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# **Sqlcool Documentation**

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**synw**

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# Crud operations

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The objectives of this lib is to provide a simple api while staying close to sql.



# CHAPTER 1

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## Schema definition

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### 1.1 Columns

```
DbTable category = DbTable("category")..varchar("name", unique: true);
DbTable product = DbTable("product")
    ..varchar("name", unique: true)
    ..integer("price")
    ..real("number")
    ..boolean("bool", defaultValue: true)
    ..text("description")
    ..blob("blob")
    ..timestamp()
    ..foreignKey("category", onDelete: OnDelete.CASCADE);
```

Parameters for the column constructors:

**name** *String* the name of the column

Optional parameters:

**unique** *bool* if the column must be unique

**nullable** *bool* if the column can be null

**defaultValue** *dynamic* (depending on the row type: integer if the row is integer for example) the default value of a column

**check** *String* a check constraint: ex:

```
DbTable("table")..integer("intname", check="intname>0");
```

Note: the foreignKey must be placed after the other fields definitions

Create an index on a column:

```
DbTable("table")
..varchar("name")
..index("name");
```

Unique together constraint:

```
DbTable("table")
..varchar("name")
..integer("number")
..uniqueTogether("name", "number");
```

## 1.2 Methods

Initialize the database with a schema:

```
db.init(path: "mydb.sqlite", schema: <DbTable>[category, product]);
```

Check if the database has a schema:

```
final bool hasSchema = db.hasSchema() // true or false;
```

Get a table schema:

```
final DbTable productSchema = db.schema.table("product");
```

Check if a table is in the schema:

```
final bool tableExists = db.schema.hasTable("product");
```

Check if a table has a column:

```
final bool columnExists = db.schema.table("product").hasColumn("name");
```

# CHAPTER 2

## Initialize database

### 2.1 Initialize an empty database

```
import 'package:sqlcool/sqlcool.dart';

Db db = Db();

// either use the schema definition constructor
// or define the tables by hand
void myInit() {
    String q1 = """CREATE TABLE category (
        id INTEGER PRIMARY KEY,
        name TEXT NOT NULL
    )""";
    String q2 = """CREATE TABLE product (
        id INTEGER PRIMARY KEY,
        name TEXT NOT NULL,
        price REAL NOT NULL,
        category_id INTEGER,
        CONSTRAINT category
            FOREIGN KEY (category_id)
            REFERENCES category(id)
            ON DELETE CASCADE
    )""";
    // the path is relative to the documents directory
    String dbpath = "data.sqlite";
    List<String> queries = [q1, q2];
    db.init(path: dbpath, queries: queries, verbose: true).catchError((e) {
        throw("Error initializing the database: $e");
    });
}

void main() {
    /// initialize the database async. Use the [onReady]
```

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```

/// callback later to react to the initialization completed event
myInit();
runApp(MyApp());
}

// then later check if the database is ready

@Override
void initState() {
    db.onReady.then((_) {
        setState(() {
            print("STATE: THE DATABASE IS READY");
        });
    });
super.initState();
}

```

Required parameters for init:

**path** *String* path where the database file will be stored: relative to the documents directory path

Optional parameter:

**sqfliteDatabase** *Database* an optional existing Sqflite database

**queries** *List<String>* queries to run at database creation

**fromAsset** *String* path to the Sqlite asset file, relative to the documents directory

**absolutePath** *bool* if *true* the provided path will not be relative to the documents directory and taken as absolute :verbose: *bool* true or false

The database is created in the documents directory. The create table queries will run once on database file creation.

## 2.2 Initialize a database from an Sqlite asset file

```

void main() {
    String dbpath = "data.sqlite";
    db.init(path: dbpath, fromAsset: "assets/data.sqlite", verbose: true).
    ↪catchError((e) {
        print("Error initializing the database; $e");
    });
}

```

## 2.3 Multiple databases

```

import 'package:sqlcool/sqlcool.dart';

void main() {
    db1 = Db();
    db2 = Db();
    // ...
}

```

## 2.4 Verbosity

The `Db` methods have a `verbose` option that will print the query. To get more detailed information and queries results you can activate the Sqflite debug mode:

