**CS 6360.501**

**Programming Project 1**

**Contact List**

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**Design Document**

**Introduction –**

The objective of this programming project is to create a database host application that interfaces with a backend SQL database implementing ContactList application. The application should have GUI interface which manages all types of communication with database like queries, updates and deletes etc.

Tools and Technologies used – HTML,CSS, Bootstrap, jQuery, JavaScript, AJAX, PHP, MySQL server database, phpMyAdmin workbench, Google Chrome browser, Microsoft Excel.

**System Architecture –**

The application implements a three-tiered system architecture where the three tiers are Presentation tier, Application tier and Data tier. The Presentation tier which is the known as the User interface/ front end is done by using HTML,CSS, jQuery and Bootstrap technologies. These technologies together help to build a single page application which asynchronously loads the data without too much lag or delay felt by the user.

The second tier or application tier is implemented using PHP. PHP is mainly used to establish a connection with database and used to implement some application logic. It is the middle layer which binds the front end with backend.

The Final tier is the Data tier which is the backend of the application which is the storage space for all application data i.e., the contact details of users. The Data tier is implemented using by MySQL server which uses phpMyAdmin as the workbench for initial creation and loading of data.

**Design Decisions and Assumptions –**

Front End –

The front-end design needs to perform the following functionalities –

1. Display list of contacts

Contact data is displayed according to newly added contacts first. User can access all contact details without any restrictions. Initially only top 1000 rows are displayed to improve the speed of the application. Multiple records are displayed for same user depending on address type, phone number type and date type.

1. Search the list for particular contact

User can perform the search operation on entire database on the basis first name, last name, address, city , state , zip, phone number etc. via a single search field. Result of this search is list of all contacts that hits the search criteria.

1. Add new contacts to the database

All primary keys of table entries such as contact id, address id etc. are implemented using the auto increment functionality. Hence user is not required to enter any Id such as contact id for a particular contact. Certain fields are necessary fields and must be entered by the user such as first name and last name. User can add multiple types of address, phone numbers and dates for a single user, however, can only enter one kind of each data at a time. Additional constraints are placed on data entry such as phone number, area code and zip codes which must follow certain restrictions.

1. Modify existing contact details in the database
   1. Each table entry contains an update button which can be used by the user to open a popup window to modify existing contact details. The popup window prepopulates the table entry with already existing values from database. Null values in database are left blank.
2. Delete contacts.
   1. Similar to update button for modifying data, a delete button is also present in each table record to delete the user data. Delete button requires additional confirmation to check with user if the record really needs to be deleted. This is done with help of jQuery alert popup window. Delete operation deletes data from all tables for the particular contact id.

The front-end UI framework of the application was designed using Bootstrap on top of HTML and CSS. Various html elements such as tables, buttons, textboxes, modal popups were used to display data as well receive data from user input. These elements were neatly displayed with help of bootstrap classes and CSS classes. Additionally, jQuery and JavaScript are used to render data using ajax technology and implement some graphic effects to navigate the page. Event handling is also done using jQuery.

Middle Layer –

The Middle Layer or application layer involves application logic and query processing. PHP is used to perform these activities. Database connection is established using PHP and data is sent to AJAX request using PHP. Some HTML elements are also displayed using PHP. The data entered by user is sent to database using POST method which in turn passes the data to PHP which further processes the insert queries into the database.

Back End –

The back-end design needs to follow the database schema given in the assignment document. The given csv file was not normalized and needs various levels of normalization according to the schema. 4 tables were created according to the schema namely – Contact, Address, Phone and Date. Microsoft Excel was used to change the given csv file into normalized tabular data according to the columns listed in each of the above tables. This data was modified into insert queries and phpMyAdmin workbench was used to import the table creation and insertion queries into MySQL server database.

All these modules are integrated into one single application that is the final output required by this programming project.