

SQL_3_ITF

sql3

Training Clarusway

Pear Deck - June 22, 2022 at 0:41PM

Part 1 - Summary

Use this space to summarize your thoughts on the lesson

Part 2 - Responses

Slide 1



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Use this space to take notes:

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Table of Contents ➤

- ▶ Subqueries
- ▶ DDL Command

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▶ Subqueries

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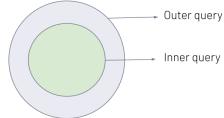


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▶ Introduction

A subquery is a **SELECT** statement that is nested within another statement. The subquery is also called the inner query or nested query.



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▶ Syntax

```
1 SELECT column_name  
2 FROM table_1, table_2  
3 WHERE column_name OPERATOR (  
4     SELECT column_name  
5     FROM table_1, table_2);  
6 |
```

The diagram illustrates the syntax of a subquery. It shows a main query structure with annotations: the WHERE clause is labeled as 'Outer query or enclosing query', and the inner SELECT statement is labeled as 'Inner query, nested query or subquery'.

- Subqueries are nested queries that provide data to the enclosing query.
- Subqueries can return individual values or a list of records
- Subqueries must be enclosed with parentheses

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▶ Introduction

A subquery may be used in:

- SELECT clause
- FROM clause
- WHERE clause



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► Types of Subqueries ➤

There are two main types of subqueries:

- Single-row subqueries
- Multiple-row subqueries

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► Single-row Subqueries ➤

Single-row subqueries return one row with only one column and are typically used with single-row operators such as =, >, >=, <=, <>, != especially in WHERE clause.

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► Example

Find the employees who get paid more than Rodney Weaver

employees table						query:	
emp_id	first_name	last_name	salary	job_title	gender		
1	17679	Robert	Glennore	110000	Operations Director	Male	2018-09-04
2	26569	Elsie	Ritter	86000	Sales Manager	Male	2017-11-24
3	30540	Gwen	Borne	83000	Data Scientist	Male	2019-12-02
4	49714	Hugh	Forster	55000	IT Support Specialist	Male	2019-11-22
5	51821	Linda	Foster	95000	Data Scientist	Female	2018-04-29
6	67323	Lee	Weaver	75000	Business Analyst	Female	2018-08-09
7	70590	Rodney	Weaver	87000	Project Manager	Male	2018-12-20
8	71320	Geyle	Weaver	75000	Web Developer	Female	2018-06-29
9	76589	Jason	Christian	90000	Project Manager	Male	2019-01-21
10	87927	Billie	Lanning	47000	Web Developer	Female	2018-06-25

```
3 SELECT first_name, last_name, salary
4 FROM employees
5 WHERE salary >
6 (SELECT salary
7 FROM employees
8 WHERE first_name = "Rodney");
```

output:

1	first_name	last_name	salary
2	Robert	Glennore	110000
3	Robert	Gilmore	110000
4	Linda	Foster	95000
5	Jason	Christian	90000



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► Analyze the query-1

employees table						query:	
emp_id	first_name	last_name	salary	job_title	gender		
1	17679	Robert	Glennore	110000	Operations Director	Male	2018-09-04
2	26569	Elsie	Ritter	86000	Sales Manager	Male	2017-11-24
3	30540	Gwen	Borne	83000	Data Scientist	Male	2019-12-02
4	49714	Hugh	Forster	55000	IT Support Specialist	Male	2019-11-22
5	51821	Linda	Foster	95000	Data Scientist	Female	2018-04-29
6	67323	Lee	Weaver	75000	Business Analyst	Female	2018-08-09
7	70590	Rodney	Weaver	87000	Project Manager	Male	2018-12-20
8	71320	Geyle	Weaver	75000	Web Manager	Female	2018-06-28
9	76589	Jason	Christian	90000	Project Manager	Male	2019-01-21
10	87927	Billie	Lanning	47000	Web Developer	Female	2018-06-25

