CIS430/530 Lab Assignment 2_2

Creating a Relational Database Schema (Logical Database Design) from an ER Diagram (Conceptual Database Design) and Populating the Database with Records

Part 1:

BEFORE adding any PK Constraint or FK Constraints in your tables, do the following test.
You may use the Employee table from Lab1 without any constraint.
If you already added PK, then drop it using Alter Table Drop or Create another table for this test with a different name but with the same schema Emp_Test without any PK, FK or Not Null declared for this Part 1.

Test with the followings:
- **Insert a duplicate tuple into your table or your Emp_Test that you just created.**
- **Insert invalid PK column values – a duplicate SSN value, Null value into the SSN column.**
- **Insert Null values into LName in your table or Emp_Test you just created.**
- **Insert any invalid data like a space ' ' to the FK Dno column or all Null values for a tuple**

You can create a separate table Emp_Test for this Part1.
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.

Part 2:
2. Creating the COMPANY database schema using DDL and DML statements.

Make sure to understand all the relationships depicted in the Page 5 from the given ER Diagram for Company Database as Explained in Class.

2-1) Transform them into a Logical Company Database schema as explained in class. Write the corresponding DDL to create Company Database Schema with Create Table (or Alter Table if it is already created) for all 6 Relations by defining PK Constraint, FK Constraints and Not Null Constraints as explained in class with the finalized ER Diagram.

The Part2 of Lab2_2 should be done based on the finalized E-R diagram completed from the Lab2-1 data which is almost the same with the ER diagram in the textbook given below with a few differences that were explained in class.

https://eecs.csuohio.edu/~sschung/cis430/ERDiagrams_CompanyDatabase.pdf

To avoid the misinterpretation, the finalized correct transformed database scheme from the E-R diagram is given in the Figure 5.7 in Page 5 and Page 6 in this Lab2-2 specification below.

The DDLs for Lab2_2 should be done based on the finalized correct transformed scheme that is given in the page 5 and 6 in the Lab2_2. Your FK Constraints for Lab2_2 should be based on all the relationships identified from the E-R Diagram that are illustrated in the page 5 and the scheme and records are given in the page 6 in this Lab2_2 specification.

The Finalized Correct Database Scheme and the records (database state) to be Inserted for the Company database is given in the last page (Page 6) of this Lab2_2 and in the Lab2_2 section of the class webpage.

You have to create a database scheme precisely with the given Meta data information (Table names, Column Names) as in the given picture in Page 6.
Make sure to insert all four tuples into Department tables as given.

Delete all the invalid data you inserted in the Part 1 first before starting this main Part 2 or you can create fresh new Tables in a new Company database with a slightly different Company database name combined with your name.

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;
…

2_2) 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)

