

BATCH AND ROLL NO: R08 42435

EXPERIMENT NO.: 03

TITLE: Design a mobile application to create the login page using sqlite / firebase

DATE OF PERFORMANCE:

DATE OF SUBMISSION:

Title: Design a mobile application to create the login page using sqlite /firebase

Requirements:

- 1 Android studio
- 2. Sqlite /firebase

Theory:

In the rapidly evolving landscape of mobile application development, creating a seamless and secure login experience is a fundamental aspect. The login page serves as the gateway for users to access the application's features and functionalities. Two widely utilized technologies for implementing login systems are SQLite and Firebase.

SQLite:

SQLite is a self-contained, serverless, and zero-configuration relational database engine. It is embedded into the mobile application to handle local data storage efficiently. For mobile applications, SQLite provides a lightweight and efficient solution to manage databases directly on the user's device. In this lab, we will explore the integration of SQLite to design a local database for storing user credentials securely.

Firebase:

Firebase, on the other hand, is a comprehensive mobile and web application development platform provided by Google. Firebase offers a real-time NoSQL database, allowing for seamless synchronization of data between different devices. Additionally, Firebase Authentication simplifies the process of user authentication, providing a secure and scalable solution for managing user logins in mobile applications.

Objective of the Lab:

The primary objective of this lab is to guide you through the process of designing a mobile application login page. You will have the opportunity to choose between two robust technologies: SQLite for local database storage or Firebase for a cloud-based solution. By the end of this lab, you should be proficient in implementing a secure and user-friendly login system in your mobile application.

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Lab Prerequisites:

- Basic understanding of mobile application development concepts.
- Familiarity with the chosen development environment (e.g., Android Studio).
- Prior knowledge of programming languages such as Java (for Android)

Steps:

Using SQLite:

Step 1: Set Up SQLite Database

- Create a SOLite database to store user credentials.
- Define a table structure to hold user information, including fields such as username and password.
- Implement methods to create, read, update, and delete user records in the SQLite database.

Step 2: Design the Login Page UI

- Create a login page UI with input fields for username and password.
- Include a "Login" button that triggers the authentication process.

Step 3: Authenticate User

- Retrieve user input from the login page.
- Query the SQLite database to verify the entered username and password.
- Grant access if the credentials are valid; otherwise, display an error message.

Common Steps:

Step 1: Handle User Input

- Implement error handling for invalid inputs on the login page.
- Validate and sanitize user input to enhance security.

Step 2: Test Your Implementation

- Test the login functionality thoroughly, considering various scenarios (valid and invalid credentials, edge cases).
- Debug and resolve any issues that may arise during testing.

Step 3: Enhance Security

• Implement secure coding practices to protect user data.



