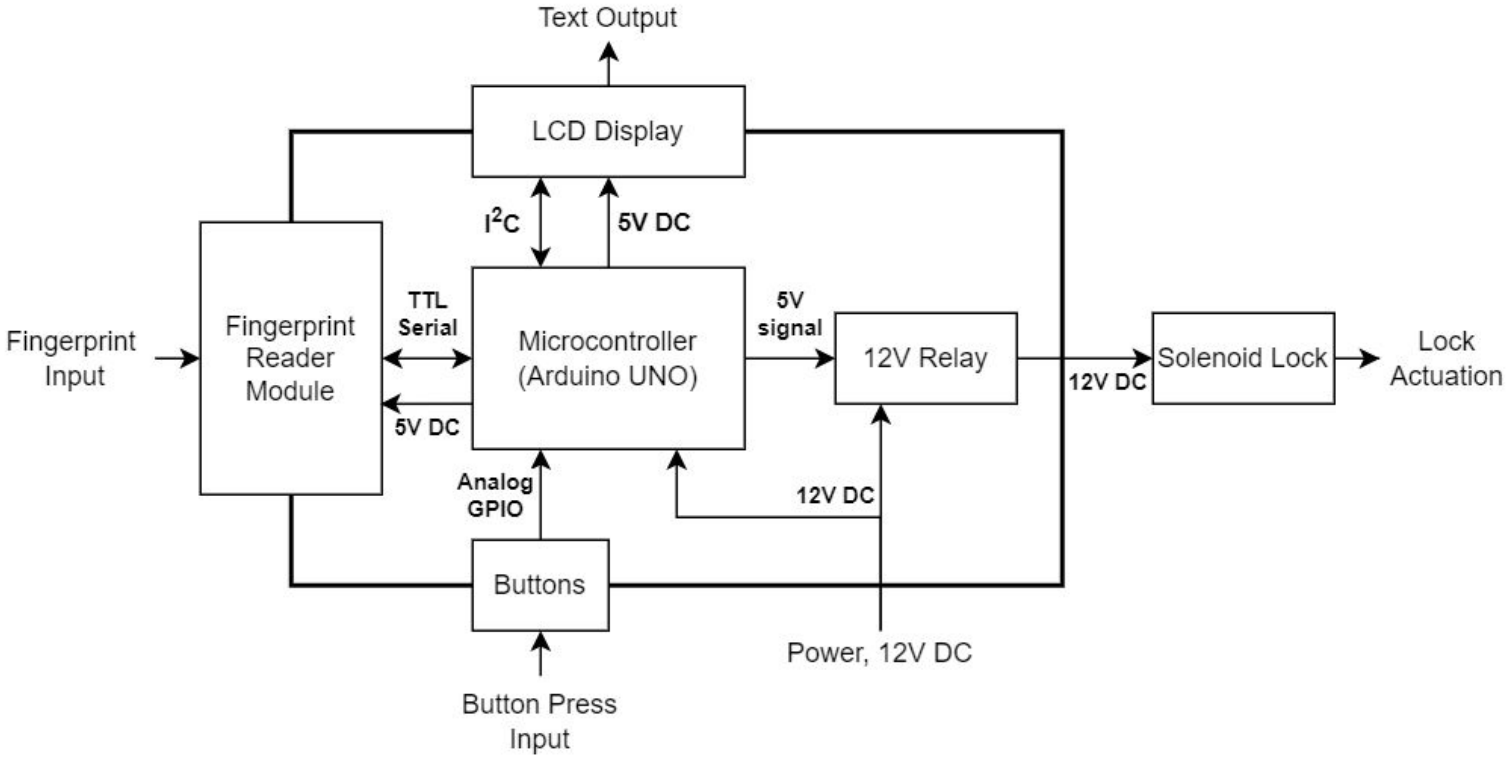
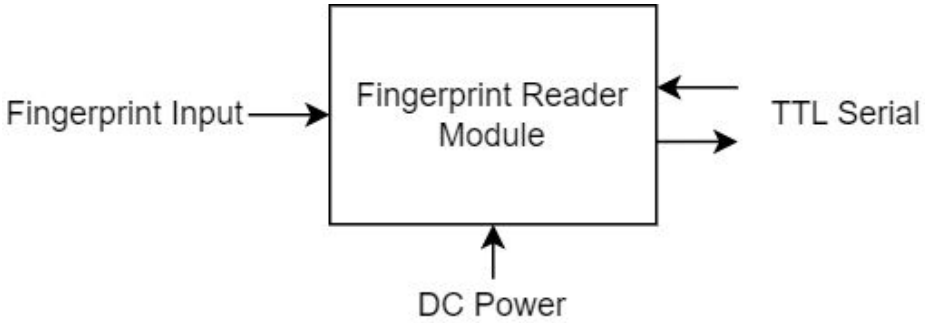
Fingerprint Lock - L0 Decomposition

Module	Fingerprint-Secured Lock Device
Inputs	Power In: 12V DC Fingerprint Input: Imaging via dedicated module Button Presses: Normally open switches; adjusts GPIO voltage
Outputs	LCD Text Output: 5V DC power in, I^2C bus Solenoid Lock Actuation: 650 mA peak current @ 12V
Functionality	Secures a door via a biometric fingerprint lock which controls a solenoid bolt mechanism

