Mobile Application Development Laboratory
Lab 7

SQLite

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Aim:

To make an android application that implements Login and Register using SQLite.

Description of App:

We create an android application with the following specifications:

1. In an activity, have a login page with username, password and two buttons (register and login). New Users can register by clicking on the register button which will redirect to another page. Existing Users can login with their credentials.
2. New users can register by providing the values such as Name, Username, Password, Confirm Password, Email Id, Phone Number. Upon clicking on the register button, check whether the Username already exists and show a warning message using Toasts. Otherwise add the data to the sqlite database and display :registration successful! Login" using toasts and redirect to the Login page.
3. Upon successful Login, use TextViews to display some welcome message and a list of registered User's names. Have a menu with a list of menu items such as Logout, Change password, Exit app.
    a. Logout - Logout and redirect to the login page.
    b. Change password - Redirect to a page where you take inputs such as current password, new password (using textviews and text boxes) and a submit button. Upon clicking the button, check whether the password matches and if it doesn't match, display error with toasts and clear the typed contents of the textboxes.
    c. Exit - Close the app.

Device Specifications:

Model: Poco F1
Android Version: 9 (API Level 28)
Resolution: 2160 x 1080 pixels

Technical Concepts Learnt:

- To create and inflate Menus.
- To create and use SharedPreferences.
- To create, use and query SQLite Databases.
- To store persistent data using SQLite Databases.
- To create and use Recycler Views.

Source Code:

(i) MainActivity.java

```
package com.example.lab7;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    EditText mUsername, mPassword;
    Button mLogin;
    TextView mRegister;

    DatabaseHandler con;

    SharedPreferences mSharedPreferences;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
```

```
        setContentView(R.layout.activity_main);

        mUsername = findViewById(R.id.username);
        mPassword = findViewById(R.id.password);

        mLogin = findViewById(R.id.login);
        mRegister = findViewById(R.id.register);

        con = new DatabaseHandler(getApplicationContext());

        mSharedPreferences = getSharedPreferences("LAB7",
MODE_PRIVATE);

        mLogin.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                String username = mUsername.getText().toString();
                String password = mPassword.getText().toString();
                if(username.equals("") || password.equals("")) {
                    Toast.makeText(getApplicationContext(), "Enter
valid User details", Toast.LENGTH_SHORT).show();
                    return;
                }

                Boolean isLoggedIn = con.checkPassword(username,
password);
                if(isLoggedIn) {
                    Toast.makeText(getApplicationContext(), "Logged
In!", Toast.LENGTH_SHORT).show();

                    SharedPreferences.Editor editor =
mSharedPreferences.edit();
                    editor.putString("USERNAME", username);
                    editor.commit();
                    Intent i = new Intent(getApplicationContext(),
DashboardActivity.class);
                    startActivity(i);
                } else {
                    Toast.makeText(getApplicationContext(),
```

```
"Incorrect user details!", Toast.LENGTH_SHORT).show();
                }
            }
        });

        mRegister.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent i = new Intent(getApplicationContext(),
RegisterActivity.class);
                startActivity(i);
            }
        });
    }
}
```