XML Code:

```
activity main.xml:
```

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"</p>
  xmlns:app="http://schemas.android.com/apk/res-auto"
  android:layout_width="match_parent"
  android:layout height="match parent"
  android:padding="16dp">
  <LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_centerInParent="true"
    android:orientation="vertical"
    android:gravity="center">
    <TextView
       android:id="@+id/welcomeText"
      android:layout width="wrap content"
      android:layout height="wrap_content"
      android:text="Welcome to the app!"
      android:textSize="24sp"
      android:layout_marginBottom="32dp"/>
    <TextView
      android:id="@+id/userEmail"
      android:layout width="wrap content"
      android:layout height="wrap content"
      android:textSize="16sp"
      android:layout marginBottom="32dp"/>
    <com.google.android.material.button.MaterialButton</p>
      android:id="@+id/signOutButton"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Sign Out"
      android:textSize="16sp"
      app:cornerRadius="8dp"/>
  </LinearLayout>
</RelativeLayout>
```



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activity_login.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"</p>
  xmlns:app="http://schemas.android.com/apk/res-auto"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:background="@color/white">
  <LinearLayout
    android:layout_width="match_parent"
    android:layout height="wrap content"
    android:layout centerInParent="true"
    android:orientation="vertical"
    android:padding="20dp">
    <ImageView
      android:layout width="120dp"
      android:layout height="120dp"
      android:layout gravity="center"
      android:layout marginBottom="30dp"
      android:src="@mipmap/ic_launcher" /> <!-- Using default app icon -->
    <!-- Rest of the layout remains the same -->
    <com.google.android.material.textfield.TextInputLayout</p>
      style="@style/Widget.MaterialComponents.TextInputLayout.OutlinedBox"
      android:layout width="match parent"
      android:layout height="wrap content"
      android:layout marginBottom="16dp"
      app:boxCornerRadiusBottomEnd="8dp"
      app:boxCornerRadiusBottomStart="8dp"
      app:boxCornerRadiusTopEnd="8dp"
      app:boxCornerRadiusTopStart="8dp">
       <com.google.android.material.textfield.TextInputEditText</p>
         android:id="@+id/emailEditText"
         android:layout width="match parent"
         android:layout height="wrap content"
         android:hint="Email"
         android:inputType="textEmailAddress" />
    </com.google.android.material.textfield.TextInputLayout>
    <com.google.android.material.textfield.TextInputLayout</p>
      style="@style/Widget.MaterialComponents.TextInputLayout.OutlinedBox"
      android:layout width="match parent"
      android:layout height="wrap content"
      android:layout marginBottom="24dp"
      app:boxCornerRadiusBottomEnd="8dp"
      app:boxCornerRadiusBottomStart="8dp"
      app:boxCornerRadiusTopEnd="8dp"
      app:boxCornerRadiusTopStart="8dp"
      app:passwordToggleEnabled="true">
```



```
<com.google.android.material.textfield.TextInputEditText</pre>
         android:id="@+id/passwordEditText"
         android:layout width="match parent"
         android:layout height="wrap content"
         android:hint="Password"
         android:inputType="textPassword" />
    </com.google.android.material.textfield.TextInputLayout>
    <com.google.android.material.button.MaterialButton</p>
       android:id="@+id/loginButton"
      android:layout width="match parent"
       android:layout height="56dp"
      android:text="Login"
      android:textSize="16sp"
      app:cornerRadius="8dp" />
    <TextView
       android:id="@+id/signupText"
      android:layout width="wrap content"
      android:layout height="wrap content"
      android:layout gravity="center"
      android:layout marginTop="16dp"
      android:text="Don't have an account? Sign Up"
      android:textColor="@color/design_default_color_primary" />
    <ProgressBar
      android:id="@+id/progressBar"
      android:layout width="wrap content"
      android:layout height="wrap content"
       android:layout gravity="center"
      android:layout marginTop="16dp"
      android:visibility="gone" />
  </LinearLayout>
</RelativeLayout>
```

activity signup.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
   xmlns:app="http://schemas.android.com/apk/res-auto"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:background="@color/white">

<LinearLayout
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:layout_centerInParent="true"
   android:orientation="vertical"
   android:padding="20dp">
```



```
<ImageView
  android:layout width="120dp"
  android:layout height="120dp"
  android:layout gravity="center"
  android:layout marginBottom="30dp"
  android:src="@mipmap/ic launcher"/>
<com.google.android.material.textfield.TextInputLayout</p>
  style="@style/Widget.MaterialComponents.TextInputLayout.OutlinedBox"
  android:layout width="match parent"
  android:layout height="wrap content"
  android:layout marginBottom="16dp"
  app:boxCornerRadiusBottomEnd="8dp"
  app:boxCornerRadiusBottomStart="8dp"
  app:boxCornerRadiusTopEnd="8dp"
  app:boxCornerRadiusTopStart="8dp">
  <com.google.android.material.textfield.TextInputEditText</p>
    android:id="@+id/emailEditText"
    android:layout width="match parent"
    android:layout height="wrap content"
    android:hint="Email"
    android:inputType="textEmailAddress" />
</com.google.android.material.textfield.TextInputLayout>
<com.google.android.material.textfield.TextInputLayout</p>
  style="@style/Widget.MaterialComponents.TextInputLayout.OutlinedBox"
  android:layout width="match parent"
  android:layout height="wrap content"
  android:layout marginBottom="16dp"
  app:boxCornerRadiusBottomEnd="8dp"
  app:boxCornerRadiusBottomStart="8dp"
  app:boxCornerRadiusTopEnd="8dp"
  app:boxCornerRadiusTopStart="8dp"
  app:passwordToggleEnabled="true">
  <com.google.android.material.textfield.TextInputEditText</p>
    android:id="@+id/passwordEditText"
    android:layout width="match parent"
    android:layout height="wrap content"
    android:hint="Password"
    android:inputType="textPassword" />
</com.google.android.material.textfield.TextInputLayout>
<com.google.android.material.textfield.TextInputLayout</p>
  style="@style/Widget.MaterialComponents.TextInputLayout.OutlinedBox"
  android:layout width="match parent"
  android:layout height="wrap content"
  android:layout marginBottom="24dp"
  app:boxCornerRadiusBottomEnd="8dp"
  app:boxCornerRadiusBottomStart="8dp"
  app:boxCornerRadiusTopEnd="8dp"
  app:boxCornerRadiusTopStart="8dp"
  app:passwordToggleEnabled="true">
```