1 The inner query is executed first and returns 87000 which is the salary of Rodney.



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► Analyze the query-2

employees table							
emp_id	first_name	last_name	salary	job_title	gender	hire_date	
1	17679	Robert	Glennor	110000	Operations Director	Male	2018-09-04
2	26650	Ehva	Ittter	86000	Sales Manager	Male	2017-11-24
3	30840	David	Barrow	85000	Data Scientist	Male	2019-12-02
4	47719	Lago	Forester	59000	IT Support Specialist	Male	2018-07-12
5	51821	Linda	Fugget	60000	Software Engineer	Female	2019-04-29
6	67232	Rodney	Werner	72000	Business Analyst	Female	2018-08-09
7	71320	Rodney	Werner	87000	Project Manager	Male	2018-12-20
8	71320	Gavyle	Peyter	72000	HR Manager	Female	2018-06-28
9	76589	Jason	Christian	99000	Project Manager	Male	2019-01-21
10	87927	Billie	Lanning	67000	Web Developer	Female	2018-06-25

- 1 The inner query is execute first and returns 87000 which is the salary of Rodney.

- 2 The value 87000 is passed to the outer query, in particular to the WHERE clause.

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► Analyze the query-3

employees table							
emp_id	first_name	last_name	salary	job_title	gender	hire_date	
1	17679	Robert	Glennor	110000	Operations Director	Male	2018-09-04
2	26650	Ehva	Ittter	86000	Sales Manager	Male	2017-11-24
3	30840	David	Barrow	85000	Data Scientist	Male	2019-12-02
4	47719	Lago	Forester	59000	IT Support Specialist	Male	2018-07-12
5	51821	Linda	Fugget	60000	Software Engineer	Female	2019-04-29
6	67232	Rodney	Werner	72000	Business Analyst	Female	2018-08-09
7	71320	Rodney	Werner	87000	Project Manager	Male	2018-12-20
8	71320	Gavyle	Peyter	72000	HR Manager	Female	2018-06-28
9	76589	Jason	Christian	99000	Project Manager	Male	2019-01-21
10	87927	Billie	Lanning	67000	Web Developer	Female	2018-06-25

- 1 The inner query is execute first and returns 87000 which is the salary of Rodney.

- 2 The value 87000 is passed to the outer query, in particular to the WHERE clause.

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► Analyze the query-4

```
2   SELECT first_name, last_name, salary
3   FROM employees
4   WHERE salary > 87000
5
6   (SELECT salary
7   FROM employees
8   WHERE first_name = "Rodney");
```

output:

first_name	last_name	salary
Robert	Gilmore	118000
Linda	Foster	95000
Jason	Christian	99000

- 1 The inner query is execute first and returns 87000 which is the salary of Rodney.
- 2 The value 87000 is passed this value to the outer query, in particular to the WHERE clause.

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Example

Find out the employees who get paid more than the average salary

employees table						
emp_id	first_name	last_name	salary	job_title	gender	hire_date
1	12767	Robert	98000	Operations Director	Male	2018-09-04
2	26650	Irene	86000	Sales Manager	Male	2017-11-24
3	30840	David	85000	Data Scientist	Male	2019-12-02
4	49714	Hugo	55000	IT Support Specialist	Male	2019-11-22
5	51821	Linda	95000	Data Scientist	Female	2019-04-29
6	67732	Lisa	75000	Business Analyst	Female	2018-08-09
7	70950	Rodney	87000	Project Manager	Male	2018-12-20
8	71239	Gayle	77000	HR Manager	Female	2019-06-28
9	75859	Jason	99000	Project Manager	Male	2019-01-21
10	97927	Bille	67000	Web Developer	Female	2018-06-25

```
1 SELECT first_name, last_name, salary
2 FROM employees
3 WHERE salary >
4   (SELECT AVG(salary) |
5    FROM employees);
```

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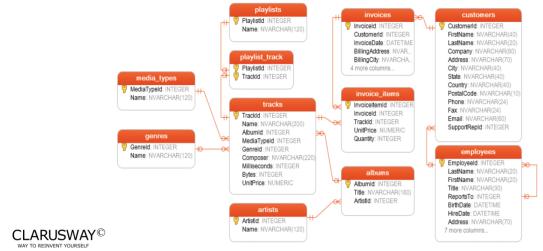
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Retrieve track id, track name, album id info of the Album title 'Faceless'. (use : Subquery)



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Most queries using a join can be rewritten using a subquery (a query nested within another query), and most subqueries can be rewritten as joins.

