MODUL - WEEK.11
Entity Relationship (ER) Modelling

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)

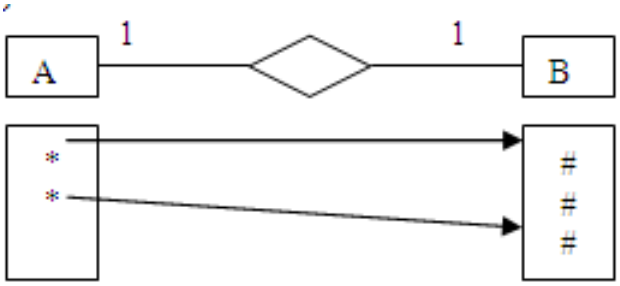
III. PENUNJANG PRAKTIKUM
1. Microsoft SQL Server management studio, SQL Server 2019
2. Module Practicum
3. These Module have been adapted from Connolly, T., & Begg, C. (2015). Database Systems: A Practical Approach to Design, Implementation, and Management. 6th edition. Pearson Education. USA. ISBN: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

IV. REVIEW TEORI DAN KONSEP
Objectives
- Database Concept
- Multiplicity
- Data Relational
- Normalization

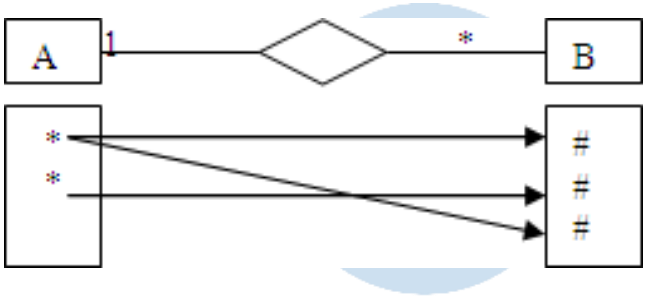
1. Database Concept
- **Conceptual model:**Merupakan pengumpulan / integrasi seluruh kebutuhan atribut dari para user / aplikasi menjadi satu pandangan organisasi
- **Logical model:**Dari model conceptual yang terbentuk dapat dipilih salah satu model data dasar logikal : hirarki, network atau relational. Kemudian dibagikan kepada para user yang berwenang
- **Physical model**:Bagaimana secara fisik data tersimpan pada penyimpanan sekunder, yang perlu dipertimbangkan mengenai metode akses (menyimpan / *stored* dan mengambil / *retrieval*) dan teknik pengindeksan untuk *retrieval* (pencarian lebih cepat).

2. Multiplicity
Bertujuan untuk mengidentifikasi entity dan hubungan (relationship) pada model data
Ada 3 macam hubungan :

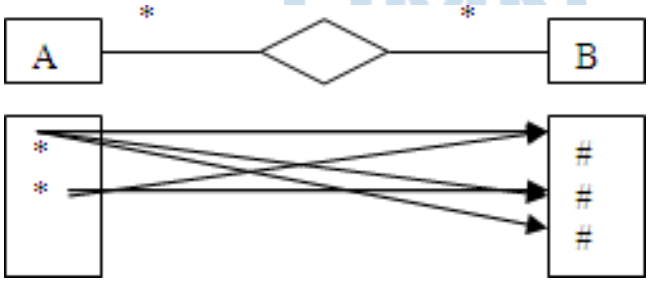
1. One To One : Terjadi bila tiap anggota entity A hanya boleh berpasangan dengan satu anggota



2. One To Many: Terjadi bila tiap anggota entity A boleh berpasangan dengan lebih dari satu anggota B tetapi tidak berlaku sebaliknya



3. Many To Many: Terjadi bila tiap anggota A boleh berpasangan dengan lebih dari satu anggota B dan berlaku untuk sebaliknya



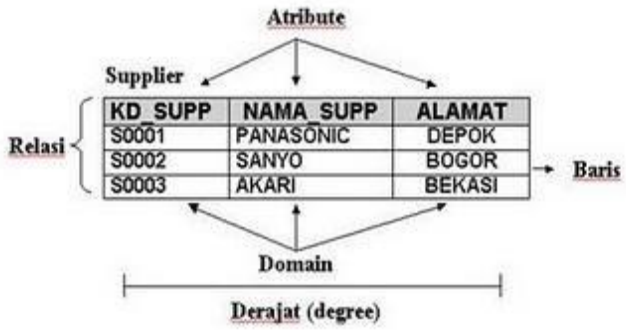
3. **Data Relational**

Relasi adalah hubungan sebuah tabel yang terdiri dari beberapa kolom dan beberapa baris.