(ii) RegisterActivity.java

```
package com.example.lab7;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

public class RegisterActivity extends AppCompatActivity {
    EditText mName, mUsername, mEmail, mPhone, mPassword,
mConfirmPassword;

    TextView mLogin;

    Button mRegister;
```

```
    DatabaseHandler mDatabaseHandler;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_register);

        mName = findViewById(R.id.reg_name);
        mUsername = findViewById(R.id.reg_username);
        mConfirmPassword = findViewById(R.id.reg_confirm_password);
        mPassword = findViewById(R.id.reg_password);
        mEmail = findViewById(R.id.reg_email);
        mPhone = findViewById(R.id.reg_contact);

        mRegister = findViewById(R.id.register);
        mLogin = findViewById(R.id.login);

        mDatabaseHandler = new
DatabaseHandler(getApplicationContext());

        mRegister.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                String username = mUsername.getText().toString();
                String password = mPassword.getText().toString();
                String confirmPassword =
mConfirmPassword.getText().toString();
                String email = mEmail.getText().toString();
                String phone = mPhone.getText().toString();
                String name = mName.getText().toString();

                if(username.equals("") || password.equals("") ||
confirmPassword.equals("") || email.equals("") || phone.equals("") ||
name.equals("")) {
                    Toast.makeText(getApplicationContext(), "Enter
valid details!", Toast.LENGTH_SHORT).show();
                    return;
                }
```

```
                if(!password.equals(confirmPassword)) {
                    Toast.makeText(getApplicationContext(), "Confirm
password not matching.", Toast.LENGTH_SHORT).show();
                    return;
                }

                if (mDatabaseHandler.checkIfUserExists(username)) {
                    Toast.makeText(getApplicationContext(), "Username
already registered.", Toast.LENGTH_SHORT).show();
                    return;
                }

                User user = new User(0, name, username, password,
email, phone);
                mDatabaseHandler.addUser(user);

                Toast.makeText(getApplicationContext(), "Registration
Successful", Toast.LENGTH_SHORT).show();

                Intent i = new Intent(getApplicationContext(),
MainActivity.class);
                startActivity(i);
            }
        });

        mLogin.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent i = new Intent(getApplicationContext(),
MainActivity.class);
                startActivity(i);
            }
        });
    }
}
```

(iii) DashboardActivity.java

```
package com.example.lab7;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Context;
import android.content.Intent;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.view.Menu;
import android.view.MenuInflater;
import android.view.MenuItem;

public class DashboardActivity extends AppCompatActivity {

    DatabaseHandler con;

    SharedPreferences mSharedPreferences;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_dashboard);
        mSharedPreferences = getSharedPreferences("username",
Context.MODE_PRIVATE);

    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        MenuInflater inflater = getMenuInflater();
        inflater.inflate(R.menu.dashboard, menu);
        return true;
    }

    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
        switch (item.getItemId()) {
            case R.id.reset_pass:
                Intent i = new Intent(getApplicationContext(),
```

```
ChangePasswordActivity.class);
                startActivity(i);
                break;
            case R.id.logout:
                clearSharedPreferences();
                Intent i2 = new Intent(getApplicationContext(),
MainActivity.class);
                startActivity(i2);
                break;
            case R.id.exit:
                finish();
                System.exit(0);
        }

        return true;
    }

    private void clearSharedPreferences() {
        SharedPreferences.Editor editor = mSharedPreferences.edit();
        editor.clear();
        editor.apply();
    }
}
```

(iv) ChangePasswordActivity.java

```
package com.example.lab7;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Context;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
```

```
public class ChangePasswordActivity extends AppCompatActivity {

    String mUsername;

    EditText mOldPassword, mNewPassword, mConfirmPassword;
    Button mChangePassword;

    DatabaseHandler mDatabaseHandler;

    SharedPreferences mSharedPreferences;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_change_password);

        mDatabaseHandler = new DatabaseHandler(this);

        mOldPassword = findViewById(R.id.old_password);
        mNewPassword = findViewById(R.id.new_password);
        mConfirmPassword = findViewById(R.id.confirm_password);

        mChangePassword = findViewById(R.id.change_password);

        mChangePassword.setOnClickListener(this::onChangePassword);

        mSharedPreferences = getSharedPreferences("LAB7",
Context.MODE_PRIVATE);
        mUsername = mSharedPreferences.getString("USERNAME", "");
    }

    public void onChangePassword(View view) {
        String oldPassword = mOldPassword.getText().toString();
        String newPassword = mNewPassword.getText().toString();
        String confirmPassword =
mConfirmPassword.getText().toString();

        if (oldPassword.equals("") || newPassword.equals("") ||
confirmPassword.equals("")) {
```

```
            Toast.makeText(getApplicationContext(), "Enter valid
input!", Toast.LENGTH_SHORT).show();
            return;
        }

        if (!mDatabaseHandler.checkPassword(mUsername, oldPassword))
{
            Toast.makeText(getApplicationContext(), "Old password
doesn't match!", Toast.LENGTH_SHORT).show();
            return;
        }

        if (!newPassword.equals(confirmPassword)) {
            Toast.makeText(getApplicationContext(), "Confirm password
doesn't match!", Toast.LENGTH_SHORT).show();
            return;
        }

        mDatabaseHandler.updatePassword(mUsername, newPassword);
        Toast.makeText(getApplicationContext(), "Password changed",
Toast.LENGTH_SHORT).show();
    }
}
```

