CIS430/530   Lab Assignment 2

Creating a Relational Database Schema from ER Diagram and Populating the Database

1. **BEFORE adding any PK Constraint or PK-FK Constraints in your tables, do the following test. If you already added PK, then drop it using Alter Table Drop (See Part2 for the Alter command) or Create another table with different name but with the same schema Emp_Test without PK, FK or NotNull declared for this task 1 part.**

   Test with the followings:
   - **Insert a few tuples to your Employee table with the given data set below.**
   - **Insert invalid PK column values – a duplicate SSN value, Null value into SSN column or Null values into LName, FName of your table Employee that you created in Lab1 (or Emp_Test you just created).**
   - **Insert any invalid data like a space ' ', all Null values for a tuple, or a duplicate tuple into your the Employee table you created in Lab1 or your Emp_Test.**

   Copy and paste the screen captures that show how the server responses with your SQL statements in a Word document. Add screenshots showing your statements and the results Together in one window of SQL management studio.

2. Creating the COMPANY database schema using SQL (DDL) statements.
The COMPANY database schema is depicted from ER Diagram in Figure 7.15 (in the slide 30 of Elmasri Chapter 7). Core data for this database is given below (at the last page of this lab). Make sure insert all four tuples into Department tables.

Delete all the invalid data you inserted in Task 1 first before starting this main Task 2.

2-1) Identify all the relationships in the given ERD for Company Database
2-2) Transform them into a logical Company Database schema:
   Write the corresponding DDL to create Company Database Schema by Creating (or Altering each table if already created) all 6 Relations by defining all the PK-FK Constraints and NotNull constraint as shown in Figure 7.15 or Figure5-7 below.

The typical SQL commands (DDL) to look up for this lab are as follow:

Create Database…;
Drop Database …;
Use *database_name*;
Delete table…;
Drop table Employee;
Create table Employee (....);
```
ALTER TABLE EMPLOYEE ADD COLUMN…
ALTER TABLE EMPLOYEE ADD CONSTRAINT…
```

```
ALTER TABLE EMPLOYEE DROP COLUMN…;
ALTER TABLE EMPLOYEE DROP CONSTRAINT…;
ALTER TABLE EMPLOYEE ALTER COLUMN…;
```
Select * From Employee;
…

3. **Populating the COMPANY database using SQL (DML) statements with the given data below. Make sure to insert the exact data set as given.**

The typical SQL commands (DML) to populate a table and show the rows inserted into the table for this task are like the following example.

```
INSERT INTO EMPLOYEE VALUES('John','B','Smith','123456789','9-Jan-55','731
Fondren, Houston, TX','M',30000,'987654321',5);
INSERT INTO EMPLOYEE VALUES ('James', 'E', 'Borg', 888665555, '10-Nov-27', '450
Stone, Houston, TX', 'M', 55000, NULL, 1);
```

…
```
Alter Table Employee
Add Foreign Key (Super_ssn) References Employee (Ssn);
```

Select * From Employee;

```
insert into DEPARTMENT values ('Headquarters', 1, 888665555, '19-Jun-71');

INSERT INTO DEPENDENT VALUES (123456789, 'Alice', 'F', '31-Dec-78', 'Daughter');

INSERT INTO PROJECT VALUES ('ProductX', 1, 'Bellaire', 5);

INSERT INTO WORKS_ON VALUES (123456789, 1, 32.5);
```
…

```
ALTER TABLE employee ADD
 foreign key (superssn) references employee(ssn),
 foreign key (dno) references department(dnumber);


ALTER TABLE department ADD Constraint FKMgrSsnPKSsn
 foreign key (mgrssn) references employee(ssn)
```


…

After creating a PK constraint, PK-FK Constraints in your tables, Test the followings with the same invalid data you inserted in Task 1:
Insert a same PK value (for example, same SSN into your table Employee) you created in Lab1.
Insert a duplicate tuple or Null value into Non Null Column in your table you created in Task 1 or Lab1.

Copy and paste your SQL statements in a Word document. Add screenshots showing your statements and the results.

2. **Visualize the Database Relationships**. Use "Database Diagram" in the left pane (or the tab "Database Tools" on the tool bar if your management studio is older than 2012) to create a visual representation of the database tables and relationships. Add the figure to your report.

   Database Visualization tool can be found on Database diagram:
   Right click on Database Diagram under your Company database in Object
   Explorer in the left pane of SQL Server Management Studio or under database Tool menu.
   This may vary depending on the version of your server.

4. Document your work. Add comments explaining the meaning of each component included in the report.
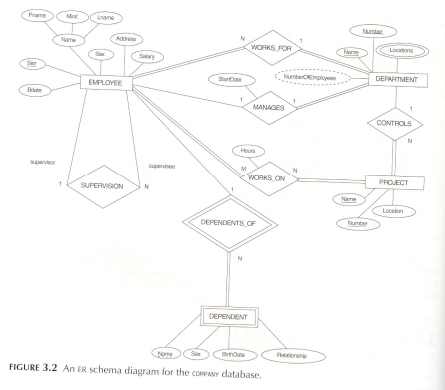
FIGURE 3.2 An ER schema diagram for the COMPANY database.
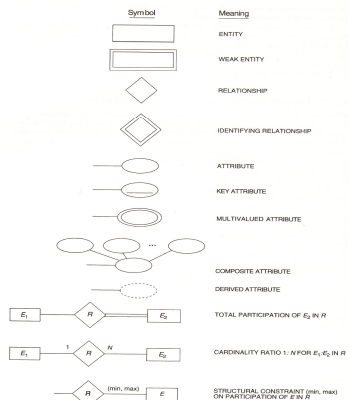
Figure 2. COMPANY SCHEMA - ER Diagram

FIGURE 3.14 Summary of the notation for ER diagrams.

