Applying Computer Science Fundamentals in Mobile Application Development

Background

Smartphones have become increasingly significant in our everyday lives. Particularly in developing countries, many people use mobile phones as their only computer and gateway to the internet. Mobile applications span a large range of interests, industries, and objectives: from social networking to mobile banking, food delivery, and on-demand transportation. Given the pervasiveness of mobile devices, it should be worthwhile for a computer science major to spend some time understanding how mobile application development works. So for my project, I would like to develop a mobile application, with the goal of applying and expanding upon the knowledge I have gained in my past 3 years of study.

Project Overview

I will use iOS as the mobile platform for this project, simply because it is the most convenient given my current possessions (iPhone and MacBook). The project’s overarching goals are listed below:

1) Design user interface and create specifications for the application given broad objectives.

This will be a different experience from the class assignments that I am used to, where we are given specific instructions or requirements. In creating my own specifications I will have
more freedom to decide what I would like to do, but with the challenge of shaping vague ideas into clear goals/features.

2) Implement data structures and architect a system to meet specifications. Once I know the requirements, this will be an opportunity to apply the computer science concepts that I’ve learned so far to come up with the right data structures and algorithms for the job.

3) Experience the technicalities of creating an iOS application. I will need to learn a new programming language, set up my development environment, and figure out the basics of how the platform works.

4) Improve through multiple iterations, testing, and acquiring user feedback. This should be a good opportunity to look back and redesign/improve things based on what I learned.

I expect that my academic experiences will be applicable to the higher-level design of the application- I will be able to apply core concepts such as data structures, algorithms, and object-oriented programming. However, I have limited experience developing applications outside of class, and none in developing on iOS. As part of this project I will have to learn either Objective C or Swift (determine which one is more appropriate), as well as how to use XCode, Apple’s IDE.

I plan to implement a simple trip-mapping application, which should enable users to add photos and descriptions to different locations on a map. This should allow for a good exploration of the platform, and work well with the 4 goals listed above. In addition, it would be possible to explore further either through planning or attempting to implement additional features such as integrating with third-party services and APIs, incorporating a social aspect, or creating a web application to accompany the mobile experience.
Approach

1) Research the platform and choose a programming language. Choose between Swift and Objective C, and learn about different frameworks or tools that could help in application development.

2) Read guides and go through tutorials. Possibly create some very basic applications to get a feel of how things work. Read the app store guidelines to understand what a well-built application should look like.

3) Write out specifications and plan high level design. At this point, I should have enough knowledge to appropriately scope the application and understand how I might implement it.

4) Build application. Go through iterations, add various features, try to get and incorporate user feedback.

5) Write final report. The final report should contain documentation of my learning throughout the process, and include a description of the final design and implementation of the application.