DATA AND
ARTIFICIAL INTELLIGENCE

Working with Operators, Constraints and Data Types

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Learning Objectives

By the end of this lesson, you will be able to:

- Identify the different types of operators in MySQL
- Determine the levels of data in SQL
- List the different MySQL constraints
- Differentiate between the data types in SQL

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MySQL Operators

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MySQL Operators

- An operator is a reserved word or character used with the WHERE clause of an SQL statement.
- It specifies a condition in the SQL statement.

Arithmetic Operators

Arithmetic operators are used to perform arithmetic operations in SQL.

Consider variables: a = 5 and b = 10

Operator	Description	Example
+	Addition of two operands	a + b = 15
-	Subtraction of two operands	a – b = -5
*	Multiplication of two operands	a * b = 50
/	Division of two operands	a / b = 0.5
%	Modulus or remainder from the division	a % b = 0

Arithmetic Operators

Syntax

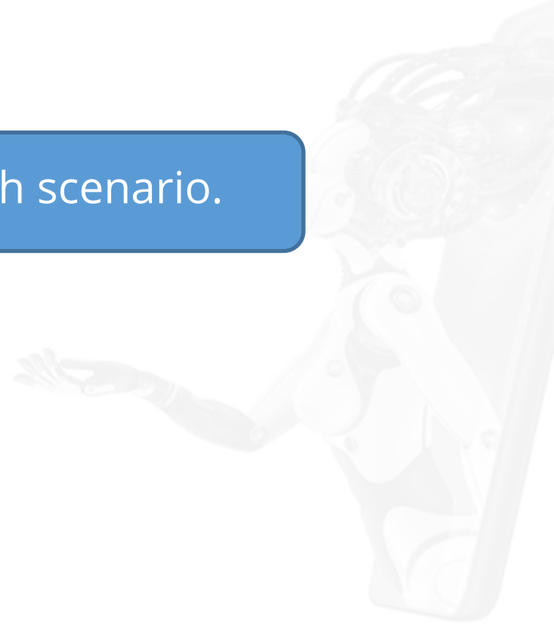
```
SELECT column 1 + column 2 FROM table 1

SELECT column 1 * column 2 FROM table 2
```

Arithmetic Operators: Example

Problem Statement: You are a junior analyst in your organization. You need to help the HR team determine salaries of employees for different scenarios.

Objective: Use arithmetic operators to determine the new values based on each scenario.



Arithmetic Operators: Example

Consider the employee table given below, which has columns: Emp_ID, Emp_First_Name, Emp_Last_Name, Emp_Salary, and Emp_Annual_Bonus.

Emp_ID	Emp_F_Name	Emp_L_Name	Emp_Salary	Emp_Annual Bonus
1134	Mark	Jacobs	20000	1500
1256	John	Barter	25000	1000
1277	Michael	Scar	22000	1000
1300	Dan	Harris	30000	2000

Arithmetic Operators: Example

If you want to add the salary and bonus, use the addition operator. You get the following results.

Syntax

```
SELECT Emp_ID, Emp_Salary +Emp_Annual_Bonus as Emp_Total_Earning FROM
Employee_Records;
```

Emp_ID	Emp_Total_Earning
1134	21500
1256	26000
1277	23000
1300	32000

Arithmetic Operators: Example

Suppose for the same table there is another column named deductions, and you are required to deduct this amount from the final earning. Here, you should use the subtract operator.

Emp_ID	Deductions
1256	200
1300	150

Syntax

```
SELECT Emp_ID, Emp_Salary – Deductions as Emp_Final_Earning FROM
Employee_Records;
```

Emp_ID	Emp_Final_Earning
1134	20000
1256	24800
1277	22000
1300	29850

Arithmetic Operators: Example

If you want to increase the salary of employees by two times, then you must use the multiplication operator to get the following results.

Syntax

```
SELECT Emp_Salary * 2 as New_Salary FROM Employee_Records;
```

Emp_ID	New_Salary
1134	40000
1256	50000
1277	44000
1300	60000

Arithmetic Operators: Example

Similarly, if you want to reduce the salary of each employee by 50%, then you can use the division operator to obtain the following results.

Syntax

```
SELECT Emp_Salary / 2 as New_Salary FROM Employee_Records;
```

	Emp_ID	New_Salary
▶	1134	10000.0000
	1256	12500.0000
	1277	11000.0000
	1300	15000.0000

Bitwise Operators

Bitwise operators perform bit manipulations between two expressions of integer data type.

Operator	Description
&	AND
|	OR
^	Exclusive OR

They take two integer values, convert them to binary bits, and then apply AND, OR, or NOT operations on each bit.

Bitwise Operators: Example

Consider the same employee table used for arithmetic operators. If you want to apply Bitwise AND on salary and annual bonus, use the syntax below.

Syntax

```
SELECT Emp_Salary & Emp_Annual_Bonus from Employee_Records;
```

Emp_Salary & Emp_Annual_Bonus
1024
424
480
1296

Bitwise Operators: Example

For Bitwise OR operation, use the syntax given below.

Syntax

```
SELECT Emp_Salary | Emp_Annual_Bonus from Employee_Records;
```

Emp_Salary | Emp_Annual_Bonus
20476
25576
22520
30704

Comparison Operators

Comparison operators compare values between operands and return TRUE or FALSE based on the condition.

Operator	Description
=	Equal to
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to
<>	Not equal to

Syntax

```
SELECT * FROM table1 WHERE column1 >= Condition
```

Comparison Operators: Example

The example that was shown before has been used here. If you want to find the employees whose salary is more than 2500, then you use the *greater than* operator.

Syntax

```
SELECT Emp_ID, Emp_Salary from Employee_Records WHERE Emp_Salary > 25000;
```

	Emp_ID	Emp_Salary
▶	1300	30000

Similarly, other comparison operators like less than, equal to, greater than equal to, or less than equal to can be used based on the requirement.

Compound Operators

Compound operators operate where variables are operated upon and assigned in the same line.

Compound Operators	Description
+=	Add equals
-=	Subtract equals
*=	Multiply equals
/=	Divide equals
%=	Modulo equals
&=	Bitwise AND equals
^-=	Bitwise exclusive equals
|*=	Bitwise exclusive OR equals

Syntax

```
SELECT column1+= condition FROM table1;
```

Logical Operators

Logical operators compare two conditions at a time to determine whether a row can be selected for an output or not.

