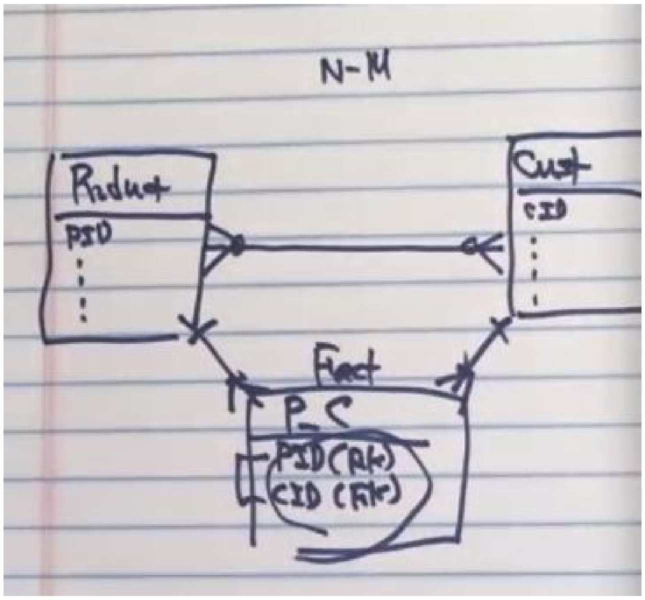
Day 0
Just syllabus

Day 1

S subject oriented	- particular segment of a business / company
I integrated	- multiple data sources integrated
N non-volatile	- data is stable; added but not removed
T time-variant	- all data is for a particular, identified point in time

Day 2
Why do we create warehouses? More user friendly and efficient / fast

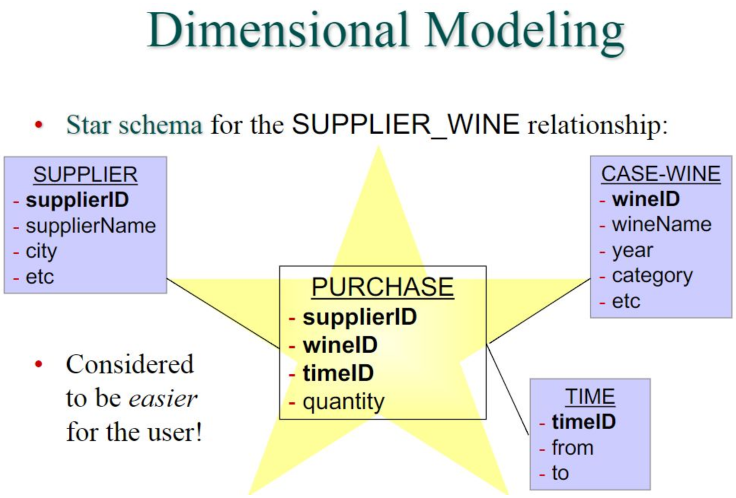
How to implement any to many - put a composite (fact) table in between using an associative identity



Look for any to many relationships as they will be a candidate for a fact table

Any data map MUST have time or date mapped (the T in SINT - time dimension)

Star schema is then created: fact table in middle with dimensional tables on the ends with one to many relationships



Dimensional Modeling

- Star schema for the SUPPLIER_WINE relationship:

SUPPLIER
- **supplierID**
- supplierName
- city
- etc

CASE-WINE
- **wineID**
- wineName
- year
- category
- etc

PURCHASE
- **supplierID**
- **wineID**
- **timeID**
- quantity

TIME
- **timeID**
- from
- to

- Considered to be *easier* for the user!

Day 3

Why do we need data warehousing?

Accessible

Roll-up / summary / details which can then be sliced, diced to specific data (ex. Getting data just from the state of NY)

Easy, user friendly, fast, efficient

Can show just what is important

Possible problems wh

Duplicate data

Incorrect or missing data

Data with differing names (ex. 'Student Id' vs 'Id Number')

Operational systems = computing systems that provide the information necessary to run day to day business activities

Decision support systems = computing systems that provide vital strategic information for effective decision making

Good strategic info:

Integrated: a single, enterprise-wide viewpoint

Data integrity: data is correct and accurately represents business rules

Credible: single source values

Accessible: ease of access, flexible for intuitive and investigational analysis

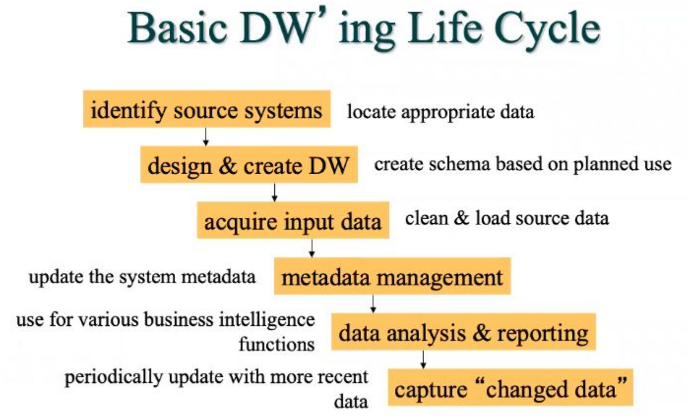
Timely: up to date ino is available when needed

Data warehousing definition - the activities needed to create, maintain, and utilize a data warehouse or data mart

Creating

Populating

Querying (user accessing)



Basic DW'ing Life Cycle

identify source systems — locate appropriate data

design & create DW — create schema based on planned use

acquire input data — clean & load source data

metadata management — update the system metadata

data analysis & reporting — use for various business intelligence functions

capture "changed data" — periodically update with more recent data

<- Handling dimensional change is important!

Ex: someone buy tv in NY state, person later moves to CA, so we need to handle that they lived in NY when it was bought and not CA - "Slowly changing dimension(al table)"

General Guidelines:

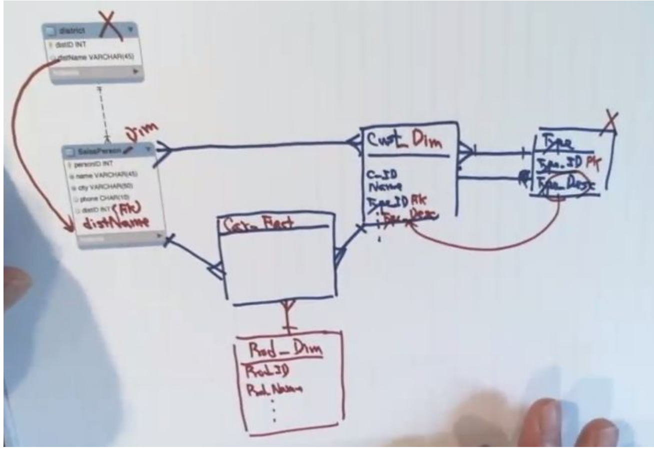
Build from a clear set of business objectives and user requirements
Define the architectural framework in advance
Document all assumptions
Use the right tools for the job
Understand the life cycle
Expect data problems
Learn from mistakes

Any data map MUST have a time table (remember SINT)

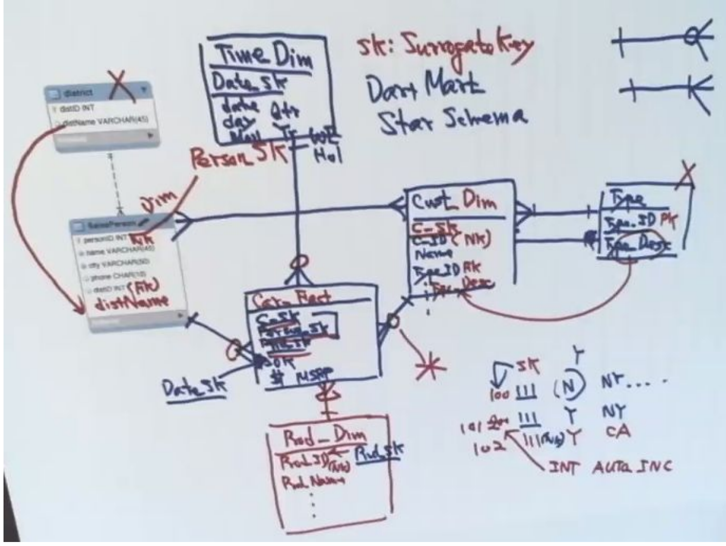
Day 4

Denormalizing a many to many relationship with an associative identity to a Data Mart (star schema):

1. Bring district name into sales person to remove the District table
2. Bring type description into customer to remove the Type table
3. Customer, sales person, and rod are all connected and represented by individual dimensional tables, connected by the "car" fact table

