Unnormalized data

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CustId | CustName | CustPhone | CustEmail | CustAddress | OrdId | OrdDate | OrdBill | ProdName | ProdPrice | Supplier |
| C1 | Sam | 9892710473 | Sam87@  gmail.com | C-20, MV-3, Delhi-96 | 101 | 2/3/2022 | 1320 | Boat DataCable,  Boat Headphone | 310,  940 | ABC Pvt. Ltd. |
| C2 | Neel | 8492957992 | Neel34@  gmail.com | A-43, GK-2,  Delhi-34 | 102 | 3/3/2022 | 8750 | Samsung M02,  Sony EarPhone | 7970,  770 | XYZ Pvt.  Ltd. |
| C1 | Sam | 9892710473 | Sam87@  gmail.com | C-20, MV-3, Delhi-96 | 103 | 9/3/2022 | 8000 | Samsung M02 | 7970 | XYZ Pvt.  Ltd. |
| C2 | Neel | 8492957992 | Neel34@  gmail.com | A-43, GK-2,  Delhi-34 | 104 | 8/3/2022 | 1000 | Boat Headphone | 940 | ABC Pvt. Ltd. |

1NF

Every column should have atomic values and redundancy should be removed. So, we create two tables, i.e. Customer and Order.

1. Customer

Key-CustId

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CustId | CustName | CustPhone | CustEmail | CustAddress |
| C1 | Sam | 9892710473 | Sam87@gmail.com | C-20, MV-3, Delhi-96 |
| C2 | Neel | 8492957992 | Neel34@gmail.com | A-43, GK-2, Delhi-34 |

1. Order

Key-(OrdId,ProdName)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| OrdId | CustId | OrdDate | OrdTotal | ProdName | ProdPrice | Supplier | SupPhone |
| 101 | C1 | 2/3/2022 | 1320 | Boat DataCable | 310 | ABC Pvt. Ltd. | 011-22456880 |
| 101 | C1 | 2/3/2022 | 1320 | Boat Headphone | 940 | ABC Pvt. Ltd. | 011-22456880 |
| 102 | C2 | 3/3/2022 | 8750 | Samsung M02 | 7970 | XYZ Pvt. Ltd. | 011-22448922 |
| 102 | C2 | 3/3/2022 | 8750 | Sony EarPhone | 770 | XYZ Pvt. Ltd. | 011-22448922 |
| 103 | C1 | 9/3/2022 | 8000 | Samsung M02 | 7970 | XYZ Pvt. Ltd. | 011-22448922 |
| 104 | C2 | 8/3/2022 | 1000 | Boat Headphone | 940 | ABC Pvt. Ltd. | 011-22456880 |

2NF

Partial dependency should not be present. Since, product details are depending upon ProdName and order details are dependent upon OrdId, partial dependency exist. Thus, we create separate tables for product and order details.

1. OrderDetail

Key-OrdId

|  |  |  |  |
| --- | --- | --- | --- |
| OrdId | CustId | OrdDate | OrdTotal |
| 101 | C1 | 2/3/2022 | 1320 |
| 102 | C2 | 3/3/2022 | 8750 |
| 103 | C1 | 9/3/2022 | 8000 |
| 104 | C2 | 8/3/2022 | 1000 |

1. Product

Key-ProdName

|  |  |  |  |
| --- | --- | --- | --- |
| ProdName | ProdPrice | Supplier | SupPhone |
| Boat DataCable | 310 | ABC Pvt. Ltd. | 011-22456880 |
| Samsung M02 | 7970 | XYZ Pvt. Ltd. | 011-22448922 |
| Boat Headphone | 940 | ABC Pvt. Ltd. | 011-22456880 |
| Sony EarPhone | 770 | XYZ Pvt. Ltd. | 011-22448922 |

1. OrderProduct

|  |  |
| --- | --- |
| OrdId | ProdName |
| 101 | Boat DataCable |
| 101 | Boat Headphone |
| 102 | Samsung M02 |
| 102 | Sony EarPhone |
| 103 | Samsung M02 |
| 104 | Boat Headphone |

3NF

There should not be transitive dependencies. The supplier depends on ProdId and SupPhone can be determined by supplier. So, there exists a transitive dependency between ProdId and SupPhone. To remove it, we decompose Product table in two tables, i.e. ProductDetail and SupplierDetail.

1. ProductDetail

Key-ProdName

|  |  |  |
| --- | --- | --- |
| ProdName | ProdPrice | Supplier |
| Boat DataCable | 310 | ABC Pvt. Ltd. |
| Samsung M02 | 7970 | XYZ Pvt. Ltd. |
| Boat Headphone | 940 | ABC Pvt. Ltd. |
| Sony EarPhone | 770 | XYZ Pvt. Ltd. |

1. SupplierDetail

Key-Supplier

|  |  |
| --- | --- |
| Supplier | SupPhone |
| ABC Pvt. Ltd. | 011-22456880 |
| XYZ Pvt. Ltd. | 011-22448922 |

BCNF

The table should be in 3NF and a prime attribute, i.e. a key column should not depend on a non-prime attribute i.e. non-key column.

We have following relations:

1. Customer – CustId->CustName,CustEmail,CustAddress
2. OrderDetail – OrdId->OrdDate,OrdTotal,CustId
3. ProductDetail – ProdName->SupplierName,ProdPrice
4. SupplierDetail – Supplier->SupPhone
5. OrderProduct – OrdId,ProdName

Since, all columns are part of candidate key, this relation is in BCNF.