Business School
UNIVERSITY OF COLORADO DENVER

Information Systems Program

Module 3
Data Warehouse Design Practices and Methodologies

Lesson 5: Mini Case for Data Warehouse Design

Lesson Objectives

- Practice with data warehouse design problems
- Prepare for data warehouse design assignment
- Gain insights about analyzing data sources

Mini Case on Data Warehouse Design

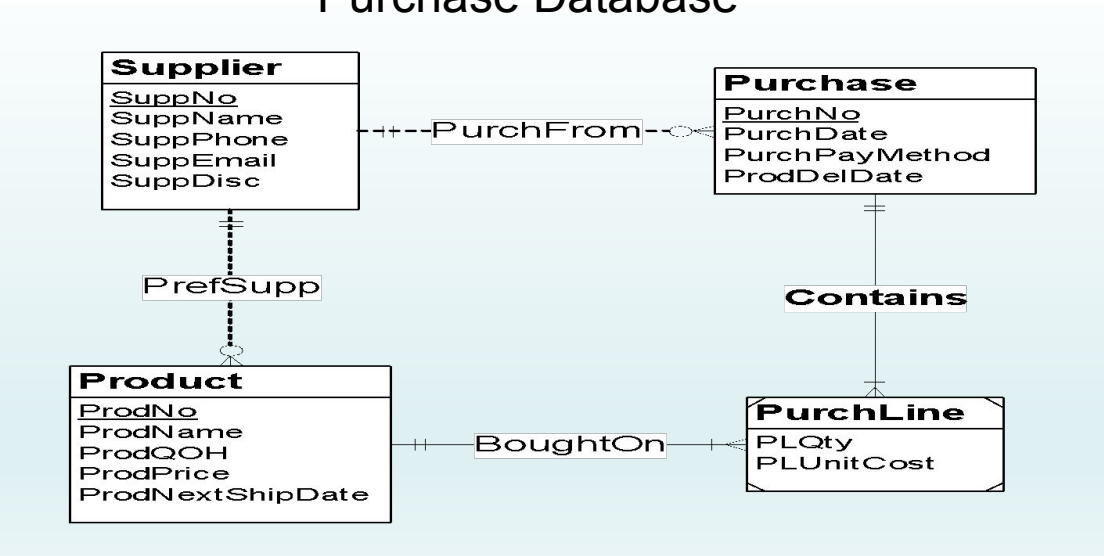
- Apply and integrate skills from module 3 lessons
- Acquire new skills
- Data source specifications, business needs, and sample data

Design Requirements

Specify dimensions and measures	Determine grain	Create table design	Identify summarizability problems and suggest resolutions	Map data sources and populate tables

Data Sources

Purchase Database



Purchases Spreadsheet for Custom Products

ProdCode	ProdDesc	Supp	Qty	Stock	Unit Price	PurDate	Amount
CPC1	Souvenir 1	Omart	20	1	$2.00	13-Feb-2018	$40.00
CPC2	Souvenir 2	Smart	10	2	$3.50	14-Feb-2018	$35.00
CPC3	Souvenir 3	Pmart	20	0	$1.50	11-Feb-2018	$30.00

Business Intelligence Needs

- Track inventory over time by product and supplier
- Calculate inventory measures over time using quantity on hand and value
- Report on additions to inventory (purchases)
- No reporting on deletions to inventory (orders)

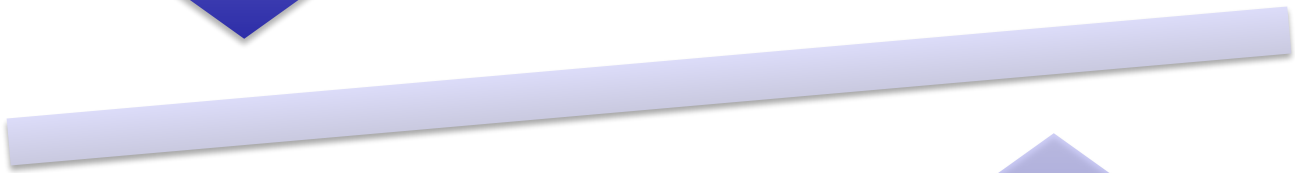
Important Design Decisions

- Grain determination and relative size calculations
- Simplification
- Mappings from source data to populate data warehouse tables

Grain Size Calculations

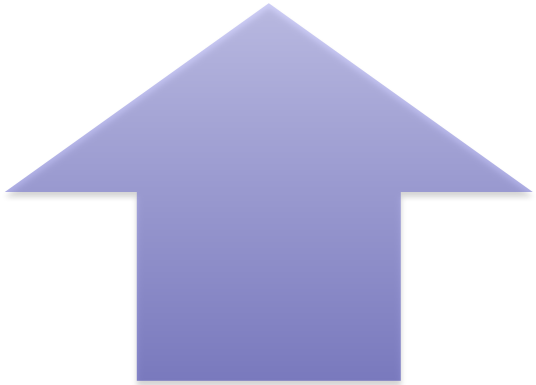
Fact table size

- Use sizes of dimensions and estimate sparsity
- Fill Ratio: 1 - Sparsity
- Fact Table Size: Product of dimension sizes times fill ratio



Sparsity

- Match fact table to source tables
- Use sizes of dimensions and source table
- Fill Ratio: Source table size divided by product of dimension table sizes
- Sparsity: 1 – Fill Ratio



Mappings from Source Data

Associations

- **Source column matching**
- **Conversions**

Additions

- **Generated PK values**
- **Default values**
- **Derived values**

Data Warehouse Design Assignment

- Similar to design exercise
- Artifacts
  - Dimensional design with dimensions and members
  - ERD integrating data sources
  - Grain analysis
  - Summarizability problems and resolutions
  - Mapping from data sources
  - Population of DW tables using sample data from data sources

Summary

- Mini case study to help apply and integrate concepts and skills
- Case study requirements and data sources
- Concept extensions
  - Grain size
  - Mapping source data to data warehouse

Grain Size Determination

- Determine sparsity
  - Given dimension cardinalities and source table cardinality
  - Associate fact table to tables of data source
  - 1 minus source table cardinality divided by product of dimension cardinalities
- Determine fact table size
  - Given dimension cardinalities and sparsity estimate
  - Product of dimension cardinalities
  - Reduce by sparsity