TUGAS LATIHAN

DATABASE ADMINISTRATOR

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PROGRAM STUDI SISTEM INFORMASI

JURUSAN MANAJEMEN INFORMATIKA

POLITEKNIK NEGERI SUBANG

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DD 2 - 1

Database Design
2-1: Conceptual and Physical Models
Practice Activities

Objectives

- Explain the importance of clearly communicating and accurately capturing information requirements
- Distinguish between a conceptual model and its physical implementation
- List five reasons for building a conceptual data model
- Give examples of conceptual models and physical models

Vocabulary

Identify the vocabulary word for each definition below.

	A design for an object (a car, a house, a database, etc.) which includes implementation details such as size, volume, weight, etc.
	A data model, usually represented by an entity-relationship diagram.
	A collection of facts from which conclusions may be drawn.
	The process of capturing the important concepts and rules that shape a business and depicting them visually on a conceptual model

1. You will be working in pairs for this activity

   - One student describes his/her "dream house" while the other student attempts to draw it.

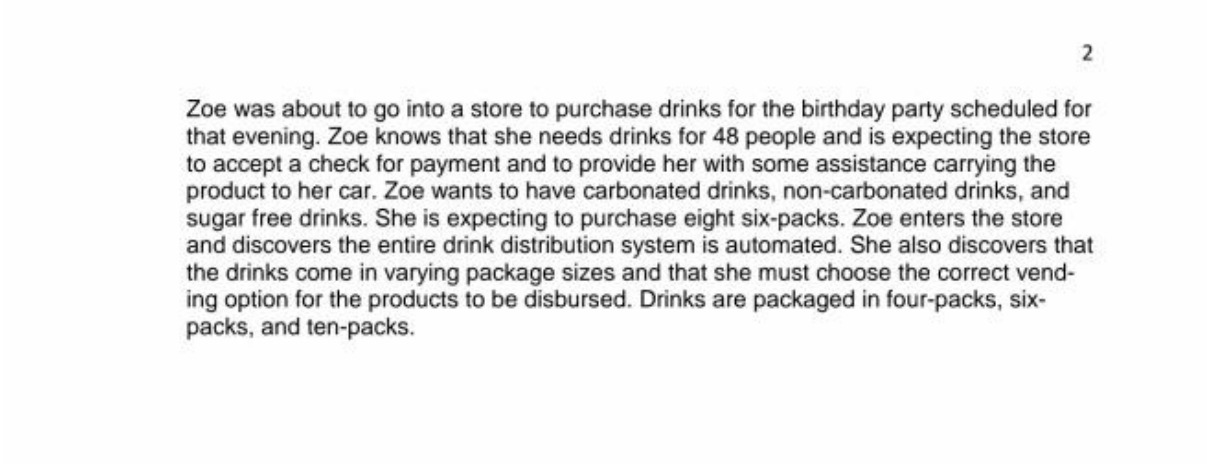
     You can discuss specific details, but the student describing the house is not allowed to see what is being drawn until after time is called.

   - After sharing your drawing, describe the importance of accurately describing information requirements.

Jawab:

Untuk merancang model fisik secara akurat, tangkap semua aturan bisnis dan pertimbangkan aturan akun yang mengatur sistem masa depan.

2. Review the scenario below. Identify the conceptual model and physical model from the scenario



2

Zoe was about to go into a store to purchase drinks for the birthday party scheduled for that evening. Zoe knows that she needs drinks for 48 people and is expecting the store to accept a check for payment and to provide her with some assistance carrying the product to her car. Zoe wants to have carbonated drinks, non-carbonated drinks, and sugar free drinks. She is expecting to purchase eight six-packs. Zoe enters the store and discovers the entire drink distribution system is automated. She also discovers that the drinks come in varying package sizes and that she must choose the correct vending option for the products to be disbursed. Drinks are packaged in four-packs, six-packs, and ten-packs.

Jawab :

a. *Conseptual:*

Zoe hendak pergi ke toko untuk membeli minuman untuk pesta ulang tahun yang dijadwalkan malam itu. Zoe tahu bahwa dia membutuhkan minuman untuk 48 orang dan mengharapkan toko menerima cek untuk pembayaran dan membantunya membawa produk ke mobilnya. Zoe ingin memiliki minuman berkarbonasi, minuman non-karbonasi, dan minuman bebas gula. Dia mengharapkan untuk membeli delapan six-packs.

b. *Physical:*

Zoe memasuki toko dan menemukan seluruh sistem distribusi minuman otomatis. Dia juga menemukan bahwa minuman datang dalam berbagai ukuran paket dan dia harus memilih opsi penjual yang tepat untuk produk yang akan dicairkan. Minuman dikemas dalam empat bungkus, enam bungkus, dan sepuluh bungkus.