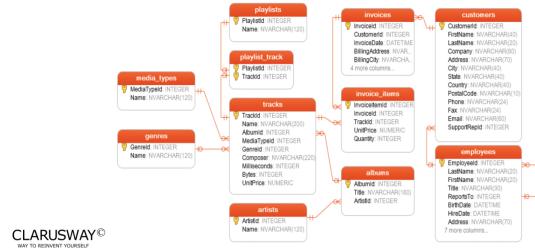
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Retrieve track id, track name, album id info of the Album title 'Faceless'. (**use : Joins**)



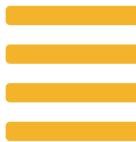
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► Multiple-row Subqueries

Multiple-row subqueries return sets of rows and are used with multiple-row operators such as **IN, NOT IN, ANY, ALL**.



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► Example

employees table						
emp_id	first_name	last_name	salary	job_title	gender	hire_date
1	17679	Robert	610000	Operations Director	Male	2010-09-04
2	26640	Ritter	480000	Cash Manager	Male	2010-09-24
3	30040	David	850000	Controller	Male	2010-09-12
4	49714	Hugo	55000	IT Support Specialist	Male	2010-11-22
5	51821	Linda	95000	Data Scientist	Female	2010-04-29
6	67232	Linda	75000	Business Analyst	Female	2010-08-09
7	70001	Satya	850000	Project Manager	Male	2010-03-08
8	71329	Gad	77000	HR Manager	Female	2010-06-28
9	76389	Jason	96000	Project Manager	Male	2010-01-21
10	97027	Bill	67000	Web Developer	Female	2010-04-25

Find the employees (first name, last name from employees table) who work under the Operations department (departments table)

query:

```
1 SELECT first_name, last_name
2 FROM employees
3 WHERE dept_id = 1
4 (SELECT emp_id
5 FROM departments
6 WHERE dept_name = 'Operations')
7 |
```

departments table		
emp_id	dept_name	dept_id
1	17679	Operations
2	26640	Marketing
3	30040	Marketing
4	49714	Technology
5	51821	Operations
6	67232	Marketing
7	70001	Marketing
8	71329	Operations
9	97027	Technology

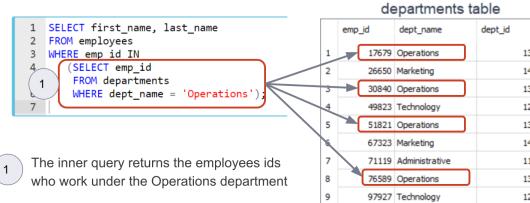
output:

```
1 first_name last_name
2 Robert Ritter
3 David Barros
4 Hugo Foster
5 Linda Foster
6 Jason Christian
7 |
```

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► Analyze the query-1



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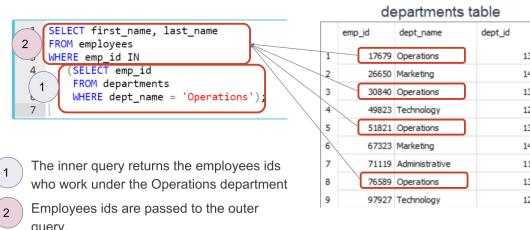


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► Analyze the query-2

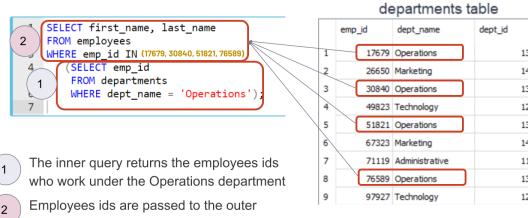


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► Analyze the query-3



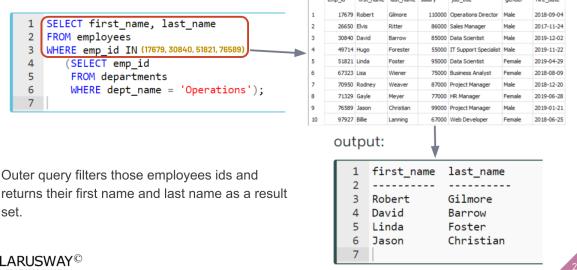
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► Analyze the query-4



