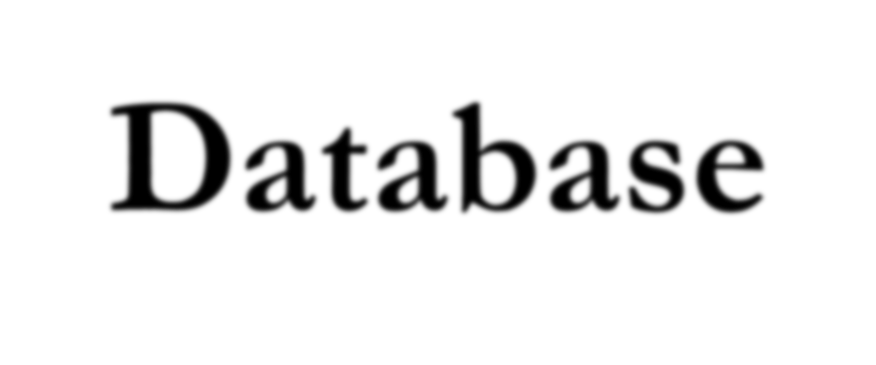
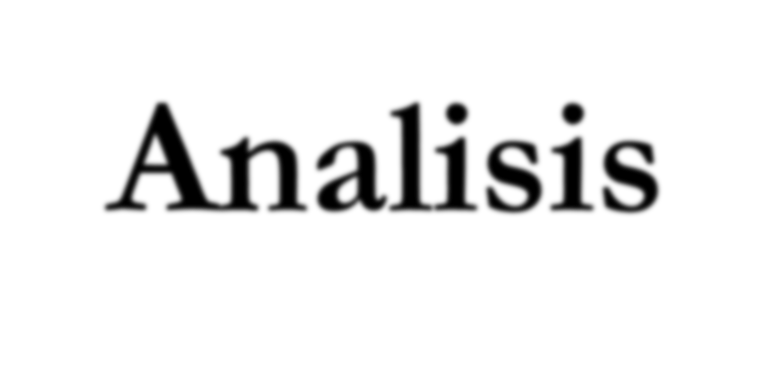
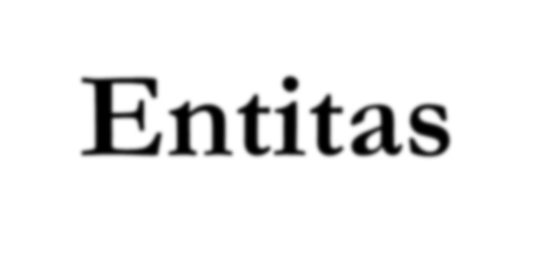
**Analisis Database**



**Entitas**

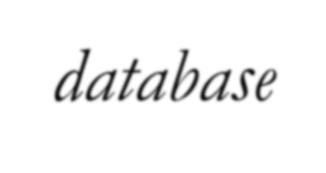
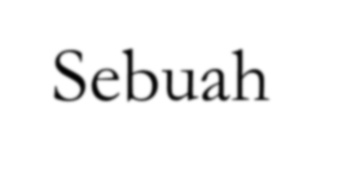
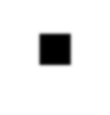


Sebuah *database* dapat dimodelkan sebagai

◼

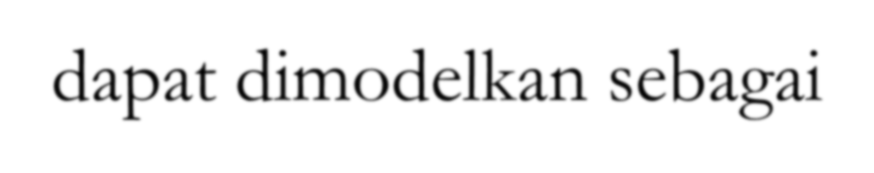
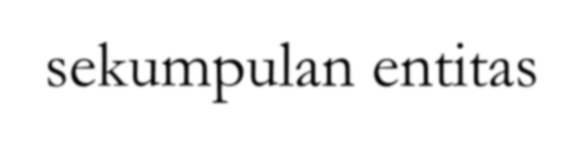
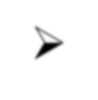
sekumpulan entitas

➢



Hubungan antarentitas

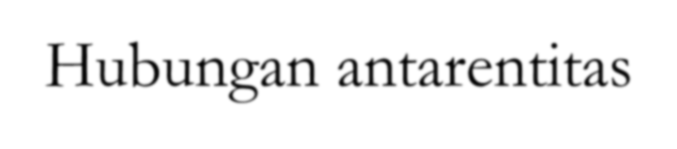
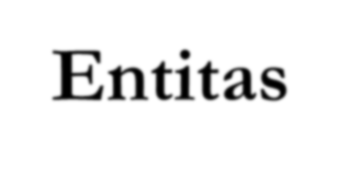
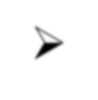
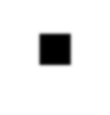
➢



**Entitas** *(entity)* adalah sebuah objek yang keberadaannya

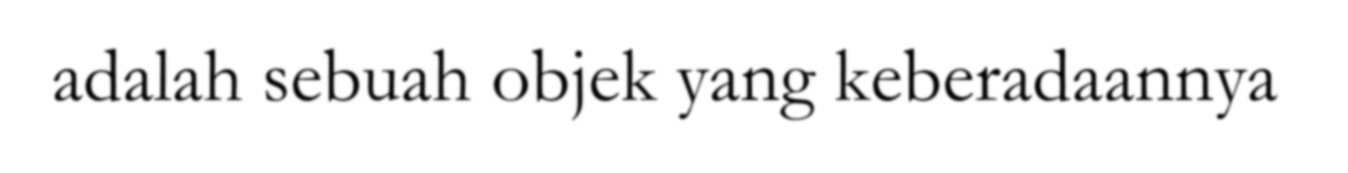
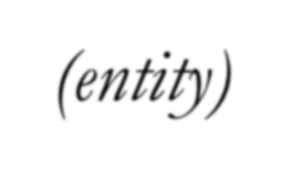
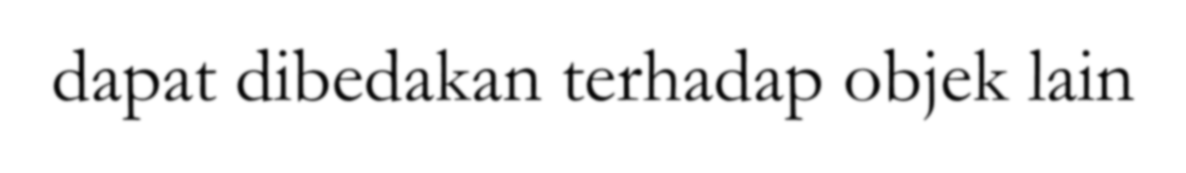
◼

dapat dibedakan terhadap objek lain



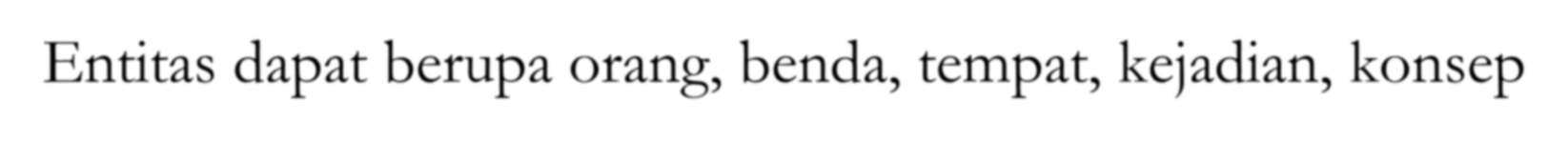
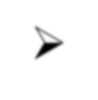
Entitas dapat berupa orang, benda, tempat, kejadian, konsep

➢



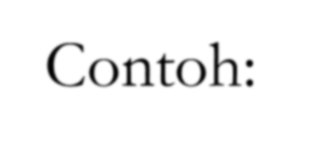
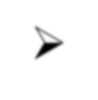
Contoh:

➢



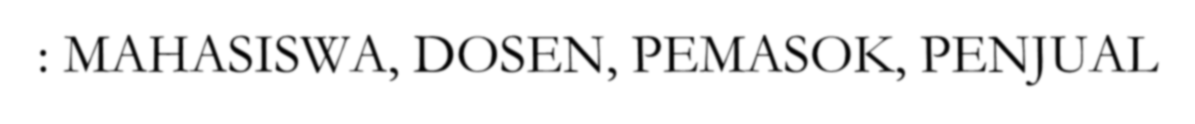
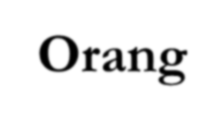
**Orang**: MAHASISWA, DOSEN, PEMASOK, PENJUAL

o



**Benda**: MOBIL, MESIN, RUANGAN

o



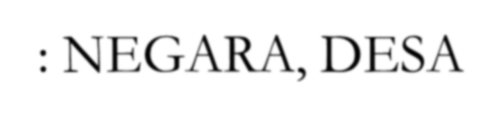
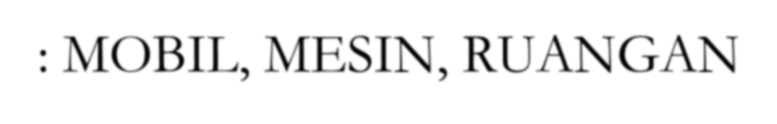
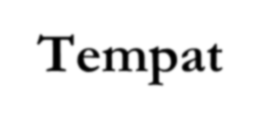
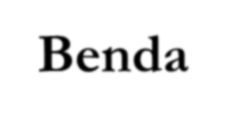
**Tempat**: NEGARA, DESA

o



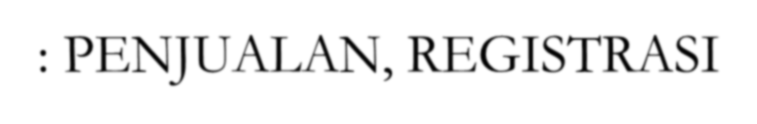
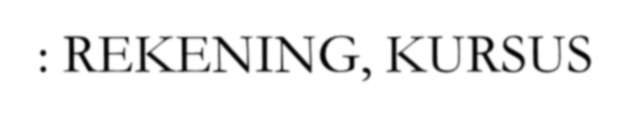
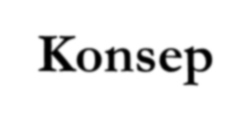
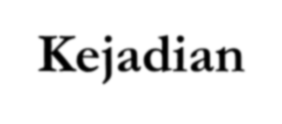
**Kejadian**: PENJUALAN, REGISTRASI

o



**Konsep**: REKENING, KURSUS

o



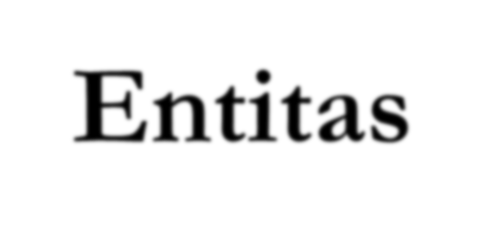
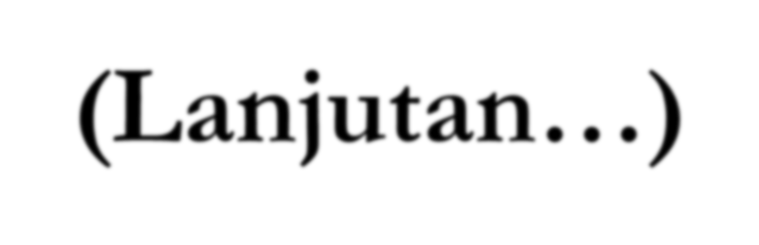
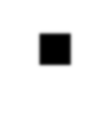
**Entitas**

**(Lanjutan…)**

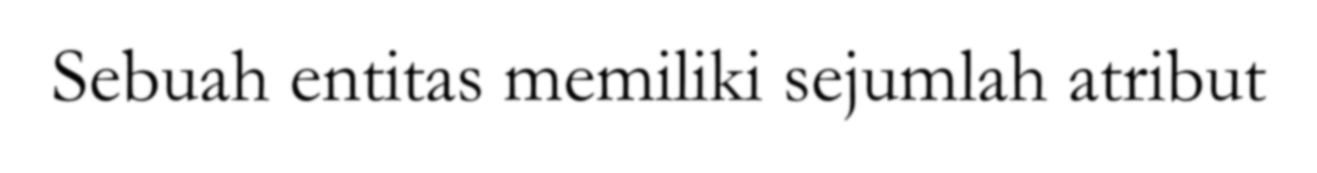
Sebuah entitas memiliki sejumlah atribut

◼

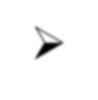
Contoh: mahasiswa memiliki *nama* dan *alamat*



➢

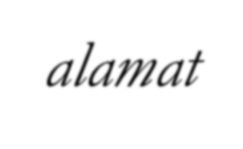
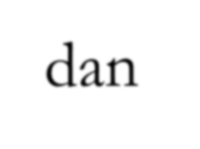
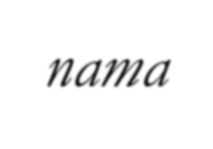
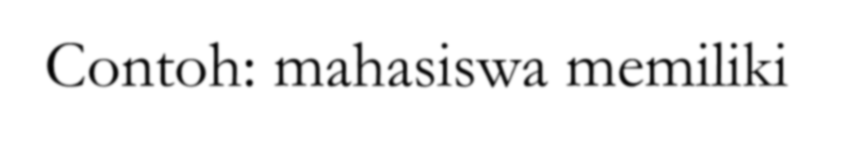
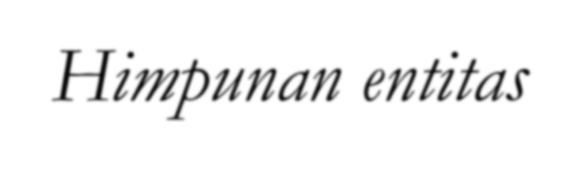
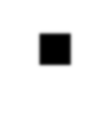


*Himpunan entitas* adalah sekumpulan entitas yang



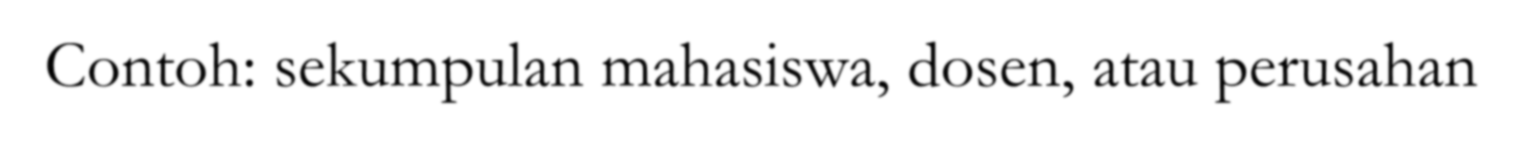
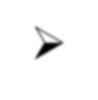
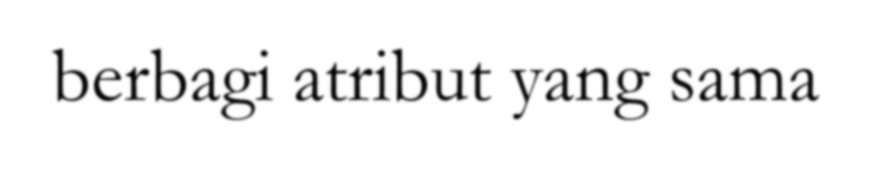
◼

berbagi atribut yang sama



Contoh: sekumpulan mahasiswa, dosen, atau perusahan

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Nomor\_Mhs

Nama\_Mhs

Alamat\_Mhs

Kota\_Mhs

02001

Dian

Jl. Kenanga 23

Yogya

02002

Fika Ariyanti

Jl. Griya Utama II/2

Sleman

02003

Komarudin

Jl. Kakaktua 12

Yogya

02004

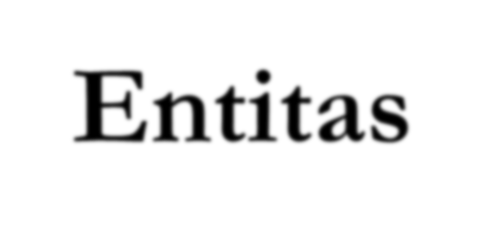
Joni Setiawan

Jl. Kemenangan 76

Bantul

**Entitas**

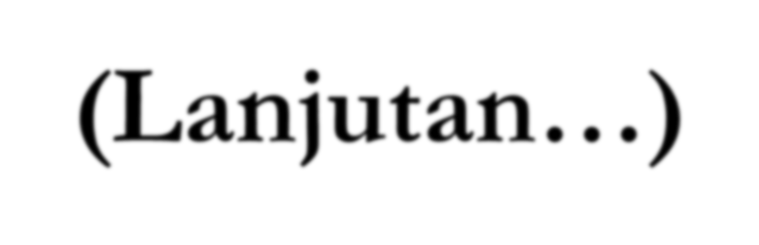
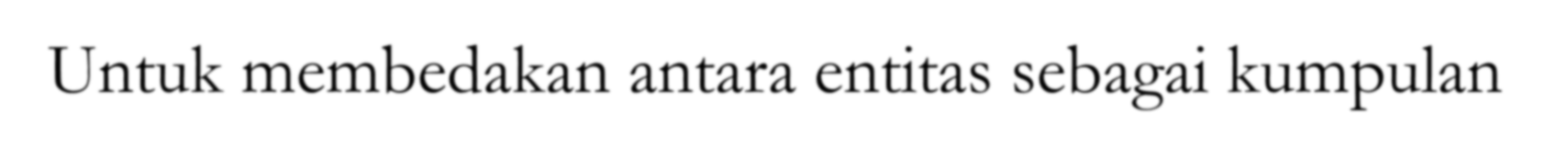
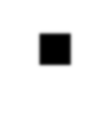
**(Lanjutan…)**



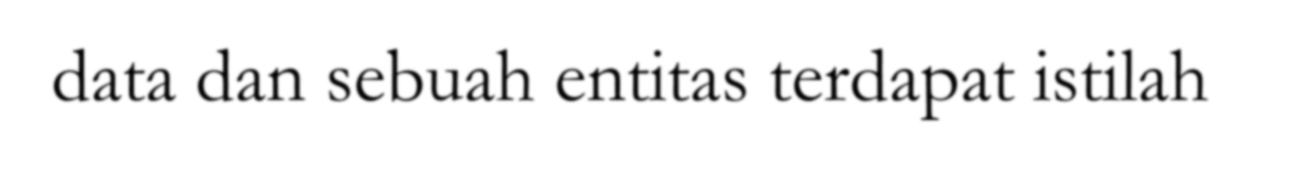
Untuk membedakan antara entitas sebagai kumpulan

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data dan sebuah entitas terdapat istilah **tipe entitas**

