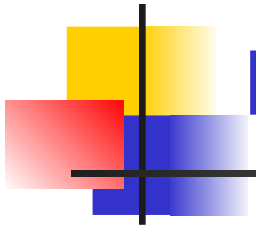
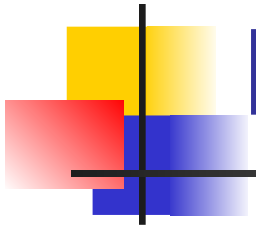
A multi-dimensional data model



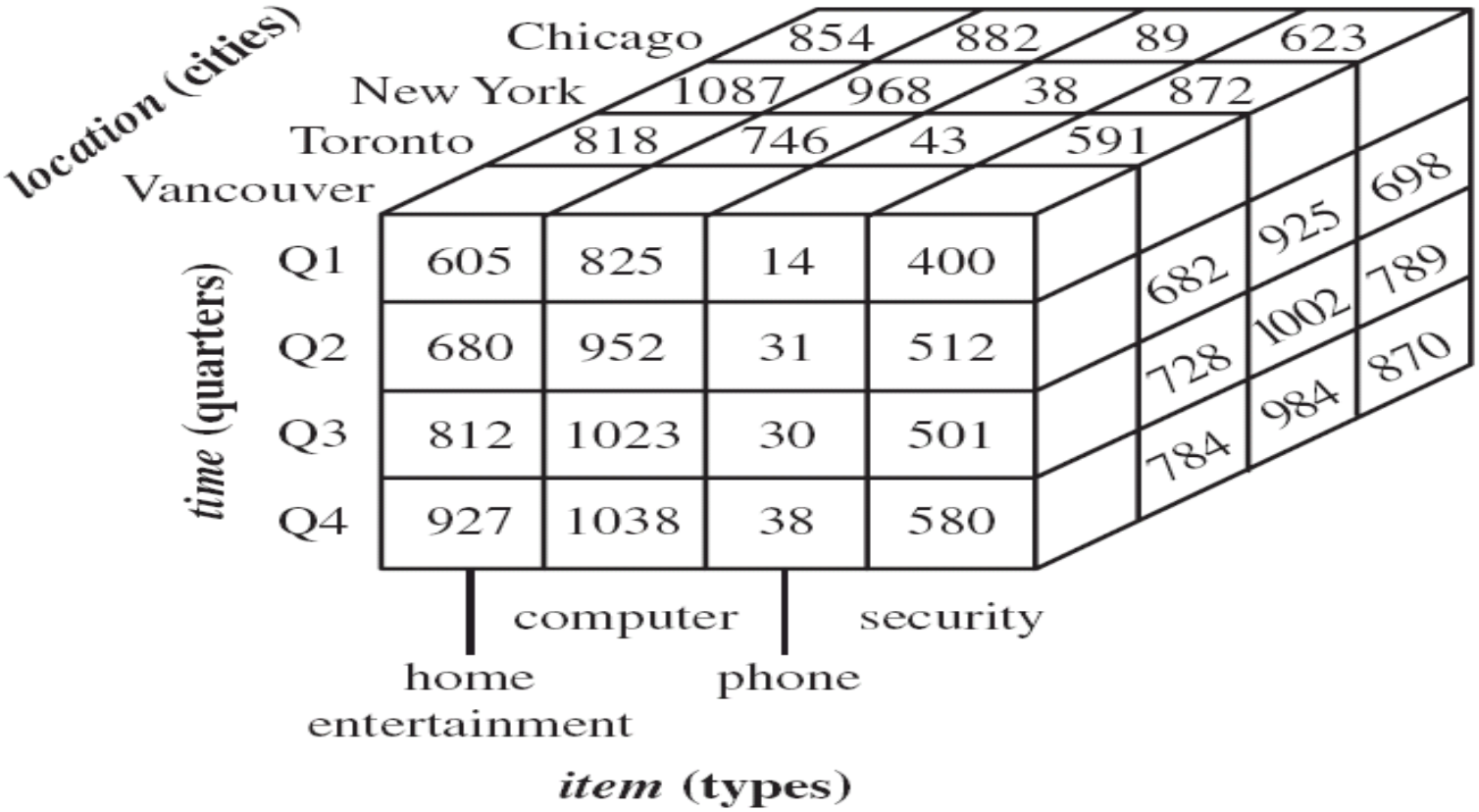
- A data warehouse is based on a multidimensional data model which views data in the form of a data cube



Data cube

- A data cube, such as sales, allows data to be modeled and viewed in multiple dimensions
- Suppose ALLELETRONICS create a *sales* data warehouse with respect to dimensions
  - Time
  - Item
  - Location

