

**COMSATS University Islamabad (CUI)**

Project Report Front End

(Final Lab Project)

for

**Gym Management System**

**(Data Communication and Computer Networks Project)**

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# Description:

## Problem Statement:

Everyone nowadays wants to get in shape and enjoy a healthy lifestyle so what do they do for achieving this goal? They join and get membership of a gym. Gyms have become a major and essential part of our lives and can be very helpful for people who are looking to gain or lose weight. There is a need of managing records of those gym members and equipment. Currently, in most of the gyms all the data is stored and maintained on paper. Managing records of gym members and machinery can be a hectic task if done on paper. The goal is to create a client server application which allow admin to manage record of equipment, members and equipment usage.

## Solution:

The solution to above problem is creating an client server application that will take input from user and store data remotely on server using database. In this way, there is no need to store data and records on paper. The purpose of Gym Management System is to manage all the records of equipment and members by using Client and Server. The transport protocol used in this application is UDP. To store data, we have used ORACLE DBMS.

After establishing connection with server, the system will show the main menu from there an admin can then choose to enter in different menus which are Equipment, Members and Usage. In equipment menu, client can enter details about equipment which is then send to server to store into database. In members menu admin can view, add and search the records of members. In usage menu admin can manage details about which member uses which equipment. To make a GUI, I have used Java Swing library to build front end of the system.

I have made separate classes for JFrames to handle different operations performed on an entity. These JFrames contains buttons and text fields for better user experience and I have bind those buttons with methods in client class to handle data from user and send it to server. To bind those buttons I have made on click action listeners for buttons to do their respective function and move from one frame to another.

# Functions in Classes:

## Server Class:

In server class, I have made separate switch cases to handle different functionalities like adding, viewing and searching of entities. There are no additional functions except main method in Server Class.

## Client Class:

Before front end development, in client class we made up cases to send data to server depending upon different options that user input in console. But for GUI, I break up the use cases and handle their functionalities in separate static methods so that I can bind them with buttons of JFrame. When a user/client presses any button it will call respective static method and after performing that function it will send that data to frame by making its instance.

### addEquipment():

This method is used to take data from JFrame make its object and send it to server to insert a new equipment into database.

### viewEquipment():

This method helps us in getting all the data from server of equipment and showing it in table in Equipment Data JFrame.

### searchEquipment():

This method will get an id for searching an equipment and send it to server to search from database. After searching it returns equipment to client which then display the result in another Jframe.

### addMember():

This method is used to take data from Add Member JFrame make its object and send it to server to insert a new member into database.

### viewMembers():

This method helps us in getting all the data from of members server and showing it in table in Member Data JFrame.

### searchMember():

This method will get an id for searching an member and send it to server to search from database. After searching it returns member to client which then display the result in another Jframe.

### addUsage():

This method is used to take both ids of equipment and member from JFrame and send it to server to insert a new Usage into database.

### viewUsage():

This method returns us all the data from server of equipment and member using that equipment and showing it in table in Usage Data JFrame.

### searchUsage():

This method will get an id for both equipment and member and send it to server to search from database. If usage exists of those id, it returns them to JFrame to display details of that usage.

## JFrames:

Most of the functionality in JFrame of swing library is styling different elements in constructor and action listeners methods to different buttons. The details of these action listeners and their behaviour is given below with their Frame name.

## Main Menu:

When the user runs client, main menu is displayed to him with three buttons each for respective entity. User can click any of these buttons to move in menu of entity to view data, add and also search through data.

### Equipment Button:

The action performed by equipment button is that it will call the viewEquipment() method of client class which is a static method and in this method client will fetch all the equipment data from server and it will then send to EquipmentFE Frame by making its object.

### Member Button:

After clicking member button in main menu, it will call the viewMember() method of client class which is a static method and in this method client will fetch all the member data from server and it will then send to MemberFE Frame by making its object.

### Usage Button:

Usage Button will call the viewUsage() method of client class which is a static method and in this method client will fetch all the usage data from server and it will then send to UsageFE Frame by making its object.

## EquipmentFE:

This Frame also contains add and search button and also user can move back to main menu by clicking back button. It also shows all the equipment data which was fetched from server.

