SQL1

SQL and Database Management Systems (DBMS)

A DBMS is a collection of programs that enables users to create and

maintain a database, also provide interface for programming languages to interact with database.

Examples of DBMSs, include:

- SQLite
- MariaDB
- MySQL

SQL

> Although SQL is a standard, it is not supported *exactly* the same way by all DBMSs.

SQL Sublanguages

- Data Definition Language (DDL)
- Data Manipulation Language (DML)
- Data Control Language (DCL)

SQL CREATE

```
create table Student (
   ...> sID INTEGER not null primary key,
   ...> sNAME varchar(50) not null,
   ...> sAddress varchar(255),
   ...> sYear integer default 1
   ...> );
```

Constrain

```
constrain pk_student primary key (SID)

sID Integer primary key

//have the same function
```

- **PRIMARY KEY**
  - Primary keys cannot be NULL
  - Primary keys must be unique
  - Primary keys will typically add NOT NULL and UNIQUE constraints
- **UNIQUE**
  - UNIQUE constraints can be NULL
  - UNIQUE constraints must be unique

• This has the same effect as a primary key constraint, except that the column(s) can contain NULL values

• This effectively creates a candidate key for the table

- NOT NULL

Data Types

Data Type	Description	Example
INTEGER	Integer value	1, 2, 3
REAL	Floating point value	1.0, 2.0, 3.0
CHAR	Fixed length string	'a', 'b', 'c'
VARCHAR or TEXT	Variable length string	'a', 'ab', 'abc'
DATE	Date value	'2018-10-01'

Foreign keys

```
    FOREIGN KEY (mCode)
        REFERENCES Module (mCode)
```

add referential integrity constrains

```
CONSTRAINT en_fk1
FOREIGN KEY (sID) REFERENCES Student(sID)
ON UPDATE CASCADE
ON DELETE CASCADE,
CONSTRAINT en_fk2
FOREIGN KEY (mCode) REFERENCES Module(mCode)
ON UPDATE CASCADE
ON DELETE CASCADE
```

- RESTRICT: The database will not allow the update or delete to proceed if it would break referential integrity
- CASCADE: The database will update/delete related rows in the other table
- SET NULL: The database will set the foreign key to NULL in the related row in the other table

> using
>
> ```
> PRAGMA foreign_keys = ON;
> ```
>
> to use foreign key constrains

Deleting Tables (DROP)

```
DROP TABLE [IF EXISTS] table-name;

DROP TABLE IF EXISTS Student; # example
```

SQLite Dot Commands

The most useful commands are:

- .help - Display a list of commands
- .tables - Display a list of tables
- .import - Import data from a file into a table
- .read - Execute commands from a file
- .schema - Display the schema of a table
- .quit - Exit the command line tool