Database Project2 Report

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1 Statement

"We have done this assignment completely on our own except for the tools/software acknowledged in the project report. We have not copied it, nor have we given our solution to anyone else. We understand that if we are involved in plagiarism or cheating we will have to sign an official form that we have cheated and that this form will be stored in our official university records. We also understand that we will receive a grade of 0 for the involved assignment and our grades will be reduced by one level (e.g., from A to A- or from B+ to B) for our first offense, and that we will receive a grade of "F" for the course for any additional offense of any kind."

Signature: Xin Hong, Liuzixin Wang

2 Introduction

This team project is to use Oracle's PL/SQL and JDBC to create an web application to support typical student registration tasks in a university.

3 Meetings

3.1 meeting1: determine the overall progress,labor division and realization plan

This meeting defined the initial idea of the whole project. We wanted to implement functionality based on existing stored procedures in Oracle, and to implement a modern interface rather than a command line application. Obviously, the command line application could be developed directly in Java, while the web application needed to be divided into three parts (database, front-end and back-end) using the API and database interface as boundaries. Given our respective knowledge of the different technologies, an initial division of labor was established for this meeting and a time for the next meeting was set. Before the next meeting, we will each determine the technical solution and development schedule of our respective modules according to the division of labor.

3.2 meeting2: technology selection

This meeting determined the technologies to be used. Among them: the database part must use Oracle database, there is no other choice. The overall technology stack is outlined as follows:

- the back-end uses built-in HttpServer and Gson
- the front-end uses React and Ant Design.
- the front-end and back-end interact via JSON format.
- The database uses JDBC for connection.

In terms of interaction between the front-end and back-end, a JSON-based API interface was initially determined, and a preliminary API interface specification was developed. There are many options available on the back end. From an overall perspective, the back-end implementation solution needs to meet the following requirements: first, it is easy to get started and does not require much learning time; second, it can interact with the current Oracle stored procedures, especially using the demo code; third, it can interact with the front-end in JSON format. At present, the more commonly used HTTP service development solutions in Java are mainly SpringBoot. But SpringBoot comes with a lot of components and features. According to its "convention is configuration" design idea, it is difficult to transfer its interface to stored procedures. And SpringBoot is complicated, so it was difficult to implement the requirements in a month's time. Finally, taking all aspects into account, we decided to used a simple HTTPserver implementation from the package com.sun.net.httpserver and used the Gson library to implement JSON object construction to reduce the difficulty of writing code. The Gsonlibraryhelpus to construct JSON objects more efficiency. On the front-end side, the main consideration is thespeedofdevelopment. In terms of technical solutions, theycanbedivided into two categories: first, traditional front-enddevelopment based on jQuery, a model that manipulatesDOMobjects in HTML by writing JavaScript directly; second,responsive frameworks based on React, Vue, etc. The main benefit of these responsive library is that it avoids direct manipulation of DOM objects and focuses on the development content of the requirements themselves. In the end,we adopted React as the main development framework. Using React's official scaffolding tool create-react-app we can improve our development efficiency. Finally, we used Ant-Design, a popular React-based UI framework, to improve development efficiency and avoid writing a lot of CSS code. This technical solution design allows us to implement the front-end interface relatively quickly, the only drawback is that it takes more time to learn .

3.3 meeting3: checking the progress and determining the timing of the interpolation

The main content of this meeting was to check the development progress of each of them to determine the final time of the call. Overall we were able to complete the development on the scheduled date.

3.4 meeting4: undergoing the final tests and mocking demo interview

The main content of this meeting was to check the final result of our project and prepare for mock interview. We exchanged the knowledge we learnt in the process of development.

4 Schedule

4.1 Determine the technical solution : Determine the technology to be used and the development schedule.

In this phase, technical solution and labor division are figured out.

4.2 Development phase : Determine the API interface and the Oracle stored procedures to be written, and develop them individually.

In the development process we always want to find a solution that can increase the speed and improve the quality of the code.For example, in designing Oracle stored procedures, we standardized the procedure names so that the form names passed through the front-end API could be used directly on the stored procedure calls. This design allows us to use one set of code to implement multiple queries for different forms, and the UI components they correspond to are identical, greatly improving the reusability of the code.

4.3 Debugging phase: interface to the API and database, testing and functional verification

During the debugging phase, we mainly tested the API and stored procedures. Since we have already adapted the Result Set in the early stage, those stored procedures that involve query, as long as the correct return value is given, there is generally no problem of adaptability; for the API, since the API specification was made in the early stage and the interface was debugged in advance, we did not encounter great difficulties in this step.

4.4 Summary and Submission: Organize the respective code and write the documentation.

Overall, the schedule is in line with the estimated time, and the API development schedule was a little behind in the early stages due to the large amount of learning required, but quickly caught up with the schedule as it became more proficient.

5 Responsibility

Since our project is a small-scale WEB project, the division of labor is also based on the main modules of the web, i.e. front-end, back-end and database parts.

5.1 Team Member1: Liuzixin Wang

- Responsible for back-end development, using jdk's own httpserver and Gson to write back-end services.
- Responsible for front-end development, using React framework, Ant Design component library to implement web front-end interface

5.2 Team Member2: Xin Hong

- Use Oracle's PL/SQL to create all the procedures in a package to achieve functionality.
- Use Oracle's PL/SQL to create all the triggers outside the package to keep data consistent.

6 Self-Assessment

The group members cooperate well with each other and complete the whole development according to the predefined plan.Because of the proper division of labor up front, we were able to use our respective strengths and therefore had an advantage in development efficiency. Both of us acquire lots of knowledge and ability.