**The State University of Zanzibar**

**Department of Computer Science and Information Technology**

**CS2219 – Mobile Applications Design and Development**

**SQLite Application Tutorial 2024**

**This tutorial shows step-by-step of creating SQLite Application using DatabaseHandler**

**Step 1: Create XML Layout that contains the following components - text fields (number, name, age gender), buttons (Save, View, Delete, and Clear fields)**

*<?***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"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 tools:context=".MainActivity"**>  
  
 <**TextView  
 android:id="@+id/info"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="SQLite Database Application"  
 android:textSize="20sp"**/>  
  
 <**TextView  
 android:id="@+id/no"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Enter Number"  
 android:layout\_below="@id/info"**/>  
  
 <**EditText  
 android:id="@+id/number"  
 android:layout\_width="fill\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_below="@id/info"  
 android:layout\_toRightOf="@id/no"**/>  
  
 <**TextView  
 android:id="@+id/namet"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Enter Name"  
 android:layout\_below="@id/number"**/>  
  
 <**EditText  
 android:id="@+id/name"  
 android:layout\_width="fill\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_below="@id/number"  
 android:layout\_toRightOf="@id/namet"**/>  
  
 <**TextView  
 android:id="@+id/aget"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Enter Age"  
 android:layout\_below="@id/name"**/>  
  
 <**EditText  
 android:id="@+id/age"  
 android:layout\_width="fill\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_below="@id/name"  
 android:layout\_toRightOf="@id/aget"**/>  
  
 <**TextView  
 android:id="@+id/gendert"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Enter Gender"  
 android:layout\_below="@id/age"**/>  
  
 <**EditText  
 android:id="@+id/gender"  
 android:layout\_width="fill\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_below="@id/age"  
 android:layout\_toRightOf="@id/gendert"**/>  
  
 <**Button  
 android:id="@+id/save"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Save Data"  
 android:layout\_below="@id/gender"  
 android:onClick="saveData"**/>  
  
 <**Button  
 android:id="@+id/view"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_below="@id/gender"  
 android:layout\_toRightOf="@id/save"  
 android:text="View Data"  
 android:onClick="viewData"**/>  
  
  
 <**Button  
 android:id="@+id/delete"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_below="@id/view"  
 android:text="Delete All Data"  
 android:onClick="deleteData"**/>  
  
 <**Button  
 android:id="@+id/clear"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"**

**android:layout\_below="@id/view"  
 android:layout\_toRightOf="@id/delete"  
 android:text="Clear All Fields"**

**android:onClick="clearFields"**/>

</**RelativeLayout**>

**Step 2: Create DatabaseHandler class**

**import** android.content.ContentValues;  
**import** android.content.Context;  
**import** android.database.Cursor;  
**import** android.database.sqlite.SQLiteDatabase;  
**import** android.database.sqlite.SQLiteOpenHelper;  
**import** android.util.Log;  
  
**import** java.util.ArrayList;  
**import** java.util.HashMap;  
  
**public class** DatabaseHandler **extends** SQLiteOpenHelper {  
  
 **public** DatabaseHandler(Context applicationcontext) {  
 **super**(applicationcontext, **"androidsqlite.db"**, **null**, 2);  
 }  
@Override  
 **public void** onCreate(SQLiteDatabase database) {  
 String query;  
 query = **"CREATE TABLE users (serialNumber INTEGER PRIMARY KEY AUTOINCREMENT, userId TEXT, userName TEXT,userAge TEXT,userGender TEXT, udpateStatus TEXT)"**;  
 database.execSQL(query);  
 }  
 @Override  
 **public void** onUpgrade(SQLiteDatabase database, **int** version\_old, **int** current\_version) {  
 String query;  
 query = **"DROP TABLE IF EXISTS users"**;  
 database.execSQL(query);  
 onCreate(database);  
 }

*// Inserts User into Table - SQLite DB* **public void** insertUser(HashMap<String, String> queryValues) {  
 SQLiteDatabase database = **this**.getWritableDatabase();  
 ContentValues values = **new** ContentValues();  
 values.put(**"userId"**, queryValues.get(**"userId"**));  
 values.put(**"userName"**, queryValues.get(**"userName"**));  
 values.put(**"userAge"**, queryValues.get(**"userAge"**));  
 values.put(**"userGender"**, queryValues.get(**"userGender"**));  
 values.put(**"udpateStatus"**, **"no"**);  
 database.insert(**"users"**, **null**, values);  
 database.close();  
 }  
  
  
 *// Get list of Users from Table - SQLite DB as Array List* **public** ArrayList<HashMap<String, String>> getAllUsers() {  
 ArrayList<HashMap<String, String>> wordList;  
 wordList = **new** ArrayList<HashMap<String, String>>();  
 String selectQuery = **"SELECT \* FROM users"**;  
 SQLiteDatabase database = **this**.getWritableDatabase();  
 Cursor cursor = database.rawQuery(selectQuery, **null**);  
 **if** (cursor.moveToFirst()) {  
 **do** {  
 HashMap<String, String> map = **new** HashMap<String, String>();  
 map.put(**"serialNumber"**, cursor.getString(0));  
 map.put(**"userId"**, cursor.getString(1));  
 map.put(**"userName"**, cursor.getString(2));  
 map.put(**"userAge"**, cursor.getString(3));  
 map.put(**"userGender"**, cursor.getString(4));  
 wordList.add(map);  
 } **while** (cursor.moveToNext());  
 }  
 database.close();  
 **return** wordList;  
 }  
  
  
  
