

**LAPORAN PRAKTIKUM PEMOGRAMAN
PERANGKAT BERGERAK
MODUL 10**



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**PRODI S1 REKAYASA PERANGKAT LUNAK
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GUIDED

1. Pengenalan SQLite

SQLite adalah database relasional yang berfungsi sebagai tempat penyimpanan data secara offline untuk aplikasi mobile, tepatnya di local storage atau cache memory aplikasi. SQLite mendukung operasi dasar seperti CRUD (create, read, update, delete), yang merupakan inti dari pengelolaan data. Struktur database di SQLite mirip dengan SQL pada umumnya, termasuk penggunaan variabel dan tipe data yang tidak jauh berbeda.

2. SQL Helper Dasar

Di Flutter, SQL Helper biasanya mengacu pada penggunaan paket seperti sqflite untuk mengelola database SQLite. SQL Helper adalah sebuah class yang dirancang untuk menyediakan berbagai method yang berhubungan dengan manipulasi data. sqflite sendiri merupakan plugin Flutter yang memungkinkan pengembang melakukan operasi CRUD (Create, Read, Update, Delete) pada database SQLite dengan mudah.

Berikut adalah langkah-langkah dasar untuk menggunakan sqflite sebagai SQL Helper di Flutter :

- 1) Tambahkan plugin sqflite dan path ke file pubspec.yaml. Plugin bisa didapat disini.
- 2) Buat class baru bernama DatabaseHelper untuk mengelola database dan import package sqflite dan path di file db_helper.dart.

```
import 'package:sqflite/sqflite.dart';
import 'package:path/path.dart';

// Kelas DatabaseHelper untuk mengelola database
class DatabaseHelper {
  static final DatabaseHelper _instance =
    DatabaseHelper._internal();
  static Database? _database;
```

- 3) Buat factory constructor untuk mengembalikan instance singleton dan private singleton.

```
import 'package:sqflite/sqflite.dart';
import 'package:path/path.dart';

// kelas DatabaseHelper untuk mengelola database
class DatabaseHelper {
  static final DatabaseHelper _instance =
    DatabaseHelper._internal();
  static Database? _database;
  factory DatabaseHelper() {
    return _instance;
  }

  // Private constructor
  DatabaseHelper._internal();
}
```

- 4) Buat Getter untuk database.

```
// Getter untuk database
Future<Database> get database async {
  if (_database != null) return _database!;
  {
    _database = await _initDatabase();
    return _database!;
  }
}
```

- 5) Inisialisasi database dengan nama database yang kita mau.

```
//inisialisasi Database
Future<Database> _initDatabase() async {
  // mendapatkan path untuk database
  String path = join(await getDatabasesPath(), 'my_prakdatabase.db');
  // membuka database
  return await openDatabase(
    path,
    version: 1,
    onCreate: _onCreate,
  );
}
```

- 6) Kemudian buat tabel untuk database-nya dengan record atau value id, title, dan description.

```
// membuat tabel saat db pertama kali dibuat
Future<void> _onCreate(Database db, int version) async{
  await db.execute('''
CREATE TABLE my_table(
  id INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
  title TEXT,
  description TEXT,
  createdAt TIMESTAMP NOT NULL DEFAULT CURRENT_TIMESTAMP)
''');
```

- 7) Buat metode untuk memasukkan data ke dalam tabel

```
// METODE UNTUK MEMASUKKAN DATA KE DALAM TABEL
Future<int> insert(Map<String, dynamic> row) async {
  Database db = await database;
  int id = row['id'];
  return await db.insert('my_table', row);
}
```

- 8) Lalu, metode untuk mengambil semua data dari tabel.

```
// metode untuk mengambil semua data dari table
Future<List<Map<String, dynamic>>> queryAllRows() async {
  Database db = await database;
  return await db.query('my_table');
```

- 9) Buat metode untuk memperbarui data dalam tabel.

```
// metode untuk meperbarui data dalam tabel
Future<int> update(Map<String, dynamic> row) async {
  Database db = await database;
  int id = row['id'];
  return await db.update('my_table', row, where: 'id = ?', whereArgs: [id]);
}
```

- 10) Diakhiri dengan metode untuk menghapus data dari tabel.

```
// metode untuk menghapus data dari tabel
Future<int> delete(int id) async {
  Database db = await database;
  return await db.delete('my_table', where: 'id = ?', whereArgs: [id]);
}
```

a. Read

Pada package sqflite, kita bisa menggunakan metode query() untuk mengambil data dari database. Dengan sqflite di Flutter, kita dapat membuat query menggunakan berbagai perintah, seperti where, groupBy, orderBy, dan having. Selain itu, kita juga punya fleksibilitas untuk membaca satu data saja atau langsung beberapa data sekaligus. Berikut barisan kode read pada sqflite :

Membaca semua data

```
// metode untuk mengambil semua data dari table
Future<List<Map<String, dynamic>>> queryAllRows() async {
  Database db = await database;
  return await db.query('my_table');
```

