Praktikum 2- STA261

KONSEP DASAR BASIS DATA

Laily Nissa Atul Mualifah
Abdul Aziz Nurussadad

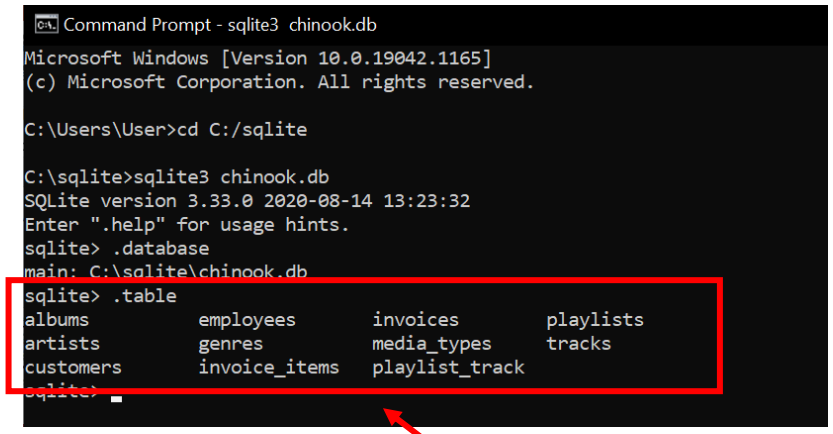
IPB University
Bogor Indonesia

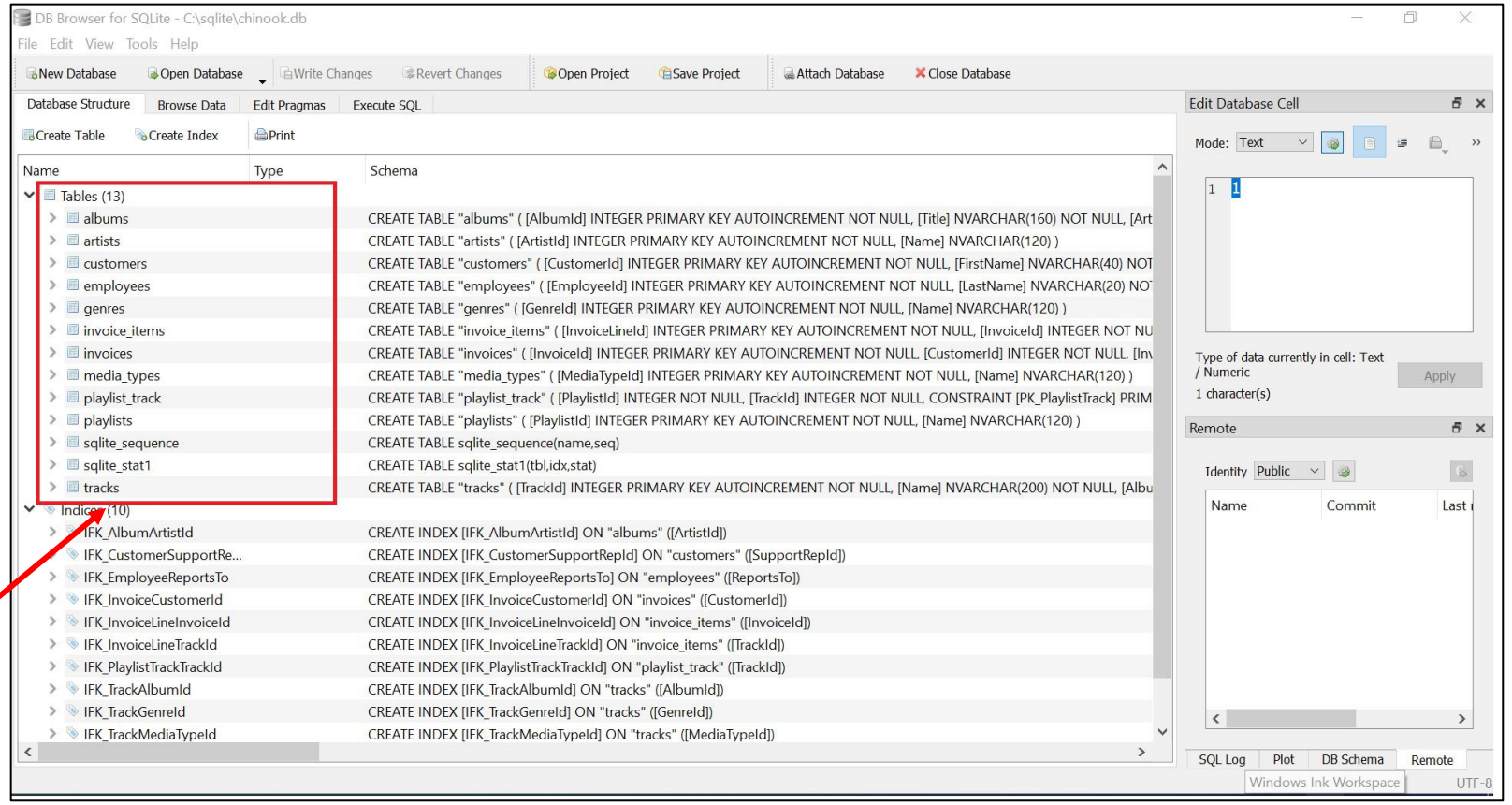
Study Program
Statistics and Data Science
Department of Statistics

Istilah dalam Basis Data

ENTERPRISE	ENTITY	ATTRIBUTE	DATA VALUE	RECORD	KEY
organisasi atau lembaga yang mengelola basis data (*database*) Contoh Universitas, Rumah Sakit, Bank	objek yang akan disimpan dan dapat dibedakan dengan objek lain Contoh: Mahasiswa, Mata Kuliah, Dosen, Fakultas	disebut juga **Field,** adalah unsur-unsur pada entity yang berisi data Contoh: NIM, Nama, Fakultas, Jurusan	data yang tersimpan pada setiap field Contoh: Budiman, Wahyu, Desi	Disebut juga **Tuple**,adalah kumpulan unsur-unsur data yang saling berkaitan menginforma sikan tentang suatu entity secara lengkap	pengenal unik untuk mengidentifik asi suatu entity

Istilah dalam Basis Data





Entity

Istilah dalam Basis Data

Attribute/ Field

```
sqlite> .schema invoices
CREATE TABLE IF NOT EXISTS "invoices"
(
    [InvoiceId] INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    [CustomerId] INTEGER  NOT NULL,
    [InvoiceDate] DATETIME  NOT NULL,
    [BillingAddress] NVARCHAR(70),
    [BillingCity] NVARCHAR(40),
    [BillingState] NVARCHAR(40),
    [BillingCountry] NVARCHAR(40),
    [BillingPostalCode] NVARCHAR(10),
    [Total] NUMERIC(10,2)  NOT NULL,
    FOREIGN KEY ([CustomerId]) REFERENCES "customers" ([CustomerId])
                ON DELETE NO ACTION ON UPDATE NO ACTION
);
CREATE INDEX [IFK_InvoiceCustomerId] ON "invoices" ([CustomerId]);
sqlite>
```

DB Browser for SQLite - C:\sqlite\chinook.db

File Edit View Tools Help

New Database | Open Database | Write Changes | Revert Changes | Open Project | Save Project | Attach Database | Close Database

