

Exercise 4 - Android Application Development using Database

Objective

Develop a Product information application in Android that enables to perform CRUD operations on data stored in SQLite Database.

Algorithm

1. Initialize the Project:
 - Open Android Studio and create a new Android project.
 - Set up the project with a suitable name and package.
2. Design Layouts:
 - Utilize Linear Layout for the main layout structure.
 - Use Table Layout for displaying data in a tabular format.
3. Set Up SQLite Database:
 - Create a SQLite database to store product information.
 - Define a table for products with relevant fields such as ID, Name, Price, etc.
4. Implement CRUD Operations:
 - Insert Operation:
 - Create an Intent for inserting a new product.
 - Implement a form to input product details.
 - Upon submission, insert the data into the SQLite database.
 - Retrieve Operation:

- Create an Intent for retrieving a specific product.
 - Implement a mechanism to search and display a product's details.

 - Retrieve All Operation:
 - Create an Intent for retrieving all products.
 - Display all products in a tabular format using Table Layout.

 - Update Operation:
 - Create an Intent for updating product information.
 - Implement a form to modify product details.
 - Update the corresponding entry in the SQLite database.

 - Delete Operation:
 - Create an Intent for deleting a product.
 - Implement a mechanism to delete a specific product entry from the database.
5. Integrate with Main Activity:
- Create a Main Activity to serve as the entry point of the application.
 - Include buttons or options to navigate to Insert, Retrieve, Retrieve All, Update, and Delete operations.

Features used

Main Features:

- CRUD Operations: Insert, Retrieve, Retrieve All, Update, and Delete operations on product data.
- SQLite Database: Use of SQLite for local data storage.
- Layouts: Utilization of Linear Layout for the main structure and Table Layout for displaying product data.
- Intents: Separate intents for each CRUD operation and a Main Activity for navigation.

Source Code

MainActivity.java:

```
package com.example.ex4;
```

```
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        final Database[] db = new Database[1];
        Button create = findViewById(R.id.create);
        create.setOnClickListener(new View.OnClickListener() { @Override
        public void onClick(View v) {
            db[0] = new Database(MainActivity.this);
        }
        });
        Button insert = findViewById(R.id.insert);
        insert.setOnClickListener(new View.OnClickListener() { @Override
        public void onClick(View v) {
            Intent intent = new Intent(MainActivity.this, Insert.class);
            startActivity(intent);
        }
        });
        Button delete = findViewById(R.id.delete);
        delete.setOnClickListener(new View.OnClickListener() { @Override
        public void onClick(View v) {
            Intent intent = new Intent(MainActivity.this, Delete.class);
            startActivity(intent);
        }
        });
        Button retrieve = findViewById(R.id.read);
        retrieve.setOnClickListener(new View.OnClickListener() { @Override
        public void onClick(View v) {
            Intent intent = new Intent(MainActivity.this, Retrieve.class);
            startActivity(intent);
        }
        });
        Button retrieveAll = findViewById(R.id.read_all);
        retrieveAll.setOnClickListener(new View.OnClickListener() { @Override
        public void onClick(View v) {
```

```

Intent intent = new Intent(MainActivity.this, RetrieveAll.class);
startActivity(intent);
}
});
Button update = findViewById(R.id.update);
update.setOnClickListener(new View.OnClickListener() { @Override
public void onClick(View v) {
Intent intent = new Intent(MainActivity.this, Update.class);
startActivity(intent);
}
});
}
}

```

Database.java:

```

package com.example.ex4;
import
android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
public class Database extends SQLiteOpenHelper {
private static final String DB_NAME = "product";
private static final int DB_VERSION = 3;
private static final String TABLE_NAME = "prod"; private static final String
ID_COL = "id";
private static final String NAME_COL = "name"; private static final String
BRAND_COL = "brand";
private static final String DESC_COL = "desc"; private static final String
PRICE_COL = "price";
public Database(Context context) {
super(context, DB_NAME, null, DB_VERSION); }
@Override
public void onCreate(SQLiteDatabase db) {
String query = "CREATE TABLE " + TABLE_NAME + " (" + ID_COL + " INTEGER
PRIMARY KEY, "
+ NAME_COL + " TEXT, "
+ BRAND_COL + " TEXT, "
+ DESC_COL + " TEXT, "
+ PRICE_COL + " TEXT)";

