

BDM 1034 - Application Design for Big Data

SQL Essential Training

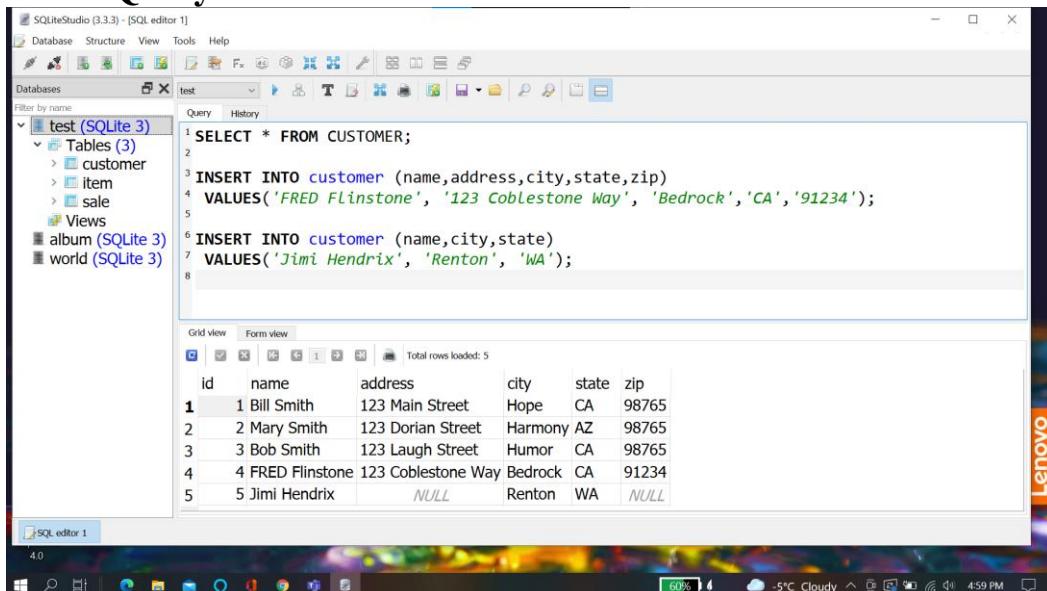
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Submitted to: Prof. Teresa Zhu

Here I have attached the certificate I achieved from Linkedin learning for Course “SQL Essential Training along with the Screenshot of queries I practised”

Insert Query:



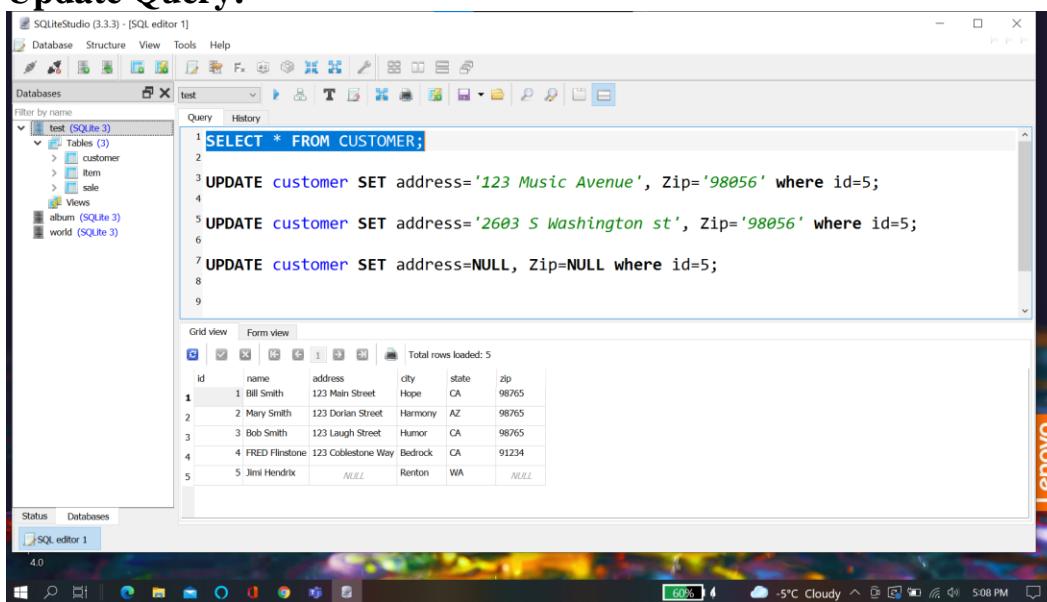
The screenshot shows the SQLiteStudio interface with a database named 'test (SQLite 3)'. In the 'Tables' section, there is a 'customer' table. The query window contains the following SQL code:

```
1 SELECT * FROM CUSTOMER;
2
3 INSERT INTO customer (name,address,city,state,zip)
4 VALUES('FRED Flinstone', '123 Cobblestone Way', 'Bedrock', 'CA', '91234');
5
6 INSERT INTO customer (name,city,state)
7 VALUES('Jimi Hendrix', 'Renton', 'WA');
```

The results grid shows the following data:

	id	name	address	city	state	zip
1	1	Bill Smith	123 Main Street	Hope	CA	98765
2	2	Mary Smith	123 Dorian Street	Harmony	AZ	98765
3	3	Bob Smith	123 Laugh Street	Humor	CA	98765
4	4	FRED Flinstone	123 Cobblestone Way	Bedrock	CA	91234
5	5	Jimi Hendrix	NULL	Renton	WA	NULL

Update Query:



The screenshot shows the SQLiteStudio interface with a database named 'test (SQLite 3)'. In the 'Tables' section, there is a 'customer' table. The query window contains the following SQL code:

```
1 SELECT * FROM CUSTOMER;
2
3 UPDATE customer SET address='123 Music Avenue', Zip='98056' where id=5;
4
5 UPDATE customer SET address='2603 S Washington st', Zip='98056' where id=5;
6
7 UPDATE customer SET address=NULL, Zip=NULL where id=5;
```

The results grid shows the following data:

	id	name	address	city	state	zip
1	1	Bill Smith	123 Main Street	Hope	CA	98765
2	2	Mary Smith	123 Dorian Street	Harmony	AZ	98765
3	3	Bob Smith	123 Laugh Street	Humor	CA	98765
4	4	FRED Flinstone	123 Cobblestone Way	Bedrock	CA	91234
5	5	Jimi Hendrix	NULL	Renton	WA	NULL

Delete Query:

The screenshot shows the SQLiteStudio interface. In the top-left pane, the database 'test (SQLite 3)' is selected, displaying tables like customer, item, sale, album, and world. The main area contains the following SQL code:

```
1 SELECT * FROM CUSTOMER WHERE id=4;
2
3 DELETE FROM customer WHERE id=4;
4 SELECT * FROM customer;
5
6 DELETE FROM customer WHERE id=5;
7 SELECT * FROM customer;
8
9
```

Below the code, a results grid shows the state of the 'customer' table:

	id	name	address	city	state	zip
1	1	Bill Smith	123 Main Street	Hope	CA	98765
2	2	Mary Smith	123 Dorian Street	Harmony	AZ	98765
3	3	Bob Smith	123 Lough Street	Humor	CA	98765

Chapter Quiz 1:

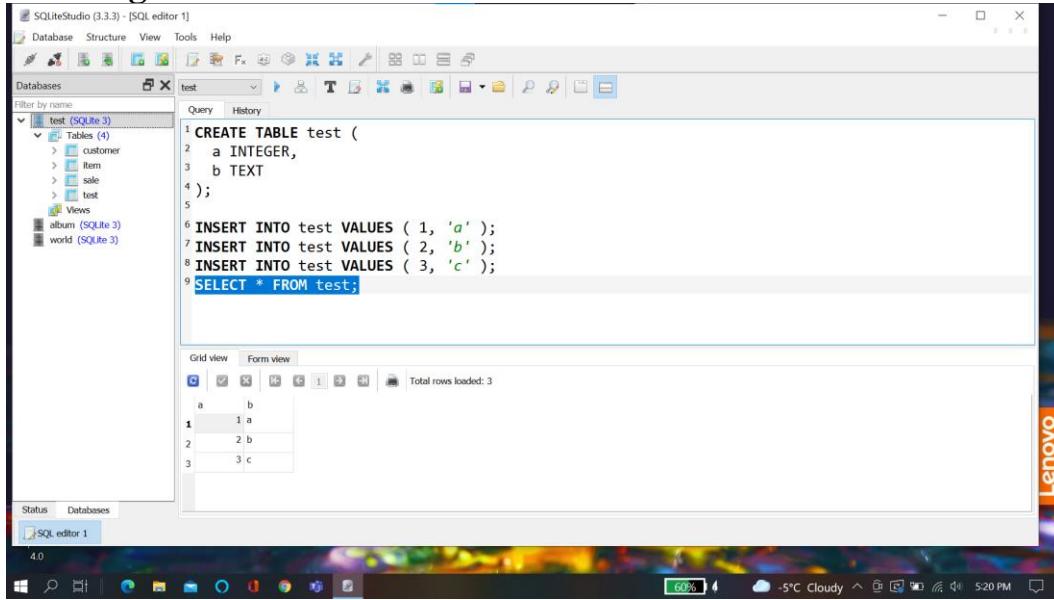
The screenshot shows the LinkedIn Learning platform. The URL in the address bar is linkedin.com/learning/sql-essential-training-3/quiz/urn:li:learningApiAssessment:14349178?autoAdvance=true&autoSkip=true.... The page displays the 'SQL Essential Training' course content, specifically the 'Chapter Quiz' section. The quiz summary indicates:

- You answered 30 of 30 questions correctly.
- You successfully completed all questions in this quiz.

Buttons for 'Review all answers' and 'Continue watching' are visible. The LinkedIn navigation bar at the top includes Home, My Learning, Notifications, Me, and EN.