Membaca satu data melalui id

```
Future<List<Map<String, dynamic>>> getItem(int id) async {
  Database db = await database;
  return await db.query('my_table', where: 'id = ?', whereArgs: [id], limit: 1);
}
```

3. Hasil Praktikum saat dikelas

- Source Code main.dart

```
1 import 'package:flutter/material.dart';
2 import 'package:guided/view/my_db_view.dart';
3
4 void main() {
5   runApp(const MyApp());
6 }
7
8 class MyApp extends StatelessWidget {
9   const MyApp({super.key});
10
11   @override
12   Widget build(BuildContext context) {
13     return MaterialApp(
14       title: 'Database Storage',
15       theme: ThemeData(
16         colorScheme: ColorScheme.fromSeed(seedColor: Colors.deepPurple),
17         useMaterial3: true,
18       ),
19       home: MyDatabaseView(),
20     );
21   }
22 }
```

- Source Code my_db_view

```
1 import 'package:flutter/material.dart';
2 import 'package:guided/view/my_db_view.dart';
3
4 class MyDatabaseView extends StatelessWidget {
5   const MyDatabaseView({super.key});
6
7   @override
8   State<MyDatabaseView> createState() => _MyDatabaseViewState();
9 }
10
11 class _MyDatabaseViewState extends State<MyDatabaseView> {
12   final DatabaseHelper _dbHelper = DatabaseHelper();
13   List<Map<String, dynamic>> _dbData = [];
14   List<Map<String, dynamic>> _dbData2 = [];
15   final TextEditingController _titleController = TextEditingController();
16   final TextEditingController _descriptionController = TextEditingController();
17
18   @override
19   void initState() {
20     _dbHelper.refreshData();
21     super.initState();
22   }
23
24   @override
25   void dispose() {
26     _titleController.dispose();
27     _descriptionController.dispose();
28     super.dispose();
29   }
30
31   void _refreshData() async {
32     final data = await _dbHelper.queryAllData();
33     setState(() {
34       _dbData = data;
35     });
36   }
37
38   void _addData() async {
39     if (_titleController.text.isEmpty || _descriptionController.text.isEmpty) {
40       _showSnackBar('Title and Description cannot be empty!');
41       return;
42     }
43     _dbHelper.insert(
44       'title': _titleController.text,
45       'description': _descriptionController.text,
46     );
47     _titleController.clear();
48     _descriptionController.clear();
49     _refreshData();
50   }
51
52   void _deleteData(int id) async {
53     if (_titleController.text.isEmpty || _descriptionController.text.isEmpty) {
54       _showSnackBar('Title and Description cannot be empty!');
55       return;
56     }
57     await _dbHelper.delete(
58       id: id,
59       'title': _titleController.text,
60       'description': _descriptionController.text,
61     );
62     _titleController.clear();
63     _descriptionController.clear();
64     _refreshData();
65   }
66
67   void _deleteData(int id) async {
68     await _dbHelper.delete(id);
69     _refreshData();
70   }
71
72   void _showAlertDialog(BuildContext context) {
73     _titleController.text = 'Title';
74     _descriptionController.text = 'Description';
75
76     showDialog(
77       context: context,
78       builder: (context) {
79         return AlertDialog(
80           title: const Text('Title'),
81           content: const Text('Description'),
82           children: [
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1447                 const Text('Title'),
1448                 const Text('Description'),
1449               ],
1450             ),
1451             Row(
1452               children: [
14
```

```

112 void _showMessage(string message) {
113     ScaffoldMessenger.of(context)
114       .showSnackBar(SnackBar(content: Text(message)));
115 }
116
117 // Override
118 Widget build(BuildContext context) {
119     return Scaffold(
120       appBar: AppBar(
121         title: const Text('Pattern Database - SQLite'),
122         backgroundColor: Colors.transparent,
123         centerTitle: true,
124       ),
125       body: Column(
126         children: [
127           Padding(
128             padding: const EdgeInsets.all(8.0),
129             child: TextFormField(
130               controller: _titleController,
131               decoration: const InputDecoration(labelText: 'Title'),
132             ),
133           Padding(
134             padding: const EdgeInsets.all(8.0),
135             child: TextFormField(
136               controller: _descriptionController,
137               decoration: const InputDecoration(labelText: 'Description'),
138             ),
139           ElevatedButton(
140             onPressed: _addData,
141             child: const Text('Add Data'),
142           ),
143           Expanded(
144             child: ListView.builder(
145               itemCount: _data.length,
146               itemBuilder: (context, index) {
147                 final item = _data[index];
148                 return ListTile(
149                   title: Text('${item['title']}'),
150                   subtitle: Text('${item['description']}'),
151                   trailing: Row(
152                     mainAxisAlignment: MainAxisAlignment.end,
153                     children: [
154                       IconButton(
155                         icon: const Icon(Icons.edit),
156                         onPressed: () {
157                           _showDialog(item);
158                         },
159                       ),
160                       IconButton(
161                         icon: const Icon(Icons.delete),
162                         onPressed: () => _deleteData(item['id']),
163                       ),
164                     ],
165                   ),
166                 ),
167               ),
168             ),
169           ),
170         ],
171       ),
172     );
173 }
174
175 // ...
176 }
177
178 }

