

# Database System Tutorial 2

You've started a new movie-rating website, and you've been collecting data on reviewers' ratings of various movies. There's not much data yet, but you can still try out some interesting queries.

## Schema

You can download the database files from the following links:

- Download `lab2.db` – This is the database file. If you need a ready-to-use database, you can directly use this file.
- Download `rating.sql` – This SQL script contains the commands to create the database from scratch. If you prefer to generate the database yourself, use this script.

The database consists of the following tables:

- **Movie** ( `mID`, `title`, `year`, `director` )  
Represents a movie with a unique ID (`mID`), a title, a release year, and a director.
- **Reviewer** ( `rID`, `name` )  
Represents a reviewer with a unique ID (`rID`) and a name.
- **Rating** ( `rID`, `mID`, `stars`, `ratingDate` )  
Represents a review where a reviewer (`rID`) gives a movie (`mID`) a star rating (1-5) on a specific date (`ratingDate`).

## Task

Your task is to write SQL queries to retrieve information from a sample dataset based on this schema.

## Instructions

For each problem, write an SQL query that answers the given question. Compare your query's output with the provided expected results to verify its correctness.

## Important Notes

- Your queries are executed using SQLite, so you must conform to the SQL constructs supported by SQLite.
- Unless explicitly stated, you may return result rows in any order.
- You are to translate the English into a SQL query that computes the desired result over all possible databases. All you need to check is that your query gets the right answer on the small sample database. Thus, even if your output is correct, it is possible that your query does not correctly reflect the problem at hand. (For example, if we ask for a complex condition that requires accessing all of the tables, but over our small data set in the end the condition is satisfied only by Star Wars, then the query "select title from Movie where title = 'Star Wars'" will be correct even though it doesn't reflect the actual question.) Writing such queries may give the right answer on this dataset, but it does not help you properly learn SQL. On the other hand, if you attempt to write a general solution but make an error, your query will likely return incorrect results. Therefore, do not assume that a query is correct just because it produces the expected output on the small sample database. Always ensure that your query correctly reflects the given problem statement.

You are encouraged to experiment with and refine your queries to improve your understanding of SQL. Keep practicing until you are confident in your solutions!

## Questions

1. Retrieve the titles of all movies where the director is Steven Spielberg.

	title
1	E.T.
2	Raiders of the Lost Ark

2. Retrieve the years where there are one or more movies rated 4 or 5. Sort the years in ascending order.

	year
1	1937
2	1939
3	1981
4	2009

3. Retrieve the titles of all movies that have never been rated.

	title
1	Star Wars
2	Titanic

4. Retrieve the names of all reviewers who submitted ratings where the rating date is NULL.

	name
1	Daniel Lewis
2	Chris Jackson

5. Write a query to return the ratings data in a more readable format: reviewer name, movie title, stars, and ratingDate. Also, sort the data, first by reviewer name, then by movie title, and lastly by number of stars.

	name	title	stars	ratingDate
1	Ashley White	E.T.	3	2011-01-02
2	Brittany Harris	Raiders of the Lost Ark	2	2011-01-30
3	Brittany Harris	Raiders of the Lost Ark	4	2011-01-12
4	Brittany Harris	The Sound of Music	2	2011-01-20
5	Chris Jackson	E.T.	2	2011-01-22
6	Chris Jackson	Raiders of the Lost Ark	4	NULL
7	Chris Jackson	The Sound of Music	3	2011-01-27
8	Daniel Lewis	Snow White	4	NULL
9	Elizabeth Thomas	Avatar	3	2011-01-15
10	Elizabeth Thomas	Snow White	5	2011-01-19
11	James Cameron	Avatar	5	2011-01-20
12	Mike Anderson	Gone with the Wind	3	2011-01-09
13	Sarah Martinez	Gone with the Wind	2	2011-01-22
14	Sarah Martinez	Gone with the Wind	4	2011-01-27

6. Retrieve the names of reviewers and the titles of movies where the reviewer rated the same movie twice, with the second rating being higher than the first.

	name	title
1	Sarah Martinez	Gone with the Wind

7. For each movie that has at least one rating, find the highest number of stars that movie received. Return the movie title and number of stars. Sort by movie title.

	title	score
1	Avatar	5
2	E.T.	3
3	Gone with the Wind	4
4	Raiders of the Lost Ark	4
5	Snow White	5
6	The Sound of Music	3

8. Retrieve the titles of all movies along with their rating spread (the difference between the highest and lowest ratings). Sort results by rating spread (descending), then by title.

	title	rs
1	Avatar	2
2	Gone with the Wind	2
3	Raiders of the Lost Ark	2
4	E.T.	1
5	Snow White	1
6	The Sound of Music	1

9. Compute the difference between the average per-movie rating of films released before 1980 and those released after 1980.

	avg(av1) - avg(av2)
1	0.05555555555555558

10. Retrieve the names of all reviewers who submitted ratings for the movie *Gone with the Wind*.

	name
1	Sarah Martinez
2	Mike Anderson

11. For any rating where the reviewer is the same as the director of the movie, return the reviewer name, movie title, and number of stars.

	name	title	stars
1	James Cameron	Avatar	5

12. Retrieve a combined list of reviewer names and movie titles, sorted alphabetically.

	r
1	Ashley White
2	Avatar
3	Brittany Harris
4	Chris Jackson
5	Daniel Lewis
6	E.T.
7	Elizabeth Thomas
8	Gone with the Wind
9	James Cameron
10	Mike Anderson
11	Raiders of the Lost Ark
12	Sarah Martinez
13	Snow White
14	Star Wars
15	The Sound of Music
16	Titanic