(v) UserFragment.java

```
package com.example.lab7;

import android.content.Context;
import android.os.Bundle;

import androidx.fragment.app.Fragment;
import androidx.recyclerview.widget.GridLayoutManager;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;

import android.view.LayoutInflater;
import android.view.View;
```

```java
import android.view.ViewGroup;

/**
 * A fragment representing a list of Items.
 */
public class UserFragment extends Fragment {

    // TODO: Customize parameter argument names
    private static final String ARG_COLUMN_COUNT = "column-count";
    // TODO: Customize parameters
    private int mColumnCount = 1;

    private DatabaseHandler mDatabaseHandler;

    /**
     * Mandatory empty constructor for the fragment manager to
instantiate the
     * fragment (e.g. upon screen orientation changes).
     */
    public UserFragment() {
    }

    // TODO: Customize parameter initialization
    @SuppressWarnings("unused")
    public static UserFragment newInstance(int columnCount) {
        UserFragment fragment = new UserFragment();
        Bundle args = new Bundle();
        args.putInt(ARG_COLUMN_COUNT, columnCount);
        fragment.setArguments(args);
        return fragment;
    }

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);

        mDatabaseHandler = new DatabaseHandler(getActivity());

        if (getArguments() != null) {
```

```
            mColumnCount = getArguments().getInt(ARG_COLUMN_COUNT);
        }
    }

    @Override
    public View onCreateView(LayoutInflater inflater, ViewGroup
container,
                             Bundle savedInstanceState) {
        View view = inflater.inflate(R.layout.fragment_user_list,
container, false);

        // Set the adapter
        if (view instanceof RecyclerView) {
            Context context = view.getContext();
            RecyclerView recyclerView = (RecyclerView) view;
            if (mColumnCount <= 1) {
                recyclerView.setLayoutManager(new
LinearLayoutManager(context));
            } else {
                recyclerView.setLayoutManager(new
GridLayoutManager(context, mColumnCount));
            }
            recyclerView.setAdapter(new
MyUserRecyclerViewAdapter(mDatabaseHandler.getAllUsers()));
        }
        return view;
    }
}
```

(vi) MyUserRecyclerViewAdapter.java

```
package com.example.lab7;

import androidx.recyclerview.widget.RecyclerView;

import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
```

```
import android.widget.TextView;

import java.util.List;

/**
 * {@link RecyclerView.Adapter} that can display a {@link User}.
 * TODO: Replace the implementation with code for your data type.
 */
public class MyUserRecyclerViewAdapter extends
RecyclerView.Adapter<MyUserRecyclerViewAdapter.ViewHolder> {

    private final List<User> mValues;

    public MyUserRecyclerViewAdapter(List<User> items) {
        mValues = items;
    }

    @Override
    public ViewHolder onCreateViewHolder(ViewGroup parent, int
viewType) {
        View view = LayoutInflater.from(parent.getContext())
                .inflate(R.layout.fragment_user, parent, false);
        return new ViewHolder(view);
    }

    @Override
    public void onBindViewHolder(final ViewHolder holder, int
position) {
        holder.mItem = mValues.get(position);
        holder.mIdView.setText("" + mValues.get(position).get_id());

holder.mUsernameView.setText(mValues.get(position).get_username());
        holder.mNameView.setText(mValues.get(position).get_name());
    }

    @Override
    public int getItemCount() {
        return mValues.size();
    }
```

```
    public class ViewHolder extends RecyclerView.ViewHolder {
        public final View mView;
        public final TextView mIdView;
        public final TextView mUsernameView;
        public final TextView mNameView;
        public User mItem;

        public ViewHolder(View view) {
            super(view);
            mView = view;
            mIdView = (TextView) view.findViewById(R.id.user_id);
            mUsernameView = (TextView)
view.findViewById(R.id.user_username);
            mNameView = (TextView) view.findViewById(R.id.user_name);
        }

        @Override
        public String toString() {
            return super.toString() + " '" + mUsernameView.getText()
+ "'";
        }
    }
}
```

