Solutions to Extra Problems for Module 3

1. Write a CREATE TABLE statement for the *Customer* table. Choose data types appropriate using standard SQL data types where possible. Note that the *CustBal* column contains numeric data. The currency symbols are not stored in the database. The *CustFirstName* and *CustLastName* columns are required (not null).
2. Write a CREATE TABLE statement for the *Employee* table. Choose data types appropriate using standard SQL data types where possible. The *EmpFirstName*, *EmpLastName*, and *EmpEMail* columns are required (not null).
3. Write a CREATE TABLE statement for the *OrderTbl* table. Choose data types appropriate using standard SQL data types where possible. The *OrdDate* column is required (not null).
4. Identify the foreign keys and 1-M relationships among the Customer, Employee, and OrderTbl tables. For each relationship, identify the parent table and the child table.
5. Extend your CREATE TABLE statement from problem (3) with referential integrity constraints.
6. From examination of the sample data and your common understanding of order entry businesses, are null values allowed for the foreign keys in the *OrderTbl* table? Why or why not? Extend the CREATE TABLE statement in problem (5) to enforce the null value constraints if any.
7. Extend your CREATE TABLE statement for the *Employee* table (problem 2) with a unique constraint for *EmpEMail*. Use a named constraint clause for the unique constraint.

The CREATE TABLE statement solution uses the standard SQL:2016 data types. Your DBMS may provide a different collection of data types.

1.

Oracle

```
CREATE TABLE Customer
( CustNo          CHAR(8),
  CustFirstName   VARCHAR2(20) CONSTRAINT CustFirstNameRequired NOT NULL,
  CustLastName    VARCHAR2(30) CONSTRAINT CustLastNameRequired NOT NULL,
  CustCity        VARCHAR2(30),
  CustState       CHAR(2),
  CustZip         CHAR(10),
  CustBal         DECIMAL(12,2),
  CONSTRAINT PKCustomer PRIMARY KEY (CustNo)  );
```

MySQL

```
CREATE TABLE Customer
( CustNo                CHAR(8),
  CustFirstName         VARCHAR(20) NOT NULL,
  CustLastName          VARCHAR(30) NOT NULL,
  CustCity              VARCHAR(30),
  CustState             CHAR(2),
  CustZip               CHAR(10),
  CustBal               DECIMAL(12,2),
  CONSTRAINT PKCustomer PRIMARY KEY (CustNo)  )
```

PostgreSQL

```
CREATE TABLE Customer
( CustNo                CHAR(8),
  CustFirstName         VARCHAR(20) NOT NULL,
  CustLastName          VARCHAR(30) NOT NULL,
  CustCity              VARCHAR(30),
  CustState             CHAR(2),
  CustZip               CHAR(10),
  CustBal               DECIMAL(12,2),
  CONSTRAINT PKCustomer PRIMARY KEY (CustNo)  );
```

2.

Oracle

```
CREATE TABLE Employee
  ( EmpNo          CHAR(8),
    EmpFirstName VARCHAR2(20) CONSTRAINT EmpFirstNameRequired NOT NULL,
    EmpLastName VARCHAR2(30) CONSTRAINT EmpLastNameRequired NOT NULL,
    EmpPhone       CHAR(15),
    EmpEMail       VARCHAR2(50) CONSTRAINT EmpEmailRequired NOT NULL,
CONSTRAINT PKEmployee PRIMARY KEY (EmpNo) );
```

MySQL

```
CREATE TABLE Employee
 ( EmpNo          CHAR(8),
   EmpFirstName VARCHAR(20) NOT NULL,
   EmpLastName VARCHAR(30) NOT NULL,
   EmpPhone       CHAR(15),
   EmpEMail       VARCHAR(50) NOT NULL,
CONSTRAINT PKEmployee PRIMARY KEY (EmpNo) )
```

PostgreSQL

```
CREATE TABLE Employee
 ( EmpNo          CHAR(8),
   EmpFirstName VARCHAR(20) NOT NULL,
   EmpLastName VARCHAR(30) NOT NULL,
   EmpPhone       CHAR(15),
   EmpEMail       VARCHAR(50) NOT NULL,
CONSTRAINT PKEmployee PRIMARY KEY (EmpNo) );
```

3.

Oracle

```
CREATE TABLE OrderTbl
( OrdNo          CHAR(8),
  OrdDate        DATE CONSTRAINT OrdDateRequired NOT NULL,
  CustNo          CHAR(8),
   EmpNo         CHAR(8),
CONSTRAINT PKOrderTbl PRIMARY KEY (OrdNo)  )
```

MySQL

```
CREATE TABLE OrderTbl
( OrdNo          CHAR(8),
  OrdDate        DATE NOT NULL,
  CustNo         CHAR(8),
   EmpNo         CHAR(8),
CONSTRAINT PKOrderTbl PRIMARY KEY (OrdNo)  )
```

PostgreSQL

```
CREATE TABLE OrderTbl
( OrdNo          CHAR(8),
  OrdDate        DATE NOT NULL,
  CustNo         CHAR(8),
   EmpNo         CHAR(8),
CONSTRAINT PKOrderTbl PRIMARY KEY (OrdNo)  )
```

4.

There are two 1-M relationships: (1) Customer (CustNo PK) – OrderTbl (CustNo FK) and (2) Employee (EmpNo PK) – OrderTbl (EmpNo FK).