```
<com.google.android.material.textfield.TextInputEditText</pre>
                 android:id="@+id/confirmPasswordEditText"
                 android:layout width="match parent"
                 android:layout height="wrap content"
                 android:hint="Confirm Password"
                 android:inputType="textPassword" />
            </com.google.android.material.textfield.TextInputLayout>
             <com.google.android.material.button.MaterialButton</p>
               android:id="@+id/signupButton"
              android:layout width="match parent"
               android:layout height="56dp"
              android:text="Sign Up"
              android:textSize="16sp"
              app:cornerRadius="8dp" />
             <TextView
               android:id="@+id/loginText"
              android:layout width="wrap content"
              android:layout height="wrap content"
              android:layout gravity="center"
              android:layout marginTop="16dp"
              android:text="Already have an account? Login"
              android:textColor="@color/design_default_color_primary" />
             <ProgressBar
              android:id="@+id/progressBar"
              android:layout width="wrap content"
              android:layout height="wrap content"
               android:layout gravity="center"
              android:layout marginTop="16dp"
              android:visibility="gone" />
          </LinearLayout>
        </RelativeLayout>
AndroitManifest.xml:
        <?xml version="1.0" encoding="utf-8"?>
        <manifest xmlns:android="http://schemas.android.com/apk/res/android">
          <uses-permission android:name="android.permission.INTERNET" />
          <application
            android:name=".MyApplication"
            android:allowBackup="true"
            android:icon="@mipmap/ic launcher"
            android:label="@string/app name"
            android:roundIcon="@mipmap/ic launcher round"
            android:supportsRtl="true"
            android:theme="@style/Theme.MaterialComponents.Light.NoActionBar">
```



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```
<activity
android:name=".MainActivity"
android:exported="true">
<intent-filter>
<action android:name="android.intent.action.MAIN" />
<actegory android:name="android.intent.category.LAUNCHER" />
</intent-filter>
</activity>
<activity android:name=".LoginActivity" />
<activity android:name=".SignupActivity" />
</activity android:name=".SignupActivity" />
</application>
</manifest>
```

JAVA Code:

```
MainActivity.java:
        package com.example.expt03_42435;
        import androidx.appcompat.app.AppCompatActivity;
        import android.content.Intent;
        import android.os.Bundle;
        import android.widget.TextView;
        import android.widget.Toast;
        import com.google.android.material.button.MaterialButton;
        import com.google.firebase.auth.FirebaseAuth;
        import com.google.firebase.auth.FirebaseUser;
        public class MainActivity extends AppCompatActivity {
          private FirebaseAuth mAuth;
          private TextView userEmail;
          private MaterialButton signOutButton;
          @Override
          protected void onCreate(Bundle savedInstanceState) {
             super.onCreate(savedInstanceState);
             setContentView(R.layout.activity main);
             // Initialize Firebase Auth
             mAuth = FirebaseAuth.getInstance();
             // Initialize views
```

userEmail = findViewById(R.id.userEmail);