Fundamental Concepts:

Creating a table:



The screenshot shows the SQLiteStudio interface. In the left sidebar, under the 'Databases' section, there is a tree view with 'test (SQLite 3)' expanded, showing 'Tables (4)': customer, item, sale, and test. Below this is a 'Views' section. On the right, the main window has a 'Query' tab active, displaying the following SQL code:

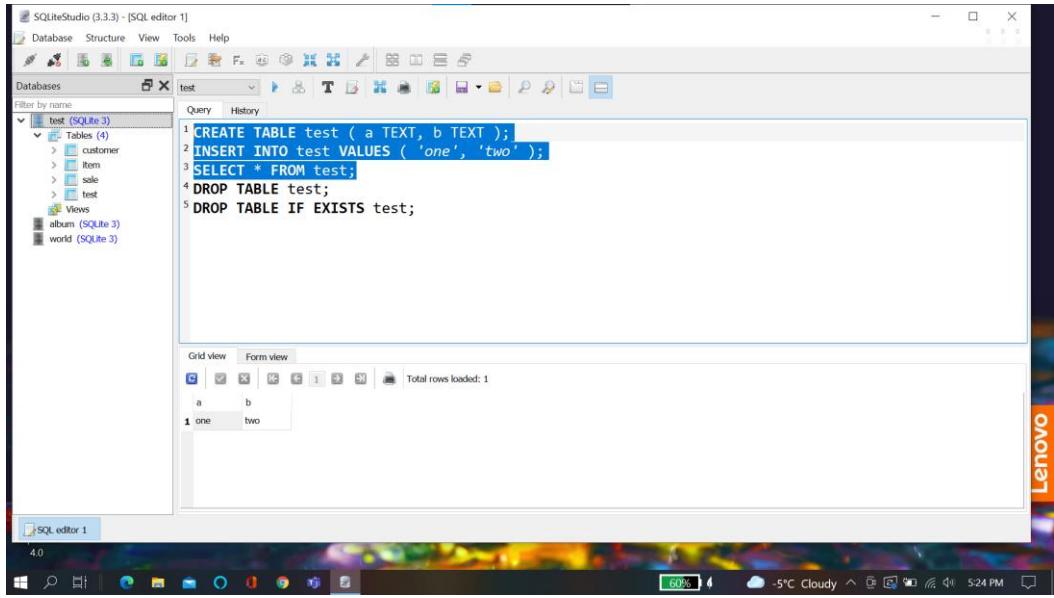
```
1 CREATE TABLE test (
2     a INTEGER,
3     b TEXT
4 );
5
6 INSERT INTO test VALUES ( 1, 'a' );
7 INSERT INTO test VALUES ( 2, 'b' );
8 INSERT INTO test VALUES ( 3, 'c' );
9 SELECT * FROM test;
```

Below the query window, a 'Grid view' table is shown with the following data:

	a	b
1	1	a
2	2	b
3	3	c

The status bar at the bottom indicates '4.0'.

Drop Table:



The screenshot shows the SQLiteStudio interface. In the left sidebar, under the 'Databases' section, there is a tree view with 'test (SQLite 3)' expanded, showing 'Tables (4)': customer, item, sale, and test. Below this is a 'Views' section. On the right, the main window has a 'Query' tab active, displaying the following SQL code:

```
1 CREATE TABLE test ( a TEXT, b TEXT );
2 INSERT INTO test VALUES ( 'one', 'two' );
3 SELECT * FROM test;
4 DROP TABLE test;
5 DROP TABLE IF EXISTS test;
```

Below the query window, a 'Grid view' table is shown with the following data:

	a	b
1	one	two

The status bar at the bottom indicates '4.0'.

Insert into:

The screenshot shows the SQLiteStudio interface with the following details:

- Toolbar:** Includes icons for Database, Structure, View, Tools, and Help.
- Databases:** Shows databases: test (SQLite 3), album (SQLite 3), and world (SQLite 3). The test database is expanded, showing tables: customer, item, sale, and test.
- Query Editor:** Contains the following SQL code:

```
1 CREATE TABLE test ( a INTEGER, b TEXT, c TEXT );
2
3 INSERT INTO test VALUES ( 1, 'This', 'Right here!' );
4 INSERT INTO test ( b, c ) VALUES ( 'That', 'Over there!' );
5 INSERT INTO test DEFAULT VALUES;
6 INSERT INTO test ( a, b, c ) SELECT id, name, description FROM item;
7
8 SELECT * FROM test;
```
- Table View:** Shows the results of the query in a grid format. The columns are labeled a, b, and c. The data is:

a	b	c
1	This	Right here!
2	NULL	Over there!
3	NULL	NULL
4	Box of 64 Pixels	64 RGB pixels in a decorative box
5	Sense of Humor	Especially dry. Imported from England.
6	Beauty	Inner beauty. No cosmetic surgery required!
7	Bar Code	Unused. In original packaging.
- Status Bar:** Shows "Status Databases" and "SQL editor 1".
- System Tray:** Shows battery level (60%), temperature (-6°C), and time (5:31 PM).

Delete From:

The screenshot shows the SQLiteStudio interface with the following details:

- Toolbar:** Includes icons for Database, Structure, View, Tools, and Help.
- Databases:** Shows databases: test (SQLite 3), album (SQLite 3), and world (SQLite 3). The test database is expanded, showing tables: customer, item, sale, and test.
- Query Editor:** Contains the following SQL code:

```
1
2 SELECT * FROM test;
3
4 DELETE FROM test WHERE a = 3;
5 SELECT * FROM test WHERE a = 1;
6 DELETE FROM test WHERE a = 1;
```
- Table View:** Shows the results of the query in a grid format. The columns are labeled a, b, and c. The data is:

a	b	c
1	NULL	Over there!
2	NULL	NULL
3	Sense of Humor	Especially dry. Imported from England.
4	Bar Code	Unused. In original packaging.
- Status Bar:** Shows "Status Databases" and "SQL editor 1".
- System Tray:** Shows battery level (60%), temperature (-6°C), and time (5:35 PM).

Null

```
10 DROP TABLE IF EXISTS test;
11 CREATE TABLE test (
12     a INTEGER NOT NULL,
13     b TEXT NOT NULL,
14     c TEXT
15 );
16
17 INSERT INTO test VALUES ( 1, 'this', 'that' );
18 SELECT * FROM test;
19
20 INSERT INTO test ( b, c ) VALUES ( 'one', 'two' );
21 INSERT INTO test ( a, c ) VALUES ( 1, 'two' );
22 INSERT INTO test ( a, b ) VALUES ( 1, 'two' );
23 DROP TABLE IF EXISTS test;
```

Grid view Form view

a	b	c
1	this	that

Total rows loaded: 1

Constraints:

```
1 DROP TABLE IF EXISTS test;
2 CREATE TABLE test ( a TEXT, b TEXT, c TEXT );
3 INSERT INTO test ( a, b ) VALUES ( 'one', 'two' );
4 SELECT * FROM test;
5
6 CREATE TABLE test ( a TEXT, b TEXT, c TEXT NOT NULL );
7 CREATE TABLE test ( a TEXT, b TEXT, c TEXT DEFAULT 'panda' );
8 CREATE TABLE test ( a TEXT UNIQUE, b TEXT, c TEXT DEFAULT 'panda' );
9 CREATE TABLE test ( a TEXT UNIQUE NOT NULL, b TEXT, c TEXT DEFAULT 'panda' );
```

Grid view Form view

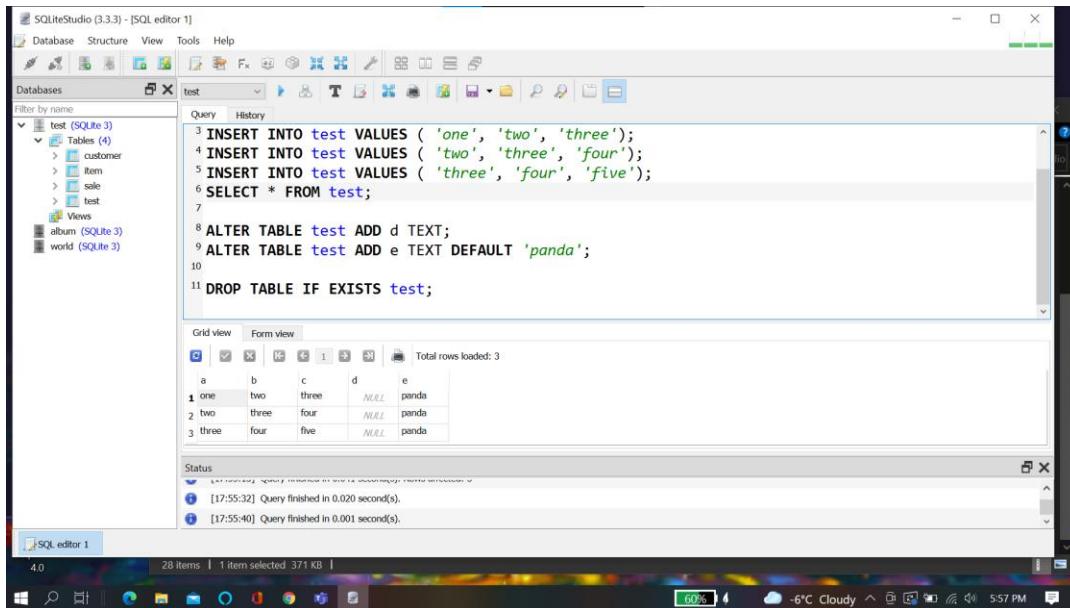
a	b	c
one	two	panda

Total rows loaded: 1

Status

- [17:50:57] Query finished in 0.017 second(s).
- [17:51:04] Query finished in 0.012 second(s). Rows affected: 1

Alter table:



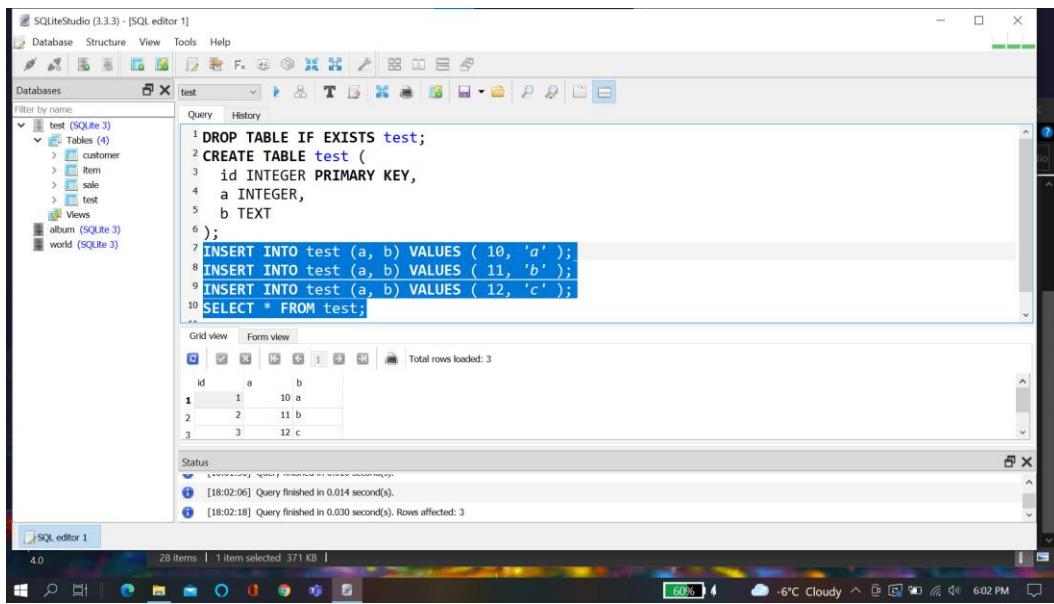
The screenshot shows the SQLiteStudio interface with the following details:

- Query Editor:** Contains the following SQL code:

```
3 INSERT INTO test VALUES ( 'one', 'two', 'three');
4 INSERT INTO test VALUES ( 'two', 'three', 'four');
5 INSERT INTO test VALUES ( 'three', 'four', 'five');
6 SELECT * FROM test;
7
8 ALTER TABLE test ADD d TEXT;
9 ALTER TABLE test ADD e TEXT DEFAULT 'panda';
10
11 DROP TABLE IF EXISTS test;
```
- Data View:** Shows a table with columns a, b, c, d, and e. The data is:

	a	b	c	d	e
1	one	two	three	NULL	panda
2	two	three	four	NULL	panda
3	three	four	five	NULL	panda
- Status Bar:** Displays "4.0", "28 items | 1 item selected 371 KB |", and system information like battery level (60%), temperature (-6°C), and time (5:57 PM).

ID:



The screenshot shows the SQLiteStudio interface with the following details:

- Query Editor:** Contains the following SQL code:

```
1 DROP TABLE IF EXISTS test;
2 CREATE TABLE test (
3     id INTEGER PRIMARY KEY,
4     a INTEGER,
5     b TEXT
6 );
7 INSERT INTO test (a, b) VALUES ( 10, 'a' );
8 INSERT INTO test (a, b) VALUES ( 11, 'b' );
9 INSERT INTO test (a, b) VALUES ( 12, 'c' );
10 SELECT * FROM test;
```
- Data View:** Shows a table with columns id, a, and b. The data is:

	a	b
1	10	a
2	11	b
3	12	c
- Status Bar:** Displays "4.0", "28 items | 1 item selected 371 KB |", and system information like battery level (60%), temperature (-6°C), and time (6:02 PM).

Filtering with where like, in

The screenshot shows the SQLiteStudio interface with the following details:

- Database Tree:** Shows databases "test" and "world". Under "test", there are tables "customer", "item", "sale", and "test". Under "world", there are tables "City", "Country", "CountryLanguage", and "test".
- Query Editor:** Displays the following SQL code:

```
2 SELECT Name, Continent, Population FROM Country
3 WHERE Population < 100000 ORDER BY Population DESC;
4 SELECT Name, Continent, Population FROM Country
5 WHERE Population < 100000 OR Population IS NULL ORDER BY Population DESC;
6 SELECT Name, Continent, Population FROM Country
7 WHERE Population < 100000 AND Continent = 'Oceania' ORDER BY Population DESC;
8 SELECT Name, Continent, Population FROM Country
9 WHERE Name LIKE '%island%' ORDER BY Name;
10 SELECT Name, Continent, Population FROM Country
11 WHERE Continent IN ('Europe', 'Asia') ORDER BY Name;
```
- Grid View:** Shows the results of the last query, which are two rows of data from the "Country" table:

Name	Continent	Population
Afghanistan	Asia	22720000
Albania	Europe	3401200
- Status Bar:** Shows the status bar with "Total rows loaded: 97".
- System Tray:** Shows battery level at 60%, temperature at -7°C, and time at 6:08 PM.

Select Distinct:

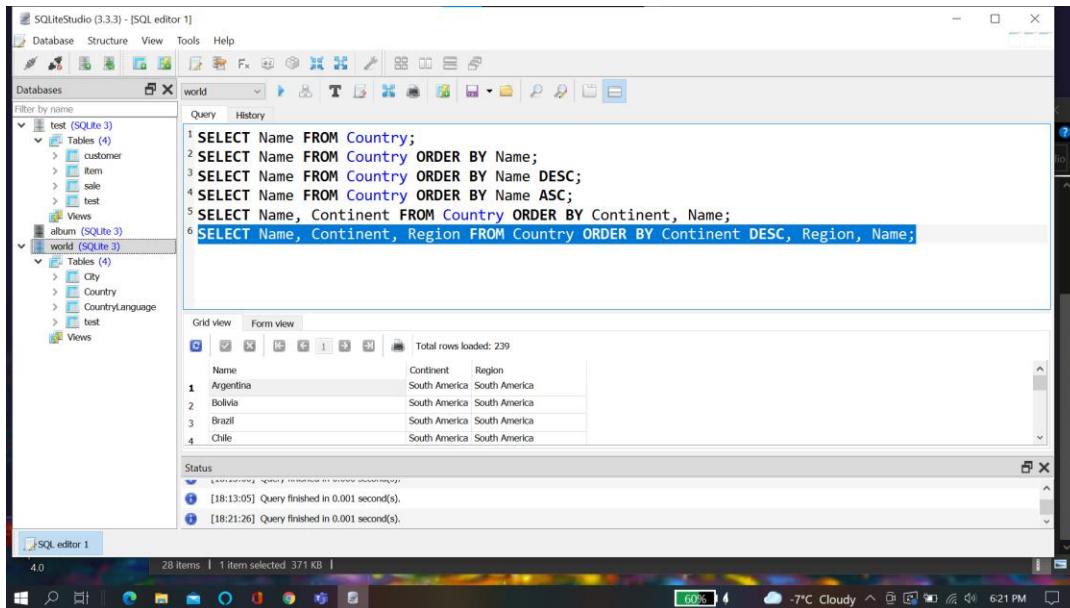
The screenshot shows the SQLiteStudio interface with the following details:

- Database Tree:** Shows databases "test" and "world". Under "test", there are tables "customer", "item", "sale", and "test". Under "world", there are tables "City", "Country", "CountryLanguage", and "test".
- Query Editor:** Displays the following SQL code:

```
9 INSERT INTO test VALUES ( 1, 2 );
10 INSERT INTO test VALUES ( 1, 2 );
11 INSERT INTO test VALUES ( 1, 2 );
12 INSERT INTO test VALUES ( 1, 2 );
13 SELECT * FROM test;
14
15 SELECT DISTINCT a FROM test;
16 SELECT DISTINCT b FROM test;
17 SELECT DISTINCT a, b FROM test;
```
- Grid View:** Shows the results of the last query, which are six distinct rows of data from the "test" table:

a	b	i
3	3	1
4	4	1
5	5	1
6	1	2
- Status Bar:** Shows the status bar with "Total rows loaded: 6".
- System Tray:** Shows battery level at 60%, temperature at -7°C, and time at 6:13 PM.

Order By:



The screenshot shows the SQLiteStudio interface with several SQL queries demonstrating the use of the ORDER BY clause. The queries are:

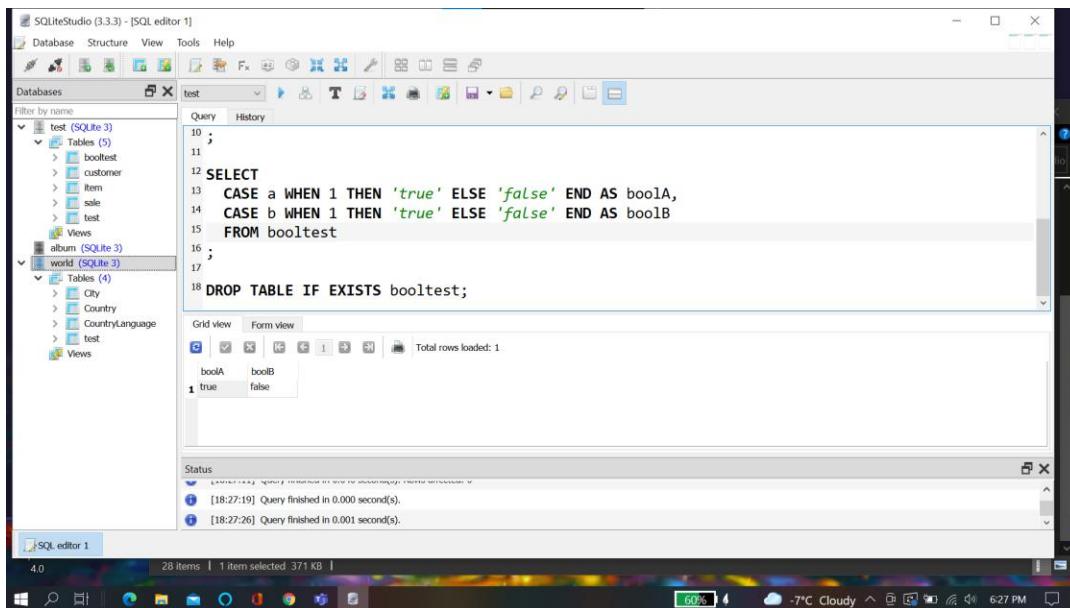
```
1 SELECT Name FROM Country;
2 SELECT Name FROM Country ORDER BY Name;
3 SELECT Name FROM Country ORDER BY Name DESC;
4 SELECT Name FROM Country ORDER BY Name ASC;
5 SELECT Name, Continent FROM Country ORDER BY Continent, Name;
6 SELECT Name, Continent, Region FROM Country ORDER BY Continent DESC, Region, Name;
```

The results of the last query are displayed in a grid view:

Name	Continent	Region
Argentina	South America	South America
Bolivia	South America	South America
Brazil	South America	South America
Chile	South America	South America

The status bar at the bottom shows the following information: 4.0, 28 items, 1 item selected, 371 KB.