```

■ Source Code db_helper

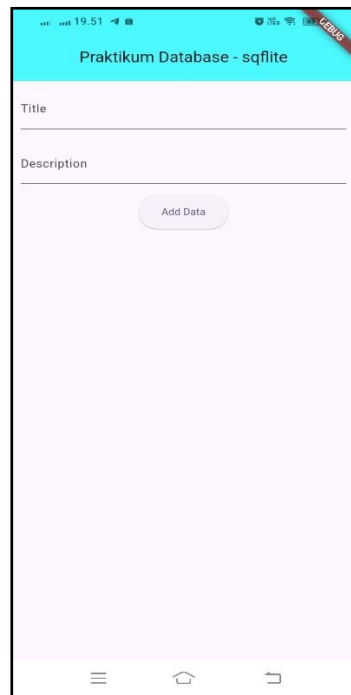
```

1 import package:flutter/cupertino.dart;
2 import package:flutter/material.dart;
3
4 // Value database untuk mengelola database
5 class DatabaseHelper {
6   static final DatabaseHelper _instance = DatabaseHelper._internal();
7   static Database? _database;
8
9   // Factory constructor untuk menghasilkan instance singleton
10   factory DatabaseHelper() {
11     return _instance;
12   }
13
14   // Private constructor
15   DatabaseHelper._internal();
16
17   // Getter untuk database
18   Future<Database> get database async {
19     if (_database == null) return _database!;
20     {
21       _database = await _initDatabase();
22       return _database!;
23     }
24   }
25
26   // Inisialisasi database
27   Future<Database> _initDatabase() async {
28     // Memeriksa apakah ada database
29     String path = join(await getDatabasePath(), 'my_database.db');
30     // Membuat database
31     return await openDatabase(
32       path,
33       version: 1,
34       onCreate: _onCreate,
35     );
36   }
37
38   // Membuat tabel db dengan record dan value id, title, description
39   Future<void> _onCreate(Database db, int version) async {
40     await db.execute('''
41       CREATE TABLE my_table (
42         id INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
43         title TEXT,
44         description TEXT,
45         createdAt TIMESTAMP NOT NULL DEFAULT CURRENT_TIMESTAMP
46       );
47     ''');
48   }
49
50   // Metode untuk menambah data ke database
51   Future<void> insert(Database db, dynamic row) async {
52     Database db = await database;
53     return await db.insert('my_table', row);
54   }
55
56   // Metode untuk memperbarui data di database
57   Future<void> update(Database db, dynamic row) async {
58     Database db = await database;
59     return await db.update('my_table', row, where: 'id = ?', whereArgs: [row['id']]);
60   }
61
62   // Metode untuk menghapus data dari database
63   Future<void> delete(Database db, id) async {
64     Database db = await database;
65     return await db.delete('my_table', where: 'id = ?', whereArgs: [id]);
66   }
67
68   // Metode untuk mencari data
69   Future<List<dynamic>> query(Database db, dynamic query) async {
70     Database db = await database;
71     return await db.query('my_table');
72   }
73 }
74
75 }

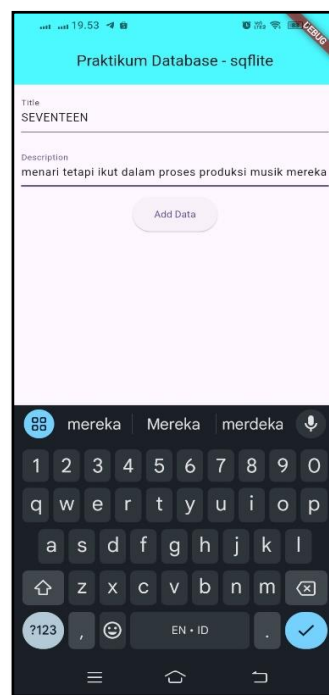
```

■ Hasil Output

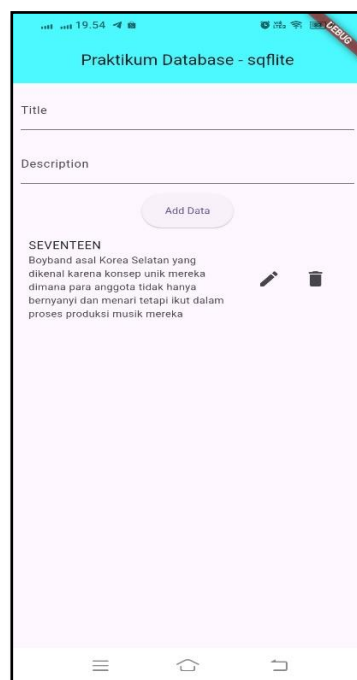
- **Gambar 1** yaitu tampilan awal yang terdiri dari dua field teks untuk memasukkan judul (Title) dan deskripsi (Description) data yang akan disimpan. Kemudian **Gambar 2** yaitu tampilan saat user mengetik title dan description serta **Gambar 3** tampilan user mengklik tombol “Add Data” untuk menyimpan data tersebut, setelah itu data tersebut ditampilkan di bawah formulir dalam font berwarna abu-abu yang menunjukkan bahwa data telah berhasil ditambahkan