Logical operators	Description
AND	True if both conditions are true
OR	True if either condition is true
NOT	True if the condition is false
ALL	True if all subquery values meet the condition
ANY	True if any subquery value meets the condition
EXISTS	True if the subquery returns any row

Syntax

```
SELECT column_name(s) FROM table_name WHERE condition_1
LOGICAL_OPERATOR condition_2..
```

Logical Operators: Example

Consider the same employee records table. If you want to extract data based on two conditions, that are salary and location, then you use the AND operator.

Syntax

```
SELECT Emp_ID, Emp_Salary, Emp_Location from Employee_Records WHERE
Emp_Salary > 1000 AND Emp_Location = 'California';
```

	Emp_ID	Emp_Salary	Emp_Location
▶	1256	25000	California

Logical Operators: Example

If you want to extract data based on any one of the two conditions mentioned, that are salary or annual bonus, then you use OR operator.

Syntax

```
SELECT Emp_ID, Emp_Salary from Employee_Records WHERE Emp_Salary >
22000 OR Emp_Annual_Bonus <1000;
```

	Emp_ID	Emp_Salary
▶	1256	25000
	1300	30000

Logical Operators: Example

If you want to extract data by excluding a certain data record, that is, excluding employees from New York, then you use the NOT operator.

Syntax

```
SELECT Emp_ID, Emp_F_Name, Emp_L_Name from Employee_Records WHERE
Emp_Location NOT = 'New York';
```

Emp_ID	Emp_F_Name	Emp_L_Name
1256	John	Barter
1277	Michael	Scar
1300	Dan	Harris

Logical Operators: Example

If you want to extract data starting with a specific character or ending with a specific character, that is employees whose name starts with M, then the LIKE operator is used.

Syntax

```
SELECT Emp_ID, Emp_F_Name from Employee_Records WHERE Emp_F_Name
LIKE 'M%';
```

Emp_ID	Emp_F_Name
1134	Mark
1277	Michael

Assisted Practice: Logical Operator

Duration: 20 Min.

Problem Statement: You are required to use a logical operator to identify the candidates in the age group of 22 to 35 from the created table in the MySQL Workbench.

ASSISTED PRACTICE

Assisted Practice: Logical Operator

Steps to be performed:

1. Create a database **example**, then make a table **candidates** that has columns **FirstName**, **LastName**, and **Age**.

TABLE CREATION

```
CREATE TABLE `example`.`candidates` (
`FirstName` VARCHAR(255) NOT NULL,
`LastName` VARCHAR(255) NOT NULL,
`Age` INT NOT NULL);
```

ASSISTED PRACTICE

Assisted Practice: Logical Operator

Steps to be performed:

2. Insert values in the table **candidates**.

VALUE INSERTION

```
INSERT INTO `example`.`candidates` (`FirstName`, `LastName`, `Age`)
VALUES ('James', 'Smith', '23'),
('Maria ', 'Gracia', '21'),
('Michael ', 'Rodriguez', '27'),
('Robert ', 'Johnson', '41'),
('David', 'Hernandez', '27');
```

ASSISTED PRACTICE

Assisted Practice: Logical Operator

3. Write a query to select all the people in the age group of 22 to 35.

QUERY

```
SELECT * FROM example.candidates
WHERE Age BETWEEN 22 and 35;
```

ASSISTED PRACTICE

Assisted Practice: Lab Output

Result Grid | Filter Rows: | Export:

	FirstName	LastName	Age
▶	James	Smith	23
	Michael	Rodriguez	27
	David	Hernandez	27

ASSISTED PRACTICE

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Indexing in MySQL

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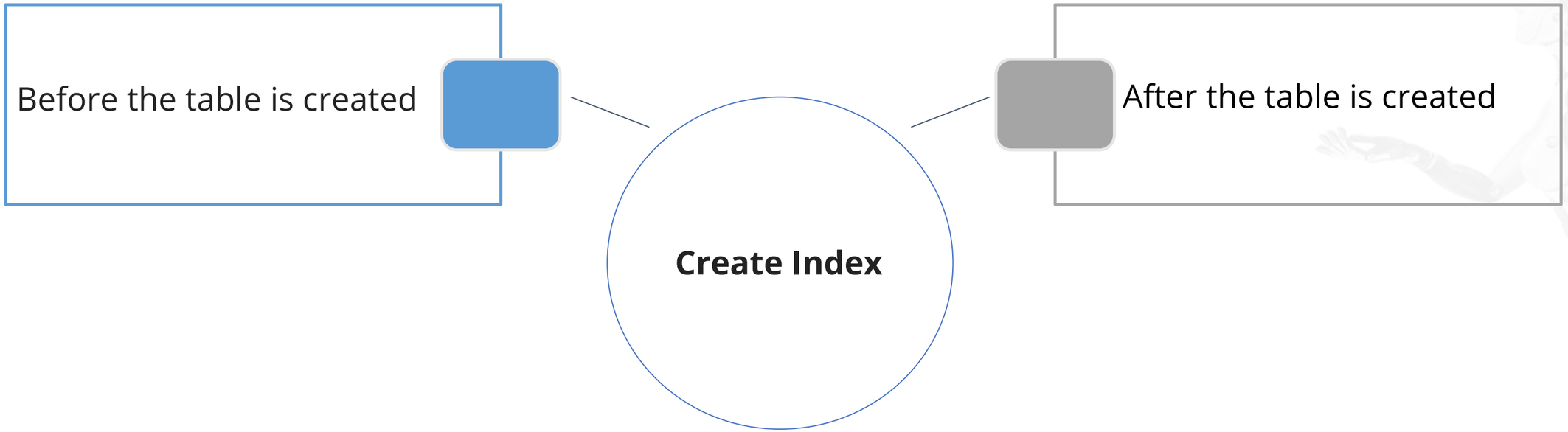
Indexing in MySQL

- MySQL indexes sort data in a logical and sequential order.

- Indexes are used to find rows with specific column values quickly.

Indexing in MySQL

There are two ways to create an index:



Indexing in MySQL

Before creating the table, use the following syntax:

Syntax

```
CREATE TABLE t_index
(
   col1 INT PRIMARY KEY,
   col2 INT NOT NULL,
   col3 INT NOT NULL,
   col4 VARCHAR(20),
  INDEX (col2,col3)
);
```

Indexing in MySQL

After creating the table, use the following syntax:

Syntax

```
CREATE INDEX id_index ON table_name(column_name);
```

Indexing in MySQL

Problem statement: Consider the junior DBA wants to improve the speed and result of the query by adding an index.

Objective: Implement indexing and get the desire result.

Instructions: Refer the emp_data table which was created and shown before.

