

A

Mini-Project Report On

PING PONG GAME

Under the Course “Java Programming Lab” (CI3131)

& “Database Management System Lab” (CI3151)

Submitted by

Third Year (*Information Technology Department*)

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K. E. Society's

Rajarambapu Institute of Technology, Rajaramnagar

(An Autonomous Institute Affiliated to Shivaji University, Kolhapur)

2022-2023

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Rajarambapu Institute of Technology, Rajaramnagar
(An Autonomous Institute Affiliated to Shivaji University, Kolhapur)

CERTIFICATE

This is to certify that below mentioned students of T.Y.B.Tech. (IT) have successfully completed the project entitled “*Ping Pong Game*” under the course “Java Programming Lab” (CI3131) & “Database Management System Lab” (CI3151). The content of this report, in full or in parts, has not been submitted to any other institution or university for the award of any degree.

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DECLARATION

We, the undersigned, the students of T.Y. B. Tech. (*Information Technology Department*) hereby declare that the project entitled **“Ping Pong Game”** under the course “Java Programming Lab” (CI3131) & “Database Management System Lab” (CI3151) is a genuine work conducted by us through observations, data collection and study of various codes and algorithms.

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ABSTRACT

The “Ping Pong Game With User Login System” project is built for the convenience of gamers, children`s, teenagers etc, so that everyone would enjoy gamming without getting any problem. The project “Ping Pong Game With User Login System” is built on the three pillars of languages Java, MySQL, Java Swing. In this project, a system can register any new user, user can login with password, user can set goal score, user can see game history. This application allows / enables smooth and easy gaming experience of the gamers and children`s. For fun and entertainment “Ping Pong Game is designed”. Pong is a 2D video game inspired from the sport table tennis Features a very basic graphical user interface. A ball is passed between two paddles controlled by the two players. A player can invoke only two actions move the paddle upwards move the paddle downwards. While entering into game 2 players should log in and need to enter the score to win. After completion of game, System will store the history. And any user can able to see past history. Whatever changes that are made to the database are reflected and can be seen through GUI. The ‘Ping Pong Game’ undertaken as a project is based on relevant technologies. In the analysis phase we analyzed the requirements of what the project will do. We collected the requirements needed to develop the project. Created database was used to store the details of users in tables. Hence in the existing system for Ping Pong Game, the performance evaluation system and the maintenance are done manually. The proposed system will maintain all the information in a standard database and will be able to generate reports when necessary.

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3. List of Acronyms :-

1. ULS : Ping Pong Game User Login System.
2. GUI : GUI stands for Graphical User Interface.
3. ECLIPSE IDE for Java Developers.

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1. Introduction :-

To create an user friendly game by using java graphical user interface which will be simple to play. The game should be played by two players at a time and control should be given to both the players on their side. Also to create user login system for players along with their registration as only authorized persons should play the game. The game should not be accessed by unauthorized people especially by children. Admin should able to delete the record of particular player. Two players who are going to login into the game can decide their winning score. No other player or third person can delete the record of any player. After playing the game, system should record of the winner, score and player names as history of the game and should display whenever we want. This is a simple game developed in java with Source Code. Front-end interface is designed using java . In our free its very efficient to play such a game .This is a two-player game in which players need to touch the ball with the paddle if the ball will not touch the paddle then the other player will get numbers and vice versa. The Pong Class is main class from which all things are controlled. Ball class that draws the ball and also check its collision with the paddles. Paddle class that draws the paddles and also move the paddles up and down. This application completely provides a user-friendly interface. Java is a programming language and a platform. Java is a high level, robust, object-oriented and secure programming language. MySQL is becoming so popular because of many good reasons. MySQL Workbench is a visual database design tool that integrates SQL development, administration, database design, creation and maintenance into a single integrated development environment for the MySQL database system. We are using java along with database connectivity with SQL to perform this project.

1. Problem Life-Cycle :-

The game Ping Pong was one of the first computer video games and was all the rage in the 1970's. In the modern age, game suffering from many problems including a lack of login info, history of gamers, and improper management that data.

It contains different phases:

- **planning:** Planning for ping pong game is a process of envisioning the future of the game lovers. Planning helps the team understand the situation of their community, set priorities, and establish methods for achieving those priorities.
- **Analysis:** Systems analysis is the study of a problem domain of any organization which helps to recommend improvements and specify the requirements for the solution whereas the systems study is the specification of computer based solution for the requirements identified in a system analysis.
- **Design:** A Ping Pong Game is software that provides the ability to find user history, manage winning score amount players. It helps to manage its gaming account and make changes with their account.
- **Testing:** The system requirement in Ping Pong Game focuses on the user login system and their account. They can set and reset a valid password for gaming account. With this they should be able to Login, Register, View user history.

2.1 Problem Identification:-

As we know demand for gaming is increasing rapidly worldwide. Game creation is one of the fastest growing programming era in Coding world. The main aim of the project is to create the interest among users for game and give access only to authorized users only. To give authority for playing is the agenda for unwanted access from unauthorized users.

2.2 Problem Selection :-

A Ping pong game is selected in consideration with user demand of games in world. Game is one of the ruled way of entertainment among people. Ping pong is simple game but which gives a idea of creating bigger project than this. This project is combination of Java components along with MySQL database which gives learning opportunities of database management with programming languages .

2.3 Problem Definition :-

To create an user friendly game by using java graphical user interface which will be simple to play.

The game should be played by two players at a time and control should be given to both the players on their side. Also to create user login system for players along with their registration as only authorized persons should play the game. The game should not be accessed by unauthorized people especially by children. Admin should able to delete the record of particular player. Two players who are going to login into the game can decide their winning score. No other player or third person can delete the record of any player. After playing the game, system should record of the winner, score and player names as history of the game and should display whenever we want.

