

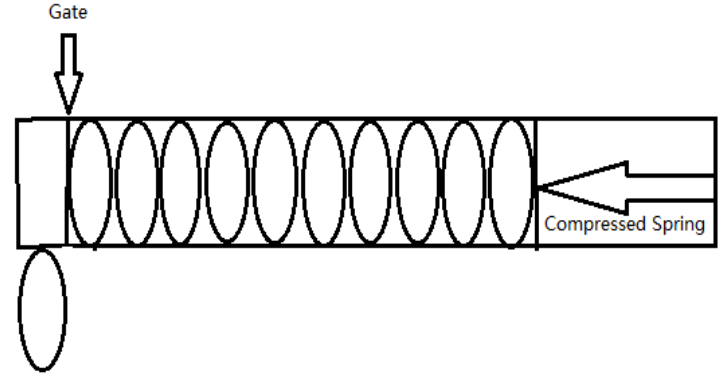


Smart Medication Adherence Phone Case (S.M.A.P) Presentation

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Dispensing Mechanism

- Pills are pushed by a compressed spring to the gate.
- Gate open, one pill is pushed into the empty room.
- Gate close, pill drop.
- [ECE 4180 Final Project](#)
- [Another similar pill-dispenser project by peer group](#)



Power Management

- The LiPo battery (Lithium Ion Polymer Battery)
 - Reason: the phone case needs to be rechargeable
 - Battery is to be stacked with other compartments
- Details: 3.7V power supply (the following specs are from an [Adafruit LiPo battery](#))
 - (2500mAh; temporary, but may be increased if needed)
 - Weight: 52g
 - Size: 2" x 2.55" x 0.30" (51mm x 65mm x 8mm)
- Plan to use [SparkFun Battery Babysitter](#) - LiPo Battery Manager
 - Protects battery from overcharging and provides stable output



Features:

- LiPo Charger and LiPo Fuel Gauge combined into one board
- DIP-switch-selectable charge rates of 100mA, 500mA or 1.5A
- MicroUSB port for charging, or external options
- Dynamic power-path management maintains a reliable output supply
- On/Off switch disconnects the battery for more power saving
- 5V-tolerant I²C interface to fuel gauge
- Fuel gauge measures voltage, percentage, and current

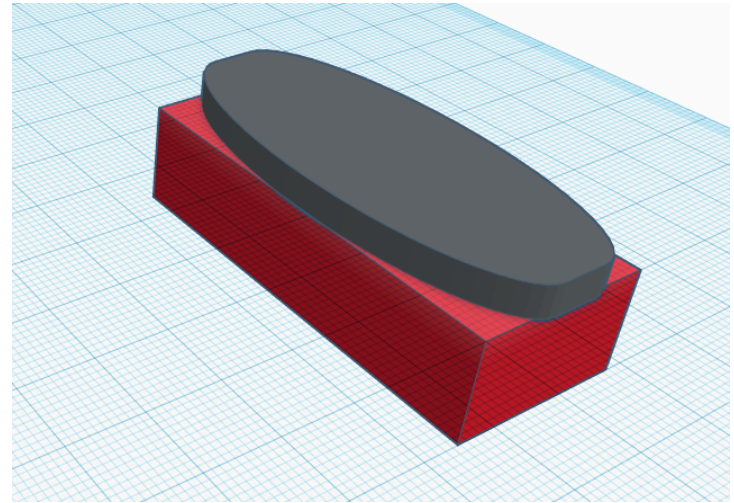


PCB Design

- A PCB board containing:
 - NRF52 DK
 - Power circuitry
 - Bluetooth module
 - Output ports for dispensing motor or solenoid
 - Photoresistor sensor
- Size: 140 mm height, 70mm wide, 35mm deep.
- Design software: eagle or kicad