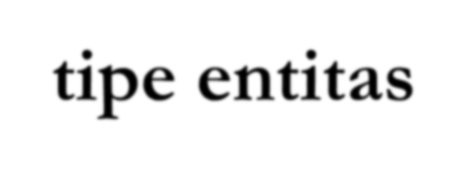
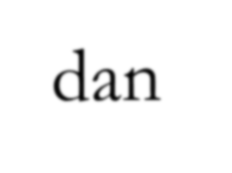


dan **instan entitas**

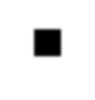


**Tipe entitas** disebut juga himpunan entitas

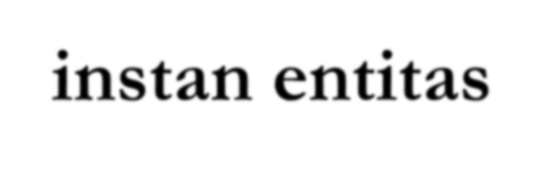
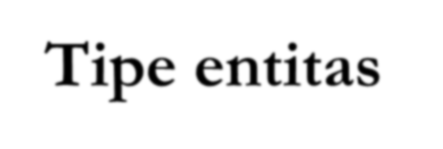
◼



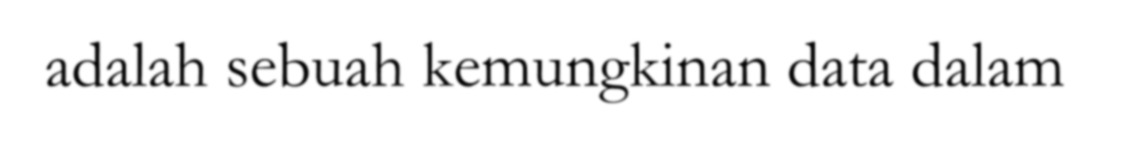
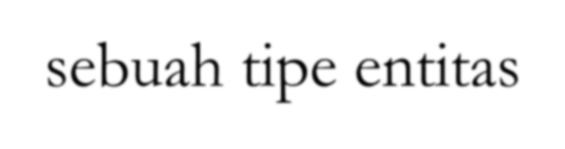
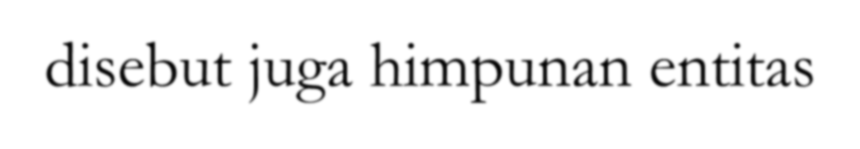
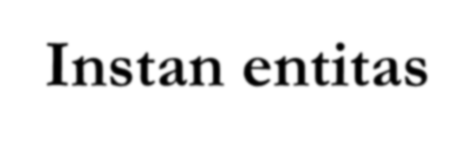
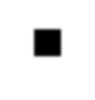
**Instan entitas** adalah sebuah kemungkinan data dalam



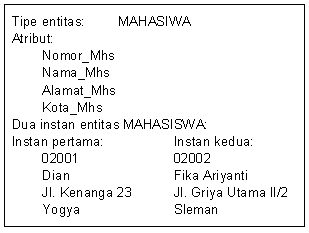
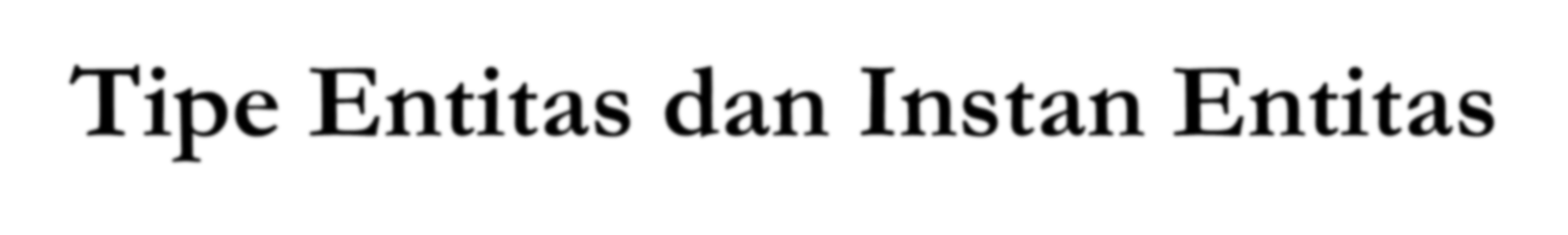
◼



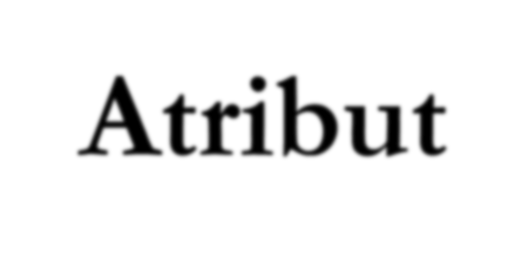
sebuah tipe entitas



**Tipe Entitas dan Instan Entitas**



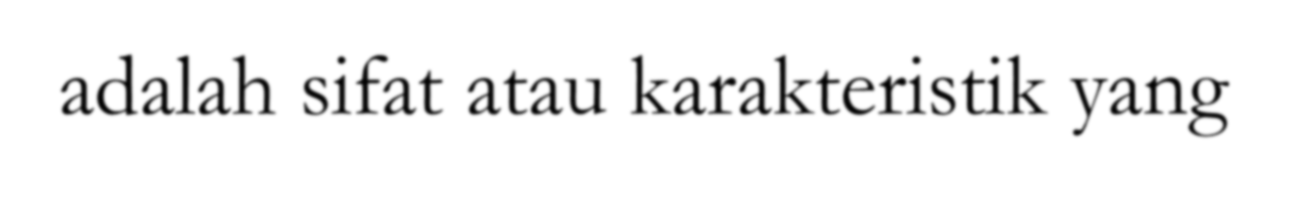
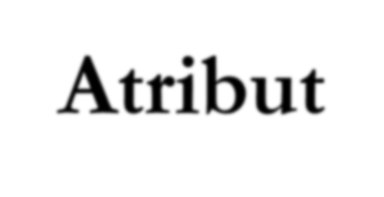
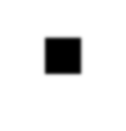
**Atribut**



**Atribut** adalah sifat atau karakteristik yang

◼

melekat dalam sebuah entitas

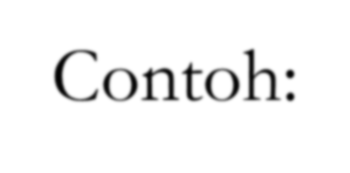
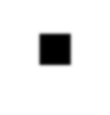


Contoh:

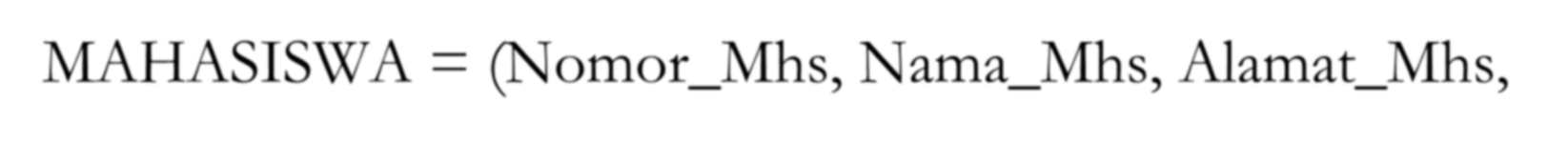
◼



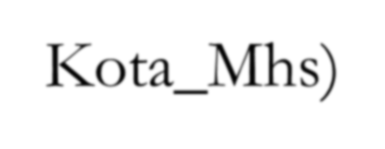
MAHASISWA = (Nomor\_Mhs, Nama\_Mhs, Alamat\_Mhs,



Kota\_Mhs)



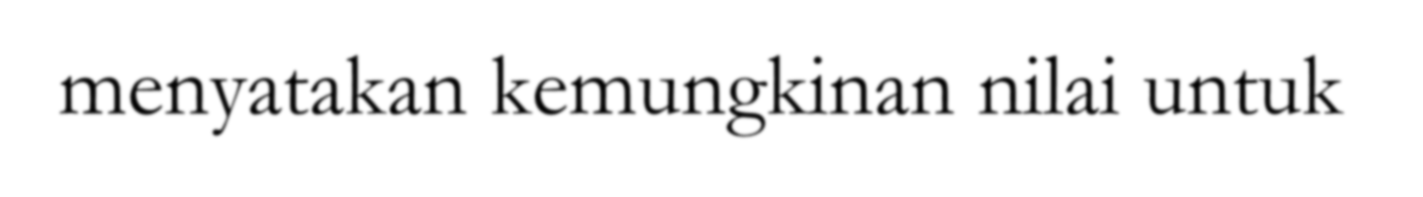
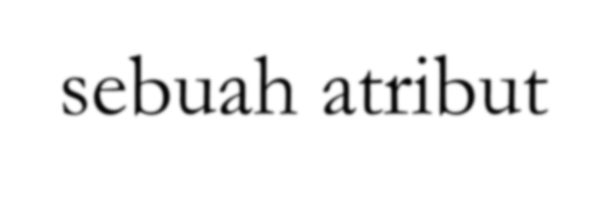
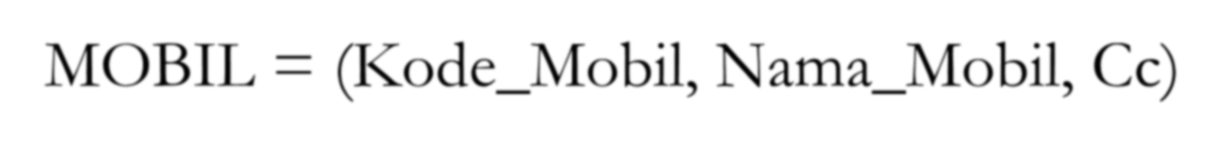
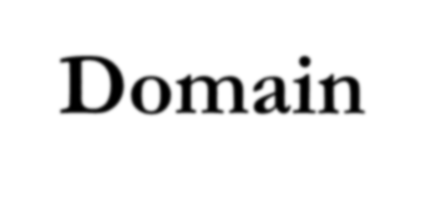
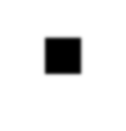
MOBIL = (Kode\_Mobil, Nama\_Mobil, Cc)



**Domain** menyatakan kemungkinan nilai untuk

◼

sebuah atribut



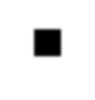
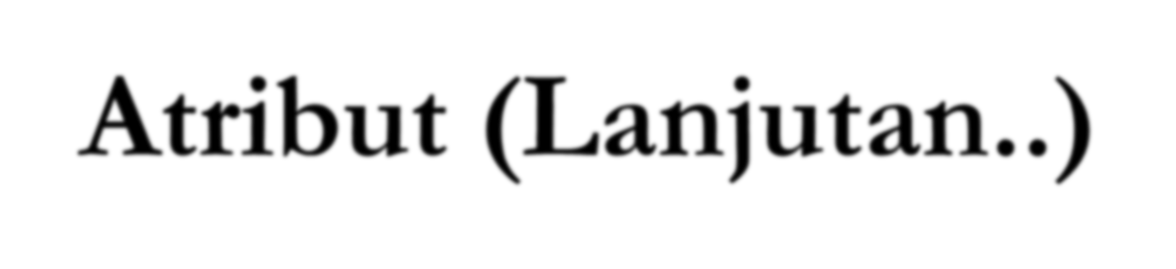
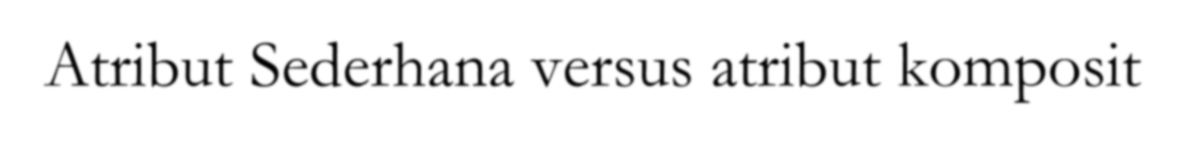
**Atribut (Lanjutan..)**

Atribut Sederhana versus atribut komposit

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Atribut sederhana tidak bisa dipecah menjadi bagian yang lebih kecil lagi

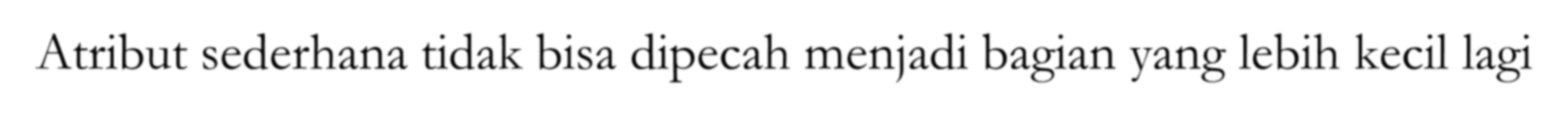
◼



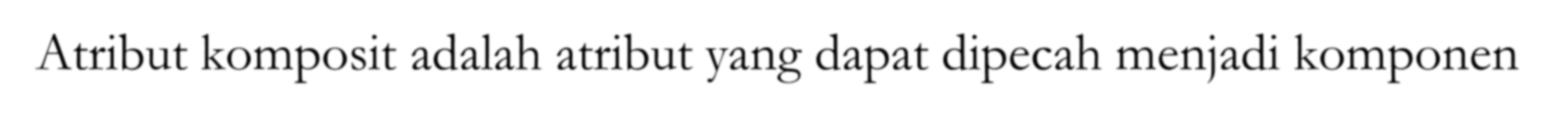
Atribut komposit adalah atribut yang dapat dipecah menjadi komponen



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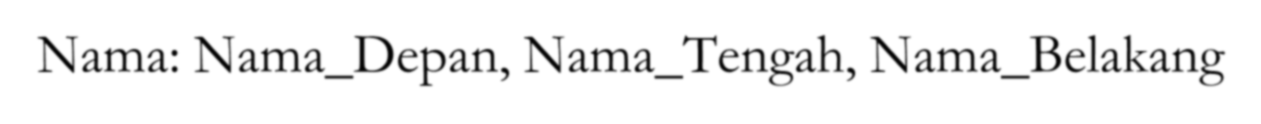


yang lain

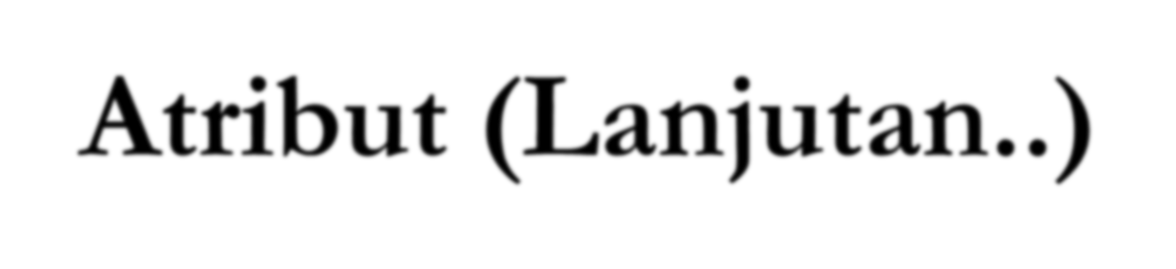


Alamat: Alamat\_Jalan, Kota, Kode\_Pos

Nama: Nama\_Depan, Nama\_Tengah, Nama\_Belakang



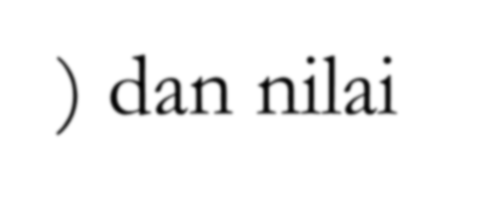
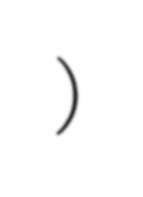
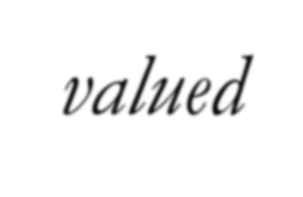
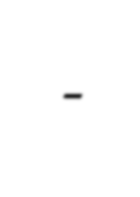
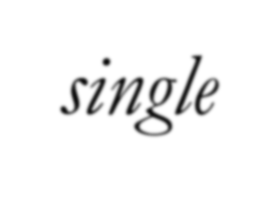
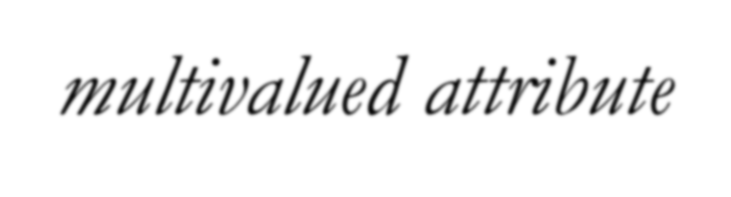
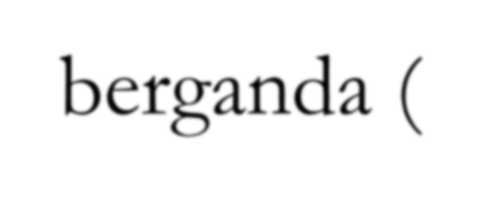
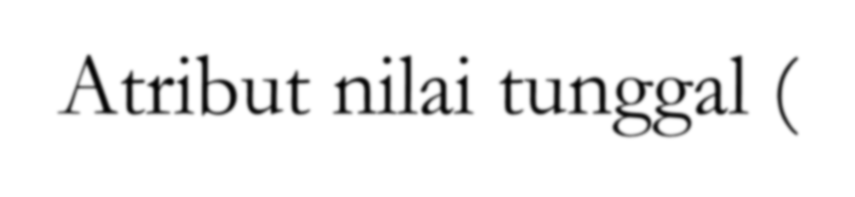
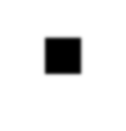
**Atribut (Lanjutan..)**



Atribut nilai tunggal (*single-valued*) dan nilai

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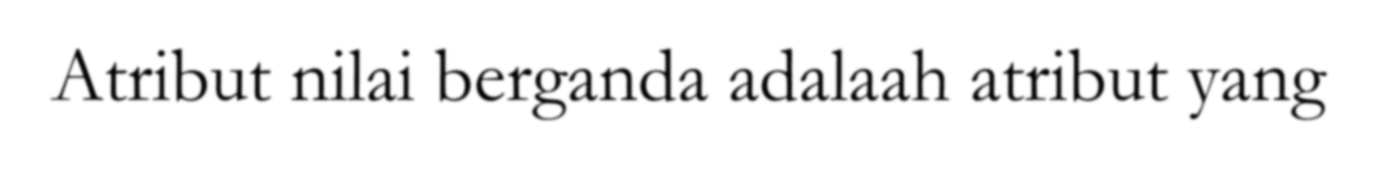
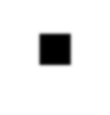
berganda (*multivalued attribute*)



Atribut nilai berganda adalaah atribut yang

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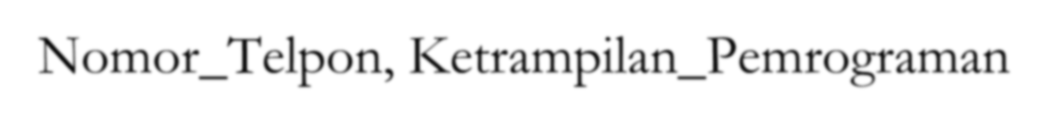
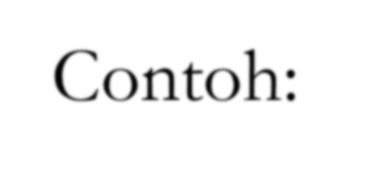
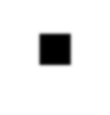
berkemungkinan memiliki nilai lebih dari satu



