SISTEM BASIS DATA – Pertemuan 10

NORMALISASI

Hoffer, Jeffrey A.
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tyas@stikom.edu

Pokok Bahasan

- Pengertian Normalisasi
- Langkah-langkah Normalisasi
- Latihan

Normalisasi

- Normalization
  The process of decomposing relations with anomalies to produce smaller, well structured relations.
  (Suatu Proses pemecahan relasi dengan anomali menjadi relasi yang lebih kecil dan struktur yang baik)

Normalisasi

- **Normal form**
  A state of a relation that requires that certain rules regarding relationships between attributes (or functional dependencies) are satisfied.
  (Suatu keadaan dari relasi yang membutuhkan aturan khusus tentang hubungan relasi antar atribut (Functional Dependencies) telah terpenuhi)

Langkah-langkah Normalisasi

1. **First normal form (1NF)**
   Segala atribut yang memiliki *multi valued* (juga disebut dengan *repeating groups*) telah dihilangkan, sehingga yang tersisa hanya *single value* (atau mungkin juga *null*) pada pertemuan setiap baris dan kolom dari tabel. (seperti terlihat pada Figure 4-2b).

Langkah-langkah Normalisasi

FIGURE 4-2 Eliminating multivalued attributes

(a) Table with repeating groups

EmpID	Name	DeptName	Salary	CourseTitle	DateCompleted
100	Margaret Simpson	Marketing	48,000	SPSS	6/19/201X
				Surveys	10/7/201X
140	Alan Beeton	Accounting	52,000	Tax Acc	12/8/201X
110	Chris Lucero	Info Systems	43,000	Visual Basic	1/12/201X
				C++	4/22/201X
190	Lorenzo Davis	Finance	55,000		
150	Susan Martin	Marketing	42,000	SPSS	6/16/201X
				Java	8/12/201X

(b) EMPLOYEE2 relation

EMPLOYEE2

EmpID	Name	DeptName	Salary	CourseTitle	DateCompleted
100	Margaret Simpson	Marketing	48,000	SPSS	6/19/201X
100	Margaret Simpson	Marketing	48,000	Surveys	10/7/201X
140	Alan Beeton	Accounting	52,000	Tax Acc	12/8/201X
110	Chris Lucero	Info Systems	43,000	Visual Basic	1/12/201X
110	Chris Lucero	Info Systems	43,000	C++	4/22/201X
190	Lorenzo Davis	Finance	55,000		
150	Susan Martin	Marketing	42,000	SPSS	6/19/201X
150	Susan Martin	Marketing	42,000	Java	8/12/201X

Langkah-langkah Normalisasi

2. **Second normal form (2NF)**
   segala *partial functional dependencies* telah dihilangkan (seperti, non key attributes are identified by the whole primary key).
3. **Third normal form (3NF)**
   segala *transitive dependencies* telah dihilangkan (seperti, non key attributes are identified by only the primary key).