Case:



The screenshot shows the SQLiteStudio interface with a SQL query using the CASE WHEN construct. The query is:

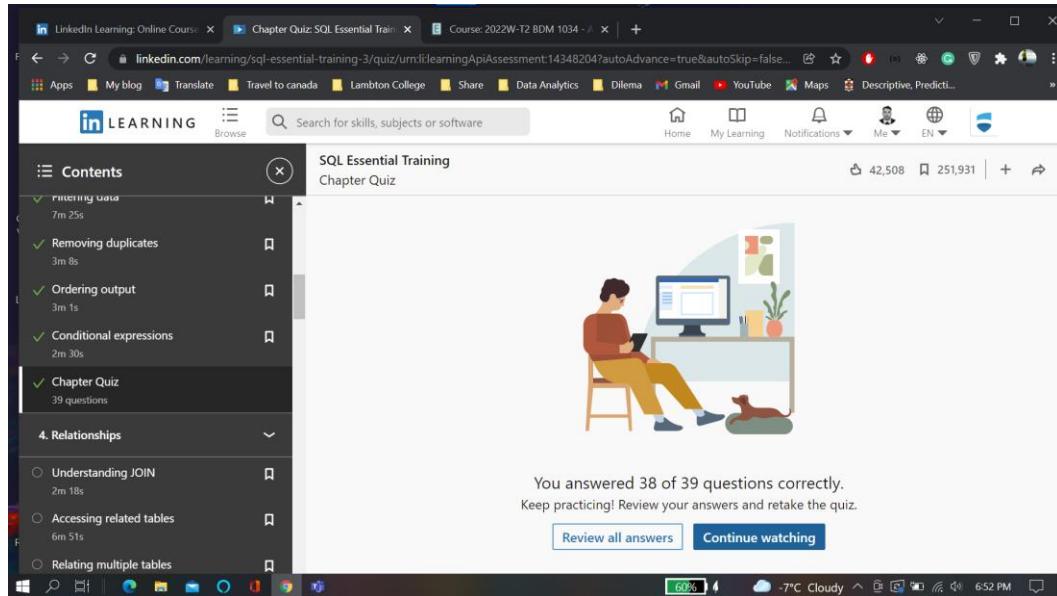
```
10 ;
11
12 SELECT
13   CASE a WHEN 1 THEN 'true' ELSE 'false' END AS boolA,
14   CASE b WHEN 1 THEN 'true' ELSE 'false' END AS boolB
15   FROM booltest
16 ;
17
18 DROP TABLE IF EXISTS booltest;
```

The results of the query are displayed in a grid view:

boolA	boolB
true	false

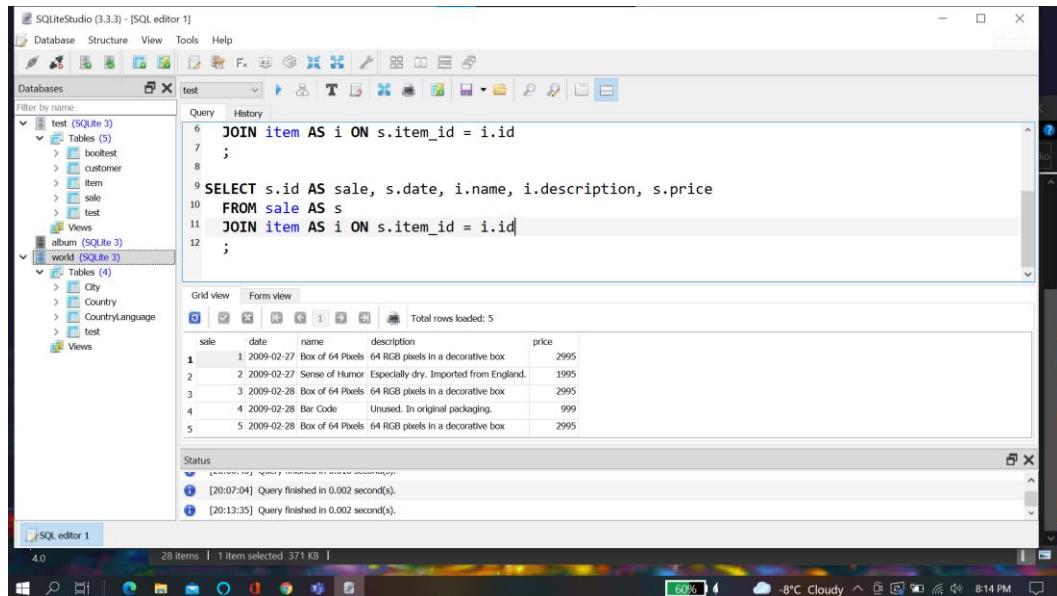
The status bar at the bottom shows the following information: 4.0, 28 items, 1 item selected, 371 KB.

Chapter Quiz:



The screenshot shows a LinkedIn Learning chapter quiz results page. The top navigation bar includes tabs for 'Course: 2022W-T2 BDM 1034 - /' and 'Chapter Quiz: SQL Essential Training'. The main content area displays a sidebar with a 'Contents' tree showing various quiz sections like 'Removing data', 'Removing duplicates', 'Ordering output', 'Conditional expressions', and 'Chapter Quiz' (39 questions). Below the sidebar is a central area with a cartoon illustration of a person sitting at a desk with a computer monitor. Text below the illustration states: 'You answered 38 of 39 questions correctly. Keep practicing! Review your answers and retake the quiz.' There are two buttons: 'Review all answers' and 'Continue watching'. The bottom status bar shows battery level at 60%, temperature at -7°C, and time at 6:52 PM.

Related Table:



The screenshot shows the SQLiteStudio interface. On the left, the 'Databases' pane lists databases 'test (SQLite 3)' and 'world (SQLite 3)'. The 'Tables' section under 'test' contains tables: boottest, customer, item, sale, and test. The 'Tables' section under 'world' contains tables: album, City, Country, CountryLanguage, and test. The main window shows a SQL query editor with the following code:

```
6 JOIN item AS i ON s.item_id = i.id
7 ;
8
9 SELECT s.id AS sale, s.date, i.name, i.description, s.price
10 FROM sale AS s
11 JOIN item AS i ON s.item_id = i.id
12 ;
```

Below the query, the 'Grid view' shows the results of the query:

	sale	date	name	description	price
1	1	2009-02-27	Box of 64 Pixels	64 RGB pixels in a decorative box	2995
2	2	2009-02-27	Sense of Humor	Especially dry. Imported from England.	1995
3	3	2009-02-28	Box of 64 Pixels	64 RGB pixels in a decorative box	2995
4	4	2009-02-28	Bar Code	Unused. In original packaging.	999
5	5	2009-02-28	Box of 64 Pixels	64 RGB pixels in a decorative box	2995

The status bar at the bottom indicates '28 items | 1 item selected 371 KB |' and shows system status like battery level (60%), temperature (-8°C), and time (8:14 PM).

Relating Multiple Tables

The screenshot shows the SQLiteStudio interface. In the left sidebar, there are two databases: 'test (SQLite 3)' and 'world (SQLite 3)'. Under 'test (SQLite 3)', there are five tables: boottest, customer, item, sale, and test. Under 'world (SQLite 3)', there are four tables: City, Country, CountryLanguage, and test. The main window displays a SQL query:

```
1 SELECT c.name AS Cust, c.zip, i.name AS Item, i.description, s.quantity AS Quan, s.price AS Price
2 FROM sale AS s
3 JOIN item AS i ON s.item_id = i.id
4 JOIN customer AS c ON s.customer_id = c.id
5 ORDER BY Cust, Item
6 ;
7 INSERT INTO customer ( name ) VALUES ( 'Jane Smith' );
8 SELECT c.name AS Cust, c.zip, i.name AS Item, i.description, s.quantity AS Quan, s.price AS Price
9 FROM customer AS c
10 LEFT JOIN sale AS s ON s.customer_id = c.id
11 LEFT JOIN item AS i ON s.item_id = i.id
12 ORDER BY Cust, Item
13 ;
```

The results grid shows the following data:

Cust	zip	Item	description	Quan	Price
1 Bill Smith	98765	Box of 64 Pixels	64 RGB pixels in a decorative box	1	2995
2 Bob Smith	98765	Bar Code	Unused. In original packaging.	2	999
3 Jane Smith	NULL	NULL	NULL	NULL	NULL
4 Mary Smith	98765	Box of 64 Pixels	64 RGB pixels in a decorative box	1	2995

The status bar at the bottom indicates: [20:32:28] Query finished in 0.013 second(s). Rows affected: 1 [20:32:45] Query finished in 0.002 second(s).

