ANDROID LOCAL DB SQLITE

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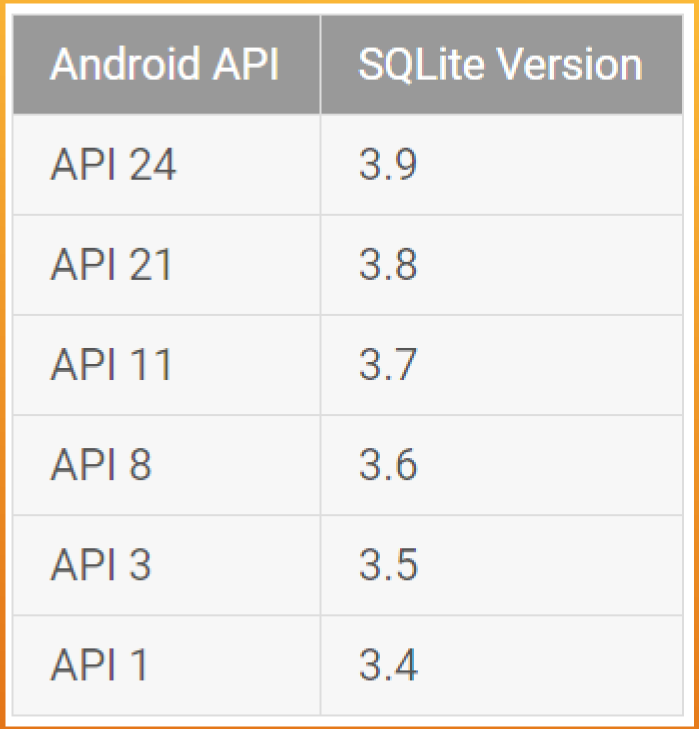
USING SQLITE IN ANROID

- Android provides full support for SQLite databases
- Any databases you create will be accessible by name to any class in the application, but not outside the application
- The recommended method to create a new SQLite database is to create a subclass of SQLiteOpenHelper and override the onCreate() method, in which you can execute a SQLite command to create tables in the database
- You can then get an instance of your SQLiteOpenHelper implementation using the constructor you've defined
- To write to and read from the database, call getWritableDatabase() and getReadableDatabase(), respectively

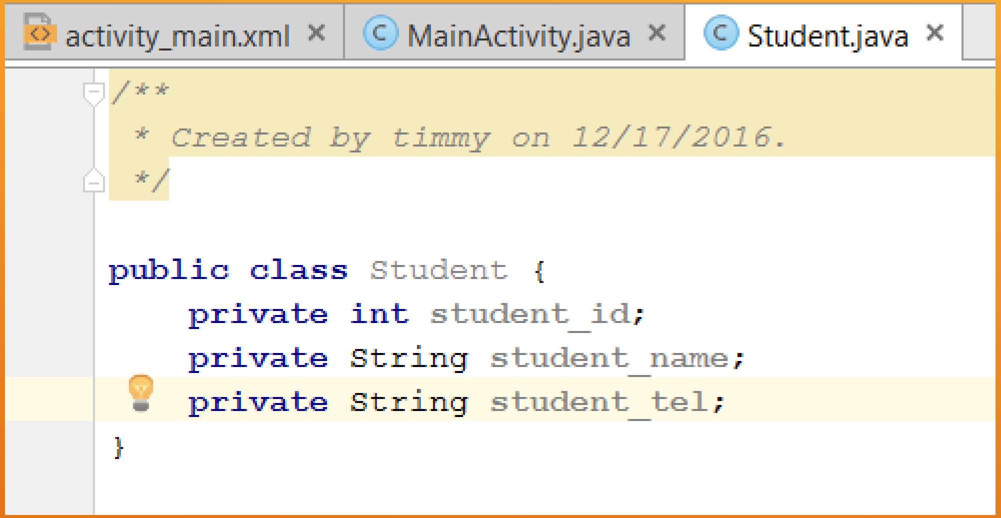
- You can execute SQLite queries using the SQLiteDatabase query() methods
- These methods return a Cursor that points to all the rows found by the query
- The Cursor is always the mechanism with which you can navigate results from a database query and read rows and columns

CURSOR INTERFACE



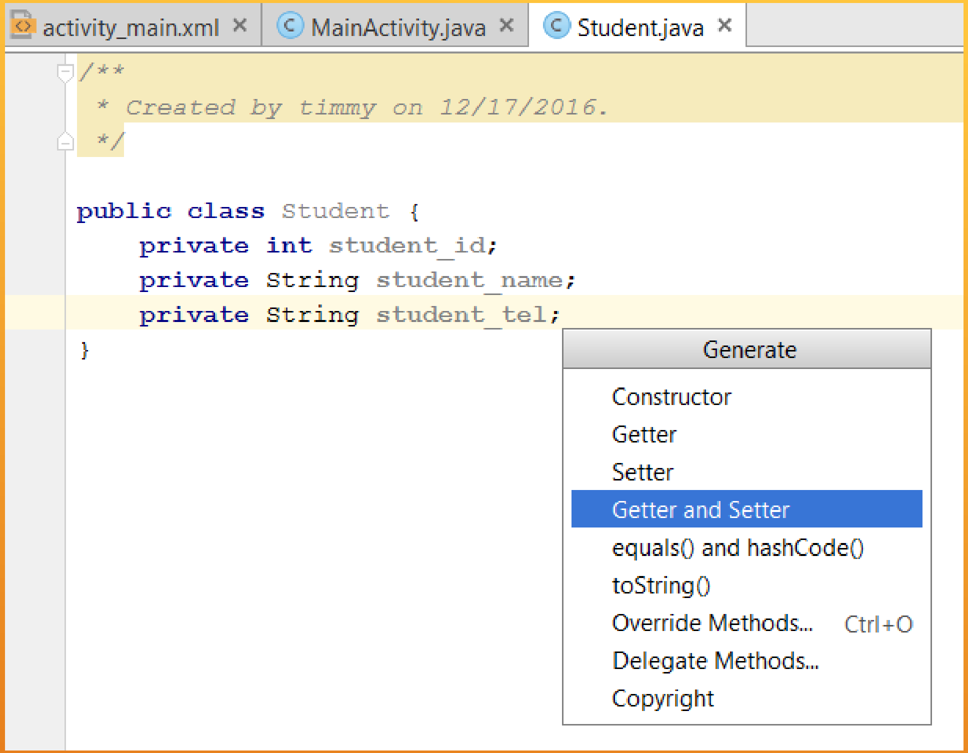
Android API	SQLite Version
API 24	3.9
API 21	3.8
API 11	3.7
API 8	3.6
API 3	3.5
API 1	3.4

SQLITE VERSIONS

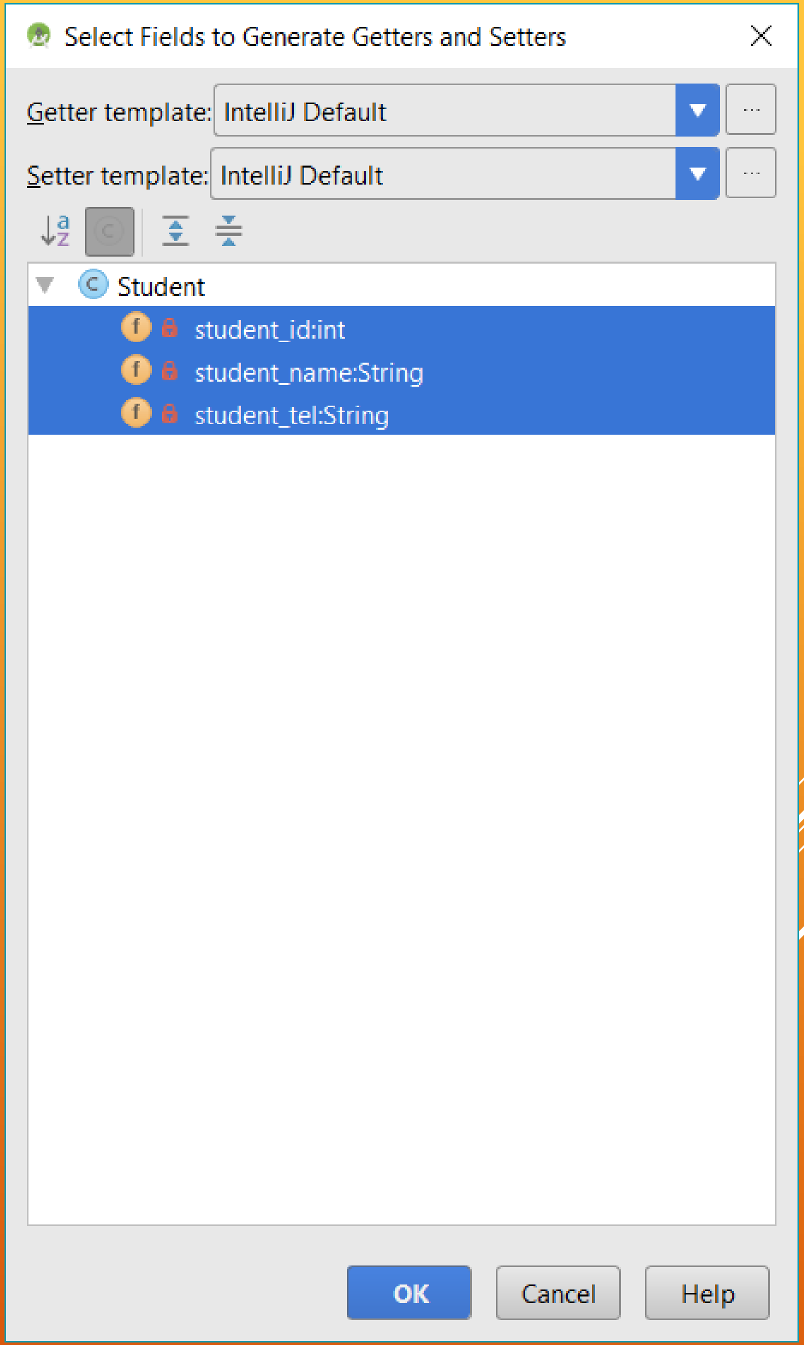


```
/**
 * Created by timmy on 12/17/2016.
 */

public class Student {
    private int student_id;
    private String student_name;
    private String student_tel;
}
```

