CSE 4308 - DBMS Lab

DBMS LAB 03 MATERIAL

Prepared by:

Mohammad Anas Jawad

Lecturer, IUT CSE

Department of Computer Science and Engineering

Islamic University of Technology

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1 SCHEMA DIAGRAM

A database schema, along with primary key and foreign key dependencies, can be depicted by ***schema diagrams***.

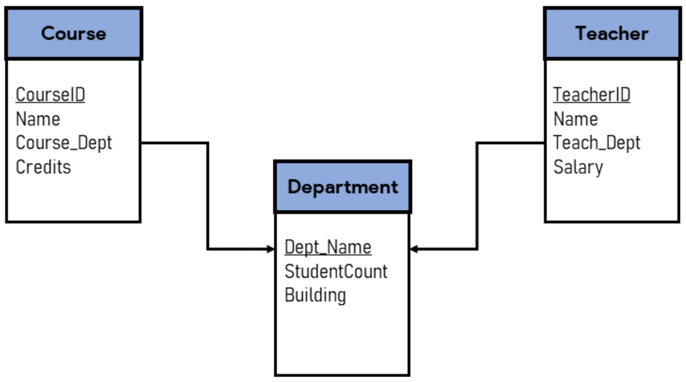


Figure 1: A simple schema diagram

Foreign key dependencies appear as arrows from the foreign key attributes of the referencing relation to the primary key of the referenced relation.

2 SQL Statements

2.1 Primary Key and Foreign Key

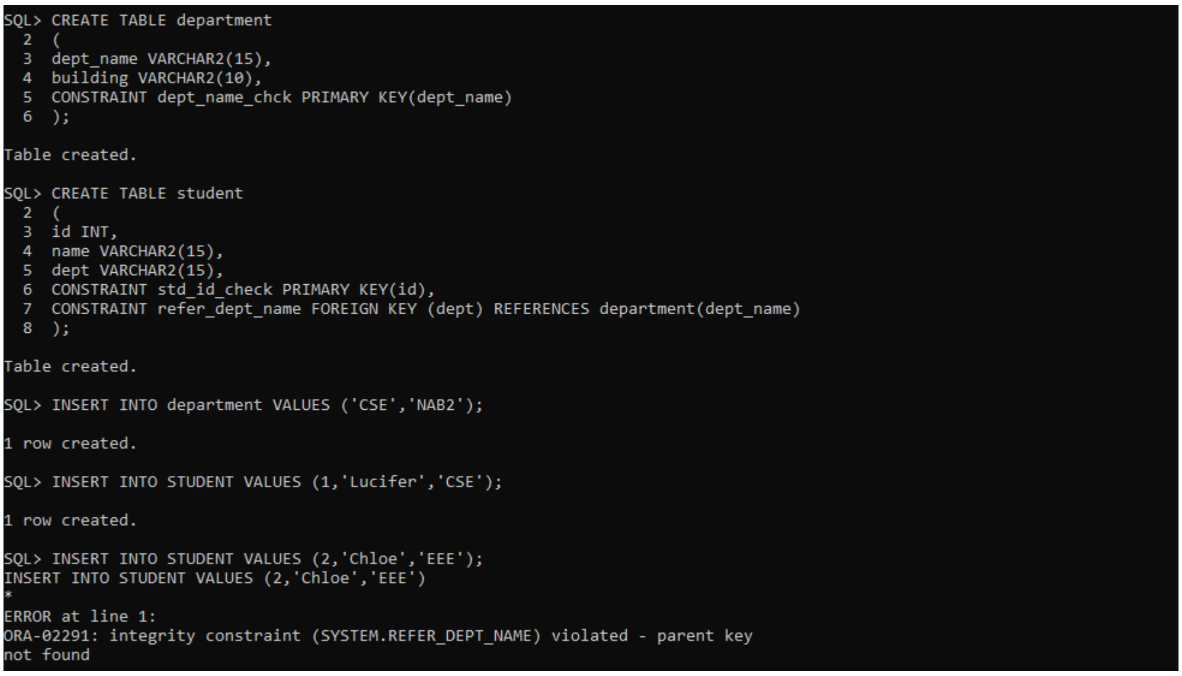
A *composite primary key* is a set of columns that uniquely identifies each row in a table. The statement for declaring a *composite primary key* is as follows:

```
CREATE TABLE table_name
    (
    col_1 data_type_1,
    col_2 data_type_2,
    ... ...
    CONSTRAINT constraint_name PRIMARY KEY (col_1,col_2...)
    );
```

It is possible to declare foreign keys from one table to other tables such that the domain of a particular column is limited to the domain of the column being referred to in the other tables. Syntax is as follows:

```
CREATE TABLE table_1
CREATE TABLE table_name
    (
    col_1 data_type_1,
    col_2 data_type_2,
    ... ...
    PRIMARY KEY (col_1, col_2, ...)
    CONSTRAINT constraint_name FOREIGN KEY (col_1) REFERENCES table_2(col_1)
    );
```

Example:



```
SQL> CREATE TABLE department
  2  (
  3  dept_name VARCHAR2(15),
  4  building VARCHAR2(10),
  5  CONSTRAINT dept_name_chck PRIMARY KEY(dept_name)
  6  );

Table created.

SQL> CREATE TABLE student
  2  (
  3  id INT,
  4  name VARCHAR2(15),
  5  dept VARCHAR2(15),
  6  CONSTRAINT std_id_check PRIMARY KEY(id),
  7  CONSTRAINT refer_dept_name FOREIGN KEY (dept) REFERENCES department(dept_name)
  8  );

Table created.

SQL> INSERT INTO department VALUES ('CSE','NAB2');

1 row created.

SQL> INSERT INTO STUDENT VALUES (1,'Lucifer','CSE');

1 row created.

SQL> INSERT INTO STUDENT VALUES (2,'Chloe','EEE');
INSERT INTO STUDENT VALUES (2,'Chloe','EEE')
*
ERROR at line 1:
ORA-02291: integrity constraint (SYSTEM.REFER_DEPT_NAME) violated - parent key
not found
```

Figure 2: Foreign key example

2.2 Alter statement

The ALTER TABLE statement is used to add, delete, or modify columns in an existing table. The ALTER TABLE statement is also used to add and drop various constraints on an existing table.

The syntax for altering tables is as follows:

2.2.1 For adding columns

```
ALTER TABLE table_name
ADD column_name datatype;
```

2.2.2 For adding constraints

```
ALTER TABLE table_name
ADD CONSTRAINT constraint_name CONSTRAINT1,CONSTRAINT2...;
```

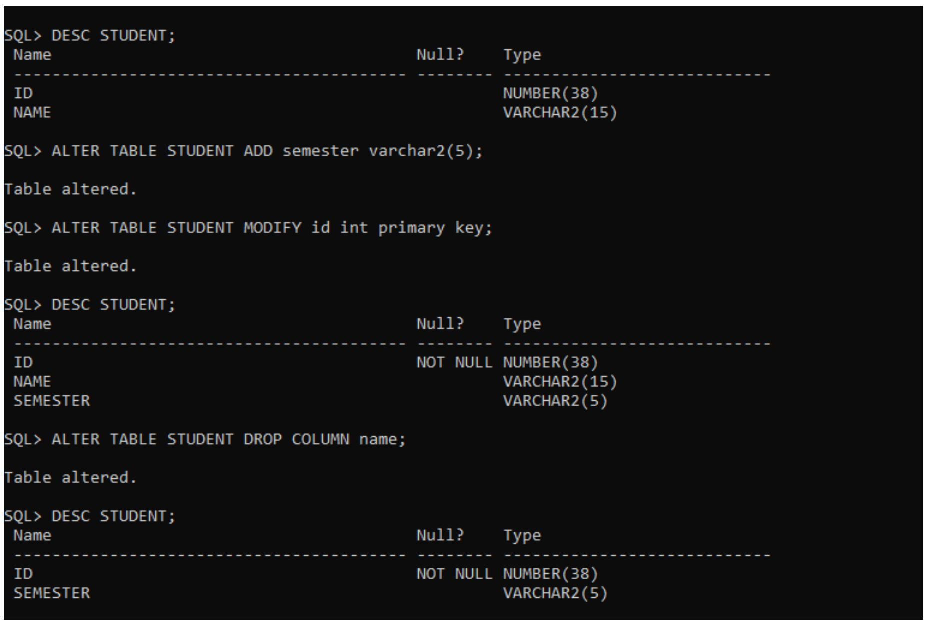
2.2.3 For deleting or dropping columns

```
ALTER TABLE table_name
DROP COLUMN column_name;
```

2.2.4 For modifying columns

```
ALTER TABLE table_name
MODIFY column_name datatype;
```

Example:



```
SQL> DESC STUDENT;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 ID                                                 NUMBER(38)
 NAME                                               VARCHAR2(15)

SQL> ALTER TABLE STUDENT ADD semester varchar2(5);

Table altered.

SQL> ALTER TABLE STUDENT MODIFY id int primary key;

Table altered.

SQL> DESC STUDENT;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 ID                                        NOT NULL NUMBER(38)
 NAME                                               VARCHAR2(15)
 SEMESTER                                           VARCHAR2(5)

SQL> ALTER TABLE STUDENT DROP COLUMN name;

Table altered.

SQL> DESC STUDENT;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 ID                                        NOT NULL NUMBER(38)
 SEMESTER                                           VARCHAR2(5)
```

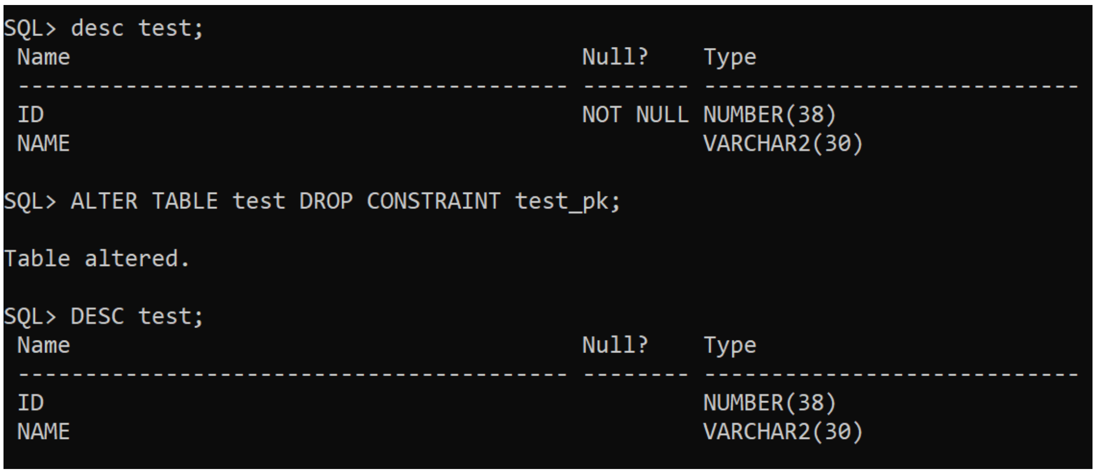
Figure 3: Alter table example

For detailed description and example, visit `https://www.w3schools.com/sql/sql_alter.asp`

2.2.5 For dropping Constraints

It's also possible to delete or drop any constraint that you have defined using the ALTER TABLE command with the DROP CONSTRAINT option.

```
ALTER TABLE table_name
DROP CONSTRAINT constraint_name;
```



```
SQL> desc test;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 ID                                        NOT NULL NUMBER(38)
 NAME                                               VARCHAR2(30)

SQL> ALTER TABLE test DROP CONSTRAINT test_pk;

Table altered.

SQL> DESC test;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 ID                                                 NUMBER(38)
 NAME                                               VARCHAR2(30)
```

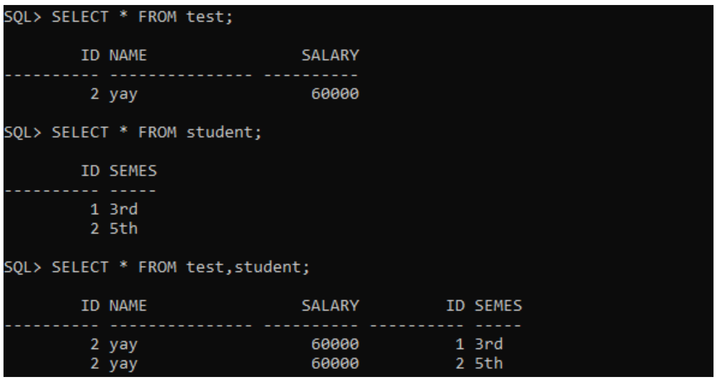
Figure 4: Dropping constraint example

2.3 Cartesian product between tables

In case you ever want to display the content of multiple tables at once, SQL allows you to do that as well. This is known as cartesian product between tables. We will know more about cartesian product and join operations on tables in subsequent labs.

```
SELECT * FROM
table1,table2...
```

Example:



```
SQL> SELECT * FROM test;

        ID NAME                SALARY
---------- --------------- ----------
         2 yay                  60000

SQL> SELECT * FROM student;

        ID SEMES
---------- -----
         1 3rd
         2 5th

SQL> SELECT * FROM test,student;

        ID NAME                SALARY         ID SEMES
---------- --------------- ---------- ---------- -----
         2 yay                  60000          1 3rd
         2 yay                  60000          2 5th
```

Figure 5: Cartesian product between two tables