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Library System

Firstly , we're goin' to talk about our system generally , we've created a library placing order system which the customer is going to use while making orders to buy books .
We've created a simple user interface using java swing for user registration , login ,and placing orders and saving them into our data base ; then we've created another user interface to modify the data base tables and add new entries .

Class : RegisterActivity

Introduction:
The `RegisterActivity` class is a Java Swing-based graphical user interface (GUI) designed to facilitate user registration for a library system. This class provides a form where users can input their personal information, including first name, last name, email, address, phone number, and password. The class ensures secure user registration by checking for duplicate email entries in the database.

Key Components:

1. **Text Fields:**
   - `JTextField` components are used for capturing user input for first name, last name, email, address, and phone number.

2. **Password Field:**
   - A `JPasswordField` is employed to securely handle password input.

3. **Buttons:**
   - **Submit Button:**
   - A `JButton` labeled "Submit" triggers the `registerUser` method when clicked, initiating the user registration process.
   - **Already Registered Button:**
   - Another `JButton` labeled "Already Registered?" triggers the `openLoginActivity` method, directing users to the login screen.

4. **User Registration Logic:**
   - The `registerUser` method gathers user input, establishes a connection to the MySQL database, and checks if the user is already registered using the `isUserAlreadyRegistered` method.

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   - If the user is not registered, it prepares and executes an SQL statement to insert the user's data into the database.

5. **Database Connection:**
   - The class establishes a JDBC connection to the MySQL database using connection parameters such as URL, username, and password.

6. **Error Handling:**
   - The class incorporates error handling mechanisms, displaying appropriate JOptionPane dialogs in case of database connection errors or unsuccessful user registration.

7. **Main Method:**
   - The `main` method initiates the GUI by invoking the `SwingUtilities.invokeLater` method to create an instance of the `RegisterActivity` class.

8. **Open Login Activity:**
- The `openLoginActivity` method creates and displays an instance of the `LoginActivity` class, allowing users who are already registered to log in.

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Class LoginActivity

Introduction:
The `LoginActivity` class is a Java Swing-based graphical user interface (GUI) designed to facilitate user authentication for a library system. This class provides a login form where users can input their email and password to access the library system. Additionally, it offers a link to register as a new user through the "New User?" button.

Key Components:

1. **Text Fields:**
   - `JTextField` and `JPasswordField` components are utilized to capture user input for email and password, respectively.

2. **Buttons:**
   - **New User Button:**
   - A `JButton` labeled "New User?" triggers the creation and display of a new instance of the `RegisterActivity` class when clicked. This allows new users to register.
   - **Login Button:**
   - A `JButton` labeled "Login" triggers the `login` method when clicked, initiating the user authentication process.

3. **User Authentication Logic:**
   - The `login` method retrieves the user input, establishes a connection to the MySQL database, and executes an SQL query to check the validity of the provided email and password.
   - If the user is authenticated, the method displays a success message and opens the `MainActivity`. Otherwise, it displays an error message.

4. **Database Connection:**
   - The class establishes a JDBC connection to the MySQL database using connection parameters such as URL, username, and password.

5. **Error Handling:**
   - The class includes error-handling mechanisms, displaying appropriate JOptionPane dialogs in case of database connection errors or invalid login credentials.

6. **Main Method:**

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   - The `main` method initiates the GUI by invoking the `SwingUtilities.invokeLater` method to create an instance of the `LoginActivity` class.

7. **Open New User Activity:**
   - The "New User?" button's action listener opens a new instance of the `RegisterActivity` class, enabling users to register if they are not already in the system.

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Class : MainActivity

Introduction:
The `MainActivity` class is a Java Swing-based graphical user interface (GUI) designed to serve as the main interface for the library buying system. It provides functionality for displaying a list of books, allowing users to add books to a shopping cart, view their customer information, and make orders.

Key Components and Features:

1. **Book Display Panel:**
   - A panel (`booksPanel`) is created to display a grid of books retrieved from the database.
   - Each book is represented by a button with its title, and the price is displayed below each button.

2. **Shopping Cart:**
   - An instance of the `ShoppingCart` class is created to manage the user's selected books and their quantities.
   - Users can add books to the shopping cart, and the cart dynamically updates to show the selected books, quantities, and total cost.

3. **Customer Information Panel:**
   - A panel (`customerInfoPanel`) is added to display customer information, including name, email, and address.
   - The information is retrieved from the database based on the user's ID.

4. **Logout Button:**
   - A "Logout" button allows users to return to the login screen (`LoginActivity`).

5. **Database Interaction:**
   - The class interacts with a MySQL database to retrieve book information and customer details.
   - It uses JDBC for database connectivity and executes queries to fetch required data.