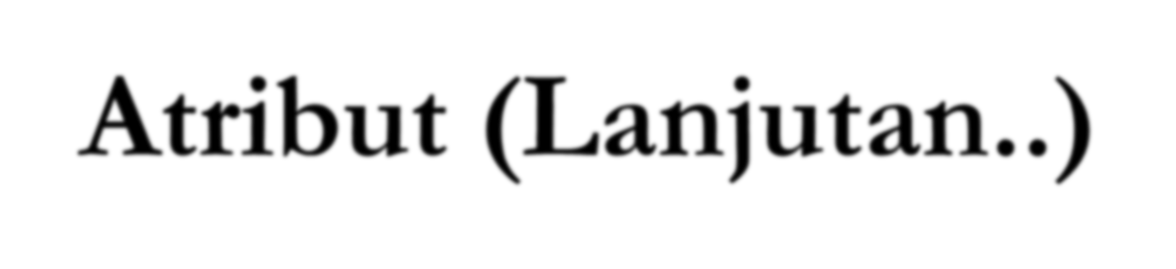
Contoh:

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Nomor\_Telpon, Ketrampilan\_Pemrograman



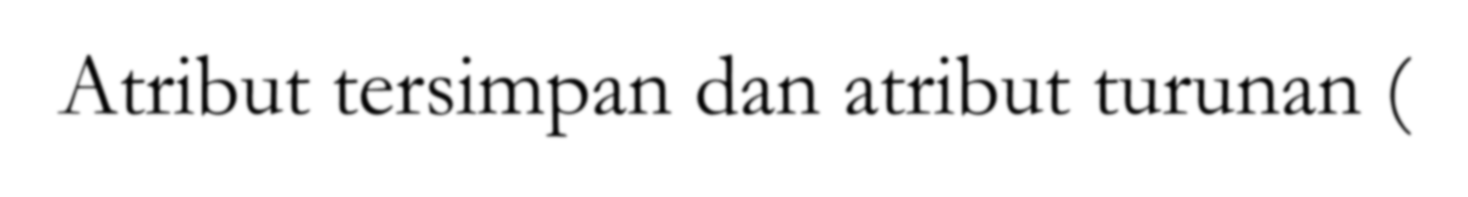
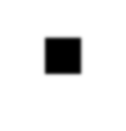
**Atribut (Lanjutan..)**



Atribut tersimpan dan atribut turunan (*derived*

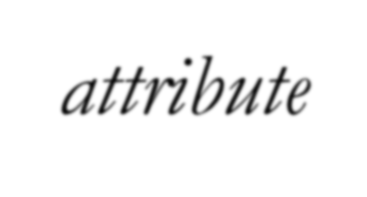
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*attribute*)

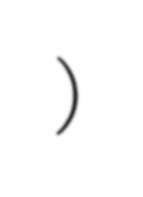
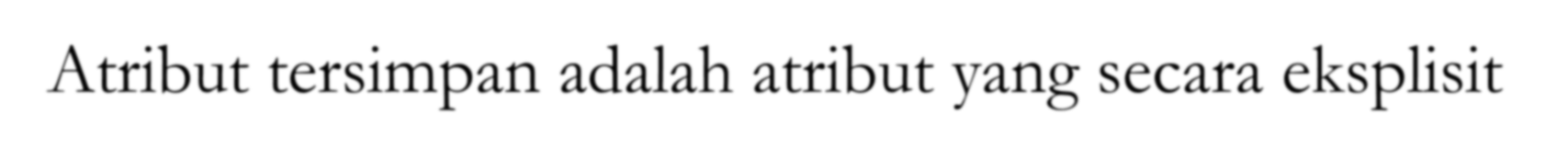
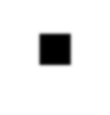


Atribut tersimpan adalah atribut yang secara eksplisit

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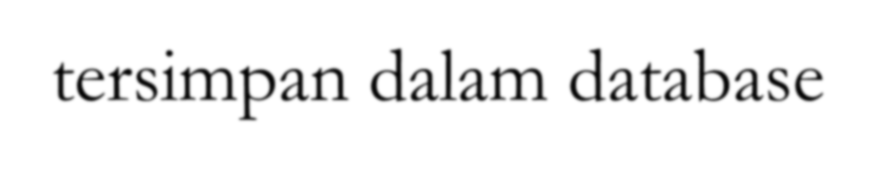


tersimpan dalam database

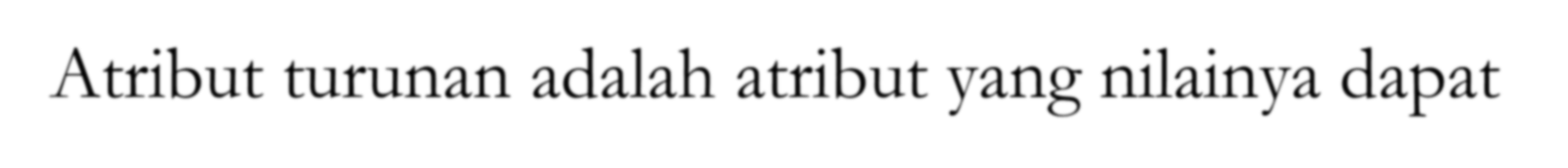
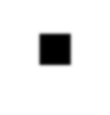


Atribut turunan adalah atribut yang nilainya dapat

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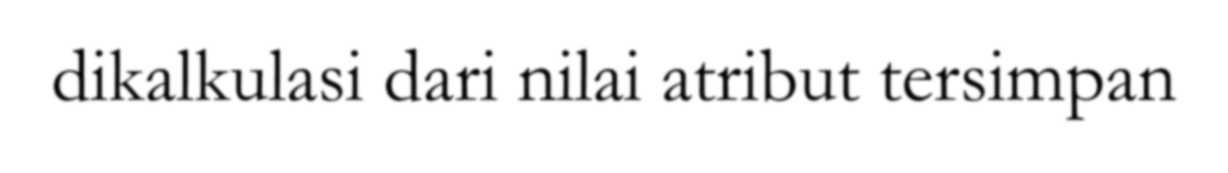


dikalkulasi dari nilai atribut tersimpan



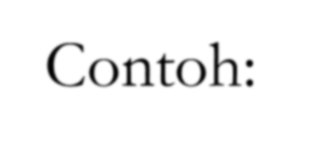
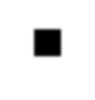
Contoh:

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Lama\_Bekerja dapat dihitung dari Tgl\_Mulai\_Bekerja

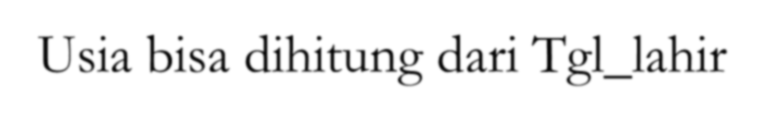
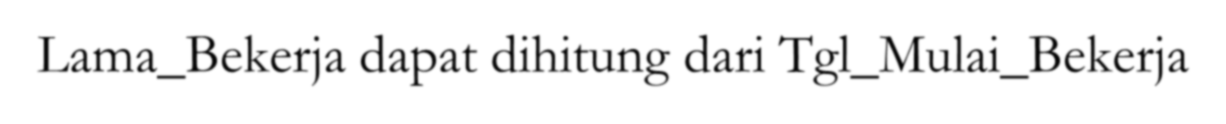
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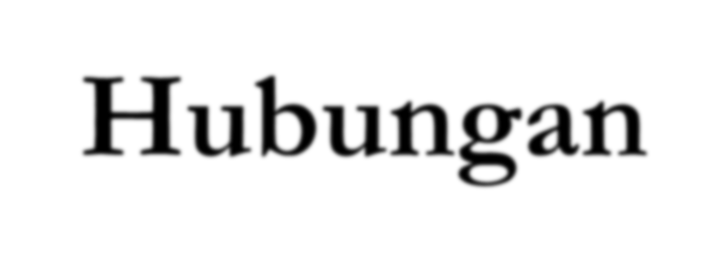
Usia bisa dihitung dari Tgl\_lahir



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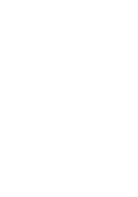
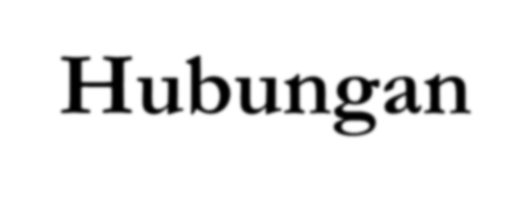
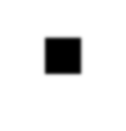
**Hubungan**



**Hubungan** (*relationship*) adalah pengait antara

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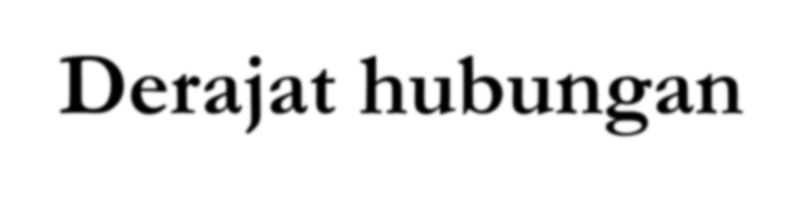
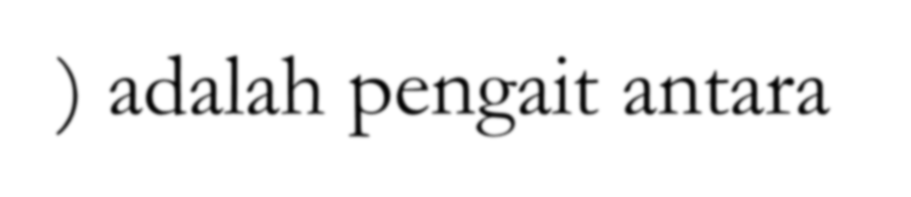
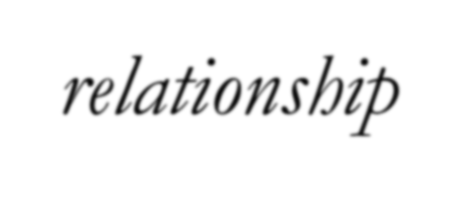
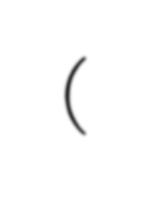
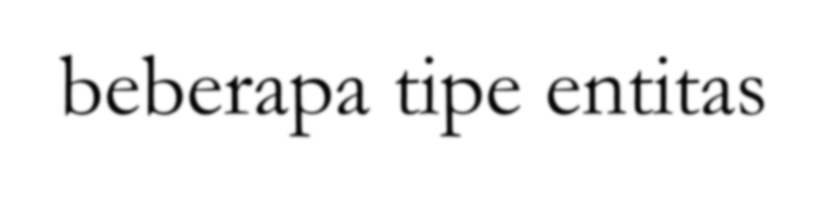
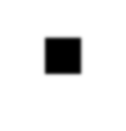
beberapa tipe entitas



**Derajat hubungan** menyatakan jumlah tipe

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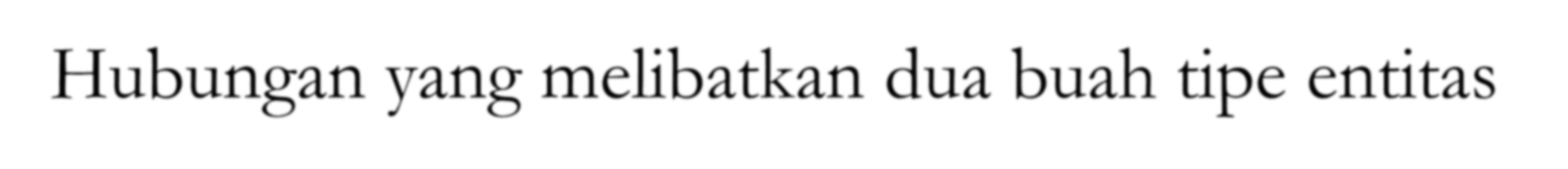
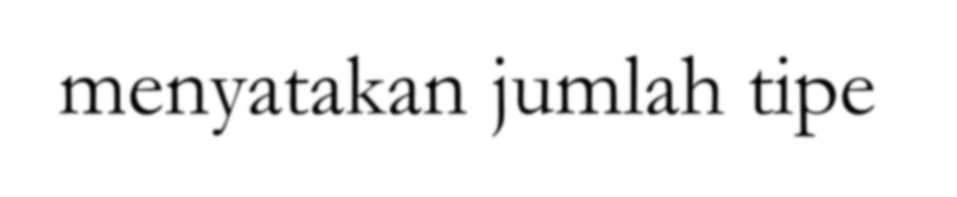
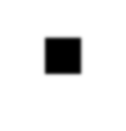
entitas yang terkait dalam sebuah hubungan



Hubungan yang melibatkan dua buah tipe entitas

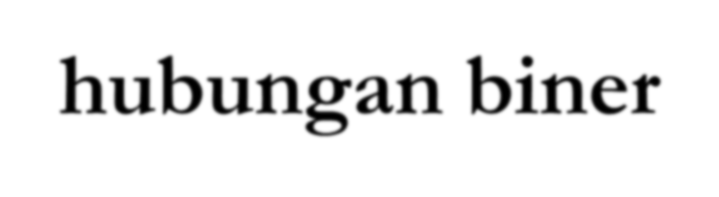
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dinamakan **hubungan biner**

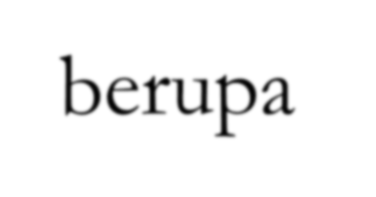
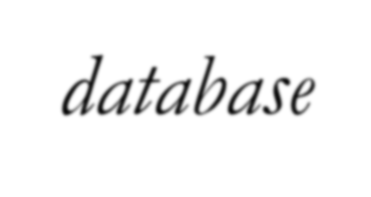
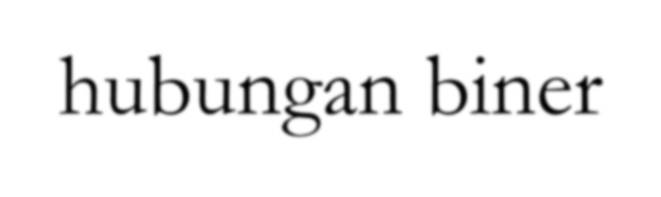
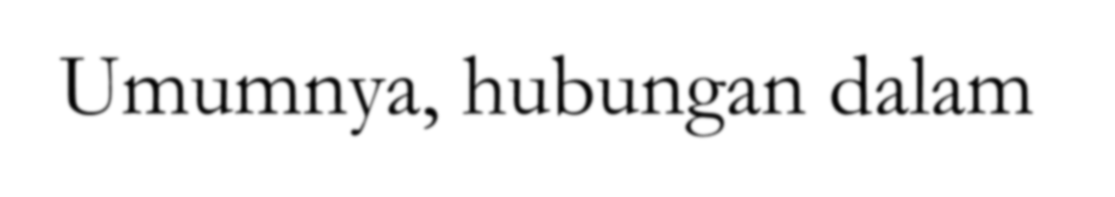
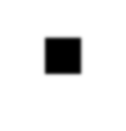


Umumnya, hubungan dalam *database* berupa

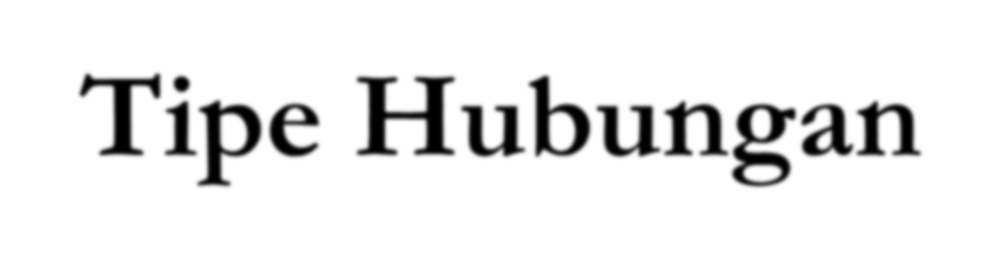
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hubungan biner



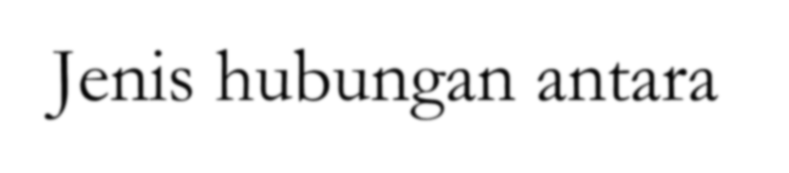
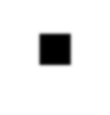
**Tipe Hubungan**



Jenis hubungan antara

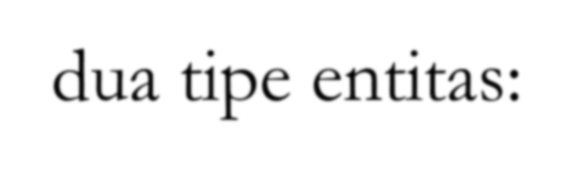
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dua tipe entitas:

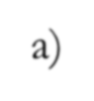


One to One

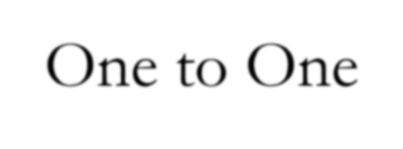
a)



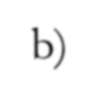
One to Many



b)

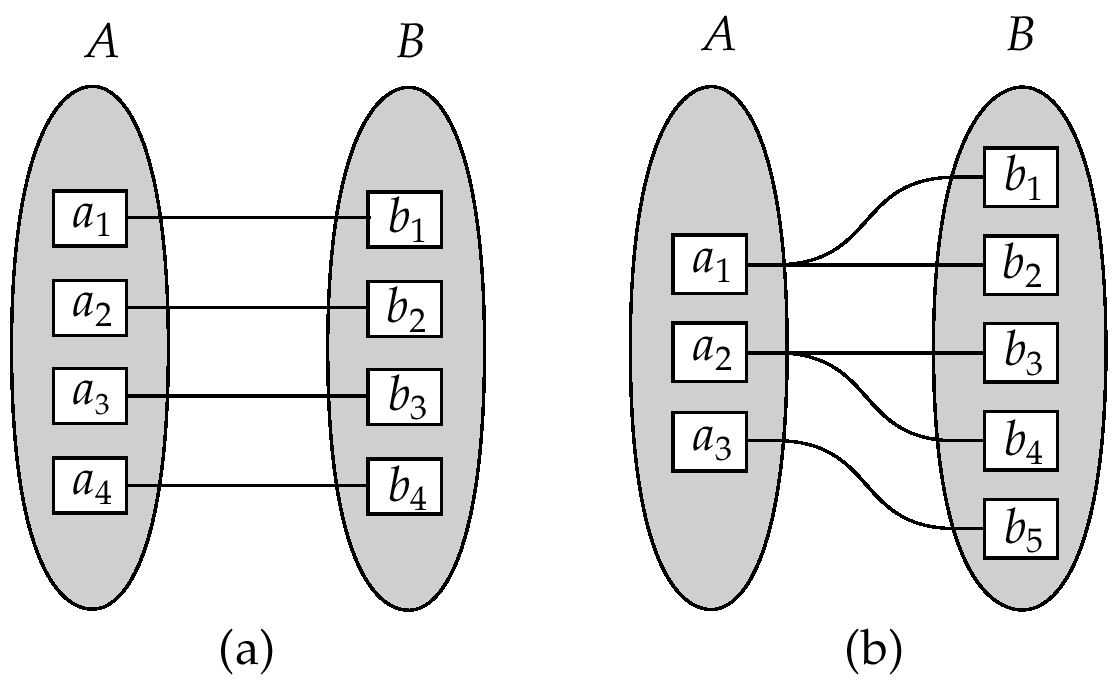
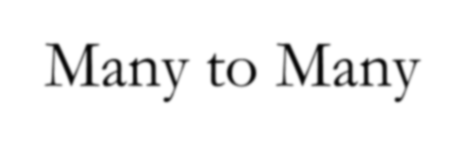
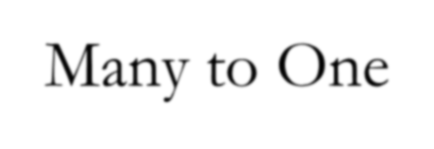
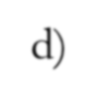
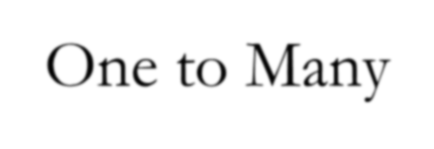
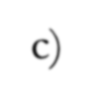