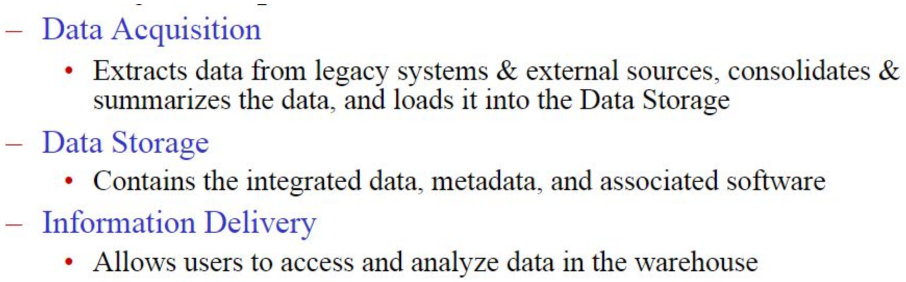


4. Surrogate key represented by '_SK' (which are also the primary keys), all added to the car fact table, auto increments when information changes
5. We NEED a time/date table now (always!)
6. Add the circles to create ANY to one instead of many to one
7. For the original primary keys, we represent them as '_NK', natural keys now

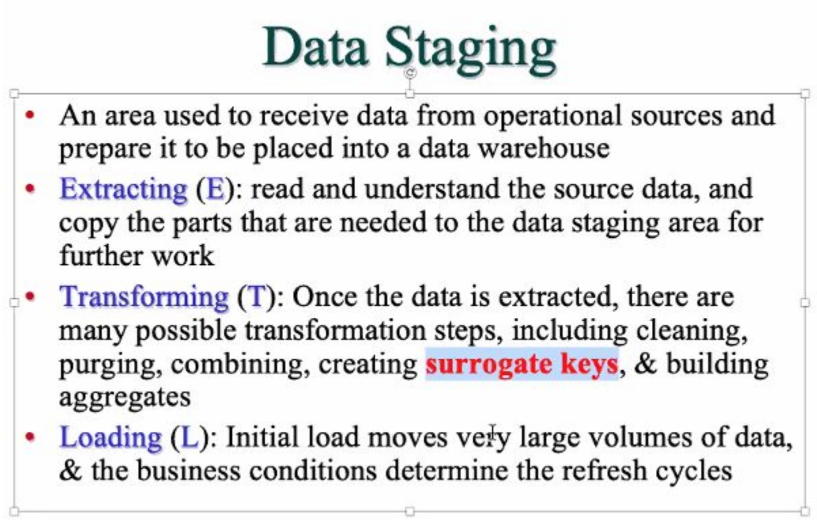


Tips for exercise 1:
Put Type_Desc into customer and get rid of Customer_Type table; this creates ‘Customer_DIM’ table
‘Customer_ID’ must now be natural key -> add a surrogate key ‘Customer_SK’
Move Cat_Name into Product and get rid of Category table
Customer_ID and Product_ID in Sales table becomes _SK
Create Date dimensional table using the Date from the Sales table, with ‘Date_SK’ as primary/surrogate key
Change ‘many to one’ to ‘any to one’ with open circle on the many side
Bring a hard copy to class!

Major components of DW architecture:



- Data Acquisition
  - Extracts data from legacy systems & external sources, consolidates & summarizes the data, and loads it into the Data Storage
- Data Storage
  - Contains the integrated data, metadata, and associated software
- Information Delivery
  - Allows users to access and analyze data in the warehouse