2. Literature Survey :-

A) Ping Pong Ball Rotation Trajectory Tracking Algorithm

The objective of this work is to design a real-time accurate ping pong ball tracking system and to reconstruct the spatial coordinates of the ping pong ball using image information and camera position to calculate the ball velocity. In addition, the information and periodicity pattern of feature points on the table tennis ball in consecutive multi frame images are used to estimate the speed and rotation axis information of the table tennis ball and to extract the spatial position, speed, rotation axis, and other technical and tactical indicators of the table tennis ball. To test and perfect the whole system, it is necessary to measure and collect data in actual matches, measure the effect of the algorithm in actual table tennis match videos, and finally perfect the whole real-time table tennis analysis system. The research of this project includes the tracking system in table tennis matches, including target tracking and trajectory prediction for single-camera and two-camera systems, spin speed and rotation axis estimation of the ball, and visualization and analysis of the data. Combine traditional target tracking algorithms with the latest technologies to achieve a real-time table tennis match analysis system.

B) Case Study : The Game of Pong

The game of Pong was one of the first computer video games and was all the rage in the 1970s. The game consists of a ball that moves horizontally and vertically within a rectangular region, and a single paddle, which is located at the right edge of the region that can be moved up and down by the user. When the ball hits the top, left, or bottom walls or the paddle, it bounces off in the opposite direction. If the ball misses the paddle, it passes through the right wall and re-emerges at the left wall. Each time the ball bounces off a wall or paddle, it emits a pong sound.

4. Proposed System and Required Specification :-

4.1 Significance of project :-

- Creating a game is great chance for programmers to create more interesting games.
- This Game project is simple one, and it gives new Ideas and methods for creating new Games.
- To give authorization for players is one of the emerging concept in Gaming world which requires database management.
- To display History of game is user demand in which we can see history anytime.

4.2 Scope of Project :-

- Pong is a 2D video game inspired from the sport table tennis Features a very basic graphical user interface.
- A ball is passed between two paddles controlled by the two players.
- A player can invoke only two actions move the paddle upwards move the paddle downwards.
- While entering into game 2 players should log in and need to enter the score to win.
- After completion of game, System will store the history. And any user can able to see past history.

5. Design :-

1. Flow-chart :

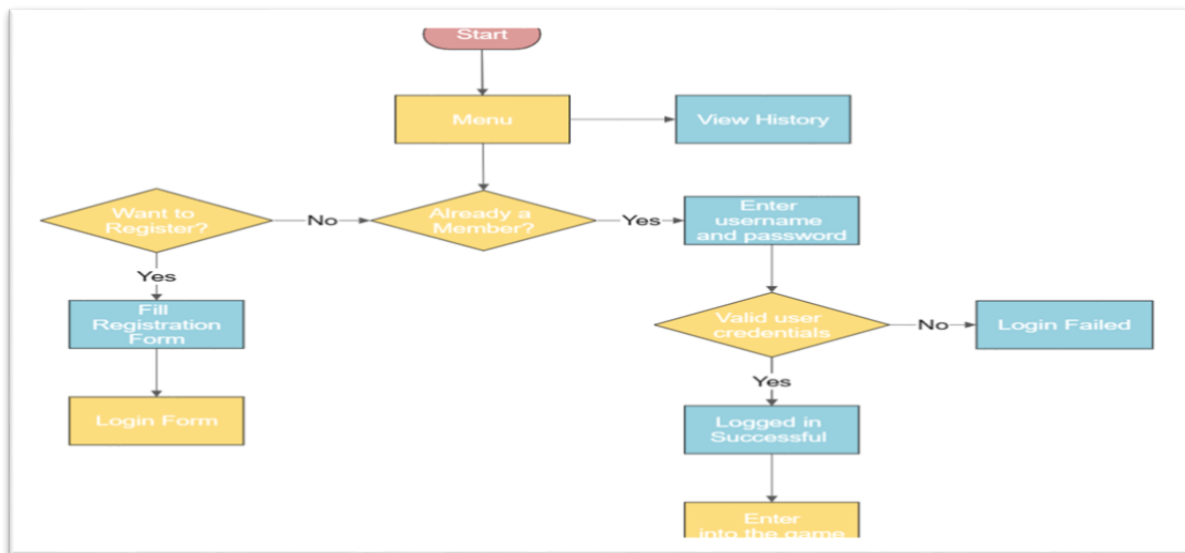


Figure 1. Flow chart of Ping Pong Game User Login System

Above is the flowchart of our “ping pong game with user login system”. So, while starting the game go to menu then check whether a member is already exists or not. If no then that member must have to register first and fill the registration form and then go to the login form. And if the member is already exists then enter the username and password and the information that the member entered checks is it valid or not, if it is valid then it will show that login is successful and that member will enter into the game and if the information is not valid then it will show that login is failed. After playing the game we will see the history that who was the player 1, player 2 and what score that they set before playing the game and who is the winner in that particular match.

2. Description of components of code:-

Code of the project contains multiple classes and functions mentioned as bellow.

1) FrontPage:-

This page is opening page of our project where options are given to users to log in , register, view history and Delete user. Delete user is available for admin.

2) LoginPage:-

This page will take input from user for their login credentials. If login credentials are matched then players will enter into game. Players have to enter the score to win on this page itself.

3) RegistratationPage:-

This page will take input from new users. The information which is taken will be stored in database. And while login into the game same credentials will be verified.

4) ProgressBarPage:-

This page contents labels denoting the two player's names and progress bar.