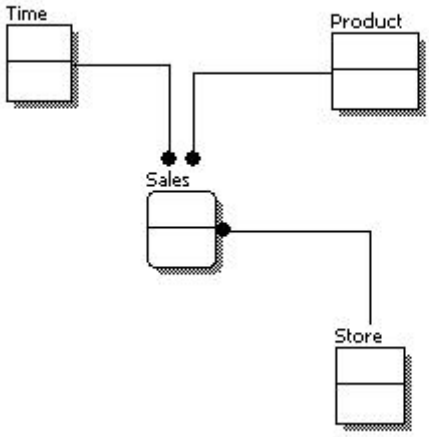
3. Provide five reasons for creating a conceptual data model

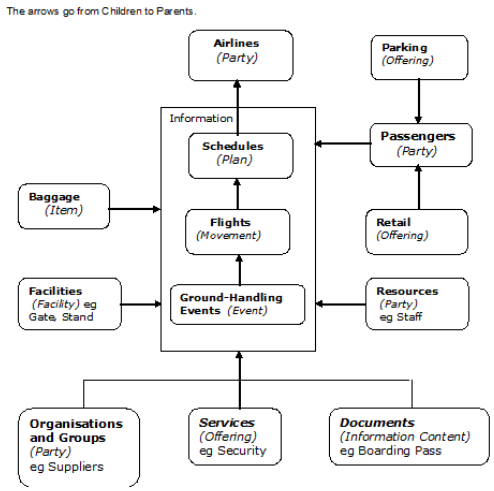
Jawab :

1. Menjelaskan dengan tepat kebutuhan informasi bisnis
2. Memfasilitasi diskusi
3. Mencegah kesalahan dan kesalahpahaman
4. Membentuk dokumentasi "sistem ideal" yang penting
5. Membentuk dasar yang kuat untuk desain database fisik.

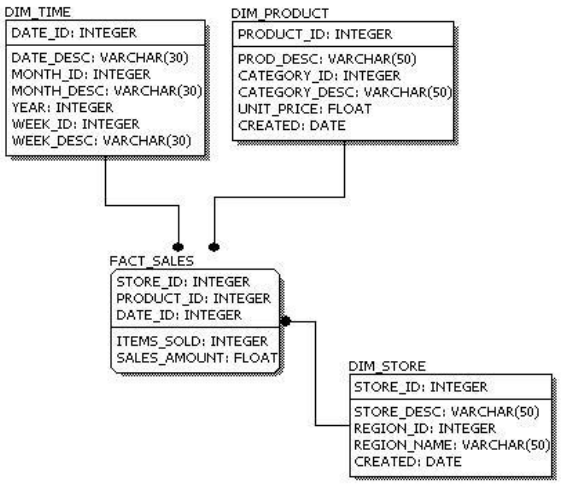
4. List two examples of conceptual models and physical models.

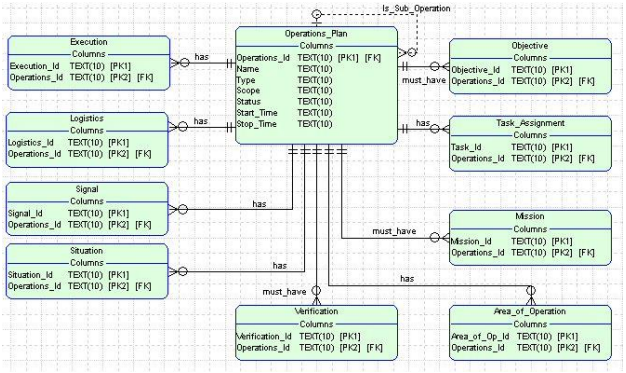
Conceptual model:





Physical models:





DD 2 - 2

Database Design
2-2: Entities, Instances, Attributes and Identifiers
Practice Activities

Objectives

- Define and give an example of an entity
- Distinguish between an entity and an instance of an entity
- Name and describe attributes for a given entity
- Distinguish between an attribute and its value
- Distinguish between mandatory and optional attributes, and between volatile and non-volatile attributes
- Select and justify a unique identifier (UID) for an entity

1. Consider the entity STUDENT. You are all students in a class. However, each one of you is a unique instance of that entity. Your teacher will lead you through an exercise to demonstrate this

   Jawab:
   Menggunakan Nilai atribut yang berbeda.
   Misal nama depan, nama belakang, dll.