```

```

// at last we are calling a exec sql
// method to execute above sql query
db.execSQL(query);
}
// this method is use to add new course to our sqlite database.
public void addProduct(String id,String name,String brand, String desc,
String price) {
// on below line we are creating a variable for
// our sqlite database and calling writable method
// as we are writing data in our database.
SQLiteDatabase db = this.getWritableDatabase();
// on below line we are creating a
// variable for content values.
ContentValues values = new ContentValues();
// on below line we are passing all values
// along with its key and value pair.
values.put(ID_COL,id);
values.put(NAME_COL, name);
values.put(BRAND_COL,brand);
values.put(DESC_COL, desc);
values.put(PRICE_COL, price);
// after adding all values we are passing
// content values to our table.
db.insert(TABLE_NAME, null, values);
// at last we are closing our
// database after adding database.
db.close();
}
public void deleteProduct(String id){
SQLiteDatabase db = this.getWritableDatabase();
db.delete(TABLE_NAME,ID_COL+"= ?",new String[]{id}); }
public void updateProduct(String id,String price){
SQLiteDatabase db = this.getWritableDatabase(); ContentValues values = new
ContentValues();
values.put(PRICE_COL, price);
db.update(TABLE_NAME, values, ID_COL + "=?", new
String[]{String.valueOf(id)});
}
public Cursor retrieveAll(){
SQLiteDatabase db = this.getReadableDatabase(); return db.query(TABLE_NAME,
null, null, null, null, null, null); }
public Cursor retrieve(String id){

```

```

    SQLiteDatabase db = this.getReadableDatabase(); String[] projection = {
    NAME_COL,
    BRAND_COL,
    DESC_COL,
    PRICE_COL
    };
    // Define the condition for retrieval (e.g., where id = ?) String selection =
    ID_COL + " = ?";
    String[] selectionArgs = { id };
    // Execute the query
    Cursor cursor = db.query(
    TABLE_NAME, // Table name
    projection, // Columns to return
    selection, // Selection (WHERE
    clause) selectionArgs, //
    Selection arguments null, // Group by
    null, // Having
    null // Order by
    );
    // The cursor now contains the retrieved row(s)
    return cursor;
}
@Override
public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
    // this method is called to check if the table exists already.
    db.execSQL("DROP TABLE IF EXISTS " + TABLE_NAME); onCreate(db);
}
}

```

Insert.java:

```

package com.example.ex4;
import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import
android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.TextView;
import

```

```

androidx.appcompat.app.AppCompatActivity; public class Insert extends
AppCompatActivity {
@Override
protected void onCreate(Bundle savedInstanceState){
super.onCreate(savedInstanceState);
setContentView(R.layout.insert);
Button backi = findViewById(R.id.backi);
backi.setOnClickListener(new View.OnClickListener() { @Override
public void onClick(View v) {
Intent intent = new Intent(Insert.this,MainActivity.class);
startActivity(intent);
}
});
Button submiti = findViewById(R.id.submiti);
submiti.setOnClickListener(new View.OnClickListener() { @Override
public void onClick(View v) {
Database db = new Database(Insert.this);
TextView textView = findViewById(R.id.idi);
String id = textView.getText().toString();
textView = findViewById(R.id.namei);
String name = textView.getText().toString();
RadioGroup radioGroup = findViewById(R.id.radioGroup); int
selectedRadioButtonId =
radioGroup.getCheckedRadioButtonId();
RadioButton selectedRadioButton =
findViewById(selectedRadioButtonId);
String brand = selectedRadioButton.getText().toString();
Log.d("Debug",brand);
textView = findViewById(R.id.desci);
String desc =
textView.getText().toString();
Log.d("Debug",desc);
textView = findViewById(R.id.pricei);
String price =
textView.getText().toString();
db.addProduct(id,name,brand,desc,price);
}
});
}
}

