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## SQL PRIMARY KEY

In this tutorial, we'll learn about the PRIMARY KEY in SQL and how to use them with the help of examples.

In SQL, the PRIMARY KEY constraint is used to uniquely identify rows.

The PRIMARY KEY constraint is simply a combination of NOT NULL and UNIQUE constraints. Meaning, the column cannot contain duplicate as well as NULL values.

### Primary Key Syntax

```
CREATE TABLE Colleges (  
  college_id INT,  
  college_code VARCHAR(20) NOT NULL,  
  college_name VARCHAR(50),  
  CONSTRAINT CollegePK PRIMARY KEY (college_id)  
);
```

Here, the college\_id column is the PRIMARY KEY. This means, the values of this column must be unique as well as it cannot contain NULL values.

**Note:** The above code works in all major database systems. However, depending on a database, there may be alternative syntaxes to create the primary key.

### Primary Key Error

If we try to insert null or duplicate values in the college\_id column—in the above table—we will get an error. For example,

```
-- Insertion Success  
INSERT INTO Colleges(college_id, college_code, college_name)  
VALUES (1, "ARD12", "Star Public School");  
  
-- UNIQUE Constraint Error  
-- The value of college_id is not unique  
INSERT INTO Colleges(college_id, college_code, college_name)  
VALUES (1, "ARD12", "Star Public School");
```

Here, the SQL command gives us an error because we cannot insert same value for the college\_id field in a table because of the UNIQUE constraint.

**Note:** In a table, there can be only one primary key.

### Primary Key With Multiple Columns

A primary key may also be made up of multiple columns. For example,

```
CREATE TABLE Colleges (  
  college_id INT,  
  college_code VARCHAR(20),  
  college_name VARCHAR(50),  
  CONSTRAINT CollegePK PRIMARY KEY (college_id, college_code)  
);
```

Here, the PRIMARY KEY constraint named CollegePK is made up of college\_id and college\_code columns.

This means, the combination of college\_id and college\_code must be unique as well as these two columns cannot contain NULL values.

Now let's try to insert records in the Colleges table,

```
-- Insertion Success  
INSERT INTO Colleges(college_id, college_code, college_name)  
VALUES (1, "ARD12", "Star Public School");  
  
-- Insertion Success  
INSERT INTO Colleges(college_id, college_code, college_name)  
VALUES (1, "ARD13", "Star Public School");  
  
-- Insertion Success  
INSERT INTO Colleges(college_id, college_code, college_name)  
VALUES (2, "ARD12", "Star Public School");  
  
-- UNIQUE Constraint Error  
-- A row already has 1 as college_id and "ARD12" as college_code  
INSERT INTO Colleges(college_id, college_code, college_name)  
VALUES (1, "ARD12", "Star Public School");
```

### Primary Key Constraint With Alter Table

We can also add the PRIMARY KEY constraint to a column in an existing table using the ALTER TABLE command. For example,

#### For single column

```
ALTER TABLE Colleges  
ADD PRIMARY KEY (college_id);
```

#### For multiple column

```
ALTER TABLE Colleges  
ADD CONSTRAINT CollegePK PRIMARY KEY (college_id, college_code);
```

Here, the SQL command adds the PRIMARY KEY constraint to the specified column(s) in the existing table.

### Auto Increment Primary Key

It is a common practice to automatically increase the value of the primary key when a new row is inserted. For example,

#### SQL Server

```
-- using IDENTITY(x, y) to auto increment the value  
-- x -> start value, y -> steps to increase  
CREATE TABLE Colleges (  
  college_id INT IDENTITY(1,1),  
  college_code VARCHAR(20) NOT NULL,  
  college_name VARCHAR(50),  
  CONSTRAINT CollegePK PRIMARY KEY (college_id)  
);  
  
-- inserting record without college_id  
INSERT INTO Colleges(college_code, college_name)  
VALUES ("ARD13", "Star Public School");
```

#### Oracle

```
-- creating sequence of numbers  
CREATE SEQUENCE auto_inc  
MINVALUE 1  
START WITH 1  
INCREMENT BY 1  
CACHE 10;  
  
CREATE TABLE Colleges (  
  college_id INT,  
  college_code VARCHAR(20) NOT NULL,  
  college_name VARCHAR(50),  
  CONSTRAINT CollegePK PRIMARY KEY (college_id)  
);  
  
-- creating trigger before insert to  
-- add auto incremented value  
CREATE TRIGGER auto_inc_trigger  
BEFORE INSERT ON Colleges  
FOR EACH ROW  
BEGIN  
  SELECT auto_inc.nextval INTO :new.college_id FROM dual  
END;  
  
-- Inserting record without college_id  
INSERT INTO Colleges(college_code, college_name)  
VALUES ("ARD13", "Star Public School");
```

#### MySQL

```
-- AUTO_INCREMENT keyword auto increments the value  
CREATE TABLE Colleges (  
  college_id INT AUTO_INCREMENT,  
  college_code VARCHAR(20) NOT NULL,  
  college_name VARCHAR(50),  
  CONSTRAINT CollegePK PRIMARY KEY (college_id)  
);  
  
-- inserting record without college_id  
INSERT INTO Colleges(college_code, college_name)  
VALUES ("ARD13", "Star Public School");
```

#### PostgreSQL

```
-- SERIAL keyword auto increments the value  
CREATE TABLE Colleges (  
  college_id INT SERIAL,  
  college_code VARCHAR(20) NOT NULL,  
  college_name VARCHAR(50),  
  CONSTRAINT CollegePK PRIMARY KEY (college_id)  
);  
  
-- Inserting record without college_id  
INSERT INTO Colleges(college_code, college_name)  
VALUES ("ARD13", "Star Public School");
```

### Remove Primary Key Constraint

We can remove the PRIMARY KEY constraint in a table using the DROP clause. For example,

#### SQL Server, Oracle

```
ALTER TABLE Colleges  
DROP CONSTRAINT CollegePK;
```

#### MySQL

```
ALTER TABLE Colleges  
DROP PRIMARY KEY;
```

Here, the SQL command removes the PRIMARY KEY constraint from the Colleges table.

#### Recommended Reading:

- SQL FOREIGN KEY
- SQL Constraints

Previous Tutorial:

SQL Unique Constraints

Next Tutorial:

SQL Foreign Key

Did you find this article helpful?

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