5) GamePanel:-

On this panel actual game will be played. Page consist of continuously moving ball and two paddles. Page also contains Live score coverage.

6) Paddle:-

This class will extend Rectangle class and create paddles by given position and dimensions. It will the rectangle with blue and red color.

7) Ball:-

This will extends rectangle class and fill it with oval shape and have functions to set direction for ball.

8) Score:-

Score will be displayed on the panel continuously throughout the game.

9) WinnerDialog:-

WinnerDialog consist of label which will display the winner and end the game.

3. Table :-

Table 1. Classes used in the code

Sr. No.	Method	Purpose
1.	JLabel	Adding label to frame
2.	JButton	Adding button to frame
3.	TextField	Adding TextField to frame
5.	JFrame	Adding a frame to GUI
6.	JPanel	Taking Panel into frame
7.	JTable	Adding table to the frame
8.	JProgressBar	Adding Progress Bar
8.	JGraphics	For painting and repainting components.

Table 2. Packages

Sr no.	packages
1.	import javax.swing
2.	import java.awt

4. Figures (Diagrams) :-

1. DFD Diagram Level 1:-

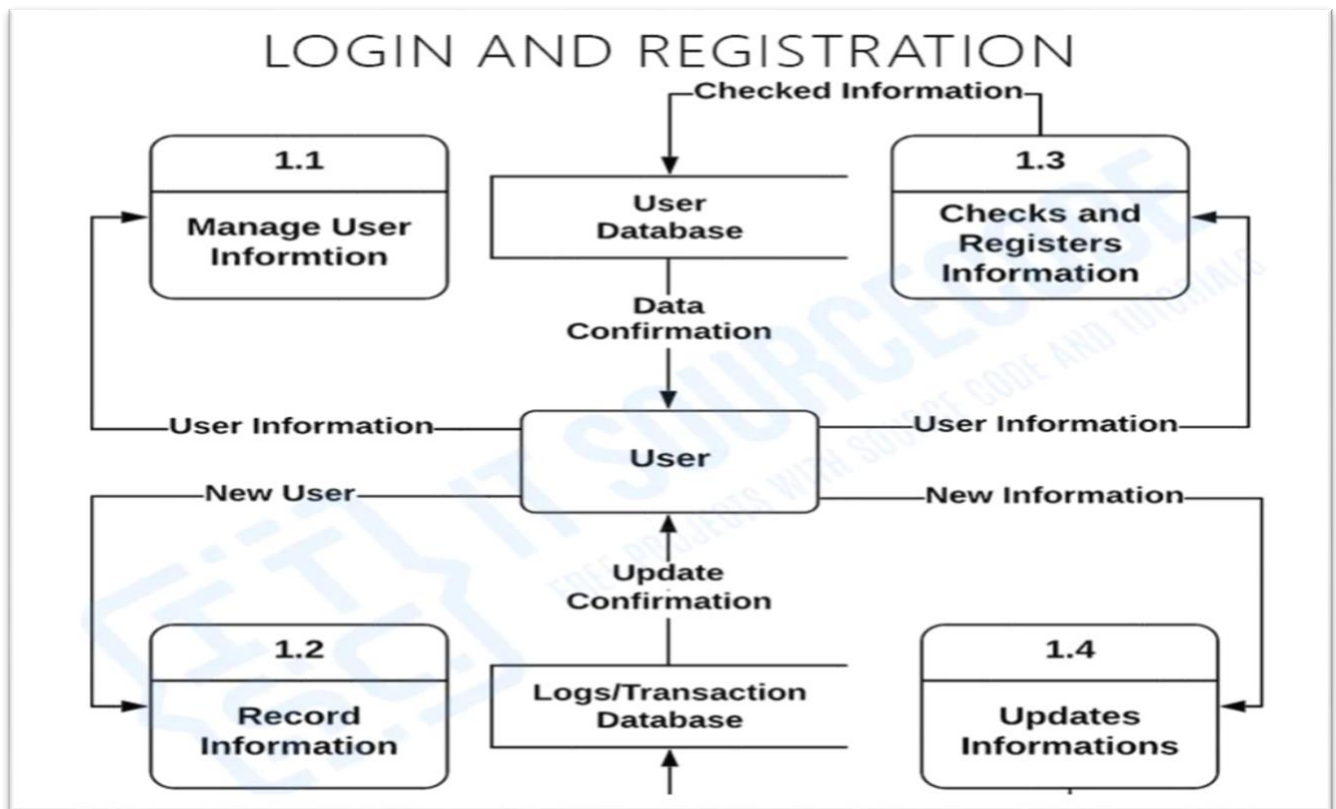


Figure 2. DFD of Ping Pong Game with User Login System(Level 1)

Above diagram represents the DFD of the user login System. In this, various tasks can be performed, and the changes are reflected in the database at the backend. Two entities are considered, namely player and database, in which intermediary is user login System. And the flow is directed from user to user login System and then to the database and also from Database to ULS and to User.

