



Business School  
UNIVERSITY OF COLORADO DENVER

Information Systems Program

# Module 3

## Data Warehouse Design Practices and Methodologies

### Lesson 3: Summarizability Patterns for Dimension Tables



# Lesson Objectives

- Recognize data patterns with dimension summarizability problems
- Recognize cardinalities in schema designs for dimension summarizability problems
- Explain ways to resolve dimension summarizability problems



# Summarizability Motivation

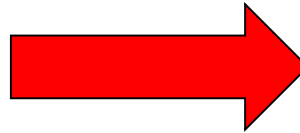
- Summary computations in navigation and join operations
- Violations of summarizability
  - Incorrect results
  - Erroneous decision making and user confusion
  - Inability to use performance optimizations
- Relationships among dimension levels and dimension and fact tables



# Drill Down Incompleteness Example

College	Enrollment
Business	1,250
CLAS	555
Eng	1,070
Total	2,875

Drill down



Department	Enrollment
Civil Eng.	150
Comp. Sc.	650
Economics	330
Electrical Eng.	270
Math	225
Total	1,625



# Roll-up Incompleteness Example

Product	Sales
Beer	5
Bread	10
Milk	10
Napkin	20
Tuna	15
Total	60

Rollup

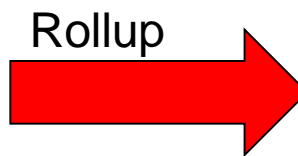


Category	Sales
Drink	15
Food	25
Total	40

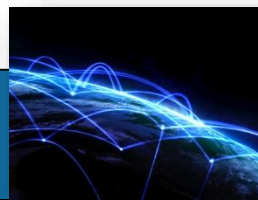


# Non Strict Example

Week	Sales
1-2017	5
2-2017	10
3-2017	10
4-2017	10
5-2017	20
6-2017	10
7-2017	10
8-2017	10
9-2017	10
Total	95

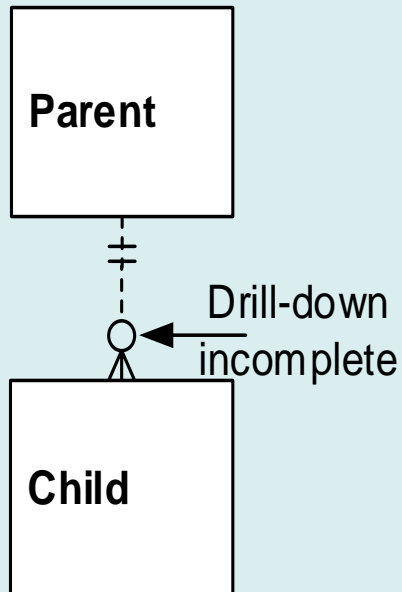


Month	Sales
Jan-2017	37
Feb-2017	53
Total	90

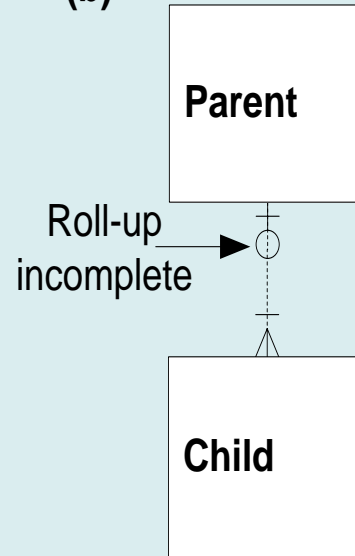


# Dimension Non Summarizability Patterns

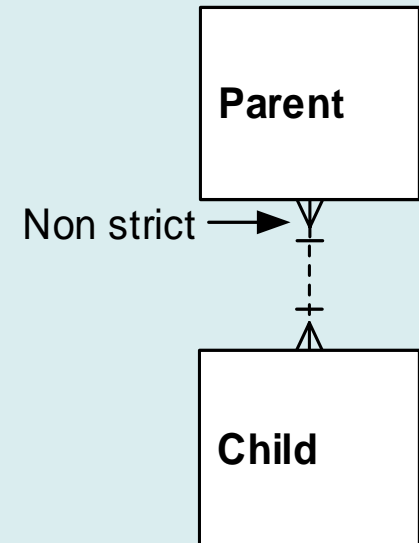
(a)