Database Structure | Browse Data | Edit Pragmas | Execute SQL

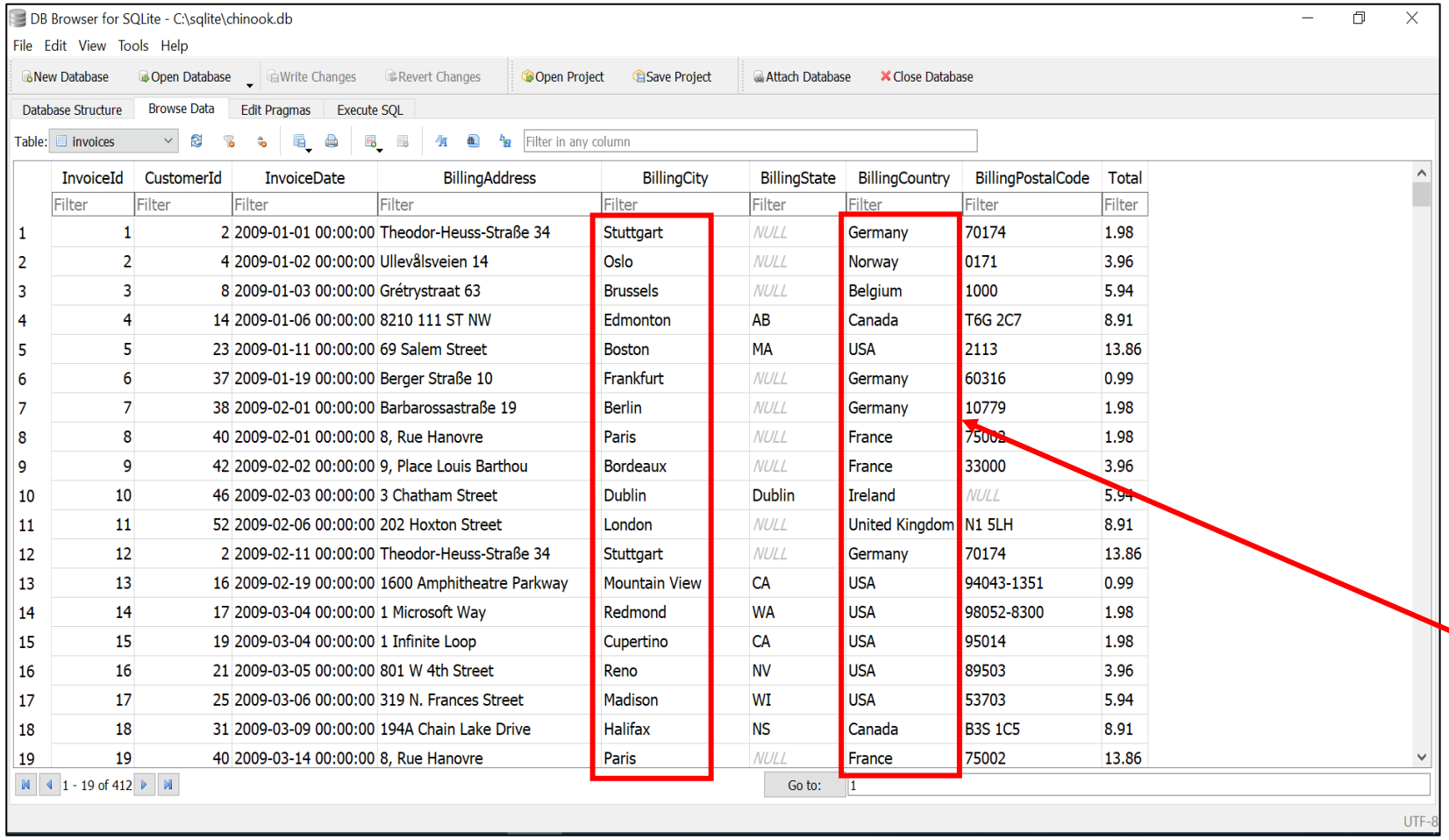
Table: invoices

	InvoiceId	CustomerId	InvoiceDate	BillingAddress	BillingCity	BillingState	BillingCountry	BillingPostalCode	Total
1	1	2	2009-01-01 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	NULL	Germany	70174	1.98
2	2	4	2009-01-02 00:00:00	Ullevålsveien 14	Oslo	NULL	Norway	0171	3.96
3	3	8	2009-01-03 00:00:00	Grétrystraat 63	Brussels	NULL	Belgium	1000	5.94
4	4	14	2009-01-06 00:00:00	8210 111 ST NW	Edmonton	AB	Canada	T6G 2C7	8.91
5	5	23	2009-01-11 00:00:00	69 Salem Street	Boston	MA	USA	2113	13.86
6	6	37	2009-01-19 00:00:00	Berger Straße 10	Frankfurt	NULL	Germany	60316	0.99
7	7	38	2009-02-01 00:00:00	Barbarossastraße 19	Berlin	NULL	Germany	10779	1.98
8	8	40	2009-02-01 00:00:00	8, Rue Hanovre	Paris	NULL	France	75002	1.98
9	9	42	2009-02-02 00:00:00	9, Place Louis Barthou	Bordeaux	NULL	France	33000	3.96
10	10	46	2009-02-03 00:00:00	3 Chatham Street	Dublin	Dublin	Ireland	NULL	5.94
11	11	52	2009-02-06 00:00:00	202 Hoxton Street	London	NULL	United Kingdom	N1 5LH	8.91
12	12	2	2009-02-11 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	NULL	Germany	70174	13.86
13	13	16	2009-02-19 00:00:00	1600 Amphitheatre Parkway	Mountain View	CA	USA	94043-1351	0.99
14	14	17	2009-03-04 00:00:00	1 Microsoft Way	Redmond	WA	USA	98052-8300	1.98
15	15	19	2009-03-04 00:00:00	1 Infinite Loop	Cupertino	CA	USA	95014	1.98
16	16	21	2009-03-05 00:00:00	801 W 4th Street	Reno	NV	USA	89503	3.96
17	17	25	2009-03-06 00:00:00	319 N. Frances Street	Madison	WI	USA	53703	5.94
18	18	31	2009-03-09 00:00:00	194A Chain Lake Drive	Halifax	NS	Canada	B3S 1C5	8.91
19	19	40	2009-03-14 00:00:00	8, Rue Hanovre	Paris	NULL	France	75002	13.86

1 - 19 of 412 | Go to: 1

UTF-8

Istilah dalam Basis Data



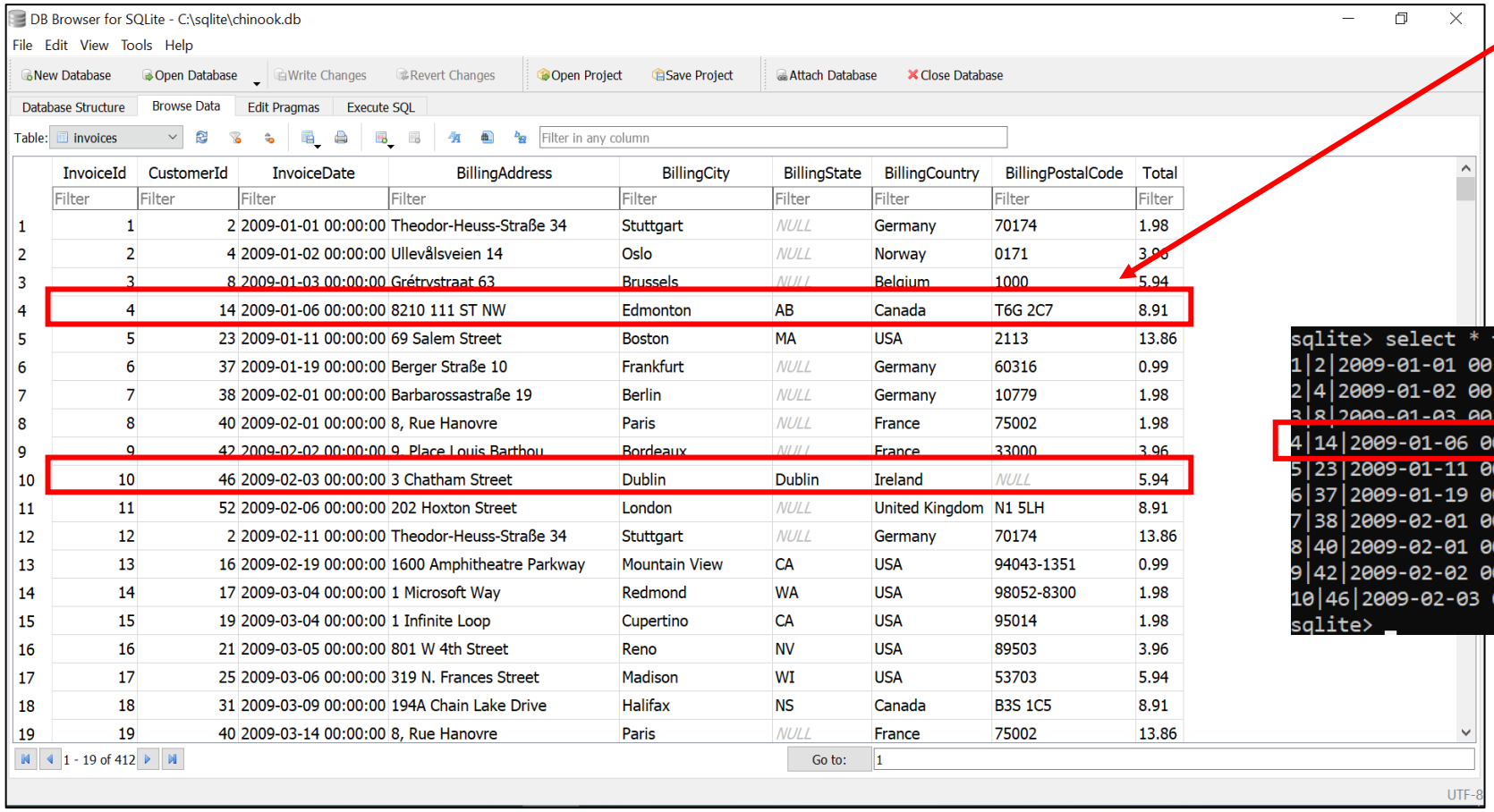
	InvoiceId	CustomerId	InvoiceDate	BillingAddress	BillingCity	BillingState	BillingCountry	BillingPostalCode	Total
	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter
1	1	2	2009-01-01 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	NULL	Germany	70174	1.98
2	2	4	2009-01-02 00:00:00	Ullevålsveien 14	Oslo	NULL	Norway	0171	3.96
3	3	8	2009-01-03 00:00:00	Grétrystraat 63	Brussels	NULL	Belgium	1000	5.94
4	4	14	2009-01-06 00:00:00	8210 111 ST NW	Edmonton	AB	Canada	T6G 2C7	8.91
5	5	23	2009-01-11 00:00:00	69 Salem Street	Boston	MA	USA	2113	13.86
6	6	37	2009-01-19 00:00:00	Berger Straße 10	Frankfurt	NULL	Germany	60316	0.99
7	7	38	2009-02-01 00:00:00	Barbarossastraße 19	Berlin	NULL	Germany	10779	1.98
8	8	40	2009-02-01 00:00:00	8, Rue Hanovre	Paris	NULL	France	75002	1.98
9	9	42	2009-02-02 00:00:00	9, Place Louis Barthou	Bordeaux	NULL	France	33000	3.96
10	10	46	2009-02-03 00:00:00	3 Chatham Street	Dublin	Dublin	Ireland	NULL	5.94
11	11	52	2009-02-06 00:00:00	202 Hoxton Street	London	NULL	United Kingdom	N1 5LH	8.91
12	12	2	2009-02-11 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	NULL	Germany	70174	13.86
13	13	16	2009-02-19 00:00:00	1600 Amphitheatre Parkway	Mountain View	CA	USA	94043-1351	0.99
14	14	17	2009-03-04 00:00:00	1 Microsoft Way	Redmond	WA	USA	98052-8300	1.98
15	15	19	2009-03-04 00:00:00	1 Infinite Loop	Cupertino	CA	USA	95014	1.98
16	16	21	2009-03-05 00:00:00	801 W 4th Street	Reno	NV	USA	89503	3.96
17	17	25	2009-03-06 00:00:00	319 N. Frances Street	Madison	WI	USA	53703	5.94
18	18	31	2009-03-09 00:00:00	194A Chain Lake Drive	Halifax	NS	Canada	B3S 1C5	8.91
19	19	40	2009-03-14 00:00:00	8, Rue Hanovre	Paris	NULL	France	75002	13.86


```
sqlite> Select BillingCity from invoices limit 10;
Stuttgart
Oslo
Brussels
Edmonton
Boston
Frankfurt
Berlin
Paris
Bordeaux
Dublin
sqlite>
```