(vii) User.java

```
package com.example.lab7;

public class User {
    int _id;
    String _name, _username, _password, _email, _phone;

    public User() {
    }

    public User(int _id, String _name, String _username, String
_password, String _email, String _phone) {
```

```
        this._id = _id;
        this._name = _name;
        this._username = _username;
        this._password = _password;
        this._email = _email;
        this._phone = _phone;
    }

    public int get_id() {
        return _id;
    }

    public String get_name() {
        return _name;
    }

    public String get_username() {
        return _username;
    }

    public String get_password() {
        return _password;
    }

    public String get_email() {
        return _email;
    }

    public String get_phone() {
        return _phone;
    }

    public void set_password(String _password) {
        this._password = _password;
    }
}
```

(viii) DatabaseHandler.java

```java
package com.example.lab7;

import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.DatabaseErrorHandler;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
import android.util.Log;

import androidx.annotation.NonNull;
import androidx.annotation.Nullable;

import java.util.ArrayList;
import java.util.List;

public class DatabaseHandler extends SQLiteOpenHelper {
    private static final int DATABASE_VERSION = 1;
    private static final String DATABASE_NAME = "lab7db";
    private static final String TABLE_USERS = "users";
    private static final String KEY_ID = "id";
    private static final String KEY_NAME = "name";
    private static final String KEY_USERNAME = "username";
    private static final String KEY_PASSWORD = "password";
    private static final String KEY_EMAIL = "email";
    private static final String KEY_PHONE = "phone";


    public DatabaseHandler(Context context) {
        super(context, DATABASE_NAME, null, DATABASE_VERSION);
    }

    @Override
    public void onCreate(SQLiteDatabase sqLiteDatabase) {
        String CREATE_USERS_TABLE = "CREATE TABLE " + TABLE_USERS +
"("
                + KEY_ID + " INTEGER PRIMARY KEY,"
                + KEY_NAME + " TEXT,"
                + KEY_USERNAME + " TEXT,"
```

```
                + KEY_PASSWORD + " TEXT,"
                + KEY_EMAIL + " TEXT,"
                + KEY_PHONE + " TEXT"
                + ")";
        sqLiteDatabase.execSQL(CREATE_USERS_TABLE);
    }

    @Override
    public void onUpgrade(SQLiteDatabase sqLiteDatabase, int i, int
i1) {
        sqLiteDatabase.execSQL("DROP TABLE IF EXISTS " +
TABLE_USERS);

        onCreate(sqLiteDatabase);
    }

    void addUser(User user) {
        SQLiteDatabase sqLiteDatabase = this.getWritableDatabase();

        ContentValues values = new ContentValues();
        values.put(KEY_NAME, user.get_name());
        values.put(KEY_USERNAME, user.get_username());
        values.put(KEY_PASSWORD, user.get_password());
        values.put(KEY_EMAIL, user.get_email());
        values.put(KEY_PHONE, user.get_phone());

        sqLiteDatabase.insert(TABLE_USERS, null, values);
        sqLiteDatabase.close();
    }

    boolean checkIfUserExists(String username) {
        SQLiteDatabase sqLiteDatabase = this.getReadableDatabase();

        Cursor cursor = sqLiteDatabase.query(
                TABLE_USERS,
                new String[] {},
                KEY_USERNAME + "=?",
                new String[] { String.valueOf(username) },
                null,
```

```
                null,
                null,
                null
        );

        boolean userExists = true;
        if (cursor.getCount() <= 0)
            userExists = false;

        cursor.close();

        return userExists;
    }

    User getUser(String username) {
        SQLiteDatabase sqLiteDatabase = this.getReadableDatabase();

        Cursor cursor = sqLiteDatabase.query(
                TABLE_USERS,
                new String[] {
                        KEY_ID,
                        KEY_NAME,
                        KEY_USERNAME,
                        KEY_PASSWORD,
                        KEY_EMAIL,
                        KEY_PHONE
                },
                KEY_USERNAME + "=?",
                new String[] { String.valueOf(username) },
                null,
                null,
                null,
                null
        );

        if (cursor != null)
            cursor.moveToFirst();

        User user = new User(
```