Table Description

Field Name	Description
EMP_ID	Employee ID
FIRST_NAME	First name of the employee
LAST_NAME	Last name of the employee
GENDER	Gender of the employee (M/F)
ROLE	Designation of the employee (Junior, Senior, Lead, and Associate Data Scientist)
DEPT	Name of the department (Retail, Finance, Automotive, and Healthcare)

Table Description

Field Name	Description
EXP	Experience of the employee
COUNTRY	Country where the employee lives
CONTINENT	Continent based on the country
SALARY	Salary of the employee per month
EMP_RATING	Rating for the employee (1: Not Achieved Any Goals, 2: Below Expectations, 3: Meeting Expectations, 4: Excellent Performance, 5: Overachiever
MANAGER_ID	Employee ID for the manager

Indexing in MySQL

Use the following emp_data:

```
1 •    SELECT * FROM sys.emp_data;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

EMP_ID	FIRST_NAME	LAST_NAME	GENDER	ROLE	DEPT	EXP	COUNTRY	CONTINENT	SALARY	EMP_RATIN
E260	Roy	Collins	M	SENIOR DATA SCIENTIST	RETAIL	7	INDIA	ASIA	7000	3
E245	Nian	Zhen	M	SENIOR DATA SCIENTIST	RETAIL	6	CHINA	ASIA	6500	2
E620	Katrina	Allen	F	JUNIOR DATA SCIENTIST	RETAIL	2	INDIA	ASIA	3000	1
E640	Jenifer	Jhones	F	JUNIOR DATA SCIENTIST	RETAIL	1	COLOMBIA	SOUTH AMERICA	2800	4
E403	Steve	Hoffman	M	ASSOCIATE DATA SCIENTIST	FINANCE	4	USA	NORTH AMERICA	5000	3
E204	Karene	Nowak	F	SENIOR DATA SCIENTIST	AUTOMOTIVE	8	GERMANY	EUROPE	7500	5
E204	Karene	Nowak	F	SENIOR DATA SCIENTIST	AUTOMOTIVE	8	GERMANY	EUROPE	7500	5
E010	William	Butler	M	LEAD DATA SCIENTIST	AUTOMOTIVE	12	FRANCE	EUROPE	9000	2
E478	David	Smith	M	ASSOCIATE DATA SCIENTIST	RETAIL	3	COLOMBIA	SOUTH AMERICA	4000	4
E005	Eric	Hoffman	M	LEAD DATA SCIENTIST	FINANCE	11	USA	NORTH AMERICA	8500	3
E532	Claire	Brennan	F	ASSOCIATE DATA SCIENTIST	AUTOMOTIVE	3	GERMANY	EUROPE	4300	1
E583	Janet	Hale	F	MANAGER	RETAIL	14	COLOMBIA	SOUTH AMERICA	10000	2
E103	Emily	Grove	F	MANAGER	FINANCE	14	CANADA	NORTH AMERICA	10500	4
E612	Tracy	Norris	F	MANAGER	RETAIL	13	INDIA	ASIA	8500	4
E428	Pete	Allen	M	MANAGER	AUTOMOTIVE	14	GERMANY	EUROPE	11000	4
E002	Cynthia	Brooks	F	PRESIDENT	ALL	17	CANADA	NORTH AMERICA	14500	5
E002	Cynthia	Brooks	F	PRESIDENT	ALL	17	CANADA	NORTH AMERICA	14500	5

Indexing in MySQL

Execute the following statement to return the result of the employee who is a manager:

EMP_ID	FIRST_NAME	LAST_NAME
E583	Janet	Hale
E103	Emily	Grove
E612	Tracy	Norris
E428	Pete	Allen

Example:

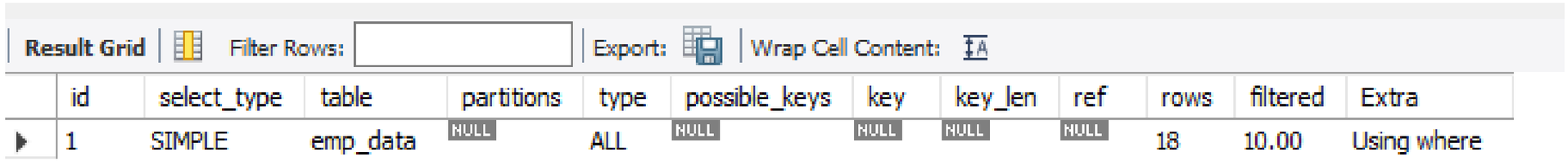
```
SELECT EMP_ID, FIRST_NAME, LAST_NAME
FROM  sys.emp_data WHERE ROLE
'MANAGER';
```

Indexing in MySQL

If you want to check how MySQL performs the previous query internally, execute the following query:

Example:

```
EXPLAIN SELECT EMP_ID, FIRST_NAME, LAST_NAME FROM  sys.emp_data WHERE
ROLE = 'MANAGER';
```


Result Grid | Filter Rows: | Export: | Wrap Cell Content:

	id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
▶	1	SIMPLE	emp_data	NULL	ALL	NULL	NULL	NULL	NULL	18	10.00	Using where

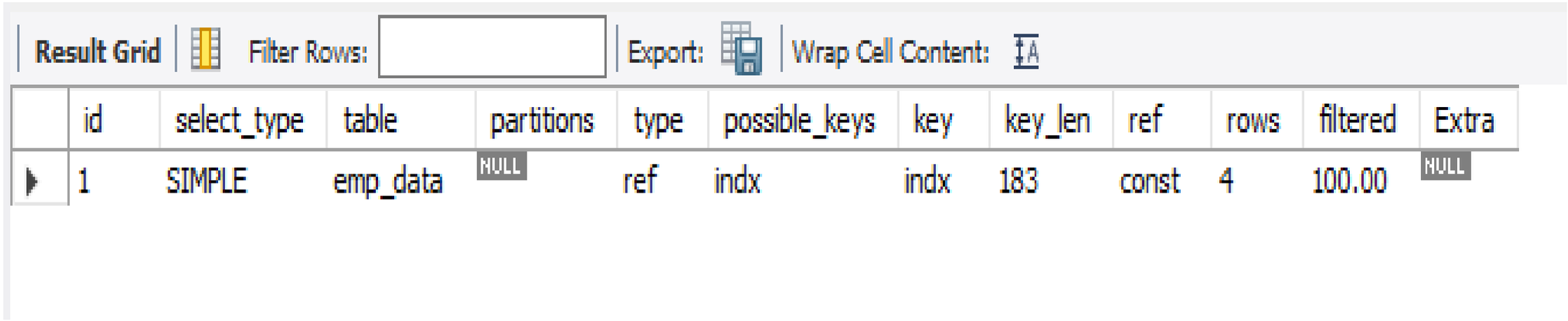
Indexing in MySQL

Create an index for a class column using the following query:

Example:

```
CREATE INDEX indx ON sys.emp_data (role);


EXPLAIN SELECT EMP_ID, FIRST_NAME, LAST_NAME FROM  sys.emp_data WHERE
ROLE = 'MANAGER';
```



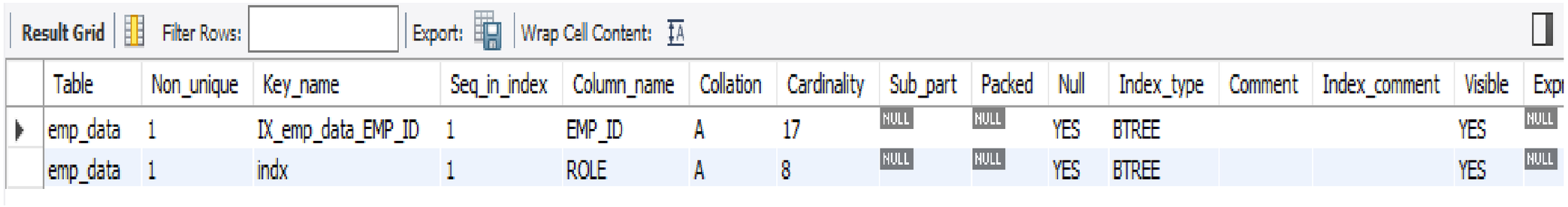
	id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
▶	1	SIMPLE	emp_data	NULL	ref	indx	indx	183	const	4	100.00	NULL

Indexing in MySQL

If you want to show the indexes of a table, execute the following query:

Example:

```
SHOW INDEXES FROM sys.emp_data;
```



Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Table	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part	Packed	Null	Index_type	Comment	Index_comment	Visible	Expr
emp_data	1	IX_emp_data_EMP_ID	1	EMP_ID	A	17	NULL	NULL	YES	BTREE			YES	NULL
emp_data	1	indx	1	ROLE	A	8	NULL	NULL	YES	BTREE			YES	NULL

Indexing in MySQL

If you want to drop the index of a table, execute the following query:

Example:

```
DROP INDEX `indx` ON `emp_data`;

SHOW INDEXES FROM sys.emp_data;
```

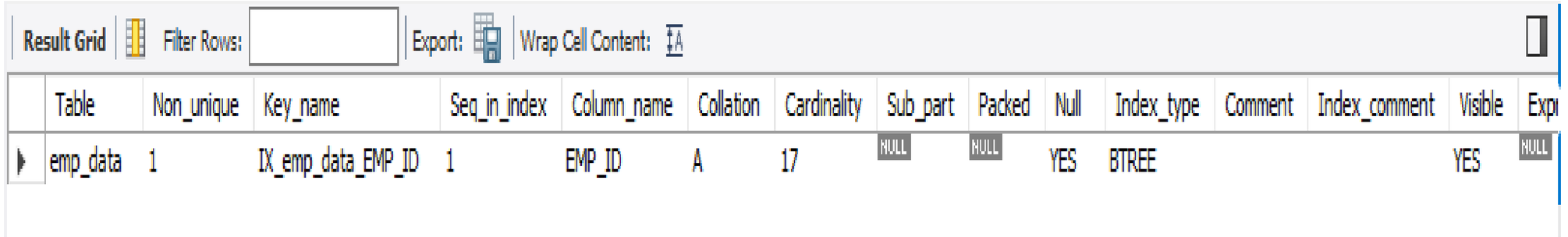


Table	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part	Packed	Null	Index_type	Comment	Index_comment	Visible	Expr
emp_data	1	IX_emp_data_EMP_ID	1	EMP_ID	A	17	NULL	NULL	YES	BTREE			YES	NULL

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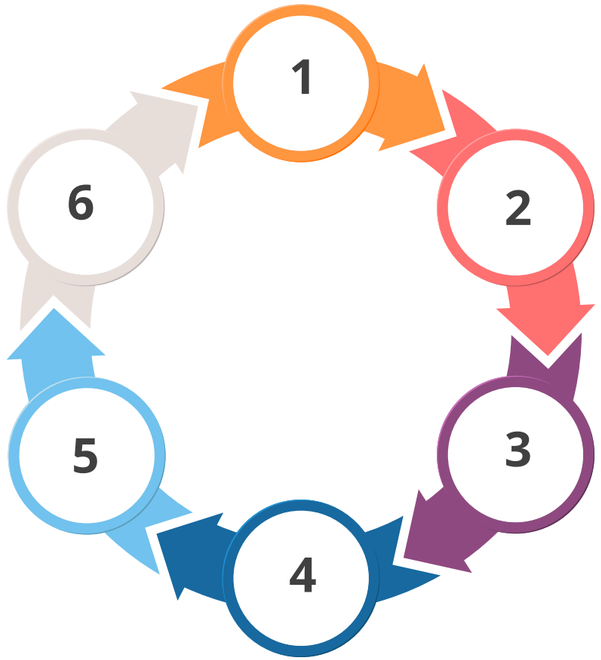
Order of Execution in SQL

Order of Execution in SQL

SELECT
Returns or derives the required data



FROM
Selects the table from which the data is obtained

JOIN
Derives common data from a different table

WHERE
Applies a condition to filter data

GROUP BY
Aggregates the data

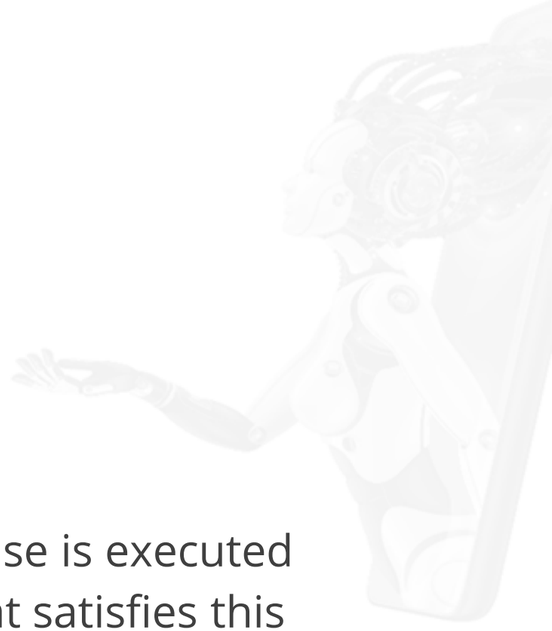
HAVING
Filters the aggregated data

Order of Execution: Example

Consider the following syntax taken from the example of logical operators.

Syntax

