

ISEV Book Publishing Company:



Database Design & Development

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Project 1 Relational Database for an Online Store

Conceptual and Logical Design

The online store database needs to keep track of orders for its inventory. When a customer places orders, the system must record that the order and order items. The system must update the available quantity on hand to reflect that the by product(s) has been sold. When an employee processes orders, the system must confirm that the ordered items are in stock. The online store need to keep track of customers and employees, too. The system must update the available quantity on hand to reflect that the by product(s) has been sold. Each team create your store, database and sell your own products.

One customer may or may not place many orders.

One order must be placed by one and only one customer.

One order must contain one or more item.

One item may or may not be in many orders.

One customer must be either a business or individual customer.

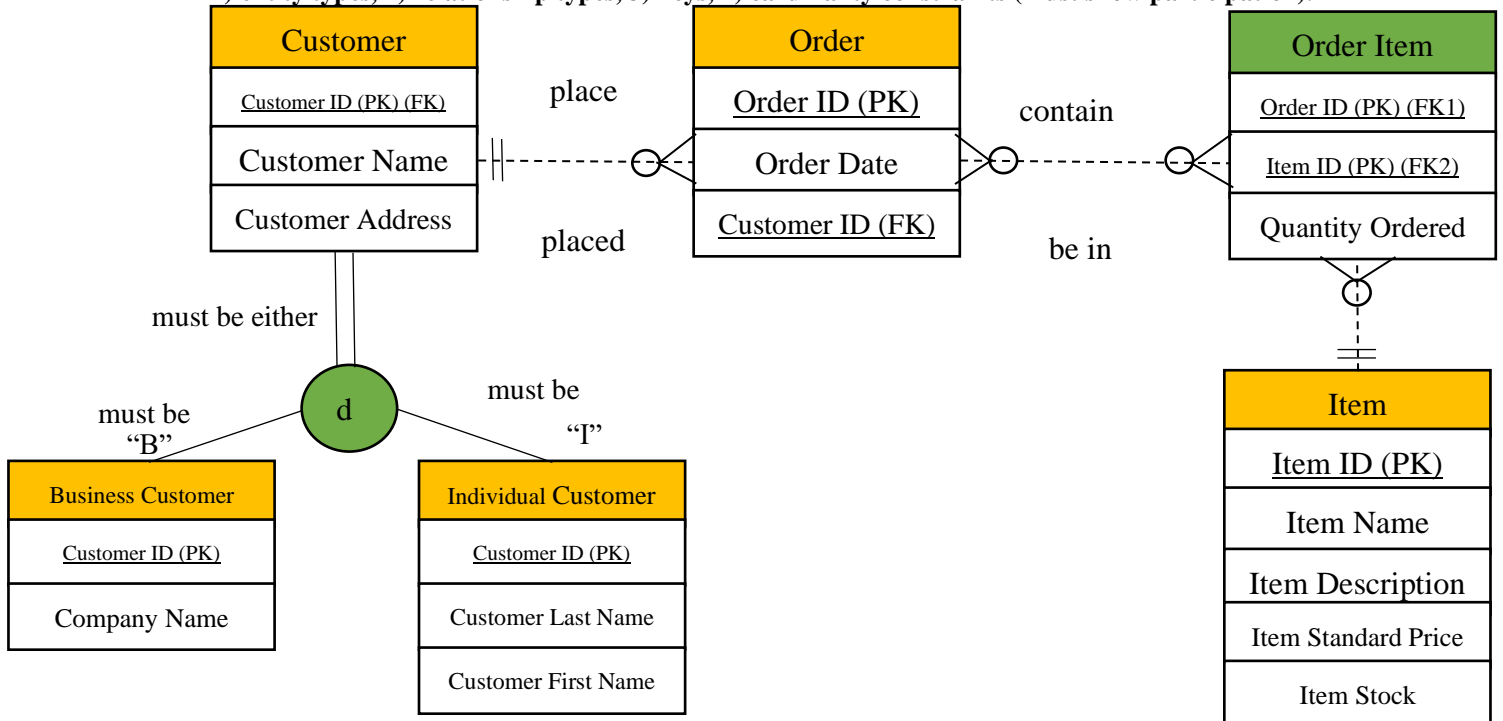
One business customer or individual customer must be a customer.