6. **Order Placement:**
   - Users can place an order by clicking the "Make Order" button in the shopping cart.
   - Order details, including customer ID, order date, total cost, and books ordered, are inserted into the database.

7. **Order Logic:**

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   - The class includes logic to handle the insertion of order details into the `orders` table in the database.
   - It calculates the total cost and constructs a string containing the books ordered with their quantities.

8. **Dynamic UI Updates:**
   - The UI dynamically updates to reflect changes in the shopping cart, such as adding or removing books.

9. **Main Method:**
   - The `main` method initiates the GUI by invoking the `SwingUtilities.invokeLater` method to create an instance of the `MainActivity` class.

Usage:
- Users interact with the `MainActivity` GUI to view available books, add books to the shopping cart, and place orders.
- The class provides a seamless experience for users to navigate through books, manage their shopping cart, and make purchases.

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Class : TableInterface

Introduction:
The `TableInterface` class is a Java Swing-based graphical user interface (GUI) designed for interacting with a MySQL database that stores information related to a library system. The primary purpose of this class is to provide an intuitive and user-friendly means of viewing, modifying, and adding data to specific tables within the database.

Key Components:

1. **JTable Component:**
   - The class includes a `JTable` component, a table that displays data retrieved from the database. It utilizes the `DefaultTableModel` to manage the structure and content of the table.

2. **Buttons for Table Navigation:**
   - Four buttons (`customersButton`, `authorsButton`, `booksButton`, and `ordersButton`) enable the user to switch between different tables in the database (customers, authors, books, and orders) seamlessly.

3. **Save Changes Button:**
   - The `saveChangesButton` triggers the `saveChanges` method when clicked. This method is responsible for persisting any modifications made to the displayed table back to the MySQL database.

4. **Add Entry Button:**
   - The `addEntryButton` allows users to add new entries to the currently displayed table. This functionality is implemented through the `addNewEntry` method.

Methods:

1. **showTableData:**
   - Connects to the MySQL database and populates the `JTable` with data from the specified table.

2. **addColumnsToModel:**
   - Retrieves column names from the database metadata and adds them to the `DefaultTableModel`.

3. **addDataToModel:**
   - Executes a SQL query to retrieve all rows from the specified table and populates the `DefaultTableModel` accordingly.

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4. **saveChanges:**
   - Handles the persistence of modifications made to the table data back to the MySQL database. It distinguishes between updating existing entries and inserting new ones.

5. **getPrimaryKeyColumnName:**
   - Returns the primary key column name for a given table, which is crucial for database operations.

6. **getTableName:**
   - Placeholder method assuming it should return the current table name being displayed.

Usage:
- The class is designed to be a standalone application. Running the main method instantiates the GUI, allowing users to interact with the MySQL database through a visually appealing interface.

-Now it's time to talk about our buisness model requirements:
- a customer has (cId,cFirstName,cLastName,cEmail,cPhoneNumber,cAddress,cPassword).
-a book has (bookId,bookName,bookPrice).
-an author has(authorId,authorName).
-a customer can place many orders but the order belongs only to 1 customer .
-an author can publish many books and a book can be written by many authors .

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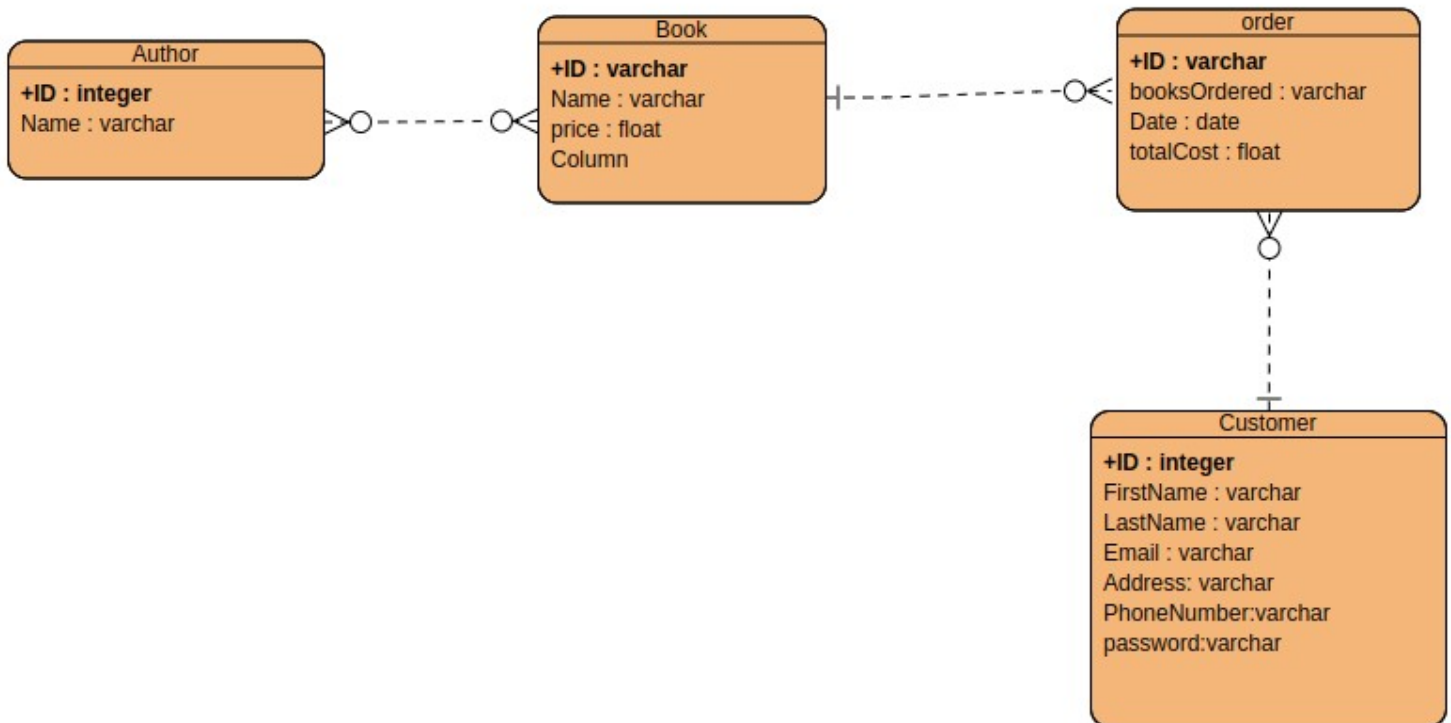**Name : Youssef Adel El banna**
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Here's the sql code used to create the 4 tables used in our LibrarySystem:

```sql
CREATE TABLE customers (
    cId INT PRIMARY KEY AUTO_INCREMENT,
    cFirstName VARCHAR(255),
    cLastName VARCHAR(255),
    cEmail VARCHAR(255),
    cPhoneNumber VARCHAR(20),
    cAddress VARCHAR(255),
    cPassword VARCHAR(255)
) AUTO_INCREMENT = 10000;
CREATE TABLE authors (
    authorId INT PRIMARY KEY AUTO_INCREMENT,
    authorName VARCHAR(255)
) AUTO_INCREMENT = 30000;
CREATE TABLE books (
    bookId INT PRIMARY KEY AUTO_INCREMENT,
    bookName VARCHAR(255),
    bookPrice float(10, 2),
    authorId INT,
    FOREIGN KEY (authorId) REFERENCES authors(authorId)
) AUTO_INCREMENT = 20000;
CREATE TABLE orders (
    orderId INT PRIMARY KEY AUTO_INCREMENT,
    totalCost float(10, 2),
    orderDate DATE,
    booksOrdered TEXT,
    customerId INT,
    cPhoneNumber VARCHAR(20),
    cAddress VARCHAR(255),
    FOREIGN KEY (customerId) REFERENCES customers(cId)
) AUTO_INCREMENT = 40000;
```

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Entity RelationShip Diagram :

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here's the sql code used to insert our real scenario dataSet into our dataBase :

```
INSERT INTO books (bookName) VALUES
("Irrfan Khan: A Life in Movies"),
("The World: A Family History"),
("Breaking Barriers: the Story of a Dalit Chief Secretary"    ),
("Ambedkar: A Life"),
("Human Anatomy"),
("Revolutionaries: The Other Story of How India Won Its Freedom"),
("Himanta Biswa Sarma"),
("Njaan Sakshi"),
("Roller Coaster: An Affair with Banking"),
("Spare"),
("Braving A Viral Storm: India's Covid-19 Vaccine Story"),
("Jadunama"),
("Come! Let's Run"),
("India's Knowledge Supremacy: The New Dawn"),
("COACHING BEYOND: My Days with the Indian Cricket Team"),
("The Poverty of Political Economy: How Economics Abandoned the Poor"),
('The Last Heroes'),
('The Best of Satyajit Ray'),
('Victory City'),
('Modi: Shaping a Global order in flux'),
('Pt. Deendayal Upadhaya : Dispersions of Thought'),
('The India Story'),
('India's vaccine Growth story'),
('Mundaka Upanishad-The Bridge of immortality'),
('As Good As My Word'),
('Pagalkhana'),
('The Book of Bihari Literature'),
('Mundaka Upanishad: The Gateway to Eternity'),
('India's Struggle for Independence – Gandhian Era'),
('Bipin: The Man Behind the Uniform'),
('Women and Men in India 2022'),
('Snakes in the Ganga'),
('A Matter of the Heart: Education in India'),
```

