

Products :

product_id	product_name	price	warehouse_id
P ₁	Laptop	1000	W ₁
P ₂	Mouse	20	W ₂

Customers :

customer_id	customer_name	customer_address	phone_number
C ₁	Alice	123 Main St	555-1234
C ₁	Alice	456 Park Ave	555-5678

Product-Suppliers-Orders :

product_id	supplier_id	order_id
P ₁	S ₁	101
P ₂	S ₂	101

Denormalized - Orders

order_id	order_date	customer_id	customer_name	customer_address	product_id	product_name	quantity	price
101	2023-01-01	C1	Alice	123 Main St	P1	Laptop	2	1000
101	2023-01-01	C1	Alice	123 Main St	P2	Mouse	3	20
102	2023-01-02	C2	Bob	456 Oak Ave	P3	Keyboard	1	50

Task 1: 1NF

order_id	order_date	customer_id	customer_name	customer_address	product_id	product_name	quantity	price
101	2023-01-01	C1	Alice	123 Main St	P1	Laptop	2	1000
101	2023-01-01	C1	Alice	123 Main St	P2	Mouse	3	20
102	2023-01-02	C2	Bob	456 Oak Ave	P3	Keyboard	1	50

Task 2: 2NF

Orders

order_id	order_date	customer_id
101	2023-01-01	C1
102	2023-01-02	C2

Customers

customer_id	customer_name	customer_address
C1	Alice	123 Main St
C2	Bob	456 Oak Ave

Task 3: 3NF:

Order-Details

order_id	product_id	quantity
101	P ₁	2
101	P ₂	3
102	P ₃	1

Products:

product_id	product_name	price
P ₁	Laptop	1000
P ₂	Mouse	20
P ₃	Keyboard	80

Task 4: BCNF:

Product Warehouse Table

product_id	warehouse_id
P ₁	W ₁
P ₂	W ₂

Products:

product_id	product_name	price
P ₁	Laptop	1000
P ₂	Mouse	20

Task 5 : 4NF :

Customer-Addresses :

customer_id	address
C ₁	123 Main St
C ₁	456 Park Ave

Customer-Phones :

customer_id	phone number
C ₁	555-1234
C ₁	555-5678

Task 6 : 5NF :

Product-Suppliers :

product_id	supplier_id
P ₁	S ₁
P ₂	S ₂

Supplier-Orders :

supplier_id	order_id
S ₁	101
S ₂	102

Product-Orders :

product_id	order_id
P ₁	101
P ₂	101

Task : 7 : Denormalization :

order.id	order.name	customer.id	customer.name	product.id	product.name	quantity	price
101	2023-01-01	Alice C ₁	Alice	P ₁	Laptop	2	1000
101	2023-01-01	Alice C ₁	Alice	P ₂	Mouse	3	20
102	2023-01-02	Bob C ₂	Bob	P ₃	Keyboard	1	50