GENERATE ANDROID CLASS



```
/**
 * Created by timmy on 12/17/2016.
 */

public class Student {
    private int student_id;
    private String student_name;
    private String student_tel;
}
```



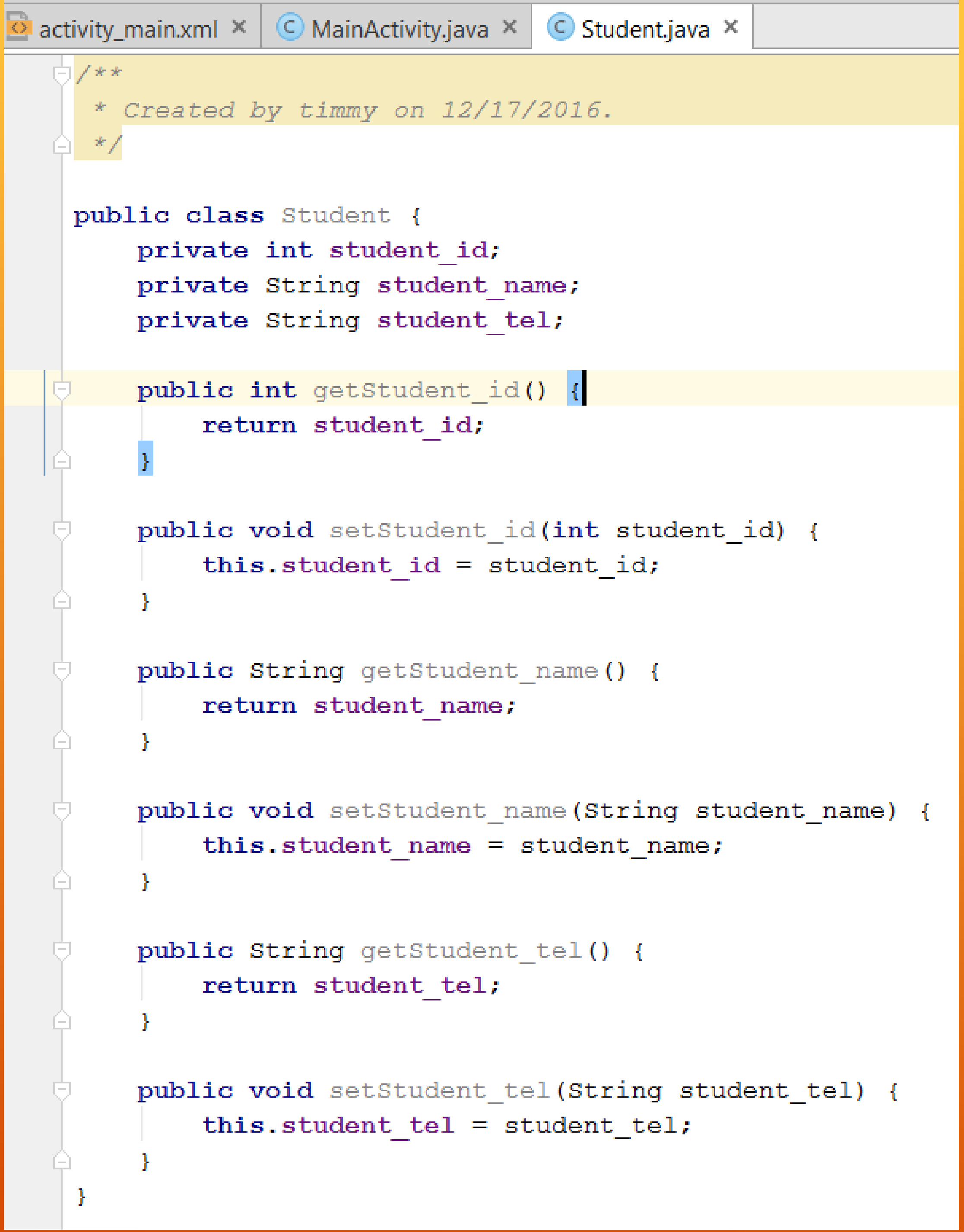
Select Fields to Generate Getters and Setters

Getter template: IntelliJ Default

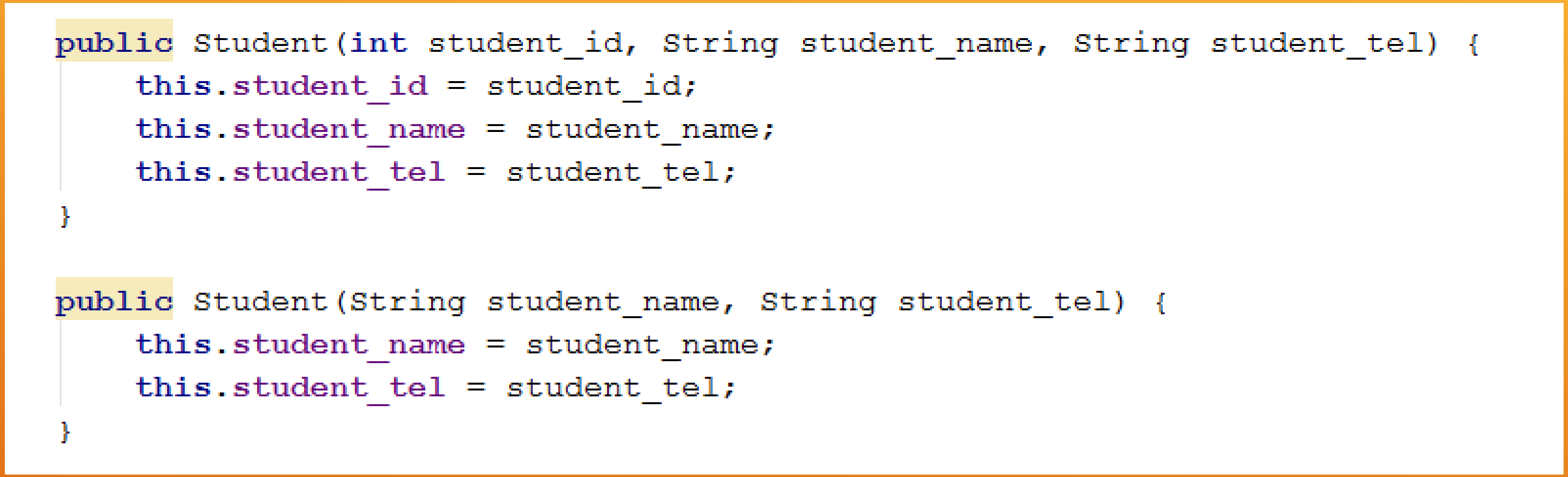
Setter template: IntelliJ Default

Student
- student_id:int
- student_name:String
- student_tel:String

INSERT GETTERS AND SETTERS (ALT+INSERT SHORTCUT)



```java
/**
 * Created by timmy on 12/17/2016.
 */

public class Student {
    private int student_id;
    private String student_name;
    private String student_tel;

    public int getStudent_id() {
        return student_id;
    }

    public void setStudent_id(int student_id) {
        this.student_id = student_id;
    }

    public String getStudent_name() {
        return student_name;
    }

    public void setStudent_name(String student_name) {
        this.student_name = student_name;
    }

    public String getStudent_tel() {
        return student_tel;
    }

    public void setStudent_tel(String student_tel) {
        this.student_tel = student_tel;
    }
}
```

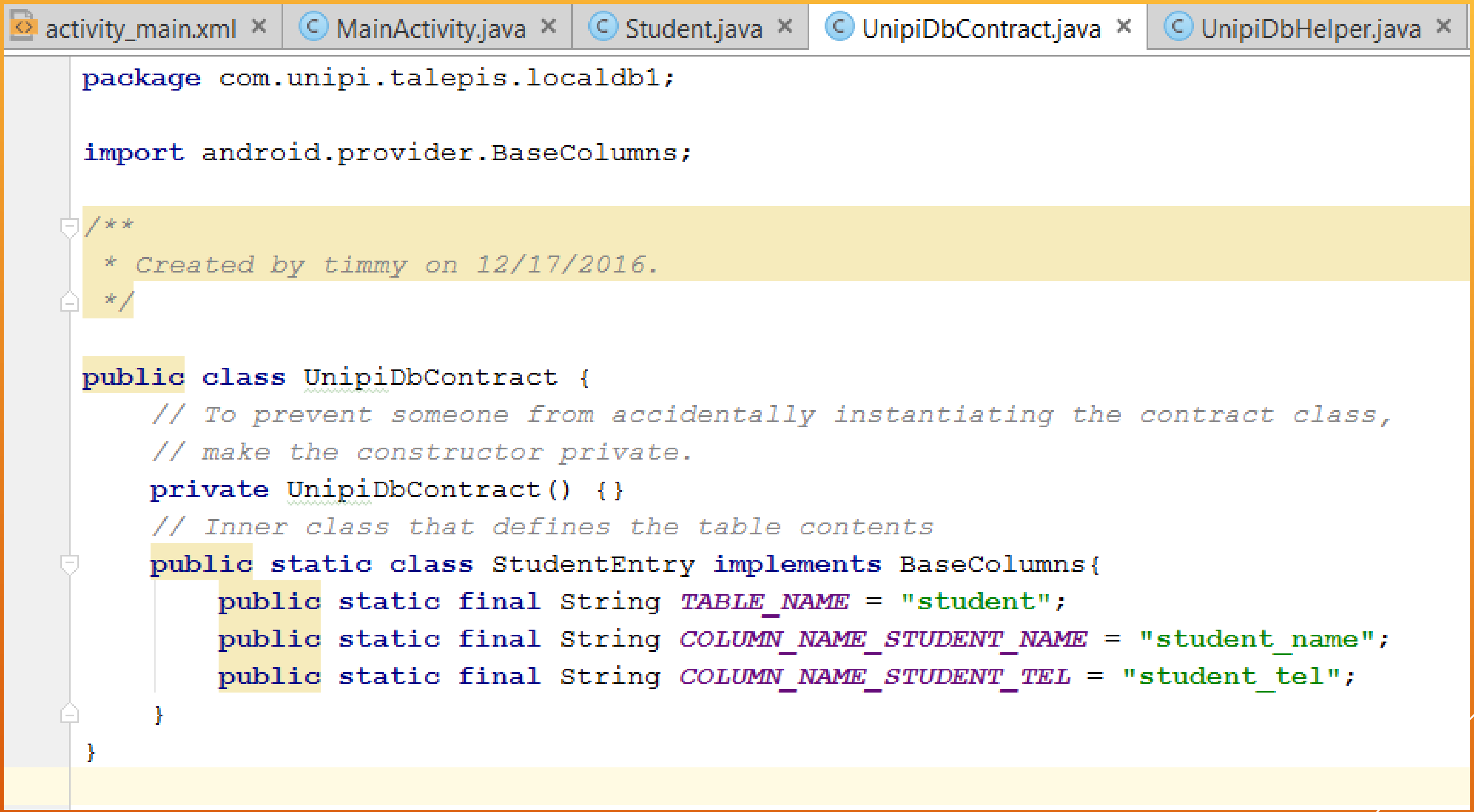


```java
public Student(int student_id, String student_name, String student_tel) {
    this.student_id = student_id;
    this.student_name = student_name;
    this.student_tel = student_tel;
}

public Student(String student_name, String student_tel) {
    this.student_name = student_name;
    this.student_tel = student_tel;
}
```

INSERT THE APPROPRIATE CLASS CONSTRUCTORS

- A contract class is a container for constants that define names for URIs, tables, and columns
- A good way to organize a contract class is to put definitions that are global to your whole database in the root level of the class
- Then create an inner class for each table that enumerates its columns
- Tip: A good advice for your inner class is to implement the "BaseColumns" interface!

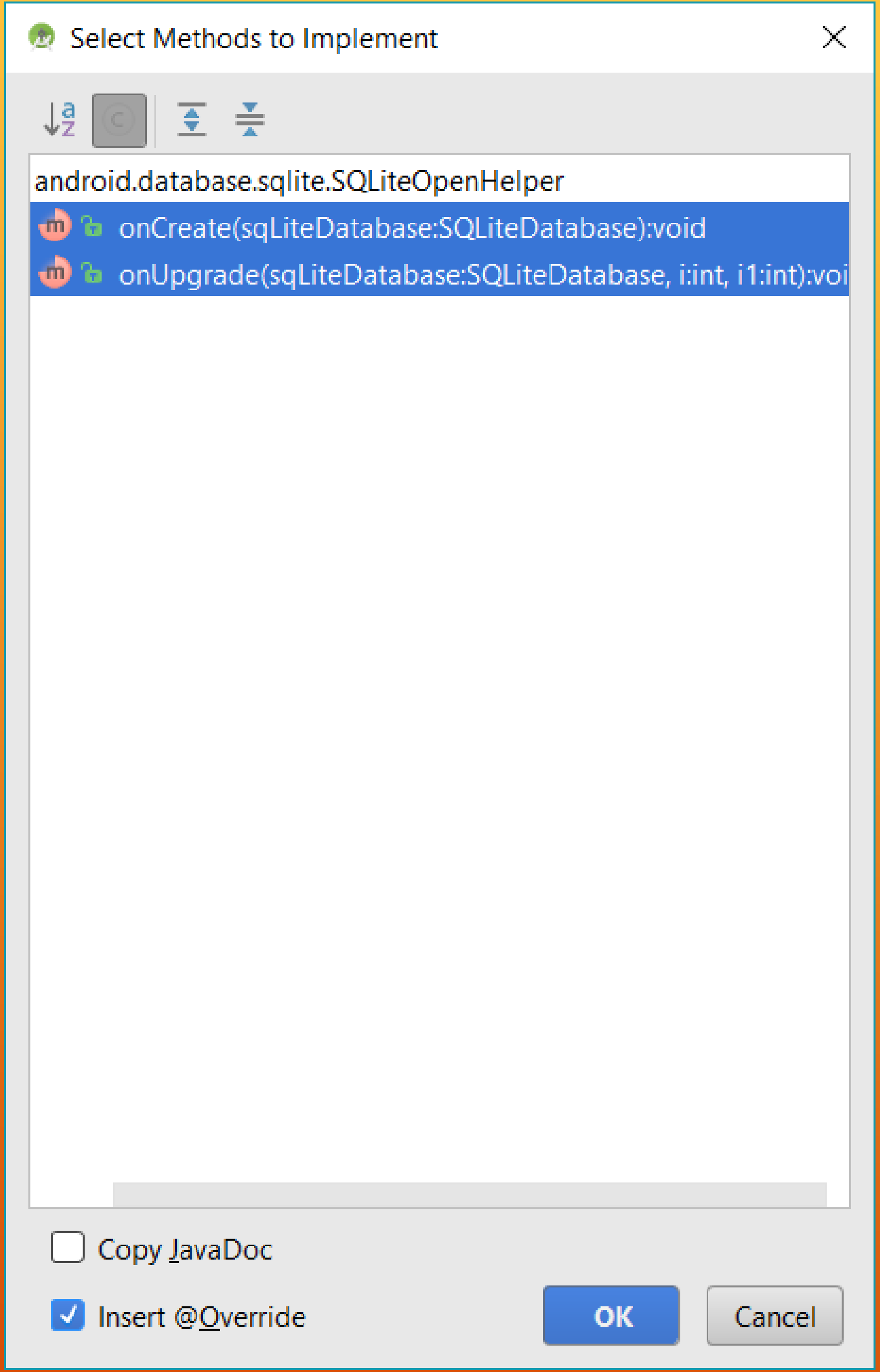
CREATE CONTRACT CLASS


activity_main.xml | MainActivity.java | Student.java | UnipiDbContract.java | UnipiDbHelper.java

```java
package com.unipi.talepis.localdb1;

import android.provider.BaseColumns;

/**
 * Created by timmy on 12/17/2016.
 */

public class UnipiDbContract {
    // To prevent someone from accidentally instantiating the contract class,
    // make the constructor private.
    private UnipiDbContract() {}
    // Inner class that defines the table contents
    public static class StudentEntry implements BaseColumns{
        public static final String TABLE_NAME = "student";
        public static final String COLUMN_NAME_STUDENT_NAME = "student_name";
        public static final String COLUMN_NAME_STUDENT_TEL = "student_tel";
    }
}
```

- When you use this class to obtain references to your database, the system performs the potentially long-running operations of creating and updating the database only when needed and not during app startup
- Implement methods that create and maintain the database and tables
- Read and Write through calls to getWritableDatabase() and getReadableDatabase()
- Tip: For long running operations call getWritableDatabase() or getReadableDatabase() in a background thread

CREATE A DB HELPER CLASS USING SQLITEOPENHELPER CLASS



Select Methods to Implement

android.database.sqlite.SQLiteOpenHelper

onCreate(sqLiteDatabase:SQLiteDatabase):void

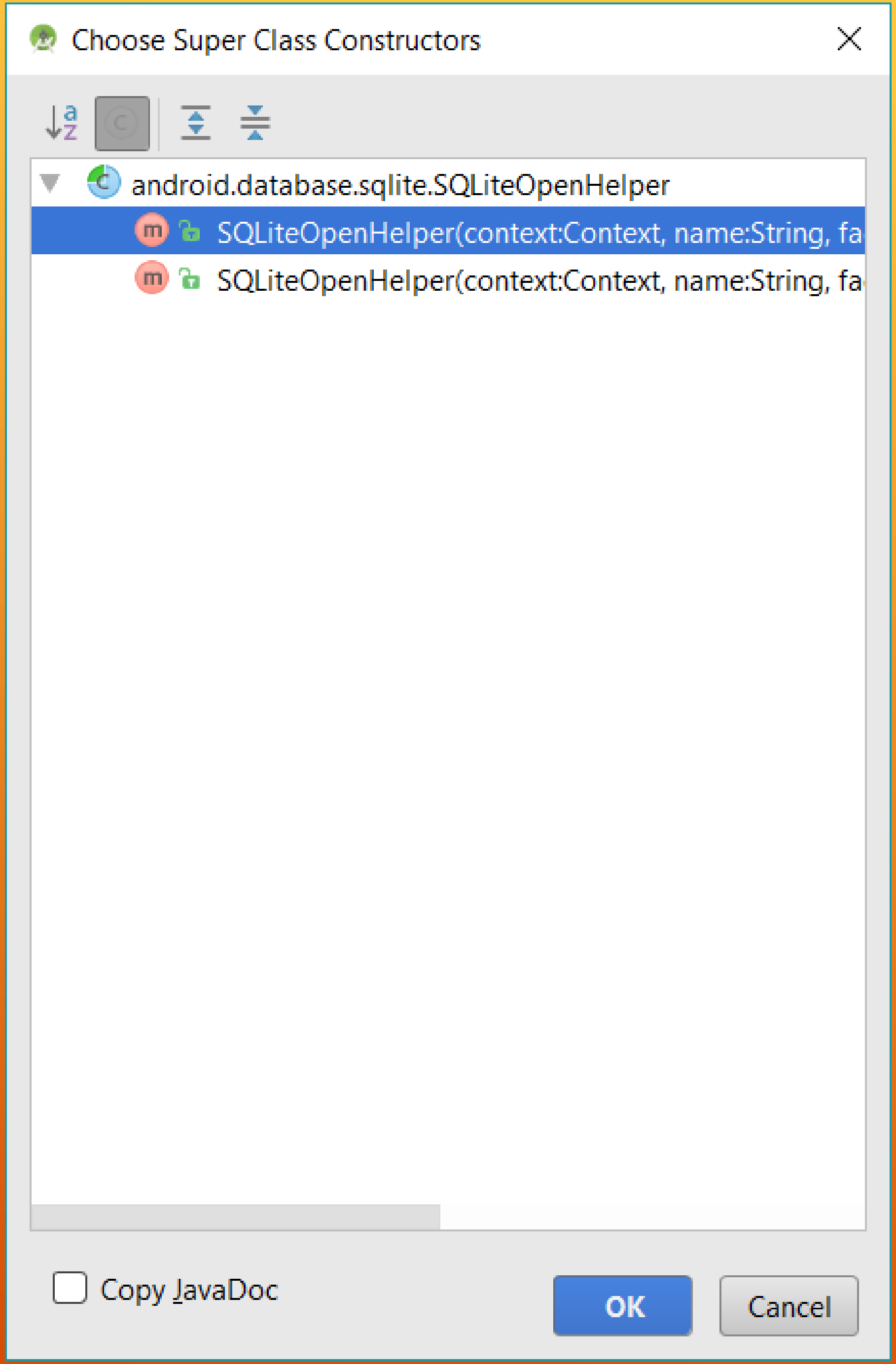
onUpgrade(sqLiteDatabase:SQLiteDatabase, i:int, i1:int):voi

☐ Copy JavaDoc

☑ Insert @Override

OK

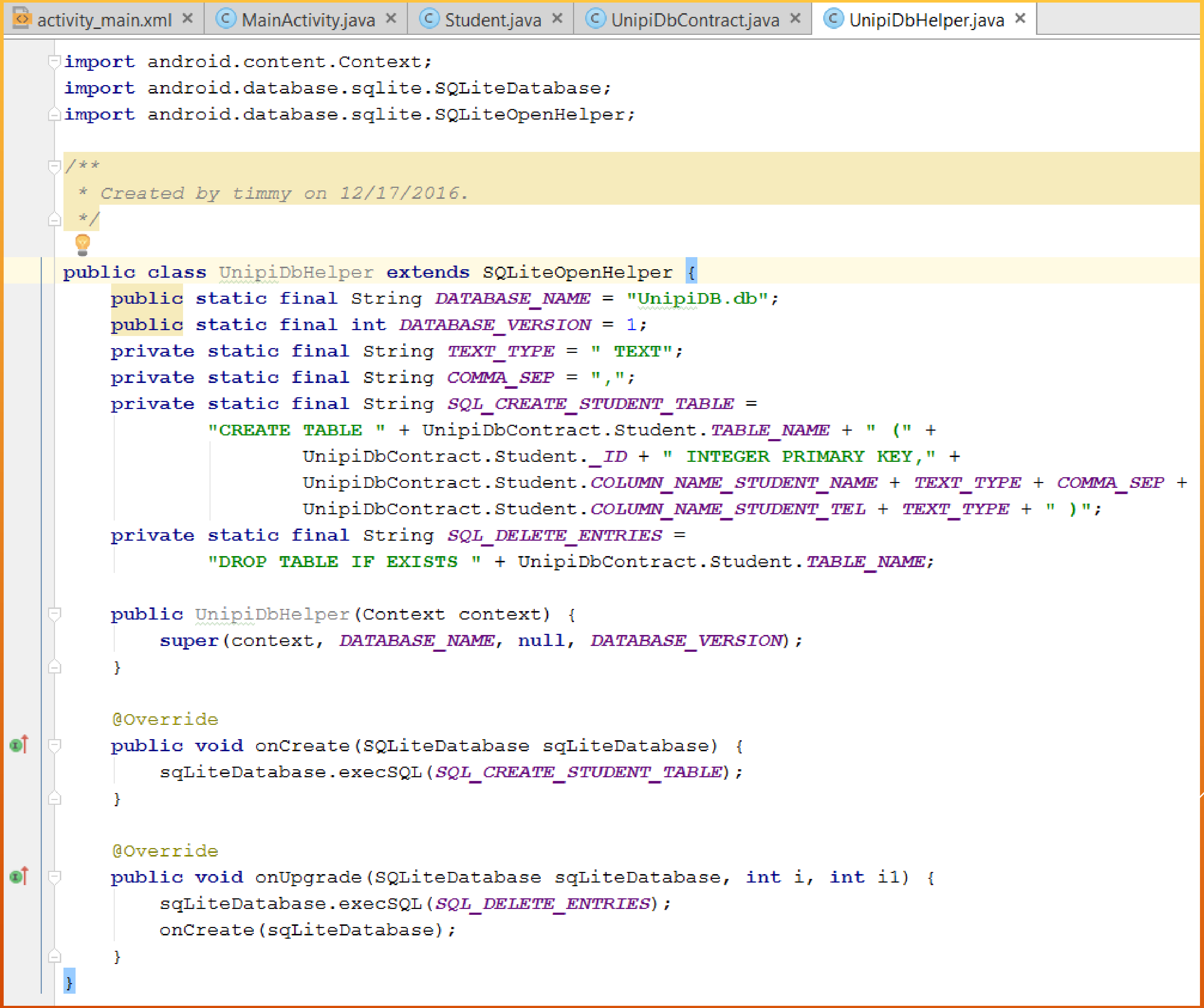
Cancel


Choose Super Class Constructors

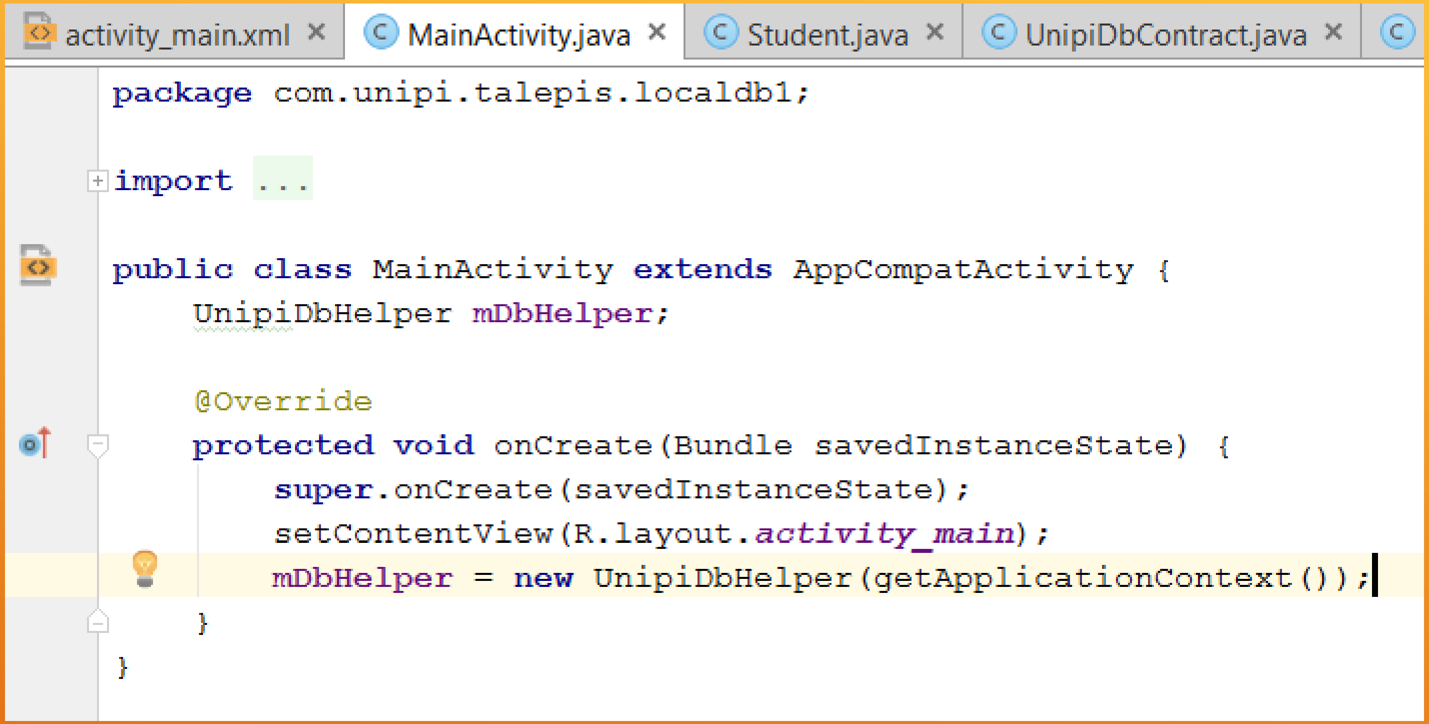
android.database.sqlite.SQLiteOpenHelper

