

CS 157A

Project Report

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Problem Statement

This project will be focusing on developing a web-based application for interviewing tinnitus patients. This interview will be taken in the form of questionnaires. The patient's answer to these questionnaires will be stored in the database. The major objectives of this project are the following

1. Design a database schema which meets 3rd Normal form condition and adheres to other aspects of a good relational design as covered in the class. It also includes learning how to transform a given business problem into a technical solution
2. The second major objective of this project is to learn and apply database connectivity libraries. It also includes the aspect of connecting the front end with back end.

In this project, we will be connecting the front end web-based questionnaires to the MySQL database.

Architecture

The application designed by us is based on the client server architecture. A client server architecture is a producer consumer style of architecture. In this type of architecture, the server (a.k.a the producer) produces information or data which is consumed by the client (consumer). Typically, the client and server are distributed over a network of computers. In this project, the server and the client were both running on the same machine.

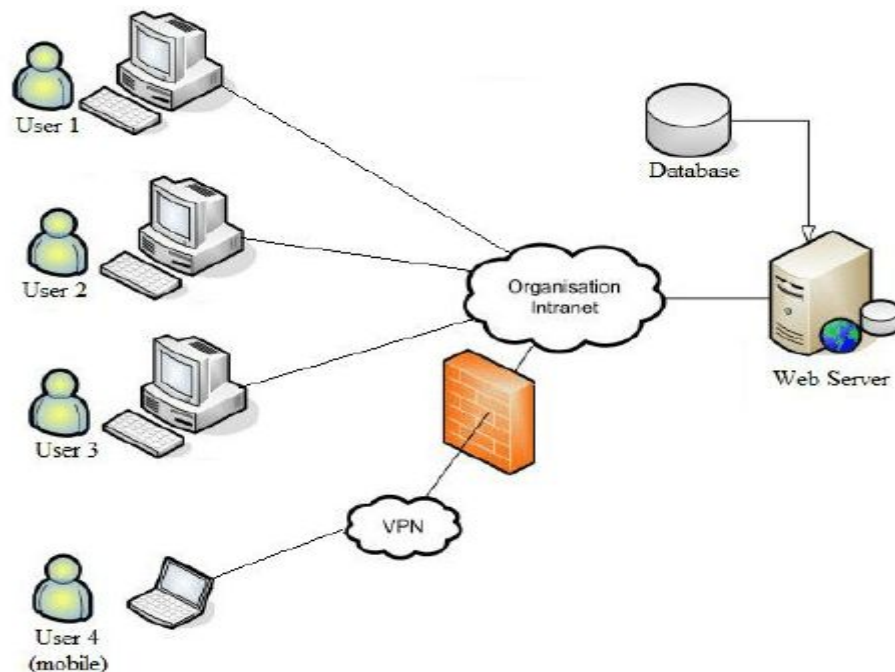


Figure: Client Server Architecture

Database Design and Implementation

We are using a relational database management system for this project. We designed the database such that its entities and relations adhere to relational design principles. We implemented our design in such a way that the tables follow the constraints defined by the definition of 3rd normal form. We used Oracle data modeller to build the logical and the physical model. The figures below depict the logical and physical models respectively.