2. Process Model :-

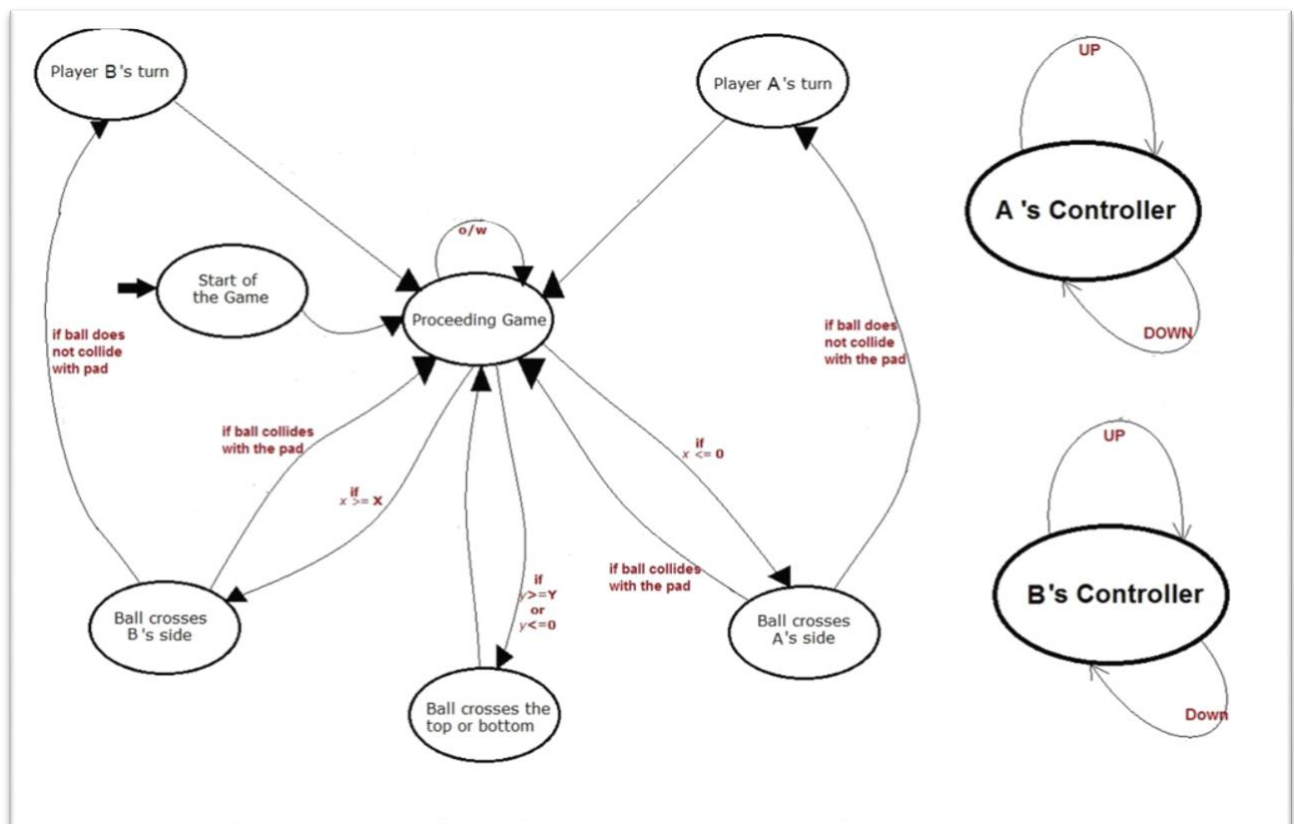


Figure 3. Process model of ping pong game with user login system

The above diagram shows the process model of our project which shows how game is actually played. The game is played by two players at a time. If ball does not reflected by paddles and if collides with back screen then opponent will get one point. Both players

3. ER Diagram of ULS:-

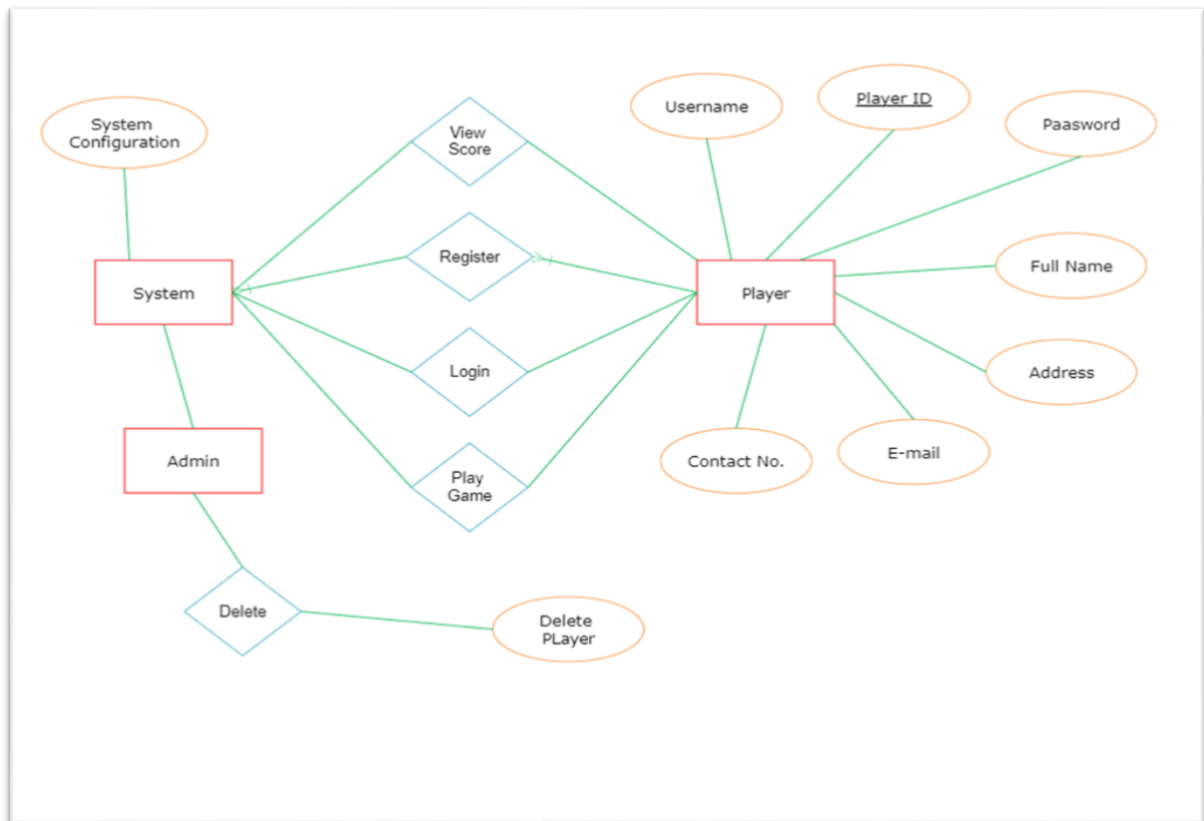


Figure 4. ER diagram of ping pong game user login system.

