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DATA MANAGEMENT AND DATABASE DESIGN
HOMEWORK: WEEK- 5

4-34)

TABLE 4-3 Sample Data for Parts and Vendors

Part No	Description	Vendor Name	Address	Unit Cost
1234	Logic chip	Fast Chips	Cupertino	10.00
		Smart Chips	Phoenix	8.00
5678	Memory chip	Fast Chips	Cupertino	3.00
		Quality Chips	Austin	2.00
		Smart Chips	Phoenix	5.00

a) Relation and 1NF

➔ Conversion of the sample table to a relation named PART SUPPLIER:

PART SUPPLIER (Part No, Description, Vendor Name, Address, Unit Cost)

Here, Part No uniquely identifies the parts and Vendor Name uniquely identify the vendors.

➔ Converting the sample data to First Normal Form:

PART SUPPLIER

Part No	Description	Vendor Name	Address	Unit Cost
1234	Logic Chip	Fast Chips	Cupertino	10.00
1234	Logic Chip	Smart Chips	Phoenix	8.00
5678	Memory Chip	Fast Chips	Cupertino	3.00
5678	Memory Chip	Quality Chips	Austin	2.00
5678	Memory Chip	Smart Chips	Phoenix	5.00

b) Functional dependencies

➔ Functional dependencies in PART SUPPLIER are as follows:

- Part No is partially dependent on Description
- Vendor Name is partially dependent on Address
- Part No and Vendor Name is fully dependent on Unit Cost

➔ Candidate Keys are as follows:

- Vendor Name
- Part No

c) Insert/Modification/Delete Anomalies

INSERT ANOMALY:

Consider a situation where a new part is being inserted in the database but there is a vendor corresponding to the part. Since Part is linked with the Vendor, it causes an insert anomaly because all the required information has not been added into the database.

For example: If we try to enter a logic chip in Part description without any Vendor information, it would cause an insert anomaly

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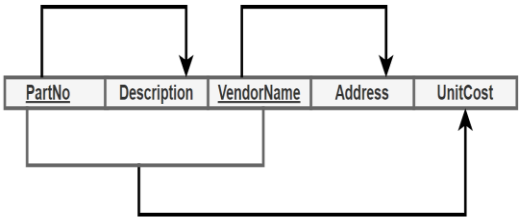
DELETE ANOMALY:
Consider a situation where a particular vendor is deleted from the database. But incase if certain part(s) are supplied only by a particular vendor, there would be a loss of information about those particular part(s). This would in turn cause a delete anomaly as it leads to data loss of Part.
For example: If we try to delete Fast Chips, we lose information regarding logic Chip and Memory Chip, and it would cause a delete anomaly.

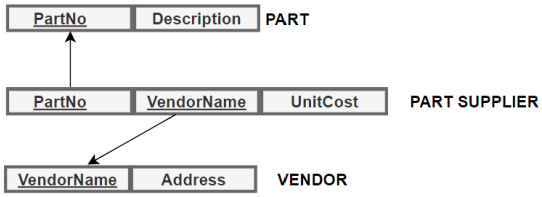
MODIFICATION ANOMALY:
Consider a situation where the address of a vendor who supplies multiple parts is being updated. The address has to be changed for every instance or else it will lead to a modification anomaly
For example: If we try to change the address of Fast Chips from Cupertino to Boston, it has to be modified for every instance, else it would cause a modification anomaly

d)

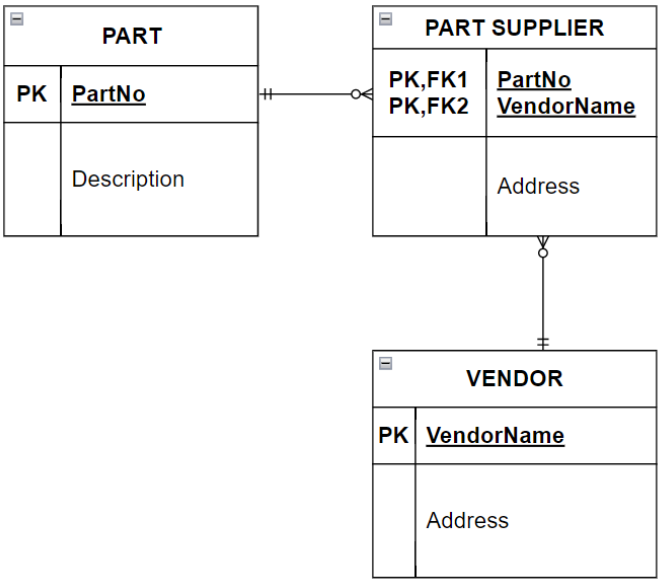


e) Normal Form
The relation is in 1 Normal Form since it does not have any multivalued attributes.

f)



g)