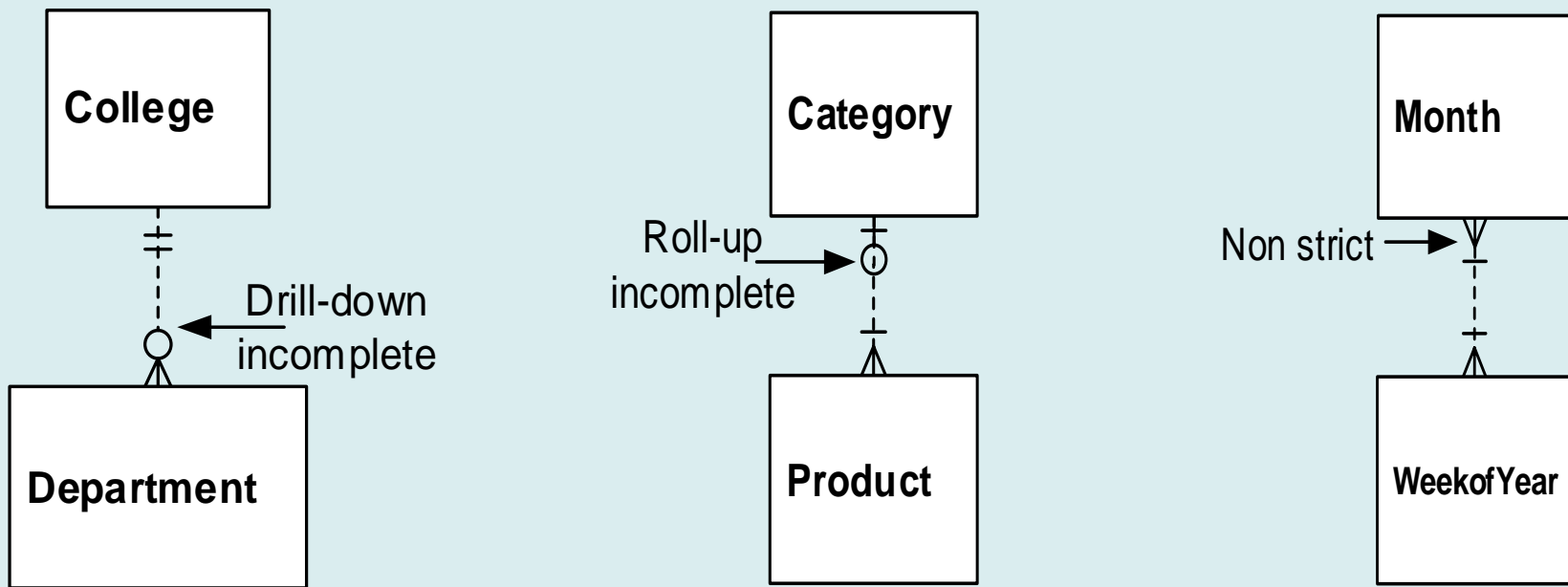
(b)



(c)



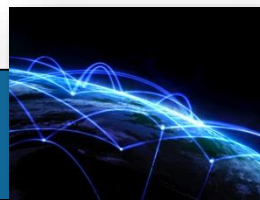
# Dimension Non Summarizability Examples





# Resolving Dimension Problems

- Drill-down and roll-up problems due to exceptions
- Incomplete drill down: add connection to unallocated children
- Incomplete rollup: add connection to unallocated parent
- Non strict relationship (M-N) among dimensions
  - Design error
  - Use separate hierarchies or a major parent category



# Summary

- Importance of understanding summarizability problems
- Incomplete hierarchical dimension relationships
- Non strict relationships among hierarchy levels
- Tedious to discover and resolve



# Summary of Dimension Patterns

Pattern	Conditions
Drill down complete	Parent min cardinality = 1
Drill down incomplete	Parent min cardinality = 0
Rollup complete	Child min cardinality = 1
Rollup incomplete	Child min cardinality = 0
Non strict	Child max cardinality = many
Unusual	Parent max cardinality = 1
Regular	Parent min, max cardinality = (1, M) Child min, max cardinality = (1, 1)