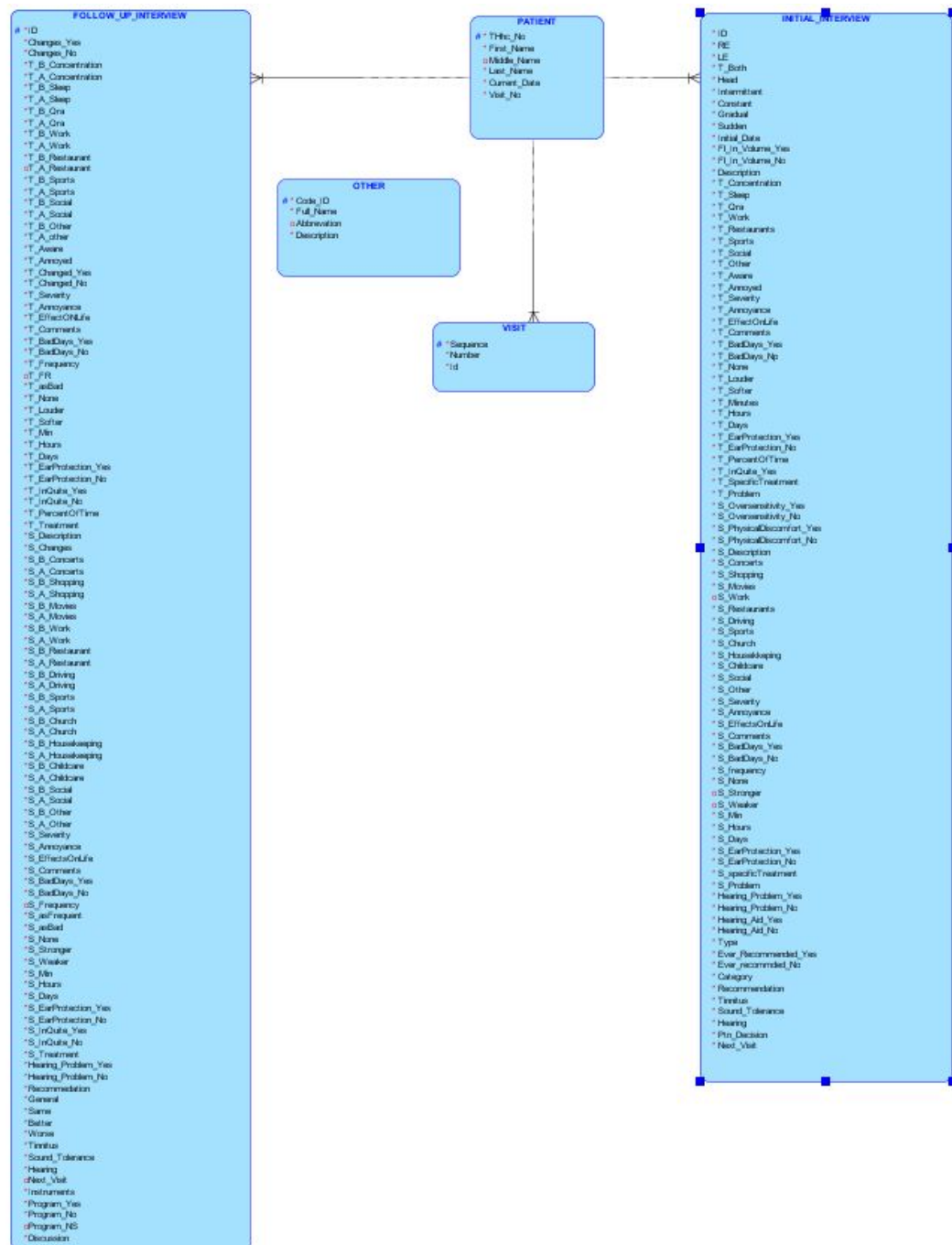


Figure: Logical Model

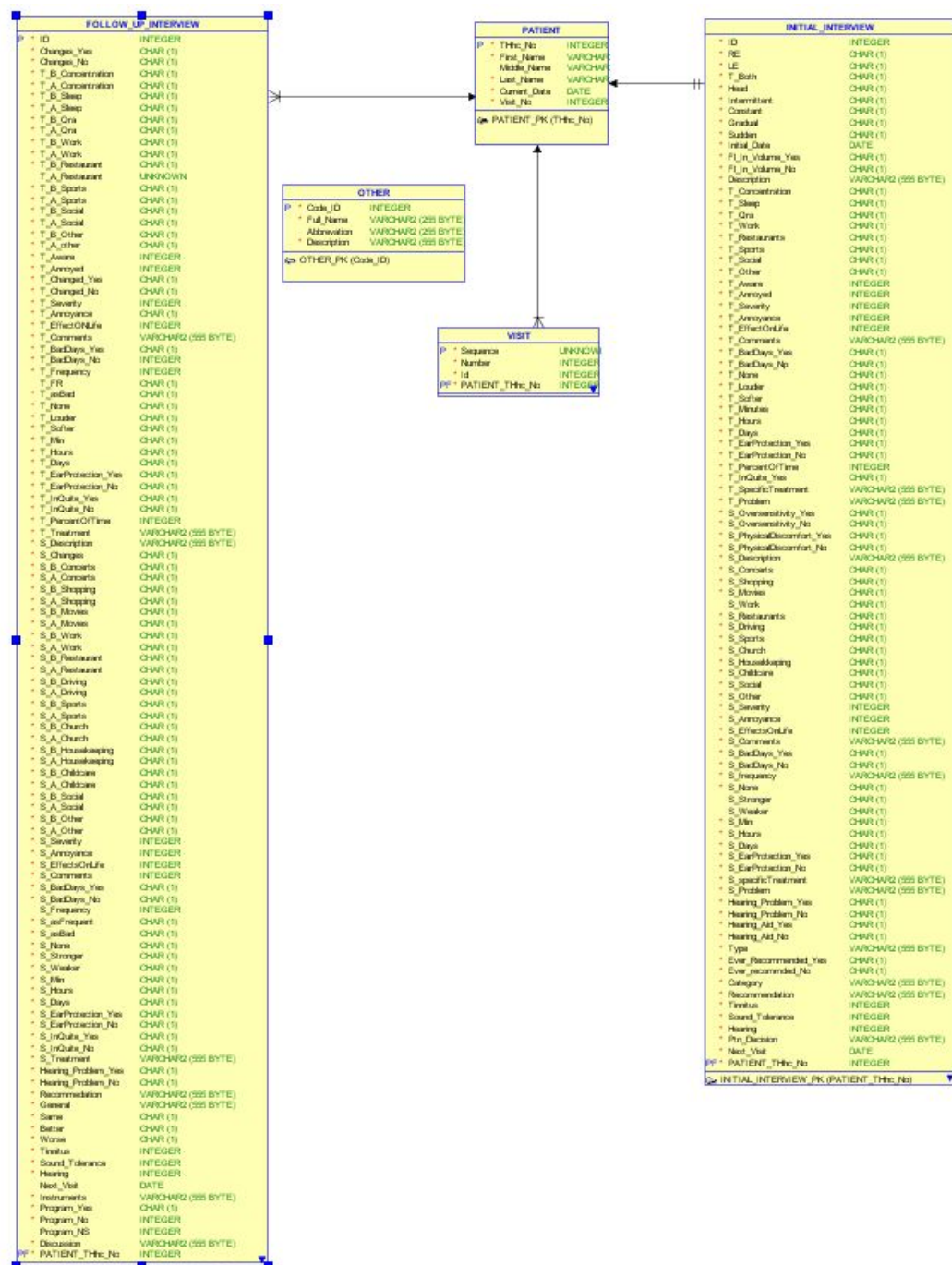


Figure: Physical model

In our design we have a total of 5 tables.

The table Patient stores the attributes as described in the figure below. We can infer from the figure that all the attributes are single valued and are dependent on the primary key of the table (THC_No). First, middle and last name of an individual are dependent on the primary key THC_No. Thus we can conclude that this table adheres 3rd normal form

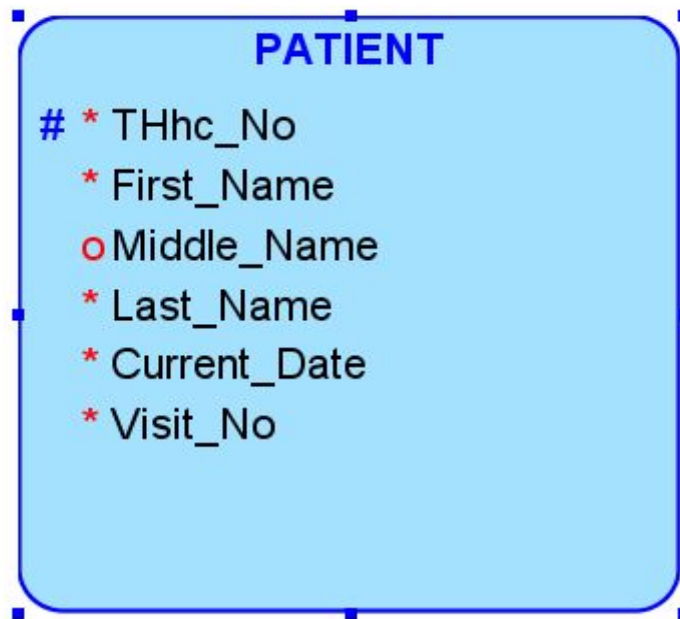


Figure: Patient entity

The table Visit has a total of three attributes; Sequence, number and id. Visit is a weak entity. It needs the primary key of patient table in order to define its entity completely. Sequence acts as the primary key of the table. Sequence converts to visit id in the implementation. Number corresponds to sequence in which the patient is visiting. Id is used to store the order in which the patient has registered to visit. All the attributes of VISIT entity are singular and are dependent on the primary UID, thus we can conclude that VISIT entity is in 3rd normal form.