Many to One

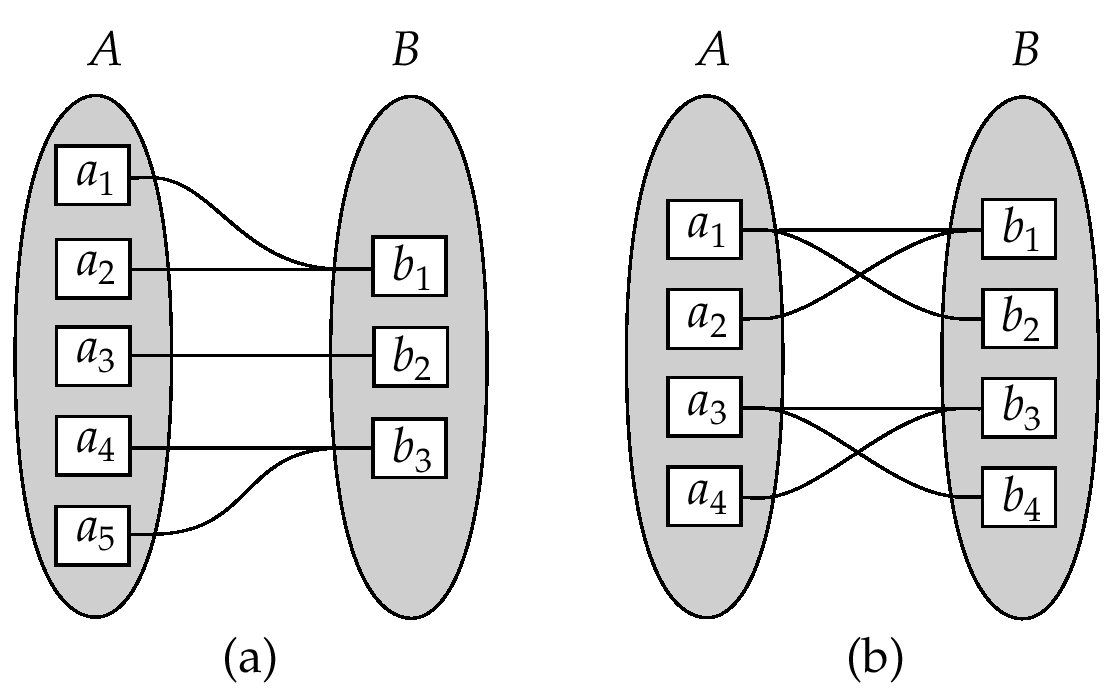


c)

Many to Many



d)



(d)

(c)

**Diagram E-R**

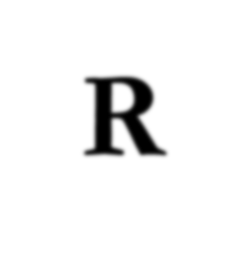
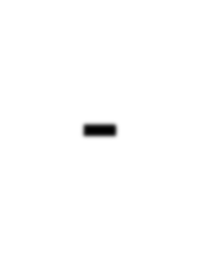
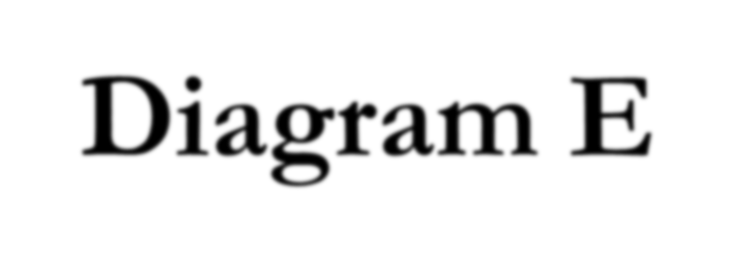
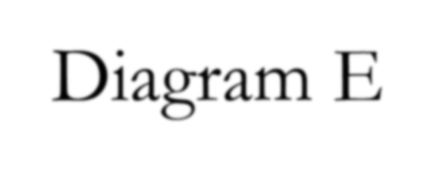
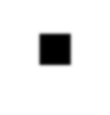


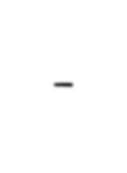
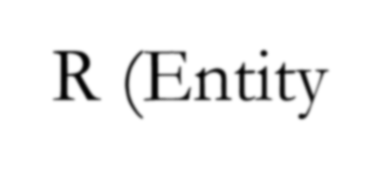
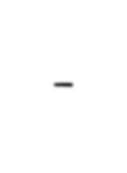
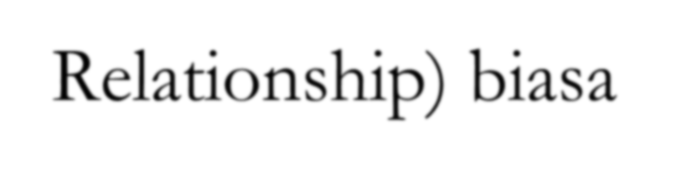
Diagram E-R (Entity-

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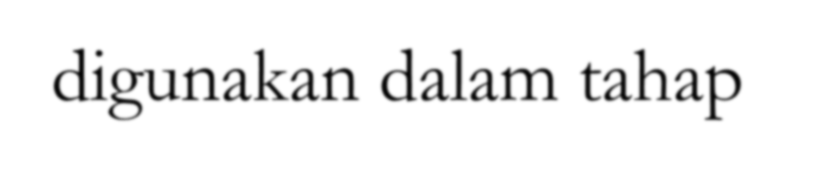
Relationship) biasa



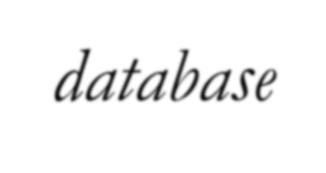
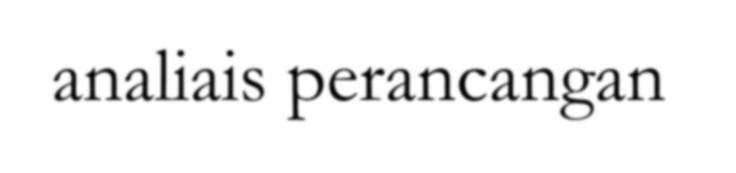
digunakan dalam tahap



analiais perancangan



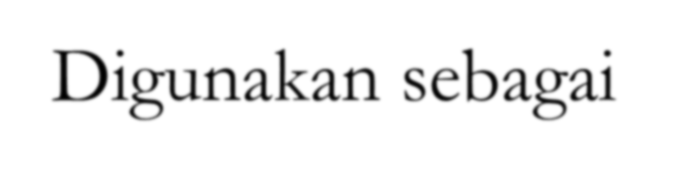
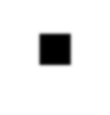
*database*



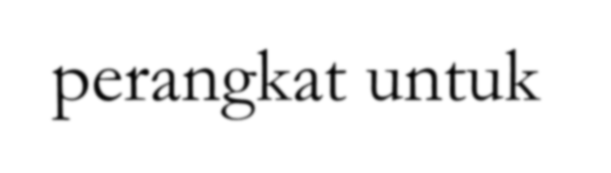
Digunakan sebagai

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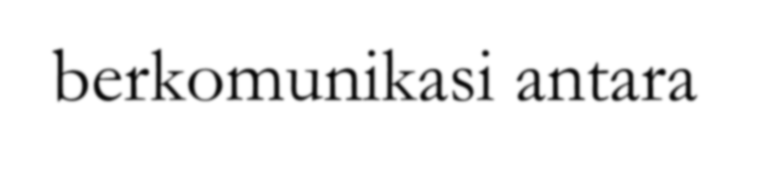
perangkat untuk



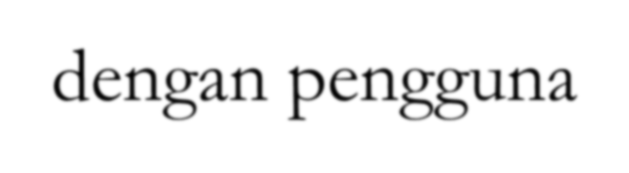
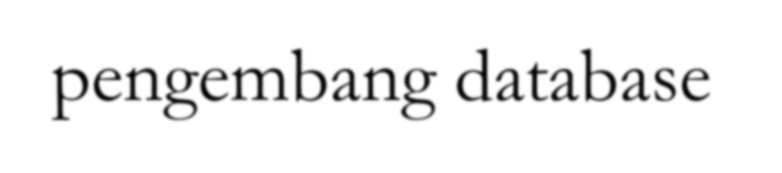
berkomunikasi antara



pengembang database



dengan pengguna



**Diagram E-R**

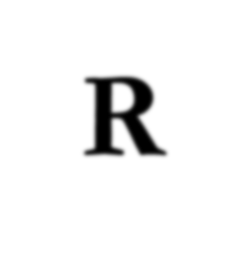
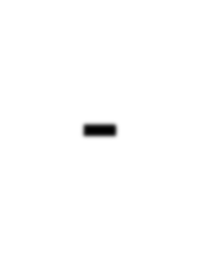
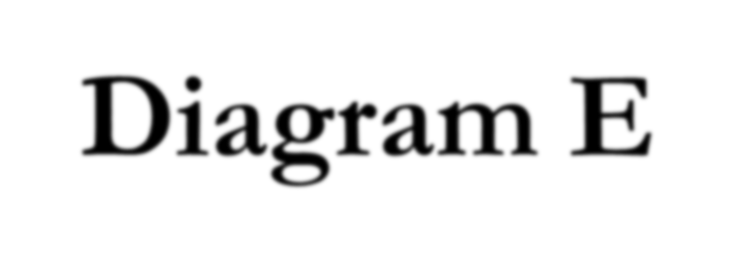
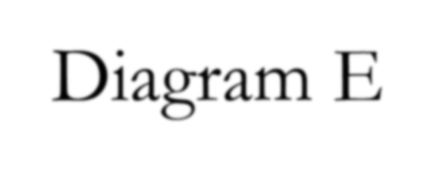
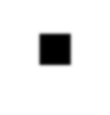


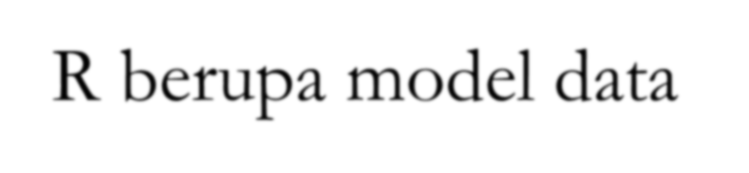
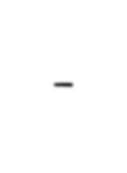
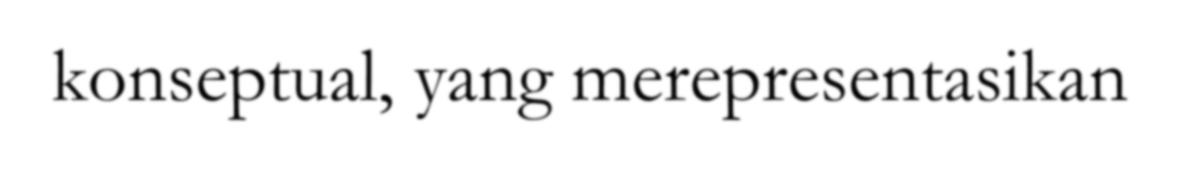
Diagram E-R berupa model data

◼

konseptual, yang merepresentasikan



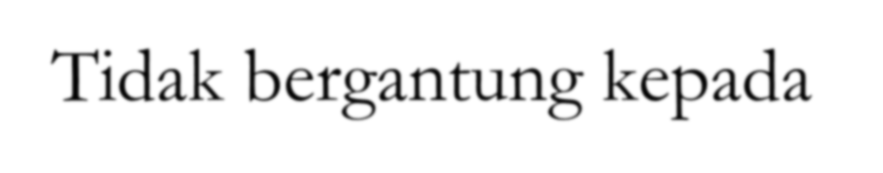
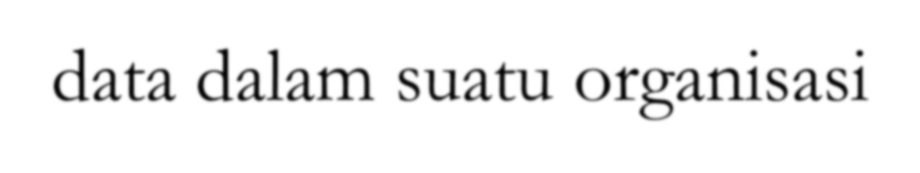
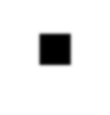
data dalam suatu organisasi



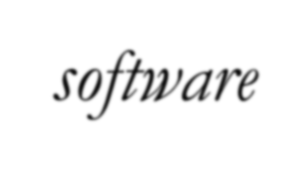
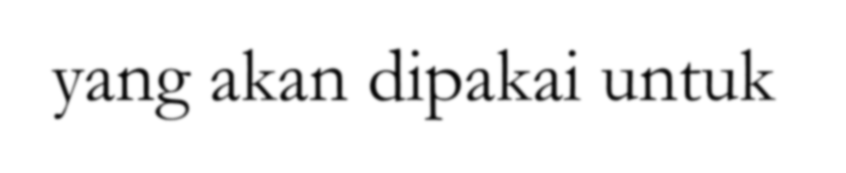
Tidak bergantung kepada *software*

◼

yang akan dipakai untuk



mengimplementasikan *database*



Sejauh ini banyak sekali model

◼

notasi yang dipakai untuk membuat

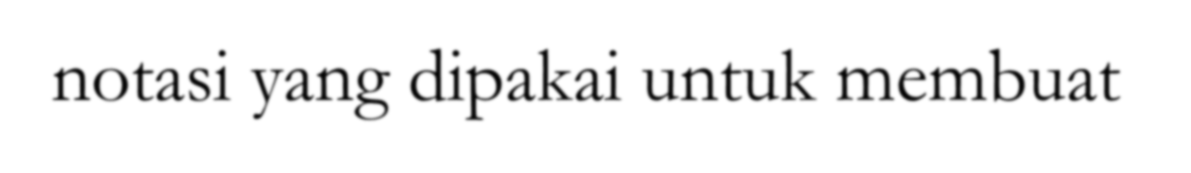
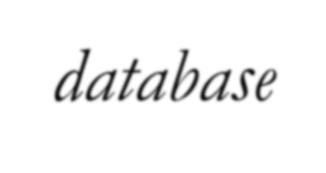
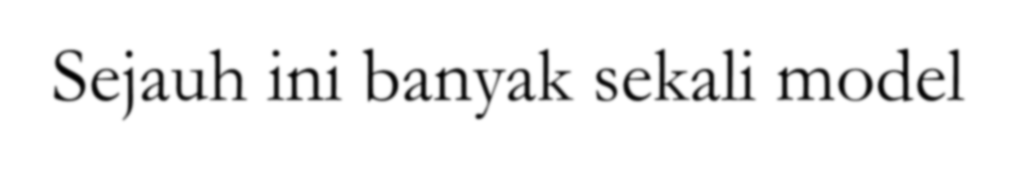
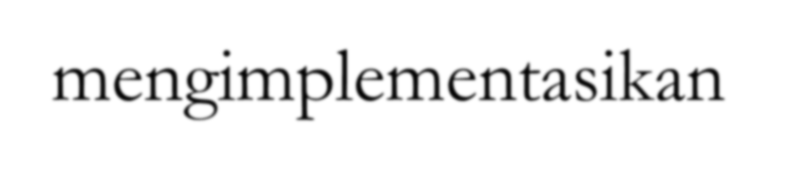
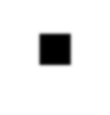
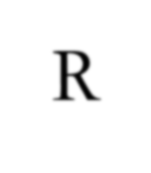
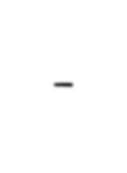
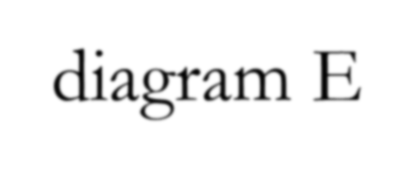
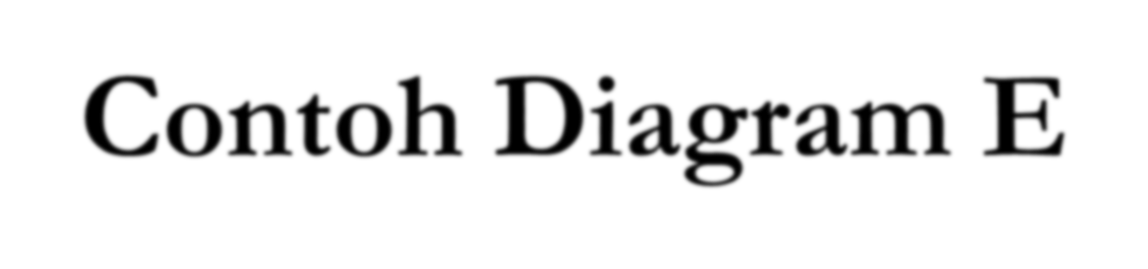


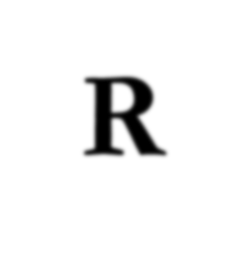
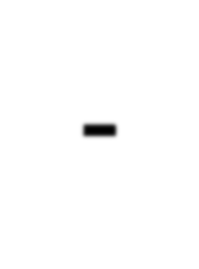
diagram E-R