### Back Button:

Back button will redirect to previous frame by making its instance and it is valid in every case.

### Add Equipment Button:

Add Equipment button will move user to another frame in which he can enter data.

### Search Equipment Button:

If a user wants to search a specific equipment and view its all details, he can do it by writing its id and clicking on search button. It will call the searchEquipment() from client and take id as a parameter. The client will send that id to server and server will then send details of equipment of particular id if it exists. If user enter invalid id, it will display a dialog box that tells us that user has entered an invalid id. Otherwise the details of equipment will be displayed as in labels in equipment detail frame.

## AddEquipment Class:

After clicking on add Equipment, user will redirected to Add Equipment Frame in which user has to fill in the fields related to Equipment and give a unique id. After that user needs to click on Add Equipment button and it will take data from fields and send them to addEquipment() method of client which will make an object and send data to server to store on database. It will then return a confirmation message which will be displayed in dialog box. If equipment is successfully added, user then will be redirected to EquipmentFE frame.

## MembersFE Class:

When user click on member button from main menu, he will be directed to MemberFE frame.

### Search Member Button:

User can also view details of specific member just like as in equipment by providing its id. This Button will send id to searchMember() method in client which will send this id to server and receive an object of Member class which was fetched from database by server of respective id. This data will then be sent of Member Details frame which will show all data of member of specific id.

## Add Member Class:

After clicking on Add Member Button from Member Data, user will be redirected to Add Member Frame. Here user can enter data about member and click on Add Member button. This button will call the addMember() method from Client class and send the values of fields as parameters and later client will make a member object and send it to server who will store it into database and later send an confirmation message.

## UsageFE Class:

If user clicks on Usage button from main menu, he will be redirected to above Usage Data Frame which will show all usage data in table. Here we do not need to move to another frame to add another record. It can be done by entering Equipment Id and Member Id.

### Add Usage:

Add Usage button will call addUsage method from client and send it equipment Id and member Id as paramenter which will be sent to server and at server it will be added to Usage table as foreign keys. The server will then respond with a confirmation.

### Search Usage:

After writing equipment and member id in the same fields as shown above, if user clicks on Search Usage button it will show details of member who is using that particular equipment. What it will exactly do is take value from fields send them as parameters to searchUsage() method in client class from where it will be sent to server who will find the member and equipment of particular id and then take natural joins and send all this data back to client who will then send it to Usage Details Frame.

# Data Representation (Data Storage at Server):

At Server level, when we receive data from clients in the form of objects and Byte Array, we then store this data into the database. In our case, we have used ORACLE DBMS to store data in different tables. To handle this functionality, we have made separate classes for each entity. In these classes, there are separate methods which makes connections with database and add, view and search from database on the need of user.

# Output:

After running client class, following window will appear. Then user can navigate through different menus.

A sign on a wall

Description automatically generated with low confidence

If user clicks on Equipments, all equipment will be shown in table to user.

Click on Add Equipment button, so user can go to add Equipment Menu. Here user can enter the fields and click on Add Equipment button. The desired equipment will be added in database as shown below

Diagram

Description automatically generated

After adding equipment, the user will be redirect to view all data frame which then looks like:Graphical user interface

Description automatically generated

To search an equipment, user can put id of desired equipment and click on search from where he will be directed to Equipment Details frame as shown below:

Timeline

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If user clicks on Members button from main menu, the following window will appear:

Graphical user interface

Description automatically generated

To add an equipment, user can move to Add Member frame by clicking on that button. Then he can enter details and click on Add Member button to add a new member as shown below.Graphical user interface

Description automatically generated

The newly added member can be seen hereDiagram

Description automatically generated

User can also search a member by giving his id and press search button. Below is the output of searching id 4.A picture containing text, electronics

Description automatically generated

If user clicks on usage button from main menu, he will be directed to window below. It contains all the recordGraphical user interface

Description automatically generated

To add another usage, user can enter equipment and member id and click on add usage button. If same member and equipment exist with same id, they will be added as a record.

User can enter equipment and member id to search details for specific usage details.

Timeline

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