Chapter Quiz:

The screenshot shows a LinkedIn Learning chapter quiz page for 'SQL Essential Training' titled 'Chapter Quiz'. The sidebar on the left lists course contents under '4. Relationships':

- Understanding JOIN (2m 18s)
- Accessing related tables (6m 51s)
- Relating multiple tables** (5m 25s)
- Chapter Quiz (9 questions)

The main content area shows a cartoon illustration of a person sitting at a desk with a computer monitor displaying a star, surrounded by books and papers. Below the illustration, a message states: 'You answered 9 of 9 questions correctly. You successfully completed all questions in this quiz.' There are two buttons: 'Review all answers' and 'Continue watching'.

String:

The screenshot shows the SQLiteStudio interface. In the top-left, the database tree displays three databases: 'test (SQLite 3)', 'album (SQLite 3)', and 'world (SQLite 3)'. The 'test' database has 5 tables: bootest, customer, item, sale, and test. The 'album' database has 2 tables: album and track. The 'world' database has 4 tables: City, Country, CountryLanguage, and test. The main area shows a query window with the following SQL code:

```
14 SELECT TRIM(' string ');
15 SELECT LTRIM(' string ');
16 SELECT RTRIM(' string ');
17 SELECT TRIM('...string...', '.');
18
19
20 SELECT 'String' = 'string';
21 SELECT LOWER('String') = LOWER('string');
22 SELECT UPPER('String') = UPPER('string');
23 SELECT UPPER(Name) FROM City ORDER BY Name;
24 SELECT LOWER(Name) FROM City ORDER BY Name;
25
26
```

Below the query window is a results grid titled 'Grid view' with 4 rows of data:

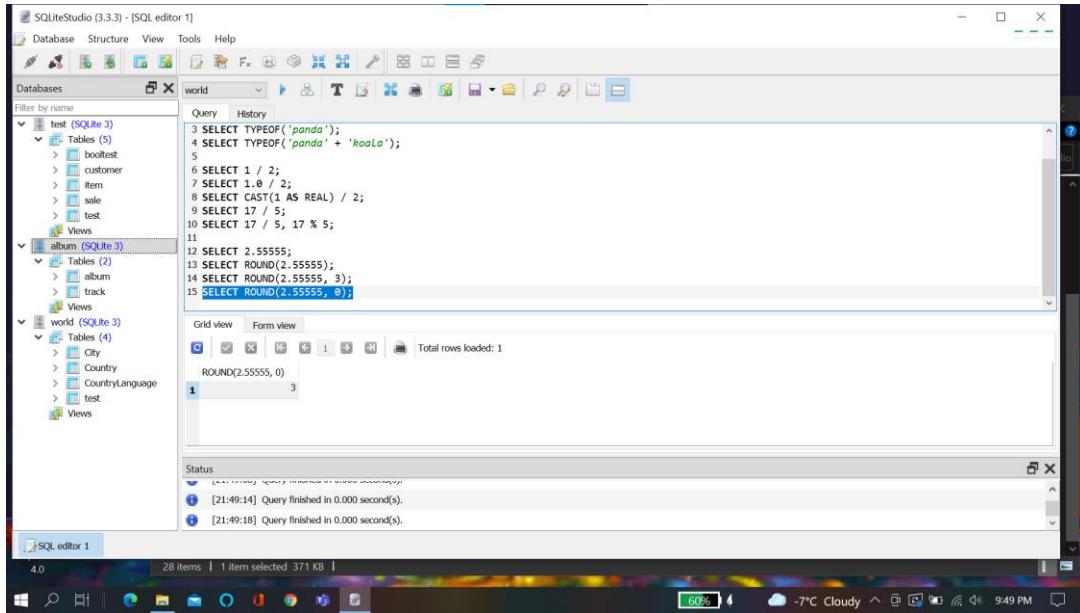
	LOWER(Name)
1	a coruña (a coruña)
2	aachen
3	walborg
4	aba

The status bar at the bottom indicates '28 items | 1 item selected 371 KB |'.

Chapter Quiz:

The screenshot shows the LinkedIn Learning Chapter Quiz results page. The left sidebar lists course contents: 'Finding the length of a string' (1m 59s), 'Selecting part of a string' (3m 46s), 'Removing spaces' (1m 33s), 'Folding case' (2m 18s), 'Chapter Quiz' (18 questions), and '6. Numbers' (with sub-sections: 'Numeric types' (3m), 'What type is that value?' (2m 16s), and 'Integer division'). The main content area shows a cartoon illustration of a person sitting at a desk with a computer monitor. Below the illustration, a message says: 'You answered 17 of 18 questions correctly. Keep practicing! Review your answers and retake the quiz.' There are two buttons: 'Review all answers' and 'Continue watching'. The status bar at the bottom indicates '60% | -8°C Cloudy | 9:06 PM |'.

Round Numbers:



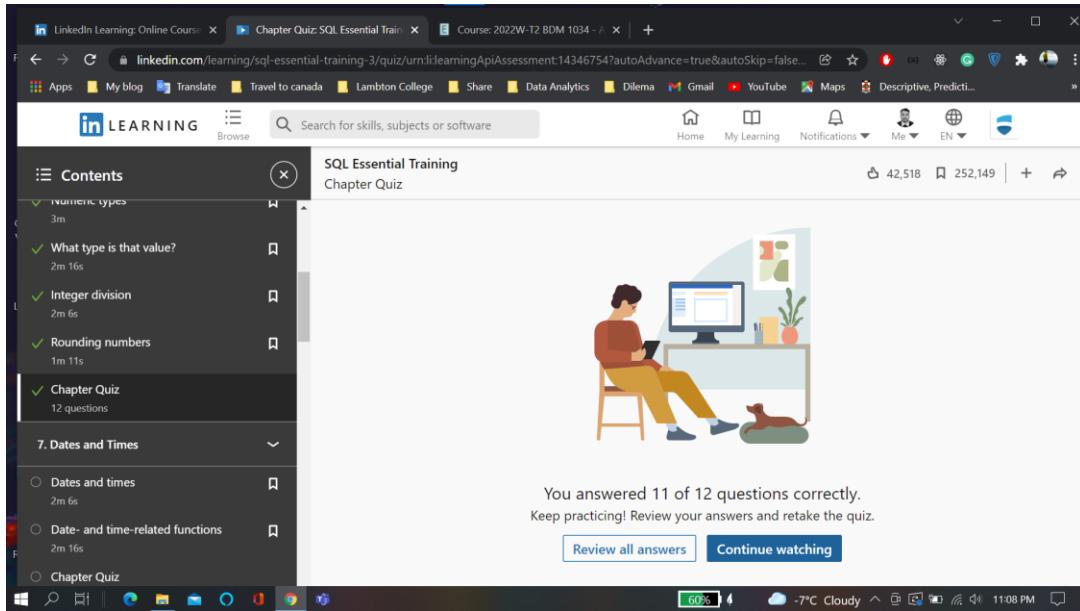
The screenshot shows the SQLiteStudio interface. The left sidebar displays databases: 'test (SQLite 3)' with 5 tables (bootleg, customer, item, sale, test), 'album (SQLite 3)' with 2 tables (album, track), and 'world (SQLite 3)' with 4 tables (City, Country, CountryLanguage, test). The main area contains a query window with the following SQL code:

```
3 SELECT typeof('panda');
4 SELECT typeof('panda' + 'koala');
5
6 SELECT 1 / 2;
7 SELECT 1.0 / 2;
8 SELECT CAST(1 AS REAL) / 2;
9 SELECT 17 % 5;
10 SELECT 17 / 5, 17 % 5;
11
12 SELECT 2.55555;
13 SELECT ROUND(2.55555);
14 SELECT ROUND(2.55555, 3);
15 SELECT ROUND(2.55555, 0);
```

The results grid shows one row with the value 3.

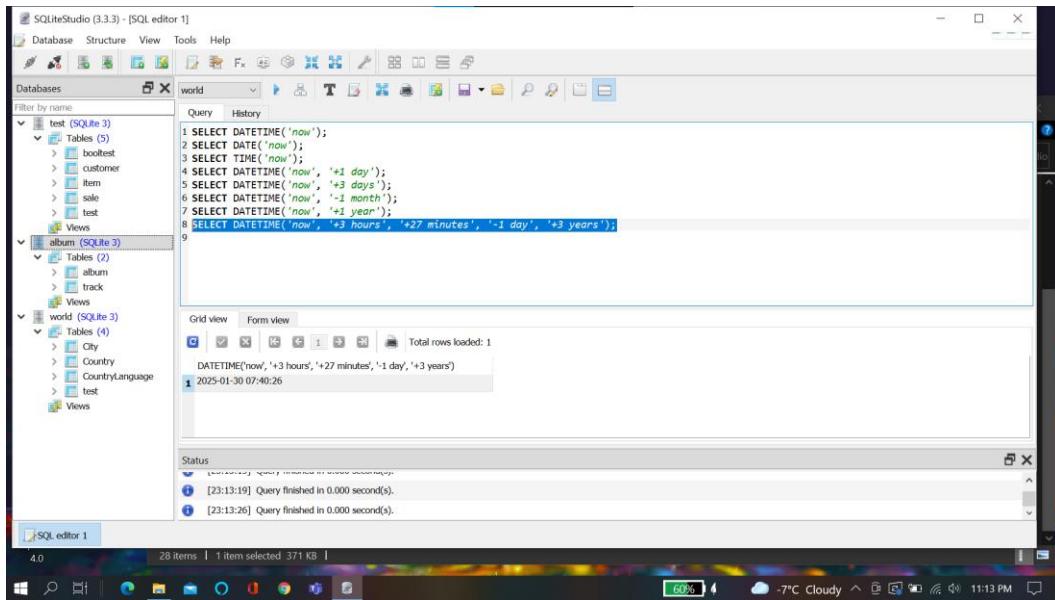
Status bar at the bottom indicates: [21:49:14] Query finished in 0.000 second(s). [21:49:18] Query finished in 0.000 second(s).