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Retrieve track id, track name, album id info of the Album title 'Faceless' and 'Let There Be Rock'



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► DDL Commands

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- ▶ Introduction
- ▶ Data Types
- ▶ CREATE TABLE
- ▶ ALTER TABLE
- ▶ DROP TABLE

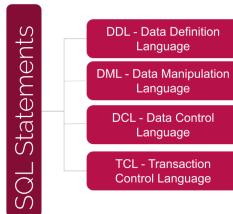
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▶ Introduction ➤



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► Data Definition Language ➤

- DDL specifies the database schema.
- Some statements used in DDL are **CREATE, ALTER, DROP**.
- DDL statements are typically used to set up and configure a new database before we insert data.

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► Data Manipulation Language ➤

- Data Manipulation Language (DML) enables users to access or manipulate data.
- **INSERT, UPDATE, DELETE, SELECT*** are the statements used in DML.

* In some sources, SELECT statement is grouped into a different category called DQL (Data Query Language).

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► Data Control Language



- Data Control Language (DCL) is used to grant or revoke access control.
- Its statements are **REVOKE** and **GRANT**.

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► Transaction Control Language



- Transaction Control Language (TCL) controls the transactions of DML and DDL commands.
- Some statements in TCL are **COMMIT**, **ROLLBACK**, **SAVEPOINT**.

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2 Data Types

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► Data Types



The data type of a column defines what value the column can hold: integer, character, date and time, binary, and so on.

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► Data Types

String

Numeric

Date and Time

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► String Data Types

The string data types are:

- CHAR
- VARCHAR
- BINARY
- VARBINARY
- BLOB
- TEXT
- ENUM
- SET

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Link(s) on this slide:

- <https://dev.mysql.com/doc/refman/8.0/en/char.html>
- <https://dev.mysql.com/doc/refman/8.0/en/char.html>
- <https://dev.mysql.com/doc/refman/8.0/en/binary-varbinary.html>
- <https://dev.mysql.com/doc/refman/8.0/en/blob.html>
- <https://dev.mysql.com/doc/refman/8.0/en/blob.html>
- <https://dev.mysql.com/doc/refman/8.0/en/enum.html>
- <https://dev.mysql.com/doc/refman/8.0/en/set.html>

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► Date and Time Data Types



The date and time data types are:

- DATE
- DATETIME
- YEAR

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► Numeric Data Types



Integer Types (Exact Value)

- INTEGER or INT
- SMALLINT
- TINYINT
- MEDIUMINT
- BIGINT

Floating-Point Types (Approximate Value)

- FLOAT
- DOUBLE

Fixed-Point Types (Exact Value)

- DECIMAL
- NUMERIC

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► Data Types



Data types might have different names in different database. And even if the name is the same, the size and other details may be different! Always check the documentation!

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3 ► CREATE TABLE

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► CREATE TABLE



When creating a table, we use **CREATE TABLE** statement.

Syntax of a Basic Create Table Statement

```
CREATE TABLE table_name  
    (column_name1 data_type,  
     column_name2 data_type);
```

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► CREATE TABLE-Example



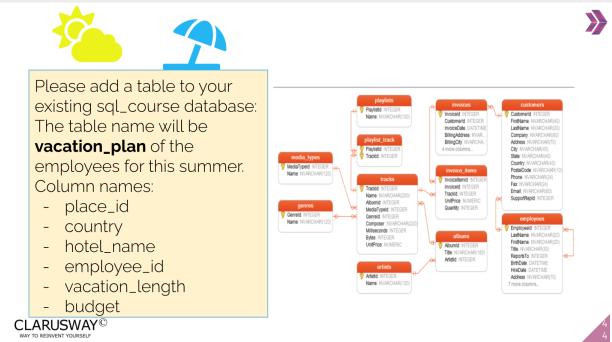
```
CREATE TABLE employee  
    (first_name VARCHAR(15),  
     last_name VARCHAR(20),  
     age INT,  
     hire_date DATE);
```

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► DROP TABLE

The DROP TABLE statement is used to drop an existing table in a database.