Figure: Visit entity

The table OTHER is used to store the dictionary part of the requirement specification. It contains 4 attributes. Code_id is the primary key of this table. The other attributes full name, abbreviation and description store the name of the disease, its abbreviation and an optional comment from the users. All the attributes are single valued and for a given instance depend on the primary UID of the entity and thus the table is in 3rd normal form.

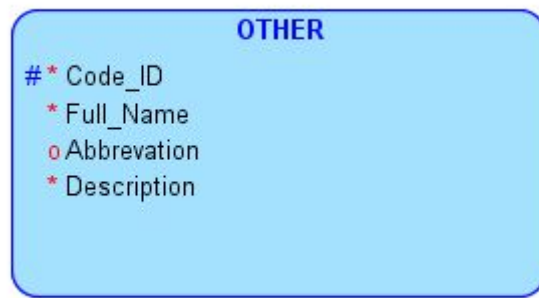


Figure: Other entity

The entity INITIAL_INTERVIEW is used to store the information provided by the patient in the initial interview form. It is a weak entity. In order to define its entity completely, it uses the primary key of PATIENT entity, THC_No. INITIAL_INTERVIEW has a total of 90 attributes. Most of the attributes are boolean values, others are integers or var chars. All attributes are single valued and are dependent on the primary key, thus the table is in 3rd Normal form.

The entity FOLLOWUP_INTERVIEW is used to store the information given by a patient in the follow up interview form. Its primary key is ID which is unique per instance. It is also a weak entity. It uses the primary key of PATIENT entity, THC_No. It has a total of 107 attributes. Like the attributes of INITIAL_INTERVIEW entity, most of them are either boolean, varchar or integers. The attributes are single valued and dependent on the UID. Thus the table is in third normal form.

UI Design

The UI was designed to keep the application easy to use and learn. We designed the UI in such a way that it is easy to follow along. We used HTML and PHP to code the UI.

The UI was designed in accordance to the functional specification. The user is first prompted to either log in or register. In registering step, each user is provided with a THC_No. The user can then log in using this number and follow the simple UI to get to the interview page. The interview and follow up interview page were designed such that they resemble the interview forms provided as an appendix to the functional specification document

Technology Stack

This project is using HTML and PHP for the client side and the server side, this project is using MySQL database 5.7. The primary reasons for choosing this particular tech stack is described below

HTML

HTML stands for Hypertext Markup Language, and it is a language for displaying documents on the web browser.. The HTML codes are executed on the Client-side for loading the design of the webpages. This project will use HTML to organize the structure of the questionnaires and login web page.

PHP

PHP stands for Hypertext Preprocessor. It is an open source language which mainly use for developing web applications. PHP is use for the Server-Side of the web application. PHP codes can be attached to the HTML codes so that the final application can receive the data from the Client-side and computing the output with the Server-side (J, 2018).

This project will use PHP to implement the functions needed for the application. The PHP server will be able to access the database with operations.

MySQL 5.7

MySQL is an open source database management system (Rouse et al. 2018). MySQL is widely used for many different applications since most applications are related with management of database (Rouse et al. 2018). The application will manage the tables inside the database for storing and loading data.

The MySQL functions will be used for managing the patient information based on the PHP operations.

Implementation

The entire application can be divided into three categories. The HTML files for UI, PHP files for functionality and the SQL files. The detailed description of the database implementation is already provided in the earlier sections. In this section we will briefly describe the implementation of the major functions and their uses

SNO	Function	Uses
1	validate_user_registration_first()	This function validates the registration of the user
2	register_user_first()	For registering a patient. Contains the sql queries to add a new patient
3	login_user(\$thc_no)	This function is used to log in a user. Creates a new entry into the database
4	validate_user_login()	Validates the query done by the function above.
5	get_other()	Fetches the data from the

		other database
6	validate_insert_medical()	Validates the insertion of medical data
7	insert_medical()	Inserts the medical data entered by the user into the database
8	intial_interview_visit_id()	Creates a new instance in the initial interview table
9	validate_intial_interview_visit_id()	Validates the above action
10	validate_submit_initial_interview_final()	Validates the information provided by the patient
11	submit_initial_interview_final	Submits the information into the database
12	validate_submit_followup_interview_final()	Validates the insertion into follow up interview table
13	submit_followup_interview_final()	Submits the information into the follow up interview table

Instructions to deploy the Application

In order to run this program, there are some necessary software which need to be downloaded before running this application on a particular computer. This application requires MYSQL and XAMPP installations.