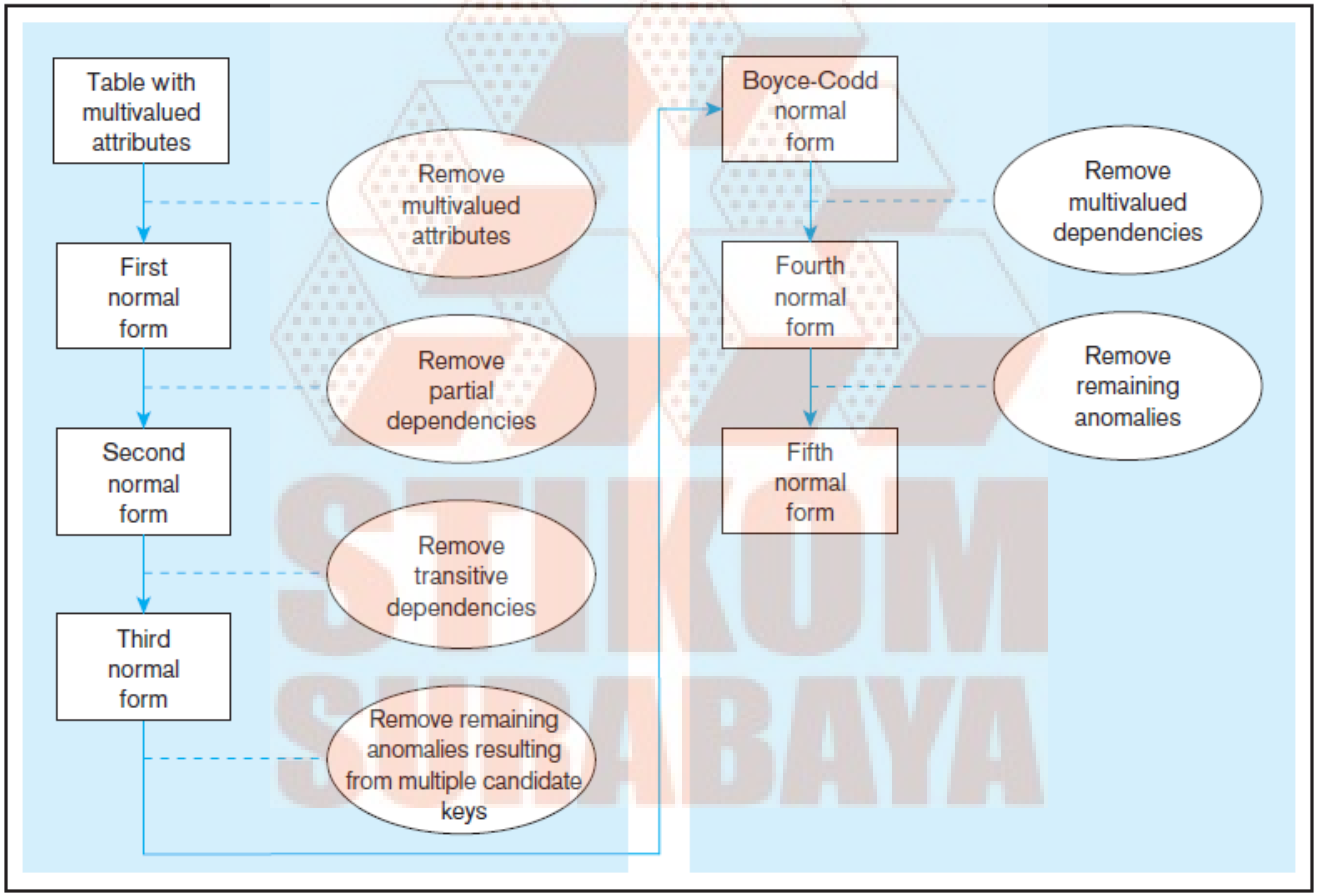
Langkah-langkah Normalisasi

4. ***Boyce-Codd normal form (BCNF)***
   segala anomali yang tersisa yang dihasilkan oleh *functional dependencies* telah dihilangkan (karena kemungkinan ada lebih dari satu primary key untuk nonkeys yang sama).

Langkah-langkah Normalisasi

5. **Fourth normal form (4NF)**
   Segala multi valued dependencies telah dihilangkan
5. **Fifth normal form (5NF)**
   Segala anomali yang tersisa sudah dihilangkan