Above ER Diagram specifies database management of our project. ER diagram consist of three entities i.e. Player, System and Admin. Player is able to register, login, play game and view history. There is one to many relationship between player and system because multiple players can register into the system. Admin can login and delete any player, no one can delete any players information except admin.

5.1 Appearance of interface :-

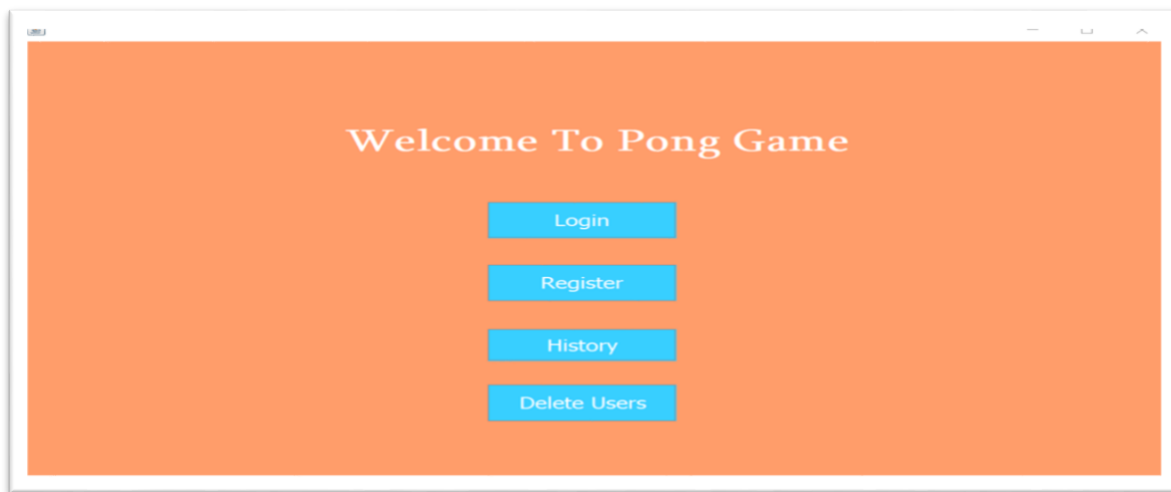


Figure 5. Front page of ping pong game with user login system.

A) Front Page :-

Above page shows the front page of our “Ping Pong Game User Login System”. It contains the buttons like Login, Register, History and Delete User. In login button user can login to play the game. In register button, the user needs to register before going to the login page. The history page is for just showing the history. And delete user is for deleting any record.



Figure 6. Registration page of ping pong game with user login system.

B) Registration Page :-

Above page shows the registration page of our “Ping Pong Game User Login System”. For playing the Ping Pong Game you need to register and fill the details properly. In the Registration Page there are 8 attributes such as User ID, Username, Password, Full name, Address, E-mail, Contact Number and Confirm Password. These are all attributes any player need to fill. Here, the password and confirm password must be same otherwise the form will not submit. After submitting the form go to login page and login, and in that login page fill the username and password correctly as you inserted in the registration page. Otherwise the form will not be submitted.



The screenshot shows a web application window titled "Student Login". The background is a solid yellow color. The window is divided into two main sections for "Player 1" and "Player 2". Each section contains two input fields: "Username :" and "Password :". Below these two sections, there is a single input field labeled "Score to Win :". At the bottom center of the window is a blue button with the text "Submit".

Figure 7. Login page of ping pong game with user login system.

C) Login Page :-

Above page shows login page of our “Ping Pong Game User Login System”. Login page contains player 1 and player 2 username and password and also both players decide to set the score to win and then submit .But his submit button will work if and only if the username and password of both the players matches with the registered username and password. Then this form will submit and progress bar comes with usernames of both the players shown. The progress bar is just for starting the game so that the players will be ready to play the game. After the progress bar will successfully completed, it will redirect to actual game and the game will start.



Figure 8. Progress bar of ping pong game.

