SQL Constraints

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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
7839	KING	PRESIDENT		1981-11-1	5000		10
7698	BLAKE	MANAGEF	7839	1981-05-0	2850		30
7782	CLARK	MANAGEF	7839	1981-06-0	2450		10
7566	JONES	MANAGEF	7839	1981-04-0	2975		20
7788	SCOTT	ANALYST	7566	1982-12-0	3000		20
7902	FORD	ANALYST	7566	1981-12-0	3000		20
7369	SMITH	CLERK	7902	1980-12-1	800		20
7499	ALLEN	SALESMAI	7698	1981-02-2	1600	300	30
7521	WARD	SALESMAI	7698	1981-02-2	1250	500	30
7654	MARTIN	SALESMAI	7698	1981-09-2	1250	1400	30
7844	TURNER	SALESMAI	7698	1981-09-0	1500	0	30
7876	ADAMS	CLERK	7788	1983-01-1	1100		20
7900	JAMES	CLERK	7698	1981-12-0	950		30
7934	MILLER	CLERK	7782	1982-01-2	1300		10

DEPT TABLE

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

THANK YOU