SQL TRAINING

PRESENTATION BY UPLATZ

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OVERVIEW

SQL COMMANDS – DDL, DML, DCL,

SQL CONSTRAINTS - KEYS, NOT NULL, CHECK, DEFAULT

MYSQL HANDS-ON AND BASIC QUERYING

SQL COMMANDS

DDL – Data Definition Language

DML – Data Manipulation Language

DCL – Data Control Language

DQL – Data Query Language

TCL – Transaction Control Language

DDL – DATA DEFINITION LANGUAGE

DDL or Data Definition Language consists of the SQL commands that can be used to define the database schema. It simply deals with descriptions of the database schema and is used to create and modify the structure of database objects in the database.

Examples of DDL commands:

- CREATE – is used to create the database or its objects (like table, index, function, views, store procedure and triggers).
- DROP – is used to remove the table definition and its content. Structure is lost.
- ALTER-is used to alter the structure of the database.
- TRUNCATE–is used to delete all the rows from the table. Structure is not lost.
- COMMENT –is used to add comments to the data dictionary.
- RENAME –is used to rename an object existing in the database.

DML – DATA MANIPULATION LANGUAGE

The SQL commands that deals with the manipulation of data present in the database belong to DML or Data Manipulation Language and this includes most of the SQL statements.

- **Examples of DML:**
- **INSERT** – is used to insert data into a table.
- **UPDATE** – is used to update existing data within a table.
- **DELETE** – is used to delete records from a database table.

DCL – DATA CONTROL LANGUAGE

DCL includes commands such as GRANT and REVOKE which mainly deals with the rights, permissions and other controls of the database system.

Examples of DCL commands:

- GRANT-gives user's access privileges to database.
- REVOKE-withdraw user's access privileges given by using the GRANT command.

DQL – DATA QUERY LANGUAGE

DML statements are used for performing queries on the data within schema objects. The purpose of DQL Command is to get some schema relation based on the query passed to it.

Example of DQL:

- **SELECT** – is used to retrieve data from the database.

TCL – TRANSACTION CONTROL LANGUAGE

TCL(transaction Control Language) : TCL commands deals with the transaction within the database.

Examples of TCL commands:

- **COMMIT**– commits a Transaction.
- **ROLLBACK**– rollbacks a transaction in case of any error occurs.
- **SAVEPOINT**–sets a savepoint within a transaction.
- **SET TRANSACTION**–specify characteristics for the transaction.

SQL CONSTRAINTS

SQL constraints are used to specify rules for the data in a table.

Constraints are used to limit the type of data that can go into a table. This ensures the accuracy and reliability of the data in the table. If there is any violation between the constraint and the data action, the action is aborted.

Constraints can be column level or table level. Column level constraints apply to a column, and table level constraints apply to the whole table.

The following constraints are commonly used in SQL:

- NOT NULL - Ensures that a column cannot have a NULL value
- UNIQUE - Ensures that all values in a column are different
- PRIMARY KEY - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table
- FOREIGN KEY - Uniquely identifies a row/record in another table
- CHECK - Ensures that all values in a column satisfies a specific condition
- DEFAULT - Sets a default value for a column when no value is specified
- INDEX - Used to create and retrieve data from the database very quickly

NOT NULL

By default, a column can hold NULL values.

The NOT NULL constraint enforces a column to NOT accept NULL values.

This enforces a field to always contain a value, which means that you cannot insert a new record, or update a record without adding a value to this field.

SYNTAX:

```
CREATE TABLE users (
    ID int NOT NULL,
    name varchar(255) NOT NULL,

    age int
);

ALTER TABLE users
MODIFY age int NOT NULL;
```

UNIQUE

The UNIQUE constraint ensures that all values in a column are different.

Both the UNIQUE and PRIMARY KEY constraints provide a guarantee for uniqueness for a column or set of columns.

A PRIMARY KEY constraint automatically has a UNIQUE constraint.