2. Think about the last time you went to get a haircut, permanent, manicure, or other service from a barbershop or hair salon.
   Discuss the business of a barbershop or hair salon. Name the entities that are the “main things” about this business. Give examples of instances for each entity

   Jawab:
   BARBER : nama, spesialisasi (potong rambut/threading/pijat/lainnya), waktu kerja
   COUNTER : Jenis (utama/individu tukang cukur/konter cuci rambut/Contoh Produk penjualan/lainnya), warna
   PERANGKAT PEMOTONG RAMBUT : Tipe (seasor/mesin listrik/lainnya)

3. The goal of this activity is to learn to make a distinction between an entity, an attribute, and an instance of an entity.
   List which of the following concepts you think is an:

   • entity
   • attribute
   • instance.

   If you determine that one is an entity, then give an example of an instance. If you determine that one is an attribute or an instance, give a sample entity name. For the last three rows, find a concept that fits.

Concept	Entity? Attribute? Instance?	Example instance or Entity
Vehicle		
Diet Cola		
Price		
Customer number		
Green		
	Entity	Cookie
	Attribute	Cookie
	Instance	Cookie

   Jawab:

Concept	Entity? Attribute? Instance?	Example instance or Entity
Vehicle	Entity	corolla, school bus, civic
Diet Cola	Instance	Drink
Price	Attribute	Toy,Drink,Vehicle
Customer number	Attribute	customer
Green	Attribute	car, train, grass

4. The goal of this practice is to recognize attributes for an entity.
   The three entities that play a role in a DJ business: SONG, EVENT, and CUSTOMER are listed as the first three column headings of the table below. The fourth column contains a collection of attributes. Use a check mark to indicate if the attribute listed could be an attribute for the entities listed. (For example, could Title be an attribute for Song, for Event, and for Customer?)

SONG	EVENT	CUSTOMER	
			Title
			Description
			Venue
			First Name
			Phone Number
			Release date
			Last Name
			Type
			Email address

Jawab:

SONG	EVENT	CUSTOMER	
Yes	Yes		Title
Yes	Yes		Description
	Yes		Venue
		Yes	First Name
		Yes	Phone Number
Yes			Release date
		Yes	Last Name
Yes	Yes		Type
		Yes	Email address

5. From the list of attributes provided, identify which attribute could be the unique identifier of each entity.

   Entity: STUDENT Attributes: student id, first name, last name, address

   Entity: MOVIE Attributes: title, date released, producer, director

   Entity: LOCKER Attributes: size, location, number

   Jawab

   Entity: STUDENT Attributes: **student id**, first name, last name, address

   Entity: MOVIE Attributes: **title**, date released, producer, director

   Entity: LOCKER Attributes: size, location, **number**

6. Read the given business scenario and walk through the steps below.

> "I'm the owner of a small movie rental store. We have over 3,000 movies that we need to keep track of.
>
> "Each of our movies has a DVD or VHS tape number. For each movie, we need to know its title and category (e.g., comedy, suspense, drama, action, war, or sci-fi).
>
> "Yes, we do have multiple copies of many of our movies.
>
> "We give each movie a specific ID, and then track which DVD or VHS contains the movie. A movie can be either DVD or VHS format.
>
> "We always have at least one DVD or VHS tape for each movie we track, and each DVD or VHS tape is always a copy of a single, specific movie.
>
> "Our DVDs and VHS tapes are very long. We don't have any movies that require multiple DVDs or VHS tapes."

a. Write a list of nouns used in the scenario.

b. Name each entity.

c. Is each instance of the entity uniquely identifiable? Which attribute or attributes could serve as the unique attribute to identify the entity?

Jawab:

a. MOVIE, DVD, VHS

b. Name each entity : MOVIE, CATEGORY, MEDIA, MEDIAFORMAT

c.

MOVIE (Attributes: #Id,* Title, * CategoryId, *Year) - generally with same Title two movies may not be released in same year, but what if? So, Id is primary key. I won't even make a composite unique key on Title and year. CategoryId is foreign key to CATEGORY (Id)

CATEGORY (Attributes: #Id, #Name). Even though Name of category is uniquely identifiable, but in physical model, I will make ID as a serial and primary key. On Name will put unique constraint.
MEDIA (Attributes: #Id, *FormatId, *MovieId), Id is the unique serial primary key. FormatId is the foreign key to MEDIAFORMAT.

MEDIAFORMAT(Attributes : #Id, #Format) FORMAT column will be unique and sufficient , under physical model, it may have three instances of MEDIAFORMAT (DVD, VHS, Others). But I will also create an Id column as primary key (+ Serial) to refer as foreign key in MEDIA.