1. Identify entity types and relationship types. Fill out the following relationship matrix.

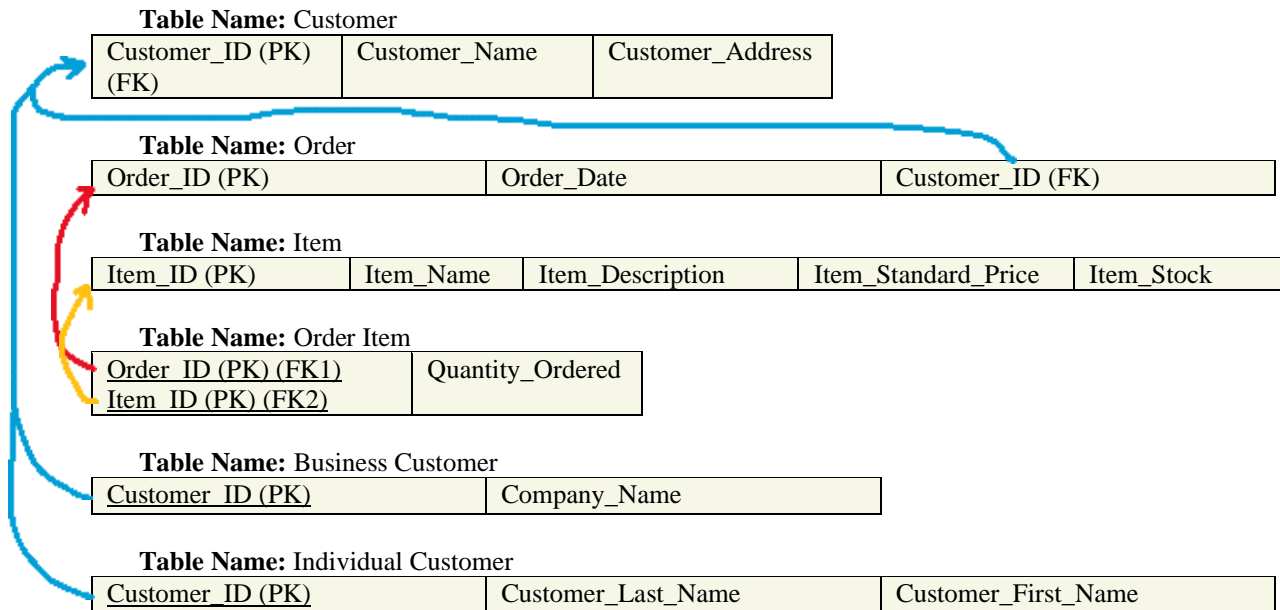
	Customer	Order	Item	Business Customer	Individual Customer
Customer	---	place	---	must be either	must be either
Order	placed by	---	contain	---	---
Item	---	be in	---	---	---
Business Customer	must be	---	---	---	---
Individual Customer	must be	---	---	---	---

2. Draw an EER diagram includes

1) entity types, 2) relationship types, 3) keys, 4) cardinality constraints (must show participation).



3. **Database Logical Design:** Map the ER diagram to a relational database schema indicating **the relation name, primary key and foreign key**. Add appropriate additional attributes by yourself.



4. Establish join paths for the above relational database using the referential integrity by drawing arrow lines between the above tables. Indicate all the foreign keys (FK).

F.K. -> P.K. (Foreign Key refers to Primary Key)

Order.Customer_ID.FK → Customer.Customer_ID.PK
 Order_Item.Order_ID.FK → Order.Order_ID.PK
 Order_Item.Item_ID.FK → Item.Item_ID.PK
 Business_Customer.Customer_ID.FK → Customer.Customer_ID.PK
 Individual_Customer.Customer_ID.FK → Customer.Customer_ID.PK

5. Do function analysis for each of your tables

Attribute A -> Attribute B (Determinant attribute(s) Determines Dependent Attribute(s))

Customer:

Customer_ID -> Customer_Name, Customer_Address [Full dependency]

