Session 3-6 Normalization Exercise

Kyunghee Lee, PhD

Normalization Process

1. Identify Primary Key of the table
2. Identify all functional dependencies
3. Remove the dependencies to refine the table to each level of the normal forms (NF1, NF2, NF3)

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Identify PK

OrderNo	OrderDate	Customer ID	Fname	Lname	Street Address	City	State	Zip	Email	Salesperson ID	Salesperson Name	Salesperson Phone	ProductNo	Product Description	Unit Price	Qty
33	2-Feb-02		Jimmy	Neutron	55 Moon	Pleasantvil	GA	32212	tothemoon		Mojo	5148210984	t-123	jelly eyeballs	$1.29	2
33	2-Feb-02		Jimmy	Neutron	55 Moon	Pleasantvil	GA	32212	tothemoon		Mojo	5148210984	t-009	sticky tongues	$2.99	1
33	2-Feb-02		Jimmy	Neutron	55 Moon	Pleasantvil	GA	32212	tothemoon		Mojo	5148210984	h-908	Snake hair stran	$0.25	40
12	4-Mar-05		Mary	Bailey	1 elysse	College pa	MD	20783	abc@xyz.		toby	2342454434	t-009	sticky tongues	$2.99	6
14	7-Jun-03		Mike	Darcy	23 park s	San Matec	CA	45422	dadada@h		mojo	5148210984	t-009	sticky tongues	$2.99	27
14	7-Jun-03		Mike	Darcy	23 park s	San Matec	CA	45422	dadada@h		mojo	5148210984	k-007	red blood cells	$7.00	4

Primary Key: OrderNo + ProductNo

OrderID, ProductNo → Qty

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Identify Functional Dependency

OrderNo	OrderDate	Customer ID	Fname	Lname	Street Address	City	State	Zip	Email	Salesperson ID	Salesperson Name	Salesperson Phone	ProductNo	Product Description	Unit Price	Qty
33	2-Feb-02		Jimmy	Neutron	55 Moon	Pleasantvil	GA	32212	tothemoon		Mojo	5148210984	t-123	jelly eyeballs	$1.29	2
33	2-Feb-02		Jimmy	Neutron	55 Moon	Pleasantvil	GA	32212	tothemoon		Mojo	5148210984	t-009	sticky tongues	$2.99	1
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14	7-Jun-03		Mike	Darcy	23 park s	San Mated	CA	45422	dadada@h		mojo	5148210984	k-007	red blood cells	$7.00	4

PARTIAL dependency
OrderID → OrderDate, CustomerID, FName, LName, StreetAddress, City, State, ZIP, Email, SalespersonID, SalespersonName, SalespersonPhone
ProductNo → ProductDescription, UnitPrice

Identify Functional Dependency

OrderNo	OrderDate	Customer ID	Fname	Lname	Street Address	City	State	Zip	Email	Salesperson ID	Salesperson Name	Salesperson Phone	ProductNo	Product Description	Unit Price	Qty
33	2-Feb-02		Jimmy	Neutron	55 Moon	Pleasantvil	GA	32212	tothemoon		Mojo	5148210984	t-123	jelly eyeballs	$1.29	2
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TRANSITIVE dependency
CustomerID → FName, LName, StreetAddress, City, State, ZIP, Email
SalespersonID → SalespersonName, SalespersonPhone

Removing Functional Dependencies

- NF1
  - SALES (<u>OrderID</u>, OrderDate, CustomerID, FName, LName, StreetAddress, City, State, ZIP, Email, SalespersonID, SalespersonName, SalespersonPhone, <u>ProductNo</u>, ProductDescription, UnitPrice, Qty)

- NF2: Remove **PARTIAL** dependency
  - SALES (OrderID, ProductNo, Qty)
  - PRODUCT (ProductNo, ProductDescription, UnitPrice)
  - ORDER (OrderID, OrderDate, CustomerID, FName, LName, StreetAddress, City, State, ZIP, Email, SalespersonID, SalespersonName, SalespersonPhone)

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Removing Functional Dependencies

- Transitive dependencies in the NF2 ORDER table
  - CustomerID → FName, LName, StreetAddress, City, State, ZIP, Email
  - SalespersonID → SalespersonName, SalespersonPhone
- NF3: Remove **TRANSITIVE** dependency
  - ORDER (OrderID, OrderDate, CustomerID, SalespersonID)
  - CUSTOMER (CustomerID, FName, LName, StreetAddress, City, State, ZIP, Email)
  - SALESPERSON (SalespersonID, SalespersonName, SalespersonPhone)

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All Tables in NF3

SALES (OrderID, ProductNo, Qty)

PRODUCT (ProductNo, ProductDescription, UnitPrice)

ORDER (OrderID, OrderDate, CustomerID, SalespersonID)

CUSTOMER (CustomerID, FName, LName, StreetAddress, City, State, ZIP, Email)

SALESPERSON (SalespersonID, SalespersonName, SalespersonPhone)

Wrap-up

- Normalization Process
  - Identify Primary Key of the table
  - Identify all functional dependencies
  - Remove the dependencies to refine the table to each level of the normal forms (NF1, NF2, NF3)