 *// Get Sync status of SQLite* **public** String getSyncStatus(){  
 String msg = **null**;  
 **if**(**this**.dbSyncCount() == 0){  
 msg = **"SQLite and Remote MySQL DBs are in Sync!"**;  
 }**else**{  
 msg = **"DB Sync needed\n"**;  
 }  
 **return** msg;  
 }  
  
  
 *// Get SQLite records that are yet to be Synced* **public int** dbSyncCount(){  
 **int** count = 0;  
 String selectQuery = **"SELECT \* FROM users where udpateStatus = '"**+**"no"**+**"'"**;  
 SQLiteDatabase database = **this**.getWritableDatabase();  
 Cursor cursor = database.rawQuery(selectQuery, **null**);  
 count = cursor.getCount();  
 database.close();  
 **return** count;  
 }  
  
  
 *// Update User into Table against each User ID* **public void** updateSyncStatus(String id, String status){  
 SQLiteDatabase database = **this**.getWritableDatabase();  
 String updateQuery = **"Update users set udpateStatus = '"**+ status +**"' where userId="**+**"'"**+ id +**"'"**;  
 Log.*d*(**"query"**,updateQuery);  
 database.execSQL(updateQuery);  
 database.close();  
 }  
  
 *//Search data* **public** Cursor getDataByName(String name){  
 SQLiteDatabase db = **this**.getWritableDatabase();  
 **return** db.rawQuery(**"SELECT \* FROM Users WHERE userId LIKE '%"**+name+**"'%"**, **null**);  
 }  
  
**public** Cursor getData(String userId) {  
 SQLiteDatabase db = **this**.getWritableDatabase();  
 String sql = **"Select \* from Users"**;  
 String[] selectionArgs = **null**;  
 **if** (userId != **null**) {  
 sql += **" where userId LIKE '%' || ? || '%'"**;  
 selectionArgs = **new** String[] {userId};  
 }  
 **return** db.rawQuery(sql, selectionArgs);  
 } *//Deleteing all contacts* **public int** deleteAll(){  
 SQLiteDatabase database = **this**.getWritableDatabase();  
 **return** database.delete(**"users"**, **null**, **null**);  
 }  
  
}

**Step 3: Create Main Activity class**

**import** androidx.appcompat.app.AlertDialog;  
**import** androidx.appcompat.app.AppCompatActivity;  
  
**import** android.database.Cursor;  
**import** android.database.sqlite.SQLiteDatabase;  
**import** android.os.Bundle;  
**import** android.view.Menu;  
**import** android.view.View;  
**import** android.widget.EditText;  
**import** android.widget.Toast;  
  
**import** java.util.HashMap;  
  
**public class** MainActivity **extends** AppCompatActivity {  
 EditText **Name**, **Age**, **Gender**, **Ids**;  
 Integer **serialNumber**;  
 String **userId**, **userName**, **userAge**, **userGender**;  
 DatabaseHandler **controller** = **new** DatabaseHandler(**this**);  
  
 @Override  
 **protected void** onCreate(Bundle savedInstanceState) {  
 **super**.onCreate(savedInstanceState);  
 setContentView(R.layout.***activity\_main***);  
  
 **Ids** = (EditText) findViewById(R.id.***number***);  
 **Name** = (EditText) findViewById(R.id.***name***);  
 **Age** = (EditText) findViewById(R.id.***age***);  
 **Gender** = (EditText) findViewById(R.id.***gender***);  
 }  
  
//Insert data into Table/Database

**public void** saveData(View v){  
 **userId** = **Ids**.getText().toString();  
 **userName** = **Name**.getText().toString();  
 **userAge** = **Age**.getText().toString();  
 **userGender** = **Gender**.getText().toString();  
  
 **if**(**userId**.equals(**""**) || **userName**.equals(**""**) || **userAge**.equals(**""**) || **userGender**.equals(**""**)){  
 Toast.*makeText*(getApplicationContext(),**"Please fill all fields"**, Toast.***LENGTH\_LONG***).show();  
 }**else** {  
  
 HashMap<String, String> queryValues = **new** HashMap<String, String>();  
 queryValues.put(**"userId"**, **userId**);  
 queryValues.put(**"userName"**, **userName**);  
 queryValues.put(**"userAge"**, **userAge**);  
 queryValues.put(**"userGender"**, **userGender**);  
  
 **if** (**userId** != **null** && **userName** != **null** && **userAge** != **null** && **userGender** != **null**){  
 **controller**.insertUser(queryValues);  
 Toast.*makeText*(getApplicationContext(), **"Data has been inserted successfuly!"**, Toast.***LENGTH\_LONG***).show();  
  
 }  
 **else** {  
 Toast.*makeText*(getApplicationContext(), **"No data, Please enter data first"**, Toast.***LENGTH\_LONG***).show();  
 }  
 }  
 }

*//View the last entered data* **public void** viewData(View v){  
 Toast.*makeText*(getApplicationContext(), **""**+**userId**+**"|"**+**userName**+**"|"**+**userAge**+**"|"**+**userGender**+**""**, Toast.***LENGTH\_LONG***).show();  
 }  
  
  
  
 **public void** deleteData(View v){  
 **controller**.deleteAll();  
 Toast.*makeText*(getApplicationContext(), **"All data have been deleted successufly"**, Toast.***LENGTH\_LONG***).show();  
  
 }  
  
 **public void** clearFields(View v){  
 **Ids**.setText(**""**);  
 **Name**.setText(**""**);  
 **Age**.setText(**""**);  
 **Gender**.setText(**""**);  
 }  
  
  
 @Override  
 **public boolean** onCreateOptionsMenu(Menu menu) {  
 *// Inflate the menu; this adds items to the action bar if it is present.  
 // getMenuInflater().inflate(R.menu.main, menu);* **return true**;  
  
 }  
}