signOutButton = findViewById(R.id.signOutButton);



```
// Check if user is logged in
             FirebaseUser currentUser = mAuth.getCurrentUser();
             if (currentUser == null) {
               // If not logged in, go to login screen
               startActivity(new Intent(this, LoginActivity.class));
               finish();
               return;
             // Display user's email
             userEmail.setText("Logged in as: " + currentUser.getEmail());
             // Set up sign out button
             signOutButton.setOnClickListener(v -> signOut());
           private void signOut() {
             mAuth.signOut();
             Toast.makeText(MainActivity.this, "Signed out successfully", Toast.LENGTH SHORT).show();
             // Redirect to login screen
             startActivity(new Intent(MainActivity.this, LoginActivity.class));
             finish();
LoginActivity.java:
        package com.example.expt03_42435;
        import android.content.Intent;
        import android.os.Bundle;
        import android.view.View;
        import android.widget.Toast;
        import androidx.appcompat.app.AppCompatActivity;
        import com.google.android.material.button.MaterialButton;
        import com.google.android.material.textfield.TextInputEditText;
        import com.google.firebase.auth.FirebaseAuth;
        import com.google.firebase.auth.FirebaseUser;
        public class LoginActivity extends AppCompatActivity {
           private TextInputEditText emailEditText, passwordEditText;
           private MaterialButton loginButton;
           private View progressBar;
           private FirebaseAuth mAuth;
           @Override
           protected void onCreate(Bundle savedInstanceState) {
             super.onCreate(savedInstanceState);
             setContentView(R.layout.activity login);
             // Initialize Firebase Auth
             mAuth = FirebaseAuth.getInstance();
             // Initialize views
             emailEditText = findViewById(R.id.emailEditText);
```



```
passwordEditText = findViewById(R.id.passwordEditText);
    loginButton = findViewById(R.id.loginButton);
    progressBar = findViewById(R.id.progressBar);
    // Setup click listeners
    loginButton.setOnClickListener(v -> attemptLogin());
    findViewById(R.id.signupText).setOnClickListener(v -> startActivity(new
Intent(LoginActivity.this, SignupActivity.class)));
  @Override
  public void onStart() {
    super.onStart();
    // Check if user is signed in
    FirebaseUser currentUser = mAuth.getCurrentUser();
    if (currentUser != null) {
       startActivity(new Intent(LoginActivity.this, MainActivity.class));
       finish();
  private void attemptLogin() {
    String email = emailEditText.getText().toString().trim();
    String password = passwordEditText.getText().toString().trim();
    // Validation
    if (email.isEmpty()) {
       emailEditText.setError("Email is required");
       emailEditText.requestFocus();
       return;
    if (password.isEmpty()) {
       passwordEditText.setError("Password is required");
       passwordEditText.requestFocus();
       return;
    // Show progress bar
    progressBar.setVisibility(View.VISIBLE);
    loginButton.setEnabled(false);
    // Attempt login with Firebase
    mAuth.signInWithEmailAndPassword(email, password)
         .addOnCompleteListener(this, task -> {
            progressBar.setVisibility(View.GONE);
            loginButton.setEnabled(true);
            if (task.isSuccessful()) {
              // Sign in success
              startActivity(new Intent(LoginActivity.this, MainActivity.class));
              finish();
```



```
} else {
                      // If sign in fails, display a message to the user
                      Toast.makeText(LoginActivity.this, "Authentication failed: " +
                           task.getException().getMessage(), Toast.LENGTH SHORT).show();
                  });
SignupActivity.java:
        package com.example.expt03_42435;
        import android.content.Intent;
        import android.os.Bundle;
        import android.view.View:
        import android.widget.Toast;
        import androidx.appcompat.app.AppCompatActivity;
        import com.google.android.material.button.MaterialButton;
        import com.google.android.material.textfield.TextInputEditText;
        import com.google.firebase.auth.FirebaseAuth;
        public class SignupActivity extends AppCompatActivity {
          private TextInputEditText emailEditText, passwordEditText, confirmPasswordEditText;
          private MaterialButton signupButton;
          private View progressBar;
          private FirebaseAuth mAuth;
          @Override
          protected void onCreate(Bundle savedInstanceState) {
             super.onCreate(savedInstanceState);
             setContentView(R.layout.activity signup);
             // Initialize Firebase Auth
             mAuth = FirebaseAuth.getInstance();
             // Initialize views
             emailEditText = findViewById(R.id.emailEditText);
             passwordEditText = findViewById(R.id.passwordEditText);
             confirmPasswordEditText = findViewById(R.id.confirmPasswordEditText);
             signupButton = findViewById(R.id.signupButton);
             progressBar = findViewById(R.id.progressBar);
             // Setup click listeners
             signupButton.setOnClickListener(v -> attemptSignup());
             findViewById(R.id.loginText).setOnClickListener(v -> finish());
          private void attemptSignup() {
             String email = emailEditText.getText().toString().trim();
             String password = passwordEditText.getText().toString().trim();
             String confirmPassword = confirmPasswordEditText.getText().toString().trim();
```