SQLiteOpenHelper(context:Context, name:String, fa

SQLiteOpenHelper(context:Context, name:String, fa

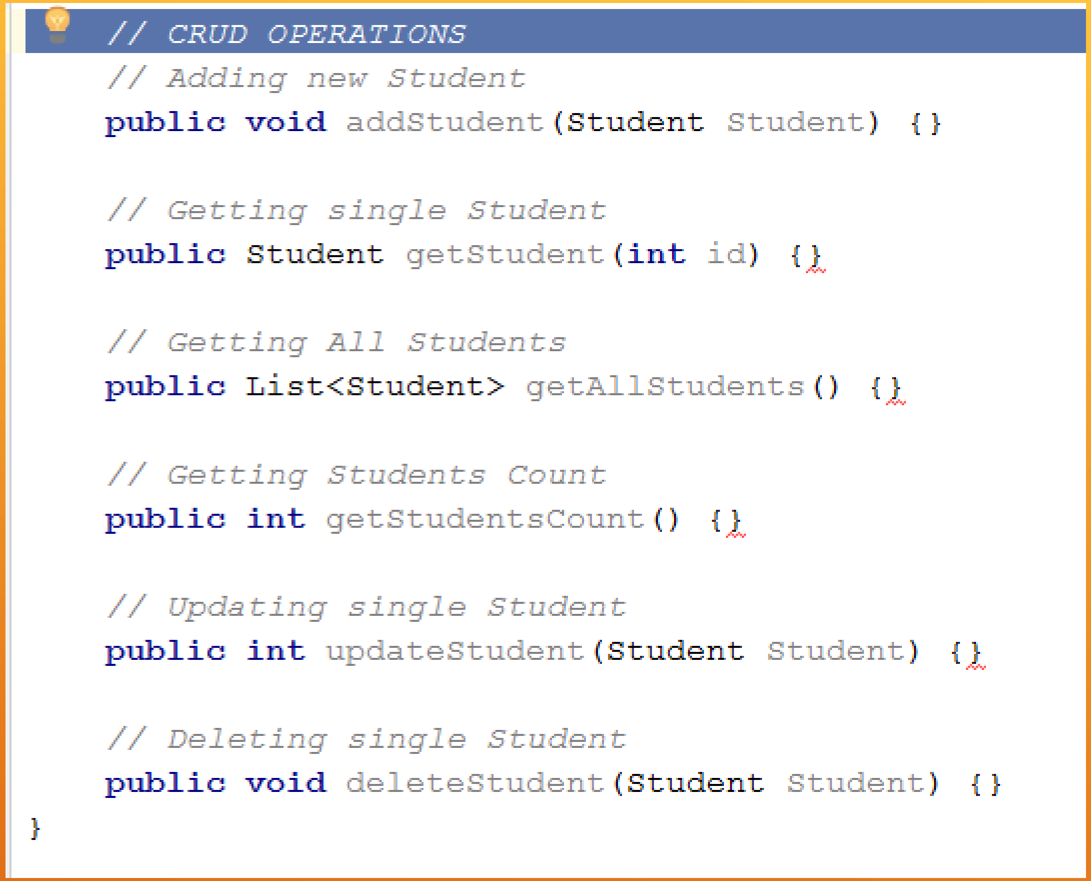


```java
import android.content.Context;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;

/**
 * Created by timmy on 12/17/2016.
 */

public class UnipiDbHelper extends SQLiteOpenHelper {
    public static final String DATABASE_NAME = "UnipiDB.db";
    public static final int DATABASE_VERSION = 1;
    private static final String TEXT_TYPE = " TEXT";
    private static final String COMMA_SEP = ",";
    private static final String SQL_CREATE_STUDENT_TABLE =
            "CREATE TABLE " + UnipiDbContract.Student.TABLE_NAME + " (" +
                    UnipiDbContract.Student._ID + " INTEGER PRIMARY KEY," +
                    UnipiDbContract.Student.COLUMN_NAME_STUDENT_NAME + TEXT_TYPE + COMMA_SEP +
                    UnipiDbContract.Student.COLUMN_NAME_STUDENT_TEL + TEXT_TYPE + " )";
    private static final String SQL_DELETE_ENTRIES =
            "DROP TABLE IF EXISTS " + UnipiDbContract.Student.TABLE_NAME;

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

    @Override
    public void onCreate(SQLiteDatabase sqLiteDatabase) {
        sqLiteDatabase.execSQL(SQL_CREATE_STUDENT_TABLE);
    }

    @Override
    public void onUpgrade(SQLiteDatabase sqLiteDatabase, int i, int i1) {
        sqLiteDatabase.execSQL(SQL_DELETE_ENTRIES);
        onCreate(sqLiteDatabase);
    }
}
```



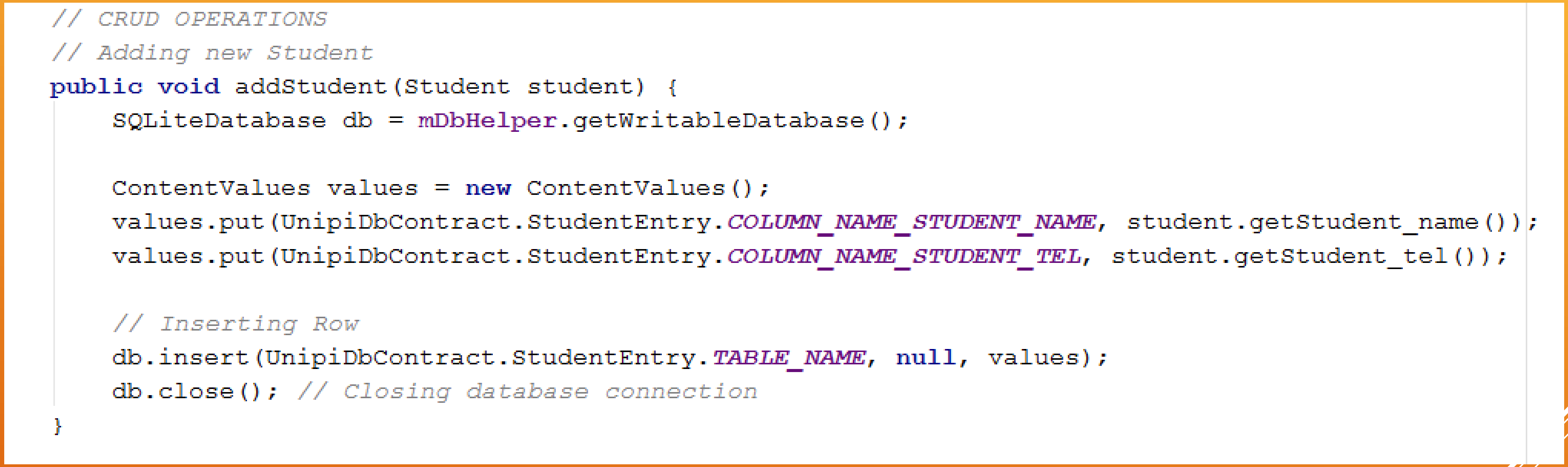
```java
package com.unipi.talepis.localdb1;

import ...

public class MainActivity extends AppCompatActivity {
    UnipiDbHelper mDbHelper;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        mDbHelper = new UnipiDbHelper(getApplicationContext());
    }
}
```

TO ACCESS YOUR DATABASE, INSTANTIATE YOUR HELPER CLASS



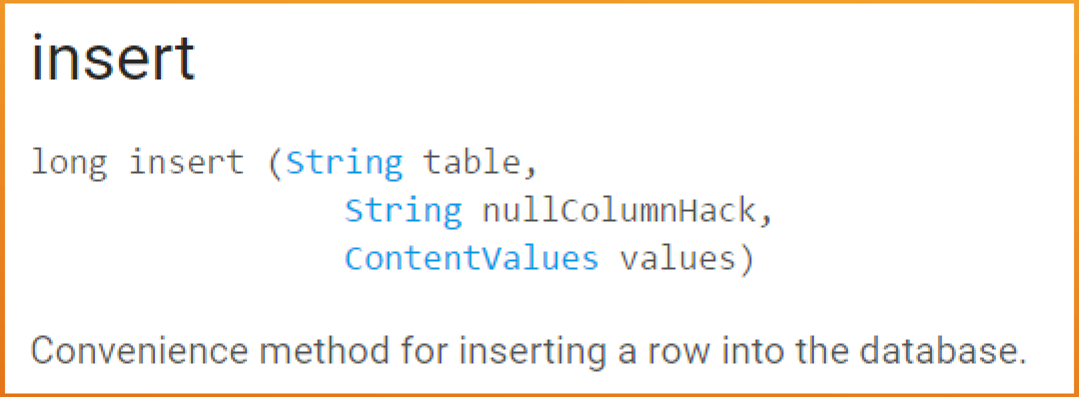
```
    // CRUD OPERATIONS
    // Adding new Student
    public void addStudent(Student Student) {}

    // Getting single Student
    public Student getStudent(int id) {}

    // Getting All Students
    public List<Student> getAllStudents() {}

    // Getting Students Count
    public int getStudentsCount() {}

    // Updating single Student
    public int updateStudent(Student Student) {}

    // Deleting single Student
    public void deleteStudent(Student Student) {}
}
```

ADD SOME BASIC CRUD OPERATIONS



```
// CRUD OPERATIONS
// Adding new Student
public void addStudent(Student student) {
    SQLiteDatabase db = mDbHelper.getWritableDatabase();

    ContentValues values = new ContentValues();
    values.put(UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_NAME, student.getStudent_name());
    values.put(UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_TEL, student.getStudent_tel());

    // Inserting Row
    db.insert(UnipiDbContract.StudentEntry.TABLE_NAME, null, values);
    db.close(); // Closing database connection
}
```

