Unit 5 Research Project

Eddie S. Jackson

Kaplan University

IT525: Database Design and Data Modeling

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Database Definition

Purpose. The purpose of the project 5 database is to provide the company *Robot Parts Emporium* with a way of maintaining its customers, sales, and parts information. The main idea is to enter the product or part information, enter the customer information, and then track sales and shipping as they happen.

Requirements. The main requirements of the database should include customer information, robot part data, the parts order, the employee who manages the order, shipment information, and finally an invoice. The users of the database will be the employees of Robot Parts Emporium. The database will be used to maintain customer, sales, and robot parts information. Note, a manager must be assigned to each order to manage the order and shipment processing.

Database Design

Table Names (Entity Types). There are seven tables in the Robot Parts Emporium database. They are:

Customers

Order (associative)

Order Item (associative)

Employee

Product

Shipment

Invoice

Business Rules. There are four business rules.

They are:

Customer - Invoice

A customer may receive many invoices

An invoice may have one customer

Customer 1:M

Order – Products

An order may have many products

Many products may be in many orders

Order M:N (Order_Item is the associative entity)

Employee – Customer

One employee can be assigned to multiple customers

Multiple customers are managed by many employees (but only one at a time)
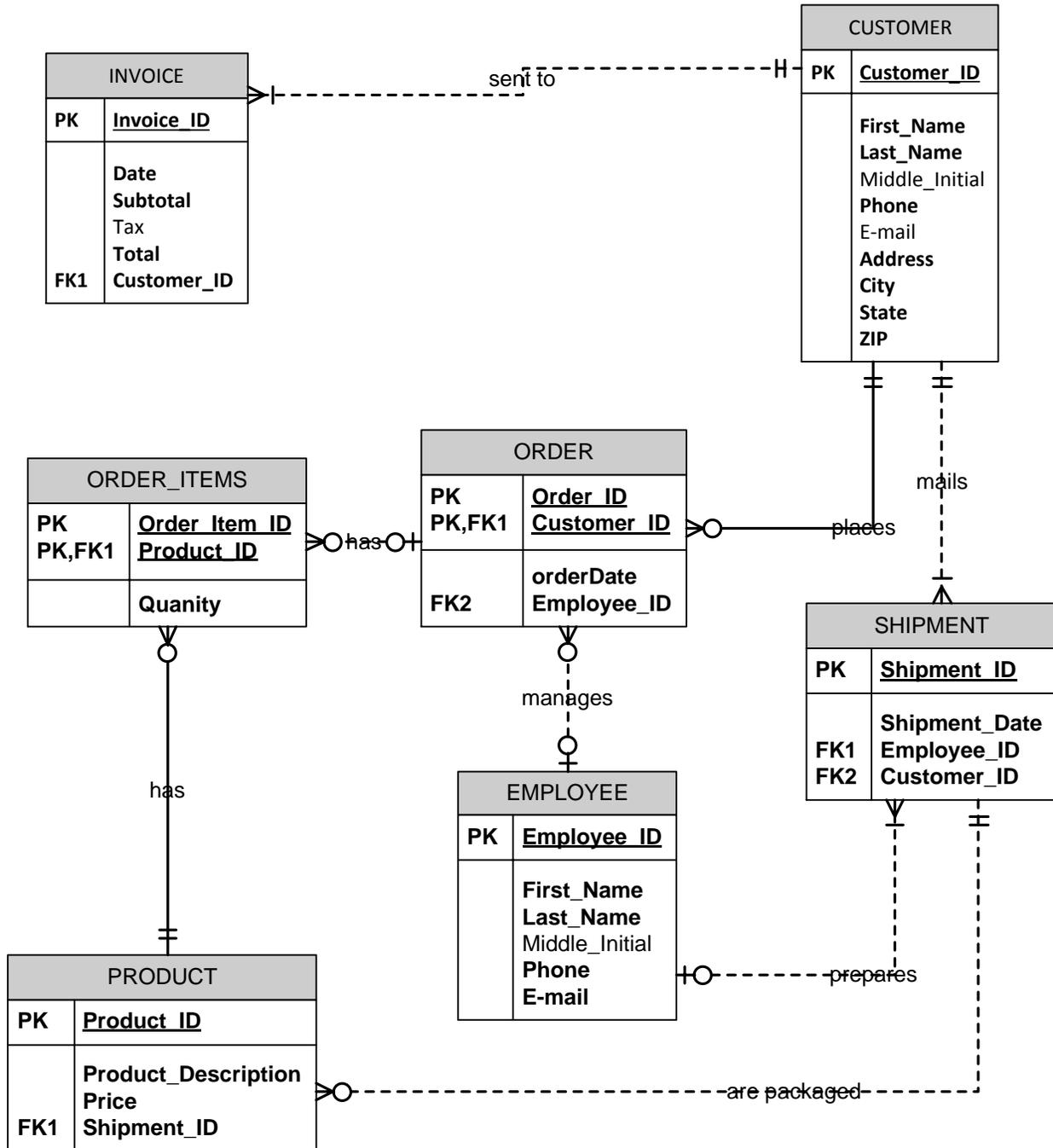
Employee M:N (Order is the associative entity)