FIGURE 4-22 Steps in normalization



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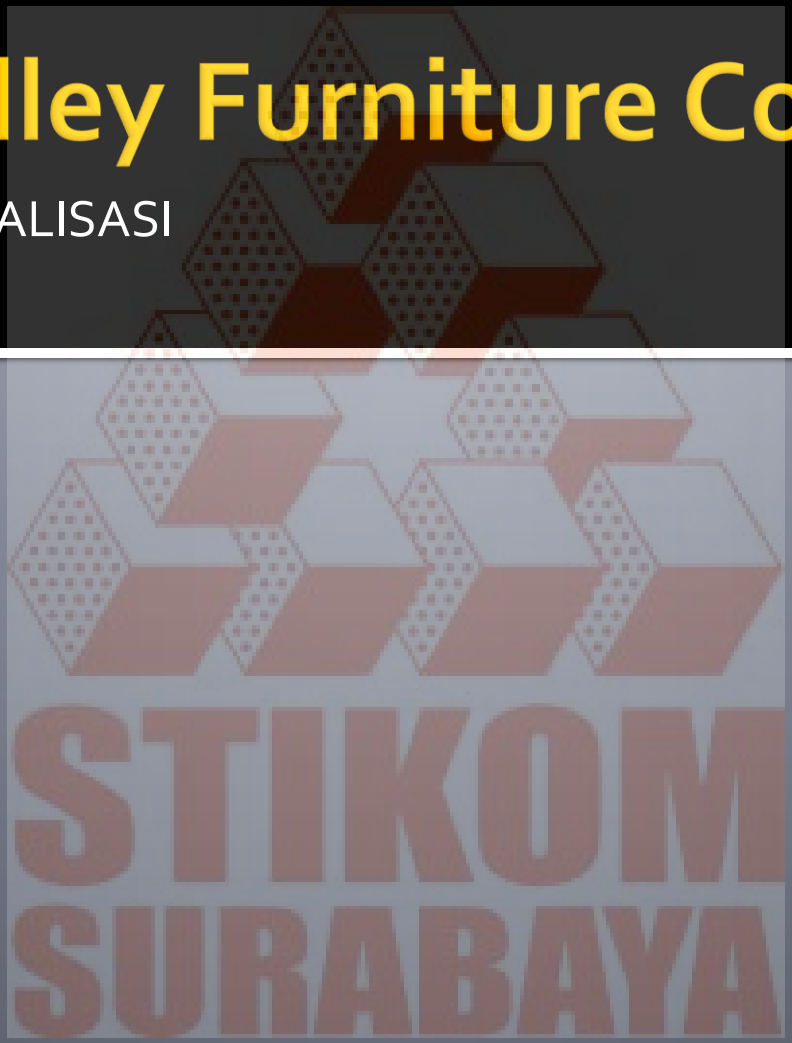

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FIGURE 4-24 Invoice (Pine Valley Furniture Company)

PVFC Customer Invoice

Customer ID	2	**Order ID**	1006
Customer Name	Value Furniture	**Order Date**	10/24/2010
Address	15145 S.W. 17th St. Plano TX 75022		

Product ID	Product Description	Finish	Quantity	Unit Price	Extended Price
7	Dining Table	Natural Ash	2	$800.00	$1,600.00
5	Writer's Desk	Cherry	2	$325.00	$650.00
4	Entertainment Center	Natural Maple	1	$650.00	$650.00
				Total	$2,900.00

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- TABEL

FIGURE 4-25 INVOICE data (Pine Valley Furniture Company)

OrderID	Order Date	Customer ID	Customer Name	Customer Address	ProductID	Product Description	Product Finish	Product StandardPrice	Ordered Quantity
1006	10/24/2010	2	Value Furniture	Plano, TX	7	Dining Table	Natural Ash	800.00	2
					5	Writer's Desk	Cherry	325.00	2
					4	Entertainment Center	Natural Maple	650.00	1
1007	10/25/2010	6	Furniture Gallery	Boulder, CO	11	4–Dr Dresser	Oak	500.00	4
					4	Entertainment Center	Natural Maple	650.00	3

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FIRST NORMAL FORM (1NF)

OrderID	Order Date	Customer ID	Customer Name	Customer Address	ProductID	Product Description	Product Finish	Product StandardPrice	Ordered Quantity
1006	10/24/2010	2	Value Furniture	Plano, TX	7	Dining Table	Natural Ash	800.00	2
1006	10/24/2010	2	Value Furniture	Plano, TX	5	Writer's Desk	Cherry	325.00	2
1006	10/24/2010	2	Value Furniture	Plano, TX	4	Entertainment Center	Natural Maple	650.00	1
1007	10/25/2010	6	Furniture Gallery	Boulder, CO	11	4–Dr Dresser	Oak	500.00	4
1007	10/25/2010	6	Furniture Gallery	Boulder, CO	4	Entertainment Center	Natural Maple	650.00	3

FIGURE 4-26 INVOICE relation (1NF) (Pine Valley Furniture Company)

FUNCTIONAL DEPENCIES

OrderID → OrderDate, CustomerID, CustomerName, CustomerAddress
CustomerID → CustomerName, CustomerAddress
ProductID → ProductDescription, ProductFinish, ProductStandardPrice
OrderID, ProductID → OrderedQuantity