5.
The CREATE TABLE statement has been extended with foreign keys for *CustNo* and *EmpNo*.

Oracle

```
CREATE TABLE OrderTbl
 ( OrdNo          CHAR(8),
   OrdDate        DATE CONSTRAINT OrdDateRequired NOT NULL,
   CustNo          CHAR(8),
   EmpNo          CHAR(8),
CONSTRAINT PKOrderTbl PRIMARY KEY (OrdNo) ,
CONSTRAINT FKCustNo FOREIGN KEY (CustNo) REFERENCES Customer,
CONSTRAINT FKEmpNo FOREIGN KEY (EmpNo) REFERENCES Employee
 )'
```

MySQL

```
CREATE TABLE OrderTbl
 ( OrdNo     CHAR(8),
   OrdDate  DATE NOT NULL,
   CustNo    CHAR(8),
   EmpNo   CHAR(8),
CONSTRAINT PKOrderTbl PRIMARY KEY (OrdNo) ,
CONSTRAINT FKCustNo FOREIGN KEY (CustNo) REFERENCES Customer (CustNo),
CONSTRAINT FKEmpNo FOREIGN KEY (EmpNo) REFERENCES Employee (EmpNo)
        )
```

MySQL

```
CREATE TABLE OrderTbl
 ( OrdNo     CHAR(8),
   OrdDate  DATE NOT NULL,
   CustNo    CHAR(8),
   EmpNo   CHAR(8),
CONSTRAINT PKOrderTbl PRIMARY KEY (OrdNo) ,
CONSTRAINT FKCustNo FOREIGN KEY (CustNo) REFERENCES Customer (CustNo),
CONSTRAINT FKEmpNo FOREIGN KEY (EmpNo) REFERENCES Employee (EmpNo)
        );
```

6.
Null values are not allowed for *CustNo*. The sample data shows that each order has a related customer. In addition, common practice indicates that an order requires a customer. Fraud could result if orders are stored without a related customer. Null values are allowed for the *EmpNo* column. The sample data shows rows without an *EmpNo* value. The null values may correspond to internet orders where no employee takes the order.

Oracle

```
CREATE TABLE OrderTbl
 ( OrdNo          CHAR(8),
   OrdDate        DATE CONSTRAINT OrdDateRequired NOT NULL,
   CustNo         CHAR(8) CONSTRAINT CustNoRequired NOT NULL,
   EmpNo          CHAR(8),
CONSTRAINT PKOrderTbl PRIMARY KEY (OrdNo) ,
CONSTRAINT FKCustNo FOREIGN KEY (CustNo) REFERENCES Customer,
CONSTRAINT FKEmpNo FOREIGN KEY (EmpNo) REFERENCES Employee
  );
```

MySQL

```
CREATE TABLE OrderTbl
 ( OrdNo    CHAR(8),
   OrdDate  DATE NOT NULL,
   CustNo   CHAR(8) NOT NULL,
   EmpNo    CHAR(8),
CONSTRAINT PKOrderTbl PRIMARY KEY (OrdNo) ,
CONSTRAINT FKCustNo FOREIGN KEY (CustNo) REFERENCES Customer (CustNo),
CONSTRAINT FKEmpNo FOREIGN KEY (EmpNo) REFERENCES Employee (EmpNo)
  )
```

PostgreSQL

```
CREATE TABLE OrderTbl
 ( OrdNo    CHAR(8),
   OrdDate  DATE NOT NULL,
   CustNo   CHAR(8) NOT NULL,
   EmpNo    CHAR(8),
CONSTRAINT PKOrderTbl PRIMARY KEY (OrdNo) ,
CONSTRAINT FKCustNo FOREIGN KEY (CustNo) REFERENCES Customer (CustNo),
CONSTRAINT FKEmpNo FOREIGN KEY (EmpNo) REFERENCES Employee (EmpNo)
  );
```

7.

Oracle

```
CREATE TABLE Employee
  ( EmpNo          CHAR(8),
    EmpFirstName VARCHAR2(20) CONSTRAINT EmpFirstNameRequired NOT NULL,
    EmpLastName VARCHAR2(30) CONSTRAINT EmpLastNameRequired NOT NULL,
    EmpPhone       CHAR(15),
    EmpEMail       VARCHAR2(50) CONSTRAINT EmpEmailRequired NOT NULL,
CONSTRAINT PKEmployee PRIMARY KEY (EmpNo),
CONSTRAINT UniqueEMail UNIQUE (EmpEMail) );
```

MySQL

```
CREATE TABLE Employee
  ( EmpNo   CHAR(8),
    EmpFirstName VARCHAR(20) NOT NULL,
    EmpLastName VARCHAR(30) NOT NULL,
    EmpPhone                CHAR(15),
    EmpEMail                VARCHAR(50) NOT NULL UNIQUE,
CONSTRAINT PKEmployee PRIMARY KEY (EmpNo)
```

```
CONSTRAINT UniqueEMail UNIQUE (EmpEMail) )
```

PostgreSQL

```
CREATE TABLE Employee
 ( EmpNo    CHAR(8),
   EmpFirstName VARCHAR(20) NOT NULL,
   EmpLastName VARCHAR(30) NOT NULL,
   EmpPhone                 CHAR(15),
   EmpEMail                 VARCHAR(50) NOT NULL UNIQUE,
CONSTRAINT PKEmployee PRIMARY KEY (EmpNo),
CONSTRAINT UniqueEMail UNIQUE (EmpEMail) );
```