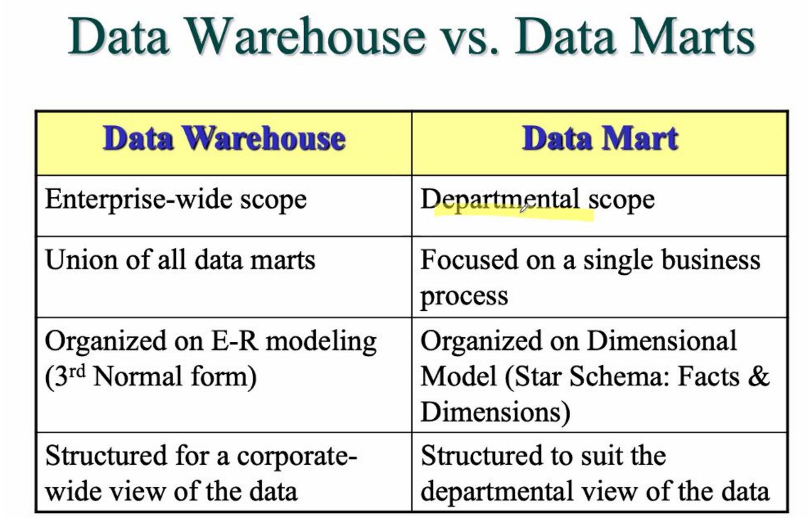


Data Staging

- An area used to receive data from operational sources and prepare it to be placed into a data warehouse
- Extracting (E): read and understand the source data, and copy the parts that are needed to the data staging area for further work
- Transforming (T): Once the data is extracted, there are many possible transformation steps, including cleaning, purging, combining, creating **surrogate keys**, & building aggregates
- Loading (L): Initial load moves very large volumes of data, & the business conditions determine the refresh cycles

Day 5
In person class going over Exercise 1

Day 6



Data Warehouse vs. Data Marts

Data Warehouse	Data Mart
Enterprise-wide scope	Departmental scope
Union of all data marts	Focused on a single business process
Organized on E-R modeling (3rd Normal form)	Organized on Dimensional Model (Star Schema: Facts & Dimensions)
Structured for a corporate-wide view of the data	Structured to suit the departmental view of the data

Design process:

1. Select business process to model
2. Determine the grain (lowest level of detail) of the business process
3. Chose the dimensions that apply to each fact table row
4. Identify the numeric facts that will populate each fact table row

Day 7

Grain: granularity of the data at the detail level (row) for the measurements in a fact table

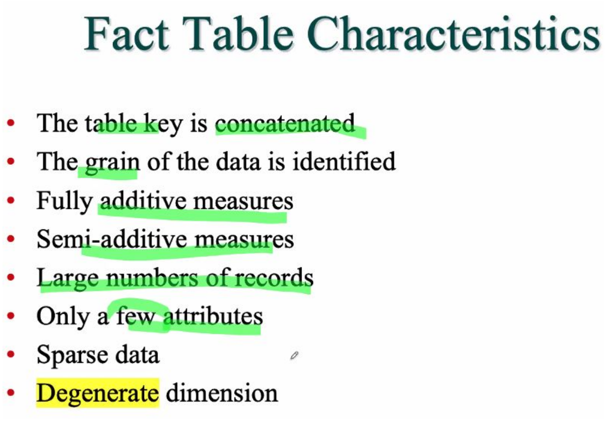
Grain selection - Kimball: “How do you describe a single row in a fact table?” What information does the user need

Ex. Line item on a receipt/bill, boarding pass for flight, monthly snapshot of bank transactions

Important: Keep the fact table at the lowest grain

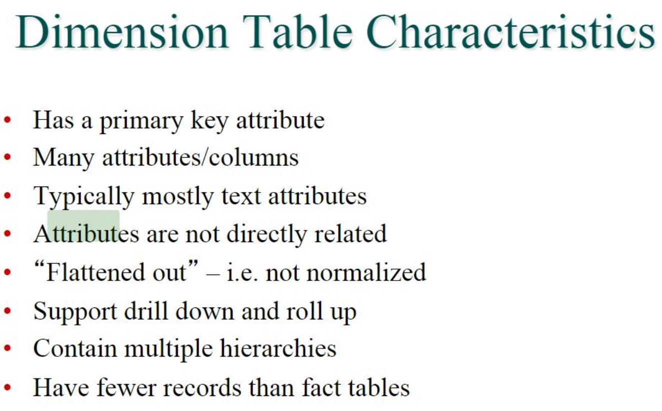
If the data mart is not at the lowest, then you will need to make another dimensional table

Universe of discourse: whenever you create a database, you have to describe what the database is for (one sentence) so user can understand what the database (mart in this case) is all about



Fact Table Characteristics

- The table key is concatenated
- The grain of the data is identified
- Fully additive measures
- Semi-additive measures
- Large numbers of records
- Only a few attributes
- Sparse data
- Degenerate dimension



Dimension Table Characteristics

- Has a primary key attribute
- Many attributes/columns
- Typically mostly text attributes
- Attributes are not directly related
- “Flattened out” – i.e. not normalized
- Support drill down and roll up
- Contain multiple hierarchies
- Have fewer records than fact tables

Day 8

In person class going over Exercise 2.