Order:

Order_ID -> Order_Date, Customer_ID [Full dependency]

Item:

Item_ID -> Item_Name, Item_Description, Item_Standard_Price, Item_Stock [Full dependency]

Order Item:

Order_ID, Item_ID -> Order_Date [Full dependency]

Business_Customer:

customerID -> businessOrderHistory [Full dependency]

Individual_Customer:

customerID -> individualOrderHistory [Full dependency]

6. Show all the normalized tables and indicate the normalization form for each of your tables.

Table Name	1NF	2NF	3NF
Customer	X	X	X
Order	X	X	X
Item	X	X	X
Order Item	X	X	X
Business Customer	X	X	X
Individual Customer	X	X	X

7. Create the relational database with five constraints in appropriate tables and load data into the database via ORACLE SQL*PLUS. For data consistency, your database must include five constraints. One person/one table

DATABASE CREATION SCRIPT (DDL)

```
DROP TABLE Customer_t          CASCADE CONSTRAINTS;
DROP TABLE Order_t             CASCADE CONSTRAINTS;
DROP TABLE Order_Item_t        CASCADE CONSTRAINTS;
DROP TABLE Item_t              CASCADE CONSTRAINTS;
DROP TABLE B_Customer_t        CASCADE CONSTRAINTS;
DROP TABLE I_Customer_t        CASCADE CONSTRAINTS;
```

```
CREATE TABLE Customer_t
    (Customer_ID      number      NOT NULL,
     Customer_Name     VARCHAR(25),
     Customer_Address  VARCHAR(50),
     CONSTRAINT Customer_PK PRIMARY KEY (Customer_ID));
```

```
CREATE TABLE Order_t
    (Order_ID         INTEGER      NOT NULL,
     Customer_ID       number      ,
     Order_Date        DATE        ,
     CONSTRAINT Order_PK PRIMARY KEY (Order_ID),
     CONSTRAINT Order_FK1 FOREIGN KEY (Customer_ID) REFERENCES
     Customer_t(Customer_ID));
```

```
CREATE TABLE Order_Item_t
    (Order_ID         INTEGER      NOT NULL,
     Item_ID           number      ,
     Quantity_Ordered  number      ,
     CONSTRAINT Order_Item_PK PRIMARY KEY (Order_ID, Item_ID),
     CONSTRAINT Order_Item_FK1 FOREIGN KEY (Order_ID) REFERENCES
     Order_t(Order_ID),
     CONSTRAINT Order_Item_FK2 FOREIGN KEY (Item_ID) REFERENCES Item_t(Item_ID));
```

```
CREATE TABLE Item_t
    (Item_ID          number      NOT NULL,
```

```

        Item_Name          VARCHAR(30)          ,
        Item_Description    VARCHAR(50)          ,
        Item_Standard_Price DECIMAL(6,2)        ,
        Item_Stock          VARCHAR(20)          ,
CONSTRAINT Item_PK PRIMARY KEY (Item_ID));

CREATE TABLE B_Customer_t
        (BCustomer_ID      number                NOT NULL,
        Company_Name       VARCHAR(30)          ,
CONSTRAINT B_Customer_PK PRIMARY KEY (BCustomer_ID),
CONSTRAINT B_Customer_FK1 FOREIGN KEY (BCustomer_ID) REFERENCES
Customer_t(Customer_ID));

CREATE TABLE I_Customer_t
        (ICustomer_ID      number                NOT NULL,
        Customer_FirstName  VARCHAR(25)          ,
        Customer_LastName   VARCHAR(25)          ,
CONSTRAINT I_Customer_PK PRIMARY KEY (ICustomer_ID),
CONSTRAINT I_Customer_FK1 FOREIGN KEY (ICustomer_ID) REFERENCES
Customer_t(Customer_ID));

INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (1, 'Omega Crop.', '9562 Swanson Ave. Camden, NJ 08105');
INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (2, 'Elsie-Mae Dale', '7285 Marshall St. Royersford, PA 19468');
INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (3, 'Kobe Hastings', '8 East Littleton Circle, Ashtabula, OH 44004');
INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (4, 'Myla Fisher', '545 W. Brook St. Holland, MI 49423');
INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (5, 'Johnathan Foster', '52 Southampton St. Titusville, FL 32780');
INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (6, 'SpeedAuto', '815 Bridle Ave. Pewaukee, WI 53072');
INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (7, 'Vladimir Johnson', '3 Linden Ave. Douglasville, GA 30134');
INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (8, 'Kaeden Forrest', '9144 Bellevue Street, Simpsonville, SC 29680');
INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (9, 'AlphaRex', '7989 Cactus St. Richmond Hill, NY 11418');
INSERT INTO Customer_t (Customer_ID, Customer_Name, Customer_Address)
VALUES (10, 'Romany Gardner', '711 James Ave. Osseo, MN 55311');

INSERT INTO Order_t (Order_ID, Order_Date, Customer_ID)
VALUES (1001, '02/Oct/20', 7);
INSERT INTO Order_t (Order_ID, Order_Date, Customer_ID)
VALUES (1002, '15/Oct/20', 4);
INSERT INTO Order_t (Order_ID, Order_Date, Customer_ID)
VALUES (1003, '20/Aug/20', 8);
INSERT INTO Order_t (Order_ID, Order_Date, Customer_ID)
VALUES (1004, '25/Nov/20', 3);
INSERT INTO Order_t (Order_ID, Order_Date, Customer_ID)