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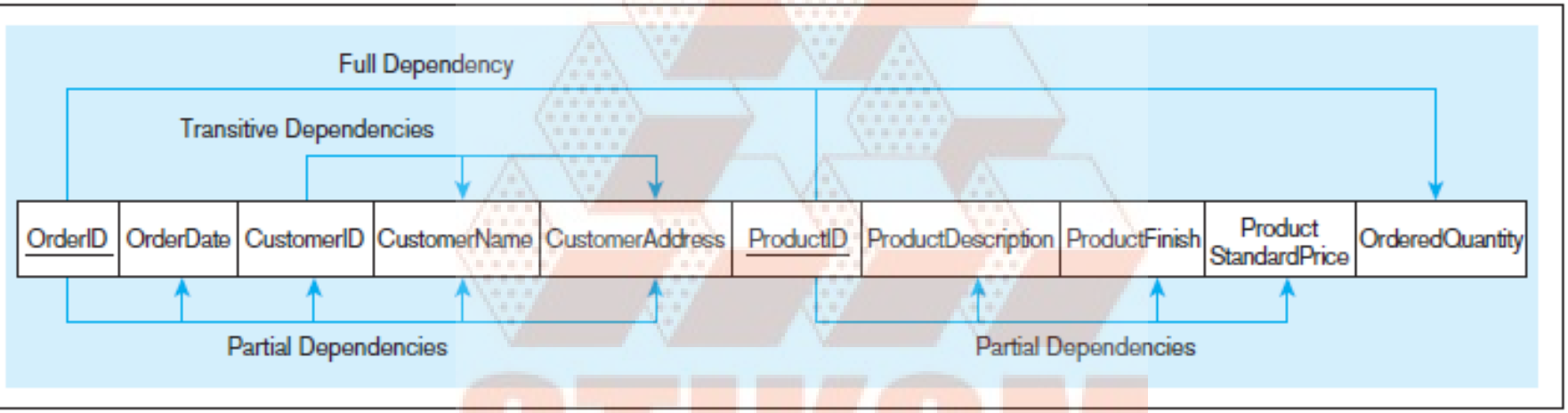

FIGURE 4-27 Functional dependency diagram for INVOICE

Pine Valley Furniture Company

SECOND NORMAL FORM (2NF)

- **PARTIAL DEPENDENCIES**

OrderID → OrderDate, CustomerID, CustomerName, CustomerAddress
ProductID → ProductDescription, ProductFinish, ProductStandardPrice