```
db.init(path: dbpath, queries: [q], debug: true);
```



# CHAPTER 3

## Database operations

### 3.1 Insert

```
import 'package:sqlcool/sqlcool.dart';

Map<String, String> row = {
  slug: "my-item",
  name: "My item",
}
await db.insert(table: "category", row: row, verbose: true);
```

Required parameters:

**table** *String* name of the table, required

**row** *Map<String, String>* data, required

Optional parameter:

**verbose** *bool* true or false

### 3.2 Select

```
import 'package:sqlcool/sqlcool.dart';

List<Map<String, dynamic>> rows =
  await db.select(table: "product", limit: 20, where: "name LIKE '%something%'",  
  orderBy: "price ASC");
```

Required parameter:

**table** *String* name of the table, required

Optional parameters:

**columns** *String* the columns to select: default is “\*”  
**where** *String* the where sql clause  
**orderBy** *String* the sql order by clause  
**groupBy** *String* the sql group by clause  
**limit** *int* the sql limit clause  
**offset** *int* the sql offset clause  
**verbose** *bool* true or false

### 3.3 Update

```
import 'package:sqlcool/sqlcool.dart';

Map<String, String> row = {
    slug: "my-item-new",
    name: "My item new",
}
int updated = await db.update(table: "category", row: row, where: "id=1", verbose: true);
```

Required parameters:

**table** *String* name of the table, required  
**row** *Map<String, String>* data, required

Optional parameters:

**where** *String* the where sql clause  
**verbose** *bool* true or false

### 3.4 Delete

```
import 'package:sqlcool/sqlcool.dart';

await db.delete(table: "category", where: "id=1");
```

Required parameters:

**table** *String* name of the table, required  
**where** *String* the where sql clause

Optional parameter:

**verbose** *bool* true or false

### 3.5 Upsert

```

import 'package:sqlcool/sqlcool.dart';

Map<String, String> row = {
  slug: "my-item",
  name: "My item",
}
await db.upsert(
  table: "product",
  row: row,
  preserveRow: "category",
  indexColumn: "id"
);

```

Required parameters:

**table** *String* name of the table, required

**row** *Map<String, String>* data, required

Optionnal parameters:

**preserveColumns** *List<String>* a list of columns to preserve,

the data in these columns will not be updated. Note: the *indexColumn* parameter is required when using this method (used to retrieve the existing data). *:indexColumn: String* the reference index column use to retrieve existing data in case of preserve *:verbose: bool* true or false

## 3.6 Join

```

import 'package:sqlcool/sqlcool.dart';

List<Map<String, dynamic>> rows = await db.join(
  table: "product", offset: 10, limit: 20,
  columns: "id, name, price, category.name as category_name",
  joinTable: "category",
  joinOn: "product.category=category.id");

```

Required parameter:

**table** *String* name of the table, required

Optional parameters:

**columns** *String* the select sql clause

**where** *String* the where sql clause

**joinTable** *String* join table name

**joinOn** *String* join on sql clause

**orderBy** *String* the sql order by clause

**groupBy** *String* the sql group by clause

**limit** *int* the sql limit clause

**offset** *int* the sql offset clause

**verbose** *bool* true or false

## 3.7 Exists

```
import 'package:sqlcool/sqlcool.dart';

bool exists = await db.exists(table: "category", "id=3");
```

Required parameters:

**table** *String* name of the table, required  
**where** *String* the where sql clause

## 3.8 Raw query

```
import 'package:sqlcool/sqlcool.dart';

List<Map<String, dynamic>> result = await db.query("SELECT * FROM mytable");
```

Required parameters:

**query** *String* the sql query, required  
**verbose** *bool* true or false

# CHAPTER 4

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## Batch insert

---