```
SELECT Emp_ID, Emp_F_Name from Employee_Records WHERE Emp_F_Name
LIKE 'M%';
```



Here, the **FROM** clause is executed first to determine the table. Next, the **WHERE** clause is executed to determine the condition. The **SELECT** statement is executed to extract the data that satisfies this condition in the table.

Order of Execution: Example

Consider that you have a **customers** table with customer ID, customer name, and their location.

If you want to identify the locations of more than five customers, then use the following syntax.

Syntax

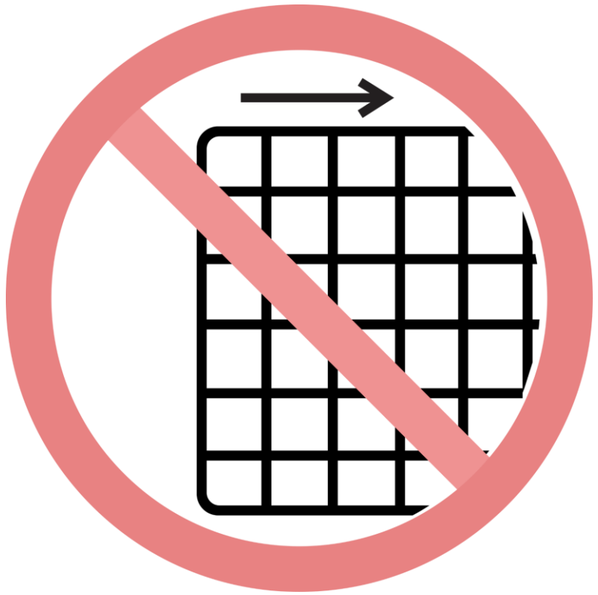
```
SELECT COUNT(CustomerID), Location FROM Customers GROUP BY Location,
HAVING COUNT(CustomerID) > 5;
```

Here, the **FROM** clause is executed first to determine the table. Next, the **GROUP BY** clause aggregates the same location records. It is followed by the **HAVING** clause that determines the condition. The **SELECT** statement is executed to extract the data that satisfies this condition in the table.

MySQL Constraints

MySQL Constraints

Constraint is a condition that specifies the type of data that can be entered into a table.



There are two types of constraints in MySQL:

- Column level restrictions
- Table level restrictions

NOT NULL Constraint

NOT NULL constraint prevents the column from having NULL or empty values.

Example

```
CREATE table Employee (ID int, First_Name text NOT NULL, Last_Name text NOT_NULL, City VARCHAR(30))
```

Primary Constraint

Primary constraint provides a distinct identity to each record in a table. A table can only have one primary key.

Example

```
CREATE table People (ID int Primary Key, Name varchar (30) NOT NULL, Age int)
```

Primary and NOT NULL Constraints: Example

Problem Statement: As a product manager, you are required to create a table with product details, such as product ID which is the primary key, product name, and date of manufacturing which is not a not value.

Example

```
CREATE table Product_Details (Pro_ID int Primary Key, Pro_Name varchar (30) NOT NULL, Date_Manf DATE);
```

Primary and NOT NULL Constraints: Example

After creating the table, if there is no record for the **NOT NULL** field as shown below, then you are prompted with an error.

Example

```
insert into Product_Details (Pro_ID, Date_Manf) values (151, "2021-02-24");
```

Error Code: 1364. Field 'Pro_Name' doesn't have a default value

Foreign Key Constraint

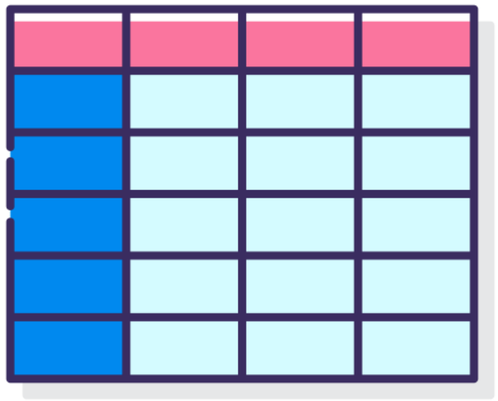
Foreign key constraint is used to connect two tables. It corresponds to the primary key of a different table.

Example

```
CREATE table Teachers (Teacher_ID int Primary Key, Name varchar (30) NOT NULL, Age int, College_ID int Foreign Key )
```

Disable Foreign Key Check

Foreign key check is a feature in SQL that prevents us from making any changes to tables that have foreign keys in them.



- If you want to make changes to the table, disable the foreign key check, make changes, and enable the key again.
- You can disable it by assigning zero to foreign key check.

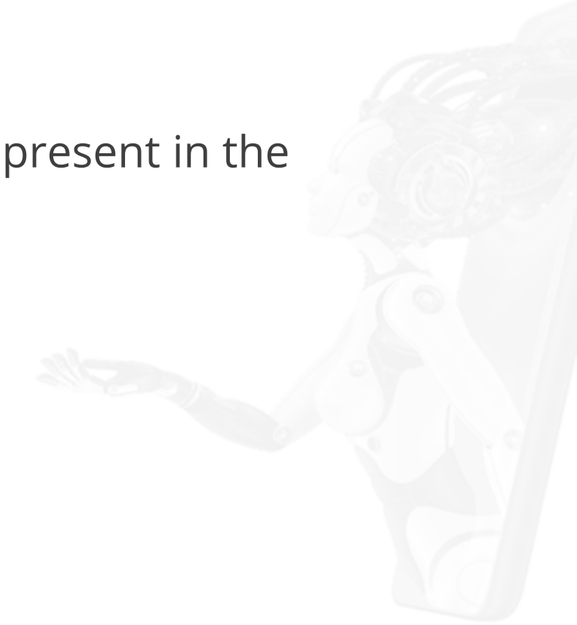
Example

