

DDL & DML

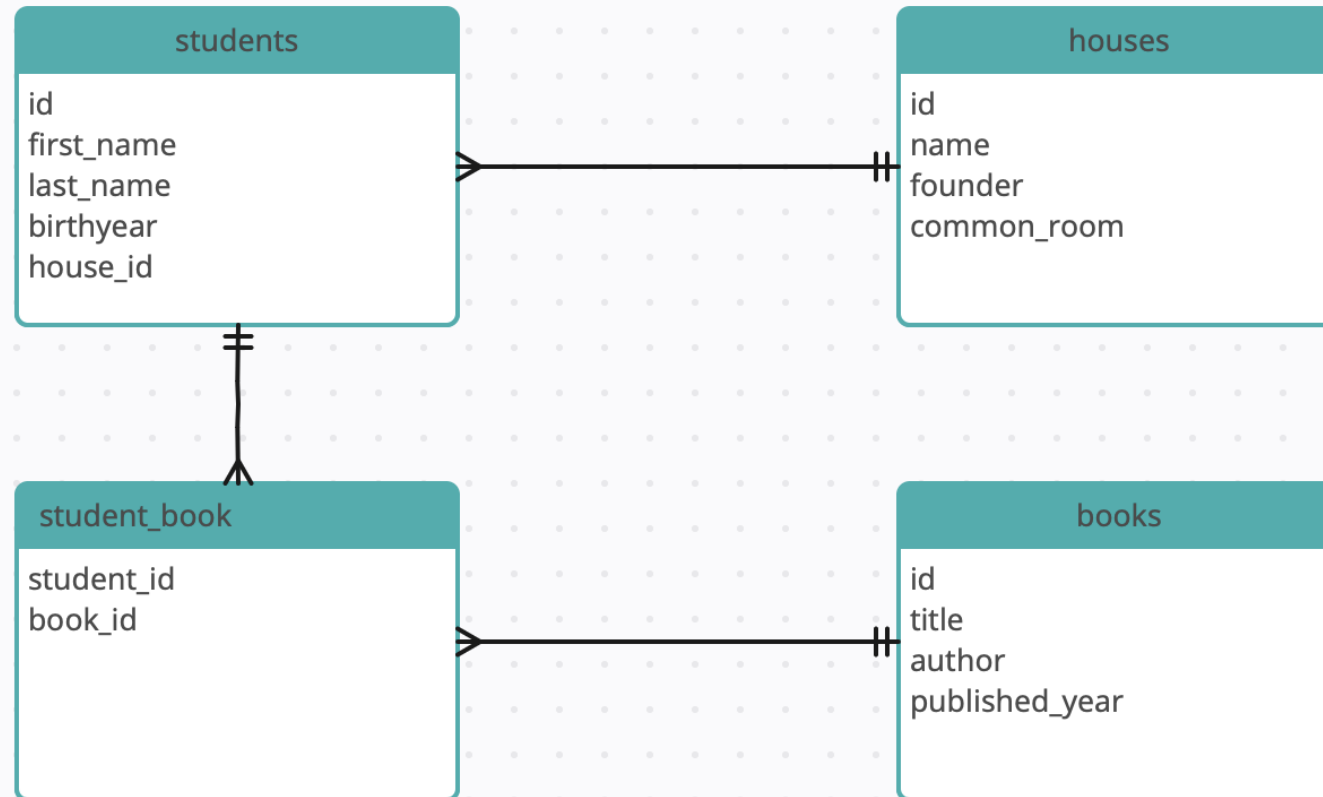
DDL: Data Definition Language

- CREATE TABLE
- ALTER TABLE
- DROP TABLE

DML: Data Manipulation Language

- INSERT INTO
- UPDATE
- DELETE FROM

Expanding the Harry Potter database



Create a new table

```
CREATE TABLE books (  
  id numeric,  
  title text,  
  author text,  
  published_year numeric,  
  PRIMARY KEY (id)  
);
```

Data types

numeric

- int
- float

...

text

- varchar(n)
- text

...

