**Software Design and Engineering**

**Lab Document**

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| **High Level Purpose Statement:** | I wanted to build a Library Book Management system using Gradle, PostgreSQL, Java, and Python. My goal was to automate as many processes as I could so that the program would be simple to clone and run by my peers. |
| **Experimental Design:** | The hard part was integrating PostgreSQL into IntelliJ and figuring out how to make sure that everything happened in the correct order for the program to run properly.  Like if the GUI started running before the database was created, then the program would act like there was no data to search.  Likewise if my python script tried to import the data before the database table was created, then there would be no where to put the data so the program would show no data to search.  I also am really crossing my fingers that all of my automation works when my peers clone my repository. I uninstalled all my dependencies and tried to start from a fresh slate with running the program. It seemed to work fine for me, but I am still nervous nonetheless. |
| **Resources Available:** | • **Gradle Documentation**: <https://docs.gradle.org/>  • **PostgreSQL Documentation**: <https://www.postgresql.org/docs/>  • **Swing (GUI) Documentation**: <https://docs.oracle.com/javase/tutorial/uiswing/>  • **IntelliJ IDEA Documentation**: <https://www.jetbrains.com/help/idea/gradle.html>  • **Python Dependencies**:  • **psycopg2** (PostgreSQL adapter): <https://www.psycopg.org/>  • **kagglehub** (Dataset import): <https://github.com/Kaggle/kagglehub> |
| **Time Estimate:** | I think it will take me about 15-20 hours to do this project. I have been working a lot with GUIs in my Software Engineering class, so I am feeling more comfortable with them, but I also know its really easy to fix one issue and cause another in doing so. It will also take me a significant amount of time trying to automate many of the tasks I want automated, and I haven’t done that quite as much so it will take a decent amount of research. |
| **Experiment Notes:** | I really liked how easy PostgreSQL made it to create a database and I also enjoyed learning how to use Python to import data into that database automatically. |
| **Results:** | I mostly accomplished my goal. All the core things I hoped to accomplish were successfully implemented. The only things I didn’t complete were optional functionality that I would have ironed out if I had more time (such as searching with ISBN, or displaying more information about the search results) |
| **Consequences for the Future:** | This project has given me even more confidence in using multiple languages and tools together to create a more complex program and has given me deeper insight into the intricacies of how these tools work together (and how they don’t). |