A. **Berikut adalah isu-isu yang terdapat dalam pembahasan Data relationship:**

1. Atribut adalah Kolom pada sebuah relasi

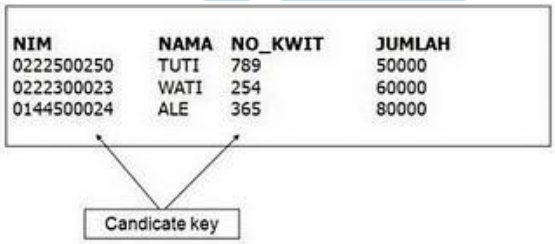
2. Tupel adalah Baris pada sebuah relasi



3. Domain adalah Kumpulan nilai yang valid untuk satu atau lebih atribut
4. Derajat (degree) adalah Jumlah atribut dalam sebuah relasi
5. Cardinality adalah Jumlah tupel dalam sebuah relasi

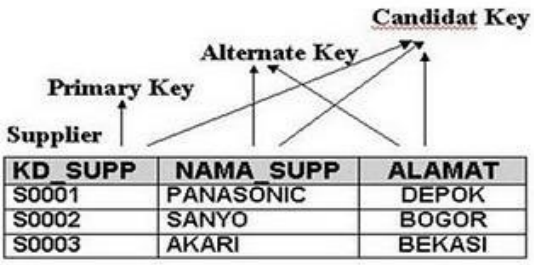
B. Dalam Data Relasional terdapat pula *Relational Key* , yang terdiri dari :

1. ***Super key*** yakni, Satu atribut/kumpulan atribut yang secara unik mengidentifikasi sebuah tupel di dalam relasi



2. ***Candidate key*** yakni, Atribut di dalam relasi yang biasanya mempunyai nilai unik dan merupakan Field-field yang bisa dipilih (dipakai) menjadi primary key.

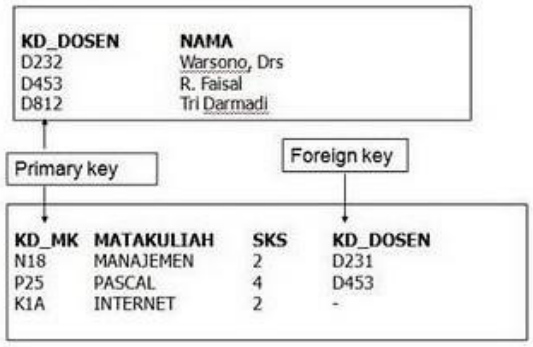
3. ***Primary key*** yakni, Candidate key yang dipilih untuk mengidentifikasikan tupel secara unik dalam relasi dan merupakan Field yang mengidentifikasikan sebuah record dalam file, bersifat unik.



KD_SUPP	NAMA_SUPP	ALAMAT
S0001	PANASONIC	DEPOK
S0002	SANYO	BOGOR
S0003	AKARI	BEKASI

4. ***Alternate key*** yakni, Candidate key yang tidak dipilih sebagai primary key.

5. ***Foreign* key** yakni, Atribut dengan domain yang sama yang menjadi kunci utama pada sebuah relasi tetapi pada relasi lain atribut tersebut hanya sebagai atribut biasa. Foreign Key ini adalah Field yang bukan key, tetapi adalah key pada file yang lain.



V. LATIHAN, STUDI KASUS: DELICIOUS FOOD

1. **Delicious Food is one of Korean Food Distributor in Indonesia for raw materials and instant food. Delicious Food has head office in Jakarta and has 10 branches all over big cities in Indonesia. As a distributor for Korean Food, Delicious Food distributes the product to Hotel, restaurant, catering, hospital, night market, bakery, golf course and sport center.**

   If the stock of raw materials in warehouse already reaches reorder point (ROP), Logistic Department will access the systems to see the stock. After that, Logistic Department will create Purchase Requisition and send to Purchasing Department. Purchasing Department then creates 4 copies of Purchase Order (PO) which will be authorized by the Manager. 1 copy for Supplier, 1 copy for Logistic Department, 1 copy for Accounting Department, and 1 copy for Purchasing Department (archive). Created PO will automatically increase the nominal of Account Payable in the systems.

At the certain time, Supplier will bring order goods along with 2 copies of Delivery Order and Invoice. Logistic Department will receive goods from Supplier then matching the goods with Delivery Order Slip from Supplier based on type of goods, quality, quantities, and also check the goods condition (good condition or broken). If the goods already match with Delivery Order, Logistic Department will sign and give 1 copy of Delivery Order to Supplier. After that, Logistic Department will create Receiving Report based on Delivery Order and Invoice. Data of receiving goods will input by the Logistic Department to the systems. Created Receiving Report automatically increases the inventory in the systems.

1 Month after purchasing date, Supplier will bring 1 copy of Delivery Order, Tax Invoice, and Original Invoice, and 1 copy of Purchase Order which received from Purchasing Department. Purchasing Department will check all the documents send the documents to Accounting Department. Accounting Department will process the payment to Supplier.