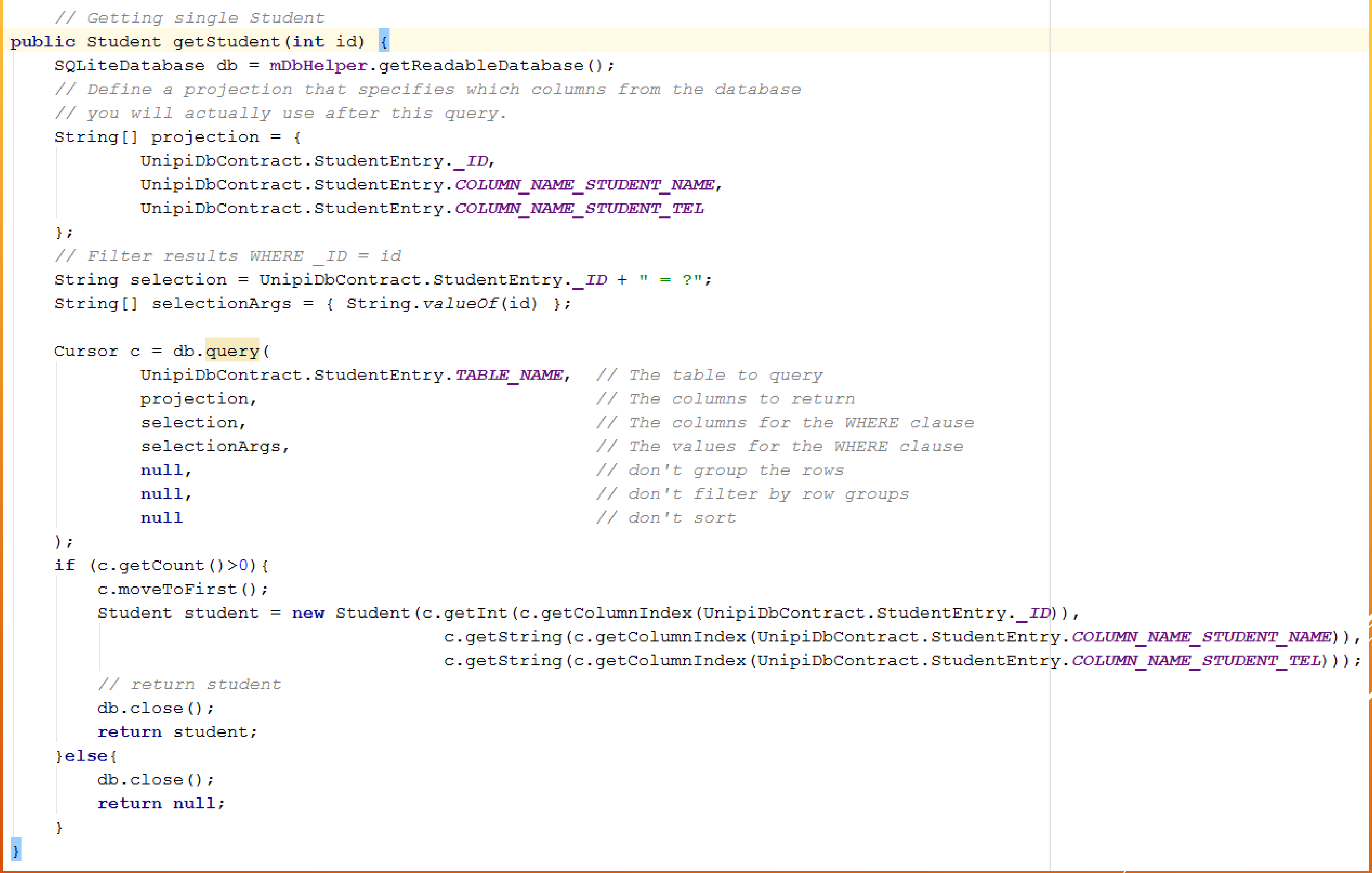
INSERT NEW RECORD



insert

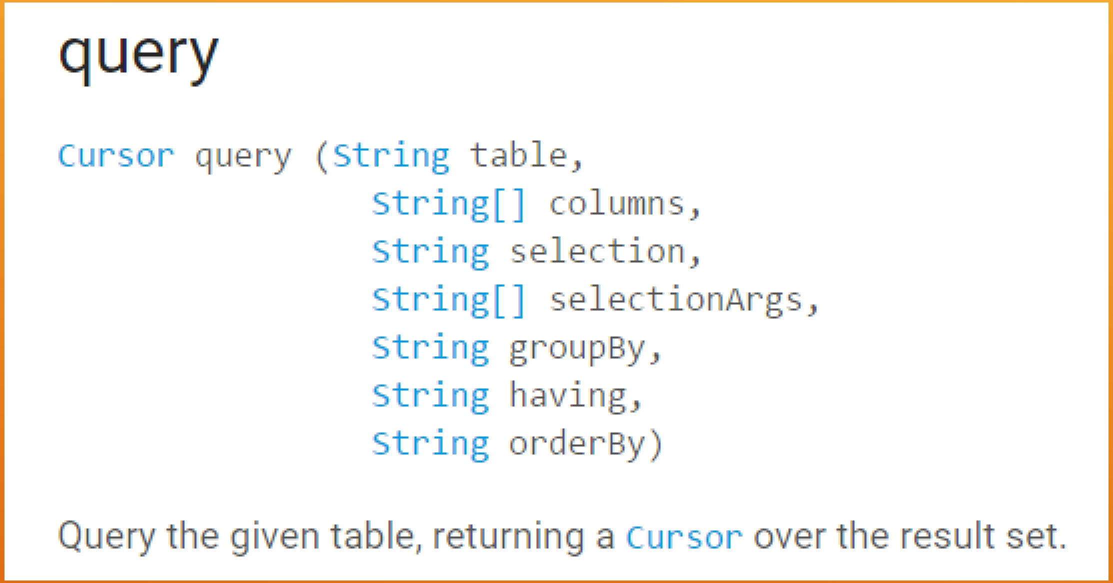
```
long insert (String table,
                String nullColumnHack,
                ContentValues values)
```

Convenience method for inserting a row into the database.



```
    // Getting single Student
public Student getStudent(int id) {
    SQLiteDatabase db = mDbHelper.getReadableDatabase();
    // Define a projection that specifies which columns from the database
    // you will actually use after this query.
    String[] projection = {
            UnipiDbContract.StudentEntry._ID,
            UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_NAME,
            UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_TEL
    };
    // Filter results WHERE _ID = id
    String selection = UnipiDbContract.StudentEntry._ID + " = ?";
    String[] selectionArgs = { String.valueOf(id) };

    Cursor c = db.query(
            UnipiDbContract.StudentEntry.TABLE_NAME,  // The table to query
            projection,                               // The columns to return
            selection,                                // The columns for the WHERE clause
            selectionArgs,                            // The values for the WHERE clause
            null,                                     // don't group the rows
            null,                                     // don't filter by row groups
            null                                      // don't sort
    );
    if (c.getCount()>0){
        c.moveToFirst();
        Student student = new Student(c.getInt(c.getColumnIndex(UnipiDbContract.StudentEntry._ID)),
                                        c.getString(c.getColumnIndex(UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_NAME)),
                                        c.getString(c.getColumnIndex(UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_TEL)));
        // return student
        db.close();
        return student;
    }else{
        db.close();
        return null;
    }
}
```