**Contoh Diagram E-R**



PELANGGAN



PEMASOK

Mengirim

Mengirim

Memasok

PESANAN

Memasok

KIRIMAN

BARANG

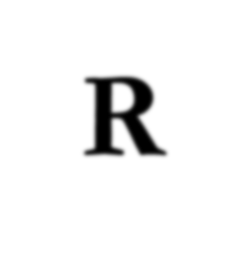
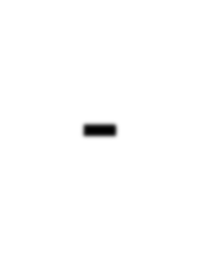
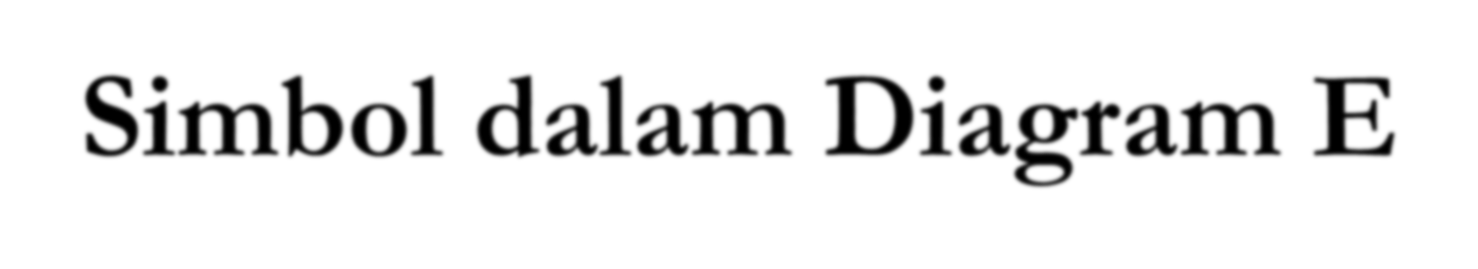
Berisi

Digunakan\_

PRODUK

pada

**Simbol dalam Diagram E-R**



**Kardinalitas:**

ENTITAS

Selalu hanya satu

Hubungan

Satu atau banyak

Nol atau satu

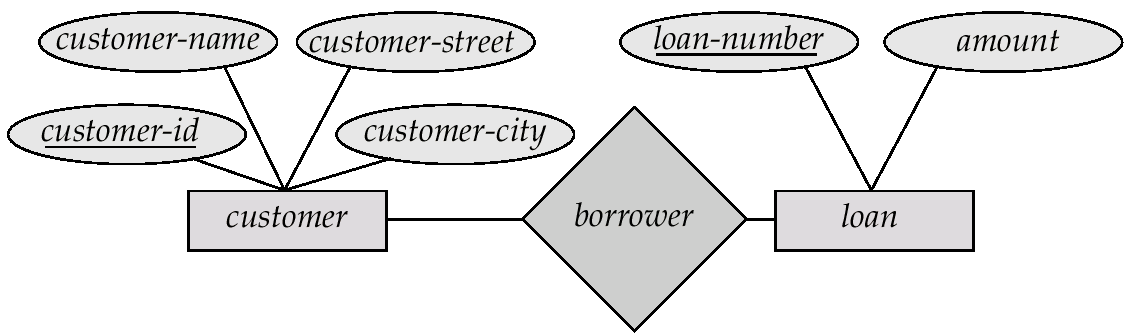
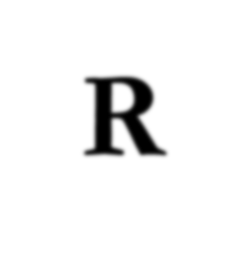
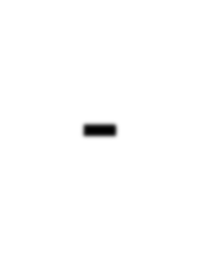
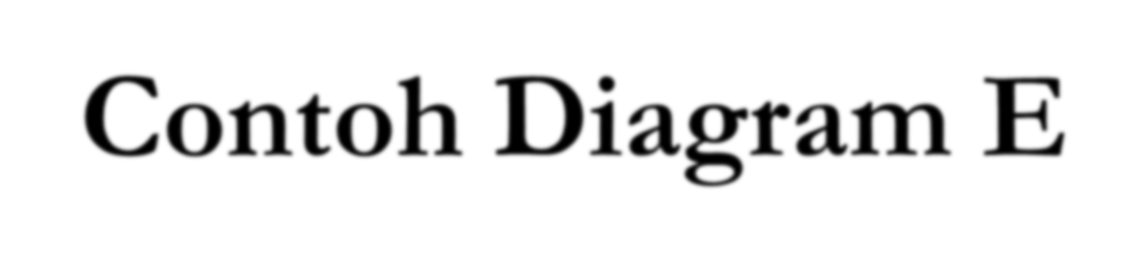
Atribut

Nol, satu, atau banyak

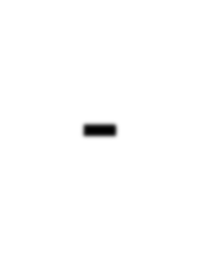
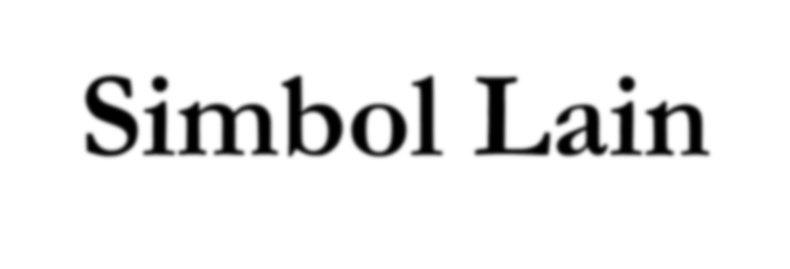
Garis bawah: Kunci atau

pengenal (*identifier*)

**Contoh Diagram E-R**



**Simbol Lain-Lain**



Entitas kuat

Entitas asosiatif

Entitas lemah

Atribut

Hubungan

Atribut nilai berganda

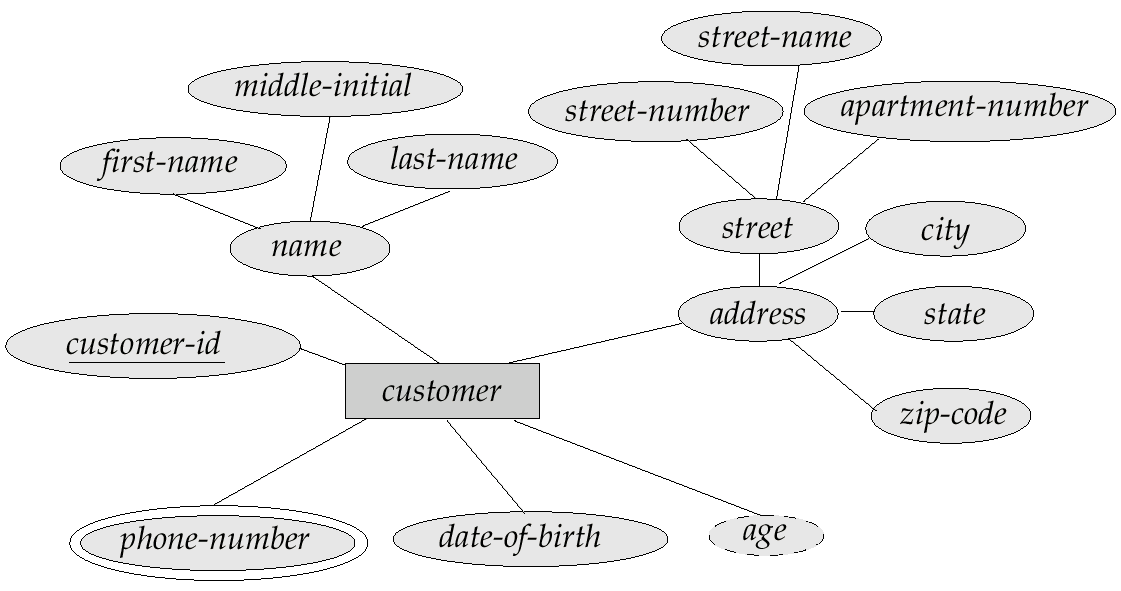
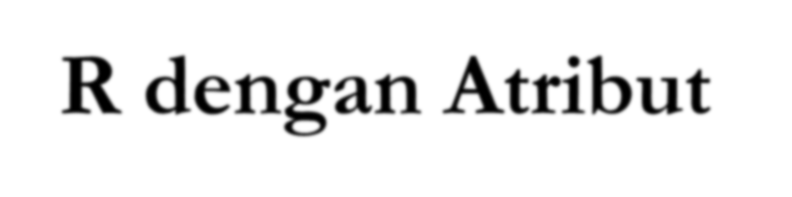
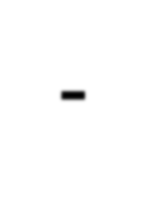
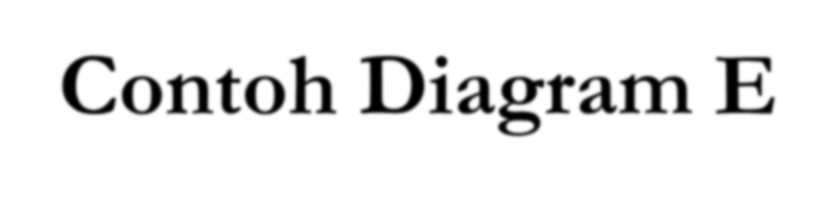
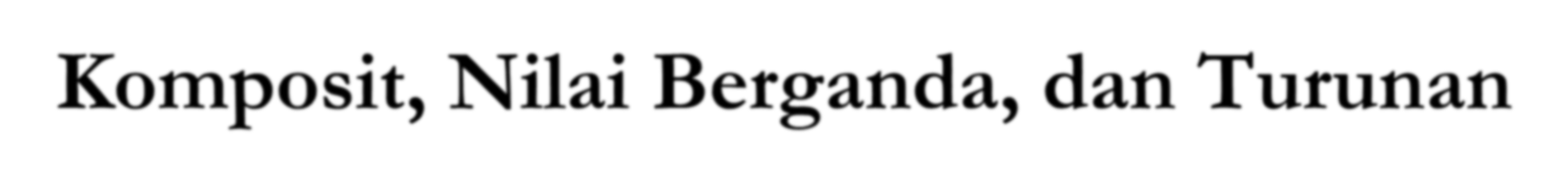
Hubungan

Atribut turunan

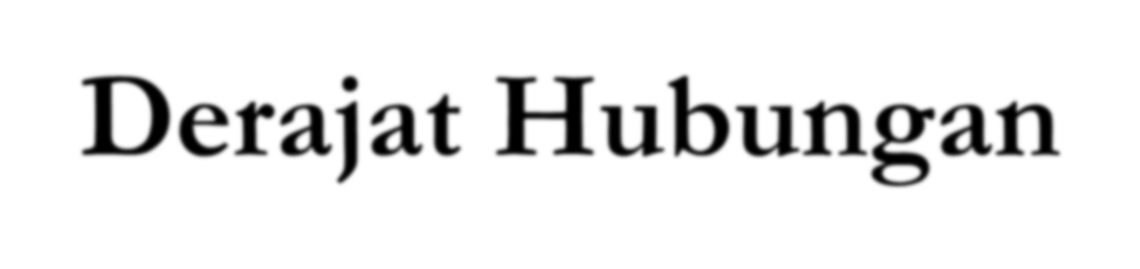
pengidentifikasi

**Contoh Diagram E-R dengan Atribut**

**Komposit, Nilai Berganda, dan Turunan**



**Derajat Hubungan**

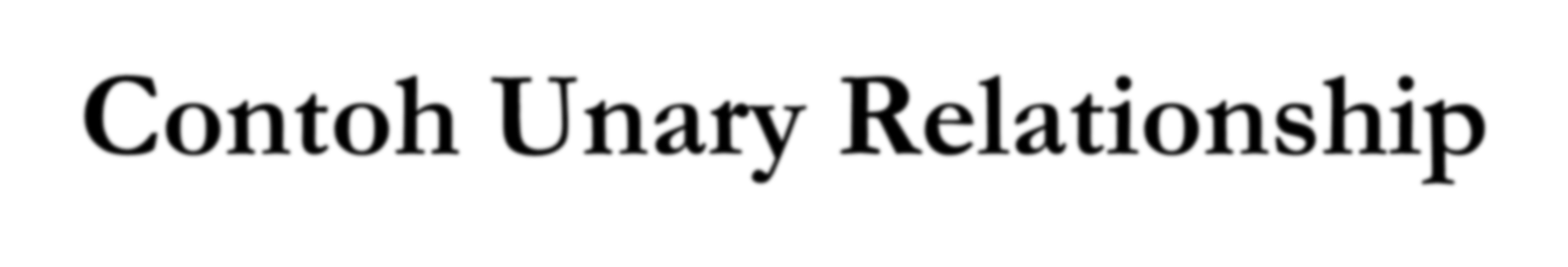


Unary

Binary

Ternary

**Contoh Unary Relationship**



ORANG

PEGAWAI

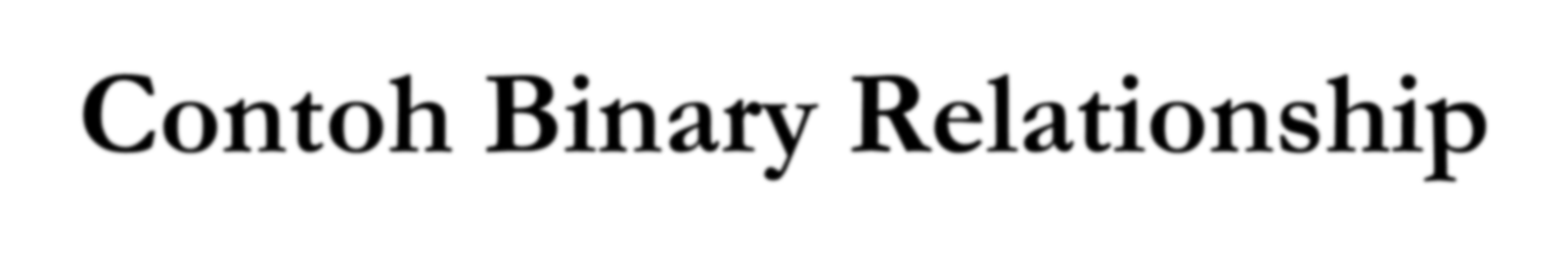
Menikah\_dengan

Membawahi

SUKU\_CADANG

Tersusun\_atas

**Contoh Binary Relationship**



ORANG

TEMPAT PARKIR

Diberi\_jatah

PEGAWAI

DEPARTEMEN

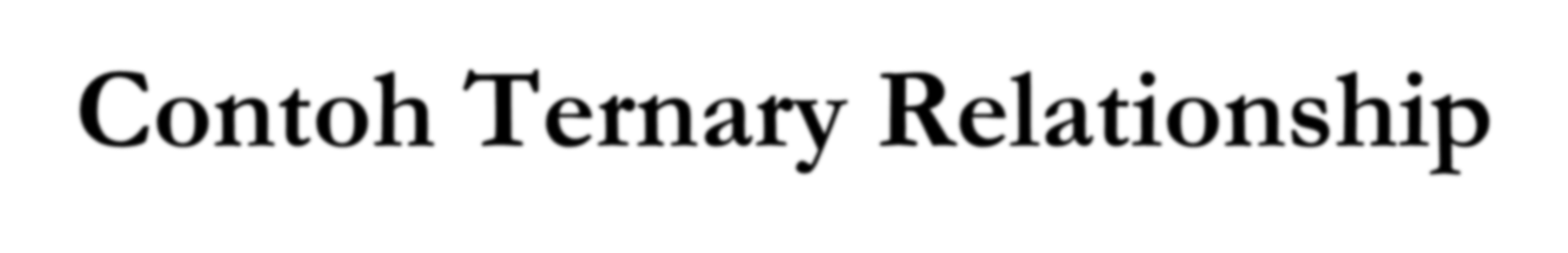
Bekerja\_pada

MAHASISWA

Mengambil

MATA KULIAH

**Contoh Ternary Relationship**



PEMASOK

GUDANG

Memasok

BARANG

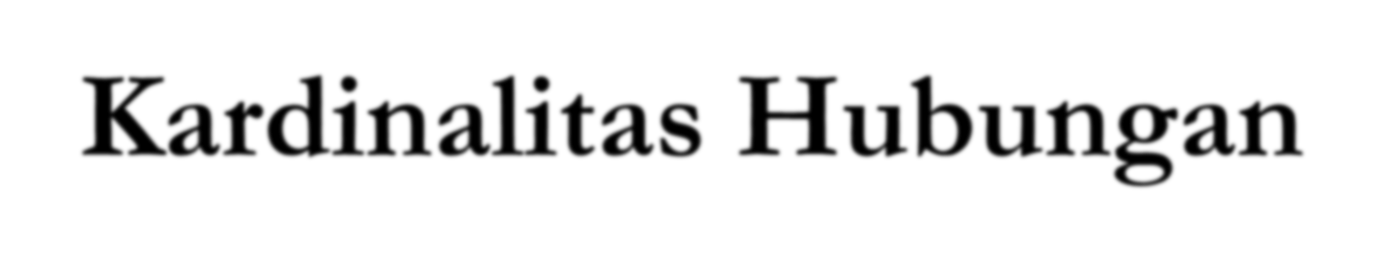
❑

Sebuah Pemasok memasok sejumlah barang pada beberapa gudang

❑

Sebuah barang bisa dipasok oleh beberapa Pemasok

**Kardinalitas Hubungan**



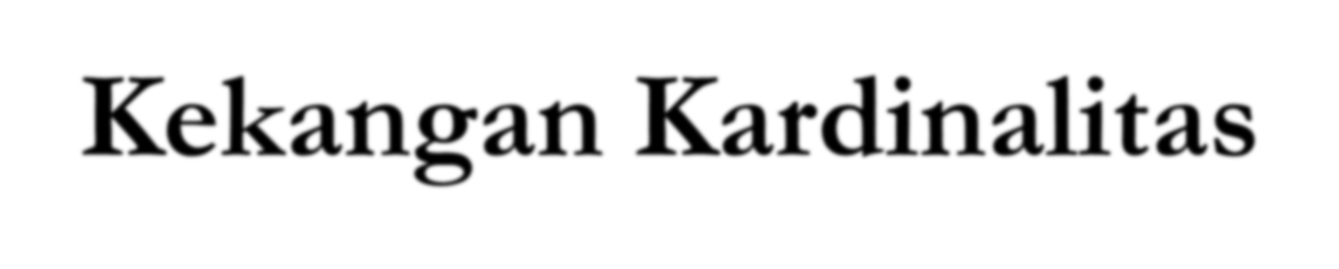
Selalu hanya satu

Satu atau banyak

Nol atau satu

Nol, satu, atau banyak

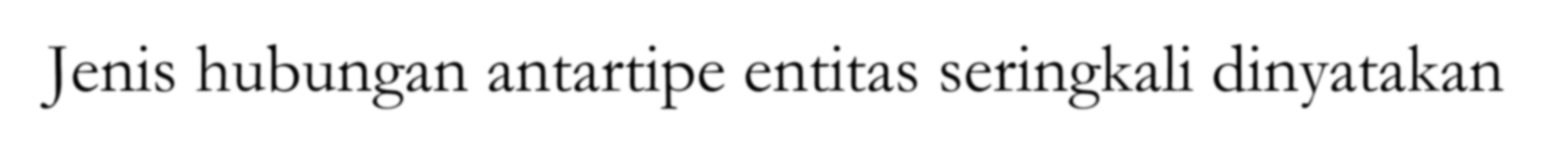
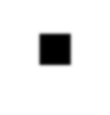
**Kekangan Kardinalitas**