Syntax:

```
DROP TABLE table_name;  
TRUNCATE TABLE table_name;
```

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► INSERT INTO

INSERT DATA to our vacation_plan table

Syntax:

```
INSERT INTO table_name (column1, column2 ...)
VALUES( value1, value2 ...);
```

```
INSERT INTO table1 (column1,column2 ...)
VALUES
(value1,value2 ,...),
(value1,value2 ,...),
...
(value1,value2 ,...);
```



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► Constraints

Constraints are the rules specified for data in a table. We can limit the type of data that will go into a table with the constraints. We can define the constraints with the **CREATE TABLE** statement or **ALTER TABLE** statement.



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► Constraints

Constraints

Constraint Name	Definition
NOT NULL	Ensures that a column cannot have a NULL value
DEFAULT	Sets a default value for a column when no value is specified
UNIQUE	Ensures that all values in a column are different
PRIMARY KEY	Uniquely identifies each row in a table
FOREIGN KEY	Uniquely identifies a row/record in another table

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► Primary Key



The primary key is a column in our table that makes each row (aka, record) unique.

Syntax

```
1 CREATE TABLE table_name(  
2     column_1 INT PRIMARY KEY,  
3     column_2 TEXT,  
4     ...  
5 );  
6
```

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► Primary Key



Syntax (Alternative)

```
1 CREATE TABLE table_name(  
2     column_1 INT,  
3     column_2 TEXT,  
4     ...  
5     PRIMARY KEY (column_1)  
6 );
```

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► Foreign Key



Foreign key is a column in a table that uniquely identifies each row of another table. That column refers to a primary key of another table. This creates a kind of link between the tables.

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► Foreign Key

customers

```
1 CREATE TABLE customers (customer_id INT PRIMARY KEY,  
2 first_name TEXT,  
3 second_name TEXT);  
4
```

orders

```
1 CREATE TABLE orders (  
2 order_id INT PRIMARY KEY,  
3 order_number INT,  
4 customer_id INT,  
5 FOREIGN KEY (customer_id)  
6 REFERENCES customers (customer_id)  
7 );  
8
```

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► Not Null



A column can include NULL values. A NULL value is a special value that means the value is unknown or does not exist.

All columns (except primary key's column) in a table can hold NULL values unless we explicitly specify **NOT NULL** constraints.

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▶ Not Null

Syntax

```
1 CREATE TABLE table_name (
2     column_name type_name NOT NULL,
3     ...
4 );
```

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Please drop the table as you've just created writing
DROP TABLE vacation_plan;
Then, recreate the vacation_plan table adding constraints as below:
Column names:
- place_id -> PRIMARY KEY
- country
- hotel_name -> NOT NULL
- employee_id -> FOREIGN KEY
- vacation_length
- budget

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4 ▶ ALTER TABLE

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▶ ALTER TABLE



The **ALTER TABLE** statement is used to add, delete, or modify columns in an existing table. It is also used to add and drop various constraints on an existing table.

To add a column in a table, use the following syntax:

```
ALTER TABLE table_name  
ADD column_name data_type;
```

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Add a column to your vacation_plan table named "city".

```
ALTER TABLE table_name  
ADD column_name data_type;
```

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► ALTER TABLE



To delete a column in a table, use the following syntax:

```
ALTER TABLE table_name  
DROP column_name;
```

To change the data type of a column in a table, use the following syntax:

```
ALTER TABLE table_name  
MODIFY COLUMN column_name data_type;
```

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Drop the city column from vacation_plan table.

```
ALTER TABLE table_name  
DROP column_name;
```

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