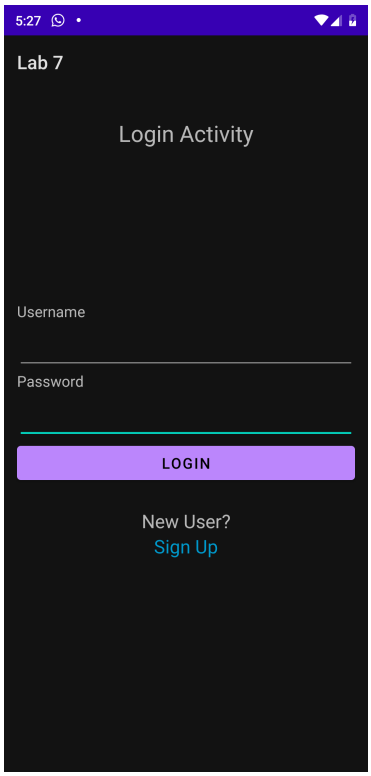
```
                Integer.parseInt(cursor.getString(0)),
                cursor.getString(1),
                cursor.getString(2),
                cursor.getString(3),
                cursor.getString(4),
                cursor.getString(5)
        );

        return user;
    }

    public List<User> getAllUsers() {
        List<User> userList = new ArrayList<User>();
        String selectQuery = "SELECT  * FROM " + TABLE_USERS;

        SQLiteDatabase db = this.getWritableDatabase();
        Cursor cursor = db.rawQuery(selectQuery, null);

        if (cursor.moveToFirst()) {
            do {
                Log.d("TAG", "" + cursor.getString(0));
                User user = new User(
                        Integer.parseInt(cursor.getString(0)),
                        cursor.getString(1),
                        cursor.getString(2),
                        cursor.getString(3),
                        cursor.getString(4),
                        cursor.getString(5)
                );
                userList.add(user);
            } while (cursor.moveToNext());
        }

        return userList;
    }

    public boolean checkPassword(String username, String password) {
        if (!checkIfUserExists(username))
            return false;
```

```
        User user = this.getUser(username);

        return password.equals(user.get_password());
    }

    public int updatePassword(String username, String newPassword) {
        SQLiteDatabase sqLiteDatabase = this.getWritableDatabase();

        ContentValues values = new ContentValues();
        values.put(KEY_PASSWORD, newPassword);

        return sqLiteDatabase.update(TABLE_USERS, values,
KEY_USERNAME + " = ?",
                new String[] { username });
    }
}
```

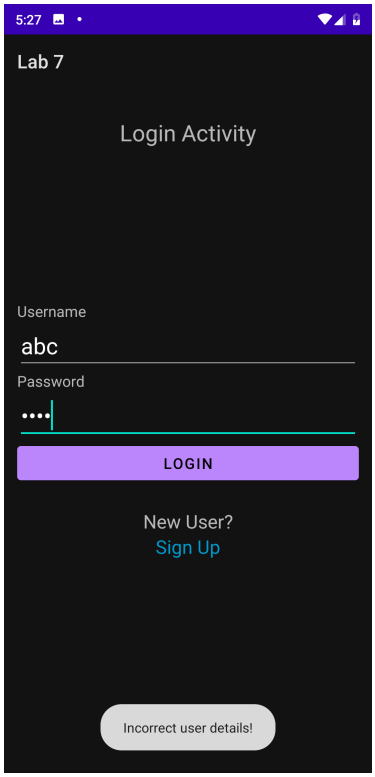
Video Demo:
https://drive.google.com/file/d/1QNwXyiVjgCb1yUwQRcDmtLuoy5_OW9Em/view?usp=sharing