Employee – Shipments

One employee manages many customer shipments

Many shipments are managed by one employee

Employee 1:M

The Entity Relationship diagram.

INVOICE

PK	Invoice_ID
	Date
	Subtotal
	Tax
	Total
FK1	Customer_ID

sent to

CUSTOMER

PK	Customer_ID
	First_Name
	Last_Name
	Middle_Initial
	Phone
	E-mail
	Address
	City
	State
	ZIP

mails

ORDER_ITEMS

PK PK,FK1	Order_Item_ID Product_ID
	Quanity

has

ORDER

PK PK,FK1	Order_ID Customer_ID
FK2	orderDate Employee_ID

places

manages

SHIPMENT

PK	Shipment_ID
FK1 FK2	Shipment_Date Employee_ID Customer_ID

has

EMPLOYEE

PK	Employee_ID
	First_Name
	Last_Name
	Middle_Initial
	Phone
	E-mail

prepares

PRODUCT

PK	Product_ID
	Product_Description
	Price
FK1	Shipment_ID

are packaged

Normalization

1NF. All the repeating group information have been eliminated in the individual tables. Separate tables have been created for each set of related data. The primary keys have been identified in each set of related data.

2NF. There are no partial dependencies; no attribute is dependent on a portion of the primary key.

3NF. There are no transitive dependencies that exist in any of the attribute relationships.

Data Dictionary

Customer Table. The customer table holds the customer's basic information such as their name, address, phone number, and email address–this table describes the customer.

Field	Description	Data Type	Allows Nulls	Key
Customer_ID	The unique ID of the customer	INTEGER	Does not allow nulls	Primary Key
First_Name	The first name of the customer	VARCHAR (20)	Does not allow nulls	Not a Key
Last_Name	The last name of the customer	VARCHAR (30)	Does not allow nulls	Not a Key
Middle_Initial	The middle initial of the customer	VARCHAR (1)	Allow nulls	Not a Key
Phone	The phone number of the customer	VARCHAR (20)	Allows nulls	Not a Key
E-mail	The email address of the customer	VARCHAR (40)	Allows nulls	Not a Key
Address	The street address of customer	VARCHAR (40)	Does not allow nulls	Not a Key
City	The city where the customer lives in	VARCHAR (40)	Does not allow nulls	Not a Key

State	State where the customer lives	CHAR (2)	Does not allow nulls	Not a Key
Zip	The state zip code of the customer	CHAR (5)	Does not allow nulls	Not a Key

Invoice Table. The invoice table is where the date, subtotal, tax, and then total amount of purchase is collected–this table describes the invoice.