Data Value

Istilah dalam Basis Data

Record/Tuple



	InvoiceId	CustomerId	InvoiceDate	BillingAddress	BillingCity	BillingState	BillingCountry	BillingPostalCode	Total
	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter
1	1	2	2009-01-01 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	NULL	Germany	70174	1.98
2	2	4	2009-01-02 00:00:00	Ullevålsveien 14	Oslo	NULL	Norway	0171	3.96
3	3	8	2009-01-03 00:00:00	Grétrystraat 63	Brussels	NULL	Belgium	1000	5.94
4	4	14	2009-01-06 00:00:00	8210 111 ST NW	Edmonton	AB	Canada	T6G 2C7	8.91
5	5	23	2009-01-11 00:00:00	69 Salem Street	Boston	MA	USA	2113	13.86
6	6	37	2009-01-19 00:00:00	Berger Straße 10	Frankfurt	NULL	Germany	60316	0.99
7	7	38	2009-02-01 00:00:00	Barbarossastraße 19	Berlin	NULL	Germany	10779	1.98
8	8	40	2009-02-01 00:00:00	8, Rue Hanovre	Paris	NULL	France	75002	1.98
9	9	42	2009-02-02 00:00:00	9, Place Louis Barthou	Bordeaux	NULL	France	33000	3.96
10	10	46	2009-02-03 00:00:00	3 Chatham Street	Dublin	Dublin	Ireland	NULL	5.94
11	11	52	2009-02-06 00:00:00	202 Hoxton Street	London	NULL	United Kingdom	N1 5LH	8.91
12	12	2	2009-02-11 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	NULL	Germany	70174	13.86
13	13	16	2009-02-19 00:00:00	1600 Amphitheatre Parkway	Mountain View	CA	USA	94043-1351	0.99
14	14	17	2009-03-04 00:00:00	1 Microsoft Way	Redmond	WA	USA	98052-8300	1.98
15	15	19	2009-03-04 00:00:00	1 Infinite Loop	Cupertino	CA	USA	95014	1.98
16	16	21	2009-03-05 00:00:00	801 W 4th Street	Reno	NV	USA	89503	3.96
17	17	25	2009-03-06 00:00:00	319 N. Frances Street	Madison	WI	USA	53703	5.94
18	18	31	2009-03-09 00:00:00	194A Chain Lake Drive	Halifax	NS	Canada	B3S 1C5	8.91
19	19	40	2009-03-14 00:00:00	8, Rue Hanovre	Paris	NULL	France	75002	13.86


```
sqlite> select * from invoices limit 10;
1|2|2009-01-01 00:00:00|Theodor-Heuss-Straße 34|Stuttgart||Germany|70174|1.98
2|4|2009-01-02 00:00:00|Ullevålsveien 14|Oslo||Norway|0171|3.96
3|8|2009-01-03 00:00:00|Grétrystraat 63|Brussels||Belgium|1000|5.94
4|14|2009-01-06 00:00:00|8210 111 ST NW|Edmonton|AB|Canada|T6G 2C7|8.91
5|23|2009-01-11 00:00:00|69 Salem Street|Boston|MA|USA|2113|13.86
6|37|2009-01-19 00:00:00|Berger Straße 10|Frankfurt||Germany|60316|0.99
7|38|2009-02-01 00:00:00|Barbarossastraße 19|Berlin||Germany|10779|1.98
8|40|2009-02-01 00:00:00|8, Rue Hanovre|Paris||France|75002|1.98
9|42|2009-02-02 00:00:00|9, Place Louis Barthou|Bordeaux||France|33000|3.96
10|46|2009-02-03 00:00:00|3 Chatham Street|Dublin|Dublin|Ireland||5.94
sqlite>
```

Istilah dalam Basis Data

Key (Primary)

```
sqlite> .schema invoices
CREATE TABLE IF NOT EXISTS "invoices"
(
    [InvoiceId] INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
    [CustomerId] INTEGER  NOT NULL,
    [InvoiceDate] DATETIME  NOT NULL,
    [BillingAddress] NVARCHAR(70),
    [BillingCity] NVARCHAR(40),
    [BillingState] NVARCHAR(40),
    [BillingCountry] NVARCHAR(40),
    [BillingPostalCode] NVARCHAR(10),
    [Total] NUMERIC(10,2)  NOT NULL,
    FOREIGN KEY ([CustomerId]) REFERENCES "customers" ([CustomerId])
                ON DELETE NO ACTION ON UPDATE NO ACTION
);
CREATE INDEX [IFK_InvoiceCustomerId] ON "invoices" ([CustomerId]);
sqlite>
```

Key (Foreign)

DB Browser for SQLite - C:\sqlite\chinook.db

File Edit View Tools Help

New Database | Open Database | Write Changes | Revert Changes | Open Project | Save Project | Attach Database | Close Database

Database Structure | Browse Data | Edit Pragmas | Execute SQL

Table: invoices | Filter in any column

	InvoiceId	CustomerId	InvoiceDate	BillingAddress	BillingCity	BillingState	BillingCountry	BillingPostalCode	Total
	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter
1	1	2	2009-01-01 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	NULL	Germany	70174	1.98
2	2	4	2009-01-02 00:00:00	Ullevålsveien 14	Oslo	NULL	Norway	0171	3.96
3	3	8	2009-01-03 00:00:00	Grétrystraat 63	Brussels	NULL	Belgium	1000	5.94
4	4	14	2009-01-06 00:00:00	8210 111 ST NW	Edmonton	AB	Canada	T6G 2C7	8.91
5	5	23	2009-01-11 00:00:00	69 Salem Street	Boston	MA	USA	2113	13.86
6	6	37	2009-01-19 00:00:00	Berger Straße 10	Frankfurt	NULL	Germany	60316	0.99
7	7	38	2009-02-01 00:00:00	Barbarossastraße 19	Berlin	NULL	Germany	10779	1.98
8	8	40	2009-02-01 00:00:00	8, Rue Hanovre	Paris	NULL	France	75002	1.98
9	9	42	2009-02-02 00:00:00	9, Place Louis Barthou	Bordeaux	NULL	France	33000	3.96
10	10	46	2009-02-03 00:00:00	3 Chatham Street	Dublin	Dublin	Ireland	NULL	5.94
11	11	52	2009-02-06 00:00:00	202 Hoxton Street	London	NULL	United Kingdom	N1 5LH	8.91
12	12	2	2009-02-11 00:00:00	Theodor-Heuss-Straße 34	Stuttgart	NULL	Germany	70174	13.86
13	13	16	2009-02-19 00:00:00	1600 Amphitheatre Parkway	Mountain View	CA	USA	94043-1351	0.99
14	14	17	2009-03-04 00:00:00	1 Microsoft Way	Redmond	WA	USA	98052-8300	1.98
15	15	19	2009-03-04 00:00:00	1 Infinite Loop	Cupertino	CA	USA	95014	1.98
16	16	21	2009-03-05 00:00:00	801 W 4th Street	Reno	NV	USA	89503	3.96
17	17	25	2009-03-06 00:00:00	319 N. Frances Street	Madison	WI	USA	53703	5.94
18	18	31	2009-03-09 00:00:00	194A Chain Lake Drive	Halifax	NS	Canada	B3S 1C5	8.91
19	19	40	2009-03-14 00:00:00	8, Rue Hanovre	Paris	NULL	France	75002	13.86