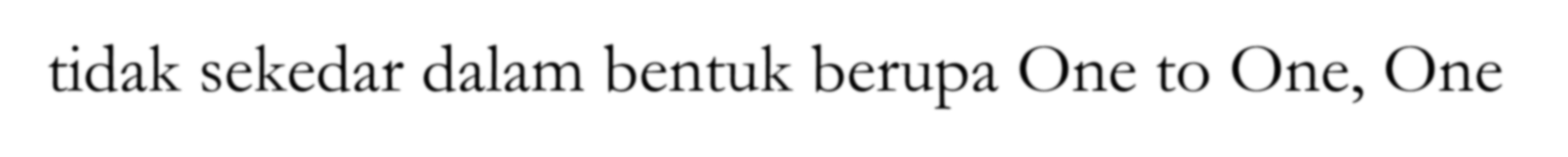
Jenis hubungan antartipe entitas seringkali dinyatakan

◼

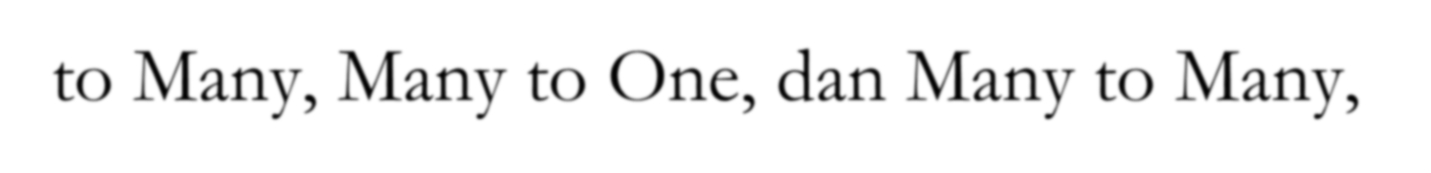
tidak sekedar dalam bentuk berupa One to One, One



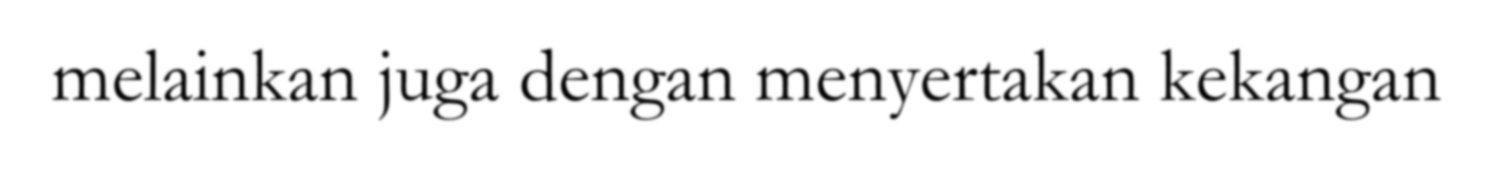
to Many, Many to One, dan Many to Many,



melainkan juga dengan menyertakan kekangan



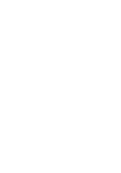
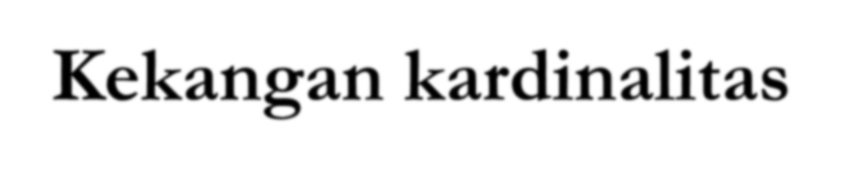
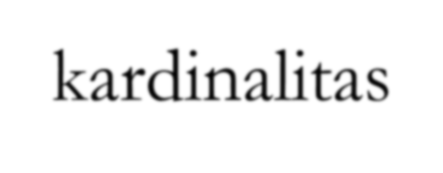
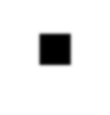
kardinalitas



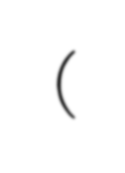
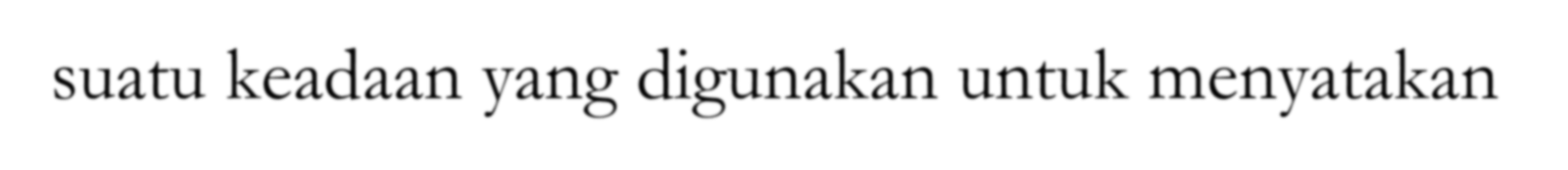
**Kekangan kardinalitas** (*cardinality constraint*) adalah

◼

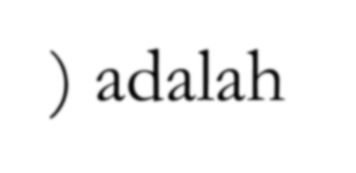
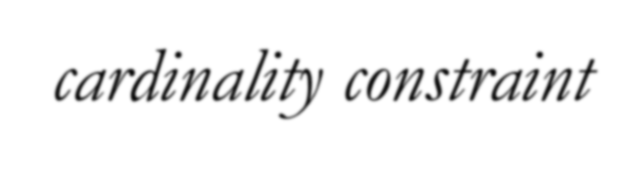
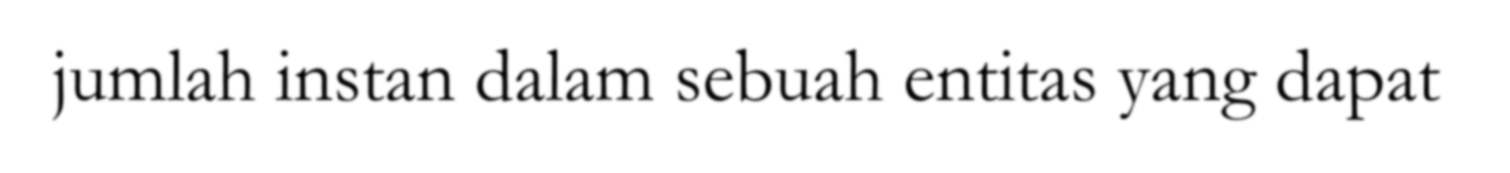
suatu keadaan yang digunakan untuk menyatakan



jumlah instan dalam sebuah entitas yang dapat



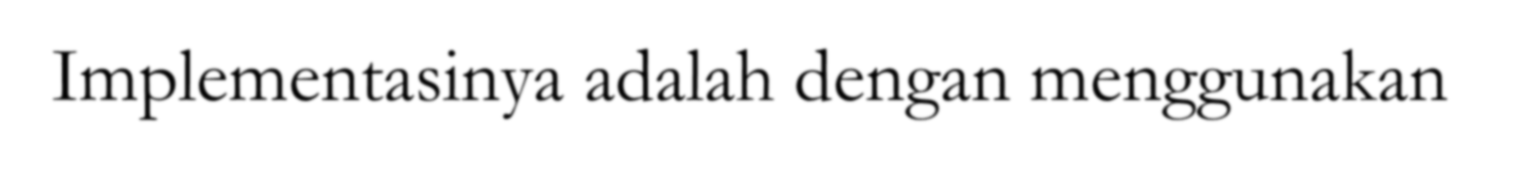
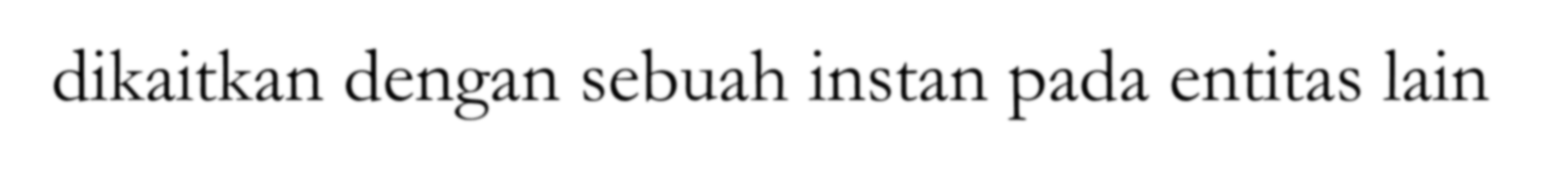
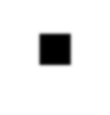
dikaitkan dengan sebuah instan pada entitas lain



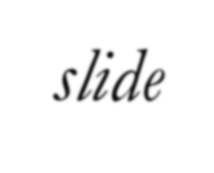
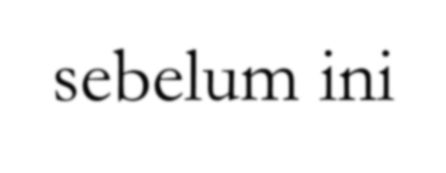
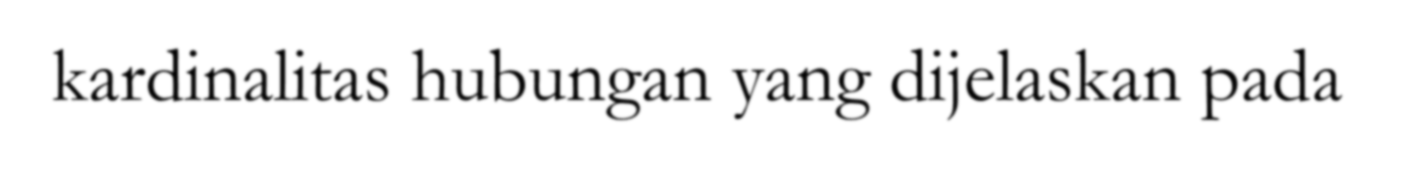
Implementasinya adalah dengan menggunakan

◼

kardinalitas hubungan yang dijelaskan pada *slide*

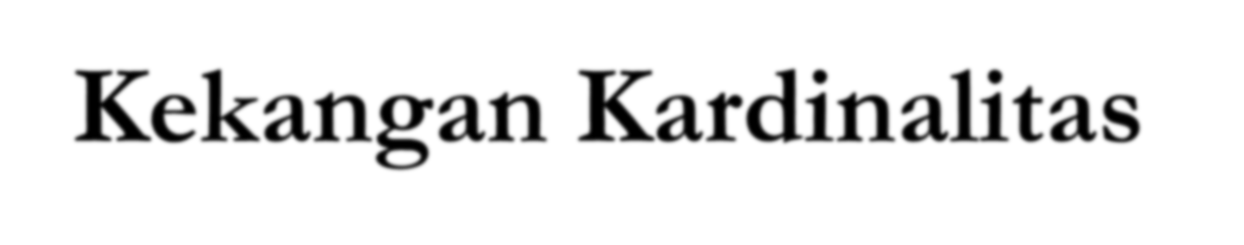


sebelum ini



**Kekangan Kardinalitas**

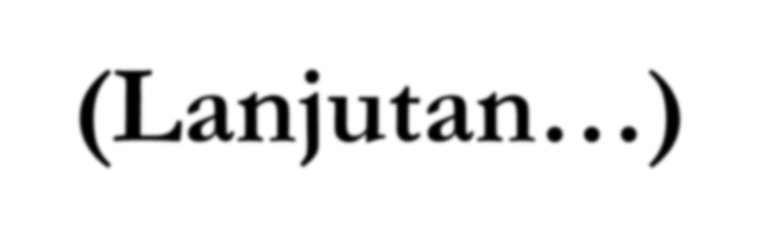
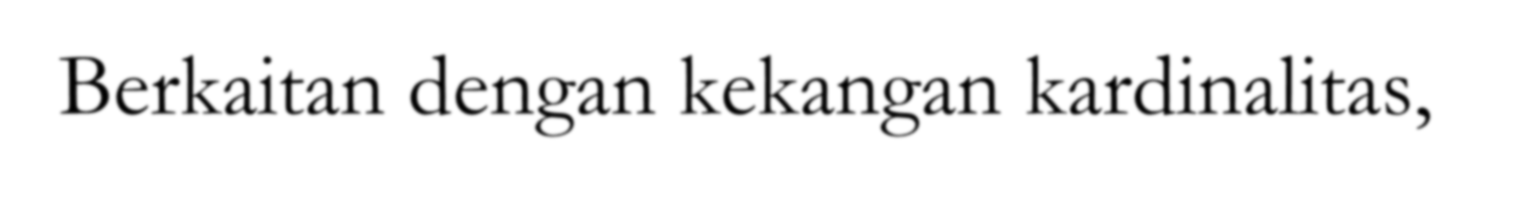
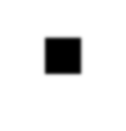
**(Lanjutan…)**



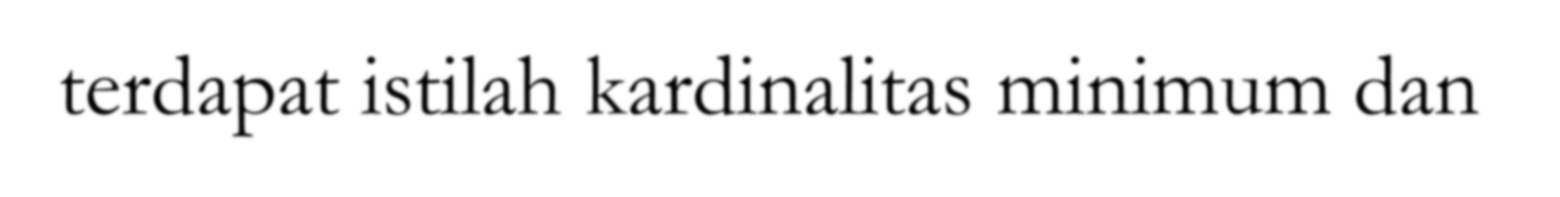
Berkaitan dengan kekangan kardinalitas,

◼

terdapat istilah kardinalitas minimum dan



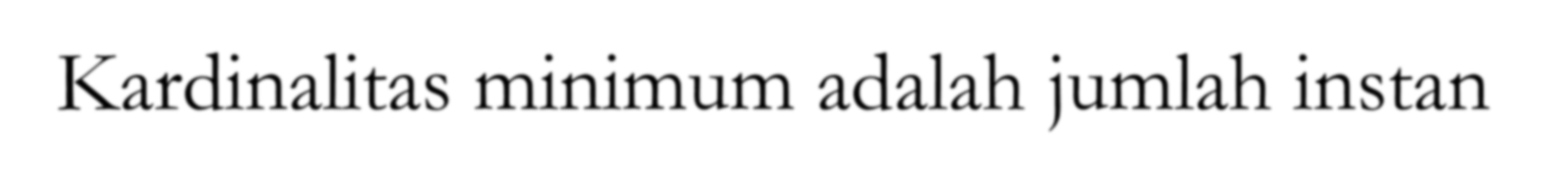
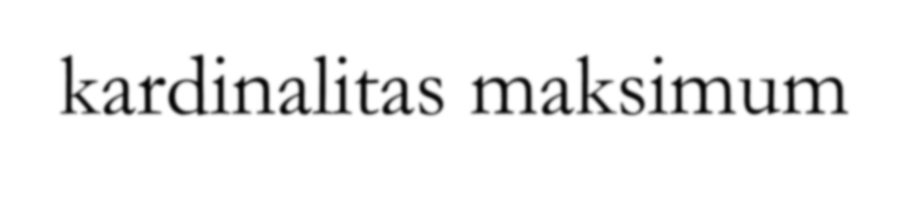
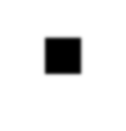
kardinalitas maksimum



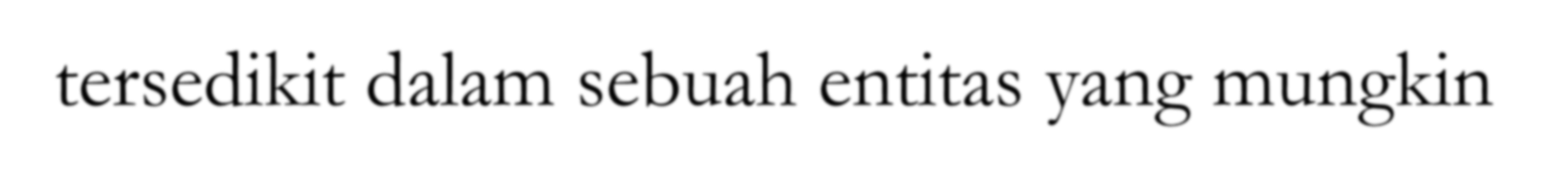
Kardinalitas minimum adalah jumlah instan

◼

tersedikit dalam sebuah entitas yang mungkin

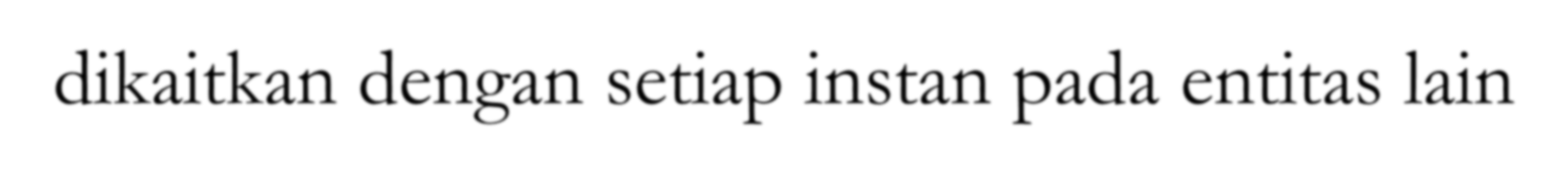


dikaitkan dengan setiap instan pada entitas lain

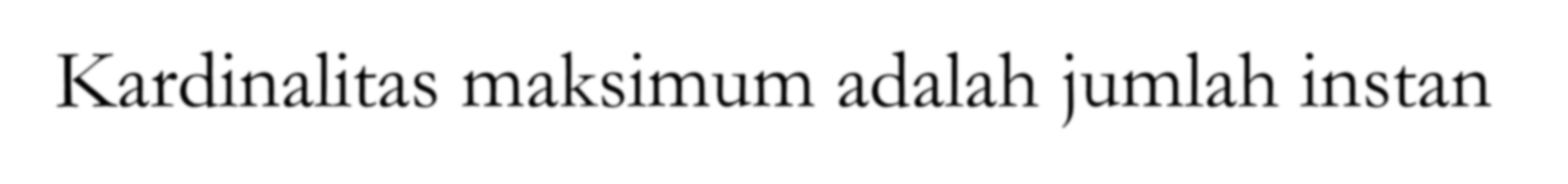
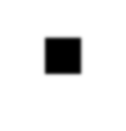