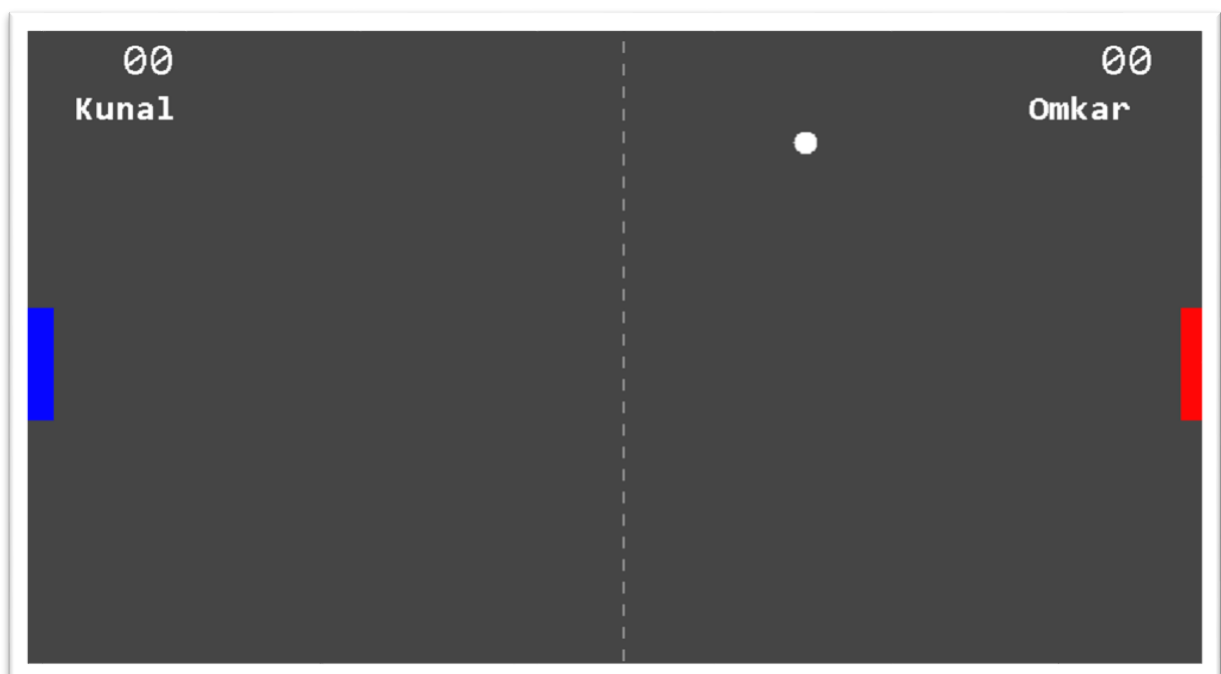


Figure 9. Actual UI of ping pong game.



Figure 10. Winner dialog of ping pong game

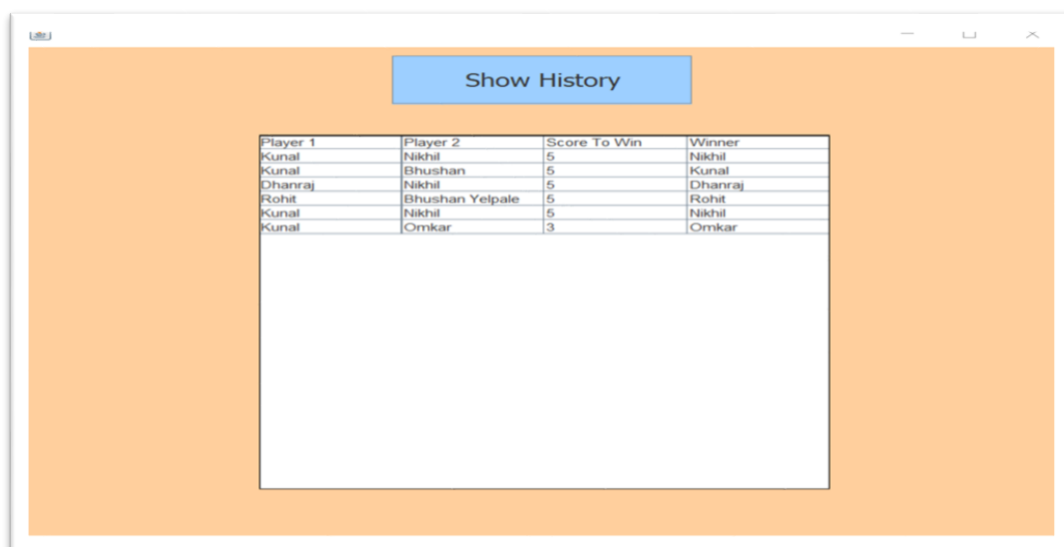


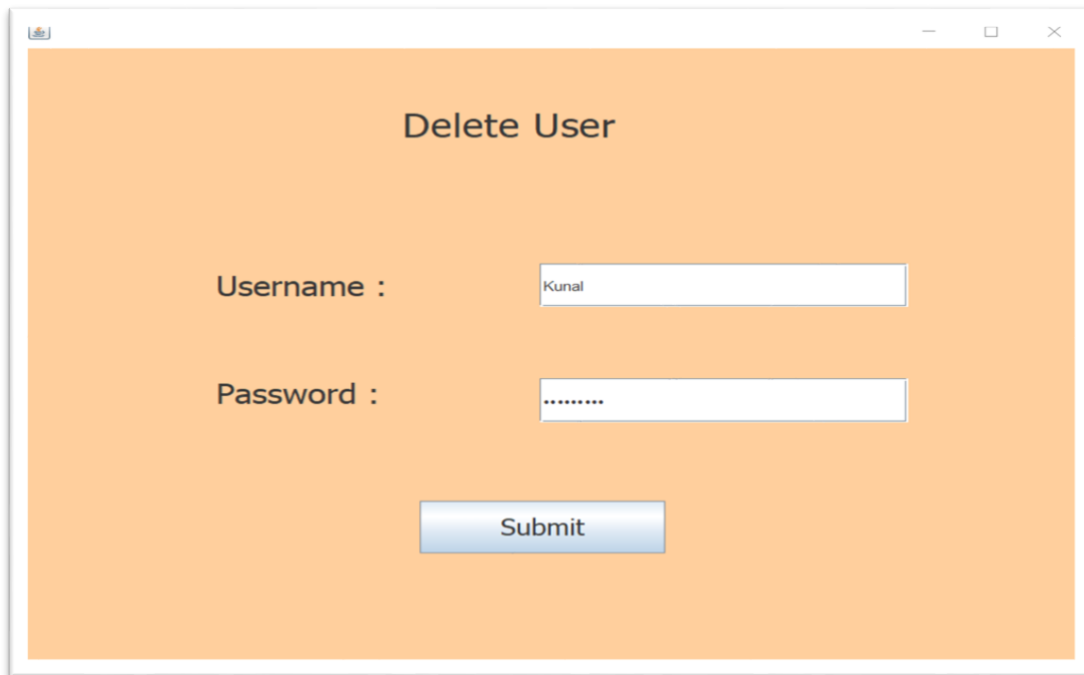
Figure 11. History page of ping pong game with user login system.