Figure 3. Symbols of ER diagrams

Figure 5.7
Referential integrity constraints displayed on the COMPANY relational database schema.

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date

DEPT_LOCATIONS

Dnumber	Dlocation

PROJECT

Pname	Pnumber	Plocation	Dnum

WORKS_ON

Essn	Pno	Hours

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
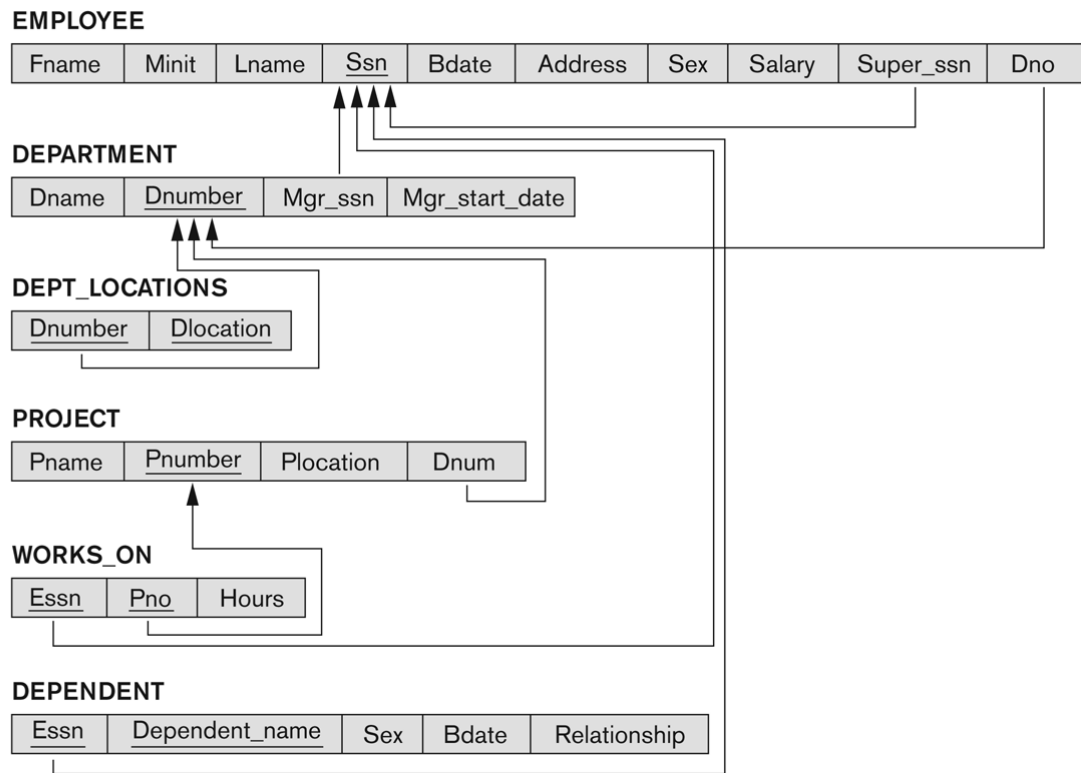
COMPANY DATABASE

EMPLOYEE

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO
John	B	Smith	123456789	09-Jan-55	731 Fondren, Houston, TX	M	30000	987654321	5
Franklin	T	Wong	333445555	08-Dec-45	638 Voss, Houston, TX	M	40000	888665555	5
Joyce	A	English	453453453	31-Jul-62	5631 Rice, Houston, TX	F	25000	333445555	5
Ramesh	K	Narayan	666884444	15-Sep-52	975 Fire Oak, Humble, TX	M	38000	333445555	5
James	E	Borg	888665555	10-Nov-27	450 Stone, Houston, TX	M	55000		1
Jennifer	S	Wallace	987654321	20-Jun-31	291 Berry, Bellaire, TX	F	43000	888665555	4
Ahmad	V	Jabbar	987987987	29-Mar-59	980 Dallas, Houston, TX	M	25000	987654321	4
Alicia	J	Zelaya	999887777	19-Jul-58	3321 Castle, SPring, TX	F	25000	987654321	4

DEPARTMENT

DNAME	DNUMBER	MGRSSN	MGRSTARTDATE
Headquarters	1	888665555	19-Jun-71
Administration	4	987654321	01-Jan-85
Research	5	333445555	22-May-78
Automation	7	123456789	06-Oct-05

DEPENDENT

ESSN	DEPENDENT_NAME	SEX	BDATE	RELATIONSHIP
123456789	Alice	F	31-Dec-78	Daughter
123456789	Elizabeth	F	05-May-57	Spouse
123456789	Michael	M	01-Jan-78	Son
333445555	Alice	F	05-Apr-76	Daughter
333445555	Joy	F	03-May-48	Spouse
333445555	Theodore	M	25-Oct-73	Son
987654321	Abner	M	29-Feb-32	Spouse

DEPT_LOCATIONS

DNUMBER	DLOCATION
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

PROJECT

PNAME	PNUMBER	PLOCATION	DNUM
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

WORKS_ON

ESSN	PNO	Hours
123456789	1	32.5
123456789	2	7.5
333445555	2	10
333445555	3	10
333445555	10	10
333445555	20	10
453453453	1	20
453453453	2	20
666884444	3	40
888665555	20	
987654321	20	15
987654321	30	20
987987987	10	35
987987987	30	5
999887777	10	10
999887777	30	30