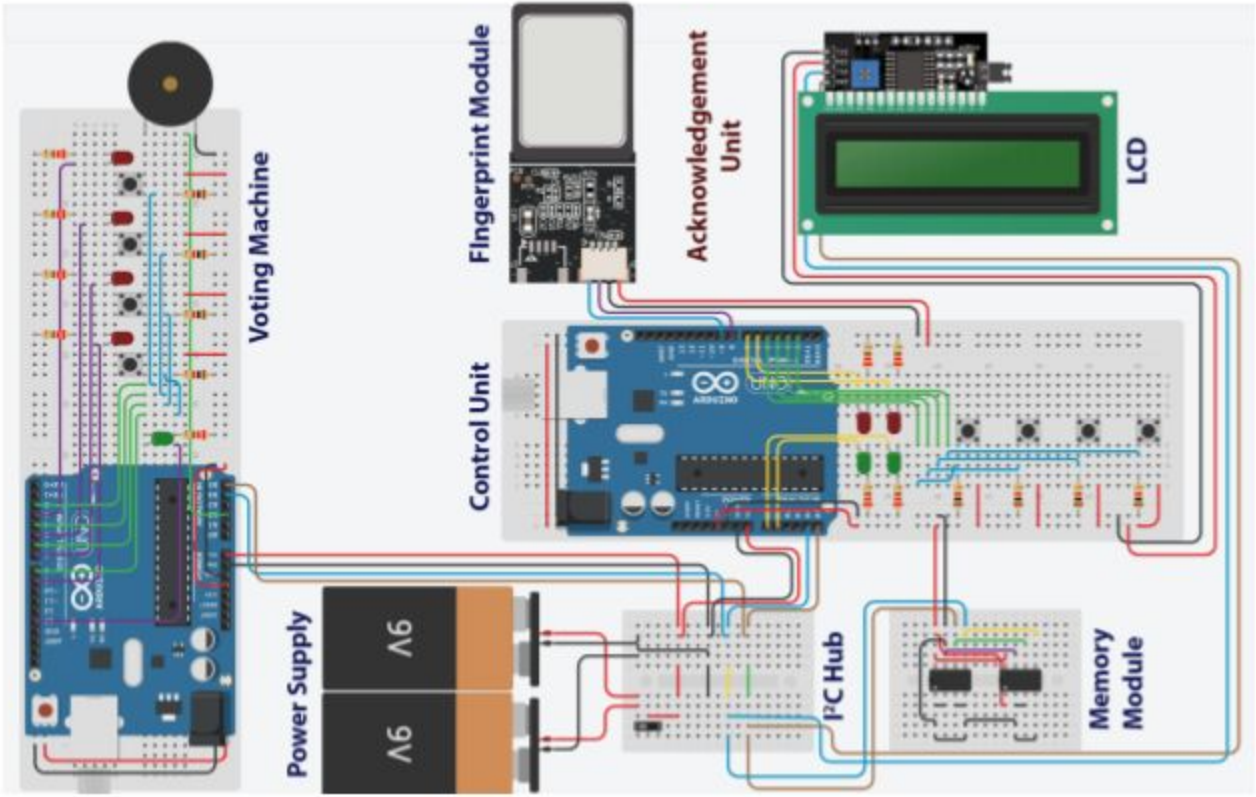
# Communication

- Arduino Communication
  - Acknowledgement Unit Address
  - Voting Machine Address
- Memory Communication
  - EEPROM I²C Addresses: 0x5X
- LCD Communication
  - LCD I²C Address: 0x27
- FIngerprint Communication
  - Rx-Tx over software serial



# Hardware Circuitry

- Powering Arduino
- Powering Devices
- Comm Points
- Soft Serial



# Analytics

## Voter Information:

- Voter Details in Database
- Voter 'voted' status per voter

## Fingerprint Information:

- Fingerprint templates per voter
- Order of fingerprints

## Candidate Information:

- Candidate Details in Database
- Vote count per candidate
- Order of candidates

# Discussions

- Proof of Concept of Prototype
- Practical model is miniaturized and stripped down
- Printed Circuit Board (PCB), wire traces, efficient
- Shortcoming: not intelligent enough
- Upgrade to microprocessor