Qiong LIU
Databases related codes

0.1 Exercise 1: SharedPerferences

Create an Activity where the user inputs their name and age, saves this data to SharedPreferences, and can retrieve it later.

```
<ScrollView
xmlns:android="http://schemas.android.com/apk/res/android"
    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:orientation="vertical"
        android:gravity="center_horizontal">

        <!-- Input for Name -->
        <EditText
            android:id="@+id/inputName"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter your name"
            android:inputType="text"
            android:minHeight="48dp"
            android:padding="12dp"
            android:layout_marginBottom="8dp" />

        ...
    </LinearLayout>
</ScrollView>
```

```
public class MainActivity2 extends AppCompatActivity {

    private static final String PREFS_NAME = "UserProfile";
    private static final String KEY_NAME = "name";
    private static final String KEY_AGE = "age";

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main2);

        EditText inputName = findViewById(R.id.inputName);
        EditText inputAge = findViewById(R.id.inputAge);
        Button saveButton = findViewById(R.id.saveButton);
        Button loadButton = findViewById(R.id.loadButton);
        Button clearButton = findViewById(R.id.clearButton);
        TextView displayProfile = findViewById(R.id.displayProfile);

        // Save data to SharedPreferences
        saveButton.setOnClickListener(v -> {
            String name = inputName.getText().toString().trim();
            String age = inputAge.getText().toString().trim();

            if (name.isEmpty() || age.isEmpty()) {
                displayProfile.setText("Please fill in both name and age.");
                return;
            }

            SharedPreferences prefs = getSharedPreferences(PREFS_NAME, MODE_PRIVATE);
            SharedPreferences.Editor editor = prefs.edit();

            editor.putString(KEY_NAME, name);
            editor.putString(KEY_AGE, age);
            editor.apply();

            displayProfile.setText("Profile saved!");
```

```
            inputName.setText("");
            inputAge.setText("");
        });

        // Load data from SharedPreferences
        loadButton.setOnClickListener(v -> {
            SharedPreferences prefs = getSharedPreferences(PREFS_NAME, MODE_PRIVATE);
            String name = prefs.getString(KEY_NAME, "No name found");
            String age = prefs.getString(KEY_AGE, "No age found");

            displayProfile.setText(String.format("Name: %s\nAge: %s", name, age));
        });

        // Clear data from SharedPreferences
        clearButton.setOnClickListener(v -> {
            SharedPreferences prefs = getSharedPreferences(PREFS_NAME, MODE_PRIVATE);
            SharedPreferences.Editor editor = prefs.edit();

            editor.clear();
            editor.apply();

            displayProfile.setText("Profile cleared!");
        });
    }
}
```

0.2 Exercise 2: SQLite

Create an Activitywhere user can add/ delete items. We use Shopping list as a use case.

```
    <ScrollView
    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:padding="16dp">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical">


        <!-- Export/Import Buttons -->
        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="horizontal"
            android:gravity="center"
            android:layout_marginBottom="16dp">

            <Button
                android:id="@+id/exportButton"
                android:layout_width="0dp"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:text="Export"
                android:backgroundTint="@color/teal_700"
                android:textColor="@android:color/white"
                android:layout_marginEnd="8dp" />

            <Button
                android:id="@+id/importButton"
                android:layout_width="0dp"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:text="Import"
                android:backgroundTint="@color/teal_700"
                android:textColor="@android:color/white"
                android:layout_marginStart="8dp" />
```

```
        </LinearLayout>

        <!-- Floating Action Button -->
        <com.google.android.material.floatingactionbutton.FloatingActionButton
            android:id="@+id/addItemFab"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_gravity="center"
            app:backgroundTint="@color/teal_700"
            android:src="@android:drawable/ic_input_add"
            android:contentDescription="Add Item" />
    </LinearLayout>
</ScrollView>
```

Step 1: Creat a ShoppingListDatabaseHelper

```
public class ShoppingListDatabaseHelper extends SQLiteOpenHelper {

    private static final String DATABASE_NAME = "ShoppingList.db";
    private static final int DATABASE_VERSION = 1;

    public static final String TABLE_NAME = "shopping_list";
    public static final String COLUMN_ID = "id";
    public static final String COLUMN_ITEM = "item";

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

    @Override
    public void onCreate(SQLiteDatabase db) {
        String createTable = "CREATE TABLE " + TABLE_NAME + " (" +
                COLUMN_ID + " INTEGER PRIMARY KEY AUTOINCREMENT, " +
                COLUMN_ITEM + " TEXT)";
        db.execSQL(createTable);
    }

    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
        db.execSQL("DROP TABLE IF EXISTS " + TABLE_NAME);
        onCreate(db);
    }

    public long addItem(String item) {
        SQLiteDatabase db = getWritableDatabase();
        ContentValues values = new ContentValues();
        values.put(COLUMN_ITEM, item);
        return db.insert(TABLE_NAME, null, values);
    }

    public Cursor getAllItems() {
        SQLiteDatabase db = getReadableDatabase();
        return db.query(TABLE_NAME, null, null, null, null, null, null);
    }

    public void deleteItem(long id) {
        SQLiteDatabase db = getWritableDatabase();
        db.delete(TABLE_NAME, COLUMN_ID + " = ?", new String[]{String.valueOf(id)});
    }
}
```