```



```

cursor.getColumnIndex("desc");
if(columnIndex!=-1){
desc=cursor.getString(columnIndex);
}
columnIndex =
cursor.getColumnIndex("price");
if(columnIndex!=-1){
price=cursor.getString(columnIndex);
}
} while (cursor.moveToNext());
}
textView = findViewById(R.id.namer); textView.setText(name);
textView = findViewById(R.id.brandr); textView.setText(brand);
textView = findViewById(R.id.descr); textView.setText(desc);
textView = findViewById(R.id.pricer); textView.setText(price);
}
});
}
}

```

RetrieveAll.java:

```

package com.example.ex4;
import android.content.Context;
import android.content.Intent;
import android.database.Cursor;
import android.graphics.Color;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.view.ViewGroup;
import android.widget.Button;
import android.widget.TableLayout;
import android.widget.TableRow;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;
import androidx.constraintlayout.widget.ConstraintLayout; import
androidx.constraintlayout.widget.ConstraintSet;
import org.w3c.dom.Text;
public class RetrieveAll extends AppCompatActivity {
private TextView newTextView(String text){
TextView tv = new TextView(RetrieveAll.this);

```

```

tv.setText(text);
tv.setPadding(4,4,4,4);
tv.setTextSize(24);
TableRow.LayoutParams layoutParams = new
TableRow.LayoutParams(
TableRow.LayoutParams.WRAP_CONTENT, // Adjust width as

needed
needed
);
layoutParams.rightMargin = 20;
TableRow.LayoutParams.WRAP_C ONTENT // Adjust height as

tv.setLayoutParams(layoutParams);
return tv;
}
@Override
protected void onCreate(Bundle savedInstanceState){
super.onCreate(savedInstanceState);
setContentView(R.layout.retrieve_all);
Database db = new Database(RetrieveAll.this);
Cursor cursor = db.retrieveAll();
ConstraintLayout parent = findViewById(R.id.parent);
// Create layout params for the TableLayout
// ConstraintLayout.LayoutParams tableLayoutParams = new
ConstraintLayout.LayoutParams(
// ConstraintLayout.LayoutParams.MATCH_PARENT, //
ConstraintLayout.LayoutParams.MATCH_PARENT // );
// tableLayoutParams.startToStart =
ConstraintLayout.LayoutParams.PARENT_ID
;
// tableLayoutParams.endToEnd =
ConstraintLayout.LayoutParams.PARENT_ID
;
// tableLayoutParams.topToTop =
ConstraintLayout.LayoutParams.PARENT_ID
;
// tableLayoutParams.bottomToBottom =
ConstraintLayout.LayoutParams.PARENT_ID
;
TableLayout tl = new TableLayout(RetrieveAll.this);
TableRow trh = new TableRow(RetrieveAll.this);

```

```

TextView tv0 = newTextView("Id");
trh.addView(tv0);
tv0 = newTextView("Name");
trh.addView(tv0);
tv0 = newTextView("Brand");
trh.addView(tv0);
tv0 = newTextView("Description");
trh.addView(tv0);
tv0 = newTextView("Price");
trh.addView(tv0);
tl.addView(trh);
String id="",name="",brand="",desc="",price=""; if (cursor.moveToFirst()) {
do {
// Retrieve values from 'column1' and 'column2' as strings int columnIndex =
cursor.getColumnIndex("id"); if (columnIndex != -1) {
id = cursor.getString(columnIndex);
}
columnIndex =
cursor.getColumnIndex("name");
if(columnIndex!=-1){
name=cursor.getString(columnIndex);
}
columnIndex =
cursor.getColumnIndex("brand");
if(columnIndex!=-1){
brand=cursor.getString(columnIndex);
}
columnIndex =
cursor.getColumnIndex("desc");
if(columnIndex!=-1){
desc=cursor.getString(columnIndex);
}
columnIndex =
cursor.getColumnIndex("price");
if(columnIndex!=-1){
price=cursor.getString(columnIndex);
}
Log.d("Debug",id+" "+name+" "+brand+" "+desc+" "+price);
TableRow tr = new TableRow(RetrieveAll.this);
TextView tv1 = newTextView(id);
TextView tv2 = newTextView(name);
TextView tv3 = newTextView(brand);