However, you can have many UNIQUE constraints per table, but only one PRIMARY KEY constraint per table.

```
CREATE TABLE Persons (
    ID int NOT NULL,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int,
    UNIQUE (ID)
);
```

```
ALTER TABLE Persons ADD CONSTRAINT UC_Person UNIQUE (ID,LastName);
```

```
ALTER TABLE Persons DROP INDEX UC_Person;
```

TYPES OF KEYS – PRIMARY KEY

The PRIMARY KEY constraint uniquely identifies each record in a table.

Primary keys must contain UNIQUE values and cannot contain NULL values.

A table can have only ONE primary key; and in the table, this primary key can consist of single or multiple columns (fields).

A primary key can never be

null while a unique can contain one null entry.

```
CREATE TABLE Persons (
    ID int NOT NULL,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int,
    PRIMARY KEY (ID)
);
```

```
ALTER TABLE Persons ADD PRIMARY KEY (ID); - When primary key is to be created on an existing table
```

TYPES OF KEYS – PRIMARY KEY

- **Rules for defining Primary key:**
- Two rows can't have the same primary key value
- It is must for every row to have a primary key value.
- The primary key field cannot be null.
- The value in a primary key column can never be modified or updated if any foreign key refers to that primary key.

TYPES OF KEYS – FOREIGN KEY

A FOREIGN KEY is a key used to link two tables together.

A FOREIGN KEY is a field (or collection of fields) in one table that refers to the PRIMARY KEY in another table.

The table containing the foreign key is called the child table, and the table containing the candidate key is called the referenced or parent table.

```
CREATE TABLE Orders (
    OrderID int NOT NULL,
    OrderNumber int NOT NULL,
    PersonID int,
    PRIMARY KEY (OrderID),
    FOREIGN KEY (PersonID) REFERENCES Persons(PersonID)
);
```

TYPES OF KEYS – SUPER KEY

A superkey is a group of single or multiple keys which identifies rows in a table. A Super key may have additional attributes that are not needed for unique identification.

EmpSSN	EmpNum	Empname
9812345098	AB05	Shown
9876512345	AB06	Roslyn
199937890	AB07	James

In the above-given example, EmpSSN and EmpNum name are superkeys.

TYPES OF KEYS – ALTERNATE KEY

ALTERNATE KEYS is a column or group of columns in a table that uniquely identify every row in that table. A table can have multiple choices for a primary key but only one can be set as the primary key. All the keys which are not primary key are called an Alternate Key.

Example: In this table, StudID, Roll No, Email are qualified to become a primary key. But since StudID is the primary key, Roll No, Email becomes the alternative key.

StudID	Roll No	First Name	LastName	Email
1	11	Tom	Price	abc@gmail.com
2	12	Nick	Wright	xyz@gmail.com
3	13	Dana	Natan	mno@yahoo.com