Field	Description	Data Type	Allows Nulls	Key
Invoice_ID	The unique ID of the invoice	INTEGER	Does not allow nulls	Primary Key
Date	The date the invoice is issued	DATE	Does not allow nulls	Not a Key
Subtotal	The subtotal of purchased items	VARCHAR (30)	Does not allow nulls	Not a Key
Tax	The tax levied	VARCHAR (2)	Allow nulls	Not a Key
Total	The total amount of purchase with tax	VARCHAR (20)	Does not allow nulls	Not a Key
Customer_ID	Unique ID of customer	INTEGER	Does not allow nulls	Foreign Key

Order Table. The order table associates an employee with a customer, as well as order items.

Field	Description	Data Type	Allows Nulls	Key
Order_ID	The unique ID of the order	INTEGER	Does not allow nulls	Primary Key
Customer_ID	The unique ID of the customer	INTEGER	Does not allow nulls	Primary Key Foreign Key
orderDate	The date of the order	DATE	Does not allow nulls	Not a Key
Employee_ID	The unique ID of the employee	INTEGER	Does not allow nulls	Not a Key

Order_Item Table. The order item table associates an order with products. The quantity of the

purchased product is also collected here.

Field	Description	Data Type	Allows Nulls	Key
Order_Item_ID	The unique ID of the order item	INTEGER	Does not allow nulls	Primary Key
Product_ID	The unique ID of the product	INTEGER	Does not allow nulls	Primary Key Foreign Key
Quantity	The total amount of each product to be purchased	INTEGER	Does not allow nulls.	Not a Key

Product Table. The product table describes the product; this includes the product description,

price, and the unique shipment identifier.

Field	Description	Data Type	Allows Nulls	Key
Product_ID	The unique ID of the product	INTEGER	Does not allow nulls	Primary Key
Product_Description	The description of the product	VARCHAR (50)	Does not allow nulls	Not a Key
Quantity	The total amount of each product to be purchased	INTEGER	Does not allow nulls	Foreign Key

Employee Table. The employee table describes the employee who manages the order. The

employee name, address, and email are collected here.

Field	Description	Data Type	Allows Nulls	Key
Employee_ID	The unique ID of the employee	INTEGER	Does not allow nulls.	Primary Key
First_Name	The description of the product	VARCHAR (20)	Does not allow nulls.	Not a Key

Last_Name	The total amount of each product to be purchased.	VARCHAR (30)	Does not allow nulls	Not a Key
Middle_Initial	The middle initial of the employee	VARCHAR (20)	Allows nulls	Not a Key
Phone	The phone number of the employee	VARCHAR (20)	Allows nulls	Not a Key
E-mail	The email address of the employee	VARCHAR (40)	Allows nulls	Not a Key

Shipment Table. The shipment table contains the shipping description of the order; this includes the shipping method, date, employee identifier, and customer identifier.

Field	Description	Data Type	Allows Nulls	Key
Shipment_ID	The unique ID of the shipment	INTEGER	Does not allow nulls.	Primary Key
Shipment_Date	The date the shipment is mailed	DATE	Does not allow nulls	Not a Key
Employee_ID	The unique ID of the employee	INTEGER	Does not allow nulls	Foreign Key
Customer_ID	The unique ID of the customer	INTEGER	Does not allow nulls	Foreign Key

Sample Data

Customer Table

Customer_ID	First_Name	Last_Name	Middle_Initial	Phone	Email	Address	City	State
1	Lee	Moss	S	407-436-1214	lm@hotmail.com	12 Marvel Ln	Orlando	FL
2	Janis	Jones	A	925-231-2184	JJ12@gmail.com	452 Center Blvd	Phoenix	AR
3	Jeff	Moore	O	770-765-2846	JMor@yahoo.com	6754 Pine Ave	Atlanta	GA
4	Bob	Nye	E	207-733-2224	MrBob@gmail.com	111 Point	Bangor	ME