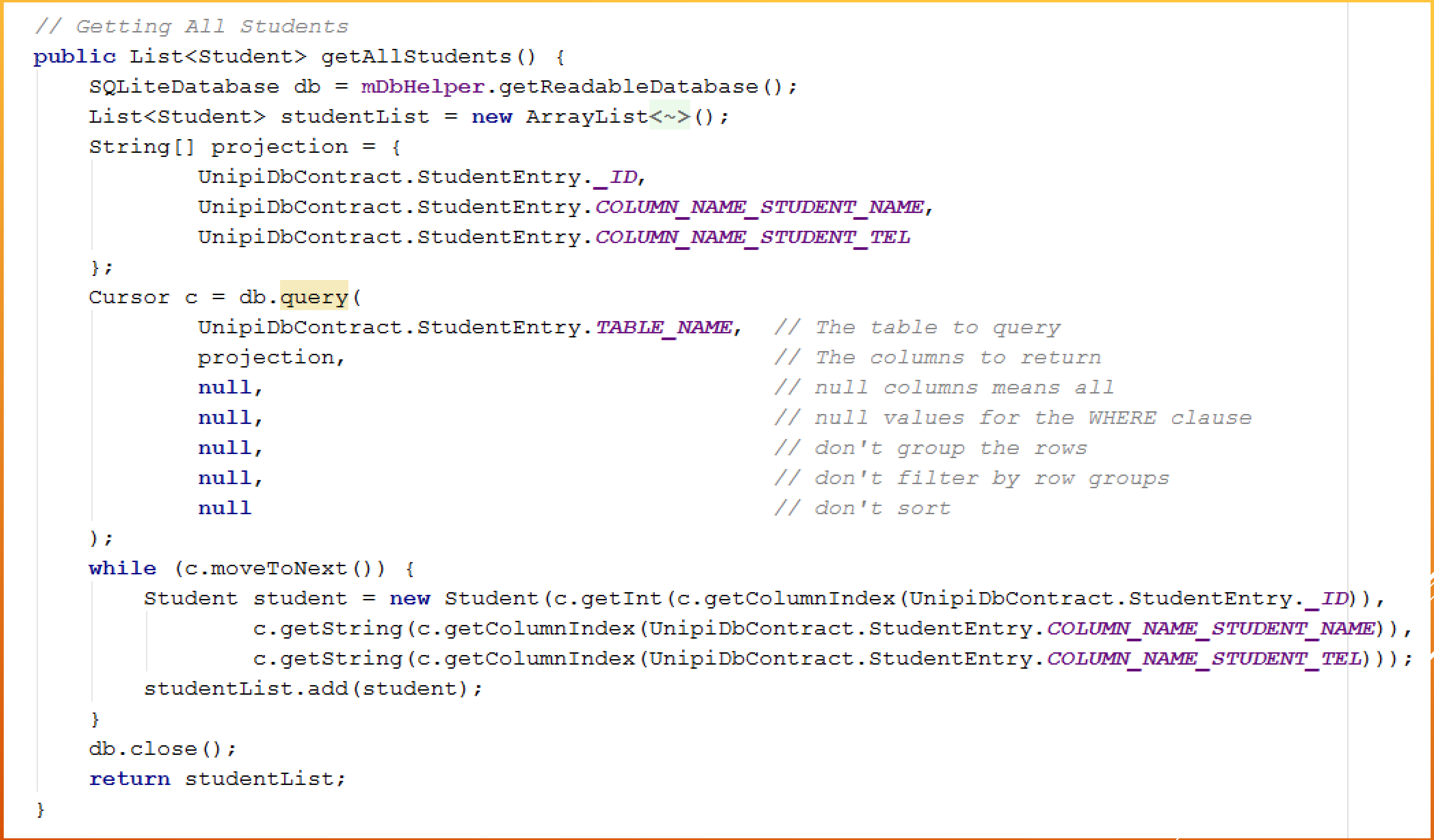
READ FROM DATABASE WITH CRITERIA



query

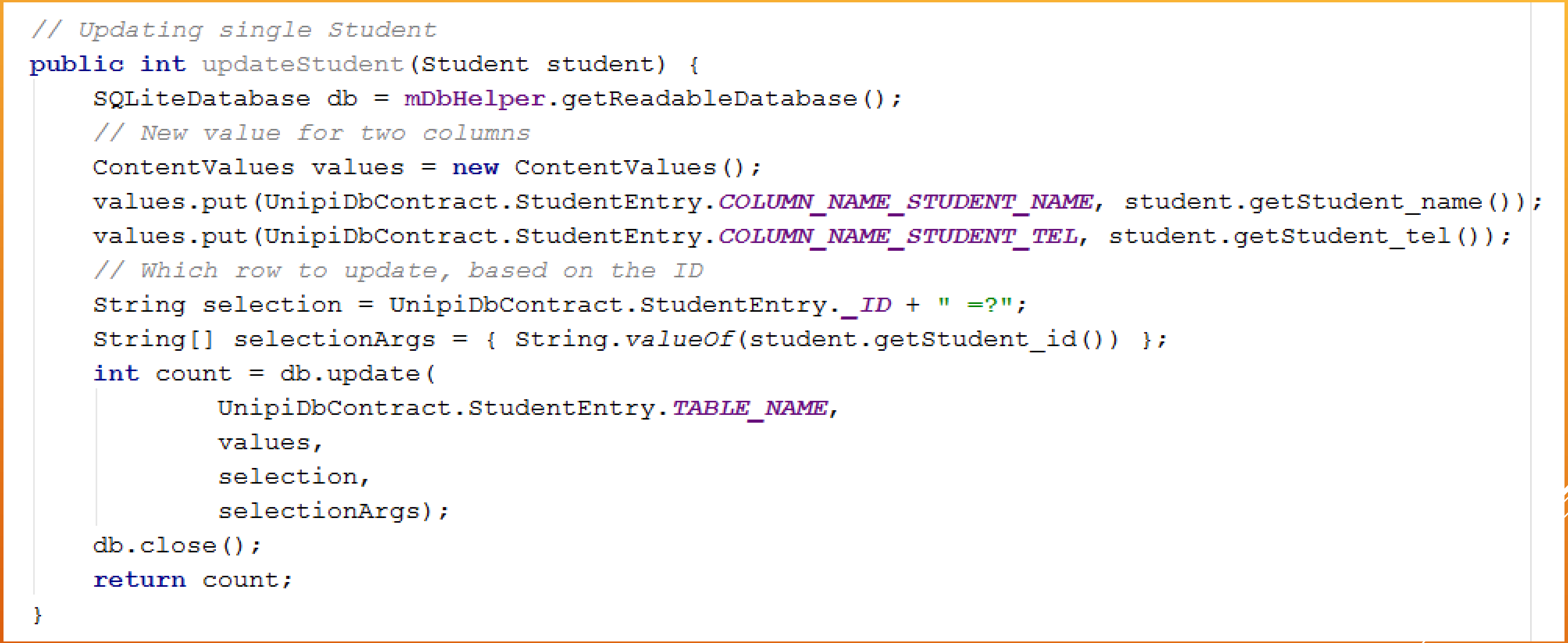
```
Cursor query (String table,
                String[] columns,
                String selection,
                String[] selectionArgs,
                String groupBy,
                String having,
                String orderBy)
```

Query the given table, returning a `Cursor` over the result set.



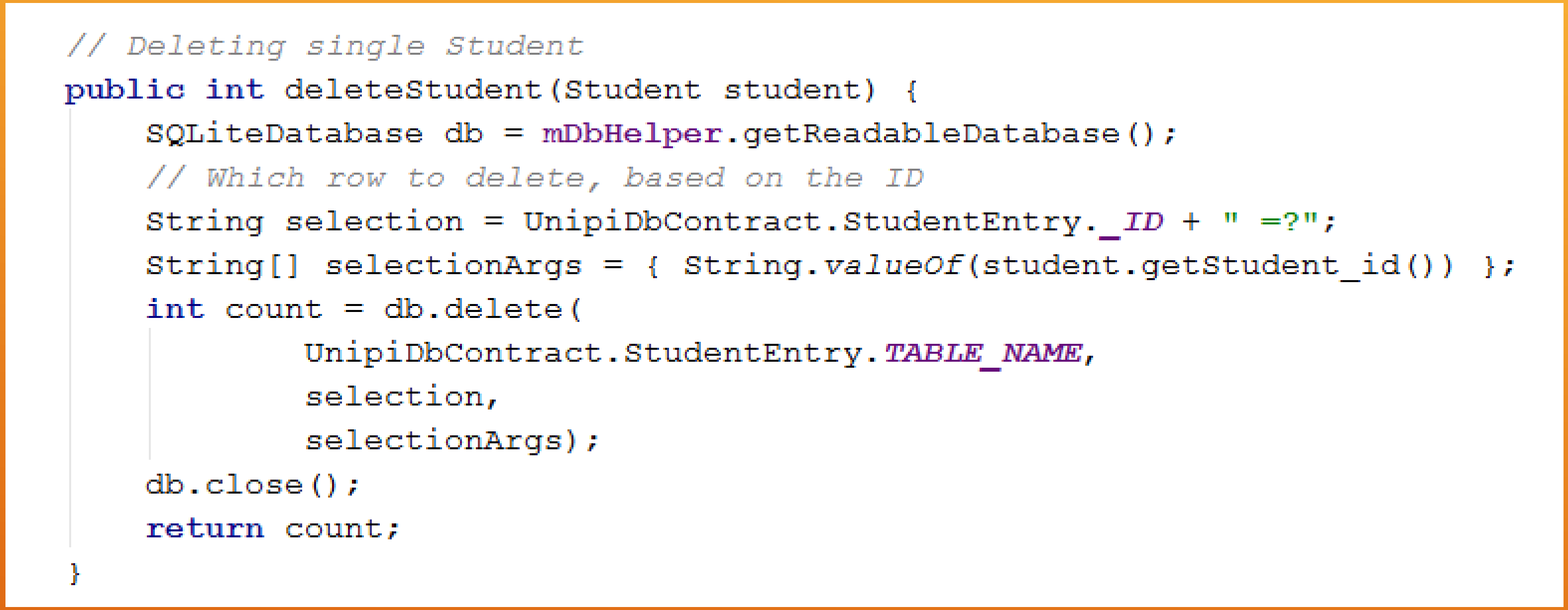
```
// Getting All Students
public List<Student> getAllStudents() {
    SQLiteDatabase db = mDbHelper.getReadableDatabase();
    List<Student> studentList = new ArrayList<~>();
    String[] projection = {
            UnipiDbContract.StudentEntry._ID,
            UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_NAME,
            UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_TEL
    };
    Cursor c = db.query(
            UnipiDbContract.StudentEntry.TABLE_NAME,  // The table to query
            projection,                               // The columns to return
            null,                                     // null columns means all
            null,                                     // null values for the WHERE clause
            null,                                     // don't group the rows
            null,                                     // don't filter by row groups
            null                                      // don't sort
    );
    while (c.moveToNext()) {
        Student student = new Student(c.getInt(c.getColumnIndex(UnipiDbContract.StudentEntry._ID)),
                c.getString(c.getColumnIndex(UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_NAME)),
                c.getString(c.getColumnIndex(UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_TEL)));
        studentList.add(student);
    }
    db.close();
    return studentList;
}
```

READ ALL FROM DATABASE



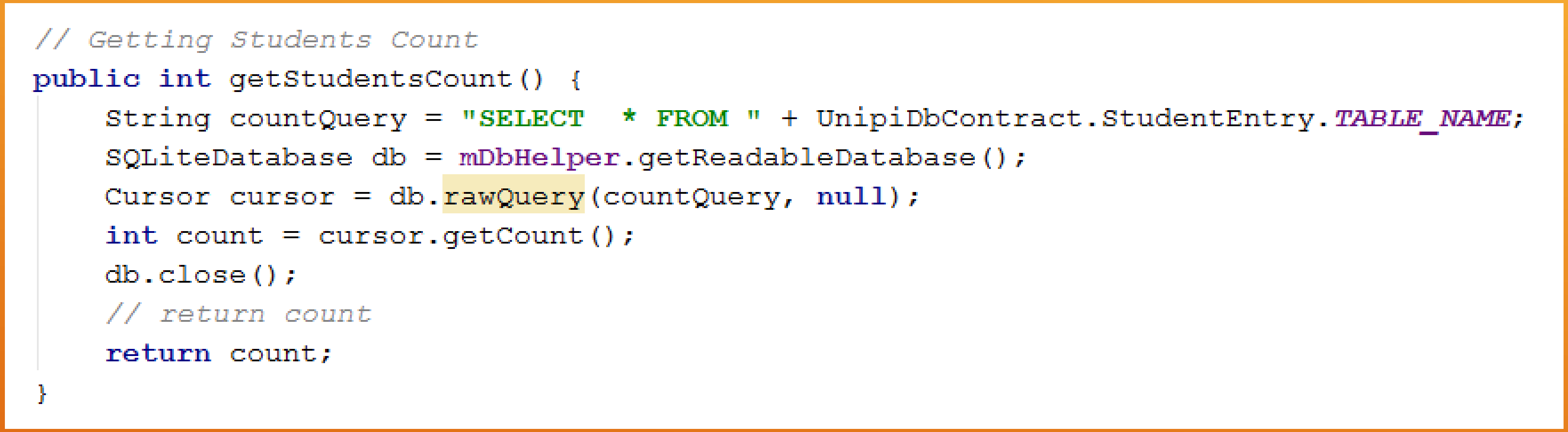
```
// Updating single Student
public int updateStudent(Student student) {
    SQLiteDatabase db = mDbHelper.getReadableDatabase();
    // New value for two columns
    ContentValues values = new ContentValues();
    values.put(UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_NAME, student.getStudent_name());
    values.put(UnipiDbContract.StudentEntry.COLUMN_NAME_STUDENT_TEL, student.getStudent_tel());
    // Which row to update, based on the ID
    String selection = UnipiDbContract.StudentEntry._ID + " =?";
    String[] selectionArgs = { String.valueOf(student.getStudent_id()) };
    int count = db.update(
            UnipiDbContract.StudentEntry.TABLE_NAME,
            values,
            selection,
            selectionArgs);
    db.close();
    return count;
}
```

UPDATE DATABASE



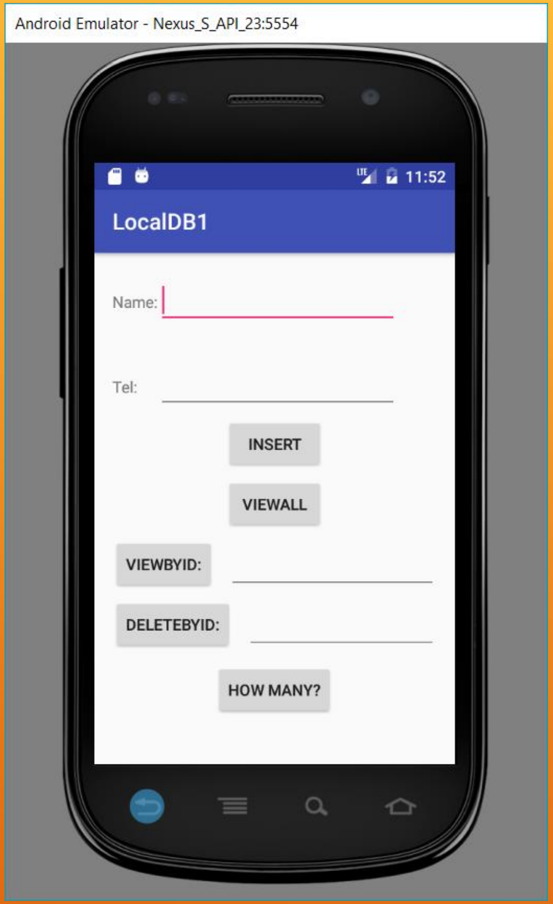
```java
// Deleting single Student
public int deleteStudent(Student student) {
    SQLiteDatabase db = mDbHelper.getReadableDatabase();
    // Which row to delete, based on the ID
    String selection = UnipiDbContract.StudentEntry._ID + " =?";
    String[] selectionArgs = { String.valueOf(student.getStudent_id()) };
    int count = db.delete(
            UnipiDbContract.StudentEntry.TABLE_NAME,
            selection,
            selectionArgs);
    db.close();
    return count;
}
```

DELETE FROM DATABASE



```java
// Getting Students Count
public int getStudentsCount() {
    String countQuery = "SELECT  * FROM " + UnipiDbContract.StudentEntry.TABLE_NAME;
    SQLiteDatabase db = mDbHelper.getReadableDatabase();
    Cursor cursor = db.rawQuery(countQuery, null);
    int count = cursor.getCount();
    db.close();
    // return count
    return count;
}
```

COUNT RECORDS IN DATABASE (THE OLD WAY)


Android Emulator - Nexus_S_API_23:5554

LocalDB1

Name:

Tel:

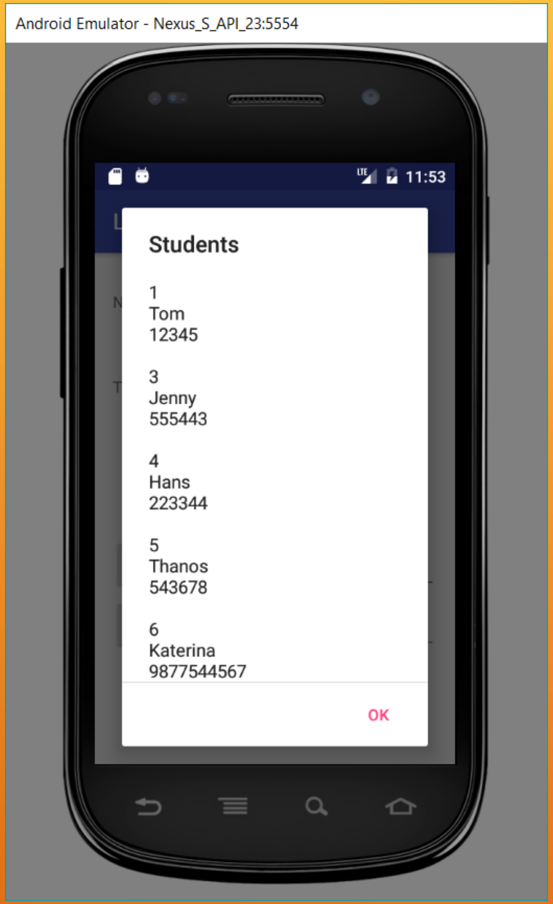
INSERT

VIEWALL

VIEWBYID:

DELETEBYID:

HOW MANY?


Android Emulator - Nexus_S_API_23:5554

Students

1
Tom
12345

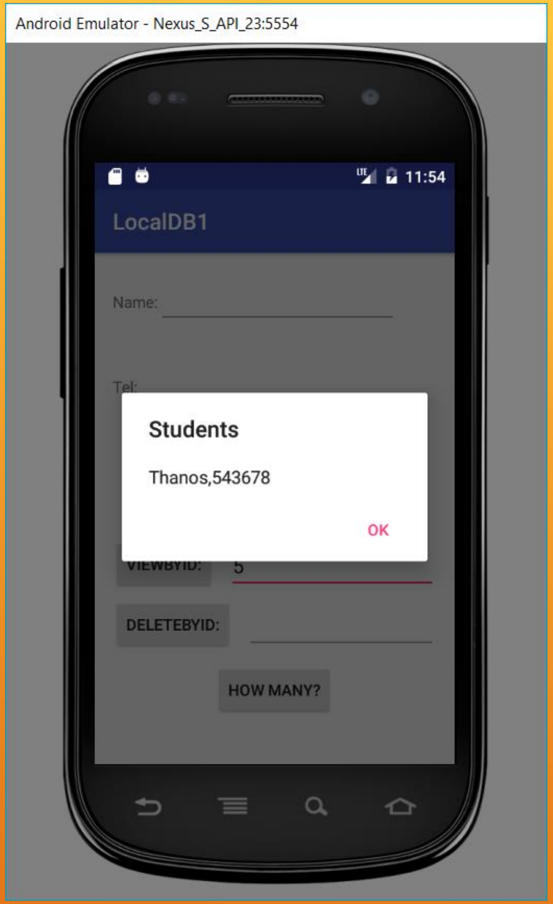
3
Jenny
555443

4
Hans
223344

5
Thanos
543678

6
Katerina
9877544567

OK


Android Emulator - Nexus_S_API_23:5554

LocalDB1

Students

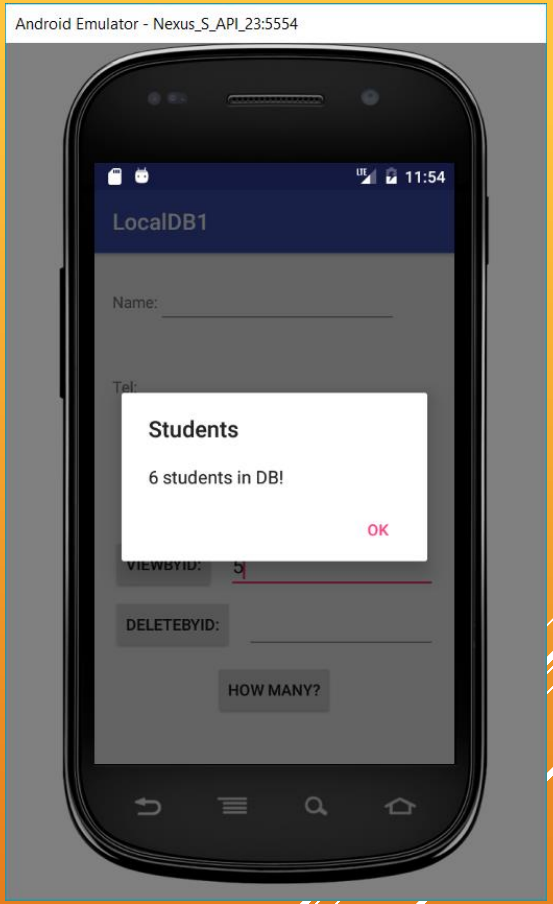
Thanos,543678

OK

VIEWBYID: 5

DELETEBYID:

HOW MANY?


Android Emulator - Nexus_S_API_23:5554

LocalDB1

Students

6 students in DB!

OK

VIEWBYID: 5

DELETEBYID:

HOW MANY?

BUILD THE APP

- https://www.dropbox.com/s/0dot24fi83zfmti/java_source.zip?dl=1

DOWNLOAD JAVA SOURCE CODE!