2. Expenditure Cycle in Delicious Food

DELICIOUS FOOD No. 64971

Kawasan Industri Jababeka Blok N No. 30-31
Jababeka Street, Cikarang
Ph. (021-9787575)

PURCHASE ORDER

To. Food Supplies Ltd
Kawasan Industri Tangerang
Tangerang Raya Street, Banten

SENT
31 Jan 2017

Date Ordered : 01/31/2017 **Purchase Req No.** : 54937

No	Product No.	Description	Qty	Price	Amount
1	R053	Rice (20Kg)	500	IDR 100,000	IDR 50,000,000
2	G302	Gochujang Sauce	500	IDR 30,000	IDR 15,000,000
3	S001	Soy Sauce (1 Liter)	380	IDR 50,000	IDR 19,000,000
4	D042	Doenjang	360	IDR 30,000	IDR 10,800,000
5	O420	Sesame Oil (1 Liter)	200	IDR 50,000	IDR 10,000,000
6	B034	Bulgogi Sauce	350	IDR 40,000	IDR 14,000,000
				Sub Total	**IDR 118,800,000**
				Discount	**IDR 0**
				Total	**IDR 118,800,000**

Prepared By : **Approved By :**

Renita Sari Thomson Wang

DELICIOUS FOOD No. 68431

Kawasan Industri Jababeka Blok N No. 30-31
Jababeka Street, Cikarang
Ph. (021-9787575)

RECEIVING REPORT

Purchase Order No : 64971 **Entered By** : Renita Sari

Goods Received From : Food Supplies Ltd **Receipt Date** : 02/07/17

No	Product No.	Description	Qty	Comments
1	B053	Rice (20Kg)	500	Condition OK
2	S302	Gochujang Sauce	500	Condition OK
3	B001	Soy Sauce (1 Liter)	380	Condition OK
4	C042	Doenjang	360	Box Damaged, Item OK
5	S420	Sesame Oil (1 Liter)	200	Condition OK
6	T034	Bulgogi Sauce	350	Condition OK

Report Prepared By : Crystal Jessica

Goods Received By : Frans Thomas

3. Revenue Cycle in Delicious Food

When Sales Department receives customer order, Sales Department will send Sales Order to Logistic Department. After that Logistic Department will create 3 copies of Good Issues and Delivery Order. Delivery Order has been sent to customer. 1 copy of Good Issue will send to the Accounting Department, and 2 copies of Good Issue for archive. Created Good Issue automatically decreases the inventory in the systems. After receive the goods and Sales Order, customer pays the goods, and customer will receive Payment Receipt.

If customer returns goods because the goods broken, Purchasing Department will create Return Goods Form based on quantity of broken goods, then authorize by Purchasing Manager. After that, Purchasing Department will send Return Goods Form and the goods to Supplier. Supplier will send good quality

goods to Logistic Department, and then Logistic Department will check and calculate goods stock (stock opname) in the warehouse. After that Logistic Department will create Stock Opname Card, and then send it to Accounting Department to create Stock Opname report.

DELICIOUS FOOD

Kawasan Industri Jababeka Blok N No. 30-31
Jababeka Street, Cikarang
Ph. (021-9787575)

SALES ORDER

Invoice No : V021
Date : 14 Februari 2017
Staff ID : SH09
Staff Name : Annisa

Cust ID : CR001
Cust Name : Happy Restaurant

No	ItemID	Item Name	Qty	Unit Price	Amount
1	RE301	Delicious Ramen	100	IDR 50,000	IDR 5,000,000
2	SA334	Ssamjang	20	IDR 30,000	IDR 600,000
3	GO044	Gochujang	20	IDR 50,000	IDR 1,000,000
4	DM456	Dang Myun	50	IDR 50,000	IDR 2,500,000
5	GA110	Ganjang (1 Liter)	10	IDR 60,000	IDR 600,000
				Sub Total	**IDR 9,700,000**
				Discount	**IDR 0**
				Total	**IDR 9,700,000**

PAYMENT RECEIPT

DELICIOUS FOOD
Kawasan Industri Jababeka Blok N No. 30-31
Jababeka Street, Cikarang
Ph. (021-9787575)

Receipt No. : 10000020
Customer No. : CR001

Received From
Happy Restaurant
Living Word Mall GF A-31
Sutera Utama Street, Tangerang
Contact : Brenda Aurelia
Telephone : 021-5866565

Paid Date : 02/20/17
Payment Method : Check
Check/ CC No. :
Reference :
Amount Paid : IDR 9,700,000

Invoice No.	Customer No.	Invoice Date	Description	Payment Adj	Applied Amount
V021	CR001	2/14/2017		IDR 0	IDR 9,700,000

4. Group Task

Delicious Restaurant has appointed you as Database Designer and you have to help Delicious Restaurant to design the Database, by create:

- Normalization Process (UNF – 3NF)!
- Create ER Modelling based on result of 3NF table!

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