```

```

TextView tv4 = newTextView(desc);
TextView tv5 = newTextView(price);
tr.addView(tv1)
;
tr.addView(tv2)
;
tr.addView(tv3)
;
tr.addView(tv4)
;
tr.addView(tv5)
;
tl.addView(tr);
} while (cursor.moveToNext());
}
parent.addView(tl);
// app:layout_constraintEnd_toEndOf="parent"
// app:layout_constraintStart_toStartOf="parent"
// app:layout_constraintTop_toTopOf="parent"
Button retrieveAll = findViewById(R.id.backra);
retrieveAll.setOnClickListener(new View.OnClickListener() { @Override
public void onClick(View v) {
Intent intent = new Intent(RetrieveAll.this,MainActivity.class);
startActivity(intent); }
});
}
}

```

Update.java:

```

package com.example.ex4;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import
android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;
public class Update extends AppCompatActivity {
@Override
protected void onCreate(Bundle savedInstanceState){
super.onCreate(savedInstanceState);

```

```

setContentView(R.layout.update);
Button backu = findViewById(R.id.backu);
backu.setOnClickListener(new View.OnClickListener() { @Override
public void onClick(View v) {
Intent intent = new Intent(Update.this,MainActivity.class);
startActivity(intent);
}
});
Button update = findViewById(R.id.update);
update.setOnClickListener(new View.OnClickListener() {
@Override
public void onClick(View v) {
Database db = new Database(Update.this);
TextView textView =
findViewById(R.id.idu); String id =
textView.getText().toString(); textView =
findViewById(R.id.priceu); String price =
textView.getText().toString();
db.updateProduct(id,price);
}
});
}
}

```

Delete.java:

```

package com.example.ex4;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import
android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity; public class Delete extends
AppCompatActivity {
@Override
protected void onCreate(Bundle savedInstanceState){
super.onCreate(savedInstanceState);
setContentView(R.layout.delete);
Button backd = findViewById(R.id.backd);
backd.setOnClickListener(new View.OnClickListener() {
@Override

```

```

public void onClick(View v) {

}
});
Intent intent = new
Intent(Delete.this,MainActivity.class); startActivity(intent);

Button delete = findViewById(R.id.delete);
delete.setOnClickListener(new View.OnClickListener() { @Override
public void onClick(View v) {
Database db = new Database(Delete.this);
TextView textView = findViewById(R.id.idd);
String id = textView.getText().toString();
db.deleteProduct(id);
}
});
}
}

```

Activity_main.xml:

```

<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
xmlns:tools="http://schemas.android.com/tools"
xmlns:app="http://schemas.android.com/apk/res-auto"
android:layout_width="match_parent"
android:layout_height="match_parent"
tools:context=".MainActivity">
<RelativeLayout
android:layout_width="match_parent"
android:layout_height="match_parent">
<!-- Center the LinearLayout vertically -->
<LinearLayout
android:id="@+id/verticalLayout"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_centerInParent="true"
android:orientation="vertical">
<!-- Add your UI elements within this LinearLayout -->
<Button
android:id="@+id/create"

```

```

android:layout_width="177dp"
android:layout_height="62dp"
android:text="Create" />
<Button
android:id="@+id/insert"
android:layout_width="177dp"
android:layout_height="62dp"
android:text="Insert" />
<Button
android:id="@+id/read"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Retrieve" />
<Button
android:id="@+id/read_all"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Retrieve All" />
<Button
android:id="@+id/update"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Update" />
<Button
android:id="@+id/delete"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Delete" />
<!-- Add more views here as needed -->
</LinearLayout>
</RelativeLayout>
</androidx.constraintlayout.widget.ConstraintLayout>