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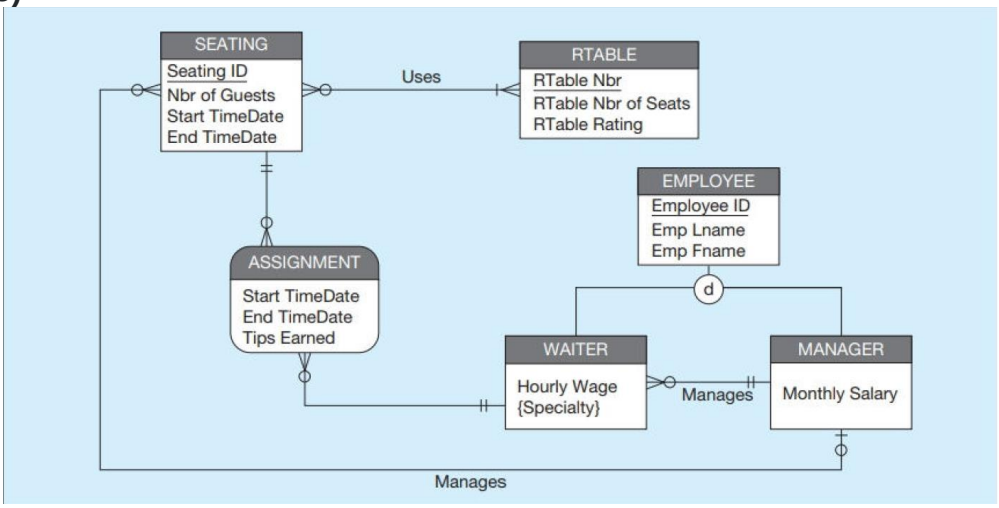

a. Relational schema.

- ➔ SEATING (Seating ID, Nbr of Guests, Start TimeDate, End TimeDate, *ManagerID*)
- ➔ RTABLE (RTable Nbr, RTable Nbr of Seats, RTable Rating)
- ➔ EMPLOYEE (Employee ID, Emp Lname, Emp Fname, Emp Type)
- ➔ WAITER (Hourly Wage, Employee ID, *Manager ID*)
- ➔ MANAGER (Monthly Salary, Employee ID)
- ➔ SEATING TABLES (*R Table Nbr*, *Seating ID*)
- ➔ SPECIALITY (Specialty ID, Specialty Description)
- ➔ WAITER SPECIALITY (*Employee ID*, *Specialty ID*)
- ➔ ASSIGNMENT (Seating ID, Employee ID, Start TimeDate, End TimeDate, Tips Earned)

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b. Functional dependencies.

➔ Functional dependencies are as follows:

Seating is partially dependent on Manager and RTable
Assignment is fully dependent on Seating
Waiter is fully dependent on Assignment

c. 3NF relations using an enterprise key.