```
SET foreign_key_checks = 0
```

Foreign Key Constraint: Example

Problem statement: You are the sales manager of a store. You have data of your customers and their orders in two different tables. You must ensure that the customer data added to the table on orders is not different from the original data.

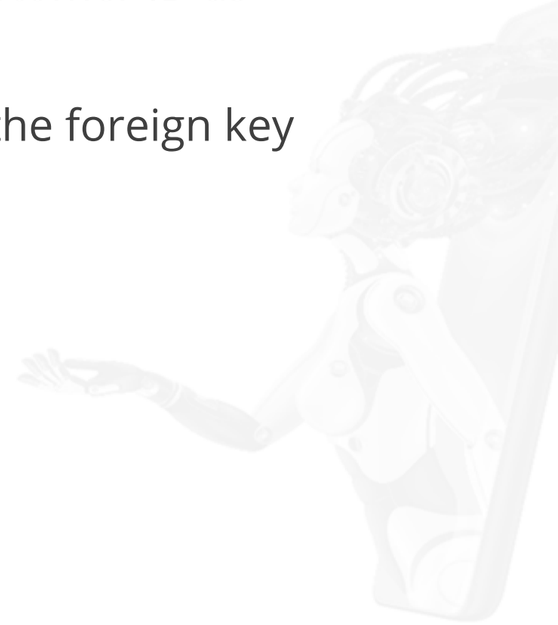
Objective: Use a foreign key to specify the column that must contain only the data present in the primary table.



Foreign Key Constraint: Example

Steps to perform:

- Create a table with data on customers, like customer name, last name, age, and customer ID as primary key
- Create a table with data on orders, with order ID, order number, and person ID as the foreign key
- Set foreign key to zero to ensure that there are no external changes



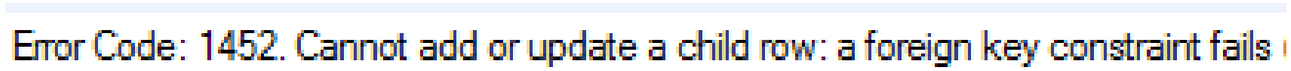
Foreign Key Constraint: Example

After creating the two tables, set foreign check to zero and insert them with the following data:

Example

```
insert into customers (Customer_ID, First_Name, Last_Name, Age) values (1,'Mark', 'Bouncer',
23),(2,'Max','Hussey',34),(3,'Harry','James',44);
insert into orders (Order_ID, Order_Number, Customer_ID) VALUES (1,7765,3),(2,7734,3),(3,7789,2)
```

If you try to enter any customer ID that is not present in the customers table, MySQL will prompt an error.



Unique Constraint

Unique constraint ensures that there are no entries with the same value in a column.

Example

```
Create table Names (ID int NOT NULL, Name varchar (30), Age int, UNIQUE (ID))
```

Unique Constraint: Example

Create a table named **names** using the syntax shown before. Add values to this table.

Example

```
insert into names (ID, Name, Age) values (1, 'George', 35),(2, 'Lily', 28);
```

You can see that there is an ID with 2 as value. If you try to enter a new record with the same ID, you will be prompted with the following error.

```
Error Code: 1062. Duplicate entry '2' for key 'names.ID'
```

Check Constraints

Check constraint can be used to verify the value being entered into a record.

Example

```
Create table Tenants (ID int NOT NULL, Name varchar (30), Age int, Check (Age >=18))
```

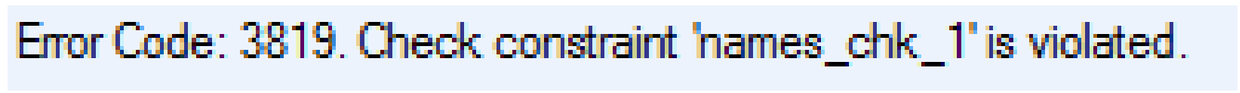
Check Constraints: Example

Consider the example shown before for unique constraint. Add the check condition to verify that ID is not more than 10.

Example

```
Create table Names (ID int NOT NULL, Name varchar (30), Age int, UNIQUE (ID), Check (ID<=10));
```

When the ID entered is more than 10, the you will get the following error prompt.



Check Constraints Emulation

These constraints are used to emulate the CHECK constraints.

The two MySQL triggers used are:

BEFORE INSERT

BEFORE UPDATE

Assisted Practice: Constraint

Duration: 10 Min.

Problem Statement: You are required to create a new table with constraints and assign **Candidate_No.** as the **primary key** in the MySQL Workbench.

ASSISTED PRACTICE

Assisted Practice: Constraint

Steps to be performed:

1. Create a table named **candidates**, name columns as **Candidate_No.**, **FirstName**, **LastName**, and **Age**, and assign **Candidate_No.** as the **primary key**.

TABLE CREATION