```
import 'package:sqflite/sqlflite.dart';
import 'package:sqlcool/sqlcool.dart';

var rows = <Map<String, String>>[{"name": "one"}, {"name": "two"}];

await db.batchInsert(
    table: "item",
    rows: rows,
    configAlgorithm: ConflictAlgorithm.replace)
```



# CHAPTER 5

## Using the bloc pattern for select

A *SelectBloc* is available to use the bloc pattern.

### 5.1 Select bloc

```
import 'package:flutter/material.dart';
import 'package:sqlcool/sqlcool.dart';

class _PageSelectBlocState extends State<PageSelectBloc> {
    SelectBloc bloc;

    @override
    void initState() {
        super.initState();
        this.bloc = SelectBloc(
            table: "items", orderBy: "name", verbose: true);
    }

    @override
    Widget build(BuildContext context) {
        return Scaffold(
            appBar: AppBar(
                title: Text("My app"),
            ),
            body: StreamBuilder<List<Map>>(
                stream: bloc.items,
                builder: (BuildContext context, AsyncSnapshot snapshot) {
                    if (snapshot.hasData) {
                        // the select query has not found anything
                        if (snapshot.data.length == 0) {
                            return Center(
                                child: Text(
                                    "No data. Use the + in the navbar to insert an item"),
                        );
                    }
                }
            )
        );
    }
}
```

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```

        );
    }
    // the select query has results
    return ListView.builder(
        itemCount: snapshot.data.length,
        itemBuilder: (BuildContext context, int index) {
            var item = snapshot.data[index];
            return ListTile(
                title: GestureDetector(
                    child: Text(item["name"]),
                    onTap: () => print("Action"),
                ),
            );
        });
    } else {
        // the select query is still running
        return CircularProgressIndicator();
    }
),
);
}
}

class PageSelectBloc extends StatefulWidget {
@override
_PageSelectBlocState createState() => _PageSelectBlocState();
}

```

SelectBloc class:

Required parameter:

**table** String name of the table, required

Optional parameters:

**select** String the select sql clause

**where** String the where sql clause

**joinTable** String join table name

**joinOn** String join on sql clause

**orderBy** String the sql order\_by clause

**limit** int the sql limit clause

**offset** int the sql offset clause

**reactive** bool if true the select bloc will react to database changes. Defaults to *false*

**verbose** bool true or false

**database** Db the database to use: default is the default database

## 5.2 Join queries

```
@override
void initState() {
    super.initState();
    this.bloc = SelectBloc(table: "product", offset: 10, limit: 20,
        select: "id, name, price, category.name as category_name",
        joinTable: "category",
        joinOn: "product.category=category.id");
}
```



# CHAPTER 6

## Reactivity

### 6.1 Changefeed

A changefeed is available (inspired by [Rethinkdb](#)). It's a stream that will notify about any change in the database.

```
import 'dart:async';
import 'package:flutter/material.dart';
import 'package:sqlcool/sqlcool.dart';
import 'dialogs.dart';

class _PageState extends State<Page> {
  StreamSubscription _changefeed;

  @override
  void initState() {
    _changefeed = db.changefeed.listen((change) {
      print("CHANGE IN THE DATABASE:");
      print("Change type: ${change.type}");
      print("Number of items impacted: ${change.value}");
      print("Query: ${change.query}");
      if (change.type == DatabaseChange.update) {
        print("${change.value} items updated");
      }
    });
    super.initState();
  }

  @override
  void dispose() {
    _changefeed.cancel();
    super.dispose();
  }

  // ...
}
```

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```
}
```

```
class Page extends StatefulWidget {
  @override
  _PageState createState() => _PageState();
}
```

## 6.2 Reactive select bloc

A SelectBloc can take a reactive parameter. If it is true the bloc will automatically rebuild itself on any database change

Check the [example](#) for usage demo.

## Declare the model

---

It is possible to use a mixin to extend a custom model and give it database interaction methods. This way when querying the database no deserializing and type casts are needed: only model objects are used

### 7.1 Extend with DbModel

```
class Car with DbModel {  
    String name;  
    double price;  
}
```

### 7.2 Override getters

```
class Car with DbModel {  
    @override  
    int id;  
  
    @override  
    Db get db => conf.db;  
  