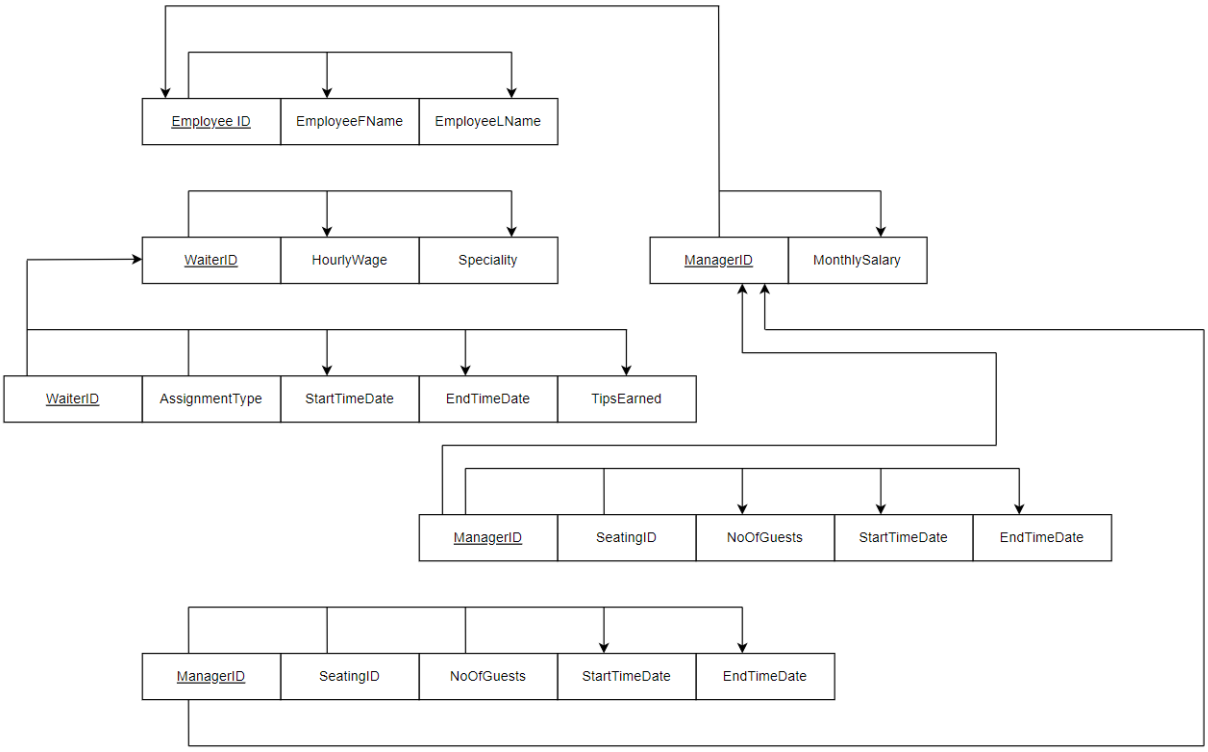

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TABLE 4-5 Shipping Manifest

Shipment ID:	**00-0001**	**Shipment Date:**	**01/10/2018**
Origin:	Boston	Expected Arrival:	01/14/2018
Destination:	Brazil		
Ship Number:	39	Captain:	002-15 Henry Moore

Item Number	Type	Description	Weight	Quantity	TOTALWEIGHT
3223	BM	Concrete Form	500	100	50,000
3297	BM	Steel Beam	87	2,000	174,000
				Shipment Total:	224,000

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a. Relational schema and diagram the functional dependencies in the relation.

➔ Functional dependencies are as follows:
SHIPPING MANIFEST (Shipment ID, Origin, Destination, Ship Number, Expected Date, Captain ID, Item Number, Type, Description, Weight, Quantity, Total Weight)

Total weight is fully dependent on Weight and Quantity
Description is partially dependent on Item Number

b. Norma form:

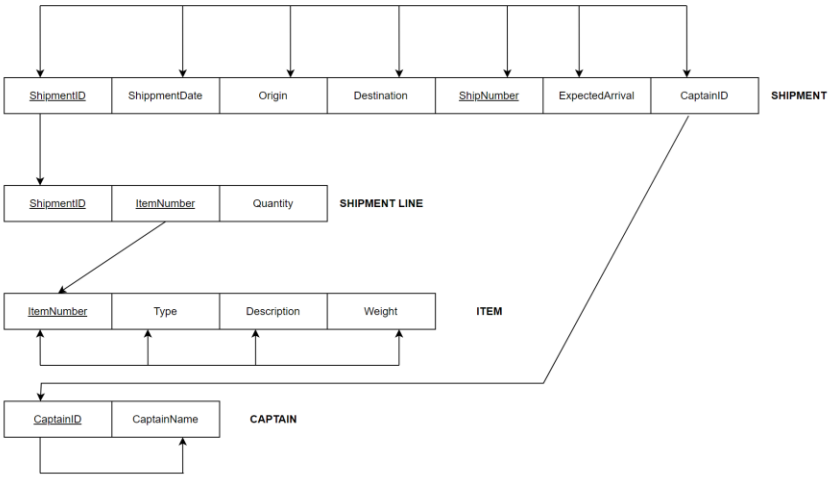
The relation is in 1 Normal Form since it does not have any multivalued attributes

c. 3NF relations.

Conversion of the sample table to a set of 3NF relations:
SHIPMENT (Shipment ID, Shipment Date, Origin, Destination, Ship Number, Expected Arrival, Captain ID)
SHIPMENT LINE (Shipment ID, Item Number, Quantity)
ITEM (Item Number, Type, Description, Weight)
CAPTAIN (Captain ID, Captain Name)

Here, Item Number uniquely identifies the item. Shipment ID uniquely identifies the Shipment, Captain ID refers to the captain navigating the ship, Item number refers to the item that is being shipped.

d. Relational schema for 3NF relations



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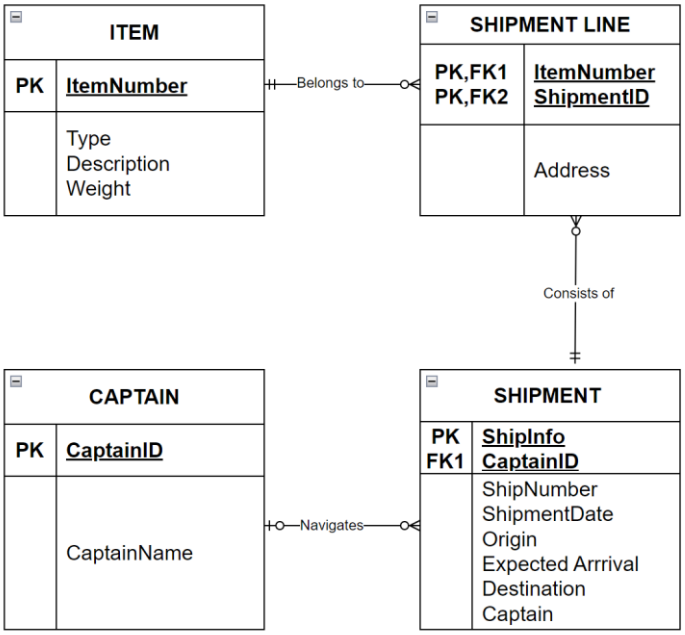
e) Relation as diagraml



4-38) EER diagram.