Chapter Quiz



The screenshot shows the LinkedIn Learning chapter quiz results page for 'SQL Essential Training'. The left sidebar lists course contents: 'Numeric types' (3m), 'What type is that value?' (2m 16s), 'Integer division' (2m 6s), 'Rounding numbers' (1m 11s), 'Chapter Quiz' (12 questions), '7. Dates and Times' (3 questions), 'Dates and times' (2m 6s), 'Date- and time-related functions' (2m 16s), and 'Chapter Quiz' (12 questions). The main area displays a cartoon illustration of a person sitting at a desk with a computer and a dog. Below the illustration, a message says: 'You answered 11 of 12 questions correctly. Keep practicing! Review your answers and retake the quiz.' There are two buttons: 'Review all answers' and 'Continue watching'. The status bar at the bottom shows: [21:49:14] Query finished in 0.000 second(s). [21:49:18] Query finished in 0.000 second(s).

Dates and time:

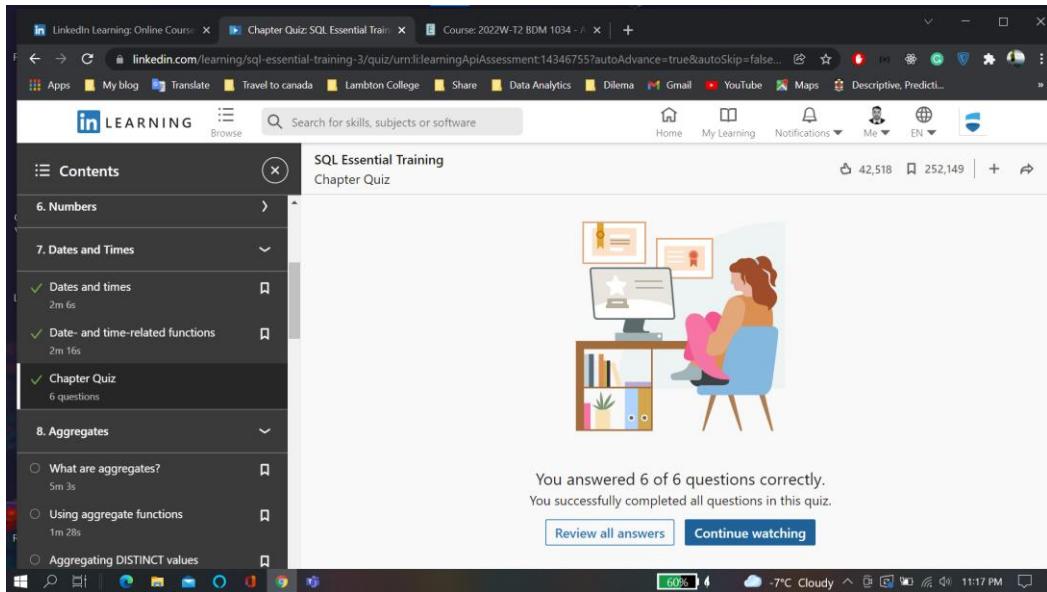


The screenshot shows the SQLiteStudio interface. In the left sidebar, databases 'test' and 'world' are listed. Under 'test', tables 'bootlist', 'customer', 'item', 'sale', and 'test' are shown. Under 'world', tables 'album' and 'track' are listed. The main window displays a SQL query:

```
1 SELECT DATETIME('now');
2 SELECT DATE('now');
3 SELECT TIME('now');
4 SELECT DATETIME('now', '+1 day');
5 SELECT DATETIME('now', '+3 days');
6 SELECT DATETIME('now', '-1 month');
7 SELECT DATETIME('now', '+1 year');
8 SELECT DATETIME('now', '+3 hours', '+27 minutes', '-1 day', '+3 years');
```

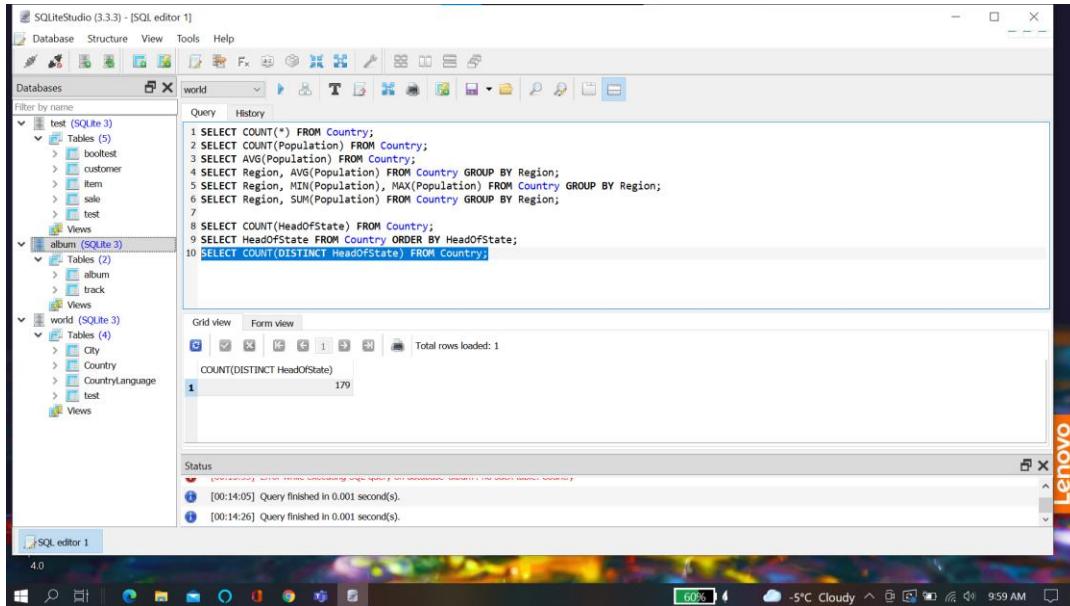
The results grid shows one row with the value '2025-01-30 07:40:26'. The status bar at the bottom indicates the query finished in 0.000 seconds.

Chapter quiz:



The screenshot shows the LinkedIn Learning interface. The top navigation bar includes 'LinkedIn Learning: Online Courses', 'Chapter Quiz: SQL Essential Training', and 'Course: 2022W-T2 BDM 1034 - /'. The main content area displays the 'SQL Essential Training Chapter Quiz' page. On the left, a sidebar lists course contents: '6. Numbers', '7. Dates and Times' (selected), '8. Aggregates', and specific topics like 'What are aggregates?' and 'Using aggregate functions'. The right side features an illustration of a person sitting at a desk with a computer monitor displaying a star icon. Below the illustration, text states: 'You answered 6 of 6 questions correctly. You successfully completed all questions in this quiz.' There are two buttons: 'Review all answers' and 'Continue watching'. The bottom of the screen shows the Windows taskbar with various icons and system status.

Aggregates:

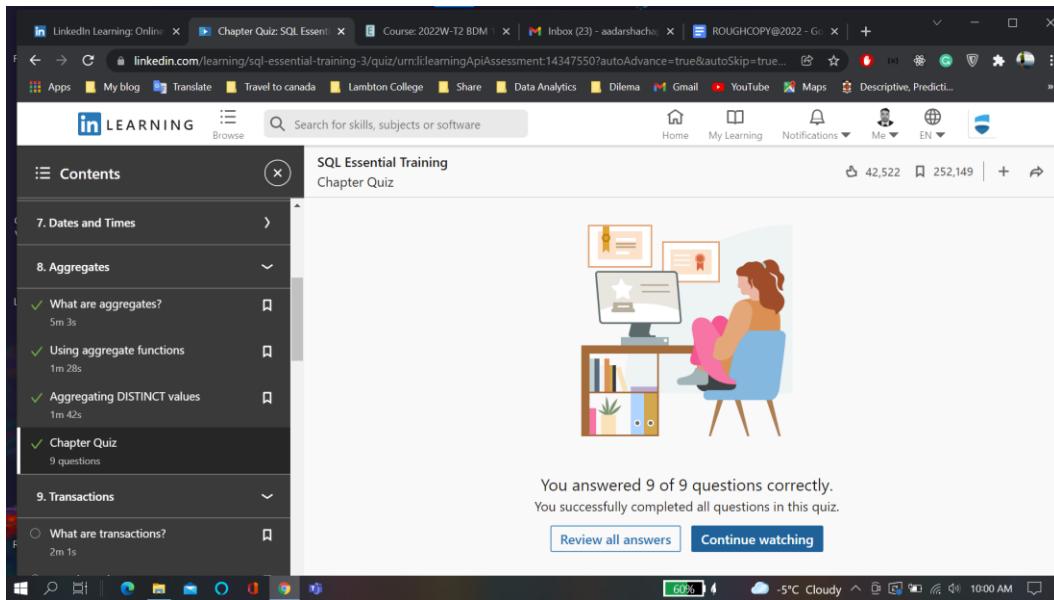


The screenshot shows the SQLiteStudio interface. In the left sidebar, there are three databases listed: 'test (SQLITE 3)', 'album (SQLITE 3)', and 'world (SQLITE 3)'. Under 'test (SQLITE 3)', there are five tables: 'bootest', 'customer', 'item', 'sale', and 'test'. Under 'album (SQLITE 3)', there are two tables: 'album' and 'track'. Under 'world (SQLITE 3)', there are four tables: 'City', 'Country', 'CountryLanguage', and 'test'. The main pane displays a SQL query window with the following code:

```
1 SELECT COUNT(*) FROM Country;
2 SELECT COUNT(Population) FROM Country;
3 SELECT AVG(Population) FROM Country;
4 SELECT Region, AVG(Population) FROM Country GROUP BY Region;
5 SELECT Region, MIN(Population), MAX(Population) FROM Country GROUP BY Region;
6 SELECT Region, SUM(Population) FROM Country GROUP BY Region;
7
8 SELECT COUNT(HeadOfState) FROM Country;
9 SELECT HeadOfState FROM Country ORDER BY HeadOfState;
10 SELECT COUNT(DISTINCT HeadOfState) FROM Country;
```