// Validation

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```
if (email.isEmpty()) {
     emailEditText.setError("Email is required");
     emailEditText.requestFocus();
     return;
  if (password.isEmpty()) {
     passwordEditText.setError("Password is required");
     passwordEditText.requestFocus();
     return;
  if (password.length() < 6) {
     passwordEditText.setError("Password must be at least 6 characters");
     passwordEditText.requestFocus();
     return;
  if (!password.equals(confirmPassword)) {
     confirmPasswordEditText.setError("Passwords do not match");
     confirmPasswordEditText.requestFocus();
     return;
  // Show progress bar
  progressBar.setVisibility(View.VISIBLE);
  signupButton.setEnabled(false);
  // Create user with Firebase
  mAuth.createUserWithEmailAndPassword(email, password)
        .addOnCompleteListener(this, task -> {
          progressBar.setVisibility(View.GONE);
          signupButton.setEnabled(true);
          if (task.isSuccessful()) {
            // Sign up success
            Toast.makeText(SignupActivity.this,
                 "Account created successfully", Toast. LENGTH_SHORT). show();
            startActivity(new Intent(SignupActivity.this, MainActivity.class));
            finishAffinity();
          } else {
            // If sign up fails, display a message to the user
            Toast.makeText(SignupActivity.this,
                 "Sign up failed: " + task.getException().getMessage(),
                 Toast.LENGTH SHORT).show();
       });
}
```



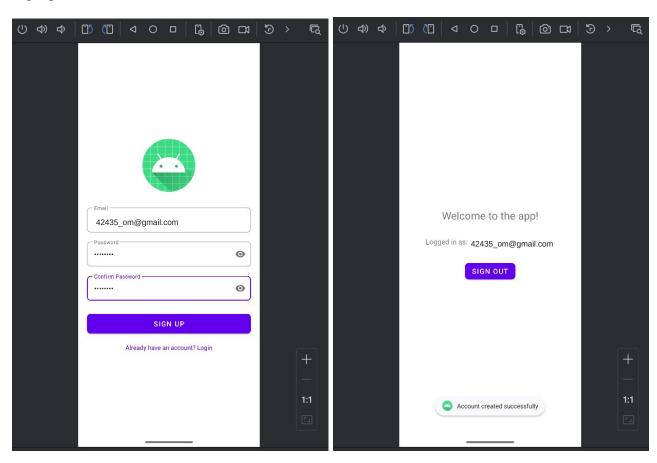
MyApplication.java:

```
package com.example.expt03_42435; // Make sure this matches your package name
import android.app.Application;
import com.google.firebase.FirebaseApp;

public class MyApplication extends Application {
    @Override
    public void onCreate() {
        super.onCreate();
        FirebaseApp.initializeApp(this);
    }
}
```

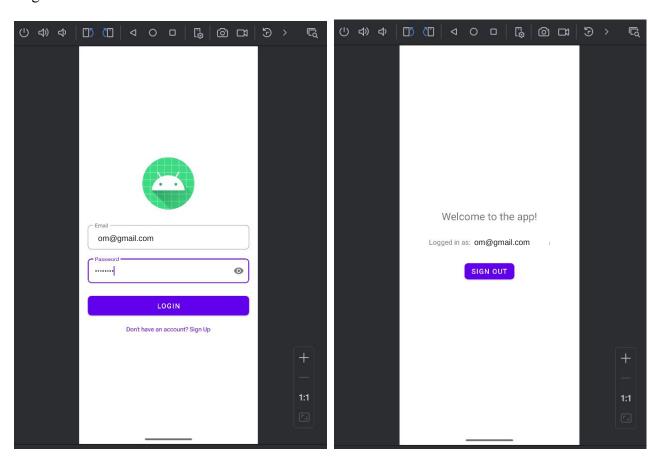
Output:

Signup:



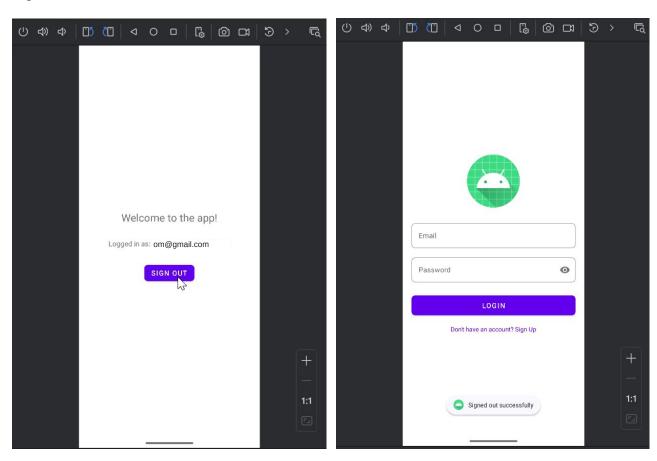


Login:





Sign out:



Co	onclusion:								
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	•••••	• • • • • • • • • • • • •		•••••	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	•••••