Fingerprint Lock - L1 Decomposition

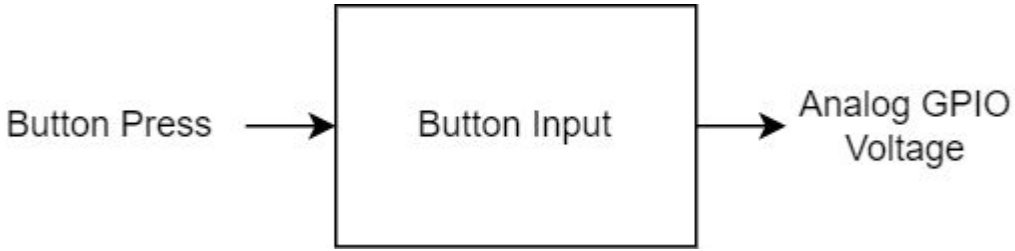


Fingerprint Reader - L1 Decomposition



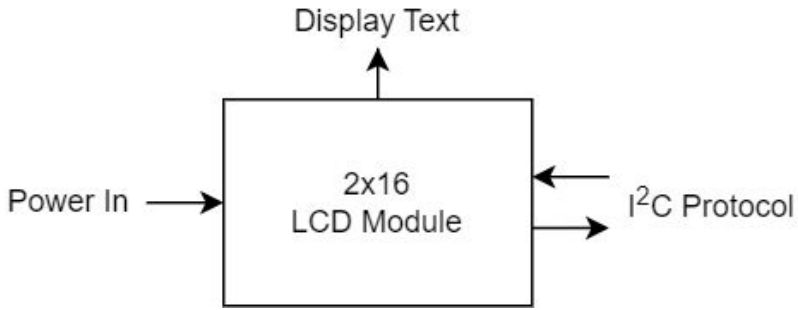
Module	Fingerprint Reader Module
Inputs	Power In: 5V DC Fingerprint Input: Imaging via dedicated module
Outputs	TTL Serial: 2-wire I/O communication bus w/ microcontroller
Functionality	Images user fingerprint for storage, comparison

Button Input - L1 Decomposition



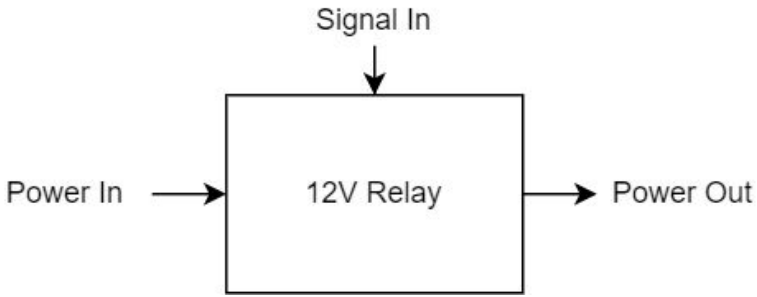
Module	Button Input(s) (SPST, Momentary, Normally-Open)
Inputs	Button Press: Normally-open connection closes until button is released
Outputs	GPIO Voltage: 0V-5V voltage read by analog GPIO
Functionality	Pushed button closes circuit connection, dropping node voltage read by analog GPIO

2x16 LCD Module - L1 Decomposition



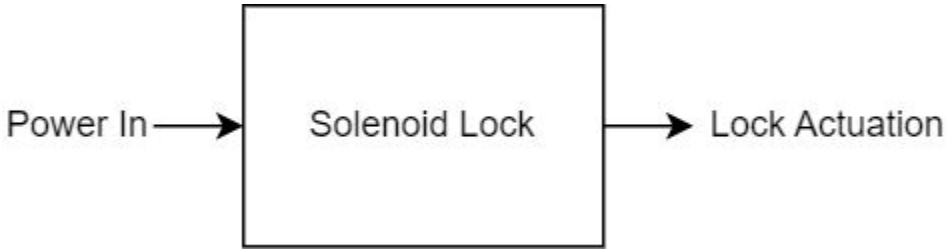
Module	2x16 LCD Module
Inputs	Power In: 5V DC I^2C Protocol: I/O communication bus w/ microcontroller
Outputs	Text Output: messages displayed to user; 32 characters total at a time
Functionality	Displays text feedback and instruction to user

12V Relay - L1 Decomposition



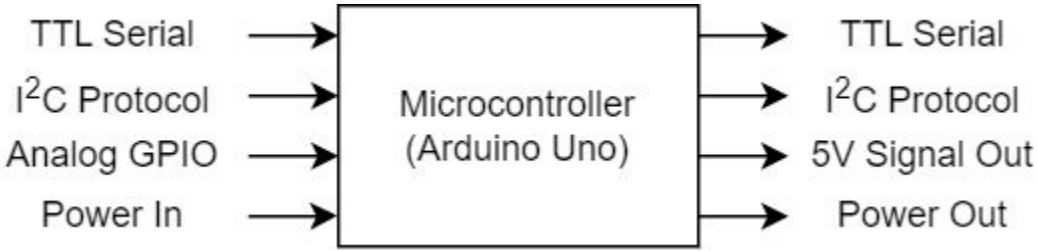
Module	12V Relay Module
Inputs	Power In: 12V DC Signal In: ≥5mA current
Outputs	Power Out: 12V DC, ≤10A
Functionality	Supplies 12V out when ≥5mA current is drawn into signal input

Solenoid Lock - L1 Decomposition



Module	Solenoid Lock Module
Inputs	Power In: 12V DC, ≤650mA
Outputs	Lock Actuation: Retracts lock bolt
Functionality	Retracts lock bolt when 12V is supplied.

Microcontroller - L1 Decomposition



Module	Arduino Uno Microcontroller Board
Inputs	TTL Serial In: Receives data from fingerprint reader module I^2C Protocol In: Receives status from LCD module Analog GPIO In: Reads voltage levels from input button nodes Power In: 12V DC power in
Outputs	TTL Serial Out: Sends commands to fingerprint reader module I^2C Protocol Out: Sends commands to LCD module Signal Out: Senses voltage level of button node Power Out: 5V out to various modules
Functionality	Stores and executes programming instructions, executes voltage changes on various GPIO pins.