APK:
https://drive.google.com/file/d/1mXJWgIEqmTIMcvfcj1RnkW2kreE4j38Z/view?usp=sharing

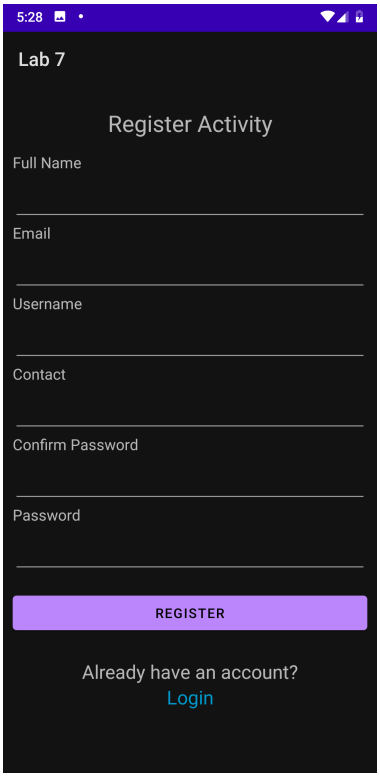
Screenshots:



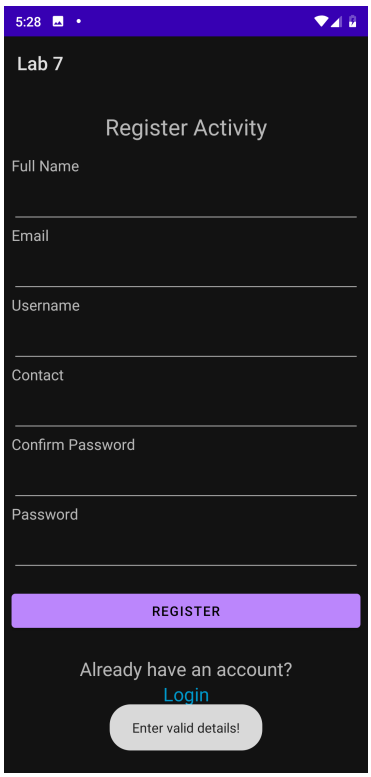
(i) Login Activity



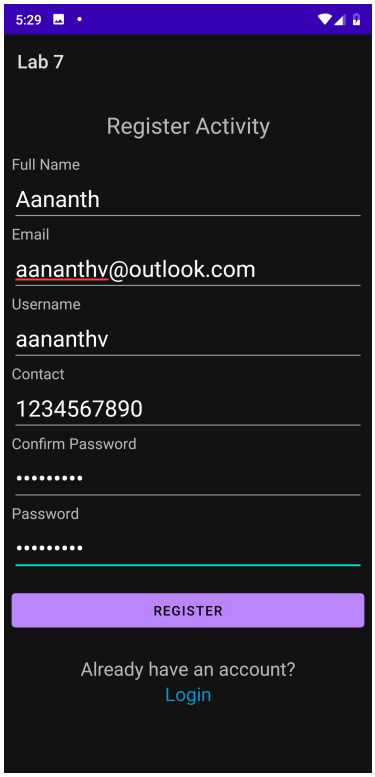
(ii) Login - Validation



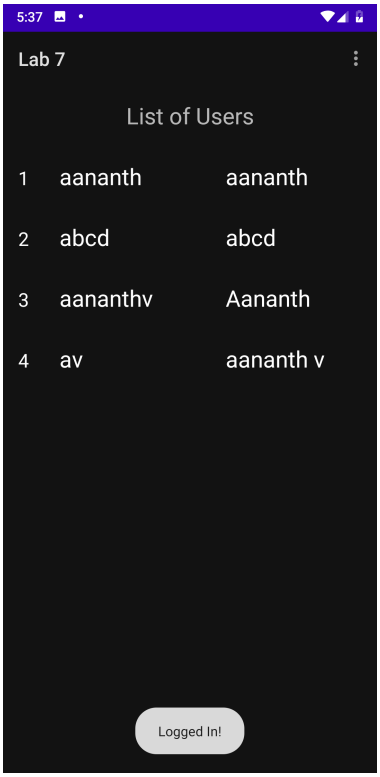
(iii) Register Activity



(iv) Register - Validation

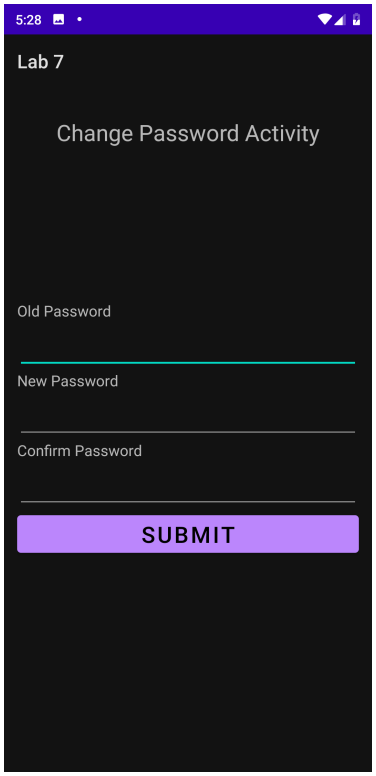


(v) Register - Filled

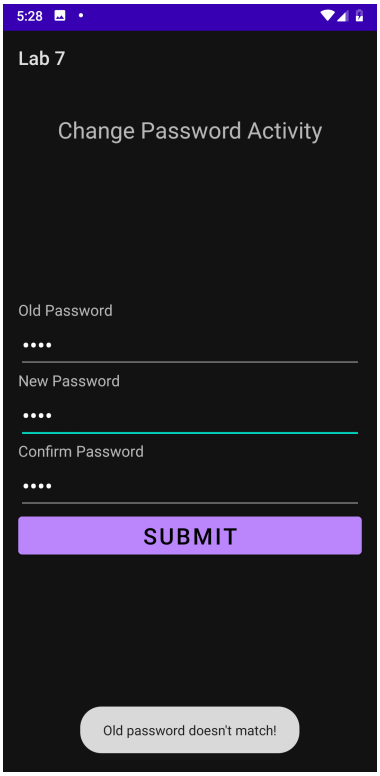