```

```
VALUES (1005, '12/Dec/20', 5);
INSERT INTO Order_t (Order_ID, Order_Date, Customer_ID)
VALUES (1006, '15/Jan/20', 2);
INSERT INTO Order_t (Order_ID, Order_Date, Customer_ID)
VALUES (1007, '02/Jun/20', 6);
INSERT INTO Order_t (Order_ID, Order_Date, Customer_ID)
VALUES (1008, '26/Dec/20', 1);
```

```
INSERT INTO Order_Item_t (Order_ID, Item_ID, Quantity_Ordered)
VALUES (1001, 2, 3);
INSERT INTO Order_Item_t (Order_ID, Item_ID, Quantity_Ordered)
VALUES (1002, 4, 1);
INSERT INTO Order_Item_t (Order_ID, Item_ID, Quantity_Ordered)
VALUES (1003, 6, 2);
INSERT INTO Order_Item_t (Order_ID, Item_ID, Quantity_Ordered)
VALUES (1004, 8, 1);
INSERT INTO Order_Item_t (Order_ID, Item_ID, Quantity_Ordered)
VALUES (1005, 10, 5);
```

```
INSERT INTO Item_t (Item_ID, Item_Name, Item_Description, Item_Standard_Price,
Item_Stock)
VALUES (2, 'America Is In The Heart', 'Non-Fiction', 11, '10');
INSERT INTO Item_t (Item_ID, Item_Name, Item_Description, Item_Standard_Price,
Item_Stock)
VALUES (3, 'Native Speaker', 'Fiction', 10, '7');
INSERT INTO Item_t (Item_ID, Item_Name, Item_Description, Item_Standard_Price,
Item_Stock)
VALUES (4, 'Kindred', 'Sci-Fi', 5, '6');
INSERT INTO Item_t (Item_ID, Item_Name, Item_Description, Item_Standard_Price,
Item_Stock)
VALUES (6, 'The Song of the Titan', 'Fantasy', 15, '4');
INSERT INTO Item_t (Item_ID, Item_Name, Item_Description, Item_Standard_Price,
Item_Stock)
VALUES (7, 'The Woman Warrior', 'Fiction', 15, '5');
INSERT INTO Item_t (Item_ID, Item_Name, Item_Description, Item_Standard_Price,
Item_Stock)
VALUES (8, 'Southland', 'Crime Fiction', 20, '2');
INSERT INTO Item_t (Item_ID, Item_Name, Item_Description, Item_Standard_Price,
Item_Stock)
VALUES (10, 'Passing', 'Fiction', 8, '6');
```

```
INSERT INTO B_Customer_t (BCustomer_ID, Company_Name)
VALUES (1, 'Omega Crop.');
INSERT INTO B_Customer_t (BCustomer_ID, Company_Name)
VALUES (6, 'SpeedAuto');
INSERT INTO B_Customer_t (BCustomer_ID, Company_Name)
VALUES (9, 'AlphaRex');
```

```
INSERT INTO I_Customer_t (ICustomer_ID, Customer_FirstName, Customer_LastName)
VALUES (2, 'Elsie-Mae', 'Dale');
INSERT INTO I_Customer_t (ICustomer_ID, Customer_FirstName, Customer_LastName)
```

```

VALUES (3, 'Kobe', 'Hastings');
INSERT INTO I_Customer_t (ICustomer_ID, Customer_FirstName, Customer_LastName)
VALUES (4, 'Myla', 'Fisher');
INSERT INTO I_Customer_t (ICustomer_ID, Customer_FirstName, Customer_LastName)
VALUES (5, 'Johnathan', 'Foster');
INSERT INTO I_Customer_t (ICustomer_ID, Customer_FirstName, Customer_LastName)
VALUES (7, 'Vladimir', 'Johnson');
INSERT INTO I_Customer_t (ICustomer_ID, Customer_FirstName, Customer_LastName)
VALUES (8, 'Kaeden', 'Forrest');
INSERT INTO I_Customer_t (ICustomer_ID, Customer_FirstName, Customer_LastName)
VALUES (10, 'Romany', 'Gardner');