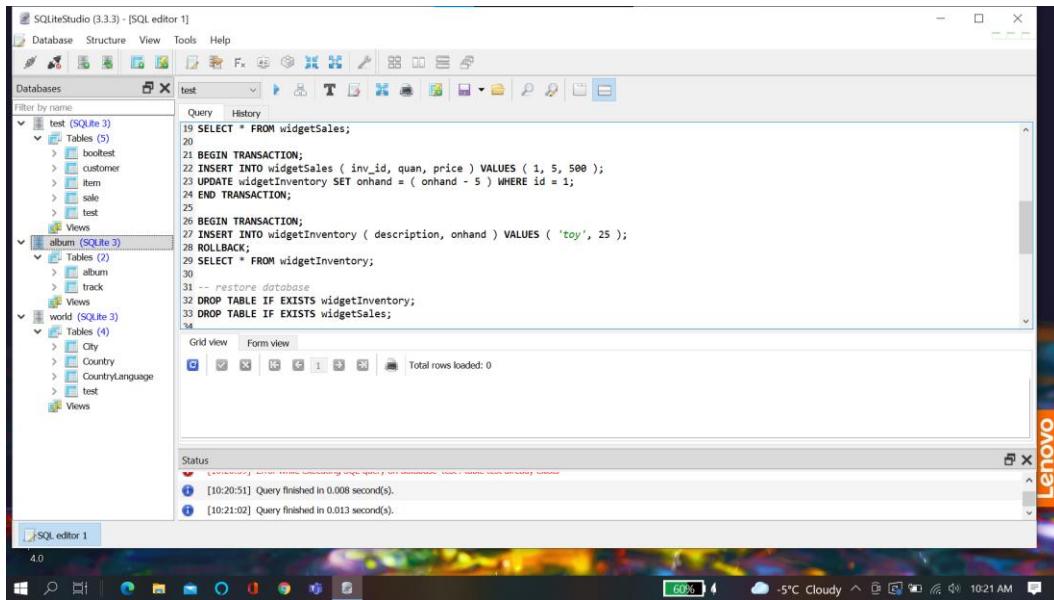
Below the query window, a status bar indicates 'Total rows loaded: 1' and shows two log entries: '[00:14:05] Query finished in 0.001 second(s)' and '[00:14:26] Query finished in 0.001 second(s)'. The bottom of the screen shows a Windows taskbar with various icons and system status.

Chapter Quiz:



The screenshot shows a LinkedIn Learning chapter quiz page. On the left, a sidebar lists course contents: '7. Dates and Times', '8. Aggregates' (selected), 'What are aggregates?', 'Using aggregate functions', 'Aggregating DISTINCT values', 'Chapter Quiz' (9 questions), and '9. Transactions'. The main content area shows the title 'SQL Essential Training Chapter Quiz'. Below it is an illustration of a person sitting at a desk with a computer monitor displaying a trophy. A message states: 'You answered 9 of 9 questions correctly. You successfully completed all questions in this quiz.' At the bottom are buttons for 'Review all answers' and 'Continue watching'. The bottom of the screen shows a Windows taskbar with system status.

Transactions:

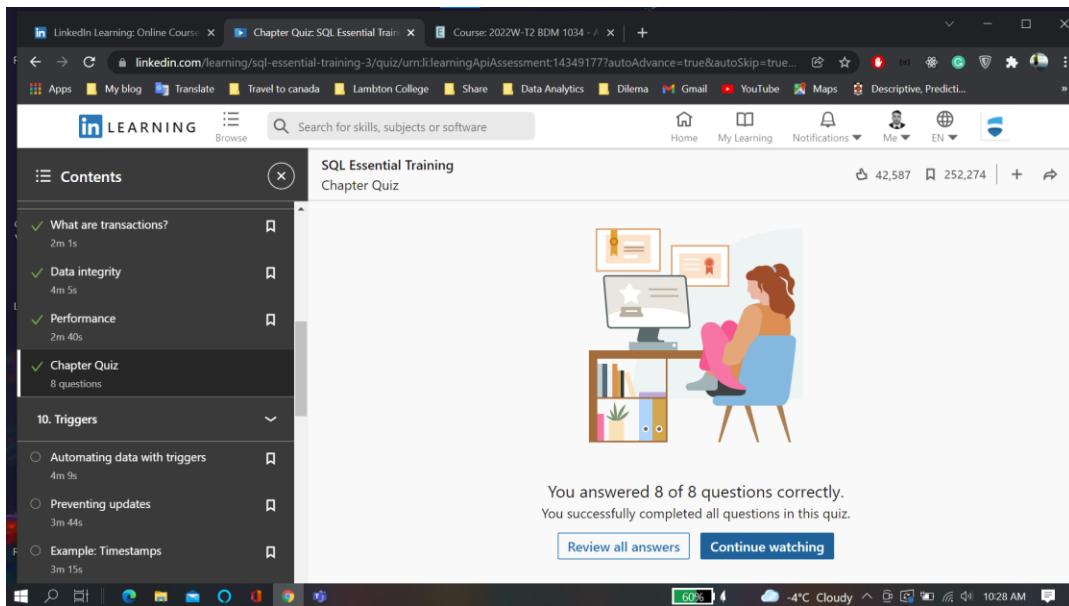


The screenshot shows the SQLiteStudio interface. On the left, the Database browser displays three databases: 'test' (SQLite 3) containing 5 tables (bootleg, customer, item, sale, test), 'album' (SQLite 3) containing 2 tables (album, track), and 'world' (SQLite 3) containing 4 tables (City, Country, CountryLanguage, test). The main window shows a SQL query editor with the following script:

```
19 SELECT * FROM widgetSales;
20
21 BEGIN TRANSACTION;
22 INSERT INTO widgetSales ( inv_id, quan, price ) VALUES ( 1, 5, 500 );
23 UPDATE widgetInventory SET onhand = ( onhand - 5 ) WHERE id = 1;
24 END TRANSACTION;
25
26 BEGIN TRANSACTION;
27 INSERT INTO widgetInventory ( description, onhand ) VALUES ( 'toy', 25 );
28 ROLLBACK;
29 SELECT * FROM widgetInventory;
30
31 -- restore database
32 DROP TABLE IF EXISTS widgetInventory;
33 DROP TABLE IF EXISTS widgetSales;
34
```

The status bar at the bottom indicates two successful queries finished in 0.008 and 0.013 seconds respectively.

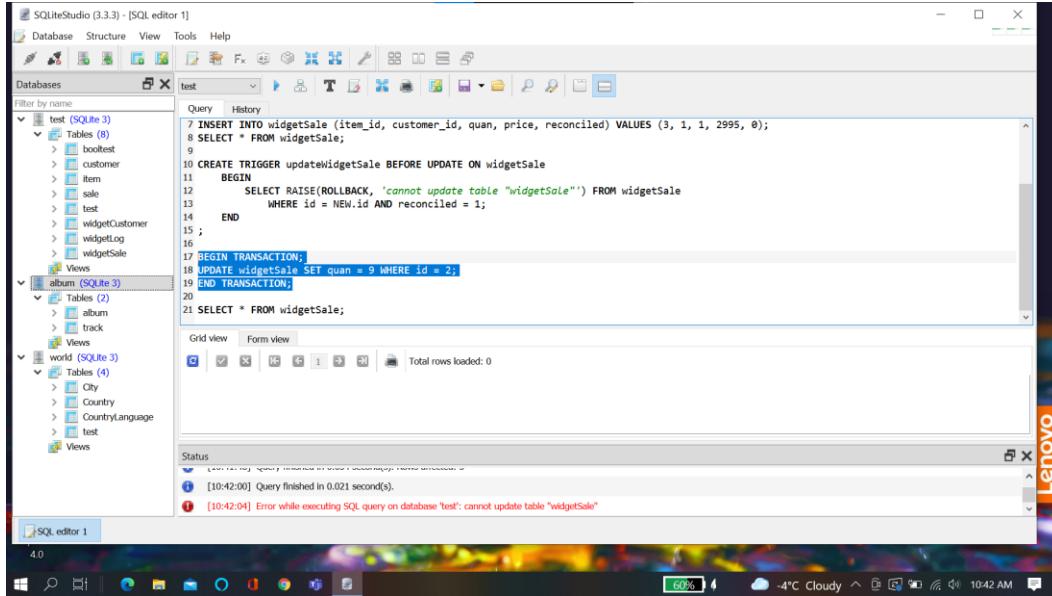
Chapter Quiz:



The screenshot shows a browser window on LinkedIn Learning displaying the 'SQL Essential Training' course. The 'Chapter Quiz' section is active, showing the results of a completed quiz. The sidebar lists course contents including 'What are transactions?', 'Data integrity', 'Performance', 'Chapter Quiz' (8 questions selected), and '10. Triggers'. The main area shows an illustration of a person sitting at a desk with a computer monitor displaying a trophy, indicating success. The message says: 'You answered 8 of 8 questions correctly. You successfully completed all questions in this quiz.' Buttons for 'Review all answers' and 'Continue watching' are visible. The system status bar at the bottom shows battery level at 60%, temperature at -5°C, and time at 10:28 AM.