1 - 19 of 412 | Go to: 1

UTF-8

Skema Basis Data

Mahasiswa

NIM	Nama	Nama_Fakultas	Prodi

Fakultas

Kode_Fakultas	Nama_Fakultas

Dosen

Kode_dosen	Nama_dosen	NIP	Prodi

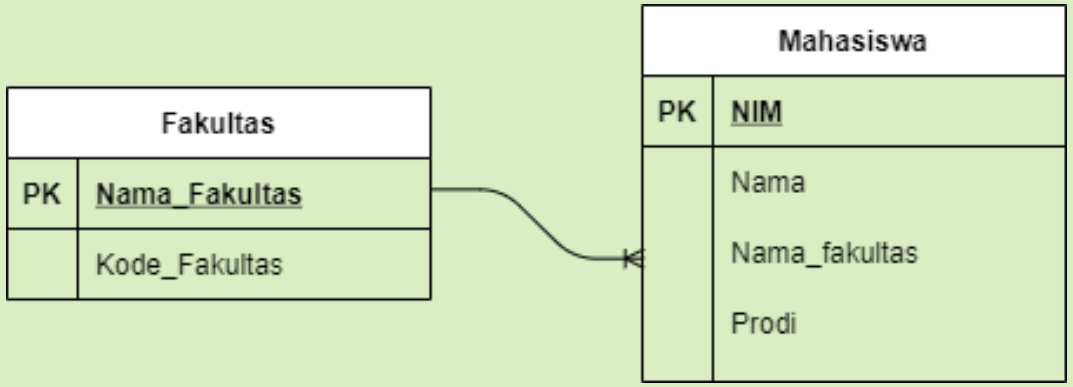
Mata Kuliah

Kode_mk	Nama_mk	SKS	Prodi	Kode_dosen

Skema basis data merupakan deskripsi dari basis data yang spesifikasinya ditentukan dalam tahap perancangan basis data.

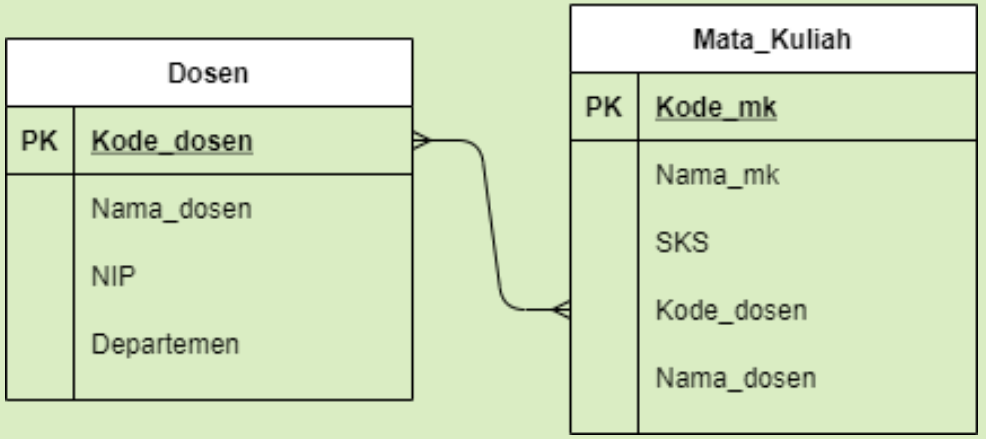
Relasi Basis Data

One to Many (1:M)



Setiap entity dapat memiliki lebih dari satu relasi dengan entity lain, akan tetapi tidak sebaliknya.

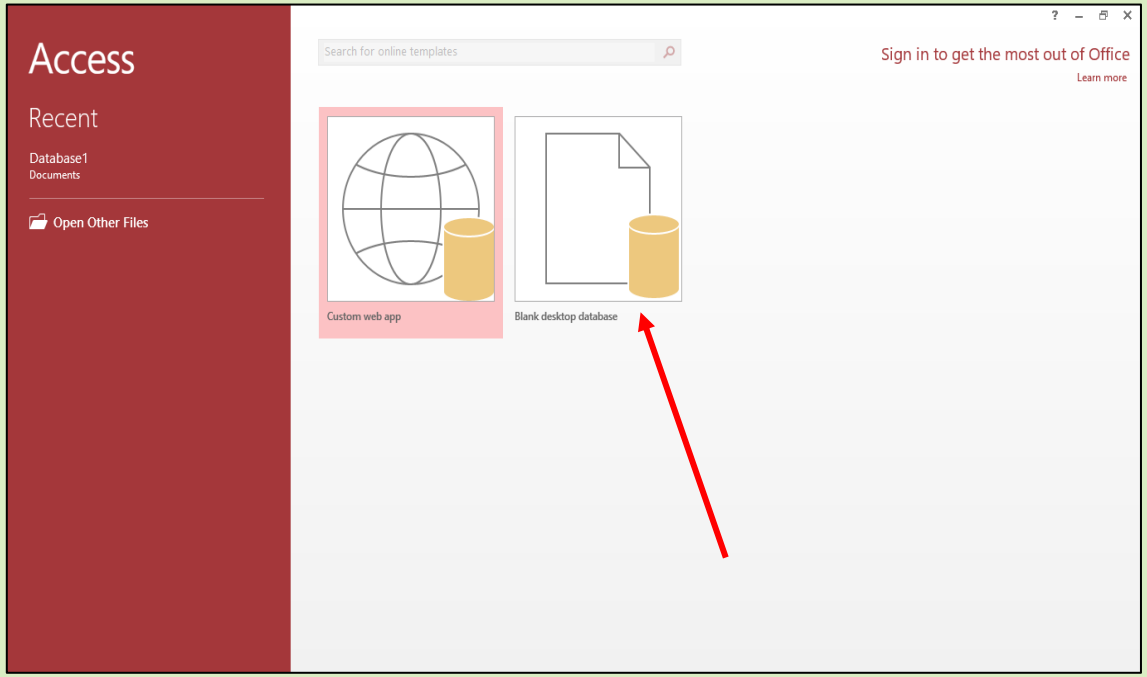
Many to Many (M:N)

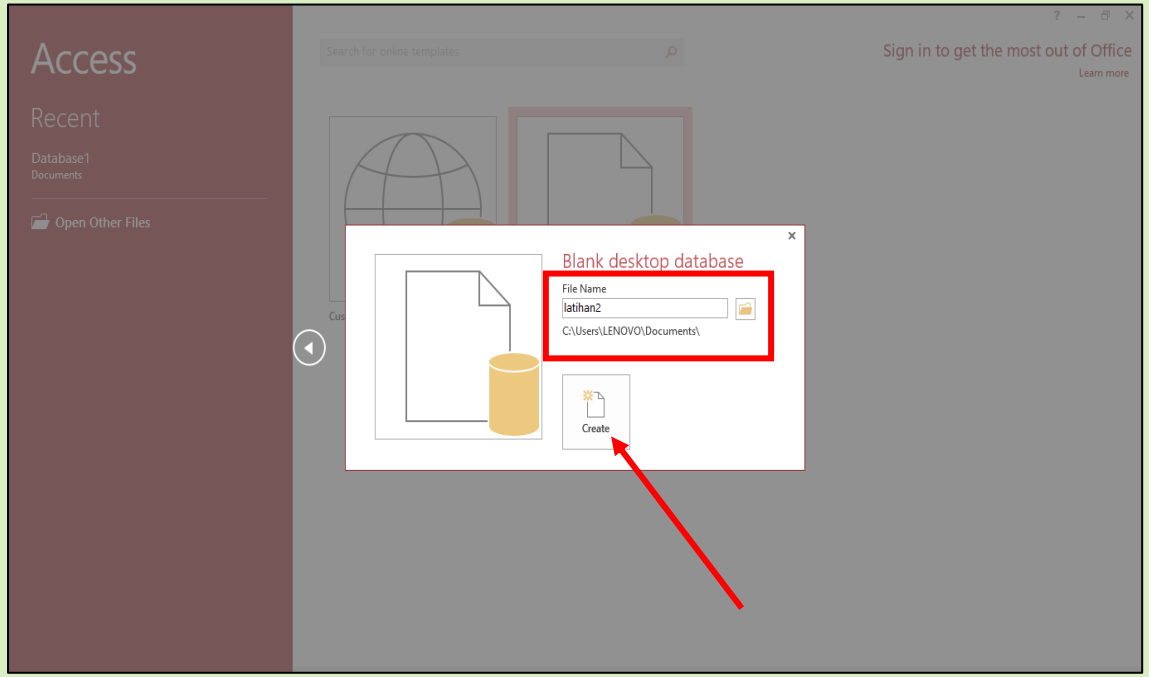


Setiap entity dapat memiliki lebih dari satu relasi dengan entity lain, dan berlaku sebaliknya.

Relasi basis data merupakan hubungan antar entity dalam suatu basis data.

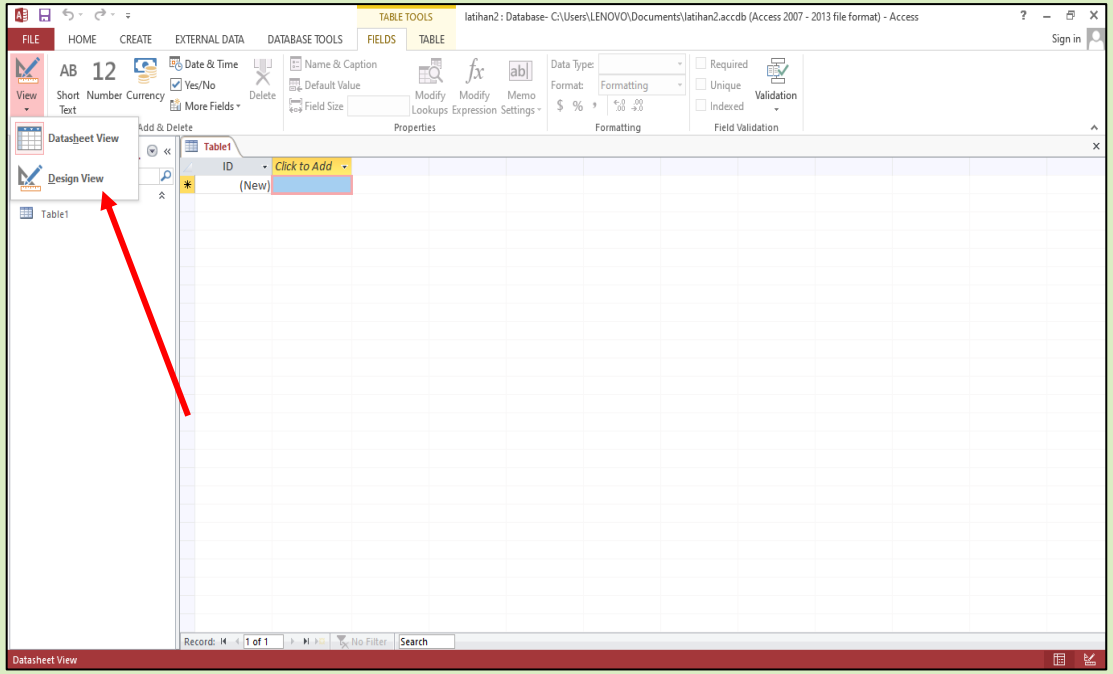
Perancangan Basis Data

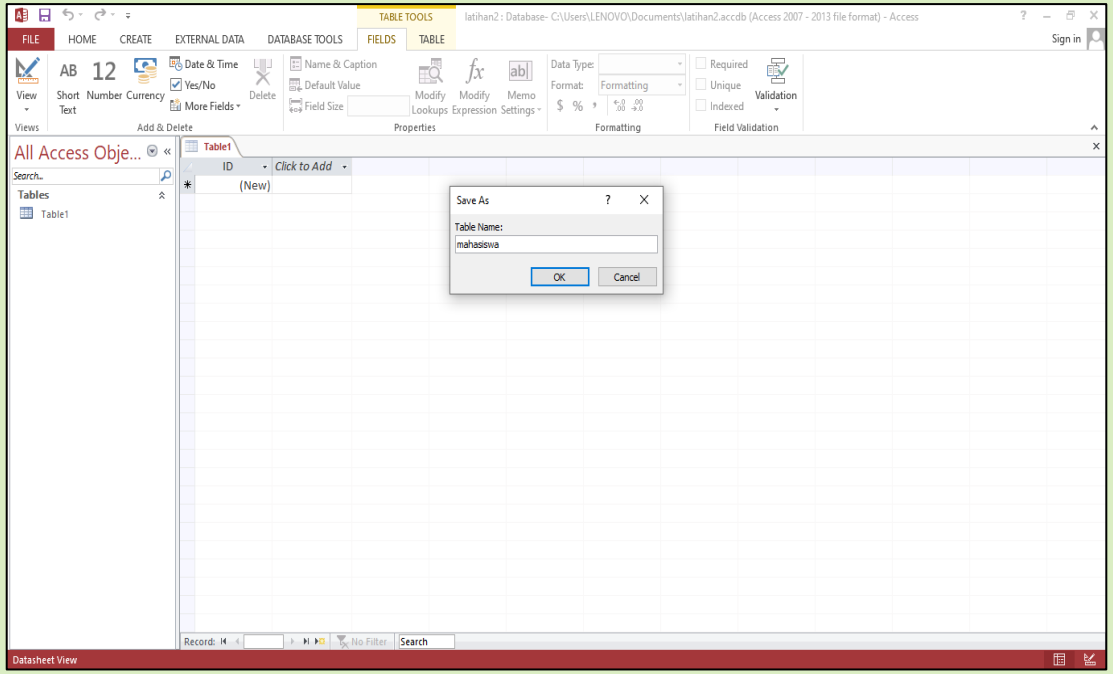




Dalam perancangan suatu basis data, salah satu langkah awal yang perlu dilakukan adalah menyusun ***Entity Relationship Diagram*** (ERD). *Entity Relationship Diagram* (ERD) adalah suatu diagram struktural yang umumnya digunakan dalam mendesain sebuah basis data.

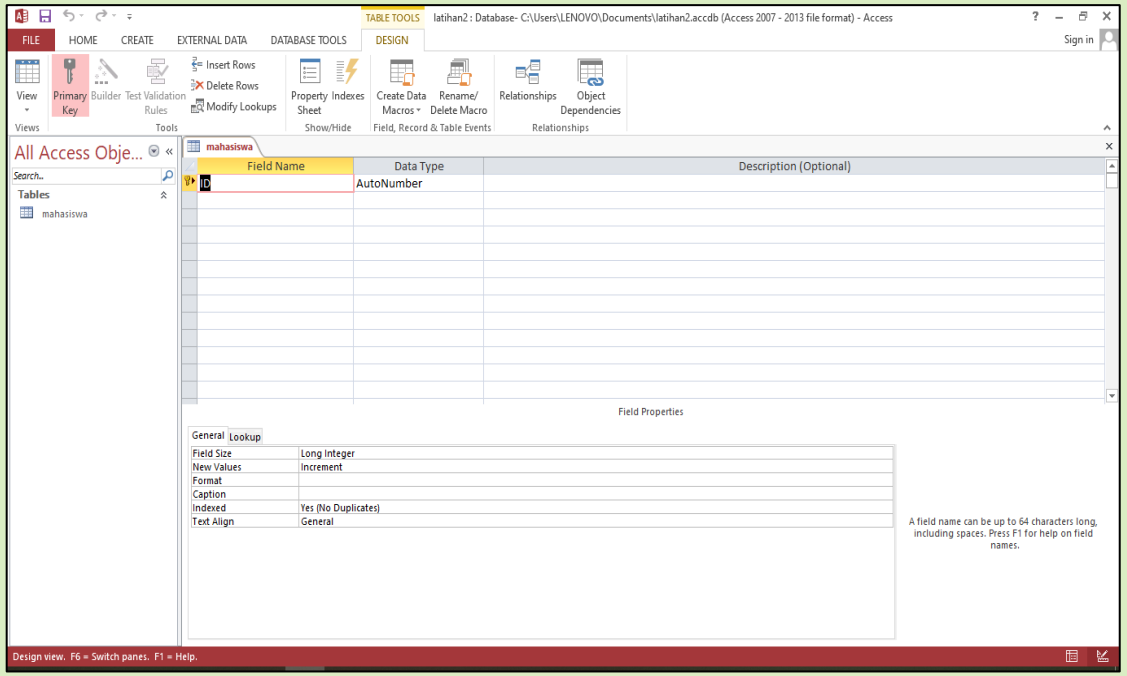
Perancangan Basis Data

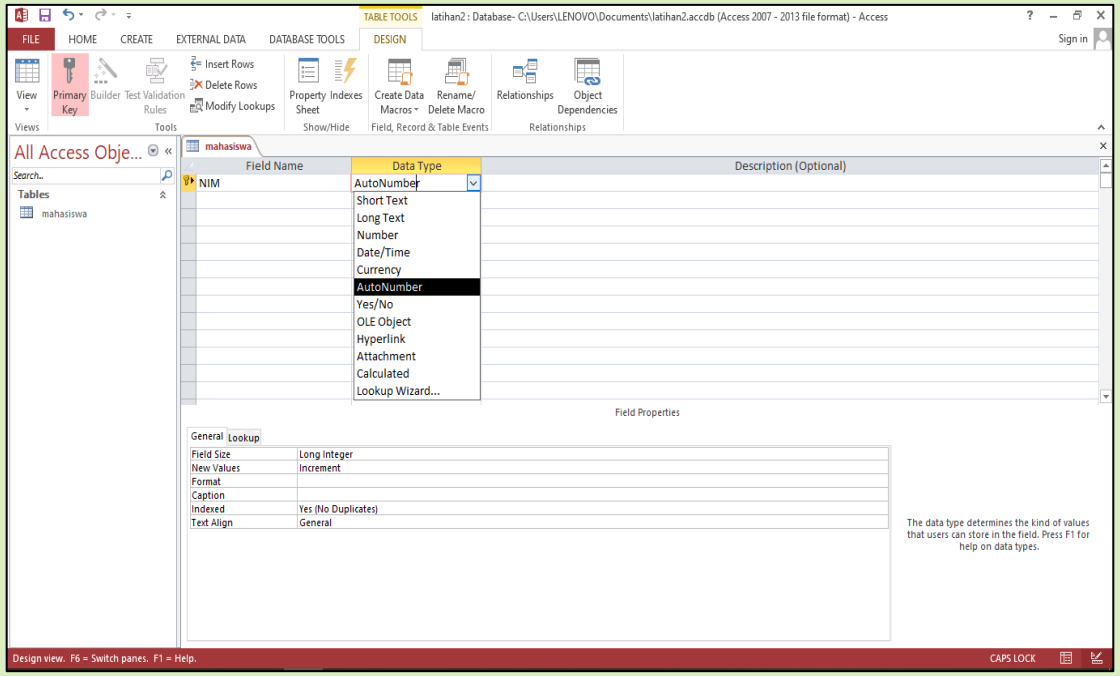




Entity Relationship Diagram (ERD)

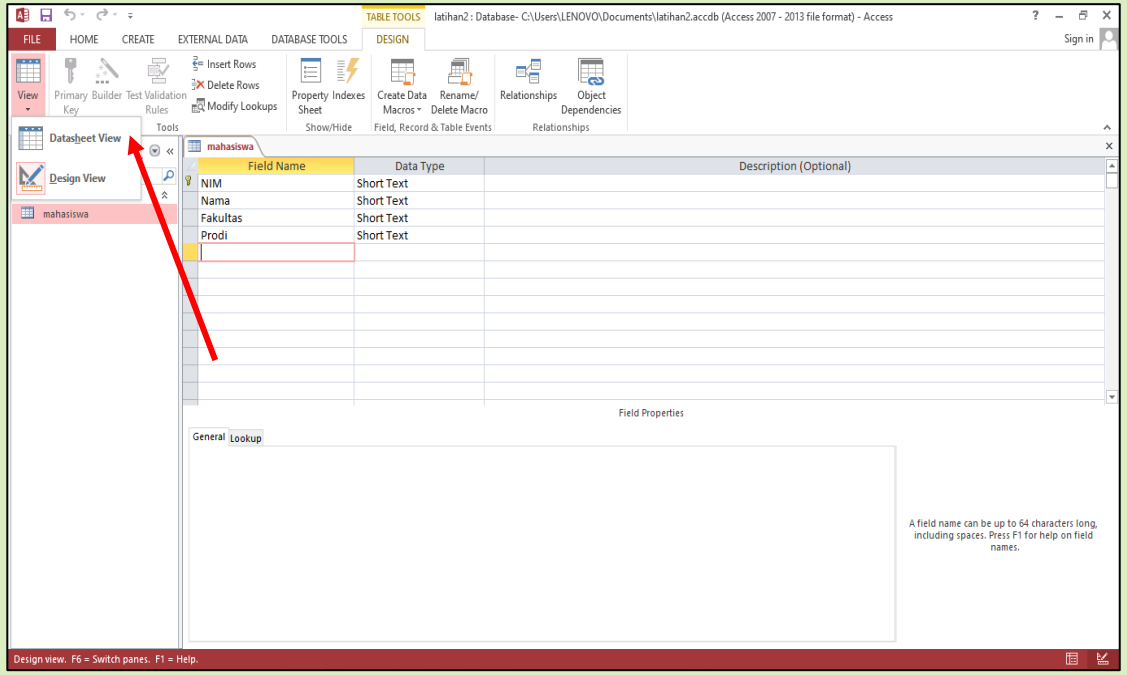
Perancangan Basis Data

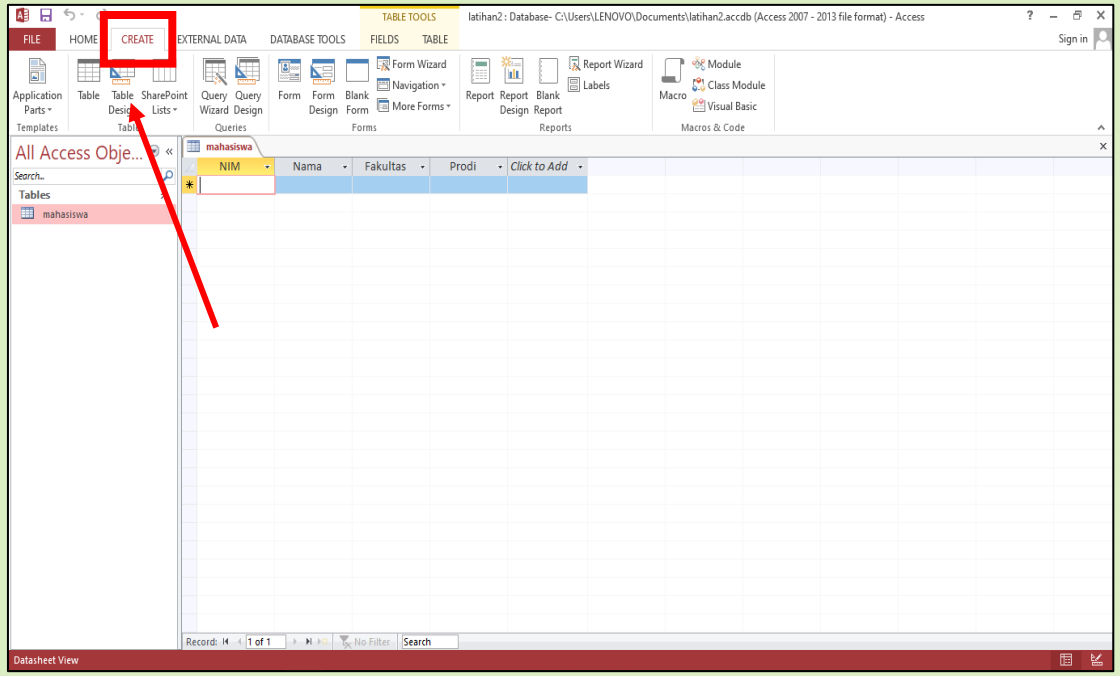




Entity Relationship Diagram (ERD)

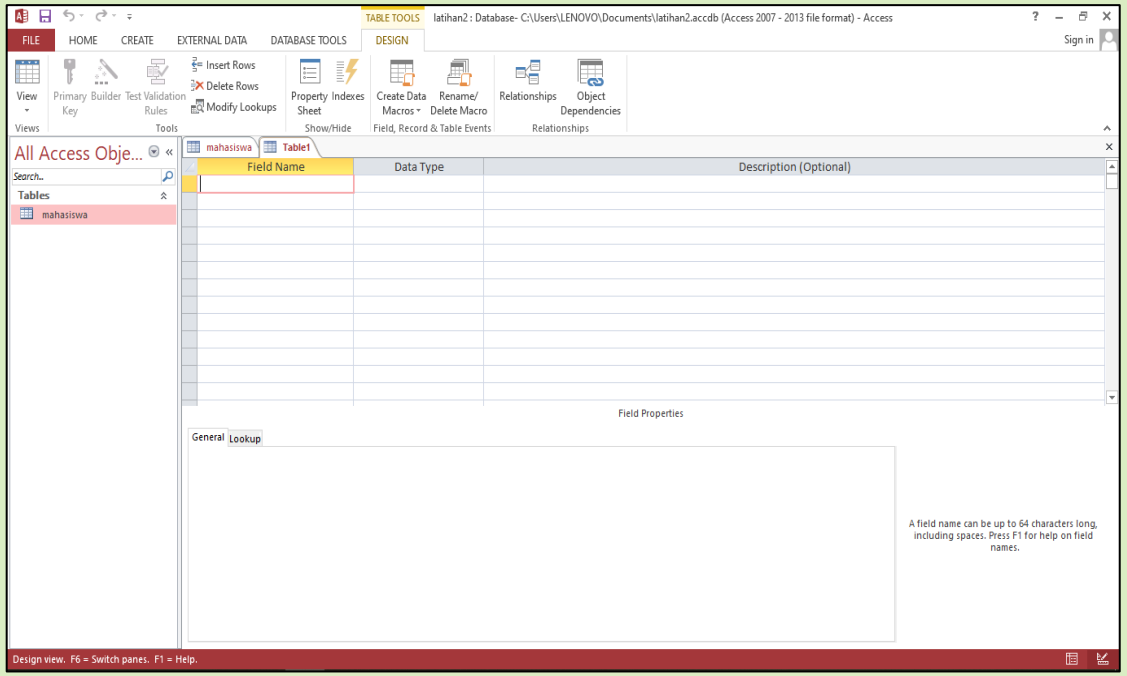
Perancangan Basis Data

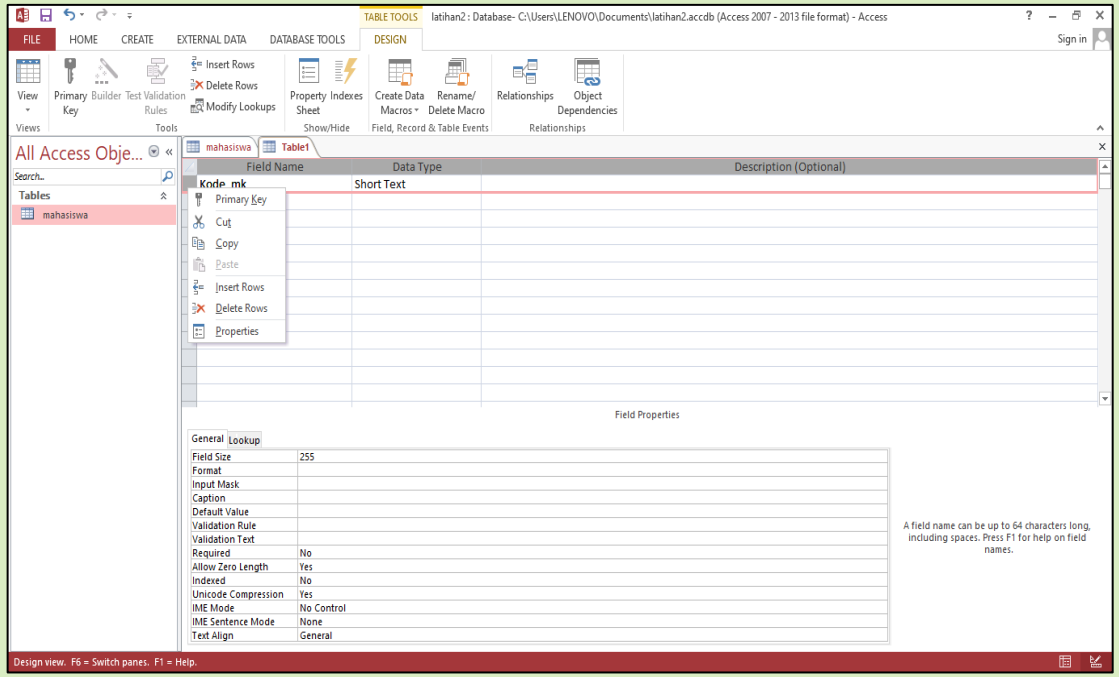




Entity Relationship Diagram (ERD)

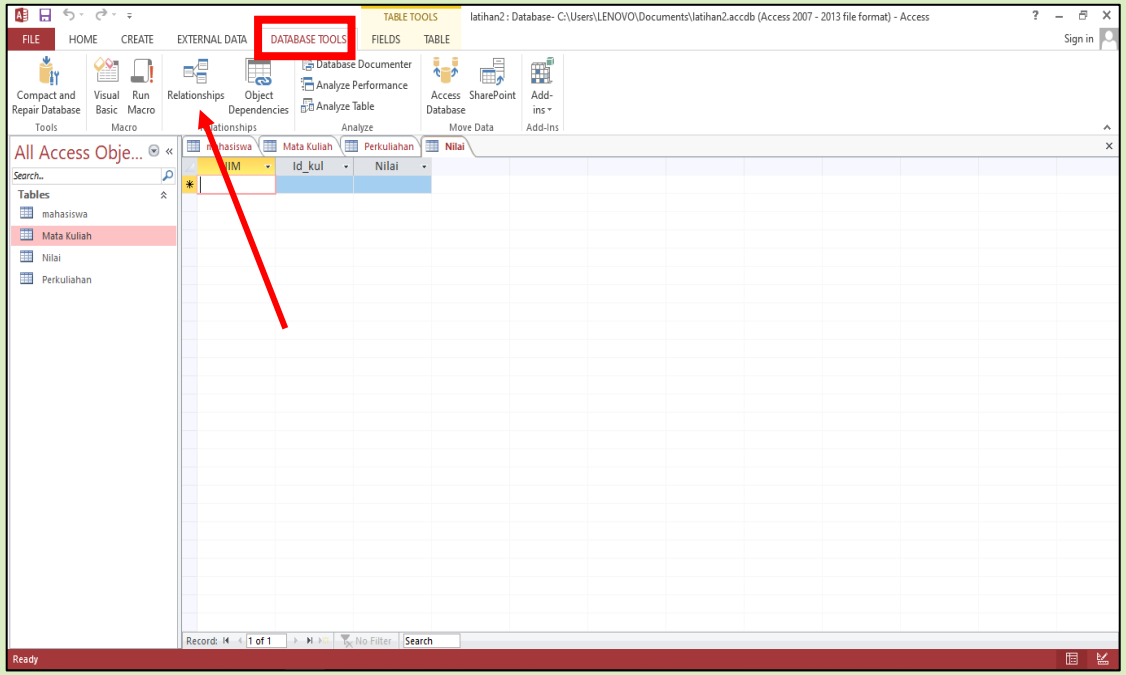
Perancangan Basis Data

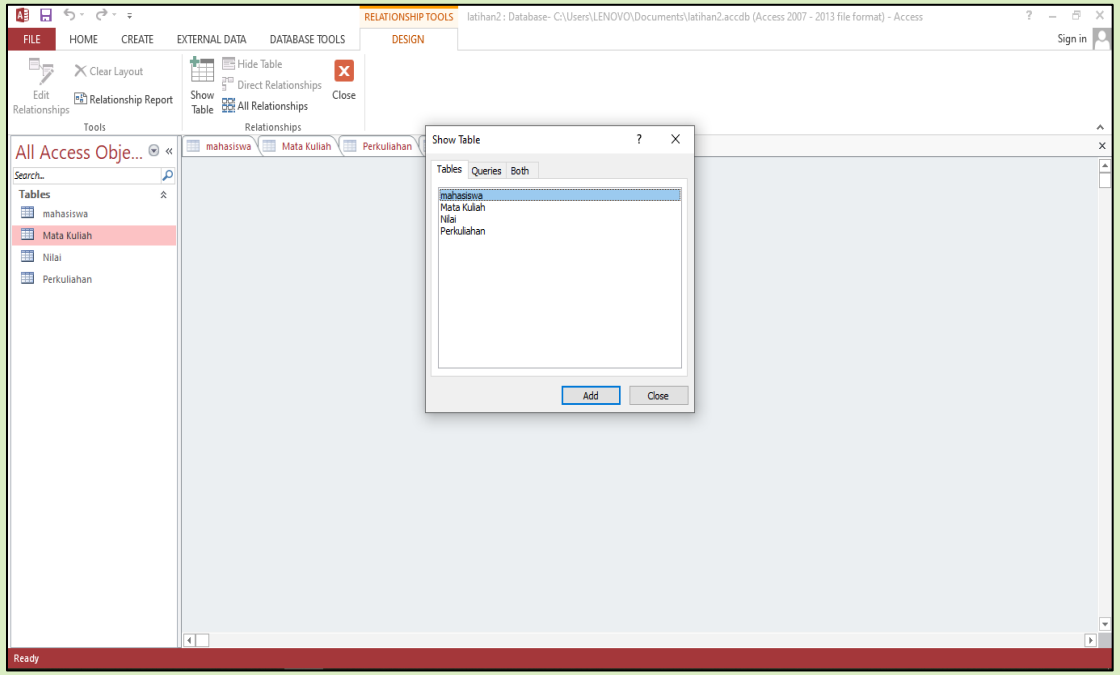




Entity Relationship Diagram (ERD)

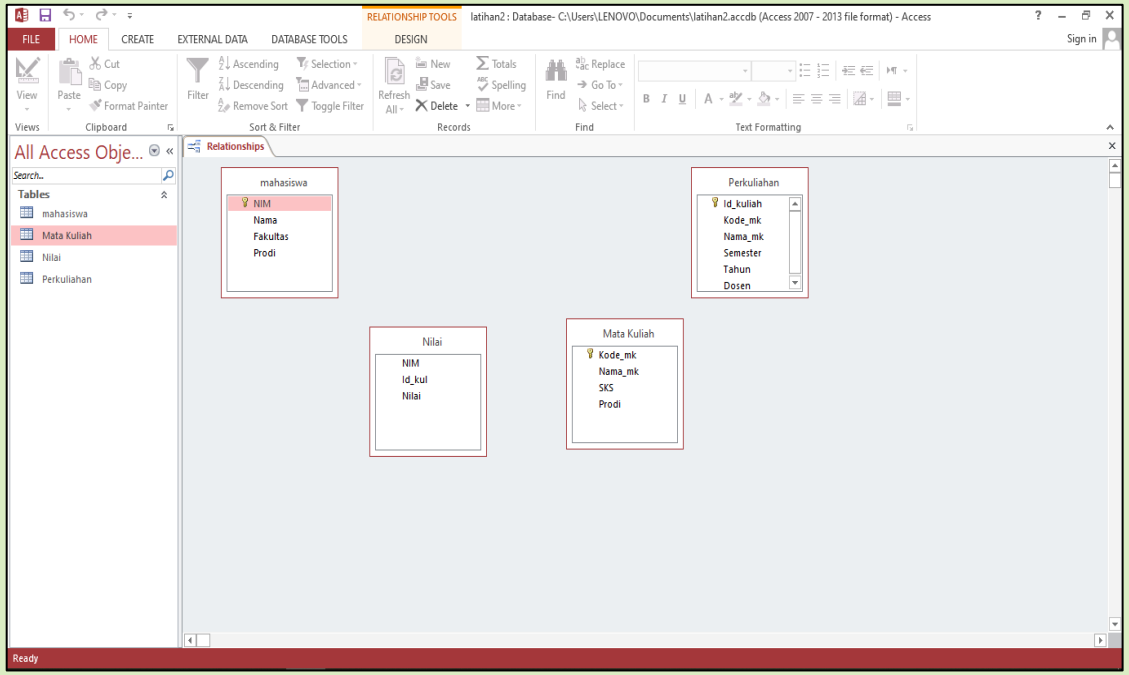
Perancangan Basis Data

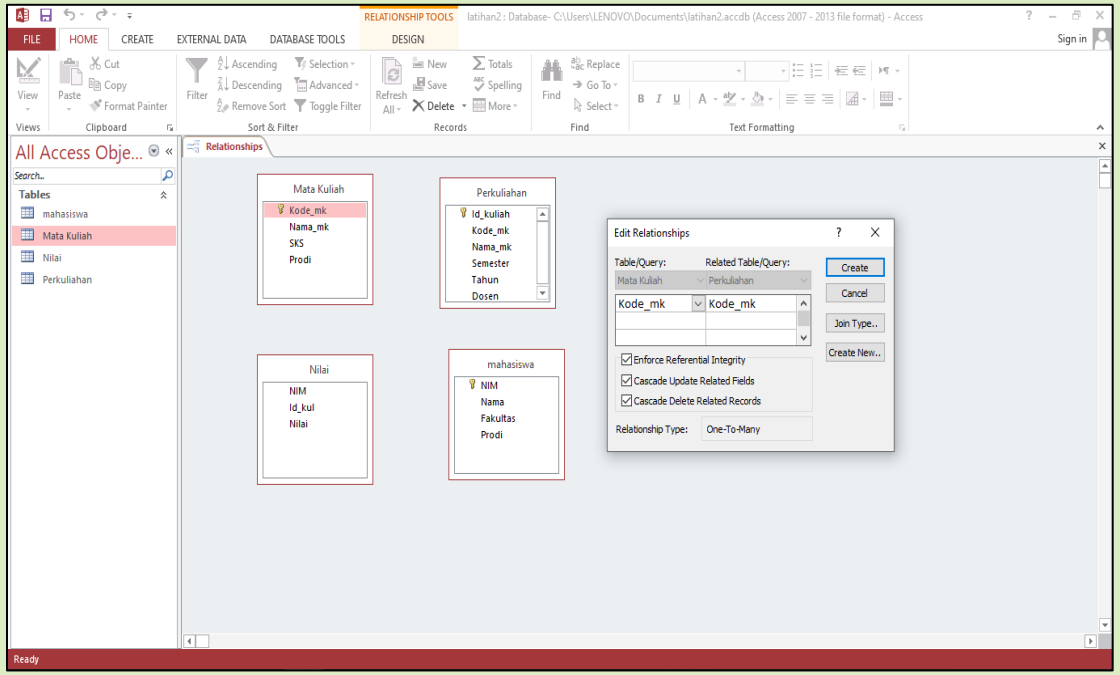




Entity Relationship Diagram (ERD)

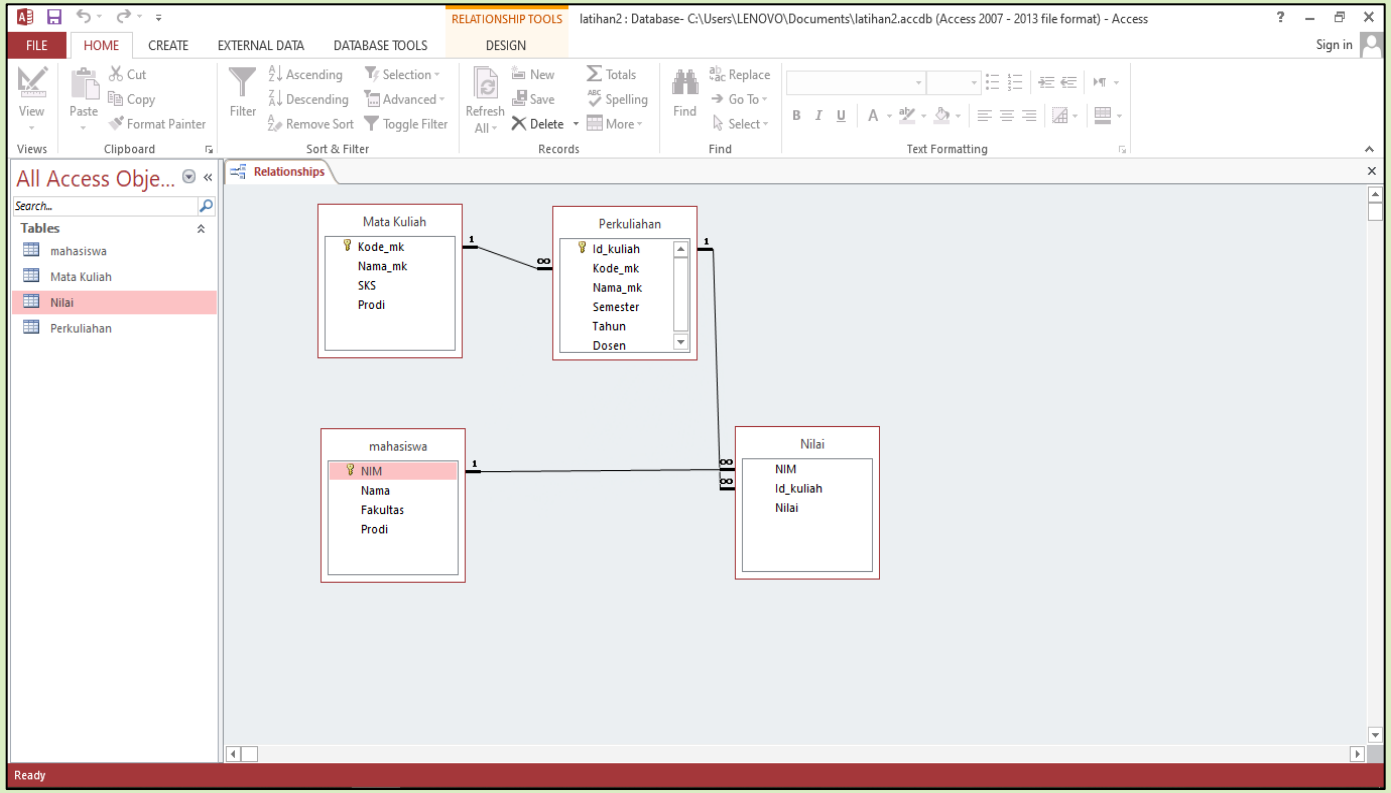
Perancangan Basis Data





Entity Relationship Diagram (ERD)

Perancangan Basis Data



Pembuatan ERD dapat dilakukan juga melalui laman https://app.diagrams.net/

Entity Relationship Diagram (ERD)

IPB University
Bogor Indonesia

Study Program
Statistics and Data Science
Department of Statistics

TERIMA KASIH