To download MySQL 5.7, navigate to this link:

<https://dev.mysql.com/downloads/mysql/5.7.html> . Then, select the proper version and operating system for the MySQL and click on download. For errors occurred during the installation process, refer to: <https://dev.mysql.com/doc/refman/5.7/en/installing.html> for solutions.

For PHP implementation and MySQL implementation, download the xampp application from <https://www.apachefriends.org/download.html>. After the file is downloaded, click on the installer and pick the directory that the program needed to be installed. Remember the directory where the xampp is installed. Launch the xampp and click on start for the Apache and MySQL. The application UI should look like the image below:

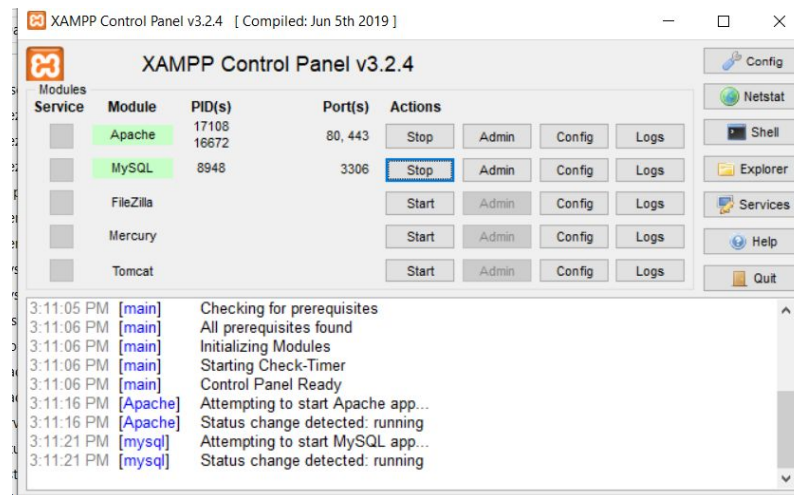


Figure: XAMPP Control Panel

Instruction on Deploying and Running the Program

First, download all files from this github:

<https://github.com/inderSjs/CS157A-team2-topic2> . Then, navigate to the file directly where the XAMMP was installed, and go to the htdocs folder. Place all the files downloaded from github into the login folder. Make sure to answer “Yes” when the system ask for replacing you files. Then, you login folder should look like this:

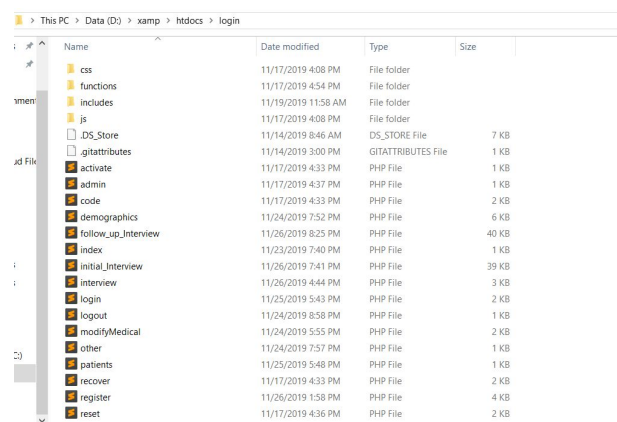


Figure :The PHP File Installation

Navigate to <http://localhost/login/> on any web browsers, and the webpage view should look like the below image:

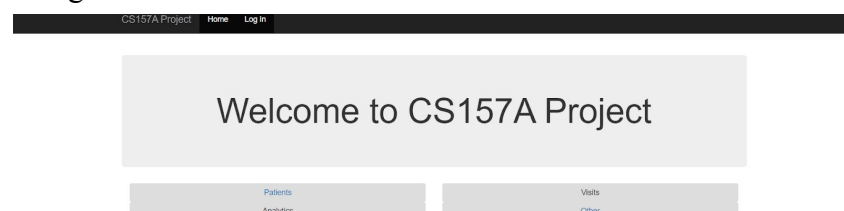


Figure: Welcome Page of The Project

After seeing this view, the patient/administrator will be able to input or load their

information.

However, the database has not been set up yet. The webpage that we have is only the front end of the program. To set up the database for this program, click on the “admin” button of MySQL on XAMPP UI (the one with the blue line surrounding):



Figure: Opening Admin Window of MySQL

The phpmyadmin window will pop up. Click on “import” button, and browse the directory for the sql file named login_db.sql. This file should be downloaded within the github files. Click on the “OK” button and the database will be installed.