```

COMMIT;

8. Test your relational database via ORACLE SQL*PLUS, which includes SQL statements, SQL solutions and output and save them in the MS word file as you did for your homework. One person/one query

DATABASE DESCRIPTION

DESC Customer_t;

Name	Null?	Type
CUSTOMER_ID	NOT NULL	NUMBER
CUSTOMER_NAME		VARCHAR2(25)
CUSTOMER_ADDRESS		VARCHAR2(50)

DESC Order_t;

Name	Null?	Type
ORDER_ID	NOT NULL	NUMBER(38)
CUSTOMER_ID		NUMBER
ORDER_DATE		DATE

DESC Order_Item_t;

Name	Null?	Type
ORDER_ID	NOT NULL	NUMBER(38)
ITEM_ID	NOT NULL	NUMBER
QUANTITY_ORDERED		NUMBER

DESC Item_t;

Name	Null?	Type
------	-------	------

ITEM_ID	NOT NULL	NUMBER
ITEM_NAME		VARCHAR2(30)
ITEM_DESCRIPTION		VARCHAR2(50)
ITEM_STANDARD_PRICE		NUMBER(6,2)
ITEM_STOCK		VARCHAR2(20)

DESC B_Customer_t;

Name	Null?	Type
BCUSTOMER_ID	NOT NULL	NUMBER
COMPANY_NAME		VARCHAR2(30)

DESC I_Customer_t;

Name	Null?	Type
ICUSTOMER_ID	NOT NULL	NUMBER
CUSTOMER_FIRSTNAME		VARCHAR2(25)
CUSTOMER_LASTNAME		VARCHAR2(25)

DATABASE INSTANCES

SELECT * FROM Customer_t;

CUSTOMER_ID	CUSTOMER_NAME	CUSTOMER_ADDRESS
1	Omega Crop.	9562 Swanson Ave. Camden, NJ 08105
2	Elsie-Mae Dale	7285 Marshall St. Royersford, PA 19468
3	Kobe Hastings	8 East Littleton Circle, Ashtabula, OH 44004
4	Myla Fisher	545 W. Brook St. Holland, MI 49423
5	Johnathan Foster	52 Southampton St. Titusville, FL 32780
6	SpeedAuto	815 Bridle Ave. Pewaukee, WI 53072
7	Vladimir Johnson	3 Linden Ave. Douglasville, GA 30134
8	Kaeden Forrest	9144 Bellevue Street, Simpsonville, SC 29680
9	AlphaRex	7989 Cactus St. Richmond Hill, NY 11418
10	Romany Gardner	711 James Ave. Osseo, MN 55311

SELECT * FROM Order_t;

