

# **IT214 Database Management Systems**

**DA-MART**

**Group-11**



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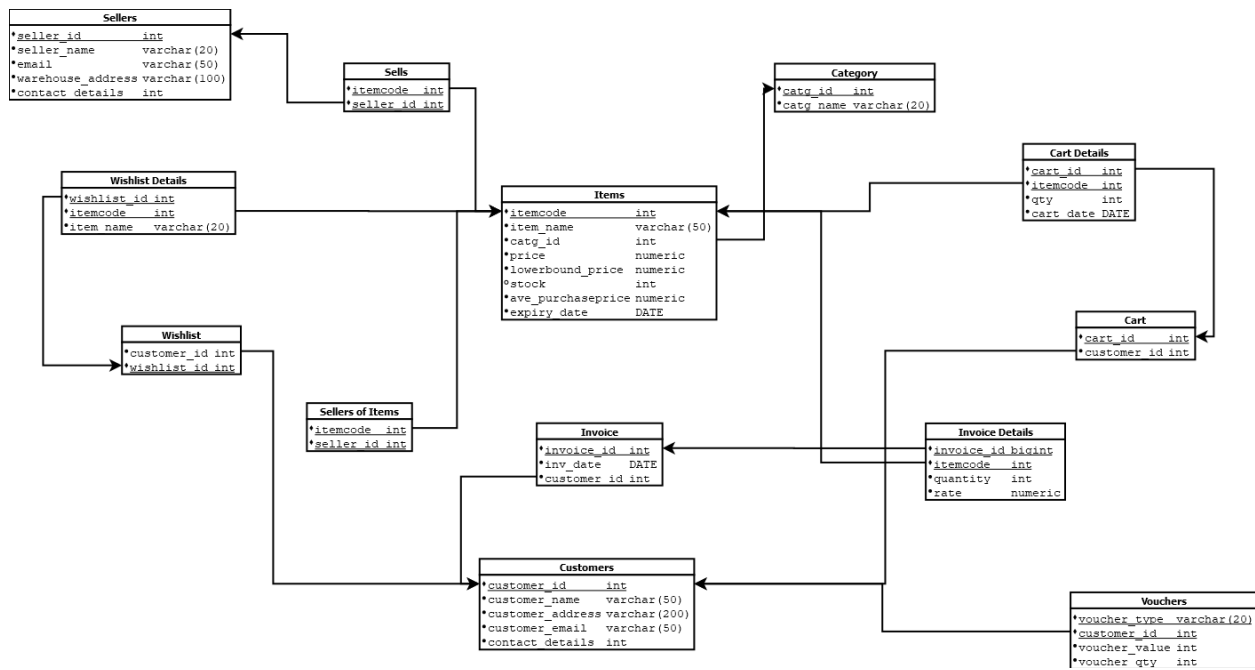
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# Entity-Relationship Diagram:



# Relational Schema:



## Minimum FD Set:

- itemcode -> item\_name
- itemcode -> catg\_id
- itemcode -> price
- itemcode -> lowerbound\_price
- itemcode -> stock
- itemcode -> ave\_purchaseprice
- itemcode -> expiry\_date
- catg\_id -> catg\_name
- seller\_id -> seller\_name
- seller\_id -> email
- seller\_id -> warehouse\_address
- seller\_id -> contact\_details
- customer\_id -> customer\_name
- customer\_id -> customer\_address
- customer\_id -> customer\_email
- customer\_id -> contact\_details
- {vouchers\_type, customer\_id} -> vouchers\_value
- {vouchers\_type, customer\_id} -> vouchers\_qty
- invoice\_id -> inv\_date
- invoice\_id -> customer\_id
- {invoice\_id,itemcode} -> qty
- {invoice\_id,itemcode} -> rate
- cart\_id -> customer\_id
- {cart\_id,itemcode} -> qty
- {cart\_id,itemcode} -> cart\_date
- wishlist\_id -> customer\_id
- {wishlist\_id,itemcode} -> item\_name

## Proof that the Relations are in BCNF:

- To prove that a relation is in Boyce-Codd Normal Form (BCNF), we need to check if it satisfies the following condition:-
  - For every FD  $A \rightarrow B$  that holds on relation R, A is its super-key.
- Let's check each relation from the given set to see if it satisfies the above condition:

### Items:-

- **itemcode** -> **item\_name**
- **itemcode** -> **catg\_id**
- **itemcode** -> **price**
- **itemcode** -> **lowerbound\_price**
- **itemcode** -> **stock**
- **itemcode** -> **ave\_purchaseprice**
- **itemcode** -> **expiry\_date**

All the functional dependencies in the relation have the super-key **itemcode** on the left-hand side. Therefore, the relation is already in **BCNF**.

### Category:-

- **catg\_id -> catg\_name**

The only functional dependency in the relation has the super-key **catg\_id** on the left-hand side. Therefore, the relation is already in **BCNF**.

### Sellers:-

- **seller\_id -> seller\_name**
- **seller\_id -> email**
- **seller\_id -> warehouse\_address**
- **seller\_id -> contact\_details**

All the functional dependencies in the relation have the super-key **seller\_id** on the left-hand side. Therefore, the relation is already in **BCNF**.

### Customers:-

- **customer\_id -> customer\_name**
- **customer\_id -> customer\_address**
- **customer\_id -> customer\_email**
- **customer\_id -> contact\_details**

All the functional dependencies in the relation have the super-key **customer\_id** on the left-hand side. Therefore, the relation is already in **BCNF**.

### **Vouchers:-**

- **{vouchers\_type, customer\_id} -> vouchers\_value**
- **{vouchers\_type, customer\_id} -> vouchers\_qty**

Here the composite attribute **{vouchers\_type, customer\_id}** forms the super-key and all the functional dependencies in the relation have the super-key **{vouchers\_type, customer\_id}** on the left-hand side. Therefore, the relation is already in **BCNF**.

### **Invoice:-**

- **invoice\_id -> inv\_date**
- **invoice\_id -> customer\_id**

All the functional dependencies in the relation have the super-key **invoice\_id** on the left-hand side. Therefore, the relation is already in **BCNF**.

### **Invoice\_details:-**

- **{invoice\_id, itemcode} -> qty**
- **{invoice\_id, itemcode} -> rate**

Here the composite attribute **{invoice\_id, itemcode}** forms the super-key and all the functional dependencies in the relation have the super-key **{invoice\_id, itemcode}** on the left-hand side. Therefore, the relation is already in **BCNF**.

### Cart:-

- **cart\_id -> customer\_id**

All the functional dependencies in the relation have the super-key **cart\_id** on the left-hand side. Therefore, the relation is already in **BCNF**.

### Cart\_details:-

- **{cart\_id,itemcode} -> qty**
- **{cart\_id,itemcode} -> cart\_date**

The functional dependency **{cart\_id,itemcode} -> qty** has the super-key, therefore the relation is **BCNF**.

### Wishlist:-

- **wishlist\_id -> customer\_id**

All the functional dependencies in the relation have the super-key **cart\_id** on the left-hand side. Therefore, the relation is already in **BCNF**.



### Wishlist\_details:-

- {wishlist\_id,itemcode} -> item\_name

The functional dependency {cart\_id,itemcode} -> qty has the super-key, therefore the relation is **BCNF**.