Kardinalitas maksimum adalah jumlah instan

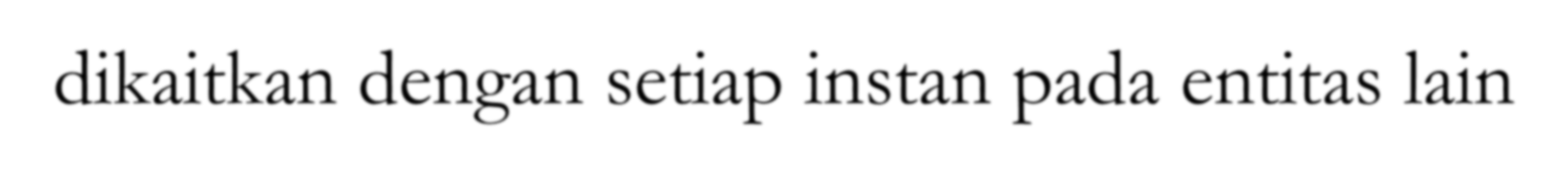
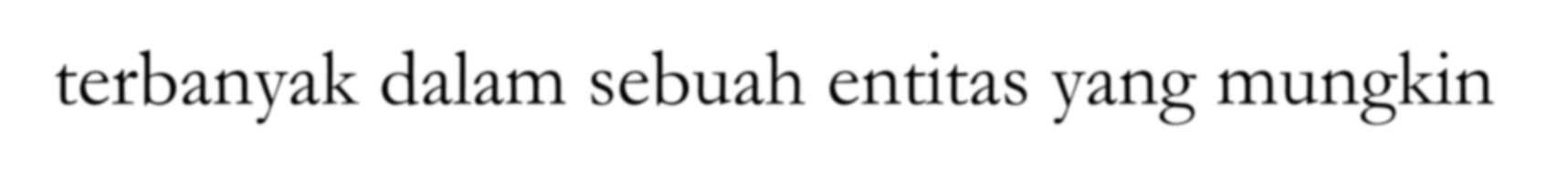
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terbanyak dalam sebuah entitas yang mungkin

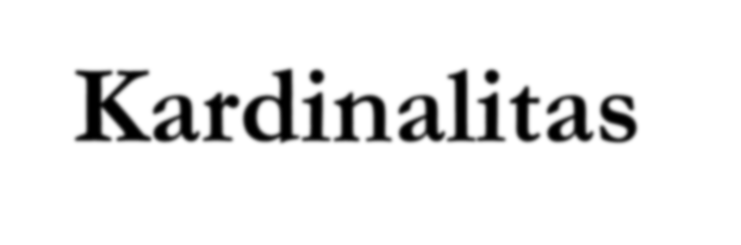
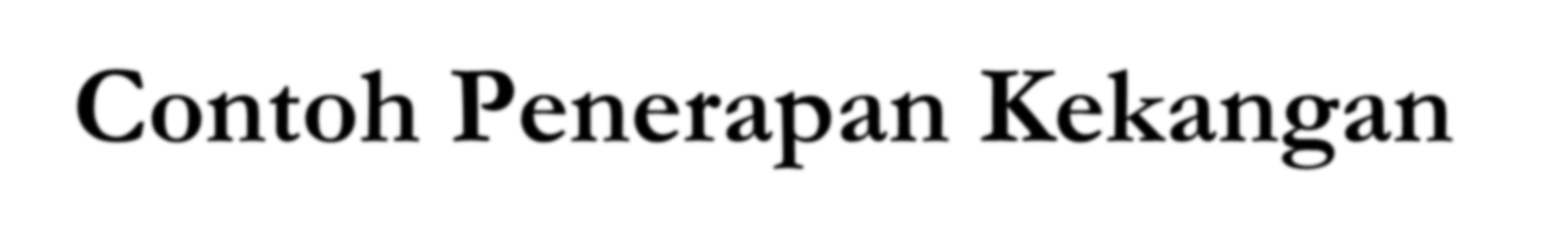


dikaitkan dengan setiap instan pada entitas lain



**Contoh Penerapan Kekangan**

**Kardinalitas**



(a) Dasar hubungan

PASIEN

KUNJUNGAN

Mempunyai

(b) Hubungan dengan

SEJARAH

PASIEN

Mempunyai

kekangan kardinalitas

PASIEN

**Contoh:**

Kunjungan 1

Amir

Kunjungan 2

Dewi

Kunjungan 1

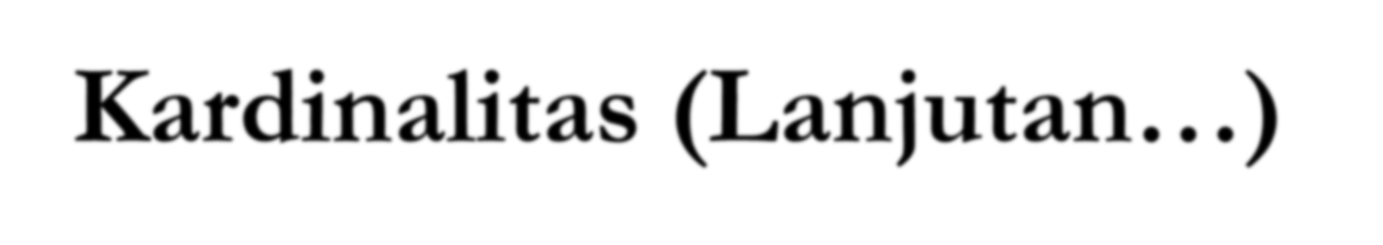
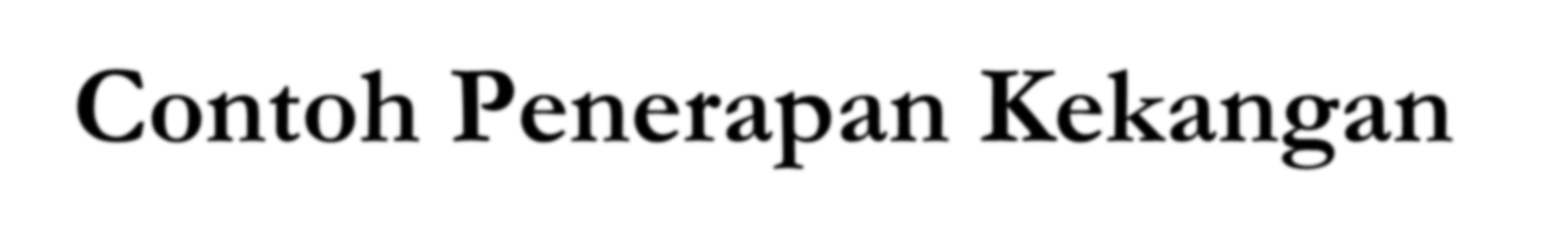
Fahmi

Kunjungan 1

Kunjungan 2

**Contoh Penerapan Kekangan**

**Kardinalitas (Lanjutan…)**



PEGAWAI

(a) Dasar hubungan

Ditugaskan\_ke

PROYEK

PEGAWAI

(b) Hubungan dengan

Ditugaskan\_ke

PROYEK

kekangan kardinalitas

**Contoh:**

Proyek 1

Amir

Proyek 2

Dewi

Fahmi

Proyek 3

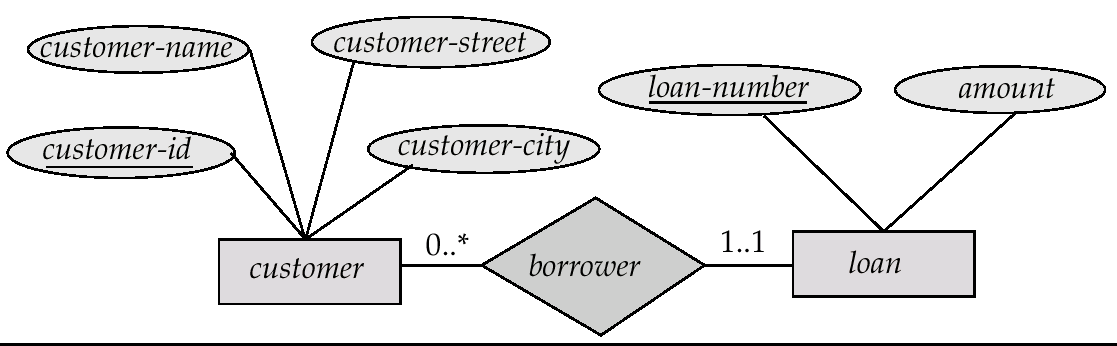
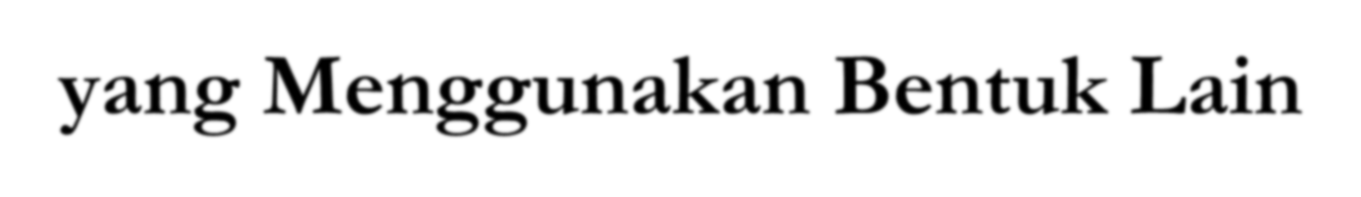
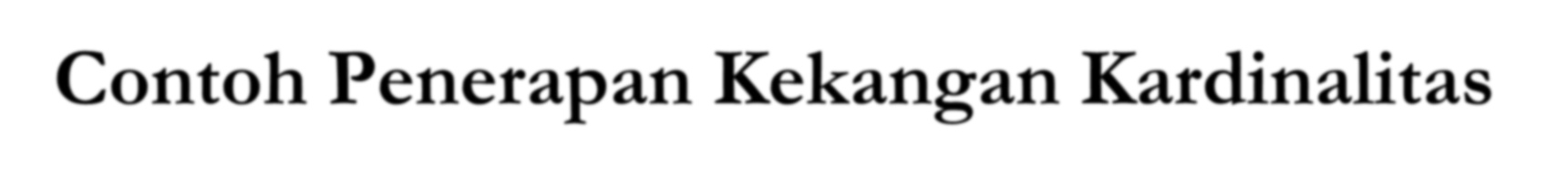
Proyek 4

Proyek 5

Sueb

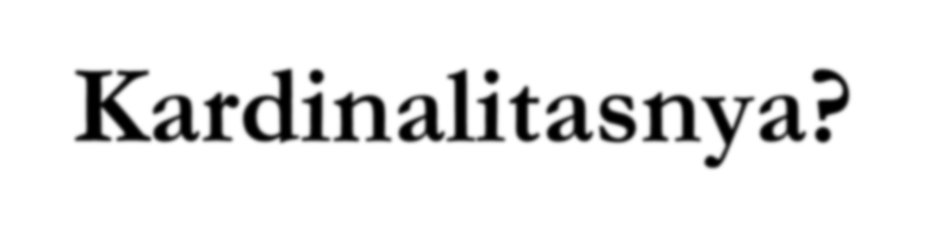
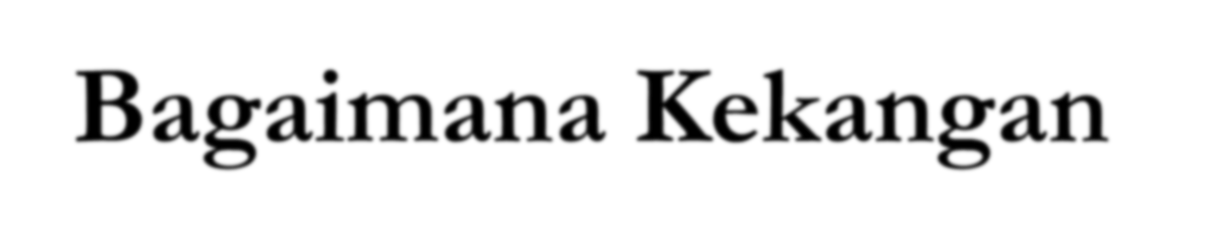
**Contoh Penerapan Kekangan Kardinalitas**

**yang Menggunakan Bentuk Lain**



**Bagaimana Kekangan**

**Kardinalitasnya?**



ORANG

PEGAWAI

Menikah\_dengan

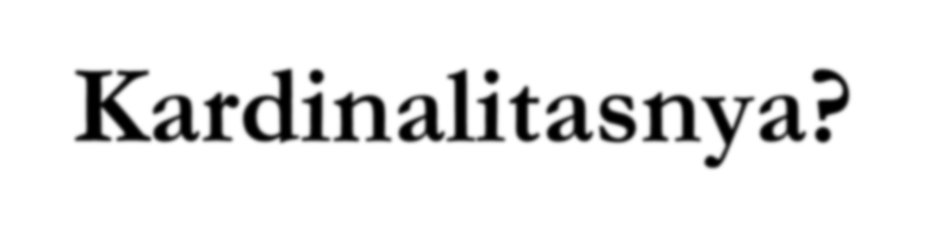
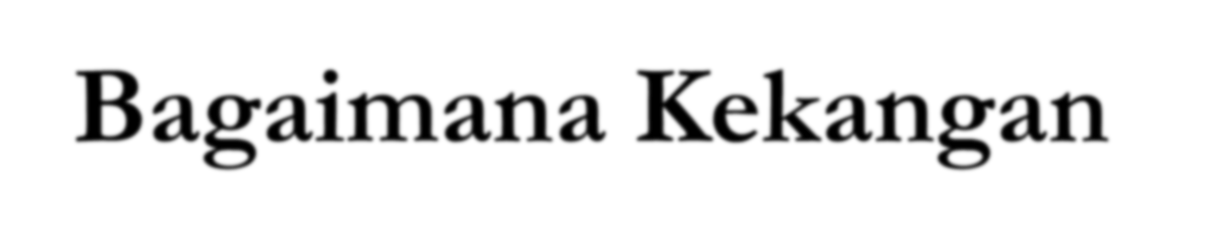
Membawahi

SUKU\_CADANG

Tersusun\_atas

**Bagaimana Kekangan**

**Kardinalitasnya?**



ORANG

TEMPAT PARKIR

Diberi\_jatah

PEGAWAI

DEPARTEMEN

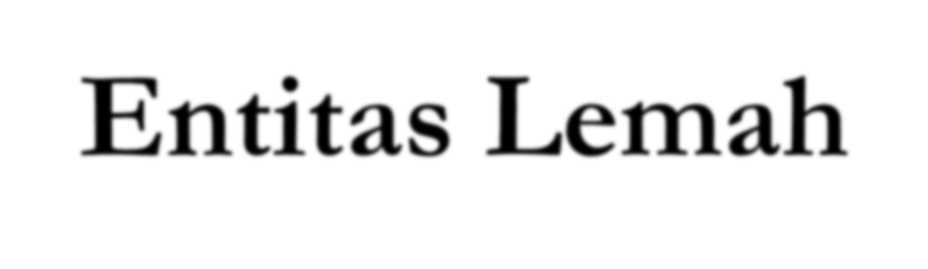
Bekerja\_pada

MAHASISWA

Mengambil

MATA KULIAH

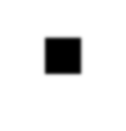
**Entitas Lemah**



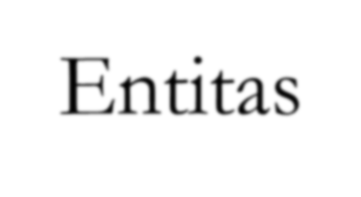
Entitas kuat versus entitas lemah

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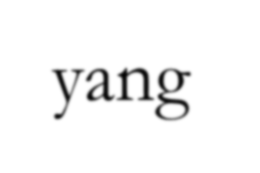
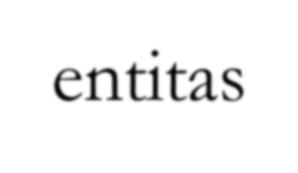
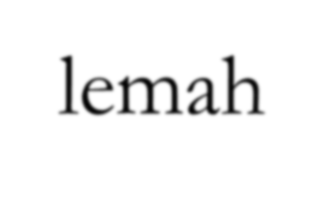
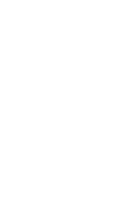
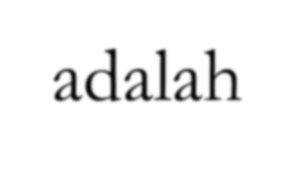
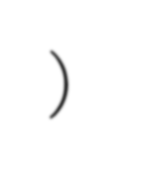
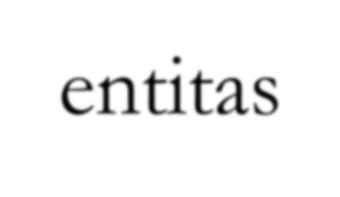
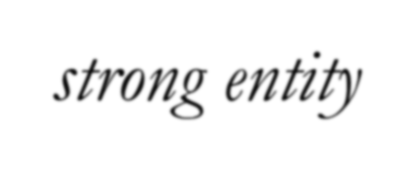
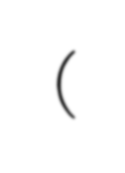
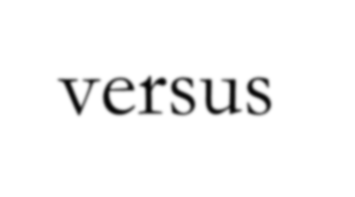
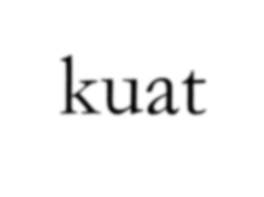
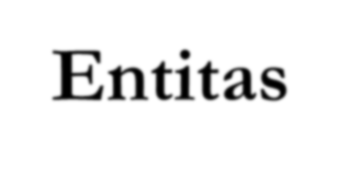
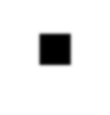
**Entitas kuat** (*strong entity*) adalah entitas yang



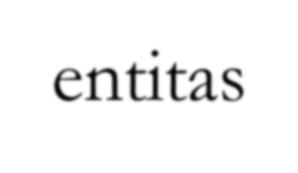
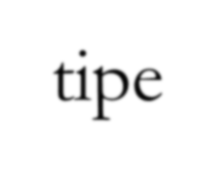
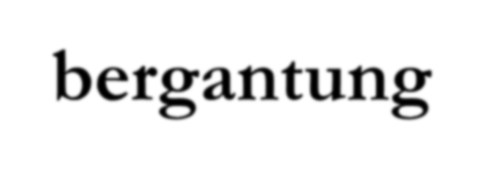
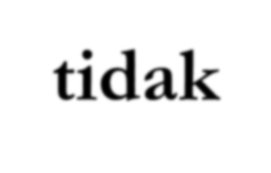
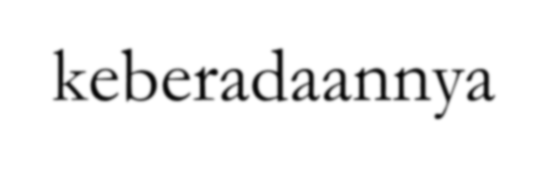
◼



keberadaannya **tidak bergantung** pada tipe entitas



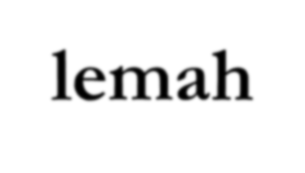
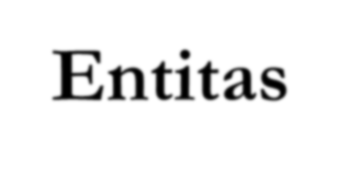
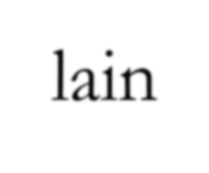
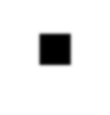
lain



**Entitas lemah** (*weak entity*) adalah entitas yang

◼

keberadaannya **bergantung** pada tipe entitas lain

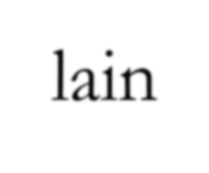
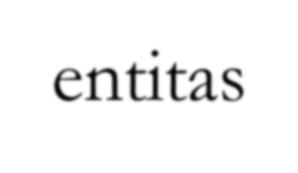
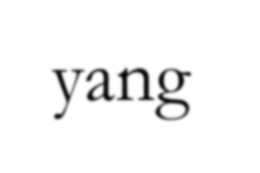
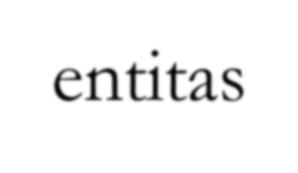
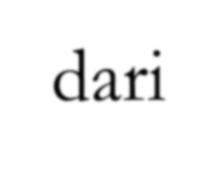
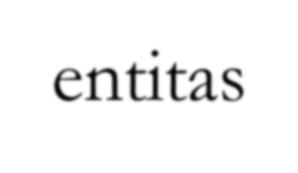
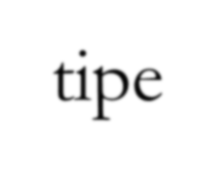
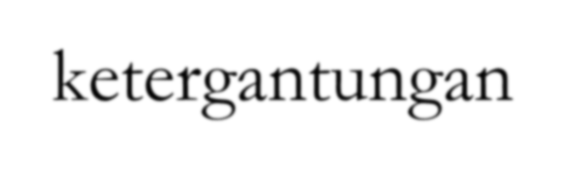
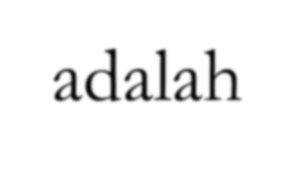
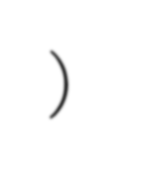
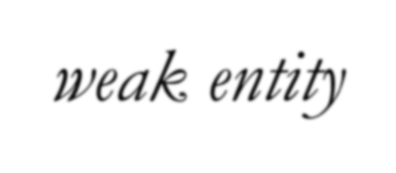
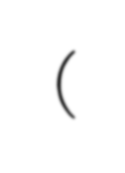
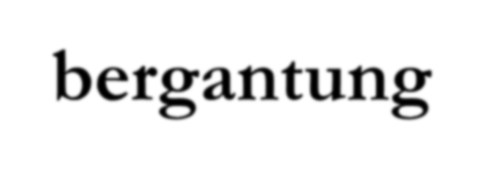
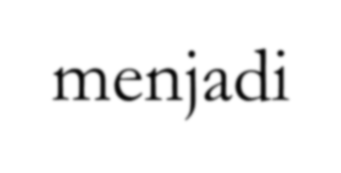
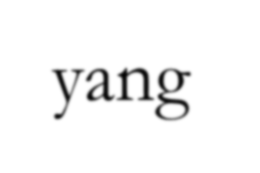
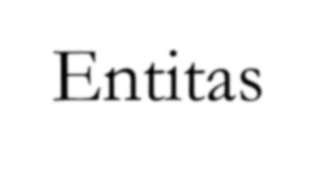
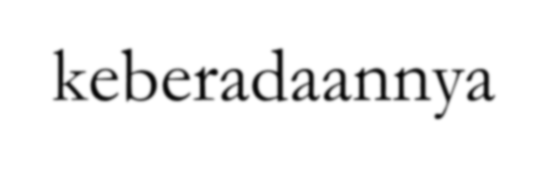
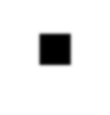


Entitas yang menjadi ketergantungan dari entitas

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lemah dinamakan

**identifying owner**

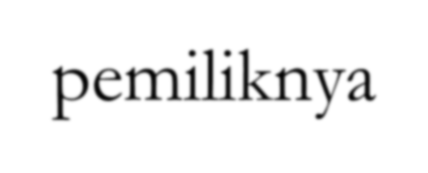
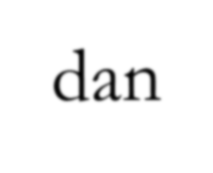
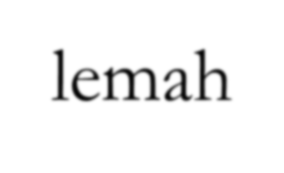
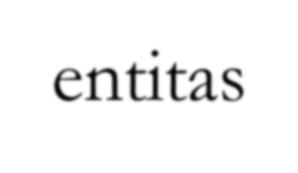
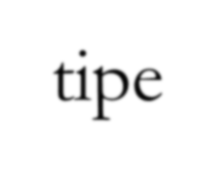
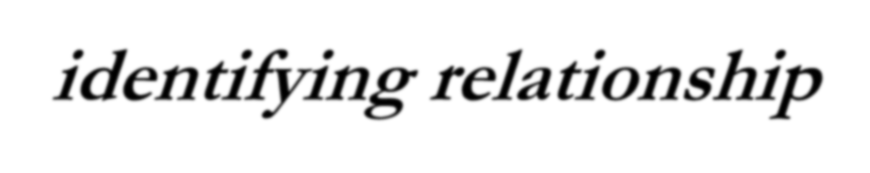
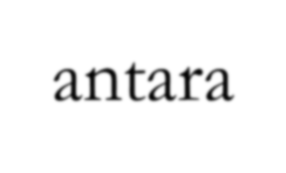
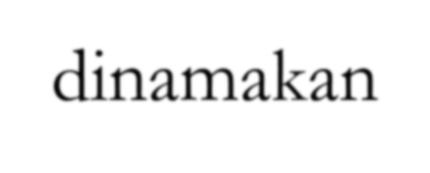
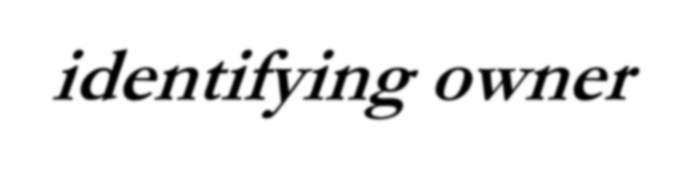
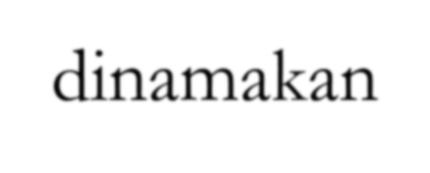
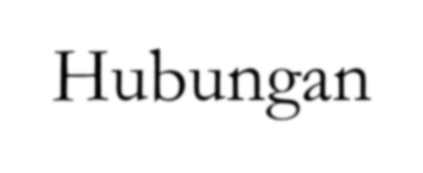
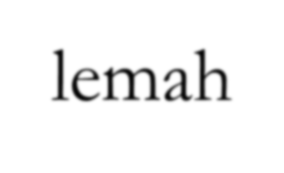
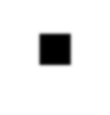


Hubungan antara tipe entitas lemah dan pemiliknya

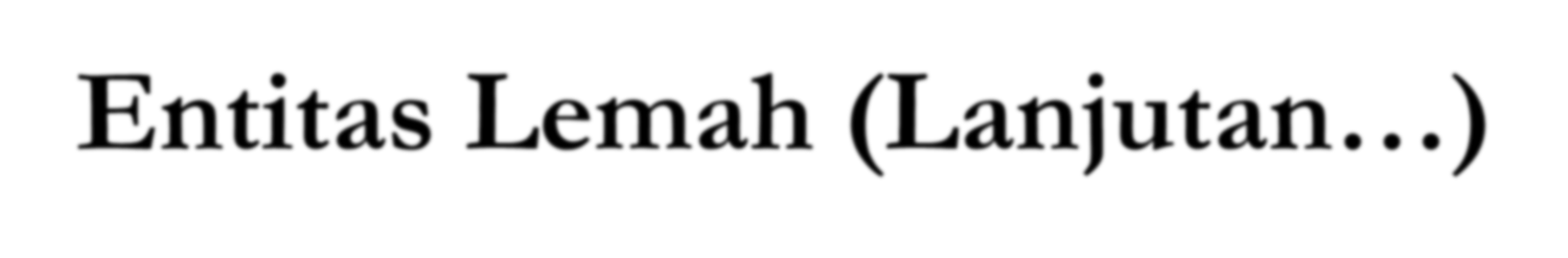
◼

dinamakan

**identifying relationship**



**Entitas Lemah (Lanjutan…)**



Nomor\_Peg

Nama\_Peg

Nama\_Tanggungan

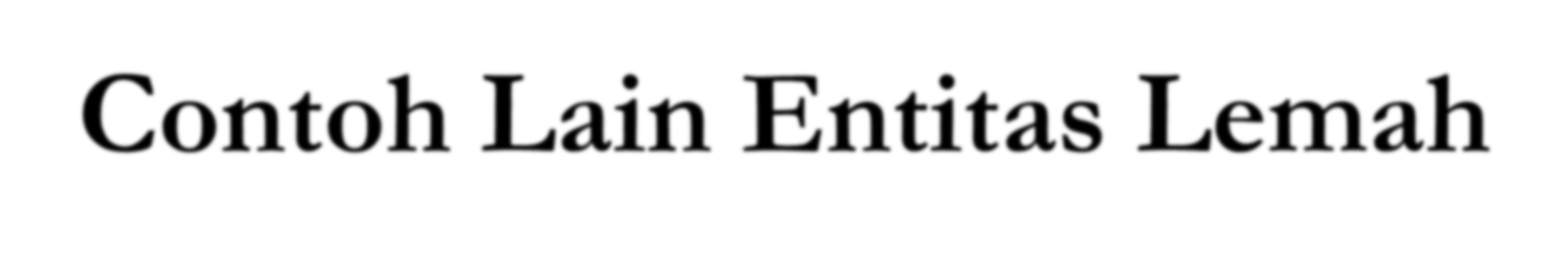
Tanggal\_Lahir

PEGAWAI

Memiliki

TANGGUNGAN

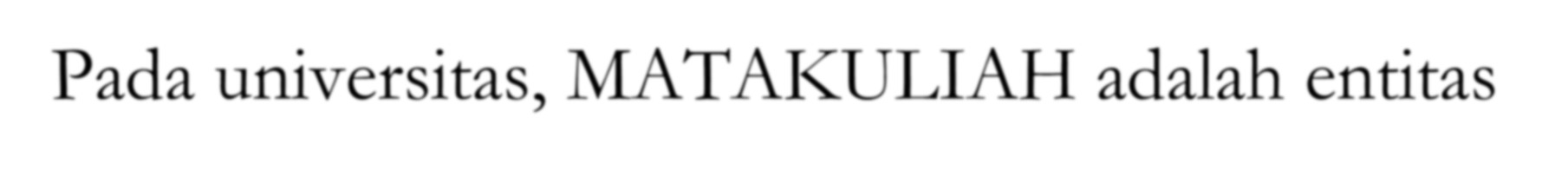
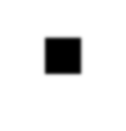
**Contoh Lain Entitas Lemah**



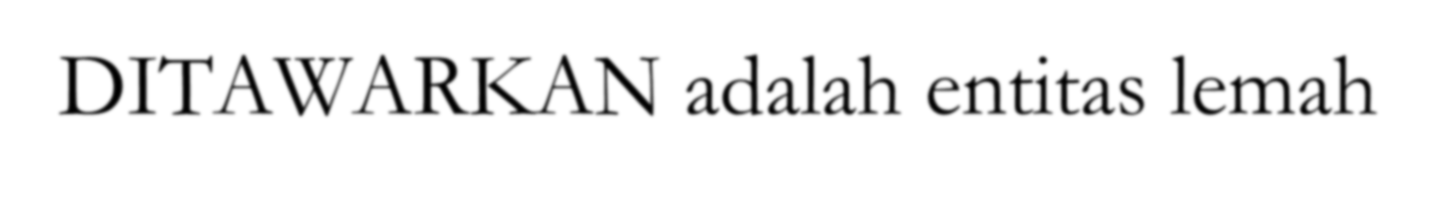
Pada universitas, MATAKULIAH adalah entitas

◼

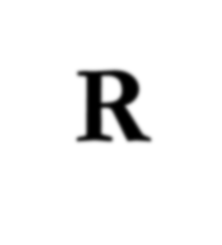
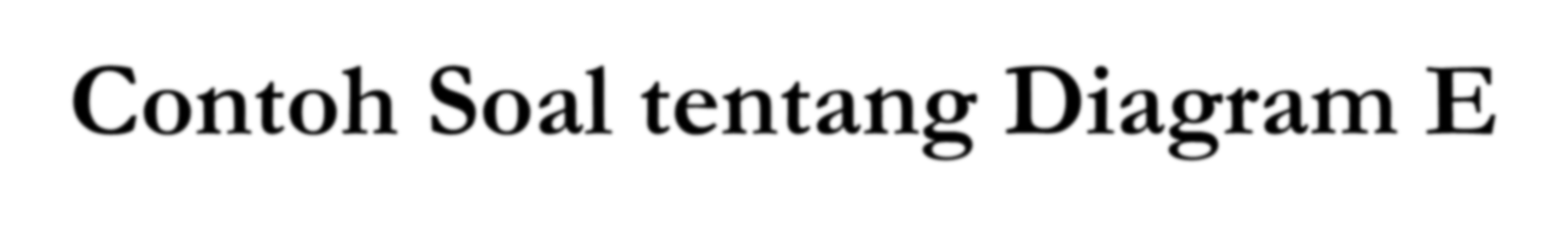
kuat, sedangkan MATAKULIAH



DITAWARKAN adalah entitas lemah



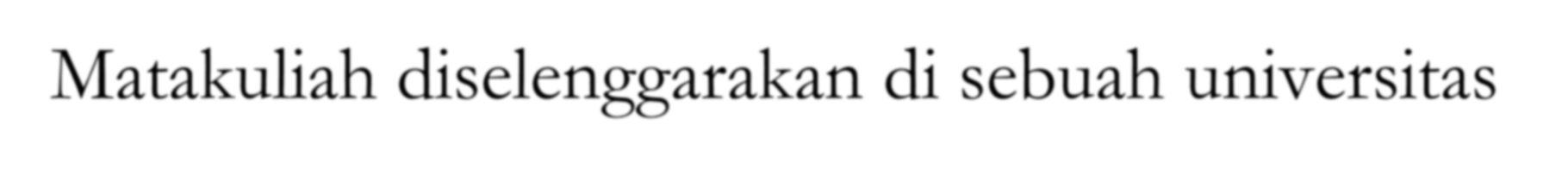
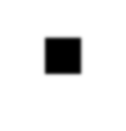
**Contoh Soal tentang Diagram E-R**



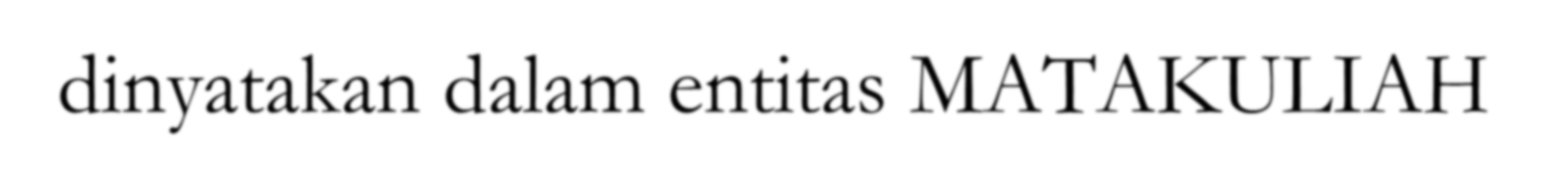
Matakuliah diselenggarakan di sebuah universitas

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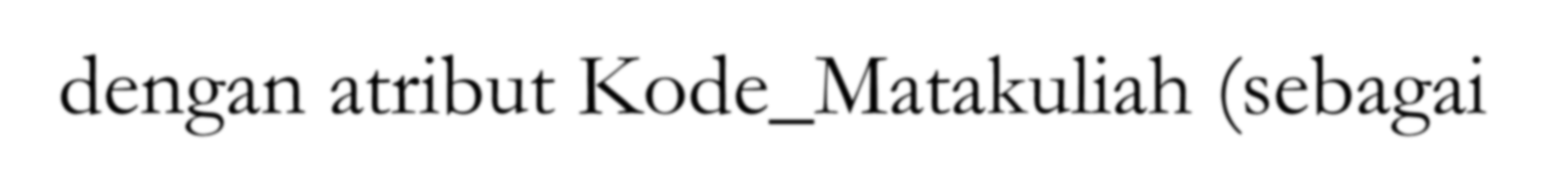
dinyatakan dalam entitas MATAKULIAH



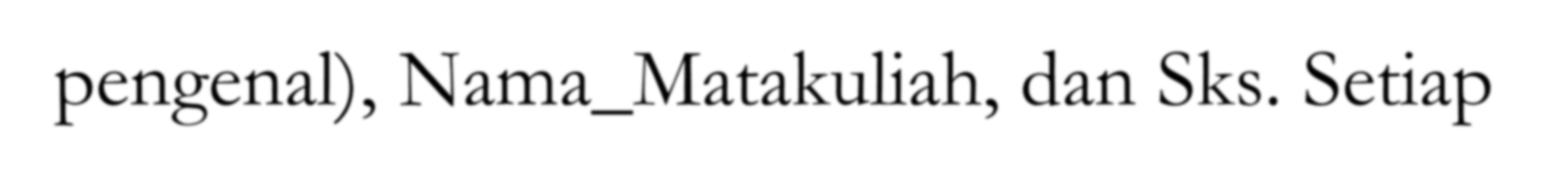
dengan atribut Kode\_Matakuliah (sebagai



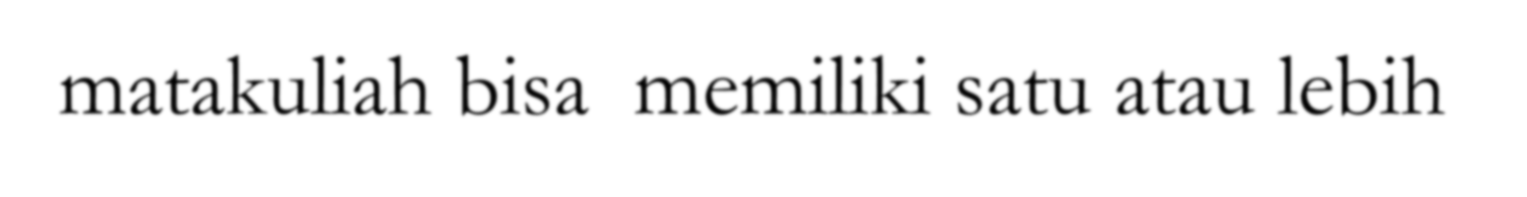
pengenal), Nama\_Matakuliah, dan Sks. Setiap



matakuliah bisa memiliki satu atau lebih



matakuliah lain yang menjadi prasyaratnya, tetapi



bisa juga tidak memiliki matakuliah prasyarat.