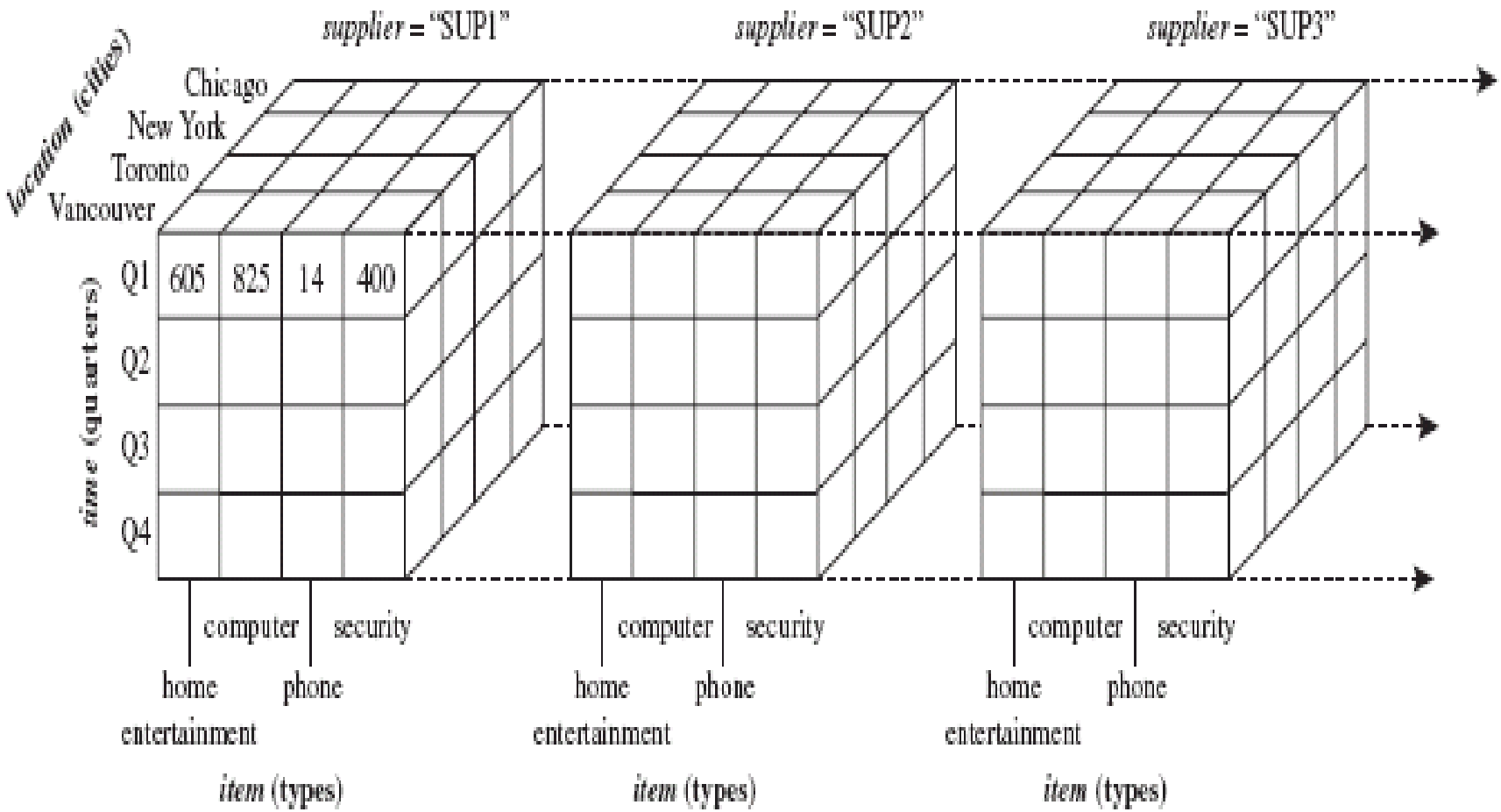
3D Data cube Example

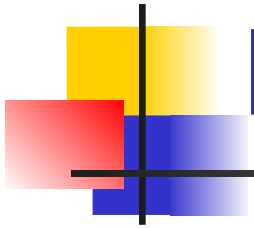


Data cube

- A data cube, such as sales, allows data to be modeled and viewed in multiple dimensions
- Suppose ALLELETRONICS create a *sales* data warehouse with respect to dimensions
  - Time
  - Item
  - Location
  - Supplier

4D Data cube Example

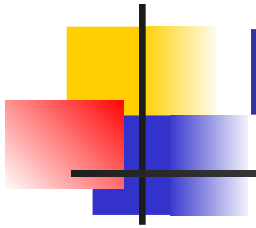




Practice Question

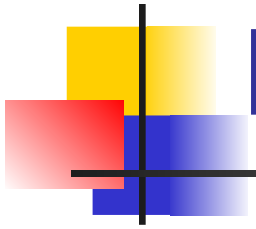
- What is a 5D cube looks like?