Triggers:

Preventing Updates:

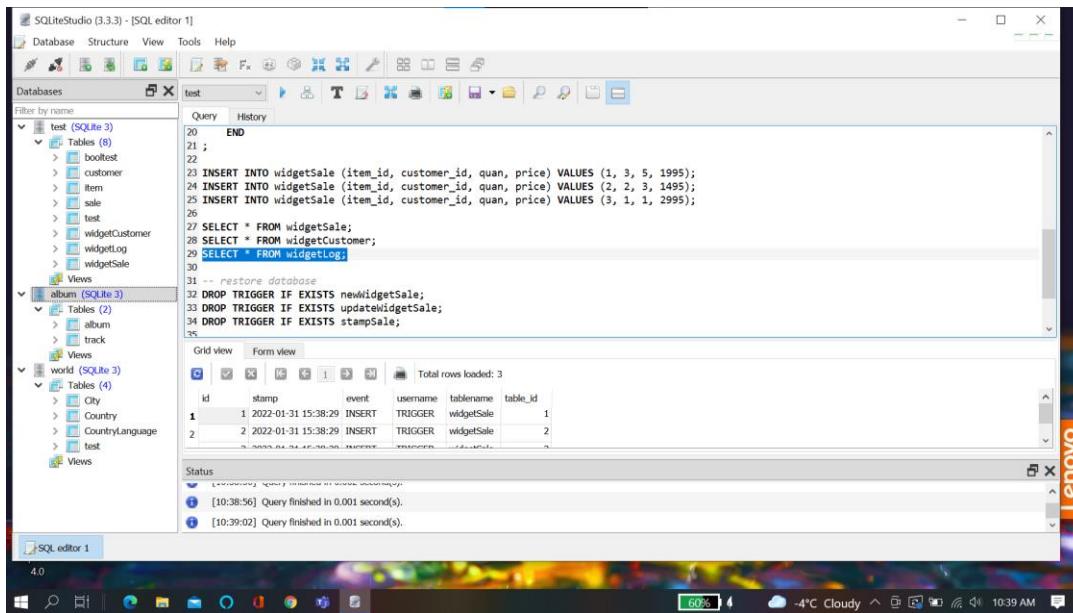


The screenshot shows the SQLiteStudio interface with the database 'test' selected. In the 'Query' tab, the following SQL code is run:

```
7 INSERT INTO widgetSale (item_id, customer_id, quan, price, reconciled) VALUES (3, 1, 1, 2995, 0);
8 SELECT * FROM widgetSale;
9
10 CREATE TRIGGER updateWidgetSale BEFORE UPDATE ON widgetSale
11 BEGIN
12     SELECT RAISE(ROLLBACK, 'cannot update table "widgetSale"') FROM widgetSale
13     WHERE id = NEW.id AND reconciled = 1;
14 END
15 ;
16
17 BEGIN TRANSACTION;
18 UPDATE widgetSale SET quan = 9 WHERE id = 2;
19 END TRANSACTION;
20
21 SELECT * FROM widgetSale;
```

The status bar at the bottom shows the error: [10:42:04] Error while executing SQL query on database 'test': cannot update table "widgetSale".

Timestamps:



The screenshot shows the SQLiteStudio interface with the database 'test' selected. In the 'Query' tab, the following SQL code is run:

```
20 END
21 ;
22
23 INSERT INTO widgetSale (item_id, customer_id, quan, price) VALUES (1, 3, 5, 1995);
24 INSERT INTO widgetSale (item_id, customer_id, quan, price) VALUES (2, 2, 3, 1495);
25 INSERT INTO widgetSale (item_id, customer_id, quan, price) VALUES (3, 1, 1, 2995);
26
27 SELECT * FROM widgetSale;
28 SELECT * FROM widgetCustomer;
29 SELECT * FROM widgetLog;
30
31 -- restore database
32 DROP TRIGGER IF EXISTS newWidgetSale;
33 DROP TRIGGER IF EXISTS updateWidgetSale;
34 DROP TRIGGER IF EXISTS stampSale;
35
```

The status bar at the bottom shows the message: [10:38:56] Query finished in 0.001 second(s).

In the 'Grid view' tab, the 'widgetLog' table is displayed with the following data:

	id	stamp	event	username	tablename	table_id
1	1	2022-01-31 15:38:29	INSERT	TRIGGER	widgetSale	1
2	2	2022-01-31 15:38:29	INSERT	TRIGGER	widgetSale	2

The status bar at the bottom shows the message: [10:39:02] Query finished in 0.001 second(s).

Chapter Quiz:

The screenshot shows a LinkedIn Learning chapter quiz interface. The top navigation bar includes tabs for 'Chapter Quiz: SQL Essential Training' and 'Course: 2022W-T2 BDM 1034 -'. The main content area displays the 'SQL Essential Training' chapter quiz with a title 'Chapter Quiz' and a subtitle '10. Triggers'. A sidebar on the left lists course contents under sections 10. Triggers and 11. Views and Subselects. A central illustration shows a person sitting at a desk with a computer monitor displaying a trophy, surrounded by books and certificates. Below the illustration, a message states: 'You answered 7 of 7 questions correctly. You successfully completed all questions in this quiz.' Buttons for 'Review all answers' and 'Continue watching' are present. The bottom of the screen shows a Windows taskbar with various icons and system status.

Subselect:

The screenshot shows the SQLiteStudio interface. The left sidebar displays a database tree with databases like 'test (SQLite 3)', 'world (SQLite 3)', and 'album (SQLite 3)'. The main window contains a query editor with the following SQL code:

```
4 INSERT INTO t VALUES ('CA1279', 'FR5678');
5 SELECT * FROM t;
6
7 SELECT SUBSTR(a, 1, 2) AS State, SUBSTR(a, 3) AS SCode,
8     SUBSTR(b, 1, 2) AS Country, SUBSTR(b, 3) AS CCode FROM t;
9
10 SELECT co.Name, ss.CCode FROM (
11     SELECT SUBSTR(a, 1, 2) AS State, SUBSTR(a, 3) AS SCode,
12         SUBSTR(b, 1, 2) AS Country, SUBSTR(b, 3) AS CCode FROM t
13     ) AS ss
14     JOIN Country AS co
15     ON co.Code2 = ss.Country;
16
17
18 DROP TABLE t;
```

The results grid shows the following data:

Name	CCode
United States	4567
United Kingdom	1234

The status bar at the bottom indicates: 'Total rows loaded: 3', '[11:14:27] Query finished in 0.002 second(s).', and '[11:15:05] Query finished in 0.001 second(s.).'

Searching within resultset:

The screenshot shows the SQLiteStudio interface with a query window containing the following SQL code:

```
7 SELECT a.title AS album, a.artist, t.track_number AS seq, t.title, t.duration AS secs
8 FROM album AS a
9 JOIN track AS t
10 ON t.album_id = a.id
11 WHERE a.id IN (SELECT DISTINCT album_id FROM track WHERE duration <= 90)
12 ORDER BY a.title, t.track_number
13 ;
14
15 SELECT a.title AS album, a.artist, t.track_number AS seq, t.title, t.duration AS secs
16 FROM album AS a
17 JOIN (
18     SELECT DISTINCT album_id, track_number, duration, title
19     FROM track
20     WHERE duration <= 90
21 ) AS t
22     ON t.album_id = a.id
23 ORDER BY a.title, t.track_number
24 ;
```

The results grid shows two rows of data:

album	artist	seq	title	secs
Birds of Fire	Mahavishnu Orchestra	4	Sapphire Bullets of Pure Love	24
Hendrix in the West	Jimi Hendrix	6	Sgt. Pepper's Lonely Hearts Club Band	76

View:

The screenshot shows the SQLiteStudio interface with a query window containing the following SQL code:

```
34 a.title AS album,
35 t.title AS track,
36 t.track_number AS trackno,
37 t.duration / 60 AS m,
38 t.duration % 60 AS s
39 FROM track AS t
40 JOIN album AS a
41 ON a.id = t.album_id
42 ;
43
44 SELECT * FROM joinedAlbum;
45 SELECT * FROM joinedAlbum WHERE artist = 'Jimi Hendrix';
46
47 SELECT artist, album, track, trackno,
48 m || ':' || substr('00' || s, -2, 2) AS duration
49 FROM joinedAlbum;
50
51 DROP VIEW IF EXISTS joinedAlbum;
```

The results grid shows four rows of data:

artist	album	track	trackno	duration
Willie Nelson and Wynton Marsalis	Two Men with the Blues	Bright Lights Big City	1	5:20
Willie Nelson and Wynton Marsalis	Two Men with the Blues	Night Life	2	5:44
Willie Nelson and Wynton Marsalis	Two Men with the Blues	Basin Street Blues	5	4:56
Willie Nelson and Wynton Marsalis	Two Men with the Blues	Caldonia	3	3:25

Chapter quiz:

This screenshot shows the LinkedIn Learning interface after completing a chapter quiz. The top navigation bar includes tabs for 'Online Courses', 'Chapter Quiz: SQL Essential Train', and 'Course: 2022W-T2 BDM 1034 -'. The main content area displays the 'SQL Essential Training' course with the title 'Chapter Quiz'. On the left, a 'Contents' sidebar lists several video lessons under '12. A Simple CRUD Application', including 'Embedding SQL' (5m 17s), 'The SELECT functions' (5m 49s), and 'The INSERT, UPDATE, and DELETE functions' (3m 42s). The central area features an illustration of a person sitting at a desk with a computer monitor displaying a certificate. Below the illustration, a message states: 'You answered 15 of 15 questions correctly. You successfully completed all questions in this quiz.' Two buttons are present: 'Review all answers' and 'Continue watching'. The bottom of the screen shows a Windows taskbar with various icons and system status.

CRUD Application:

Chapter quiz:

This screenshot shows the LinkedIn Learning interface after completing a chapter quiz. The top navigation bar includes tabs for 'Online Courses', 'Chapter Quiz: SQL Essential Train', and 'Course: 2022W-T2 BDM 1034 -'. The main content area displays the 'SQL Essential Training' course with the title 'Chapter Quiz'. On the left, a 'Contents' sidebar lists several video lessons under '12. A Simple CRUD Application', including 'Embedding SQL' (5m 17s), 'The SELECT functions' (5m 49s), and 'The INSERT, UPDATE, and DELETE functions' (3m 42s). The central area features an illustration of a person sitting at a desk with a computer monitor displaying a certificate. Below the illustration, a message states: 'You answered 6 of 6 questions correctly. You successfully completed all questions in this quiz.' Two buttons are present: 'Review all answers' and 'Continue watching'. The bottom of the screen shows a Windows taskbar with various icons and system status.

Certificate:

