Harshika Santoshi

BCNF Schema

LUCIDCHART LINK OF THE ERD:

https://lucid.app/lucidchart/ebf3307a-b46a-4be8-9428-c2dc6fb2e0bd/edit?viewport_loc=18%2C78%2C2292%2C1090%2C0_0&invitationId=inv_eeb5d055-f6bb-4f95-8ee9-ea52742a8423

To define a relational schema in at least Boyce-Codd Normal Form (BCNF) based on the updated ERD, we need to identify the functional dependencies in the schema and ensure that they adhere to BCNF requirements.

Functional Dependencies:

Product:

ProductID → Name, Category, Brand, Price, Discount, InventoryID, ReviewID

InventoryID → InStockQuantity, ReorderLevel

ReviewID → ReviewText, Rating

Inventory:

InventoryID → ProductID, InStockQuantity, ReorderLevel

SalesTransaction:

TransactionID → ProductID, TransactionDate, SalesQuantity, SalesRevenue

CustomerReview:

ReviewID → ProductID, ReviewText, Rating

DemandForecast:

ForecastID → ProductID, ForecastedDemand, ForecastDate, ConfidenceLevel

Customer:

CustomerID → Name, Email

Harshika Santoshi

Purchase:

PurchaseID → CustomerID, ProductID, PurchaseDate

Relational Schema in BCNF:

A relational schema is in BCNF if, for every non-trivial functional dependency X → Y, X is a superkey (i.e., a candidate key). A superkey is a set of attributes that uniquely identifies a tuple in a relation.

Based on the functional dependencies listed, the relational schema would include the following tables:

Product (ProductID, Name, Category, Brand, Price, Discount, ReviewID)

ProductID is the primary key.

Inventory (InventoryID, ProductID, InStockQuantity, ReorderLevel) InventoryID is the primary key.
ProductID is both part of the primary key and a foreign key referencing Product.

SalesTransaction (TransactionID, ProductID, TransactionDate, SalesQuantity, SalesRevenue)

TransactionID is the primary key.

ProductID is a foreign key referencing Product.

CustomerReview (ReviewID, ProductID, ReviewText, Rating) ReviewID is the primary key.
ProductID is a foreign key referencing Product.

DemandForecast (ForecastID, ProductID, ForecastedDemand, ForecastDate, ConfidenceLevel)

ForecastID is the primary key.

ProductID is a foreign key referencing Product.

Harshika Santoshi

Customer (CustomerID, Name, Email)

CustomerID is the primary key.

Purchase (PurchaseID, CustomerID, ProductID, PurchaseDate) PurchaseID is the primary key.
CustomerID and ProductID are foreign keys referencing Customer and Product, respectively.

All tables adhere to BCNF because the left side of each functional dependency is a superkey, ensuring that data redundancy and update anomalies are minimized. The schema is organized in a way that satisfies BCNF requirements and promotes data integrity.