Gambar 1

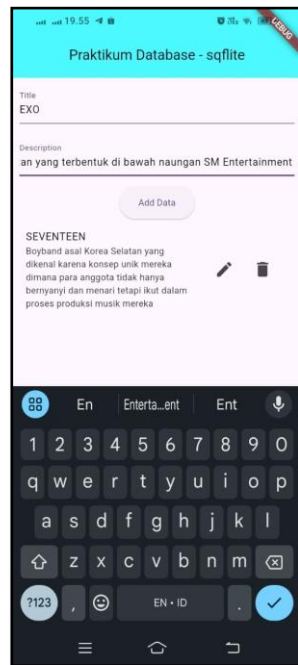


Gambar 2

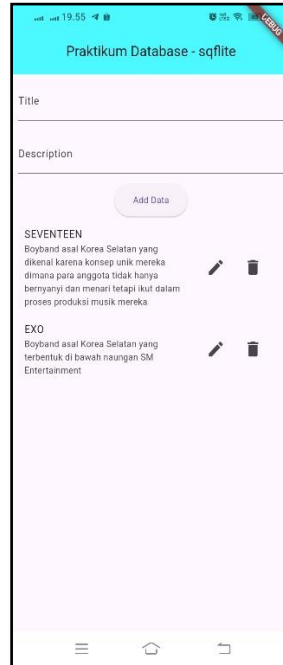


Gambar 3

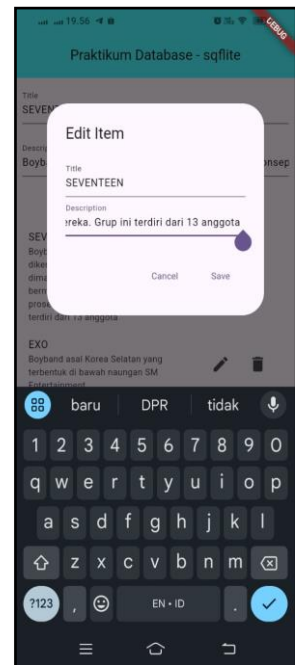
- **Gambar 4** yaitu tampilan user menambah title dan description untuk bagian yang kedua. Kemudian **Gambar 5** tampilan user mengklik tombol “Add Data” untuk menyimpan data, setelah itu data ditampilkan di bawah formulir dalam font berwarna abu-abu sebagai tanda data telah berhasil ditambahkan. Lalu **Gambar 6** user mengklik ikon “pensil” untuk mengedit title dan description yang telah ditambahkan



Gambar 4

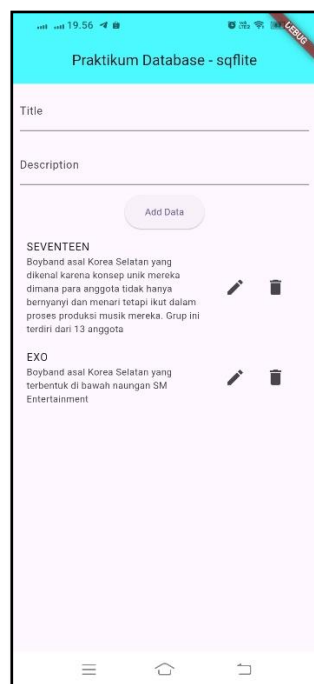


Gambar 5

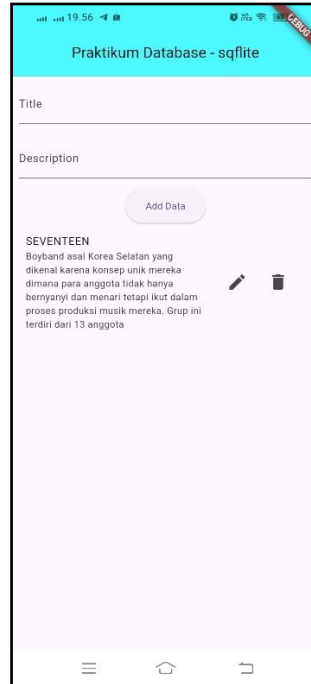


Gambar 6

- **Gambar 7** yaitu tampilan hasil edit yang telah dilakukan dan **Gambar 8** tampilan saat user mengklik ikon tong sampah untuk menghapus salah satu data yang dipilih