```

Insert.xml:

```

<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent">

```

```

<LinearLayout
    android:layout_width="409dp"
    android:layout_height="665dp"
    android:layout_marginTop="50dp"
    android:orientation="vertical"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent">
    <LinearLayout
        android:layout_width="match_parent" android:layout_height="87dp"
        android:orientation="horizontal">
        <TextView
            android:id="@+id/textView3"
            android:layout_width="120dp"
            android:layout_height="55dp"
            android:layout_weight="1"
            android:text="Product Id"
            android:textSize="24sp" />
        <EditText
            android:id="@+id/idi"
            android:layout_width="wrap_content" android:layout_height="58dp"
            android:layout_weight="1"
            android:ems="10"
            android:inputType="textPersonName " android:textSize="24sp" />
        </LinearLayout>
        <LinearLayout
            android:layout_width="match_parent" android:layout_height="84dp"
            android:orientation="horizontal">
            <TextView
                android:id="@+id/textView5"
                android:layout_width="131dp"
                android:layout_height="58dp"
                android:layout_weight="1"
                android:text="Product Name"
                android:textSize="24sp" />
            <EditText
                android:id="@+id/namei"
                android:layout_width="wrap_content" android:layout_height="59dp"
                android:layout_weight="1"
                android:ems="10"
                android:inputType="textPersonName " android:textSize="24sp" />
            </LinearLayout>

```



```

<LinearLayout
    android:layout_width="match_parent" android:layout_height="94dp"
    android:orientation="horizontal">
    <TextView
        android:id="@+id/textView6"
        android:layout_width="198dp"
        android:layout_height="71dp"
        android:layout_weight="1"
        android:text="Brand"
        android:textSize="24sp" />
    <RadioGroup
        android:id="@+id/radioGroup"
        android:layout_width="match_parent" android:layout_height="match_parent"
        android:layout_weight="1" >
        <RadioButton
            android:id="@+id/radio1"
            android:layout_width="match_parent" android:layout_height="wrap_content"
            android:textSize="24sp"
            android:text="A" />
        <RadioButton
            android:id="@+id/radio2"
            android:layout_width="match_parent" android:layout_height="wrap_content"
            android:textSize="24sp"
            android:text="B" />
    </RadioGroup>
</LinearLayout>

<LinearLayout
    android:layout_width="match_parent" android:layout_height="93dp"
    android:orientation="horizontal">
    <TextView
        android:id="@+id/textView7"
        android:layout_width="146dp"
        android:layout_height="73dp"
        android:layout_weight="1"
        android:text="Description"
        android:textSize="24sp" />
    <EditText
        android:id="@+id/desci"
        android:layout_width="wrap_content" android:layout_height="75dp"
        android:layout_weight="1"
        android:ems="10"
        android:inputType="textPersonName "

```

```

        android:textSize="24sp" />
    </LinearLayout>
    <LinearLayout
        android:layout_width="match_parent" android:layout_height="96dp"
        android:orientation="horizontal">
        <TextView
            android:id="@+id/textView8"
            android:layout_width="114dp"
            android:layout_height="79dp"
            android:layout_weight="1"
            android:text="Price"
            android:textSize="24sp" />
        <EditText
            android:id="@+id/pricei"
            android:layout_width="wrap_content" android:layout_height="82dp"
            android:layout_weight="1"
            android:ems="10"
            android:inputType="textPersonName " android:textSize="24sp" />
    </LinearLayout>
    <Button
        android:id="@+id/submiti"
        android:layout_width="match_parent" android:layout_height="wrap_content"
        android:text="Submit" />
    <Button
        android:id="@+id/backi"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Back" />
    </LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>

```

Retrieve.xml:

```

<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent">
    <LinearLayout
        android:id="@+id/linearLayout"

