Task A: BCNF Normalization

KEA Shopping Database for BCNF Compliance

1. **Customer Table**
   - **Structure:** Customer_Id, Customer_Email_Address, First_Name, Last_Name, Customer_Phone_Number
   - **Primary Key:** Customer_Id
   - **Functional Dependency:** Customer_Id functionally determines all other attributes in the table
   - **BCNF Compliance:** Given that Customer_Id is the primary key and the sole determinant, all attributes are fully functionally dependent on it. Hence, the Customer table satisfies the conditions of BCNF

2. **Transaction Table**
   - **Structure:** Transaction_Id, Customer_Id, Item_Id, Distributor_Id
   - **Primary Key:** Transaction_Id
   - **Functional Dependency:** Transaction_Id functionally determines all other attributes in the table
   - **BCNF Compliance:** Given that Transaction_Id is the primary key and the sole determinant, all attributes are fully functionally dependent on it. Hence, the Transaction table satisfies the conditions of BCNF

3. **Distributor Table**
   - **Structure:** Distributor_Id, Distibutor_Name
   - **Primary Key:** Distributor_Id
   - **Functional Dependency:** Distributor_Id functionally determines all other attributes in the table
   - **BCNF Compliance:** Given that Distributor_Id is the primary key and the sole determinant, all attributes are fully functionally dependent on it. Hence, the Distributor table satisfies the conditions of BCNF

4. **Item Table**
   - **Structure:** Item_Id, Distributor_Id, Item_Price, Item_Type, Item_Name
   - **Primary Key:** Item_Id
   - **Functional Dependency:** Item_Id functionally determines all other attributes in the table
   - **BCNF Compliance:** Given that Item_Id is the primary key and the sole determinant, all attributes are fully functionally dependent on it. Hence, the Item table satisfies the conditions of BCNF

5. **Availability Table**
   - **Structure:** Item_Id, Distributor_Id, Item_Quantity, Item_Availability

- **Primary Key:** Item_Id
- **Functional Dependency:** Item_Id functionally determines all other attributes in the table
- **BCNF Compliance:** Given that Item_Id is the primary key and the sole determinant, all attributes are fully functionally dependent on it. Hence, the Item table satisfies the conditions of BCNF

As such, all of the tables in the database are in BCNF. With everything in BCNF, we are able to minimize redundancy and potential anomalies when doing data management. This design displays crucial elements of quality and reliability maintenance of a database system