Gambar 7

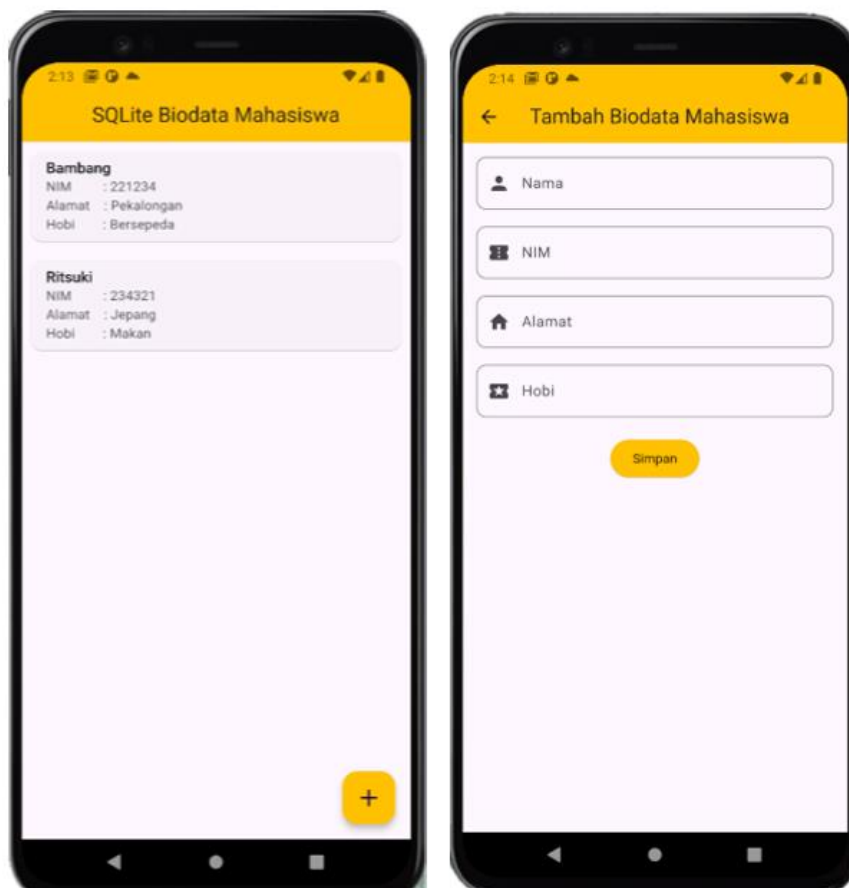


Gambar 8

UNGUIDED

Tugas Mandiri

1. (Soal) Buatlah sebuah project aplikasi Flutter dengan SQLite untuk menyimpan data biodata mahasiswa yang terdiri dari nama, NIM, domisili, dan hobi. Data yang dimasukkan melalui form akan ditampilkan dalam daftar di halaman utama. Alur Aplikasi:
 - a) Form Input: Buat form input untuk menambahkan biodata mahasiswa, dengan kolom:
 - Nama
 - Nim
 - Alamat
 - Hobi
 - b) Tampilkan Daftar Mahasiswa: Setelah data berhasil ditambahkan, tampilkan daftar semua data mahasiswa yang sudah disimpan di halaman utama.
 - c) Implementasikan fitur Create (untuk menyimpan data mahasiswa) dan Read (untuk menampilkan daftar mahasiswa yang sudah disimpan).
 - d) Contoh output:



Note : Jangan lupa sertakan source code, screenshot output, dan deskripsi program. Kreatifitas menjadi nilai tambah.

Jawab :

Source Code :

- main.dart

```
1 import 'package:flutter/material.dart';
2 import 'package:unguided/helper/db_helper.dart';
3 import 'package:unguided/view/add_data.dart';
4
5 void main() {
6   runApp(const MyApp());
7 }
8
9 class MyApp extends StatelessWidget {
10   const MyApp({super.key});
11
12   // This widget is the root of your application.
13
14   @override
15   Widget build(BuildContext context) {
16     return MaterialApp(
17       title: 'Unguided Modul 10',
18       theme: ThemeData(
19         colorScheme: ColorScheme.fromSeed(seedColor: Colors.deepPurple),
20         useMaterial3: true,
21       ),
22       home: MainView(),
23     );
24 }
```