5	Larry	Biggs	N	512-461-6623	LarryBigman@aol.com	432 Ingenuity	Austin	TX
6	Amy	Pond	D	214-991-1628	DrWho@yahoo.com	781 Back Rd	Dallas	TX
7	Mike	Smith	NULL	334-131-8934	MSmith@bellsouth.net	421 Washington Ave	Black	AL
8	Tyler	Crews	E	919-118-9922	KingMan@hotmail.com	986 Wellinton Dr	Raleigh	NC
9	Tom	Stone	M	803-914-3333	DigiTech@hotmail.com	381 Christian Ave	Columbia	SC
10	Vic	Johns	A	615-997-4421	NULL	2220 Marco St	Nashville	TN

Invoice Table

Invoice _ID	Date	Subtotal	Tax	Total	Customer_ ID
1	06/02/2014	12.12	.06	12.85	1
2	06/03/2014	8.75	.04	9.10	1
3	06/04/2014	33.63	.07	35.98	5
4	06/05/2014	94.00	.09	102.46	7
5	06/06/2014	23.99	.04	24.95	3
6	06/07/2014	85.12	.05	89.38	3
7	06/07/2014	22.52	.05	23.646	7
8	06/08/2014	73.15	NULL	73.15	7
9	06/09/2014	15.77	.06	16.72	7
10	06/10/2014	51.99	.08	56.15	4

Order Table

Order_ID	Customer_ID	Date	Employee_ID
1	1	06/02/2014	2
2	1	06/03/2014	2
3	5	06/04/2014	4
4	7	06/05/2014	4
5	3	06/06/2014	3
6	3	06/07/2014	3

7	7	06/07/2014	1
8	7	06/08/2014	1
9	7	06/09/2014	1
10	4	06/10/2014	6

Order Items

Order_Item_ID	Product_ID	Quantity
1	6	1
2	2	1
3	8	2
4	6	1
5	6	1
6	2	2
7	8	2
8	1	1
9	1	2
10	4	1

Product

Product_ID	Product_Description	Price	Shipment_ID
1	Robot left lower arm	12.85	1
2	Robot lower right arm	12.85	1
3	Robot left wrist	22.83	2
4	Robot right wrist	22.83	4
5	Robot left foot	32.53	5
6	Robot right foot	32.53	8
7	Robot eye	50.76	9
8	Robot left ear	20.76	11
9	Robot right ear	20.76	14
10	Robot left thumb	10.99	15

Employee

Employee_ID	First_Name	Last_Name	Middle_Initial	Phone	Email
1	John	Staten	A	407-278-0001	JStaten@Robots.com
2	Dalia	Stoffer	NULL	407-278-0002	DStoffer@Robots.com
3	Jennifer	Land	L	407-278-0003	JLand@Robots.com
4	Chad	Jackson	E	407-278-0004	CJackson@Robots.com
5	Terry	Miller	M	407-278-0005	TMiller@Robots.com
6	Dustin	Neville	W	407-278-0006	DNeville@Robots.com
7	Gary	Sullivan	P	407-278-0007	GSullivan@Robots.com
8	Linda	Lee	NULL	407-278-0008	LLee@Robots.com
9	Sarah	Johnson	B	407-278-0009	SJohnson@Robots.com
10	Edward	Larcen	C	407-278-0010	ELarcen@Robots.com

Shipment

Shipment_ID	Shipment_Date	Employee_ID	Customer_ID
1	06/02/2014	1	4
2	06/03/2014	4	1
3	06/04/2014	2	1
4	06/05/2014	6	7
5	06/06/2014	4	5
6	06/07/2014	1	3
7	06/07/2014	1	2
8	06/08/2014	8	9
9	06/09/2014	6	1
10	06/10/2014	1	3

References

Coronel, C., Morris, S., & Rob, P. (2012). *Database systems: design, implementation, and*

management (10th ed.). Boston, MA: Cengage Learning.