

SQL Constraints

- 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.

The following constraints are commonly used in SQL:

1. **NOT NULL** - Ensures that a column cannot have a NULL value
2. **UNIQUE** - Ensures that all values in a column are different
3. **PRIMARY KEY** - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table
4. **FOREIGN KEY** - Uniquely identifies a row/record in another table
5. **CHECK** - Ensures that all values in a column satisfies a specific condition
6. **DEFAULT** - Sets a default value for a column when no value is specified

1.SQL NOT NULL Constraint

- The NOT NULL constraint enforces a column to NOT accept NULL values.
- This enforces a field always contain at least a single value
- Example
- >CREATE TABLE Persons (
 ID int NOT NULL,
 LastName varchar(255) NOT NULL,
 FirstName varchar(255) NOT NULL,
 Age int
);

2.SQL UNIQUE Constraint

- The UNIQUE constraint ensures that all values in a column are different.
- Example:
- >CREATE TABLE Persons (ID NUMBER UNIQUE, LastName varchar(255) NOT NULL, FirstName varchar(255), Age int);

SQL UNIQUE Constraint on ALTER TABLE

To create a UNIQUE constraint on the "ID" column when the table is already created,

Example

```
>ALTER TABLE Persons  
ADD UNIQUE (ID);
```

3.SQL PRIMARY KEY Constraint

- The PRIMARY KEY constraint uniquely identifies each record in a database table.
- Primary keys must contain UNIQUE values, and cannot contain NULL values.
- Example
>CREATE TABLE Persons (ID NUMBER PRIMARY KEY, LastName varchar(255) NOT NULL, FirstName varchar(255), Age int);

SQL PRIMARY KEY on ALTER TABLE

To create a PRIMARY KEY constraint on the "ID" column when the table is already created, use the following

Example

```
>ALTER TABLE Persons ADD PRIMARY KEY (ID);
```

4.SQL FOREIGN KEY Constraint

- A FOREIGN KEY is a key used to link two tables together.
- A FOREIGN KEY is a field in one table(Child table) that refers to the PRIMARY KEY in another table(Parent table).
- The FOREIGN KEY constraint is used to prevent actions that would destroy links between tables.
- The FOREIGN KEY constraint also prevents invalid data from being inserted into the foreign key column, because it has to be one of the values contained in the table it points to.

Example

Creating parent table:

```
>CREATE TABLE DEPT(DEPTNO NUMBER PRIMARY  
KEY, DNAME VARCHAR2(10), LOC VARCHAR2(10));
```

Creating child table

```
>CREATE TABLE EMP(EMPNO NUMBER PRIMARY KEY,  
ENAME VARCHAR2(10), DEPTNO NUMBER  
REFERENCES DEPT(DEPTNO));
```

5.SQL CHECK Constraint

- 1.The CHECK constraint is used to limit the value range that can be placed in a column.
2. If you define a CHECK constraint on a single column it allows only certain values for this column.

EXAMPLE

```
>CREATE TABLE TEST(EMPNO NUMBER,  
    SAL NUMBER CHECK(SAL>5000));  
  
>CREATE TABLE TEST(EMPNO NUMBER ,  
    AGE NUMBER    CHECK(AGE>25) ,DOB DATE);
```

SQL DEFAULT Constraint

- The DEFAULT constraint is used to provide a default value for a column.
- The default value will be added to all new records IF no other value is specified.

EXAMPLE

```
>CREATE TABLE Persons (ID NUMBER NOT NULL,  
City varchar(255) DEFAULT 'MEXICO');
```

EMP TABLE

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
A	B	C	D	E	F	G	H
1	7839 KING	PRESIDENT		1981-11-17	5000		10
2	7698 BLAKE	MANAGER	7839	1981-05-01	2850		30
3	7782 CLARK	MANAGER	7839	1981-06-09	2450		10
4	7566 JONES	MANAGER	7839	1981-04-02	2975		20
5	7788 SCOTT	ANALYST	7566	1982-12-09	3000		20
6	7902 FORD	ANALYST	7566	1981-12-03	3000		20
7	7369 SMITH	CLERK	7902	1980-12-17	800		20
8	7499 ALLEN	SALESMAN	7698	1981-02-20	1600	300	30
9	7521 WARD	SALESMAN	7698	1981-02-23	1250	500	30
10	7654 MARTIN	SALESMAN	7698	1981-09-28	1250	1400	30
11	7844 TURNER	SALESMAN	7698	1981-09-08	1500	0	30
12	7876 ADAMS	CLERK	7788	1983-01-17	1100		20
13	7900 JAMES	CLERK	7698	1981-12-03	950		30
14	7934 MILLER	CLERK	7782	1982-01-23	1300		10

DEPT TABLE

DEPT NO	DNAME	LOC
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO