**SQL statements demonstrating the effects of constraints**

/\* If you type SQL statements using Word or PowerPoint,

untick ‘Stright quotes’ with ‘smart quotes’ in:

Options 🡪 Proofing 🡪 AutoCorrect Options 🡪 AutoFormat as you Type

Options 🡪 Proofing 🡪 AutoCorrect Options 🡪 AutoFormat \*/

/\* Drop all the used tables to make sure you have a clean start \*/

DROP TABLE IF EXISTS TaskAssignment;

DROP TABLE IF EXISTS Employee;

DROP TABLE IF EXISTS Task;

DROP TABLE IF EXISTS Department;

**/\* Demostrate the violation of primary key constraint \*/**

**/\* The constraint is defined with *COLUMN definition and WTHOUT Constraint Name*. \*/**

CREATE TABLE Department(

DNUM NUMERIC(5) PRIMARY KEY,

DNAME VARCHAR(5) NOT NULL UNIQUE,

ESTDATE DATE NOT NULL

);

INSERT INTO Department VALUES (4,'Admin', '2005-05-15');

SELECT \* FROM Department;

/\* The following INSERT will lead to ERROR because

the primary key 4 is duplicated which violate the Primary Key constraint. \*/

INSERT INTO Department VALUES (4, 'Acct', '2005-06-01');

SELECT \* FROM Department;

/\* The following INSERT will lead to ERROR because the primary key is NULL which violates the Primary Key constraint. \*/

INSERT INTO Department VALUES (NULL, 'Sale', '2005-06-10');

SELECT \* FROM Department;

**/\* Demostrate the violation of primary key constraint. \*/**

**/\* The constraint is defined with *COLUMN definition and WITH Constraint Name*. \*/**

DROP TABLE IF EXISTS Department;

CREATE TABLE Department(

DNUM NUMERIC(5) CONSTRAINT PKDept PRIMARY KEY,

DNAME VARCHAR(5) NOT NULL UNIQUE,

ESTDATE DATE NOT NULL

);

INSERT INTO Department VALUES (4,'Admin', '2005-05-15');

SELECT \* FROM Department;

/\* The following INSERT will lead to ERROR because

the primary key 4 is duplicat which violate the Primary Key constraint. \*/

INSERT INTO Department VALUES (4, 'Acct', '2005-06-01');

SELECT \* FROM Department;

**/\* Demostrate the violation of primary key constraint \*/**

**/\* The constraint is defined at *TABLE Level WITH Constraint Name*. \*/**

DROP TABLE IF EXISTS Department;

CREATE TABLE Department(

DNUM NUMERIC(5),

DNAME VARCHAR(5) NOT NULL UNIQUE,

ESTDATE DATE NOT NULL,

CONSTRAINT PKDeptTableLevel PRIMARY KEY (DNUM)

);

INSERT INTO Department VALUES (4,'Admin', '2005-05-15');

SELECT \* FROM Department;

/\* The following INSERT will lead to ERROR because

the primary key 4 is duplicated which violate the Primary Key constraint. \*/

INSERT INTO Department VALUES (4, 'Acct', '2005-06-01');

SELECT \* FROM Department;

**/\* Demostrate the violation of primary key constraint \*/**

**/\* The constraint is defined at *TABLE Level WITHOUT Constraint Name*. \*/**

DROP TABLE IF EXISTS Department;

CREATE TABLE Department(

DNUM NUMERIC(5),

DNAME VARCHAR(5) NOT NULL UNIQUE,

ESTDATE DATE NOT NULL,

PRIMARY KEY (DNUM)

);

INSERT INTO Department VALUES (4,'Admin', '2005-05-15');

SELECT \* FROM Department;

/\* The following INSERT will lead to ERROR because

the primary key 4 is duplicated which violate the Primary Key constraint. \*/

INSERT INTO Department VALUES (4, 'Acct', '2005-06-01');

SELECT \* FROM Department;

**/\* Demonstrate the violation of NOT NULL constraint.**

**ESTDATE cannot be NULL in the Department table definition, so**

**The following INSERT causes error. \*/**

INSERT INTO Department VALUES (50, 'RnD', NULL);

SELECT \* FROM Department;

**/\* Demonstrate the violation of UNIQUE constraint \*/**

**/\* 'Admin' department exists in the table, so the following INSERT causes error. \*/**

INSERT INTO Department VALUES (100, 'Admin', '2015-11-15');

SELECT \* FROM Department;

**/\* Demonstration of foreign key constraint \*/**

DROP TABLE IF EXISTS Department;

CREATE TABLE Department(

DNUM NUMERIC(5) PRIMARY KEY,

DNAME VARCHAR(5) NOT NULL UNIQUE,

ESTDATE DATE NOT NULL

);

CREATE TABLE Task (

TNUM NUMERIC(4) PRIMARY KEY,

TNAME VARCHAR(8) NOT NULL UNIQUE,

TLOCATION VARCHAR(10) NOT NULL,

TDNUM NUMERIC(5),

***FOREIGN KEY (TDNum)***

***REFERENCES Department (DNum)***

***ON DELETE RESTRICT***

);

INSERT INTO Department VALUES (4,'Admin', '2005-05-15');

/\* Demostrate the **violation of foreign key constraint** \*/

/\* DNUM=5 did not exist in Department table, so the following INSERT

leads to error. \*/

SELECT \* FROM Department;

INSERT INTO Task VALUES (3,'ProductZ','Taipo',5);

SELECT \* FROM Task;

/\* Demostrate **NO Violation of the foreign key constraint**. \*/

/\* DNUM=4 exists in Department table. \*/

SELECT \* FROM Department;

INSERT INTO Task VALUES(10,'Computer','Shatin',4);

SELECT \* FROM Task;

/\* Demonstrate **ON DELETE RESTRICT** \*/

SELECT \* FROM Department;

SELECT \* FROM Task;

/\* As there is a task (TNUM=10, TDNum = 4) in the Task table that is related

To 'Admin' department (DNum =4), you cannot delete the 'Admin' department from

the Department table because of ON DELETE RESTRICT.

Thus, the following DELETE statement causes error. \*/

DELETE FROM Department WHERE DNUM =4;

SELECT \* FROM Department;

SELECT \* FROM Task;

/\* Demonstrate **ON DELETE CASCADE** \*/

DROP TABLE IF EXISTS Task;

DROP TABLE IF EXISTS Department;

CREATE TABLE Department(

DNUM NUMERIC(5) PRIMARY KEY,

DNAME VARCHAR(5) NOT NULL UNIQUE,

ESTDATE DATE NOT NULL

);

CREATE TABLE Task (

TNUM NUMERIC(4) PRIMARY KEY,

TNAME VARCHAR(8) NOT NULL UNIQUE,

TLOCATION VARCHAR(10) NOT NULL,

TDNUM NUMERIC(5),

***FOREIGN KEY (TDNum)***

***REFERENCES Department (DNum)***

***ON DELETE CASCADE***

);

INSERT INTO Department VALUES (4,'Admin', '2005-05-15');

INSERT INTO Task VALUES(10,'Computer','Shatin',4);

SELECT \* FROM Task;

SELECT \* FROM Department;

/\* Since the Foreign Key is defined with ON DELETE CASCASE, so the following

DELETE statement will delete the 'Admin' department in the Department table and

the related row, i.e., 'Computer' task from the Task table. \*/

DELETE FROM Department WHERE DNUM = 4;

SELECT \* FROM Department;

SELECT \* FROM Task;

/\* Demonstrate **ON DELETE SET NULL** \*/

DROP TABLE IF EXISTS Task;

DROP TABLE IF EXISTS Department;

CREATE TABLE Department(

DNUM NUMERIC(5) PRIMARY KEY,

DNAME VARCHAR(5) NOT NULL UNIQUE,

ESTDATE DATE NOT NULL

);

CREATE TABLE Task (

TNUM NUMERIC(4) PRIMARY KEY,

TNAME VARCHAR(8) NOT NULL UNIQUE,

TLOCATION VARCHAR(10) NOT NULL,

TDNUM NUMERIC(5),

***FOREIGN KEY (TDNum)***

***REFERENCES Department (DNum)***

***ON DELETE SET NULL***

);

INSERT INTO Department VALUES (4,'Admin', '2005-05-15');

INSERT INTO Task VALUES(10,'Computer','Shatin',4);

SELECT \* FROM Task;

SELECT \* FROM Department;

/\* The Foreign Key is defined with ON DELETE SET NULL, so the following DELETE

statement will delete the 'Admin' department in the Department table and set

the value of the TDNUM column of 'Computer' task to NULL in the Task table. \*/

DELETE FROM Department WHERE DNUM = 4;

SELECT \* FROM Department;

SELECT \* FROM Task;

**/\* Demonstrating the CHECK constraint in the Employee table. \*/**

DROP TABLE IF EXISTS Task;

DROP TABLE IF EXISTS Department;

CREATE TABLE Department(

DNUM NUMERIC(5) PRIMARY KEY,

DNAME VARCHAR(5) NOT NULL UNIQUE,

ESTDATE DATE NOT NULL

);

CREATE TABLE Employee(

EMPNO NUMERIC(5) PRIMARY KEY,

NAME VARCHAR(7) NOT NULL,

SEX CHAR(1) NOT NULL

CHECK(Sex in ('M', 'F')),

SALARY NUMERIC(5) NOT NULL

CHECK (SALARY BETWEEN 1000 and 6000),

EDNUM NUMERIC(5) NOT NULL,

BOSSEMPNO NUMERIC(5),

FOREIGN KEY (EDNUM)

REFERENCES Department (DNUM) ON DELETE RESTRICT,

FOREIGN KEY (BossEmpNo)

REFERENCES Employee (EmpNo) ON DELETE RESTRICT

);

INSERT INTO Department VALUES (4,'Admin', '2005-05-15');

INSERT INTO Employee VALUES (5, 'Vincent', 'M', 2000, 4, NULL);

/\* Since 'A' is not a valid value for SEX column,

the following INSERT statement will fail. \*/

INSERT INTO Employee VALUES (10, 'Peter', 'A', 2000, 4, NULL);

SELECT \* FROM Employee;

**/\* Demonstrate the DEFAULT value \*/**

DROP TABLE IF EXISTS Task;

DROP TABLE IF EXISTS Employee;

DROP TABLE IF EXISTS Department;

CREATE TABLE Department(

DNUM NUMERIC(5) PRIMARY KEY,

DNAME VARCHAR(5) NOT NULL UNIQUE,

ESTDATE DATE NOT NULL

);

CREATE TABLE Employee(

EMPNO NUMERIC(5) PRIMARY KEY,

NAME VARCHAR(7) NOT NULL,

SEX CHAR(1) NOT NULL

CHECK(Sex in ('M', 'F')),

SALARY NUMERIC(5) NOT NULL

CHECK (SALARY BETWEEN 1000 and 6000),

EDNUM NUMERIC(5) NOT NULL,

BOSSEMPNO NUMERIC(5),

FOREIGN KEY (EDNUM)

REFERENCES Department (DNUM) ON DELETE RESTRICT,

FOREIGN KEY (BossEmpNo)

REFERENCES Employee (EmpNo) ON DELETE RESTRICT

);

CREATE TABLE Task (

TNUM NUMERIC(4),

TNAME VARCHAR(8) NOT NULL UNIQUE,

TLOCATION VARCHAR(10) NOT NULL,

TDNUM NUMERIC(5),

CONSTRAINT PKTask PRIMARY KEY (TNum),

CONSTRAINT FKTaskDept FOREIGN KEY (TDNum)

REFERENCES Department (DNum)

ON DELETE RESTRICT

);

CREATE TABLE TaskAssignment(

EmpNo NUMERIC(5),

TNUM NUMERIC(4),

HOURS NUMERIC(3,1) **DEFAULT 0**,

PRIMARY KEY (EmpNo, TNum),

FOREIGN KEY (EmpNo)

REFERENCES EMPLOYEE (EmpNo)

ON DELETE RESTRICT,

FOREIGN KEY (TNum)

REFERENCES Task (TNUM)

ON DELETE RESTRICT

);

INSERT INTO Department VALUES (4,'Admin', '2005-05-15');

INSERT INTO Employee VALUES (5, 'Vincent', 'M', 2000, 4, NULL);

INSERT INTO Task VALUES(10,'Computer','Shatin',4);

/\* Since no value of Hours is given in the following INSERT statement,

it will be set to the default value of 0. \*/

INSERT INTO taskassignment (Empno,TNum) VALUES (5, 10);

Select \* from taskassignment;