MODUL - WEEK.10
Normalization

I. DESKRIPSI TEMA
Design database using structured data model

II. CAPAIAN PEMBELAJARAN MINGGUAN (SUB-CAPAIAN PEMBELAJARAN)
CLO3-SUB-CLO10: Students are able to analyze database (C4)

III. PENUNJANG PRAKTIKUM
1. Microsoft SQL Server management studio, SQL Server 2019
2. Module Practicum
3. These Module have been adapted from Connolly, T., & Begg, C. (2015). Database Systems: A Practical Approach to Design, Implementation, and Management. 6th edition. Pearson Education. USA. ISBN: 978-1-292-06118-4, Chapter 12&14

IV. LANGKAH-LANGKAH PRAKTIKUM
Untuk merancang database yang baik, biasa dilakukan normalisasi. Normalisasi merupakan sebuah teknik untuk menghasilkan set relasi dengan property yang desirable dan memberikan data sesuai dengan kebutuhan enterprise.

Tujuan normalisasi yaitu:
- Mengidentifikasi hubungan antar atribut
- Mengkombinasikan atribut untuk membentuk relasi
- Mengkombinasikan relasi untuk membentuk database
- Menghindari anomaly

Proses Normalisasi

1. **UNF**
   Dalam proses normalisasi UNF kita menampilkan semua field atau atribut yang ada dalam suatu form yang ingin kita normalisasi.
2. **INF**
   Sebuah relasi berada dalam 1NF jika relasi tersebut tidak berisi atribut yang berulang (repeating group), field hasil perhitungan dihilangkan dan sudah mempunyai primary key.

3. **2NF**

Sebuah relasi berada dalam 2NF jika relasi tersebut dalam 1NF dan untuk setiap atribut non key bergantung fungsional penuh kepada primary key. Jadi pada 2NF kita akan menghilangkan ketergantungan sebagian / partial : ketergantungan field-field tertentu hanya kepada salah satu key yang composit.

Contoh :

Tabel Mahasiswa (Nim, Nama, Alamat)

Nama & alamat tergantung pada Nim dalam arti dengan Nim kita dapat menentukan nama maupun alamat sebaliknya nama / alamat tidak menentukan nim, maka diartikan bahwa nama & alamat tergantung secara partial kepada nim.

4. **3NF**

Sebuah relasi berada dalam 3NF bila relasi tersebut dalam 1NF dan 2NF dan tidak ada atribut non key yang tergantung fungsional kepada atribut non key yang lainnya (transitive dependency).

Contoh :

Tabel Pegawai (NoPegawai, honor, KdProyek, Tanggal)
KdProyek & Tanggal adalah atribut non key. Tapi tanggal bergantung pada KdProyek. Pemecahannya dengan membagi menjadi 2 relasi :
Proyek (KdProyek, Tanggal)
PegProyek (Nopegawai, honor, KdProyek)

5. **BCNF (Bentuk Normal Boyce-Codd, 1974)**

Relational R dikatakan dalam BCNF jika dan hanya jika setiap determinan adalah suatu candidate key sehingga saling overlap. Tujuan BCNF adalah memisahkan determinan yang bukan merupakan candidate key pada satu relasi tertentu.
Kodisinya :
A, B -> C, D
A, C -> B, D
B, C -> A, D

Contoh:

Tabel interview (NoClient, tanggalInterview, waktuInterview, NoStaff, NoRuang)
Dipisahkan menjadi :
Tabel Interview (NoClient, tanggalInterview, waktuInterview, NoStaff)
Tabel RuangStaff (NoStaff, tanggalInterview, NoRuang)

Berikut adalah latihan membuat Normalisasi:

Sales Order Form
2010 / 2011

Sales Order Number : SO001
Payment Type : Cash
Customer ID : CS001
Customer Name : Lucas
Customer Contact : (656) 617 2727
Customer Address : P.O. Box 303, 1418 Mi Street, Jakarta

No	Lego ID	Lego Name	Category	Sale Price	Quantity	Sub Total
1	L001	Bleach - 01	Komik / Manga	Rp12,000.00	1	Rp12,000.00
2	L002	Naruto - 01	Komik / Manga	Rp12,000.00	1	Rp12,000.00
3	L003	Child	Child	Rp36,000.00	1	Rp36,000.00
4	L004	OOAD - Lars Mathiasen	Teknologi	Rp49,000.00	1	Rp49,000.00
5	L006	Abstract	Nature	Rp56,000.00	2	Rp112,000.00
					Grand Total	Rp221,000.00

Jakarta, August 14, 2010

Janies
(Staff Sales)

Sales Order

UNF

Sales Order (No. SO, Payment Type, Customer ID, Customer Name, Customer Contact, Customer Address, {No, Lego ID, Lego Name, Category, Sale Price, Quantity, Sub Total}, Grand Total, SO Date, Employee Name, Position)

1NF

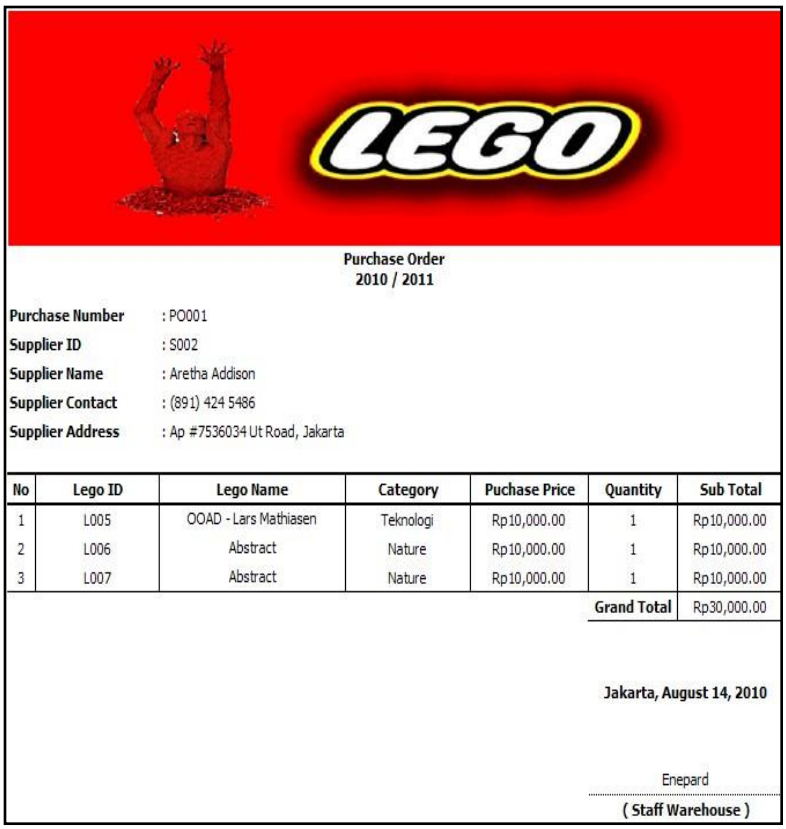
Sales Order (No. SO, Customer ID, Payment Type, Customer Name, Customer Contact, Customer Address, SO Date, Employee Name, Position)
Detail SO (No. SO, Lego ID, Lego Name, Category, Sale Price, Quantity)

2NF

Sales Order (No. SO, Customer ID, Payment Type, Customer Name, Customer Contact, Customer Address, SO Date, Employee Name, Position)
Detail SO (No. SO, Lego ID, Quantity)
Lego (Lego ID, Lego Name, Category, Sale Price)

3NF

Customer (Customer ID, Customer Name, Customer Contact, Customer Address)
Customer Category(Customer ID, Category)
Position (Position ID, Position)
Employee (Employee ID, Position ID, Employee Name, Employee Contact, Employee Address, Employee Salary)
Payment Type (Payment Type ID, Payment Type)
Sales Order (No. SO, Payment Type ID, Customer ID, Employee ID, SO Date) Detail SO (No. SO, Lego ID, Quantity)
Category (Category ID, Category)
Lego (Lego ID, Category ID, Lego Name, Sale Price, Stock)



Purchase Order
2010 / 2011

Purchase Number : PO001
Supplier ID : S002
Supplier Name : Aretha Addison
Supplier Contact : (891) 424 5486
Supplier Address : Ap #7536034 Ut Road, Jakarta

No	Lego ID	Lego Name	Category	Puchase Price	Quantity	Sub Total
1	L005	OOAD - Lars Mathiasen	Teknologi	Rp10,000.00	1	Rp10,000.00
2	L006	Abstract	Nature	Rp10,000.00	1	Rp10,000.00
3	L007	Abstract	Nature	Rp10,000.00	1	Rp10,000.00
					Grand Total	Rp30,000.00

Jakarta, August 14, 2010

Enepard
(Staff Warehouse)

Purchase Order
UNF
Purchase Order (No. PO, Supplier ID, Supplier Name, Supplier Contact, Supplier Address, {No,Lego ID,Lego Name, Category, Purchase Price, Quantity, Sub Total}, Grand Total, PO Date, Employee Name, Position)

1NF

Purchase Order (No. PO, Supplier ID, Supplier Name, Supplier Contact, Supplier Address, PO Date, Employee Name, Position)

Detail PO (No. PO, Lego ID, Lego Name, Category, Purchase Price, Quantity)

2NF

Purchase Order (No. PO, Supplier ID, Supplier Name, Supplier Contact, Supplier Address, PO Date, Employee Name, Quantity)

Detail PO (No. PO, Lego ID, Quantity)

Lego (Lego ID, Lego Name, Category, Purchase Price)

3NF

Supplier (Supplier ID, Supplier Name, Supplier Contact, Supplier Address) Position (Position ID, Position)

Employee(Employee ID, Position ID, Employee Name, Employee Contact, Employee Address, Employee Salary)

Purchase Order (No. PO, Supplier ID, Employee ID, PO Date) Detail PO (No. PO, Lego ID, Quantity)

Category (Category ID, Category)

Lego (Lego ID, Category, Lego Name, Purchase Price, Stock)

Registration

UNF

Registration (No.Registration, Member ID, Member Name, Member Contact, Member Address, Member Email, Member Type, Registration Price, Registration Date, Employee Name, Position)

1NF

Registration (No.Registration, Member ID, Member Name, Member Contact, Member Address, Member Email, Payment Type, Registration Price, Registration Date, Employee Name, Position)

2NF

Registration (No.Registration, Member ID, Member Name, Member Contact, Member Address, Member Email, Payment Type, Registration Price, Registration Date, Employee Name, Position)

3NF

Member Category(Member Type ID, Member Type, Diskon)

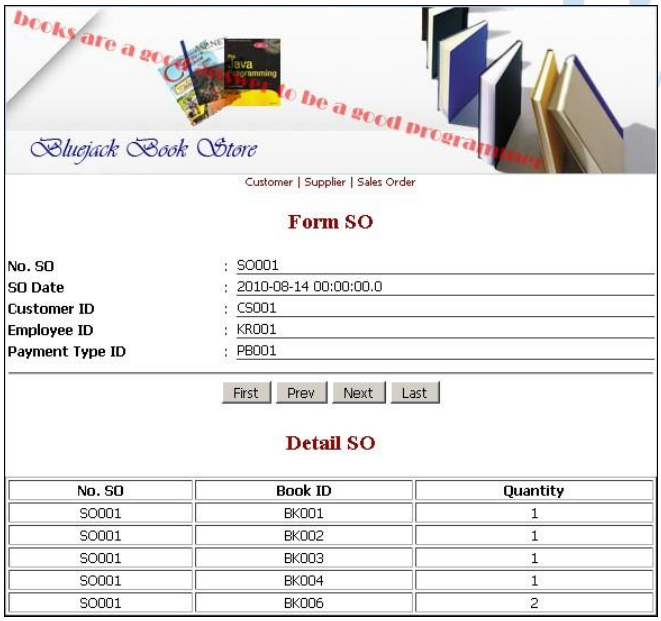
Member (Member ID, Member Type ID, Member Name, Member Contact, Member Address, Member Email)

Position(Position ID, Position)

Employee(Employee ID, Position ID, Employee Name, Employee Contact, Employee Address, Employee Salary)

Registration(No.Registration, Member ID, Employee ID, Registration Date)

Berikut adalah contoh desain Form:



1. Assessment

Laundry Store

Laundry Store is one of the most famous laundries around Multimedia Nusantara University. Because there are so many transactions that occur every day. **Laundry Store** has trouble sorting out their sales. To assist them in sorting their data, the company decided to hire you work and make an application to help them.
As a system analyst, you're assigned to design a database by using normalization UNF, 1 NF, 2NF an 3NF along with the ERD based on the form and existing business process.

Here is the business process of **Laundry Store**:
To take the order **Laundry Store**, firstly, list the name of the employee that serves the customer. After listing those, the employee will start listing the item being sent to the laundry. After all items listed, a total amount of the payment will be calculated. The customer and employee will held onto **Laundry Receipt**. Customer can pay via transfer, credit, or cash.
Laundry Store also lists the employee absence status, the first thing the employee should do is signing in to take their attendance. The laundry store attendance time is at 07.00 AM, above 07:00 AM the attendance status will be absent. This item will be record in the **Employee absence**. The **Employee Absence** will be printed once every day.

These are the provided forms:

1. Laundry Receipt

Laundry Store

Laundry Receipt
Kemanggisan Street Number 16
(021) - 5014986

SalesID	: SA001	Customer Name	: Justinus Hermawan
Date	: 1 Dec 2015	Phone	: 08999465851
Payment Type	: Credit	Address	: Anggrek Street 6

No	ItemID	ItemName	Price	Weight	SubTotal
1	IT001	Pants	Rp 20.000.00	1.5 Kg	Rp 30.000.00
2	IT002	Shirt	Rp 15.000.00	1.0 Kg	Rp 15.000.00
				Total	Rp 45.000.00

Cashier (Komala Surya)

2. **Employee Absence**

Laundry Store

Employee Absence

Kemanggisan Street Number 16

(021) - 5014986

AttendanceID : SA001

Date : 1 Dec 2015

No	EmployeeID	Name	Status	Attendance Time
1	EM001	Timothy Agustian	Present	06:23:31
2	EM002	Jessica Casanova	Present	06:45:55
3	EM003	Hermanto	Absent	13:12:54
4	EM004	Stephanus	Present	06:39:56
5	EM005	Venson Wijaya	Present	06:15:34
			Total Present	4
			Total Absent	1

Manager (August Vin)

REFERENSI

1. Connolly, T., & Begg, C. (2015). Database Systems: A Practical Approach to Design, Implementation, and Management. 6th edition. Pearson Education. USA. ISBN: 978-1-292-06118-4, Chapter 12&14