- homepage.dart

```
1 import 'package:flutter/material.dart';
2 import 'package:unguided/helper/db_helper.dart';
3 import 'package:unguided/view/add_data.dart';
4
5 class MainView extends StatelessWidget {
6   const MainView({super.key});
7
8   @override
9   createState() => _MainViewState();
10 }
11
12 class _MainViewState extends State<MainView> {
13   final DatabaseHelper dbHelper = DatabaseHelper();
14   List<Map<String, dynamic>> _dbData = [];
15
16   @override
17   void initState() {
18     refreshData();
19     super.initState();
20   }
21
22   void _refreshData() async {
23     final data = await dbHelper.queryAllRows();
24     setState(() {
25       _dbData = data;
26     });
27   }
28
29   //untuk menghapus data
30   void deleteData(int id) async {
31     await dbHelper.delete(id);
32     _refreshData();
33   }
34
35   //untuk mengedit data
36   void editData(Map<String, dynamic> item) {
37     // Panggil MyDatabaseView dengan mode edit
38     Navigator.push(
39       context,
40       MaterialPageRoute(
41         builder: (context) =>
42           MyDatabaseView(item: item), // kirim data untuk diedit
43       ),
44     ).then((_) {
45       _refreshData(); // Refresh data setelah edit
46     });
47   }
48
49   @override
50   Widget build(BuildContext context) {
51     return Scaffold(
52       appBar: AppBar(
53         title: const Text('Sqlite Modul 10 Mahasiswa'),
54         backgroundColor: const Color.fromARGB(255, 113, 255, 246),
55         centerTitle: true,
56       ),
57       body: _dbData.isEmpty
58         ? Center(
59           child: Text(
60             'Belum ada data mahasiswa yang tersimpan',
61             style: TextStyle(
62               fontSize: 15,
63               color: Colors.grey,
64             ),
65           ),
66         )
67         : ListView.builder(
68           padding: const EdgeInsets.all(8.0),
69           itemCount: _dbData.length,
70           itemBuilder: (context, index) {
71             final item = _dbData[index];
72             return Card(
73               margin: const EdgeInsets.symmetric(vertical: 8),
74               child: ListTile(
75                 title: Text(
76                   item['nama'],
77                   style: const TextStyle(
78                     fontWeight: FontWeight.bold,
79                     fontSize: 18,
80                   ),
81                 ),
82                 subtitle: Column(
83                   crossAxisAlignment: CrossAxisAlignment.start,
84                   children: [
85                     Text('NIK: ${item['nim']}'),
86                     Text('Alamat: ${item['alamat']}'),
87                     Text('Hobi: ${item['hobi']}'),
88                   ],
89                 ),
90                 trailing: Row(
91                   mainAxisAlignment: MainAxisAlignment.min,
92                   children: [
93                     // Icon untuk mengedit
94                     IconButton(
95                       icon: const Icon(Icons.edit),
96                       onPressed: () =>
97                         _editData(item), // Panggil fungsi edit
98                     ),
99                     // Icon untuk menghapus
100                     IconButton(
101                       icon: const Icon(Icons.delete),
102                       onPressed: () => _deleteData(item['id']),
103                     ),
104                   ],
105                 ),
106               ),
107             ),
108             floatingActionButton: FloatingActionButton(
109               onPressed: () async {
110                 await Navigator.push(
111                   context,
112                   MaterialPageRoute(
113                     builder: (context) => MyDatabaseView(),
114                   ),
115                 );
116                 _refreshData();
117               },
118               backgroundColor: const Color.fromARGB(255, 113, 255, 246),
119               child: const Icon(Icons.add),
120             ),
121           ),
122         ),
123       ),
124     );
125 }
```

■ add_biodata.dart

```

1 import 'package:flutter/material.dart';
2 import 'package:unquided/helper/db_helper.dart';
3
4 class MyDatabaseView extends StatefulWidget {
5   final Map<String, dynamic>? item; // Menambahkan parameter item untuk edit
6
7   const MyDatabaseView({super.key, this.item});
8
9   @override
10  State<MyDatabaseView> createState() => _MyDatabaseViewState();
11 }
12
13 class _MyDatabaseViewState extends State<MyDatabaseView> {
14   final DatabaseHelper _dbHelper = DatabaseHelper();
15   final TextEditingController _namaController = TextEditingController();
16   final TextEditingController _nimController = TextEditingController();
17   final TextEditingController _alamatController = TextEditingController();
18   final TextEditingController _hobiController = TextEditingController();
19
20   @override
21   void initState() {
22     super.initState();
23     if (widget.item != null) {
24       // Jika data ada (edit mode), masukkan data ke dalam controller
25       _namaController.text = widget.item!['nama'] ?? '';
26       _nimController.text = widget.item!['nim'] ?? '';
27       _alamatController.text = widget.item!['alamat'] ?? '';
28       _hobiController.text = widget.item!['hobi'] ?? '';
29     }
30   }
31
32   @override
33   void dispose() {
34     _namaController.dispose();
35     _nimController.dispose();
36     _alamatController.dispose();
37     _hobiController.dispose();
38     super.dispose();
39   }
40
41   void saveData() async {
42     if (_namaController.text.isEmpty ||
43         _nimController.text.isEmpty ||
44         _alamatController.text.isEmpty ||
45         _hobiController.text.isEmpty) {
46       _showSnackBar('Semua kolom harus diisi!');
47       return;
48     }
49
50     if (widget.item == null) {
51       // Jika item null berarti tambah data
52       await _dbHelper.insert({
53         'nama': _namaController.text,
54         'nim': _nimController.text,
55         'alamat': _alamatController.text,
56         'hobi': _hobiController.text,
57       });
58     } else {
59       // Jika item tidak null berarti edit data
60       await _dbHelper.update({
61         'id': widget.item!['id'],
62         'nama': _namaController.text,
63         'nim': _nimController.text,
64         'alamat': _alamatController.text,
65         'hobi': _hobiController.text,
66       });
67     }
68
69     Navigator.pop(context);
70   }
71
72   void _showSnackBar(String message) {
73     ScaffoldMessenger.of(context)
74       .showSnackBar(SnackBar(content: Text(message)));
75   }
76
77   // Mendefinisikan fungsi buildText
78   Widget buildTextField({
79     required TextEditingController controller,
80     required String label,
81     required IconData icon,
82   }) {
83     return TextField(
84       controller: controller,
85       decoration: InputDecoration(
86         labelText: label,
87         prefixIcon: Icon(icon),
88         border: OutlineInputBorder(),
89       ),
90     );
91   }
92
93   @override
94   Widget build(BuildContext context) {
95     return Scaffold(
96       appBar: AppBar(
97         title: text(widget.item == null
98           ? 'Tambah Biodata Mahasiswa'
99           : 'Edit Biodata Mahasiswa'),
100       backgroundColor: const Color.fromARGB(255, 113, 255, 246),
101       centerTitle: true,
102     ),
103     body: Padding(
104       padding: const EdgeInsets.all(8.0),
105       child: Column(
106         children: [
107           buildTextField(
108             controller: _namaController,
109             label: 'Nama',
110             icon: Icons.person,
111           ),
112           const SizedBox(height: 16),
113           buildTextField(
114             controller: _nimController,
115             label: 'NIM',
116             icon: Icons.book.outlined,
117           ),
118           const SizedBox(height: 16),
119           buildTextField(
120             controller: _alamatController,
121             label: 'Alamat',
122             icon: Icons.home,
123           ),
124           const SizedBox(height: 16),
125           buildTextField(
126             controller: _hobiController,
127             label: 'Hobi',
128             icon: Icons.local_activity,
129           ),
130           const SizedBox(height: 16),
131           ElevatedButton(
132             onPressed: _saveData,
133             child: const Text(
134               'Simpan',
135             ),
136             style: TextStyle(fontSize: 16),
137             style: ElevatedButton.styleFrom(
138               backgroundColor: const Color.fromARGB(255, 113, 255, 246),
139             ),
140           ),
141         ],
142       ),
143     );
144   }
145 }
146
```