Phone Case Design

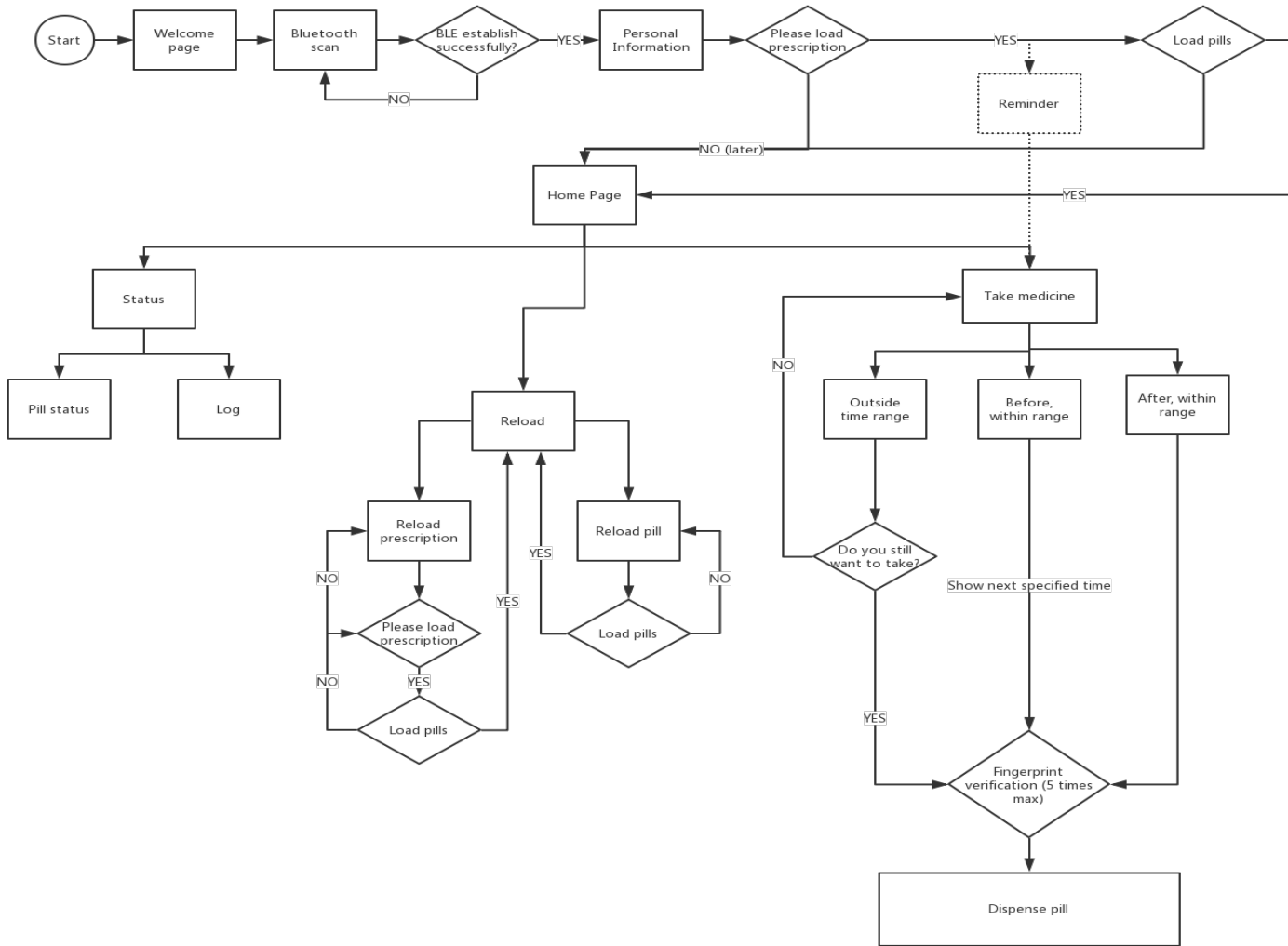
- A 3D-printed case containing:
 - PCB board
 - battery
 - pill tray
 - dispensing mechanism
- Able to mount on the smartphone
- CAD design tool: [tinkercad](#)





App Development

- System: Android 8.0
- Development Platform: Android Studio 3.0 SDK
- Main Functions:
 - Remind users to take pill according to loaded prescription.
 - Dispense medicine at users requests with Bluetooth.
 - Record users' pill taking behavior.
 - Reload prescription or pills.
 - Monitor pill status and pill taking history.
 - Allow users to take pills even not in expected times.
 - Use phone sensors such as TouchID and GPS.



App Functionality Flow Chart



Thank you