Route-Constrained Family Shopping Optimization

sdmay21-34

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Problem:

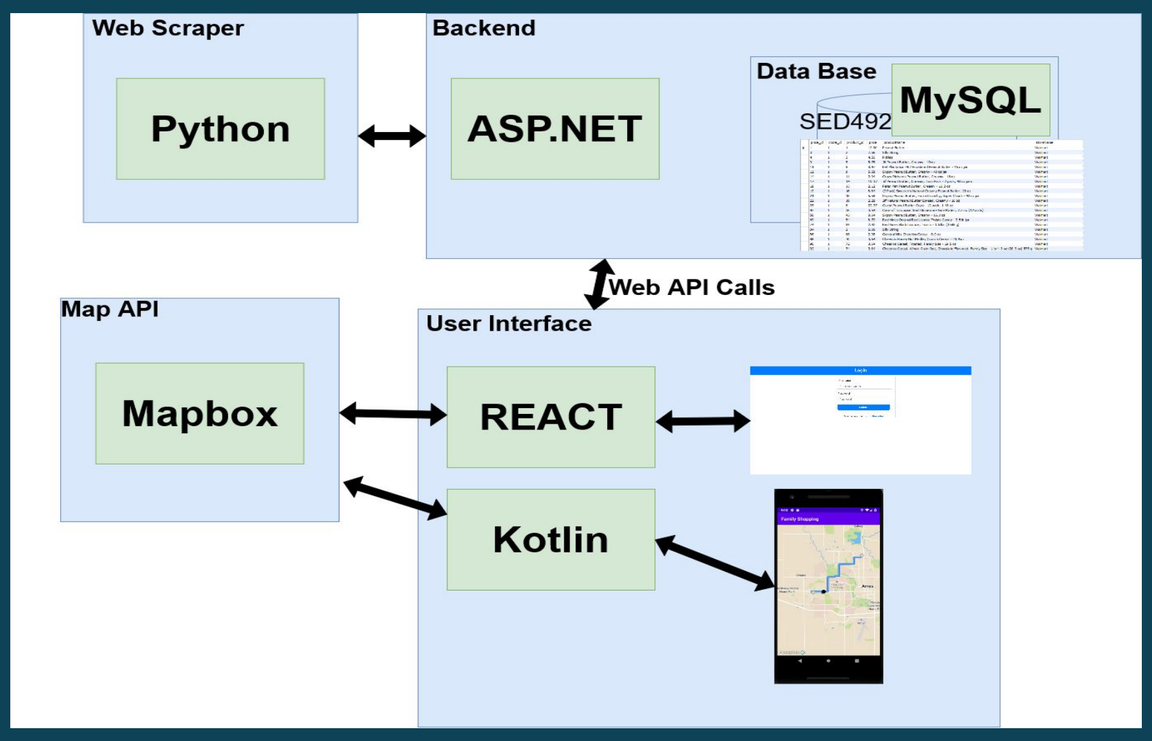
Shopping trips are often time consuming, inefficient, and more expensive than necessary.

Solution:

Implement a web and mobile application to optimize the family shopping experience

Design Approach

Block Diagram:

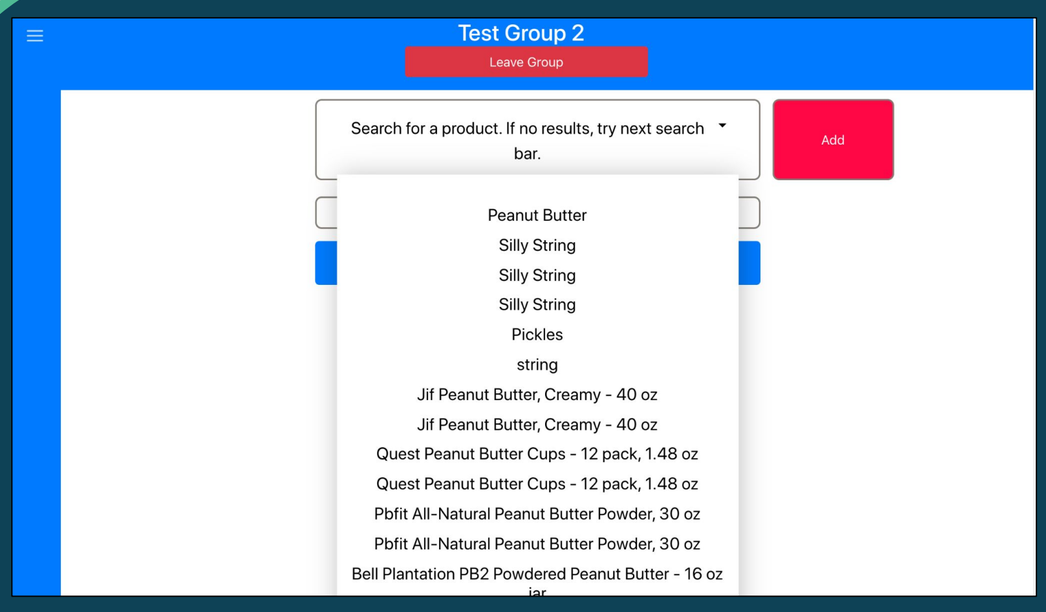


Intended Use:

- Create shopping lists
- Share shopping lists with other users
- Generate an efficient route to collect each item in the shopping list

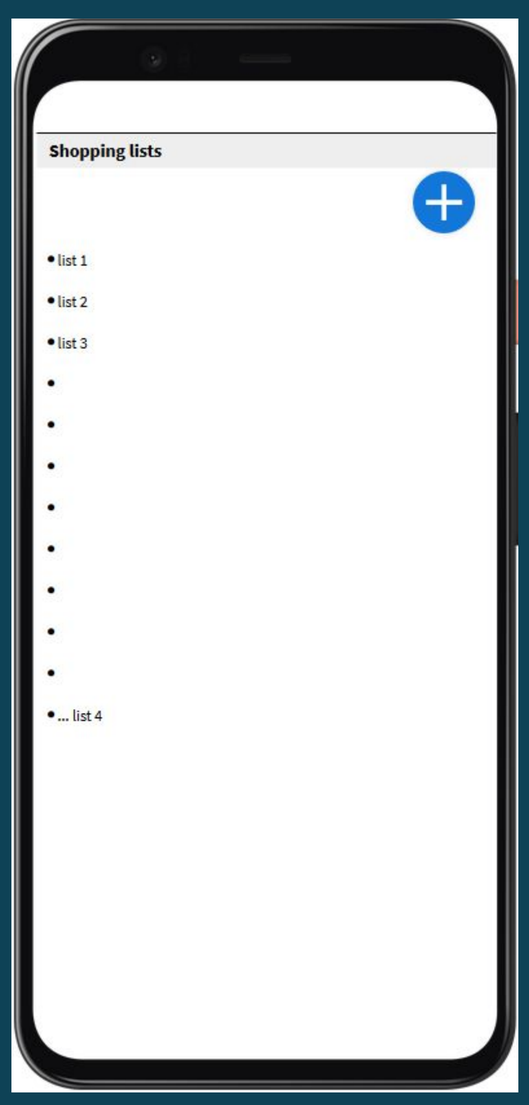
Standards:

- Software Quality Assurance Plans
- Software Unit Testing
- System Life Cycle Processes