```
CREATE TABLE `example`.`candidates` (
`Candidate_No.` INT NOT NULL,
`FirstName` VARCHAR(255) NOT NULL,
`LastName` VARCHAR(255) NOT NULL,
`Age` INT NOT NULL,  PRIMARY KEY (`Candidate_No.`));
```

ASSISTED PRACTICE

Assisted Practice: Lab Output

Column Name	Datatype	PK	NN	UQ	B	UN	ZF	AI	G	Default/Expression
Candidate_No.	INT	☑	☑	☐	☐	☐	☐	☐	☐	
FirstName	VARCHAR(255)	☐	☑	☐	☐	☐	☐	☐	☐	
LastName	VARCHAR(255)	☐	☑	☐	☐	☐	☐	☐	☐	
Age	INT	☐	☑	☐	☐	☐	☐	☐	☐	
DOB	DATE	☐	☑	☐	☐	☐	☐	☐	☐	

Column Name: Candidate_No.

Charset/Collation: Default Charset / Default Collation

Comments:

Data Type: INT

Default:

Storage: ○ Virtual ○ Stored

☑ Primary Key ☑ Not Null ☐ Unique

☐ Binary ☐ Unsigned ☐ Zero Fill

☐ Auto Increment ☐ Generated

ASSISTED PRACTICE

DATA AND
ARTIFICIAL INTELLIGENCE

SQL Data Types

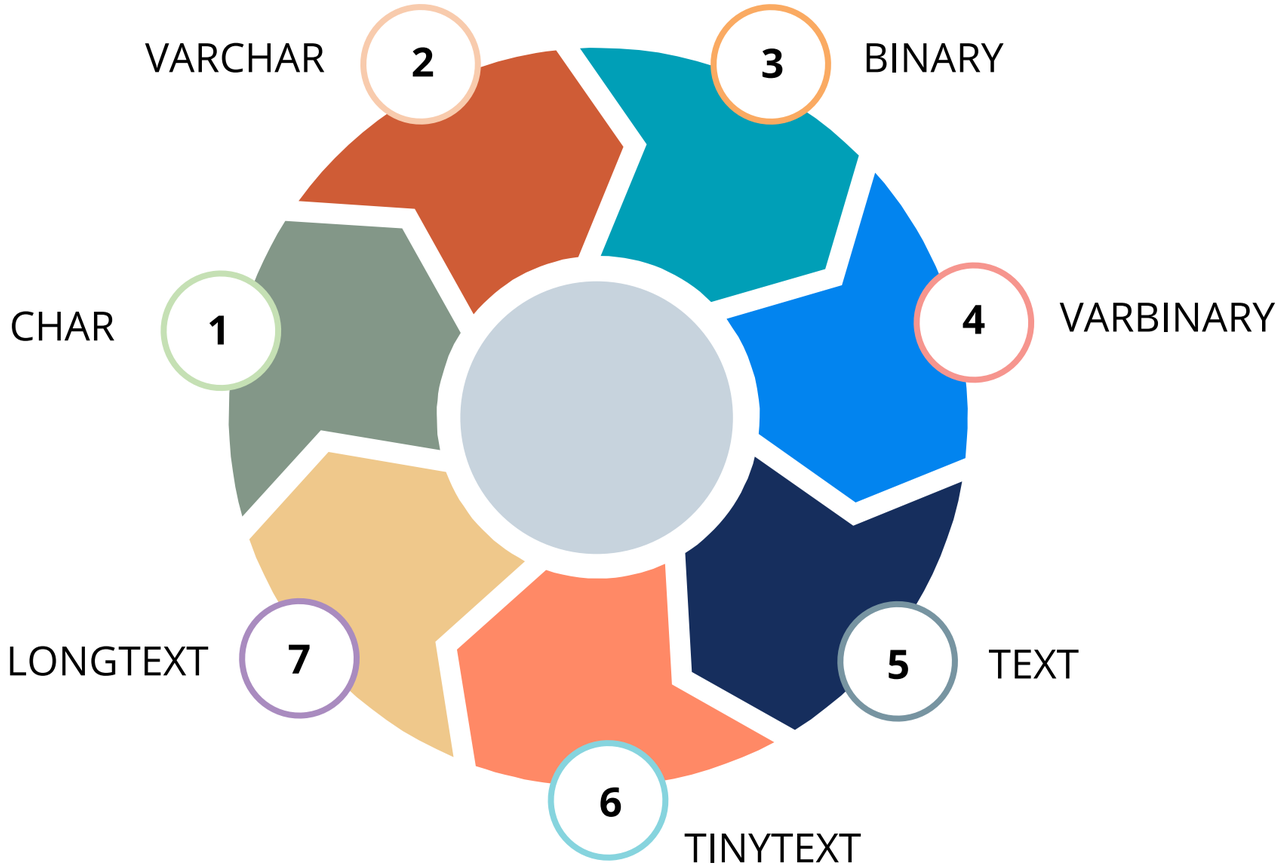
Data Types in SQL

Data type refers to the nature or format of data that is entered into the database.

Data types are divided into three categories:

- String
- Numeric
- Time and Date

String Data Types in SQL



String Data Type: Example

Problem Statement: You are an IT administrator and want to create a table that shows the office assets assigned to each employee, with the employee ID, employee Name with a restriction of number of characters, and asset name which does not have any character limit.

Objective: Create a table with employee name of char data type and asset name of varchar data type.

String Data Type: Example

Syntax

```
CREATE TABLE Asset_Tracker (Emp_ID int, Emp_Name char (7), Asset_Name
varchar (255);
```

Employee name has a character limit. When you enter a longer name as shown below in the third instance, you will get an error notification.

Syntax

```
insert into Asset_Tracker (Emp_ID, Emp_Name, Asset_Name)
values (23, 'Michael', 'Printer'),(46, 'John', 'Laptop'),(36,
'Samantha', 'Desktop Printer');
```

Error Code: 1406. Data too long for column 'Emp_Name' at row 3

Numeric Data Types in SQL

INT
Used to represent integer value

FLOATING
Used to specify a number in floating point format

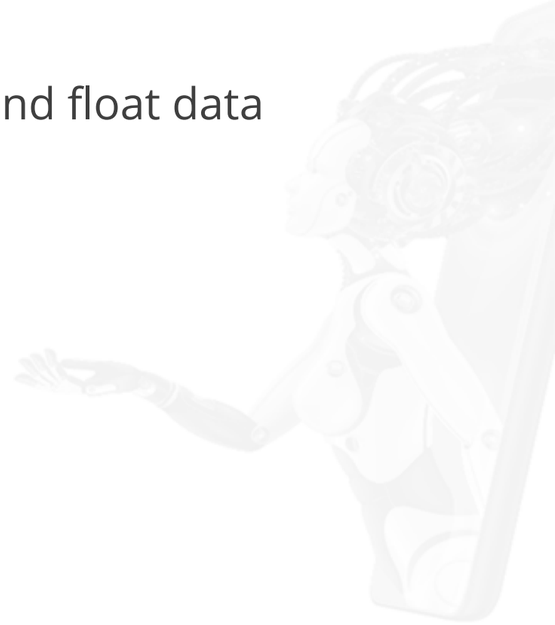
BIT
Used to denote bit-value type

DOUBLE CHECK
Used as a standard floating-point number

Numeric Data Type: Example

Problem Statement: You are a sales manager who wants to create a table with price and quantity of each item that has been sold.

Objective: Create a table with product name, quantity, and price with varchar, int, and float data type respectively.



Numeric Data Type: Example

Syntax

```
CREATE TABLE Sales_Tracker (Pro_Name varchar(255), Pro_Price float,  Pro_Quantity int);
```

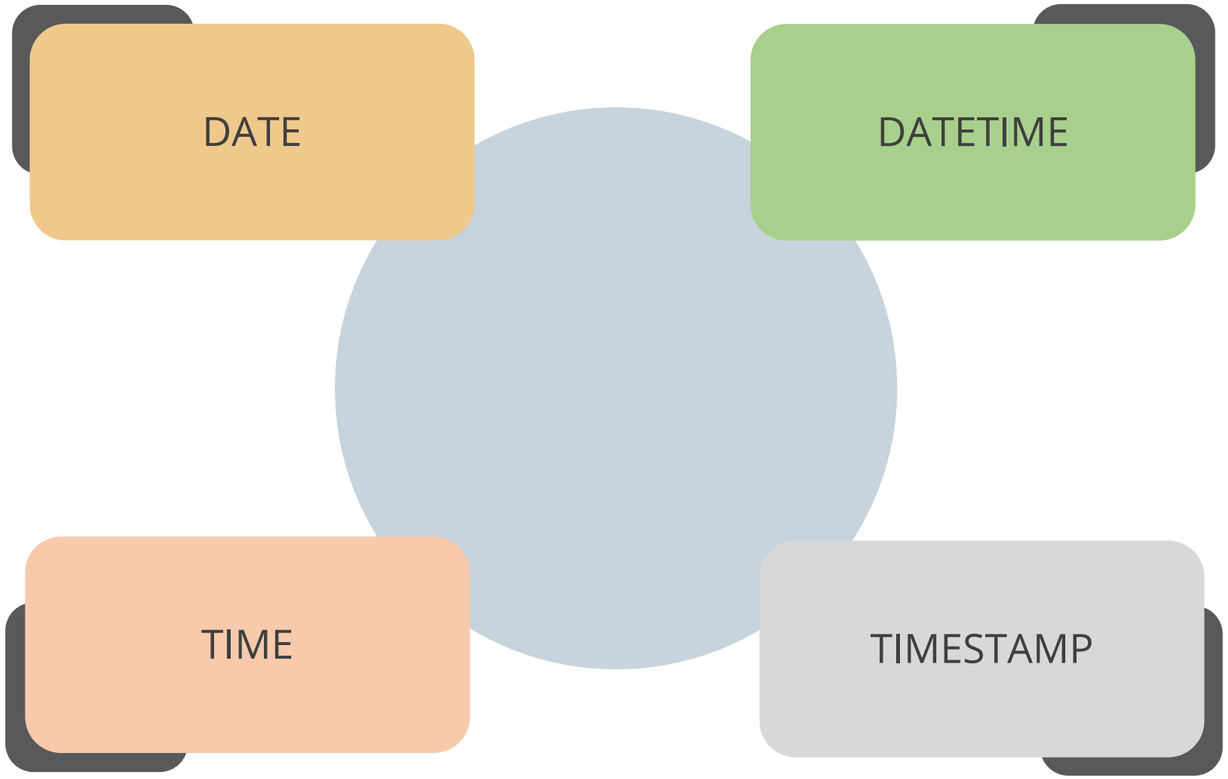
Price is a float data type, because prices can have decimal values; quantity is always an integer.

Syntax