<https://www.sqlite.org/datatype3.html>

Constraints to limit what values can be inserted into column

- `primary key`
- `foreign key`
- `not null`
- `unique`
- `check(exp)`
- ...

https://www.sqlite.org/lang_createtable.html

INSERT INTO table

```
INSERT INTO books  
VALUES (1, 'Harry Potter and the Sorcerer's Stone', 'J.K. Rowling', 1997);
```

```
INSERT INTO books (id, title, author, published_year)  
VALUES (1, 'Harry Potter and the Sorcerer's Stone', 'J.K. Rowling', 1997);
```

```
INSERT INTO books (id, title, author, published_year)  
VALUES  
    (1, 'Harry Potter and the Sorcerer's Stone', 'J.K. Rowling', 1997),  
    (2, ...),  
    (3, ...);
```


Write SQL script to create and populate tables

```
CREATE TABLE books (  
    id int,  
    title text,  
    author text,  
    published_year int,  
    PRIMARY KEY (id)  
);  
CREATE TABLE student_book (  
    student_id int,  
    book_id int,  
    PRIMARY KEY (student_id, book_id),  
    FOREIGN KEY (student_id) REFERENCES students(id),  
    FOREIGN KEY (book_id) REFERENCES books(id)  
);
```

Insert data into tables

```
INSERT INTO books (id, title, author, published_year) VALUES
(201, 'Harry Potter and the Philosopher''s Stone', 'J.K. Rowling', 1997),
(202, 'Harry Potter and the Chamber of Secrets', 'J.K. Rowling', 1998),
(203, 'Harry Potter and the Prisoner of Azkaban', 'J.K. Rowling', 1999),
(204, 'Harry Potter and the Goblet of Fire', 'J.K. Rowling', 2000),
(205, 'Harry Potter and the Order of the Phoenix', 'J.K. Rowling', 2003),
(206, 'Harry Potter and the Half-Blood Prince', 'J.K. Rowling', 2005),
(207, 'Harry Potter and the Deathly Hallows', 'J.K. Rowling', 2007);
```

```
INSERT INTO student_book (student_id, book_id)
VALUES
(101, 201), (101, 202), (101, 203), (102, 201), (102, 203),
(102, 204), (103, 201), (103, 204), (104, 202), (104, 205),
(105, 203), (105, 206), (106, 201), (106, 203), (106, 207),
(107, 205), (107, 206), (108, 204), (108, 206), (109, 203),
(109, 207), (110, 205), (111, 204), (112, 201), (113, 203),
(114, 202), (115, 205), (116, 204), (117, 201), (118, 202);
```



Add Movies table to Harry Potter database

- table name: `movies`
- columns:
 - `id` int
 - `title` text
 - `director` text
 - `year` int
- primary key: `id`



Insert data into Movies table

```
1, 'Harry Potter and the Sorcerer''s Stone', 'Chris Columbus', 2001
2, 'Harry Potter and the Chamber of Secrets', 'Chris Columbus', 2002
3, 'Harry Potter and the Prisoner of Azkaban', 'Alfonso Cuarón', 2004
4, 'Harry Potter and the Goblet of Fire', 'Mike Newell', 2005
5, 'Harry Potter and the Order of the Phoenix', 'David Yates', 2007
6, 'Harry Potter and the Half-Blood Prince', 'David Yates', 2009
7, 'Harry Potter and the Deathly Hallows – Part 1', 'David Yates', 2010
8, 'Harry Potter and the Deathly Hallows – Part 2', 'David Yates', 2011
```



Add a new column to the Movies table (solution)

```
create table movies (  
    id int,  
    title text,  
    director text,  
    year int,  
    primary key (id)  
);  
insert into movies  
values  
    (1, 'Harry Potter and the Sorcerer's Stone', 'Chris Columbus', 2001),  
    (2, 'Harry Potter and the Chamber of Secrets', 'Chris Columbus', 2002),  
    (3, 'Harry Potter and the Prisoner of Azkaban', 'Alfonso Cuarón', 2004),  
    (4, 'Harry Potter and the Goblet of Fire', 'Mike Newell', 2005),  
    (5, 'Harry Potter and the Order of the Phoenix', 'David Yates', 2007),  
    (6, 'Harry Potter and the Half-Blood Prince', 'David Yates', 2009),  
    (7, 'Harry Potter and the Deathly Hallows – Part 1', 'David Yates', 2010),  
    (8, 'Harry Potter and the Deathly Hallows – Part 2', 'David Yates', 2011);
```

DDL: ALTER TABLE

- add columns

```
ALTER TABLE mytable  
ADD column DataType OptionalTableConstraint  
    DEFAULT default_value;
```

- remove columns

```
ALTER TABLE mytable  
DROP column_name;
```

- rename the table

```
ALTER TABLE mytable  
RENAME TO new_table_name;
```

DDL: DROP TABLE

```
DROP TABLE mytable;  
DROP TABLE IF EXISTS mytable;
```


DML: **UPDATE** table

```
UPDATE books  
SET published_year = 1998  
WHERE id = 1;
```

DML: **DELETE FROM** **table**

```
DELETE FROM books  
WHERE id = 1;
```

1. remove director column from the movies table
2. add a new column `director_id` to the movies table
3. delete the movie with id 1 from the movies table
4. update the year of the movie with id 2 to 2003
5. drop the movies table