ORDER_ID	CUSTOMER_ID	ORDER_DATE
1001	7	02-OCT-20
1002	4	15-OCT-20
1003	8	20-AUG-20
1004	3	25-NOV-20
1005	5	12-DEC-20
1006	2	15-JAN-20
1007	6	02-JUN-20
1008	1	26-DEC-20

SELECT * FROM Order_Item_t;

ORDER_ID	ITEM_ID	QUANTITY_ORDERED
1001	2	3
1002	4	1
1003	6	2
1004	8	1
1005	10	3

SELECT * FROM Item_t;

ITEM_ID	ITEM_NAME	ITEM_DESCRIPTION	ITEM_STANDARD_PRICE	ITEM_STOCK
2	America Is In The Heart	Non-Fiction	11	10
3	Native Speaker	Fiction	10	7
4	Kindred	Sci-Fi	5	6
6	The Song of the Titan	Fantasy	15	4
8	Southland	Crime Fiction	20	2
10	Passing	Fiction	8	6

SELECT * FROM B_Customer_t;

BCUSTOMER_ID	COMPANY_NAME
--------------	--------------

1	Omega Crop.
6	SpeedAuto
9	AlphaRex

SELECT * FROM I_Customer_t;

ICUSTOMER_ID	CUSTOMER_FIRSTNAME	CUSTOMER_LASTNAME
2	Elsie-Mae	Dale
3	Kobe	Hastings
4	Myla	Fisher
5	Johnathan	Joestar
7	Vladimir	Johnson
8	Kaeden	Forrest
10	Romany	Gardner

9. Show Insert, Update and Delete statement in each Group. One person/one DML statement

Your SELECT statements must include join tables, subqueries, View, Group by Having and function statements.

DML STATEMENTS

- Update a customer's last name

```
UPDATE I_Customer_t
SET Customer_LastName = 'Joestar'
WHERE ICustomer_ID = 5;
```

```
SELECT *
FROM I_Customer_t
WHERE ICustomer_ID = 5;
```

ICUSTOMER_ID	CUSTOMER_FIRSTNAME	CUSTOMER_LASTNAME
5	Johnathan	Joestar

- Delete an order.

```
DELETE Order_t
WHERE Order_ID = 1002;
```

```
SELECT *
FROM Order_t
ORDER BY Order_ID;
```

ORDER_ID	CUSTOMER_ID	ORDER_DATE
1001	7	02-OCT-20
1003	8	20-AUG-20
1004	3	25-NOV-20
1005	5	12-DEC-20
1006	2	15-JAN-20
1007	6	02-JUN-20
1008	1	26-DEC-20

- Delete an item.

```
DELETE Item_t
WHERE Item_ID = 7;
```

```
SELECT *
FROM Item_t
ORDER BY Item_Name;
```

ITEM_ID	ITEM_NAME	ITEM_DESCRIPTION	ITEM_STANDARD_PRICE	ITEM_STOCK
2	America Is In The Heart	Non-Fiction	11	10
4	Kindred	Sci-Fi	5	6
3	Native Speaker	Fiction	10	7
10	Passing	Fiction	8	6
8	Southland	Crime Fiction	20	2
6	The Song of the Titan	Fantasy	15	4

- A customer whom order ID is 1005 would like to order 3 instead of 1.

```
UPDATE Order_Item_t
SET Quantity_Ordered = 3
WHERE Order_ID = 1005;
```

```
SELECT *
FROM Order_Item_t
WHERE Order_ID = 1005;
```

ORDER_ID	ITEM_ID	QUANTITY_ORDERED
1005	10	3

- View all companies and its address.

```
CREATE VIEW BusinessCustomerManuscript AS
SELECT
    Customer_Address, Company_Name
FROM
    Customer_t, B_Customer_t
WHERE
    Customer_t.Customer_ID = B_Customer_t.BCustomer_ID;

SELECT * FROM BusinessCustomerManuscript
ORDER BY Company_Name;
```

CUSTOMER_ADDRESS	COMPANY_NAME
7989 Cactus St. Richmond Hill, NY 11418	AlphaRex
9562 Swanson Ave. Camden, NJ 08105	Omega Crop.
815 Bridle Ave. Pewaukee, WI 53072	SpeedAuto