 …
```

2_3) After creating PK constraints, FK Constraints, Not Null constraints in your tables, Test the followings with the same invalid data you inserted in Part 1.

To test a Primary Key Constraint and Entity Integrity Constraint,

- **Insert a duplicate PK value (for example, same SSN into your table Employee),**
- **Insert a duplicate tuple.**
- **Insert Null into a PK column.**

To test a Not Null Constraint
Insert a Null into a Non-Null Column in a table

To Test a Referential Integrity Constraint (FK Constraint)
Insert a non-existing PK value to a corresponding FK column in a table in a relationship

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

2_4) 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 Feature can be found on Database Diagram menu under your Company Database in your Object Explorer pane:
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 SQL server.

If your client tool has a difficulty to display a Scheme Diagram, show the scheme of your Company database from Object Explorer by expanding each table and columns with PK and FK marked from your system catalogue.

The Azure Cloud clients or the Mac Docker clients Do not Have the Visualizing Database feature.
In such cases, It is ok Not to Provide a Database Diagram. Instead, Please Provide the screenshot of Your Object Explorer or Table List in Your Client to Show Your Tables with PK add FKs Created in Lab2_2.

4. Document your work. Add comments explaining the meaning of each component included in the report.

https://eecs.csuohio.edu/~sschung/cis430/ERDiagrams_CompanyDatabase.pdf

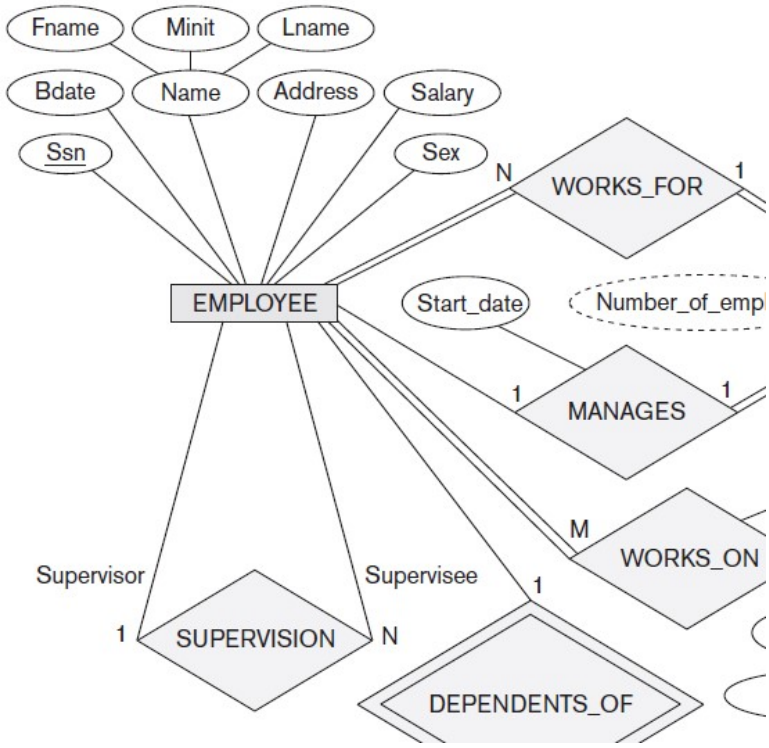


Figure 2. COMPANY SCHEMA - ER Diagram

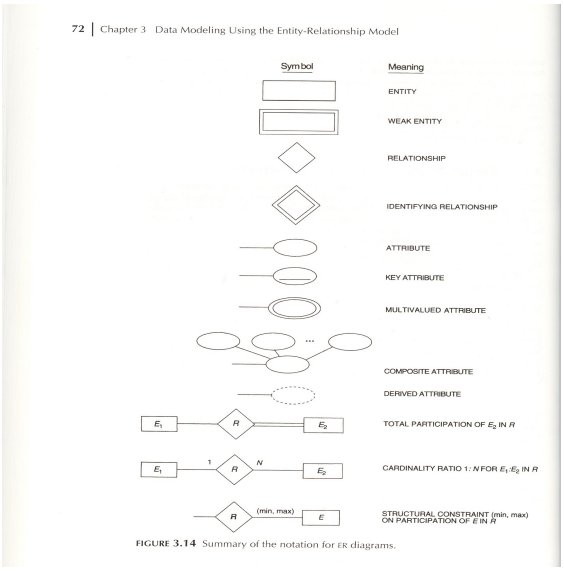
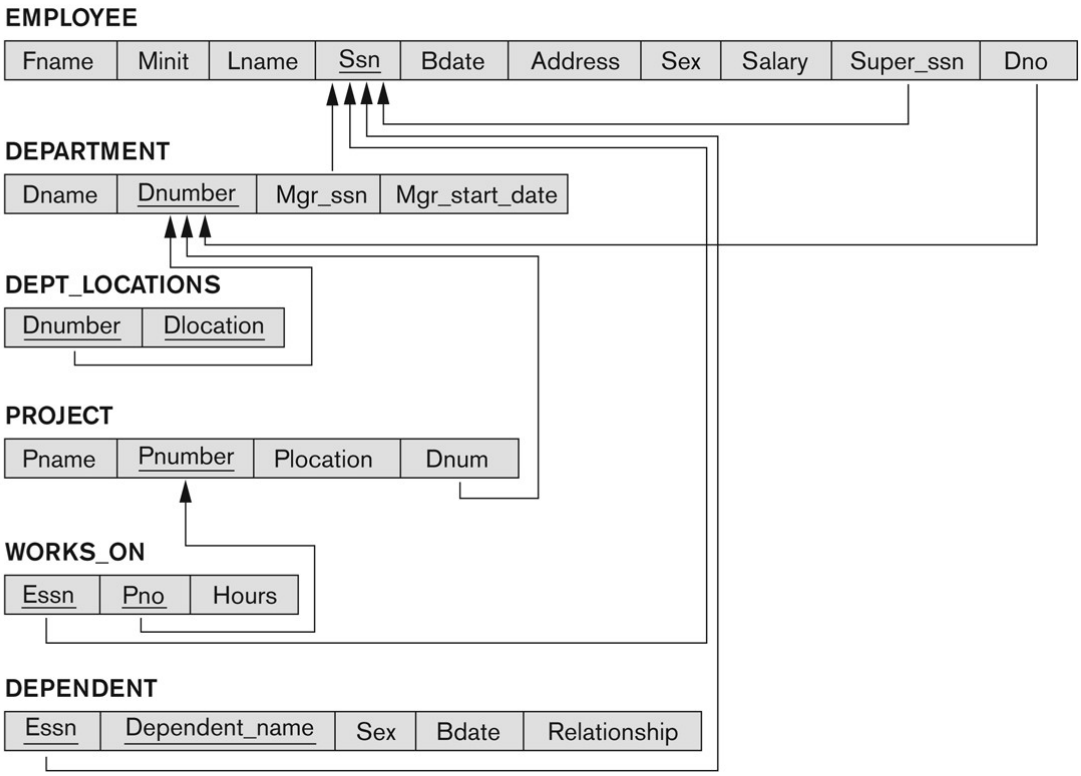


Figure 3. Symbols of ER diagrams

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



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