- db_helper.dart

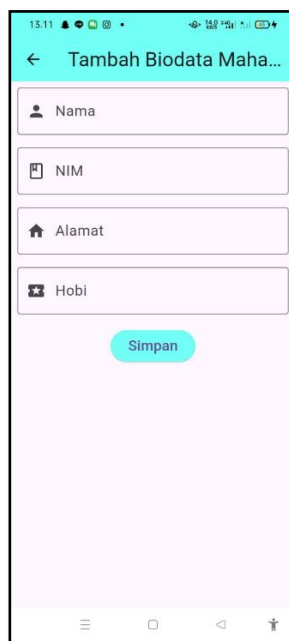
```
1 import 'package:sqflite/sqflite.dart';
2 import 'package:path/path.dart';
3
4 //Kelas database untuk mengelola database
5 class DatabaseHelper {
6   static final DatabaseHelper _instance = DatabaseHelper._internal();
7   static Database? _database;
8
9   // factory constructor untuk mengembalikan instance singletonce
10  factory DatabaseHelper() {
11    return _instance;
12  }
13
14  // Private constructor
15  DatabaseHelper._internal();
16
17  //Getter untuk database
18  Future<Database> get database async {
19    if (_database != null) return _database!;
20    {
21      _database = await _initDatabase();
22      return _database!;
23    }
24  }
25
26  //Inisialisasi database
27  Future<Database> _initDatabase() async {
28    // mendapatkan path untuk database
29    String path = join(await getDatabasesPath(), 'my_prakdatabase.db');
30    // membuka database
31    return await openDatabase(
32      path,
33      version: 2,
34      onCreate: _onCreate,
35      // Tambahkan ini untuk menangani upgrade
36      onUpgrade: _onUpgrade,
37    );
38  }
39
40  //Membuat tabel db dengan record dan value id, nama, nim
41  Future<void> _onCreate(Database db, int version) async {
42    await db.execute('''
43    CREATE TABLE my_table(
44      id INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
45      nama TEXT,
46      nim TEXT,
47      alamat TEXT,
48      hobi TEXT,
49      createdAt TIMESTAMP NOT NULL DEFAULT CURRENT_TIMESTAMP)
50    ''');
51  }
52
53  Future<void> _onUpgrade(Database db, int oldVersion, int newVersion) async {
54    if (oldVersion < 2) {
55      // Tambahkan kolom alamat dan hobi jika belum ada
56      await db.execute('ALTER TABLE my_table ADD COLUMN alamat TEXT');
57      await db.execute('ALTER TABLE my_table ADD COLUMN hobi TEXT');
58    }
59  }
60
61  // metode untuk mengambil semua data dari tabel
62  Future<int> insert(Map<String, dynamic> row) async {
63    Database db = await database;
64    return await db.insert('my_table', row);
65  }
66
67  // metode untuk memperbarui data dalam tabel
68  Future<int> update(Map<String, dynamic> row) async {
69    Database db = await database;
70    int id = row['id'];
71    return await db.update('my_table', row, where: 'id = ?', whereArgs: [id]);
72  }
73
74  // metode untuk menghapus data dari tabel
75  Future<int> delete(int id) async {
76    Database db = await database;
77    return await db.delete('my_table', where: 'id = ?', whereArgs: [id]);
78  }
79
80  //Membaca semua data
81  Future<List<Map<String, dynamic>>> queryAllRows() async {
82    Database db = await database;
83    return await db.query('my_table');
84  }
85 }
```