D) History : -

Above page shows history page of our "Ping Pong Game User Login System". After playing the game, winner will be declared from that 2 players and it will be displayed in the winner dialog and the game will over. After getting the winner, the data will be stored in the history table. In the history , the attributes such as player 1's username, player 2's username, score to win and the winner are updated each time.

E) Delete User :-

This page is authorized. No one can delete any player's data. Only admin is able to delete the user by giving his username and password.

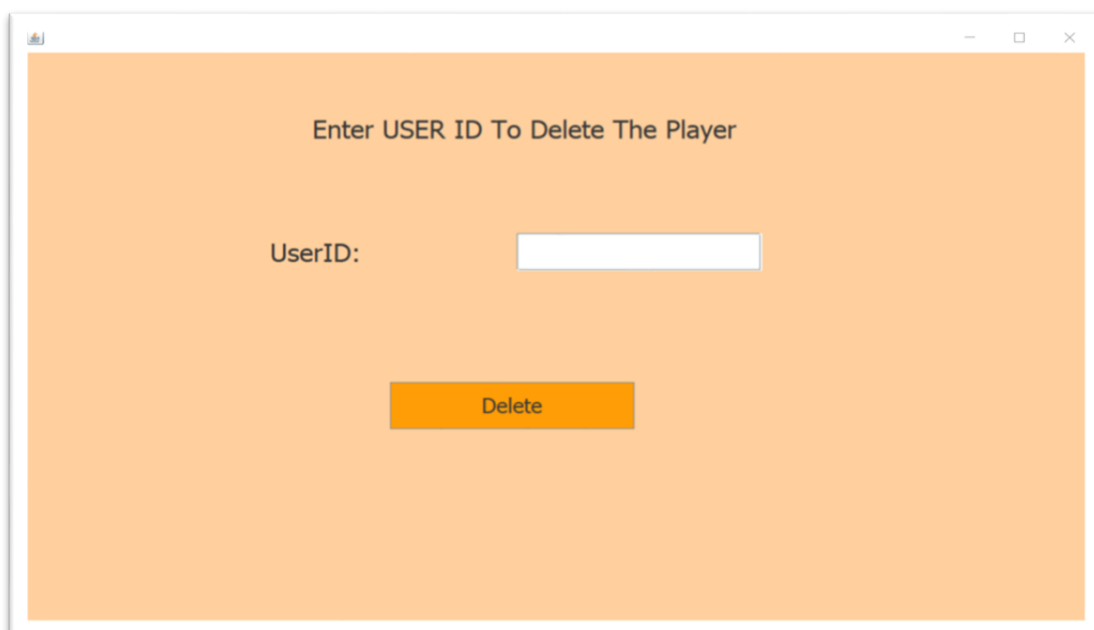


Delete User

Username :

Password :

Figure 12. Authorized delete user page of ping pong game.



Enter USER ID To Delete The Player

UserID:

Figure13. Delete user page of ping pong game with user login system.

6. Development/Implementation details :-

6.1 Packages and Functions used : -

1. Packages:

```
import java.awt.EventQueue;  
import javax.swing.JFrame;  
import javax.swing.JPanel;  
import javax.swing.JTable;  
import javax.swing.JTextField;  
import javax.swing.table.DefaultTableModel;  
import java.awt.Color;  
import javax.swing.JLabel;  
import java.awt.Font;  
import javax.swing.JButton;  
import java.awt.event.ActionListener;  
import java.io.IOException;  
import java.sql.Connection;  
import java.sql.PreparedStatement;  
import java.sql.ResultSet;  
import java.awt.event.ActionEvent;
```

Above mentioned are some of the packages used for making UI of our project. These libraries help to construct GUI using the JAVA approach. javax.swing is the library, which is used for importing the GUI features provided under swing. As it is a “JAVA FOUNDATION CLASS”, “javax” is used. To get the features of awt, java.awt package is used. To implement or define the actionlistener, java.awt.event packages. For defining the terms related to database connectivity, java.sql is used.

2. Functions :-

The functions used for making UI of Ping Pong Game :-

- a) Login
- b) Register
- c) Delete Player
- d) History

6.2 Database Connectivity :-

- For database connectivity, required five steps are followed :-

- a) Register the Driver
- b) Create a Connection
- c) Create SQL Statement
- d) Execute SQL Statement
- e) Closing the connection.

- Package supporting the database is java.sql. *;

- Commands used for queries :-

1. DDL – Data Definition Language.
2. DML – Data Manipulation language.

A) DDL - alter, truncate, rename, create.

- a) alter :- ALTER TABLE is used to add, delete/drop or modify columns in the existing table. It is also used to add and drop various constraints on the existing table. ADD is used to add columns into the existing table. Sometimes we may require to add additional information, in that case we do not require to create the whole database again, ADD comes to our rescue. DROP COLUMN is used to drop columns in a table. Deleting the unwanted columns from the table. MODIFY TABLE is used to modify the existing columns in a table. Multiple columns can also be modified at once. is used to modify the existing columns in a table. Multiple columns can also be modified at once.
- b) truncate :- The SQL TRUNCATE TABLE command is used to delete complete data from an existing table. We can also use the DROP TABLE command to delete a complete table but it would remove complete table structure from the database and you would need to re-create this table once again if we wish to store some data.
- c) rename :- The rename command is used to change the existing table name and give a new name to the table.