Step 2: Creat a ShoppingListAdapter

```
public class ShoppingListAdapter extends RecyclerView.Adapter<ShoppingListAdapter.ViewHolder> {

    private final Context context;
    private Cursor cursor;
    private final OnItemLongClickListener longClickListener;

    public interface OnItemLongClickListener {
        void onItemLongClick(long id);
    }

    public ShoppingListAdapter(Context context, Cursor cursor, OnItemLongClickListener longClickListener) {
        this.context = context;
        this.cursor = cursor;
        this.longClickListener = longClickListener;
```

```
    }

    public void swapCursor(Cursor newCursor) {
        if (cursor != null) cursor.close();
        cursor = newCursor;
        notifyDataSetChanged();
    }

    @Override
    public int getItemCount() {
        return cursor != null ? cursor.getCount() : 0;
    }

    @NonNull
    @Override
    public ViewHolder onCreateViewHolder(@NonNull ViewGroup parent, int viewType) {
        View view = LayoutInflater.from(context).inflate(android.R.layout.simple_list_item_1, parent, false);
        return new ViewHolder(view);
    }

    @Override
    public void onBindViewHolder(@NonNull ViewHolder holder, int position) {
        if (cursor.moveToPosition(position)) {
            @SuppressLint("Range") String itemName = cursor.getString(cursor.getColumnIndex(
                ShoppingListDatabaseHelper.COLUMN_ITEM));
            @SuppressLint("Range") long id = cursor.getLong(cursor.getColumnIndex(ShoppingListDatabaseHelper.
                COLUMN_ID));

            holder.textView.setText(itemName);
            holder.textView.setOnLongClickListener(v -> {
                longClickListener.onItemLongClick(id);
                return true;
            });
        }
    }

    static class ViewHolder extends RecyclerView.ViewHolder {
        TextView textView;

        ViewHolder(View itemView) {
            super(itemView);
            textView = itemView.findViewById(android.R.id.text1);
        }
    }
}
```

```
public class MainActivity3 extends AppCompatActivity {

    private static final String PREFS_NAME = "UserPrefs";
    private static final String PREFS_KEY_USERNAME = "user_name";

    private ShoppingListDatabaseHelper dbHelper;
    private ShoppingListAdapter adapter;
    private Cursor cursor;
    private TextView userNameText;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main3);

        // Initialize UI elements
        userNameText = findViewById(R.id.userNameText);
        FloatingActionButton addItemFab = findViewById(R.id.addItemFab);
        findViewById(R.id.editNameButton).setOnClickListener(v -> showEditNameDialog());

        // Initialize SQLite database helper
        dbHelper = new ShoppingListDatabaseHelper(this);

        ShoppingListDatabaseHelper dbHelper = new ShoppingListDatabaseHelper(this);
        dbHelper.addItem("Test Item new");
        Toast.makeText(this, "Database updated!", Toast.LENGTH_SHORT).show();

        // Set up RecyclerView
        cursor = dbHelper.getAllItems();
        RecyclerView recyclerView = findViewById(R.id.recyclerView);
        adapter = new ShoppingListAdapter(this, cursor, id -> {
            dbHelper.deleteItem(id);
            refreshList();
        });
```

```
        recyclerView.setAdapter(adapter);
        recyclerView.setLayoutManager(new LinearLayoutManager(this));

        // Add item FAB click listener
        addItemFab.setOnClickListener(v -> showAddItemDialog());
    }

    // Show a dialog to add an item
    private void showAddItemDialog() {
        AlertDialog.Builder builder = new AlertDialog.Builder(this);
        builder.setTitle("Add Item");

        final android.widget.EditText input = new android.widget.EditText(this);
        input.setHint("Enter item name");
        builder.setView(input);

        builder.setPositiveButton("Add", (dialog, which) -> {
            String newItem = input.getText().toString().trim();
            if (!newItem.isEmpty()) {
                // Add the item to the database
                dbHelper.addItem(newItem);

                // Refresh RecyclerView
                refreshList();
            } else {
                Toast.makeText(this, "Item name cannot be empty!", Toast.LENGTH_SHORT).show();
            }
        });

        builder.setNegativeButton("Cancel", null);
        builder.show();
    }

    // Refresh the RecyclerView data
    private void refreshList() {
        cursor = dbHelper.getAllItems();
        adapter.swapCursor(cursor);
    }

    @Override
    protected void onDestroy() {
        super.onDestroy();
        // Close the database cursor to prevent memory leaks
        if (cursor != null) {
            cursor.close();
        }
        dbHelper.close();
    }
}
```