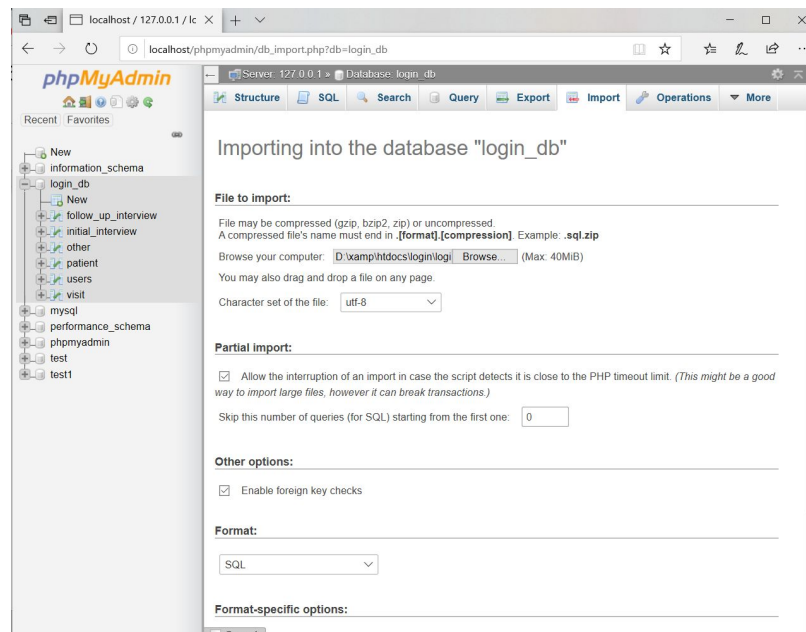


Figure : Importing sql File

After confirming, the tables will be created, and there should be confirmation show up like this:

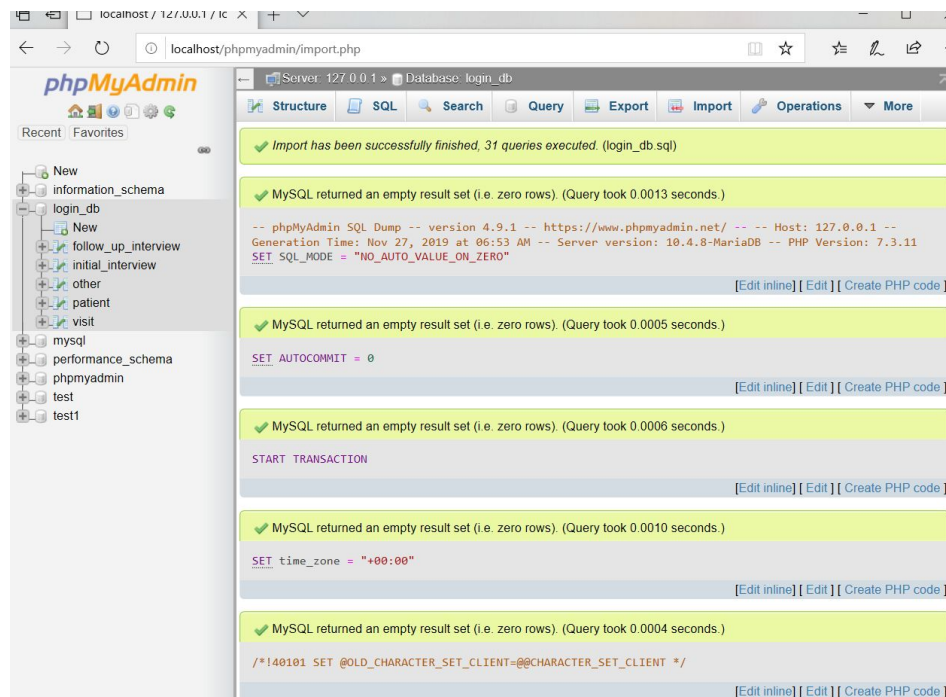


Figure: Confirmation Window of Importing sql File

Now, the project can be running on a browse tab by <http://localhost/login/>, and it should be functioning normally with the requests from the users.

Contribution Credit

Dat Do - He worked on the UI and connecting the backend with the database

Inderpreet Singh - He worked on the database design and implementation, report and helped Dat with the connection part

Jiajian Liu - He worked on the report

References

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