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('Chhatrapati Shivaji Maharaj'),
('Pyre'),
('Basu Chatterji : And Middle-of-the-Road Cinema'),
('Phoolange'),
('Why can't Elephants be Red'),
('War and Women'),
('Phoolange'),
('The Great book robbery'),
('Saurashtra-Tamil Sangamprashastih"),
('Collective Spirit, Concrete Actions'),
('Reflection'),
('Made In India   '),
('Sachin @ 50'),
('Cyber Encounters'),
('Just Aspire'),
('My Life as a Comrade'),
('First Lithuanian Travelers in India'),
('The Golden Years'),
('Partitioned Freedom'),
('RINGSIDE – Up, Close and Personal on India and Beyond'),
('NTR-A Political Biography'),
('Amrutkaal ki Ore'),
('A Life Well Spent: Four Decades in the Indian Foreign Service'),
('India's Finance Ministers'),
('Droupadi Murmu'),
('Through The Broken Glass'),
('As the Wheel Turns'),
('Memories Never Die'),
('Kargil: Ek Yatri Ki Jubani'),
('Monsoon'),
('Heritage Trees of Goa'),
('Let's Move Forward'),
('eBook-"People's G20'),
('Chacha Chaudhary aur Chunavi Dangal'),
('Nation Calling'),
('Introduction to Corporate Finance (sixth edition)')
;

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INSERT INTO authors (authorName) VALUES
('Shubhra Gupta'),
('British historian Simon Sebag Montefiore'),
('Kaki Madhava Rao'),
('Shashi Tharoor'),
('Dr. Ashvini Kumar Dwivedi'),
('Sanjeev Sanyal'),
('Mukhyamantrir Diary 1'),
("Professor K.K. Abdul Gaffar's"),
('Tamal Bandyopadhyay'),
('J. R. Moehringer'),
('Aashish Chandorkar and Suraj Sudhir'),
('Javed Akhtar and Arvind Mandloi'),
('Ma. Subramanian'),
('Dr. Ashwin Fernandes'),
('Kaushik and Ramakrishnan Sridhar'),
('Meghnad Desai'),
('Palagummi Sainath (P Sainath)'),
('Satyajit Ray'),
('Salman Rushdie'),
('President J.P. Nadda'),
('R N Ravi'),
('Bimal Jalal'),
('Sajjan singh Dev'),
('Jagdeep Dhankar'),
('KM Chandrashekhar'),
('Dr.Gyan Chaturvedi'),
('Abhay K'),
('Dr. Karan Singh'),
('P. Jyothimani, former Judge'),
('Rachna Biswat Rawat'),
('Rao Inderjit Singh'),
('Shri Rajiv Malhotra and Mrs. Vijaya Viswanathan'),
('Anurag Behar'),
('Shrimant Kokate'),
('Perumal Murugan'),
('Aniruddha Bhattacharjee'),

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('Lekhnath Chhetri'),
('Vani Tripathi Tikoo'),
('Dr MA Hasan'),
('Lekhnath Chhetri'),
('V Pattami Ram and Sabya Sachi Dosh'),
('Shree Somnath Sanskrit University '),
('Shashi Shekhar Vempati'),
('Narayanan Vaghul'),
('Amitabh Kant'),
('Boria Majumdar'),
('Ashok Kumar and OP Manocha'),
('Ajai Chowdhry'),
('K.K. Shailaja and Manju Sara Rajan'),
('Lithuanian Embassy'),
('Ruskin Bond'),
('Ram Madhav'),
('Dr Vijay Darda'),
('Ramachandra Murthy Kondubhatla'),
('Shivanand Dwivedi and K K Upadhyay'),
('Satish Chandra'),
('A.K. Bhattacharya'),
('Kasturi Ray'),
('T.N. Seshan'),
('Ranjit Pratap'),
('Dr. Y.S. Rajan, Dr. APJM Nazema Maraikayar, and Sripriya Srinivasan'),
('Shri Rishi Raj'),
('Abhay K'),
('PS Sreedharan Pillai'),
('Dr. Dinesh Prasad Saklani'),
('Shri Apurva Chandra'),
('Election Commission of India (ECI)'),
('IAS officer Sonal Goel'),
('Stephen Ross and Bradford Jordan')
;

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And finally we all worked on every piece of the project together but :

-youssef hazem was focusing on the registeration and inserting the customer's data into the dataBase as mentioned in the register and main class

-yousef Adel was focusing on the login process and retrieving the customer's and book's data from the data base as mentioned in the login and main class.

-Mohamed Tarek was focusing on the shopping cart and placing the customer's order into the data base with no duplication as mentioned in the main class

- were all responsible of the bonus user interface to view the tables data , updating and modifying it .