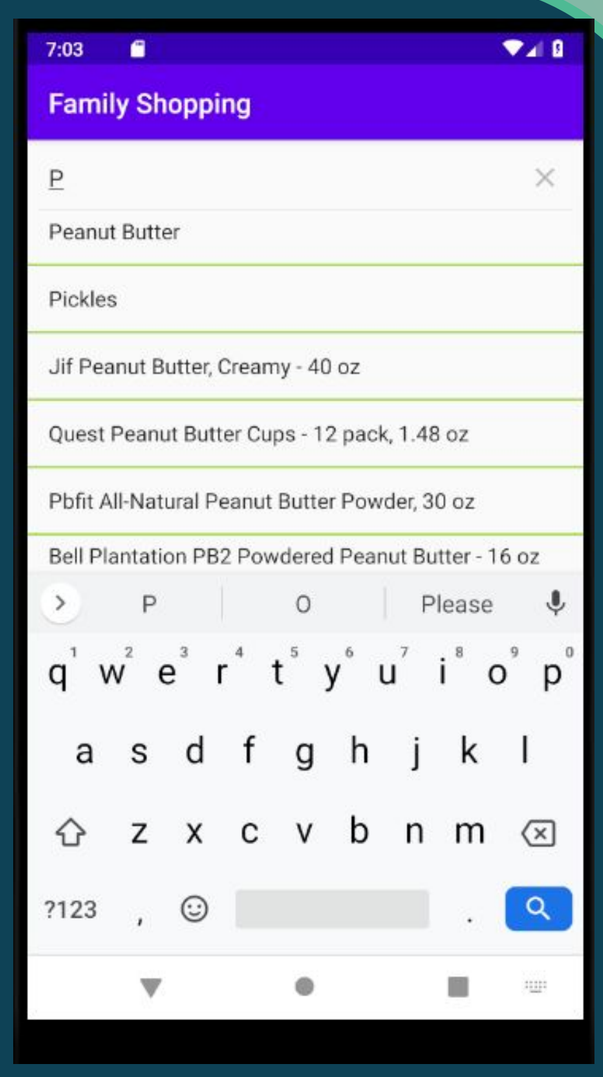


UI Items

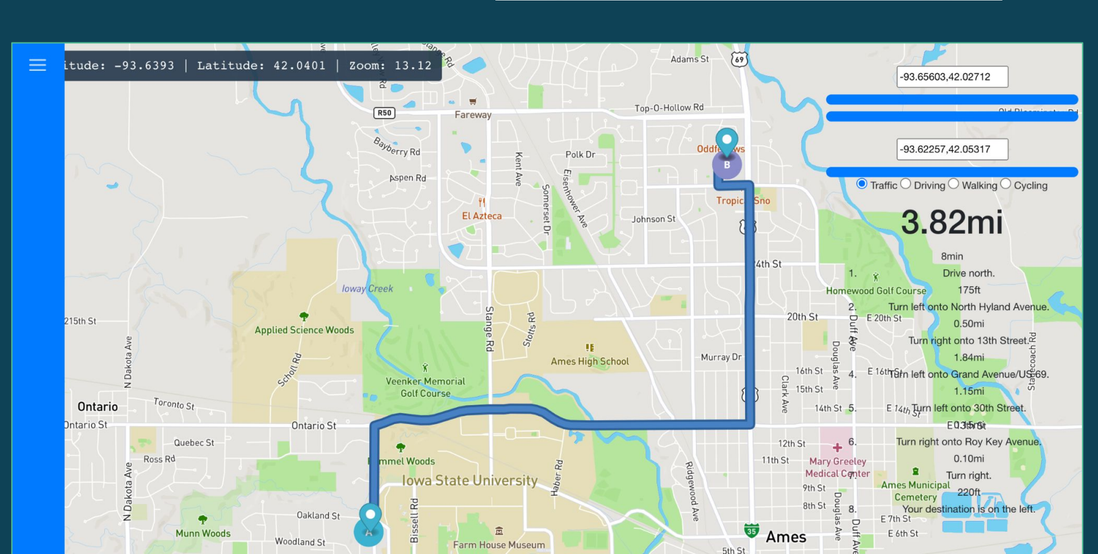
1. User logs in to app
2. User selects list
3. User adds or deletes items
4. Items stored in database
5. Items not in database get added through web scraper
6. User starts a trip
7. User gets a route on their map



Concept Sketch:



Android UI items



Final Route:

Design Requirements:

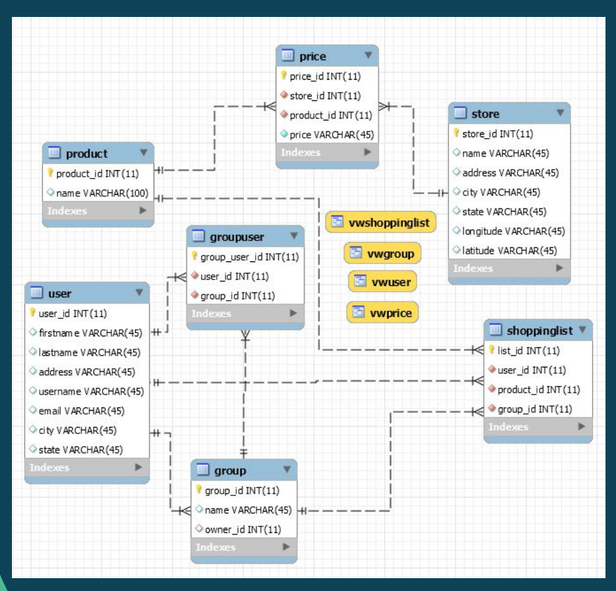
Functional

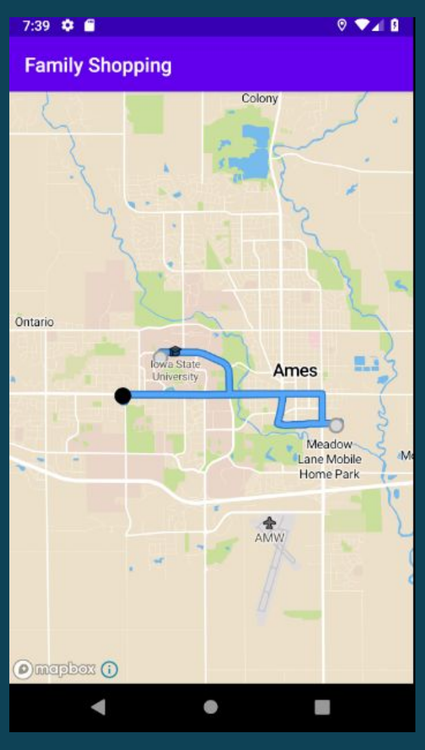
- Store location accuracy
- Output the closest store
- Output fastest travel route to any store

NonFunctional

- Routes must generate in real time
- SQL Data must be in real time
- Application must be intuitive and easy to read

Database:





Technical Details:

Frontend Technologies

Android Studio, Kotlin, Retrofit

Web App Technologies

React, Javascript, HTML, Axios

Database/API Technologies

Swashbuckle, ASP.NET, MYSQL

Algorithm/Web Scraper Technologies

Python

Intended Users and Uses:

Intended Users:

- Families
- Roommates
- Friends

Uses:

- Weekly shopping trips
- Special events

Constraints:

- Radius of the map of stores and locations
- The time it takes to travel to different stores
- Starting the trip from home vs. varying locations
- Start time of the trip
- Number of users involved in one trip

Testing:

- Unit tests for algorithms functionality
- Integration testing for connecting web scraper and route maker
- UI testing for performance