

### 1) Employee(EID, EName, Salary)

- Keys: EID
- Primary Key: EID
- FDs: EID -> CName, Salary

Since the left hand side of every non-trivial FD contains a key, the relation is in 3NF.

### 2) Complaints(CID, Status, text, FilledDateTime, HandledDateTime, EID, UID, SID, OID)

- Keys: CID, (UID, FilledDateTime)
- Primary Key: CID
- FDs:
  - CID->Status, text, FilledDateTime, HandledDateTime, EID, UID, SID, OID
    - Since the left hand side of this non-trivial FD contains a key, this FD does not violate BCNF, thus, will not violate 3NF.
  - UID, FilledDateTime->CID
    - Since the left hand side of this non-trivial FD contains a key and the right hand side of this non-trivial FD is contained in a key, this FD does not violate BCNF, thus, will not violate 3NF.
  - UID, FilledDateTime->Status, text, HandledDateTime, EID, SID, OID
    - Since the left hand side of this non-trivial FD contains a key, this FD does not violate BCNF, thus, will not violate 3NF.

Therefore, the relation is in BCNF and therefore, is in 3NF.

### 3) Users(UID, UName)

- Keys: UID
- Primary Key: UID
- FDs: UID -> UName

Since the left hand side of every non-trivial FD contains a key, the relation is in 3NF.

### 4) Shops(SID, SName)

- Assumption: different outlets under the same brand of shops have the same shop name (SNames) but different SID.
- Keys: SID
- Primary Key: SID
- FDs: SID->SName

Since the left hand side of every non-trivial FD contains a key, the relation is in 3NF.

### 5) Orders(OID, ShippingAddress, UID, Datetime)

- Keys: OID, (UID, DateTime)
- Primary Key: OID
- FDs:
  - OID -> ShippingAddress, UID, Datetime
    - Since the left hand side of this FD contains a key, this FD does not violate 3NF.
  - UID, Datetime ->OID
    - Since (UID, Datetime) can determine the primary key OID, hence (UID, Datetime) can determine the attributes found with OID.
    - Since the right hand side of this FD is contained within a key, this FD does not violate 3NF.
  - UID, Datetime -> ShippingAddress
    - Since the left hand side of this FD contains the key (UID, DateTime), this FD does not violate 3NF.

Since the left hand side of every non-trivial FD contains a key or the right hand side of every non-trivial FD is contained in a key, the relation is in 3NF.

**6) Product(PID, PName, Maker, Category)**

- Assumption: same products sold in different shops have the same product name (PName) but different PID.
- Keys: PID
- Primary Key: PID
- FDs: PID -> Pname, Maker, Category

Since the left hand side of every non-trivial FD contains a key, the relation is in 3NF.

**7) Feedback(UID, PID, Datetime, Comment, Rating)**

- Keys: (UID, PID, Datetime)
- Primary Key: (UID, PID, Datetime)
- FDs: UID, PID, Datetime -> Comment, Rating

Since the left hand side of every non-trivial FD contains a key, the relation is in 3NF.

**8) ProductInOrder(OID, PID, SID, Status, OPrice, Quantity, DeliveryDate)**

- Keys: OID
- Primary Key: OID
- FDs: OID -> PID, SID, Status, OPrice, Quantity, DeliveryDate

Since the left hand side of every non-trivial FD contains a key, it does not violate BCNF and will not violate 3NF.

**9) ProductInShops(SID, PID, SPrice, Quantity)**

- Keys: (SID, PID)
- Primary Key: (SID, PID)
- FDs: (SID, PID) -> SPrice, Quantity

Since the left-hand side of every non-trivial FD contains a key, the relation is in 3NF.

**10) PriceHistory(SID, PID, StartDate, EndDate, Price)**

- Keys: (SID, PID, StartDate)
- Primary Key: (SID, PID, StartDate)
- FDs: (SID, PID, StartDate) -> EndDate, Price

Since the left hand side of every non-trivial FD contains a key, the relation is in 3NF.