

CS-499, Assignment 7-1

Final Project Narrative

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The artifact for this final project is a web-accessed, SQL (Structured Query Language) accessed database tool, designed to provide “logbook” services for an aviation-related user. This system was first implemented some years ago for this author’s current career as an airline pilot. It has been through several revisions, including a significant re-architecting to bring it into compliance with the current versions of the Apache, MySQL, and PHP (PHP Hypertext Preprocessor) protocols on which it is primarily served. The software also makes use of certain Javascript tools and methods for interaction with the user’s browser.

This system was originally designed for a single user. As such, some of the original design decisions reflected both this author’s personal preferences, as well as limited methods for allowing multiple users to make use of its capabilities. These are some of the changes/updates envisioned for purposes of the project. Some of these changes will be implemented at this time, but many are too substantial to be completed in the time available and will be acted upon in the coming months beyond the timeframe for this term.

This artifact was chosen as it encompasses many of the skills required both for the classes taken to achieve this author’s goal of a BS in Computer Science as well as those necessary for a successful software development career. The planned modifications will demonstrate the use of these tools, as well as techniques such as Code Review, Secure Programming, Database Schema Design and Implementation, and the use of tools such as Source Code Control.

The planned updates included creation of an Android application for logbook system access. Creation of this app proved to be too involved for completion in the available timeframe. Instead, a mobile-device-optimized web page was created to allow for simple and rapid entry of new logbook data from any remote location where mobile access is available. Additionally, it was determined during the initial code review for this project that one of the critical needs was

improvement in the inline documentation (commenting) within the source code files. These updates were performed as planned. The creation of this commenting actually uncovered several other needs. Some of the algorithm logic, while working correctly, was found to be open to improvement. As there was insufficient time to create these improvements, “TODO” items were noted in the source files and will be acted upon in the near future. Some of these changes are:

- 1) Creation of a single “authentication” method that will be re-used throughout the code, rather than being locally typed in each file.
- 2) Creation of a common, standardized error display method, once again to eliminate the need for repeated code within the source files.
- 3) Creation of MySQL “session” tools, and method(s) to utilize them, to eliminate the need for the repeated passing of username/password information to/from the client and server(s), as well as from page to page withing the logbook system. While SSL security protocols are utilized, it should still be considered preferable to pass this sensitive information is little as possible.

Finally, again thanks to data discovered during the initial code review, some additional functionality has been found to be needed. These will include a change to the database schema to allow for the creation of “user-specific” database tables, allowing for multiple users to have “accounts” on the logbook system. Also, a facility for allowing previously entered data to be modified when errors are discovered is needed and will be added to the logbook system in the near future.

Additional planned database schema modification, such as “normalizing” such things as “city-pairs” (the combination of the FROM city and the TO city), allowing for additional search criteria such as full city names, as well as more compact storage in the “main” database table,

were architected and the initial database tables were created and loaded with a small amount of test information. The relational connection to the existing “primary” data tables will be undertaken in the near future.

As regards the course objectives (as opposed to the project objectives), a great deal has been learned and accomplished thanks to the work for this project. Creation of the GIT ePortfolio took place. It was populated for this final project. This ePortfolio can be accessed vis: [Mesnikoff ePortfolio](#). This was one of the major course objectives, allowing this author to better represent his work and skills to the outside world. While this ePortfolio is still relatively rudimentary, research into how to better format the web pages within the Github Pages system has pointed to ways by which this site’s readability and utility may be enhanced when time permits. The Code Review from Milestone One was very successful and uncovered a great number of small changes required. It should also be noted that very few critical errors were found during the review process, which does point to the use of good programming and testing practices in the creation of the code that was reviewed. Finally, the research in how to implement the future Android application and the current “mobile” web page has pointed out several new tools and methods (the [Mobile Detect](#) web tool, for instance) that are part of the “latest and greatest” components available for project creation. The learning and use of these tools will only serve to increase this author’s skills as work progresses. Since learning is the primary task to be considered here, it is felt that this main course objective has been met.

References:

Envato. (2015, March 11). *Detecting Mobile Devices with PHP*. Envato.Com.
<https://envato.com/blog/detecting-mobile-devices-php/>

I. Overview**A. Version Control Summary****1. Benefits of Version Control Tools in Software Development Projects**

The use of version control tools in software development project has at least two primary benefits, as well as numerous secondary advantages (not all of which will be

References

Atlassian. (n.d.). What is version control | Atlassian Git Tutorial. Retrieved July 7, 2020, from <https://www.atlassian.com/git/tutorials/what-is-version-control>