(iii) List of Users

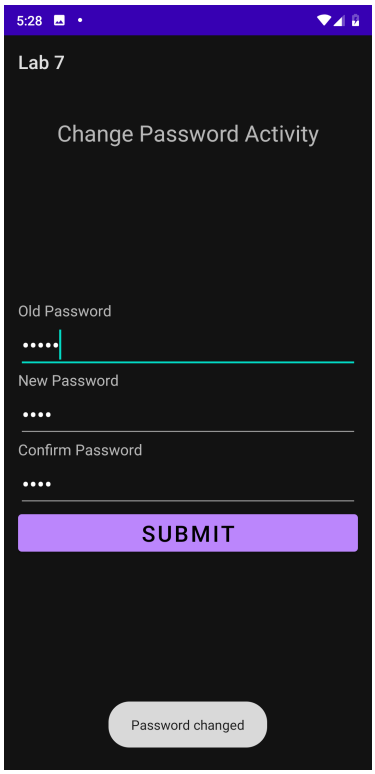
(vii) Menu



(viii) Change Password



(ix) Password - Validation



(x) Change Password - Successful

Outcomes:

An android application was developed using SQLite. Various concepts in Android App Development were explored including:

- Creating and inflating Menus.
- Creating and using SharedPreferences.
- Creating, using and query SQLite Databases.
- Storing persistent data using SQLite Databases.
- Creating and using Recycler Views.