Rx Reminder - RFID Tagging for Medication Adherence

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Background

- Missing doses on medication can lead to complications during disease as well as wrongful increases in dosage. [1]
- Current solutions: Evondos E300 Medicine Dispensing Robot, Snoozester phone call reminder service [3]
- Third party intervention means greater cost and plenty of room for human error. [2]

Project Goal

- RFID tags attached to prescription bottles.
- Pharmacy writes to RFID tag
- User end machine reads from RFID tag.
- Data: medication's name and how often it's taken: once a day, every four hours, etc.
- Schedule and remind the user when they need to take their medication.
- Phone app will connect to the database giving it access to the prepared schedule.
- Dispenser and fingerprint scanner ensure only the authorized patient takes medication and the correct dosage.

Materials
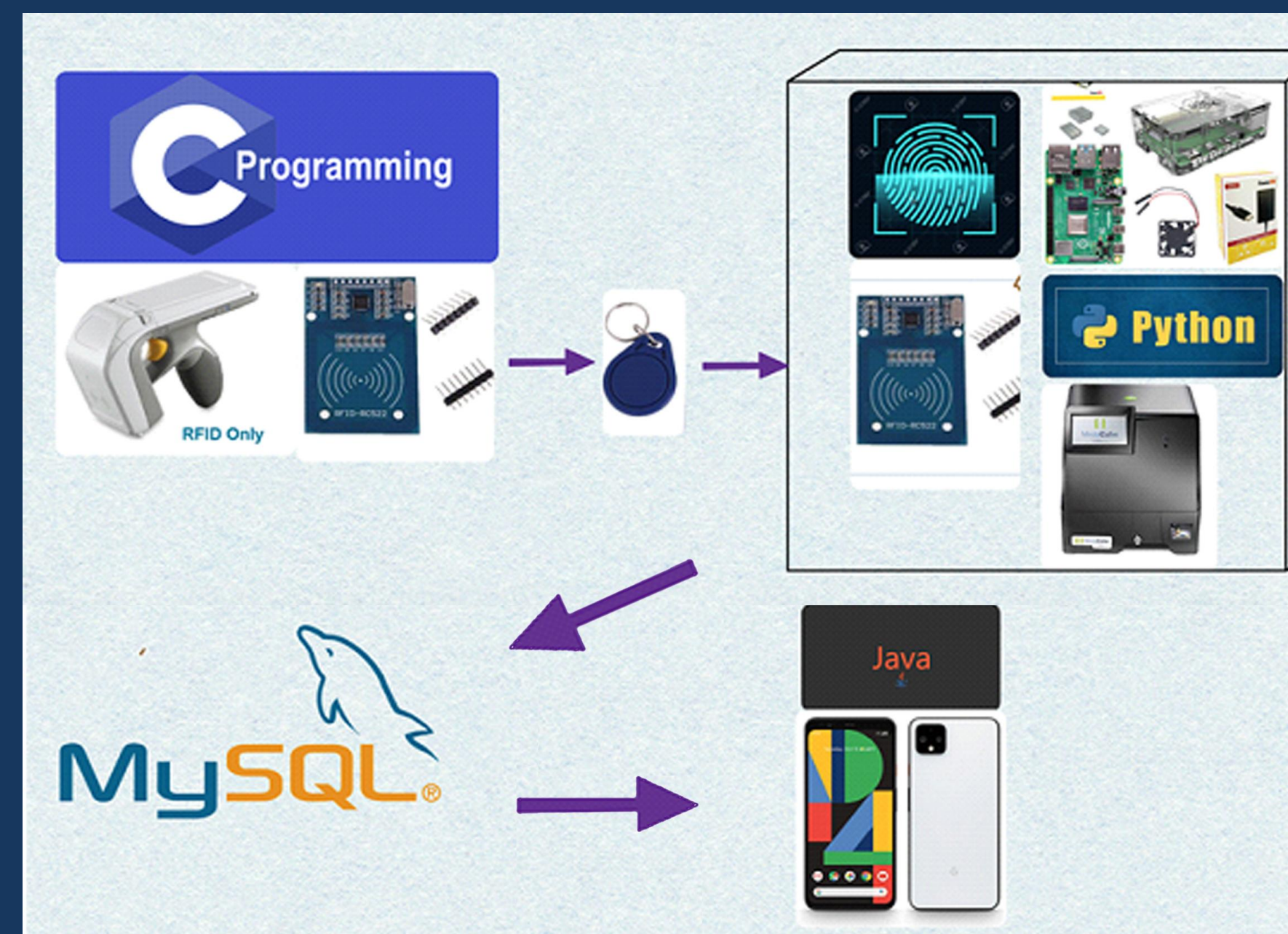
Hardware

RFID Module & Chips - Prescription bottle tagging

Raspberry Pi - RFID and Database Manipulation

Pill dispenser - Built for template size as proof of concept

Fingerprint Scanner - User identification

Software

MySQL - Raspberry Pi database interaction

Python - Raspberry Pi Scripts

Java - Android App

Milestone Timeline

Objective	Member Assigned	Percent Complet	Jan Week 1	Week 2	Week 3	Week 4	Feb Week 5	Week 6	Week 7	Week 8	Mar Week 9	Week 10
Planning/Organization												
Review Progress & Plan this Quarter's Goals	All	100%										
Order Required Components	All	100%										
Hardware/Firmware												
Configure Bluetooth for Wifi Credential Communication	Andy	0%										
Implement Fingerprint Scanner	Andy	0%										
Implement Stepper Motor Controls to Dispense Meds	Andy	0%										
Software												
Reorganize MySQL Architecture to Support Multiple Users	Leo	0%										
Add Medication Adherence Tracking Features to App	Leo	0%										
Improve App's User Friendliness and Visuals	Leo	0%										
Manufacturing												
Design Medicine dispenser based on standard size	Raymond	0%										
Design Overall Casing for Device (dispenser, reader, expandability)	Raymond	0%										
Work on Possibility of Universal Pill Dispenser	Raymond	0%										
Assembly												
Assemble/catchup	All	0%										
Optimize/debug	All	0%										

Future Work

- Currently the system's functionality is sufficient for a basic proof of concept demonstration of features.
- Packaging and ease of access steps need to be taken to achieve a more shelf ready product.
- A universal pill dispenser would be ideal as it would further abstract the task at hand.

References

[1] Choudhry, Niteesh K., et al. "Effect of Reminder Devices on Medication Adherence." JAMA Internal Medicine, vol. 177, no. 5, Jan. 2017, p. 624., doi:10.1001/jamainternmed

[2] Frakt, Austin. "People Don't Take Their Pills. Only One Thing Seems to Help." The New York Times, The New York Times, 11 Dec. 2017, https://www.nytimes.com/2017/12/11/upshot/people-dont-take-their-pills-only-one-thing-seems-to-help.html.

[3] Rantanen, Pekka, et al. "An In-Home Advanced Robotic System to Manage Elderly Home-Care Patients' Medications: A Pilot Safety and Usability Study." Clinical Therapeutics, vol. 39, no. 5, 2017, pp.1054–1061., doi:10.1016/j.clinthera.2017.03.020.

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