```
insert into Sales_Tracker (Pro_Name, Pro_Price, Pro_Quantity) values ('Mobiles',
8999.99, 26),('Laptops',24455.77, 48),('Washing_Machines',2344.55, 34);
```

Pro_Name	Pro_Price	Pro_Quantity
Mobiles	8999.99	26
Laptops	24455.7	48
Washing_Machines	2344.55	34

Date and Time Data Types in SQL



Assisted Practice: Data Type

Duration: 10 Min.

Problem Statement: You are required to create a new table with a field **DOB** with datatype as **DATE** in the MySQL Workbench.

ASSISTED PRACTICE

Assisted Practice: Data Type

Steps to be performed:

1. Create a table named **candidates**; name columns: **Candidate_No.** as **Integer**, **FirstName** as **Varchar**, **LastName** as **Varchar**, **Age** as **Integer**, and **DOB** as **Date.** Assign **Candidate_No.** as the **primary key**.

TABLE CREATION

```
CREATE TABLE `example`.`candidates` (
`Candidate_No.` INT NOT NULL,
`FirstName` VARCHAR(255) NOT NULL,
`LastName` VARCHAR(255) NOT NULL,
`Age` INT NOT NULL,
`DOB` DATE NOT NULL,
PRIMARY KEY (`Candidate_No.`));
```

ASSISTED PRACTICE

Assisted Practice: Lab Output

Field Types

#	Field	Schema	Table	Type	Character Set	Display Size	Precision	Scale
1	Candidate_No.	example	candidates	INT	binary	11	0	0
2	FirstName	example	candidates	VARCHAR	utf8mb4	255	0	0
3	LastName	example	candidates	VARCHAR	utf8mb4	255	0	0
4	Age	example	candidates	INT	binary	11	0	0
5	DOB	example	candidates	DATE	binary	10	0	0

ASSISTED PRACTICE

Knowledge Check

Knowledge Check

1

Which of the following operators is used to compare two conditions?

A. Comparison operators

B. Compound operators

C. Logical operators

D. Arithmetic operators

Knowledge Check

1

Which of the following operators is used to compare two conditions?

A. Comparison operators

B. Compound operators

C. Logical operators

D. Arithmetic operators

The correct answer is **C**

Logical operators are used to compare two conditions in an SQL query.

Knowledge Check

2

Which of the following clauses comes first in the order of execution?

A. WHERE

B. FROM

C. SELECT

D. HAVING

Knowledge Check

2

Which of the following clauses comes first in the order of execution?

A. WHERE

B. FROM

C. SELECT

D. HAVING

The correct answer is **B**

FROM is the first clause that will be executed in an SQL query.

Knowledge Check

3

Which of the following constraints is used to provide a unique identity to a column in a table?

A. Primary key

B. Foreign key

C. Unique constraint

D. Check constraint

Knowledge Check

3

Which of the following constraints is used to provide a unique identity to a column in a table?

A. Primary key

B. Foreign key

C. Unique constraint

D. Check constraint

The correct answer is **A**

Primary key is the constraint that is used to provide a unique identity to a column in a table.

Lesson-End Project: School Ranking Analysis

Problem statement:

You are a database administrator in an institution, and you have been asked to store the students' details and their marks to track their progress. The database helps to view the students' marks with a rank that can be viewed, updated, and evaluated to evaluate their performance.

Objective:

The objective is to design a database to retrieve the information of a student as needed for the records.

Note: Download the **student_datasets.csv** and **marksheet_datasets.csv** files from **Course Resources** to perform the required tasks

LESSON-END PROJECT

Lesson-End Project: School Ranking Analysis

Tasks to be performed:

1. Write a query to create a **students** table with the student ID, first name, last name, class, and age fields and ensure that the last name, first name, and student ID fields have the NOT NULL constraint and that the student ID field is a primary key
2. Write a query to create a **marksheet** table with score, year, ranking, class, and student ID fields
3. Write a query to insert values into the **students** and **marksheet** tables

LESSON-END PROJECT

Lesson-End Project: School Ranking Analysis

Tasks to be performed:

4. Write a query to display the student ID and first name of every student in the **students** table whose age is greater than or equal to 16 and whose last name is Kumar
5. Write a query to display the details of every student from the **marksheet** table whose score is between 800 and 1000
6. Write a query to increase the score in the **marksheet** table by five and create a new score column to display this new score

LESSON-END PROJECT

Lesson-End Project: School Ranking Analysis

Tasks to be performed:

7. Write a query to display the **marksheet** table in descending order of the score
8. Write a query to display the details of every student whose first name starts with an **‘a’**

Note: Download the solution document from the **Course Resources** section and follow the steps given in the document

LESSON-END PROJECT

Key Takeaways

- SQL operators are used to specify a condition in an SQL statement.
- Arithmetic operators are used to perform arithmetic operations in SQL query.
- Join clause is used to derive common data from another table in the database.
- Foreign key check is a feature in SQL that prevents you from making any changes to tables that have foreign keys in them.