7. Identify the business rules contained in the following scenario.

"We are frequently asked for movies starring specific actors. John Wayne and Julia Roberts are always popular. So we'd like to keep track of the star actors appearing in each movie. Not all of our movies have star actors. Customers like to know each actor's "real" birth name and date of birth. We track only actors who appear in the movies in our inventory."

Jawab:

This adds two more entities here one actor and one intersection entity, we need intersection entity, because we cannot stop one actor to work in multiple movies, and almost always a movie has multiple actors.
ACTOR(Attributes: #Id, #Name, #RealName, #DOB) it is quite possible that some stars are not revealing DOB and real name anywhere. Name (screen name) may be same for two actors
ACTORMOVIEMAP (Attributes: #ActorID, #MovieId, #IsMainCastingActor) We got barred relationships here, so combination of ActorId and MovieId will make composite primary key, IsMainCastingActor is required to show main names on the movie posters, but in full casting list of movie other actor names may also be shown.

8. Identify the business rules contained in the following scenario.

"We have lots of customers. We rent videos only to people who have joined our 'video club.' To belong to our club, they must have good credit. For each club member, we'd like to keep their first and last name, current phone number, and current address. And, of course, each club member has a membership number.

"Then we need to keep track of what movie each customer currently has checked out. A customer may check out multiple video tapes at any given time. We just track current rentals. We don't keep track of any rental histories."

Jawab:

CUSTOMER(Attributes: #clubMemberID, #firstName, #lastName, #phone, #address), since if customer is not member of club, we don't rent him, and club membered is always unique, it is right candidate to be primary key here. "Must have good credit" need to be programmatically handled by monthly / quarterly jobs running on server. If not good credit found, send notice to customer and throw him out.

This makes us to add an optional attribute to MEDIA entity called ◦RenterId which is a foreign key to customer table. It is optional because at a given point of time, all the media in store will not be rented out, if it does I will become billionaire soon. J. RenterID can not be kept unique because a customer can rent out multiple media if he wish to.

9. Age is an example of what type of attribute?

   Jawab:

   Volatile

10. Birth date is an example of what type of attribute?

    Jawab:

    Nonvolatile

11. Read the business scenario of a fast-food restaurant below

> We are a small fast food business. Our menu features food items that can be ordered by a customer. A customer places an order at the counter and indicates what food items he/she would like on that order.
>
> Lately we've noticed that we have some regular customers, so we started asking them for information -- such as name and address, so we can mail them coupons when we have specials.
>
> a. Using the restaurant entities ORDER, FOOD ITEM, AND CUSTOMER, identify the attributes for each entity.
> b. Where possible, indicate whether the attribute is mandatory or optional.
> c. Where possible, pick out the UIDs for each entity

Jawab:

a.

ORDER (#Id, #CustId, #DateTimeOfOrder): some customers may not be present in CUSTOMER, so CustId is optional. CustId is foreign key to Customer, it is not unique because it can be Null or present in multiple orders. Id is UId and right candidate for primary key here.

CUSTOMER(#Id, #Name, #Address). Current scenario says a customer comes into Customer collection only if he gives personal details: Name and Address which means, these two may be marked as mandatory. Just to cater future scenarios, I have kept name and address as optional. Id is UId and right candidate for primary key here.

FOODITEM (#Id, #Name, #Price) price is not optional, for free food items, give value as zero. A food item cannot be without a name. . Id is UId and right candidate for primary key here.

ORDERFOODMAP (#OrderId,#ItemId, #Count) we have composite primary key (and unique identifier) here on order and item Ids. One order can have multiple fooditems , even multiple instances of same food item. Rather than repetition of items saved as separate rows, I will prefer to have mandatory count column.

b. See above

c. See above

DD 2 - 3

Database Design
2-3: Entity Relationship Modeling and ERDs
Practice Activities

Objectives

- Define the meaning of implementation-free as it relates to data models and database design implementation
- List the four goals of entity relationship modeling
- Identify an entity relationship diagram (ERD)

Vocabulary

Identify the vocabulary word for each definition below.

	Not dependent on the physical model.
	A drawing that is used to represent a data model.

1. True or False: To be described as implementation-free, a data model must be changed to accommodate the database system onto which it is built.
   Jawab:
   False
2. True or False: To be described as implementation-free, a data model must not change to accommodate the database system onto which it is built
   Jawab:
   True
3. List four goals of entity relationship modeling.
   Jawab:
   - Capture all required information.
   - Ensure that information appears only once.
   - Model no information that is derivable from other information already modeled.
   - Locate information in predictable, logical place.
4. An _____ is a consistent tool that can be used to represent data requirements regardless of the type of database used.
   Jawab:
   Entity Relationship Diagram