CALIFORNIA STATE UNIVERSITY, FULLERTON
Department of Computer Science College of Engineering & Computer Science

Independent Study Plan
Android SQL Application

Inventory and Order Processing/Completion Tracking Application

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Purpose

The purpose of this Independent Study is to create a software application of significant complexity that utilizes the Xamarin Android Framework and Microsoft SQL Server to build an application. The purpose of this software project is to model the real life application of a shipping company that processes incoming and outgoing shipments. A database will be used to keep track of the company's inventory and orders. A Bill of Lading (BOL) which contains the contents of an order including the items, quantity, and additional shipping information are stored and managed inside this database. The application user will be equipped with an Android device and will enter a BOL number. The user will then scan QR codes that represent barcodes on the incoming or outgoing items, and will have the ability to see which items in the order have been scanned and which items still need to be scanned. Once all of the items in the order have been scanned the order will be fulfilled and the BOL will be marked as complete. Administrators or Supervisors will have the ability to enter or modify a BOL, or undo items that were scanned incorrectly. Additionally, the QR code reader will parse the barcodes based off existing parsing rules that extract information from the barcode including item number, date, date type, warehouse number, and additional information from standard GS1 codes. Logic will be implemented to determine which parsing rule will be used when a barcode is scanned so the user can scan multiple types of barcodes without interference to create a seamless experience.

Student Outcomes

The outcomes of the independent study are:

- Create a software project of significant complexity.
- Improve my knowledge of SQL and database design/management.
- Learn to build Android applications with the Xamarin framework.
- Improve my programming knowledge by incorporating databases, application frameworks, and hardware API's

The scope of the project is appropriate for 3.0 units because it is estimated to require the same number of hours of studying and work as a standard 3.0 unit class.
The outcomes are broad enough to correspond fairly to 3.0 units of work because of the scope of this project equals or exceeds the work of a standard 3.0 unit class.

Rationale

There are no courses currently offered at CSUF that meet the student outcomes given above. I am seeking out this Independent Study because there is room for advancement at my current employer if I become more proficient in integrating and managing databases with existing applications and learn to work with Android frameworks. Additionally, becoming more proficient in these topics are valuable skills for any programming jobs. I would also like to use my programming knowledge to build a software application that is applicable to real world usage.

Independent Study Outline

The independent study will take place during the 16 weeks of the semester identified in the heading. The following is an approximate timeline for the studies the student must accomplish.

1. Download/Setup necessary software. Create server and database. Successfully run Xamarin example code on Android device.
   Demonstrate database is running. Demonstrate Xamarin Android example code.
2. Create and run a screen on the Android device using Xamarin framework. Create testing tables in SQL database.
   Successfully launch the application on an Android device.
3. Create a data entry screen on the Android device. Insert data into the database.
   Demonstrate the screen and display data stored in the database.
4. Create and test a QR code reader API.
   Extract text information from a QR code.
5. Create tables for BOL's, scanned codes, item information, and parsing rules.
   Fill tables with basic testing data.
6. Create functions or stored procedure for barcode/QR code parsing.
   Test parsing rules with various barcodes.
7. Begin work on the QR scanning screen.
   Enter a BOL number and view the items listed in the BOL.
8. Continue work on the QR scanning screen.
   Scan a QR code and extract the information with parsing rules.
9. Finish QR scanning screen.
   Update BOL completion. Insert scans into the database.
10. Create a login screen
    Accept a username, password, and determine user credentials(worker, supervisor, administrator).
11. Create a screen to modify BOL information.
    Successfully modify BOL's.

12. Create a screen to modify parsing rules.
    Successfully modify parsing rules.
13. Create a screen to undo scans.
    Successfully modify scans.
14. Test for bugs and clean up code.
15. Finish testing. Prepare for project demonstration. Write project report.
16. Finish demonstration and report. Submit demonstration and report.

The report and demonstration program are due the week prior to the final exam week. The student and instructor shall select an appropriate date towards the end of the semester. Failure to coordinate a final due date with the instructor will result in an 'F' grade.

A Dropbox folder will be created by the student to upload weekly progress. The student is responsible to arrange meetings with the advisor on a biweekly basis. The student should come prepared to discuss the prior week's work, address any concerns the student may have with the material being covered, and discuss progress updates. The student is encouraged to email the instructor in advance with an agenda for the meeting to encourage a more effective meeting.

Basis for Evaluation

The student is evaluated along the following domains. The percentages denote how each is weighted with respect to one another.

- Weekly updates (attendance & preparedness) [25%]
- Quality of written report [30%]
- Quality of experimental design, experiments, and reporting [30%]
- Quality of oral presentation [15%]

The student is encouraged to ask about their progress in the independent study at each weekly meeting. The instructor will provide feedback when asked and where necessary. A midterm evaluation will be provided to the student in writing by the end of the 8th week.