```

```
android:layout_width="414dp"
android:layout_height="203dp"
android:orientation="vertical"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintHorizontal_bias="1.0"
app:layout_constraintStart_toStartOf="parent"
tools:ignore="MissingConstraints"
tools:layout_editor_absoluteY="-2dp">
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="103dp"
    android:orientation="horizontal">
    <TextView
        android:id="@+id/textView"
        android:layout_width="144dp"
        android:layout_height="64dp"
        android:layout_weight="1"
        android:text="Product Id"
        android:textSize="24sp" />
    <EditText
        android:id="@+id/idr"
        android:layout_width="wrap_content"
        android:layout_height="83dp"
        android:layout_weight="1"
        android:ems="10"
        android:inputType="textPersonName"
        " android:textSize="24sp" />
    </LinearLayout>
    <Button
        android:id="@+id/retrieve"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Retrieve" />
    <Button
        android:id="@+id/backr"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Back" />
    </LinearLayout>
    <LinearLayout
        android:layout_marginTop="50dp"
        android:layout_width="411dp"
```

```
android:layout_height="459dp"
android:orientation="vertical"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/linearLayout">
<LinearLayout
android:layout_width="match_parent"
android:layout_height="84dp"
android:orientation="horizontal">
<TextView
android:id="@+id/textView5"
android:layout_width="131dp"
android:layout_height="58dp"
android:layout_weight="1"
android:text="Product Name"
android:textSize="24sp" />
<TextView
android:id="@+id/namer"
android:layout_width="146dp"
android:layout_height="73dp"
android:layout_weight="1"
android:text=""
android:textSize="24sp" />
</LinearLayout>
<LinearLayout
android:layout_width="match_parent"
android:layout_height="94dp"
android:orientation="horizontal">
<TextView
android:id="@+id/textView6"
android:layout_width="198dp"
android:layout_height="71dp"
android:layout_weight="1"
android:text="Brand"
android:textSize="24sp" />
<TextView
android:id="@+id/brandr"
android:layout_width="146dp" android:layout_height="73dp"
android:layout_weight="1"
android:text=""
android:textSize="24sp" />
</LinearLayout>
```

```

<LinearLayout
    android:layout_width="match_parent" android:layout_height="93dp"
    android:orientation="horizontal">
    <TextView
        android:id="@+id/textView0"
        android:layout_width="146dp" android:layout_height="73dp"
        android:layout_weight="1"
        android:text="Description"
        android:textSize="24sp" />
    <TextView
        android:id="@+id/descr"
        android:layout_width="146dp" android:layout_height="73dp"
        android:layout_weight="1"
        android:text=""
        android:textSize="24sp" />
</LinearLayout>
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="96dp"
    android:orientation="horizontal">
    <TextView
        android:id="@+id/textView8"
        android:layout_width="114dp"
        android:layout_height="79dp"
        android:layout_weight="1"
        android:text="Price"
        android:textSize="24sp" />
    <TextView
        android:id="@+id/pricer"
        android:layout_width="146dp"
        android:layout_height="73dp"
        android:layout_weight="1"
        android:text=""
        android:textSize="24sp" />
</LinearLayout>
</LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>

```

RetrieveAll.xml:

```

<?xml version="1.0" encoding="utf-8"?>

```

```

<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent"
android:id="@+id/parent">
<Button
android:id="@+id/backra"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Back"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout> Update.xml:
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent">
<LinearLayout
android:layout_width="412dp"
android:layout_height="352dp"
android:orientation="vertical"
app:layout_constraintStart_toStartOf="parent"
tools:layout_editor_absoluteY="186dp"
tools:ignore="MissingConstraints">
<LinearLayout
android:layout_width="match_parent"
android:layout_height="107dp"
android:orientation="horizontal">
<TextView
android:id="@+id/textView2"
android:layout_width="105dp"
android:layout_height="80dp"
android:layout_weight="1"
android:textSize="24sp"
android:text="Product Id" />
<EditText

```

```

android:id="@+id/idu"
android:layout_width="wrap_content" android:layout_height="match_parent"
android:layout_weight="1"
android:ems="10"
android:inputType="textPersonName" android:textSize="24sp" />
</LinearLayout>
<LinearLayout
android:layout_width="match_parent" android:layout_height="97dp"
android:orientation="horizontal">
<TextView
android:id="@+id/textView4"
android:layout_width="108dp"
android:layout_height="79dp"
android:layout_weight="1"
android:textSize="24sp"
android:text="Price" />
<EditText
android:id="@+id/priceu"
android:layout_width="wrap_content"
android:layout_height="match_parent"
android:layout_weight="1"
android:ems="10"
android:textSize="24sp"
android:inputType="textPersonName" />
</LinearLayout>
<Button
android:id="@+id/update"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Update" />
<Button
android:id="@+id/backu"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Back" />
</LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>