13. Retrieve the titles of all movies that have not been reviewed by Chris Jackson.

	title
1	Gone with the Wind
2	Star Wars
3	Titanic
4	Snow White
5	Avatar

14. Retrieve pairs of reviewer names where both reviewers rated the same movie. Eliminate duplicates, ensure that each pair appears only once, do not pair reviewers with themselves. For each pair, return the names in the pair in alphabetical order.

	name	name
1	Ashley White	Chris Jackson
2	Brittany Harris	Chris Jackson
3	Daniel Lewis	Elizabeth Thomas
4	Elizabeth Thomas	James Cameron
5	Mike Anderson	Sarah Martinez

15. For each rating that is the lowest (fewest stars) currently in the database, return the reviewer name, movie title, and number of stars.

	name	title	stars
1	Sarah Martinez	Gone with the Wind	2
2	Brittany Harris	The Sound of Music	2
3	Brittany Harris	Raiders of the Lost Ark	2
4	Chris Jackson	E.T.	2

16. Retrieve movie titles along with their average ratings, sorted by average rating in descending order. If multiple movies share the same rating, sort them alphabetically.

	title	rat
1	Snow White	4.5
2	Avatar	4.0
3	Raiders of the Lost Ark	3.333333333333333
4	Gone with the Wind	3.0
5	E.T.	2.5
6	The Sound of Music	2.5

17. Find the names of all reviewers who have contributed three or more ratings. (As an extra challenge, try writing the query without HAVING or without COUNT.)

	name
1	Brittany Harris
2	Chris Jackson

18. Retrieve the names of directors who have directed more than one movie, along with the titles of all movies they directed. Sort by director name, then by movie title.

	title	director
1	Avatar	James Cameron
2	Titanic	James Cameron
3	E.T.	Steven Spielberg
4	Raiders of the Lost Ark	Steven Spielberg

19. Find the movie(s) with the highest average rating. Return the movie title(s) and average rating.

	title	x
1	Snow White	4.5

20. Find the movie(s) with the lowest average rating. Return the movie title(s) and average rating.

	title	x
1	The Sound of Music	2.5
2	E.T.	2.5

21. For each director, return the director's name together with the title(s) of the movie(s) they directed that received the highest rating among all of their movies, and the value of that rating. Ignore movies whose director is NULL.

	director	title	stars
1	Victor Fleming	Gone with the Wind	4
2	Robert Wise	The Sound of Music	3
3	James Cameron	Avatar	5
4	Steven Spielberg	Raiders of the Lost Ark	4

**Note:** We just show the demonstration of before query execution and after query execution, this is not the actual final result.

22. Add the reviewer Roger Ebert to your database, with an rID of 209.

	mID	title	year	director
1	101	Gone with the Wind	1939	Victor Fleming
2	102	Star Wars	1977	George Lucas
3	103	The Sound of Music	1965	Robert Wise
4	104	E.T.	1982	Steven Spielberg
5	105	Titanic	1997	James Cameron
6	106	Snow White	1937	NULL
7	107	Avatar	2009	James Cameron
8	108	Raiders of the Lost Ark	1981	Steven Spielberg

	mID	title	year	director
1	101	Gone with the Wind	1939	Victor Fleming
2	102	Star Wars	1977	George Lucas
3	103	The Sound of Music	1965	Robert Wise
4	104	E.T.	1982	Steven Spielberg
5	105	Titanic	1997	James Cameron
6	106	Snow White	1962	NULL
7	107	Avatar	2034	James Cameron
8	108	Raiders of the Lost Ark	1981	Steven Spielberg

23. For all movies that have an average rating of 4 stars or higher, add 25 to the release year. (Update the existing tuples; don't insert new tuples.)

	mID	title	year	director
1	101	Gone with the Wind	1939	Victor Fleming
2	102	Star Wars	1977	George Lucas
3	103	The Sound of Music	1965	Robert Wise
4	104	E.T.	1982	Steven Spielberg
5	105	Titanic	1997	James Cameron
6	106	Snow White	1937	NULL
7	107	Avatar	2009	James Cameron
8	108	Raiders of the Lost Ark	1981	Steven Spielberg

	mID	title	year	director
1	101	Gone with the Wind	1939	Victor Fleming
2	102	Star Wars	1977	George Lucas
3	103	The Sound of Music	1965	Robert Wise
4	104	E.T.	1982	Steven Spielberg
5	105	Titanic	1997	James Cameron
6	106	Snow White	1962	NULL
7	107	Avatar	2034	James Cameron
8	108	Raiders of the Lost Ark	1981	Steven Spielberg

24. Delete all ratings where the movie's year is before 1970 or after 2000, and the rating is fewer than 4 stars.

	mID	title	year	director
1	101	Gone with the Wind	1939	Victor Fleming
2	102	Star Wars	1977	George Lucas
3	103	The Sound of Music	1965	Robert Wise
4	104	E.T.	1982	Steven Spielberg
5	105	Titanic	1997	James Cameron
6	106	Snow White	1937	NULL
7	107	Avatar	2009	James Cameron
8	108	Raiders of the Lost Ark	1981	Steven Spielberg

	mID	title	year	director
1	101	Gone with the Wind	1939	Victor Fleming
2	102	Star Wars	1977	George Lucas
3	103	The Sound of Music	1965	Robert Wise
4	104	E.T.	1982	Steven Spielberg
5	105	Titanic	1997	James Cameron
6	106	Snow White	1937	NULL
7	107	Avatar	2009	James Cameron
8	108	Raiders of the Lost Ark	1981	Steven Spielberg