B) DML - select, insert, delete, update.

- a) select :- SELECT is the most important data manipulation command in Structured Query Language. The SELECT command shows the records of the specified table. It also shows the particular record of a particular column by using the WHERE clause.
- b) insert :- INSERT is another most important data manipulation command in Structured Query Language, which allows users to insert data in database tables.
- c) delete :- DELETE is a DML command which allows SQL users to remove single or multiple existing records from the database tables. This command of Data Manipulation Language does not delete the stored data permanently from the database. We use the WHERE clause with the DELETE command to select specific rows from the table.
- d) update :- UPDATE is another most important data manipulation command in Structured Query Language, which allows users to update or modify the existing data in database tables.

6.3 Database Design :-

The database design consists of two tables, namely reg and userhistory.

- A) reg :- This table is used for registering all the information of player who wants to play Ping Pong Game. It has 8 attributes: Player's User ID, Username, Password, Full Name, Address, E-mail, Contact Number and Confirm Password.

Table 3. Components of Database

Database-Name	register
1st Table-Name	reg
2nd Table- Name	userhistory

Table 4. Structure of Database

Data-base name	register	
Table Name	Attributes of table	Description of attribute
reg	User ID	For storing player's User ID.
	Username	For storing player's username.
	Password	For storing player's password that he/she sets.
	Full Name	For storing player's name.
	Address	For storing player's address.
	E-mail	For storing player's e-mail.
	Contact No.	For storing player's contact no.
	Confirm Password	This confirm password matches with above entered password.
userhistory	Player 1 Username	For storing player 1's username.
	Player 2 Username	For storing player 2's username.
	Score To Win	For storing score that they decided and set before playing the game.
	Winner	After playing the game, the winner from that 2 player's will be displayed.

Showing rows 0 - 6 (7 total, Query took 0.0003 seconds)

SELECT * FROM `reg`

Number of rows: 25 Filter rows: Search this table Sort by key: None

	UserId	Username	Password	name	address	email	contact	confirm_password
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	0	Omkar	omkar	OV	Sangli	vasudevomkar@gmail.com	8482949582	omkar
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2	Nikhil	789	NC	Kolhapur	nikhilchandekar1@gmail.com	9827737471	789
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	3	Bhavesh	bhavesh	Bhavesh Raut	Nagpur	Bhavesh123@gmail.com	9832184721	bhavesh
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	4	Malik	malik	MM	Karad	2010008@ritindia.edu	9876545779	malik

Query results operations: Print, Copy to clipboard, Export, Display chart, Create view

Figure 14. Registered information on xampp server.

Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

Showing rows 0 - 14 (15 total, Query took 0.0005 seconds)

SELECT * FROM `userhistory`

Number of rows: 25 Filter rows: Search this table

Player 1	Player 2	Score to Win	Winner
Kunal	Nikhil	5	Nikhil
Kunal	Bhushan	5	Kunal
Dhanraj	Nikhil	5	Dhanraj
Rohit	Bhushan Yelapale	5	Rohit
Kunal	Nikhil	5	Nikhil
Kunal	Omkar	3	Omkar
bhushan	Kunal	5	bhushan
Bhushan	Kunal	4	Kunal
Omkar	Kunal	5	Omkar
Kunal	Nikhil	5	Kunal
Kunal	Nikhil	5	Nikhil
Bhavesh	Kunal	5	Kunal
Ganesh1	Kunal	10	Kunal
Malik	Kunal	5	Kunal
shubham021	Kunal	5	Kunal

Figure 15. History of records on xampp server.

7. Result and Discussion :-

The “*Ping Pong Game With User Login System*” is a Java based game and the SQL is used for a backend. The User needs to register at the registration page and enter various details such as Name, Phone no, Mail Address, Password, Confirm Password, etc. Once the Registration page is completed the game user can now login and move to Players Panel. Both the players have to Login with their credentials. The game will proceed only when credentials of both of the players is correct and matches with the database and displays “Invalid credentials” otherwise. Winning score need to be set by the players, Once the Start button is clicked The Progress bar displays the Players name along with graphics. The progress bar shows that the game is now loading. After the game is started both the players can start playing. The paddle of player at the left can be controlled by the W, S, A, D keys and the player at right can control the paddle by Up, Down, Right and Left Keys. Whenever the ball hits one side the opponent gets a point. The speed of ball increases when the ball is hit to the paddle and decreases when hit to sides of Frame. Once the winning score is achieved the Display panel displays the winners name and Exits.

The Database stores the Registration details of the players and History of the game. At the Main window the user can the game history about the Players and Winner.

8. Conclusion :-

The main focus to build “*Ping Pong Game With User Login System*” project is for the convenience of gamers so that everyone would enjoy gaming without getting any problem. The development of small scale Desktop application based game .Our game is based on Java and is linked to a relational database (sql). The frontend has been coded using Java and many packages are used such as awt and swing. The backend is supported and connected with the database using java, its libraries and API's. With each new updates more features can be added to game to remain competitive within the gaming industry.

- **Future Work :-**

1. The levels within the game can be extended after every new updates
2. Graphical Interface can be improved and new game features can be added
3. Introduce new environment and scenes. Take user response through Game and produce Global Rank list.
4. Make the game deployable as a windows based software application.

9. Reference :-

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