    @override  
    DbTable get table => carTable;  
}
```

conf.db is the Db object used. carTable is the car table schema

## 7.3 Declare a schema

```
final carTable = DbTable("car")
..varchar("name")
..integer("max_speed")
..real("price")
..integer("year")
..boolean("is_4wd", defaultValue: false);
```

Include this schema in your database initialization call:

```
db.init(path: "db.sqlite", schema: <DbTable>[carTable]);
```

## 7.4 Define serializers

The `toDb` serializer and `fromDb` deserializer must be defined

```
class Car with DbModel {
  @override
  Map<String, dynamic> toDb() {
    final row = <String, dynamic>{
      "name": name,
      "max_speed": maxSpeed,
      "price": price,
      "year": year.millisecondsSinceEpoch,
      "is_4wd": is4wd,
      "manufacturer": manufacturer.id
    };
    return row;
  }

  @override
  Car fromDb(Map<String, dynamic> map) {
    final car = Car(
      id: map["id"] as int,
      name: map["name"].toString(),
      maxSpeed: map["max_speed"] as int,
      price: map["price"] as double,
      year: DateTime.fromMillisecondsSinceEpoch(map["year"] as int),
      is4wd: (map["is_4wd"].toString() == "true"),
    );
    return car;
  }
}
```

# CHAPTER 8

---

## Data mutations

---

Once properly declared the model can be modified in the database

### 8.1 Insert

```
final Car car = Car(name: "My car", price: 25000.0);
car.sqlInsert();
```

### 8.2 Update

```
car.price = 23000.0;
car.sqlUpdate();
```

### 8.3 Upsert

```
car.name = "My new car name";
car.sqlUpsert();
```

### 8.4 Delete

```
car.sqlDelete();
```

The query parameters are the same than for regular queries: check the database operations section for details



# CHAPTER 9

---

## Select operations

---

The select calls are done via an instance of the model. The recommended method is to define some select static methods in your model:

```
class Car with DbModel {  
    static Future<List<Car>> select({String where, int limit}) async {  
        final cars = List<Car>.from(  
            await Car().sqlSelect(where: where, limit: limit));  
        return cars;  
    }  
}
```

And then use it:

```
List<Car> cars = await Car.select(where: "price<50000");
```



# CHAPTER 10

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## Foreign keys support

---

The database models support foreign keys. Example: create a foreign key model:

```
class Manufacturer with DbModel {
    Manufacturer({this.name});

    final String name;

    @override
    int id;

    @override
    Db get db => conf.db;

    @override
    DbTable get table => manufacturerTable;

    @override
    Map<String, dynamic> toDb() => <String, dynamic>{ "name": name};

    @override
    Manufacturer fromDb(Map<String, dynamic> map) =>
        Manufacturer(name: map["name"].toString());
}
```

To set a foreign key mention it in your table schema:

```
final carTable = DbTable("car")
..varchar("name")
..real("price")
..foreign_key("manufacturer");
```

Update the serializers in the main model to use the foreign key:

```
class Car with DbModel {
    @override
    Map<String, dynamic> toDb() {
        final row = <String, dynamic>{
            // ...
            "manufacturer": manufacturer.id
        };
        return row;
    }

    @override
    Car fromDb(Map<String, dynamic> map) {
        final car = Car(
            // ...
        );
        // the key will be present only with join queries
        // in a simple select this data is not present
        if (map.containsKey("manufacturer")) {
            car.manufacturer =
                Manufacturer().fromDb(map["manufacturer"] as Map<String, dynamic>);
        }
        return car;
    }
}
```

To perform a join query:

```
class Car with DbModel {
    static Future<List<Car>> selectRelated({String where, int limit}) async {
        final cars = List<Car>.from(
            await Car().sqlJoin(where: where, limit: limit));
        return cars;
    }
}
```

And then use it:

```
List<Car> cars = await Car.selectRelated(where: "price<50000");
print(cars[0].manufacturer.name);
```

# CHAPTER 11

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## Indices and tables

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- genindex
- modindex
- search