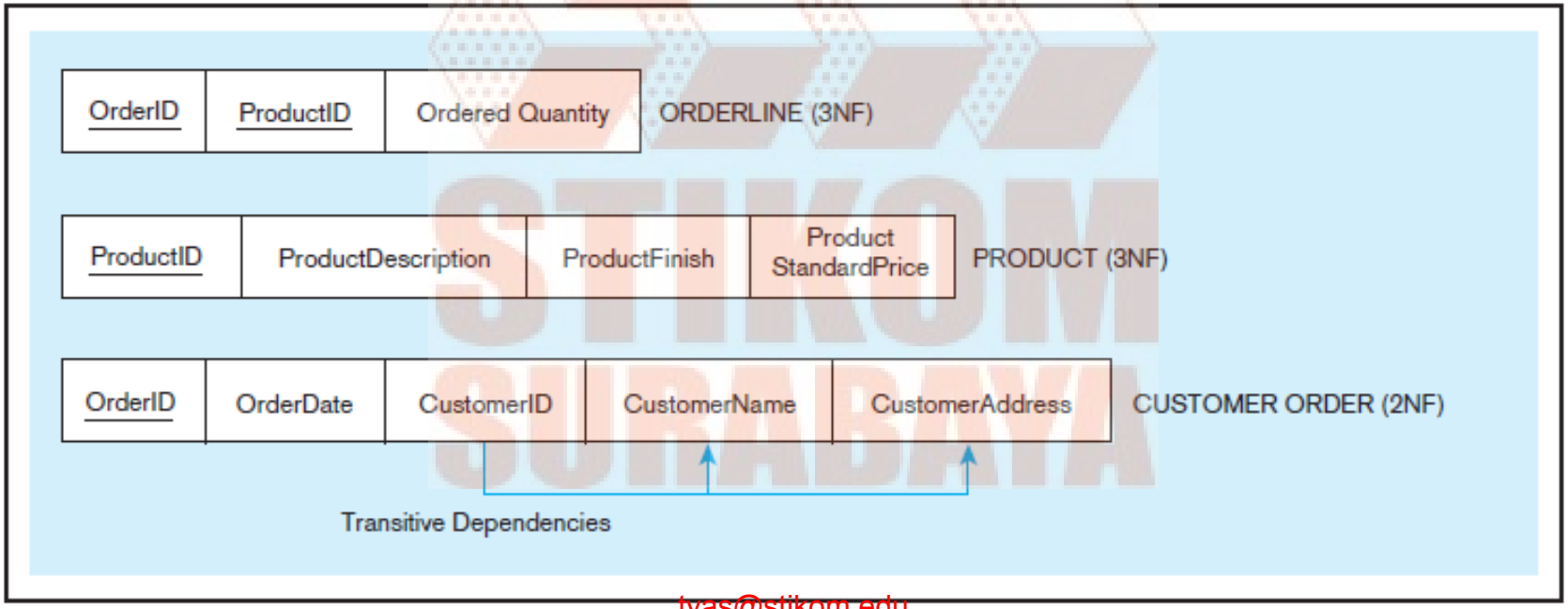

FIGURE 4-28 Removing partial dependencies

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THIRD NORMAL FORM (3NF)

TRANSITIVE DEPENDENCIES IN THE CUSTOMER ORDER

OrderID → CustomerID → CustomerName
OrderID → CustomerID → CustomerAddress

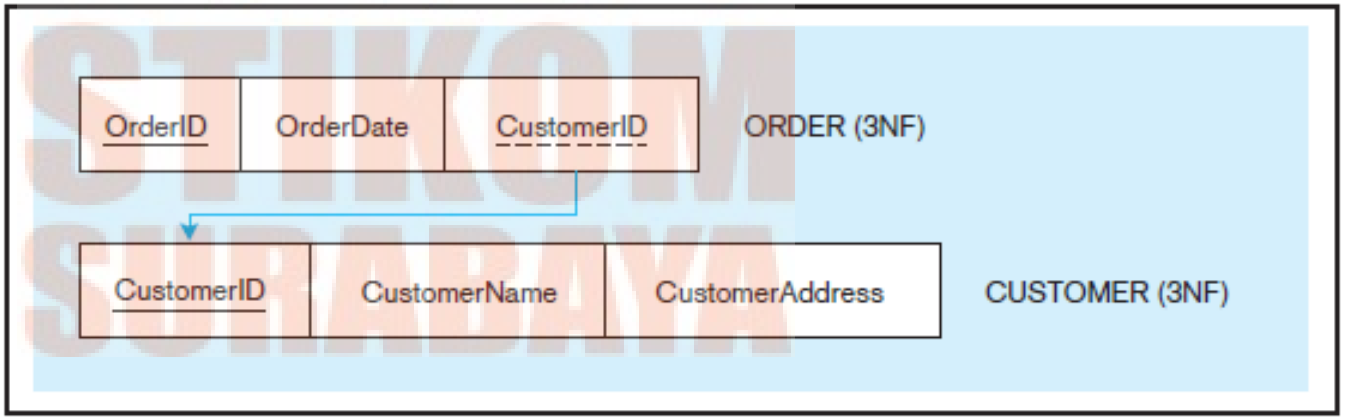

FIGURE 4-29 Removing transitive dependencies

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- Bentuk 3NF bisa dianggap sebagai bentuk aman, sehingga relasi yang terjadi adalah:

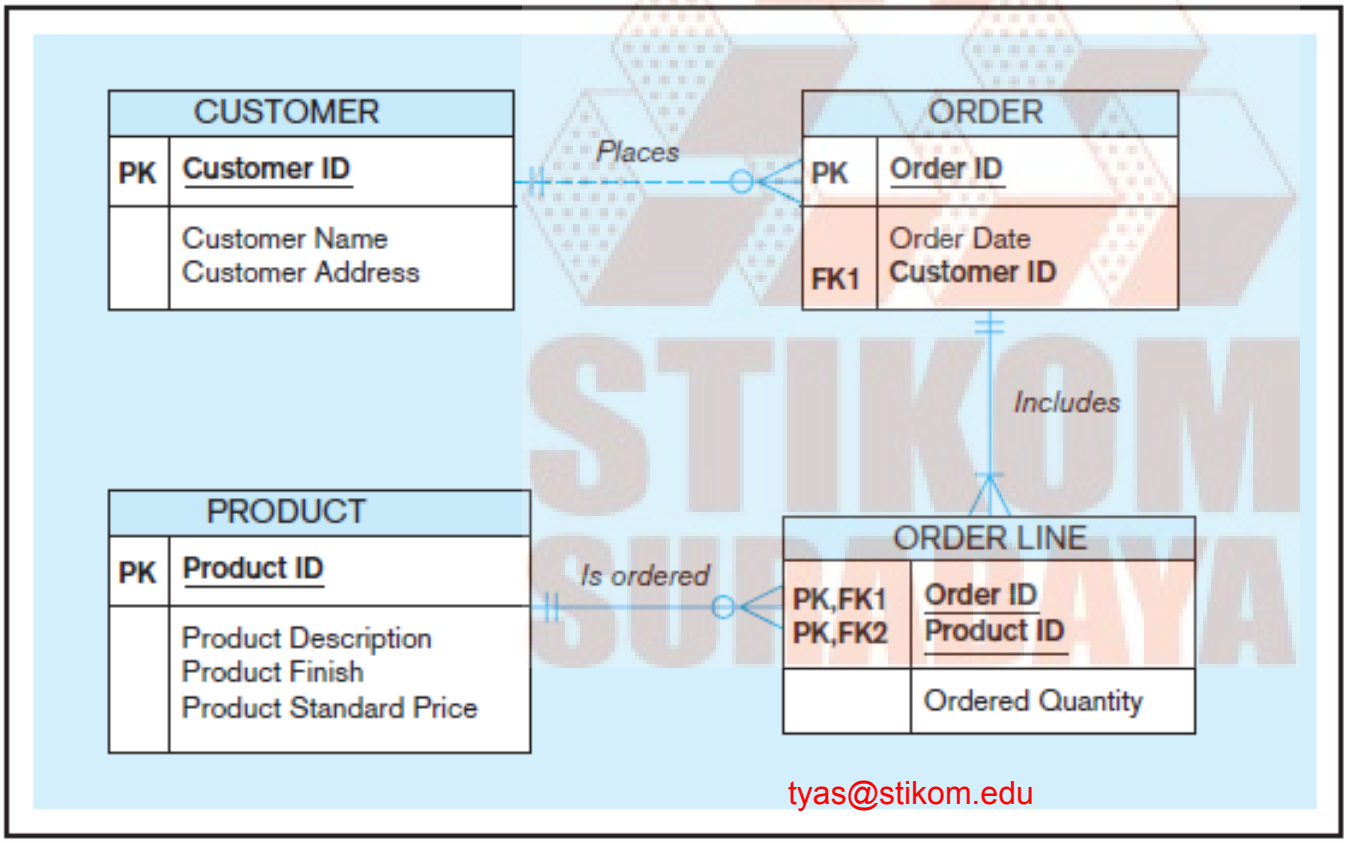

FIGURE 4-30 Relational schema for INVOICE data (Microsoft Visio notation)

LATIHAN

NORMALISASI

tyas@stikom.edu

Latihan 1

- Susunlah langkah-langkah Normalisasinya.

MILLENNIUM COLLEGE
CLASS LIST
FALL SEMESTER 201X

COURSE NO.: IS 460
COURSE TITLE: DATABASE
INSTRUCTOR NAME: NORMA L. FORM
INSTRUCTOR LOCATION: B 104

STUDENT NO.	STUDENT NAME	MAJOR	GRADE
38214	Bright	IS	A
40875	Cortez	CS	B
51893	Edwards	IS	A

- Susunlah langkah-langkah Normalisasinya.

TABLE 4-3 Sample Data for Parts and Vendors

Part No	Description	Vendor Name	Address	Unit Cost
1234	Logic chip	Fast Chips	Cupertino	10.00
		Smart Chips	Phoenix	8.00
5678	Memory chip	Fast Chips	Cupertino	3.00
		Quality Chips	Austin	2.00
		Smart Chips	Phoenix	5.00