```

Delete.xml:

```
<?xml version="1.0" encoding="utf-8"?>
```

```
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent">
<LinearLayout
android:layout_width="414dp"
android:layout_height="475dp"
android:orientation="vertical"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
tools:layout_editor_absoluteY="101dp" tools:ignore="MissingConstraints">
<LinearLayout
android:layout_width="match_parent" android:layout_height="152dp"
android:orientation="horizontal">
<TextView
android:id="@+id/textView"
android:layout_width="144dp"
android:layout_height="89dp"
android:layout_weight="1"
android:textSize="24sp"
android:text="Product Id" />
<EditText
android:id="@+id/idd"
android:layout_width="wrap_content" android:layout_height="match_parent"
android:layout_weight="1"
android:ems="10"
android:inputType="textPersonName" android:textSize="24sp" />
</LinearLayout>
<Button
android:id="@+id/delete"
android:layout_width="match_parent" android:layout_height="wrap_content"
android:text="Delete" />
<Button
android:id="@+id/backd"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Back" />
</LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```


Output Screenshots



3:44

Ex4

Product Id 4

Product Name zxcv

Brand ☒ A ☐ B

Description cool

Price 4567

SUBMIT

BACK

3:44

Ex4

Id	Name	Brand	Description	Price
1	qwer	A	nice	1234
2	asdf	B	awesome	5678
4	zxcv	A	cool	4567

BACK

3:45

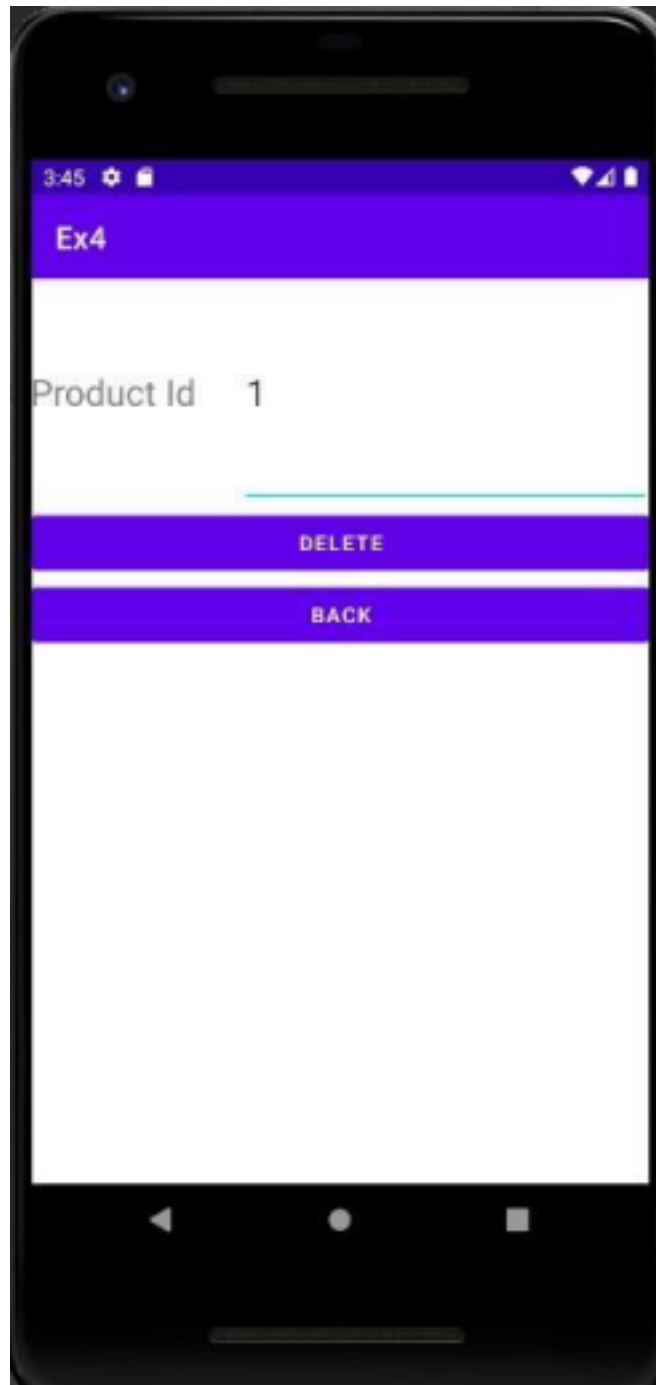
Ex4

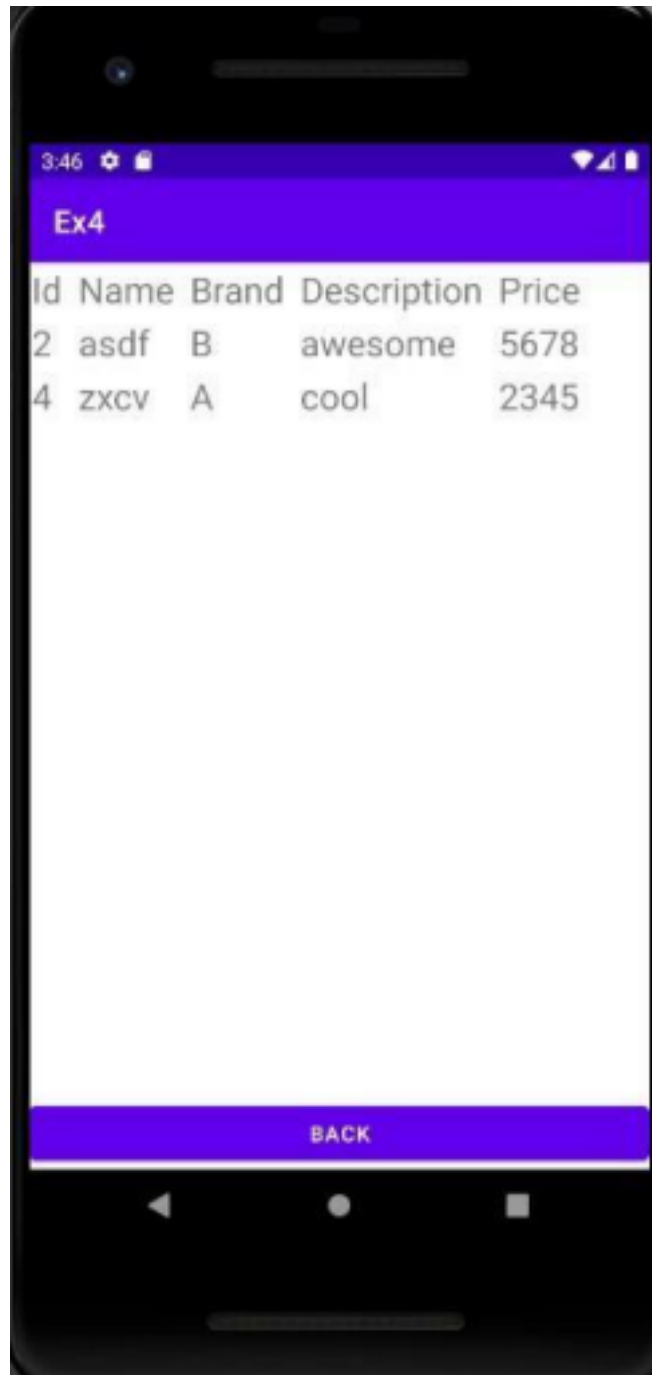
Product Id 4

Price 2345

UPDATE

BACK





Result

Thus a database system for products was implemented

Best Practices

1. User friendly design
2. Readable layouts
3. Modularity
4. Used apt names for xml and java files.
5. Set padding and margins for dynamically added elements

Learning outcomes

- Learnt to integrate sqlite3 in android studio
- Learnt to do CRUD operations