Screenshot Output :

- **Gambar 1** yaitu tampilan utama dari program ketika belum ada inputan dari user. Kemudian **Gambar 2** tampilan user mengklik tombol "+" untuk menambahkan data mahasiswa, sehingga nanti akan ditampilkan form "Tambah Biodata Mahasiswa". **Gambar 3** tampilan saat pengguna sedang mengetik/mengisi formulir biodata kemudian mengklik tombol "simpan".



Gambar 1

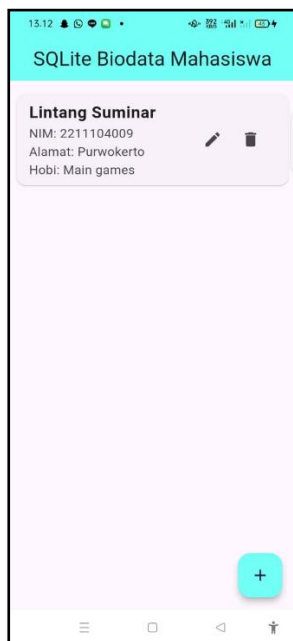


Gambar 2



Gambar 3

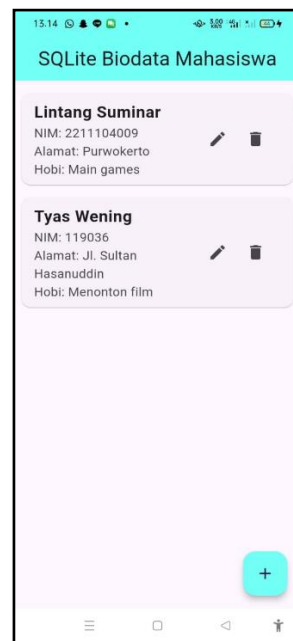
- **Gambar 4** yaitu tampilan halaman utama yang akan menampilkan data informasi mahasiswa yang baru saja ditambahkan. Kemudian **Gambar 5** tampilan ketika user ingin menambahkan lagi biodata baru. Lalu **Gambar 6** tampilan halaman utama yang menampilkan data informasi mahasiswa yang baru saja ditambahkan lagi.



Gambar 4



Gambar 5



Gambar 6

- **Gambar 7** yaitu tampilan ketika user dapat mengedit data dengan mengklik ikon “pensil”, misalnya user ingin merubah atau memperbaharui data seperti user memperbaharui bagian hobi yang awalnya ”menonton film” terus diedit menjadi ”menonton film action & animation” lalu klik ”simpan”. **Gambar 8** tampilan halaman daftar biodata mahasiswa telah berhasil diperbarui. Setelah itu **Gambar 9** yaitu tampilan saat user dengan mengklik ikon tempat sampah maka data mahasiswa tersebut telah dihapus

Gambar 7

Gambar 8

Gambar 9

- Note: **Gambar 10** tampilan ketika user tidak mengisi semua data ataupun 1 kolom tidak diisi maka ada notif dibagian bawah tampil dengan pesan ”Semua kolom harus diisi!”

Gambar 10

Deskripsi Program :

Kode ini adalah struktur dasar aplikasi Flutter yang pakai Material Design dan SQLite buat mengelola biodata mahasiswa. Aplikasinya mulai dari fungsi main(), yang manggil widget MyApp. Di sini kita mengatur judul, tema, dan halaman utamanya, yaitu MainView. Di halaman utama, data mahasiswa diambil dari database melalui DatabaseHelper. Ada fitur buat hapus atau edit data, terus biodata mahasiswa ditampilin dalam bentuk kartu. Kalau mau nambah data baru, tinggal klik ikon “pensil” yang langsung buka halaman MyDatabaseView. Halaman ini mendukung operasi CRUD, kayak menambah, mengedit, atau hapus data, plus otomatis update tampilan setelah ada perubahan. Di halaman MyDatabaseView, kita bisa nambah atau edit biodata mahasiswa. Inputnya juga divalidasi. Kemudian fungsi saveData menambah atau update data tergantung parameternya. Sementara itu, DatabaseHelper bertugas mengatur semua operasi SQLite. Pakai pola singleton biar efisien, mulai dari inisialisasi database, bikin tabel, sampai perubahan. Semua metode CRUD di sini dibuat supaya interaksi sama database, memastikan pengelolaan datanya tetep rapi.