TYPES OF KEYS – CANDIDATE KEY

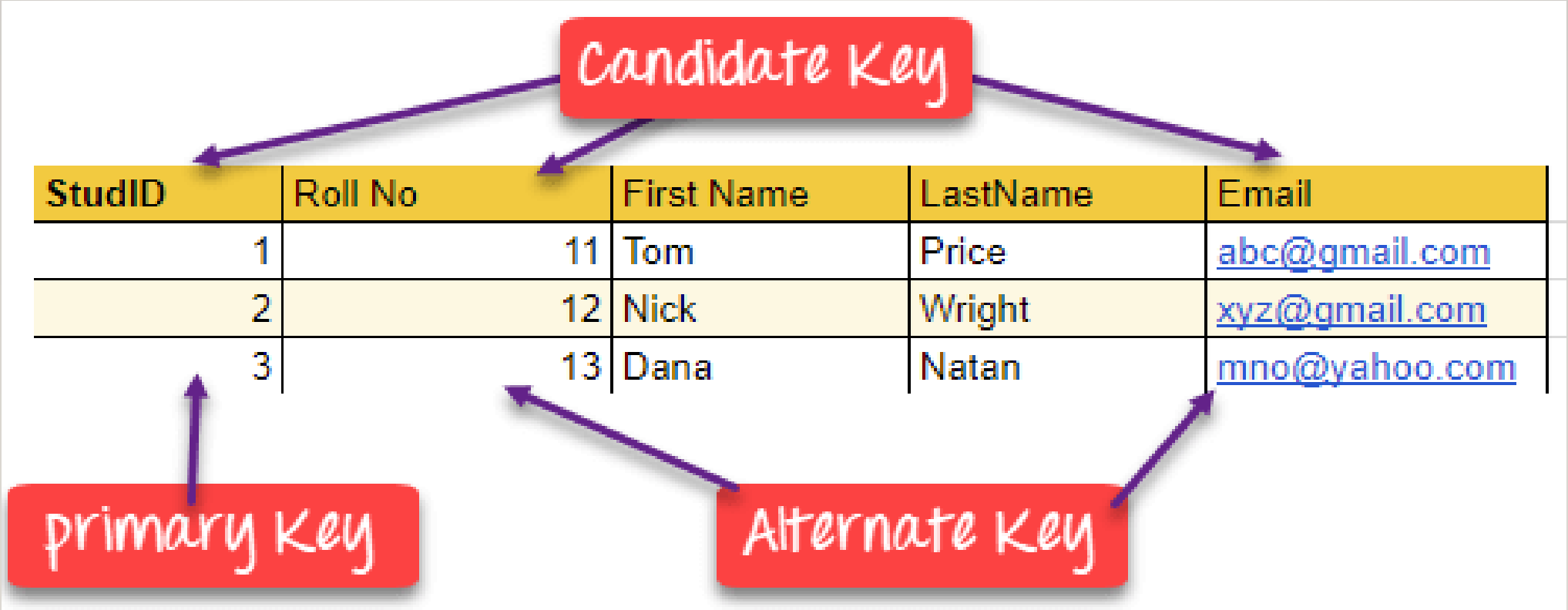
CANDIDATE KEY is a set of attributes that uniquely identify tuples in a table. Candidate Key is a super key with no repeated attributes. The Primary key should be selected from the candidate keys. Every table must have at least a single candidate key. A table can have multiple candidate keys but only a single primary key. Example: In the given table Stud ID, Roll No, and email are candidate keys which help us to uniquely identify the student record in the table.

Properties of Candidate key:

- It must contain unique values
- Candidate key may have multiple attributes
- Must not contain null values
- It should contain minimum fields to ensure uniqueness
- Uniquely identify each record in a table

StudID	Roll No	First Name	LastName	Email
1	11	Tom	Price	abc@gmail.com
2	12	Nick	Wright	xyz@gmail.com
3	13	Dana	Natan	mno@yahoo.com

TYPES OF KEYS



TYPES OF KEYS – COMPOUND KEY

- **COMPOUND KEY** has two or more attributes that allow you to uniquely recognize a specific record. It is possible that each column may not be unique by itself within the database. However, when combined with the other column or columns the combination of composite keys become unique. The purpose of the compound key in database is to uniquely identify each record in the table.
- In this example, OrderNo and ProductID can't be a primary key as it does not uniquely identify a record. However, a compound key of Order ID and Product ID could be used as it uniquely identified each record.

OrderNo	PorductID	Product Name	Quantity
B005	JAP102459	Mouse	5
B005	DKT321573	USB	10

TYPES OF KEYS – COMPOSITE KEY

- COMPOSITE KEY is a combination of two or more columns that uniquely identify rows in a table. The combination of columns guarantees uniqueness, though individually uniqueness is not guaranteed. Hence, they are combined to uniquely identify records in a table.
- The difference between compound and the composite key is that any part of the compound key can be a foreign key, but the composite key may or maybe not a part of the foreign key.

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MYSQL HANDS-ON

THANK YOU