Conceptual Modeling of Data Warehouses



- Star schema
- Snowflake schema
- Fact constellations

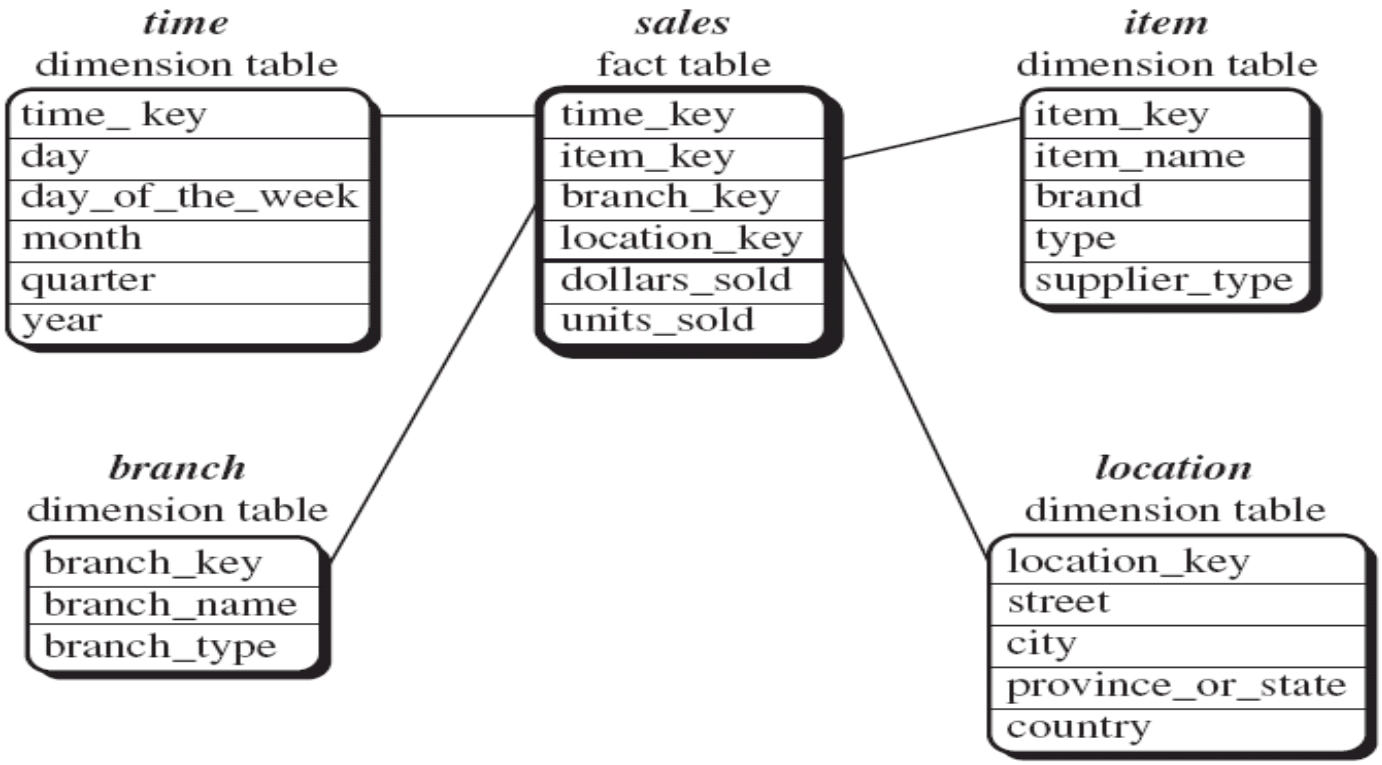
Conceptual Modeling of Data Warehouses



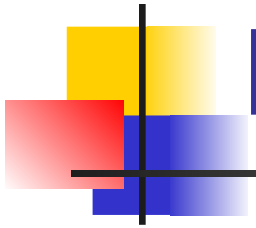
- Star schema: A fact table in the middle connected to a set of dimension tables

- It contains:
  - A large central table (fact table)
  - A set of smaller attendant tables (dimension table), one for each dimension

Star schema


time
dimension table
time_ key
day
day_of_the_week
month
quarter
year
sales
fact table
time_key
item_key
branch_key
location_key
dollars_sold
units_sold
item
dimension table
item_key
item_name
brand
type
supplier_type
branch
dimension table
branch_key
branch_name
branch_type
location
dimension table
location_key
street
city
province_or_state
country

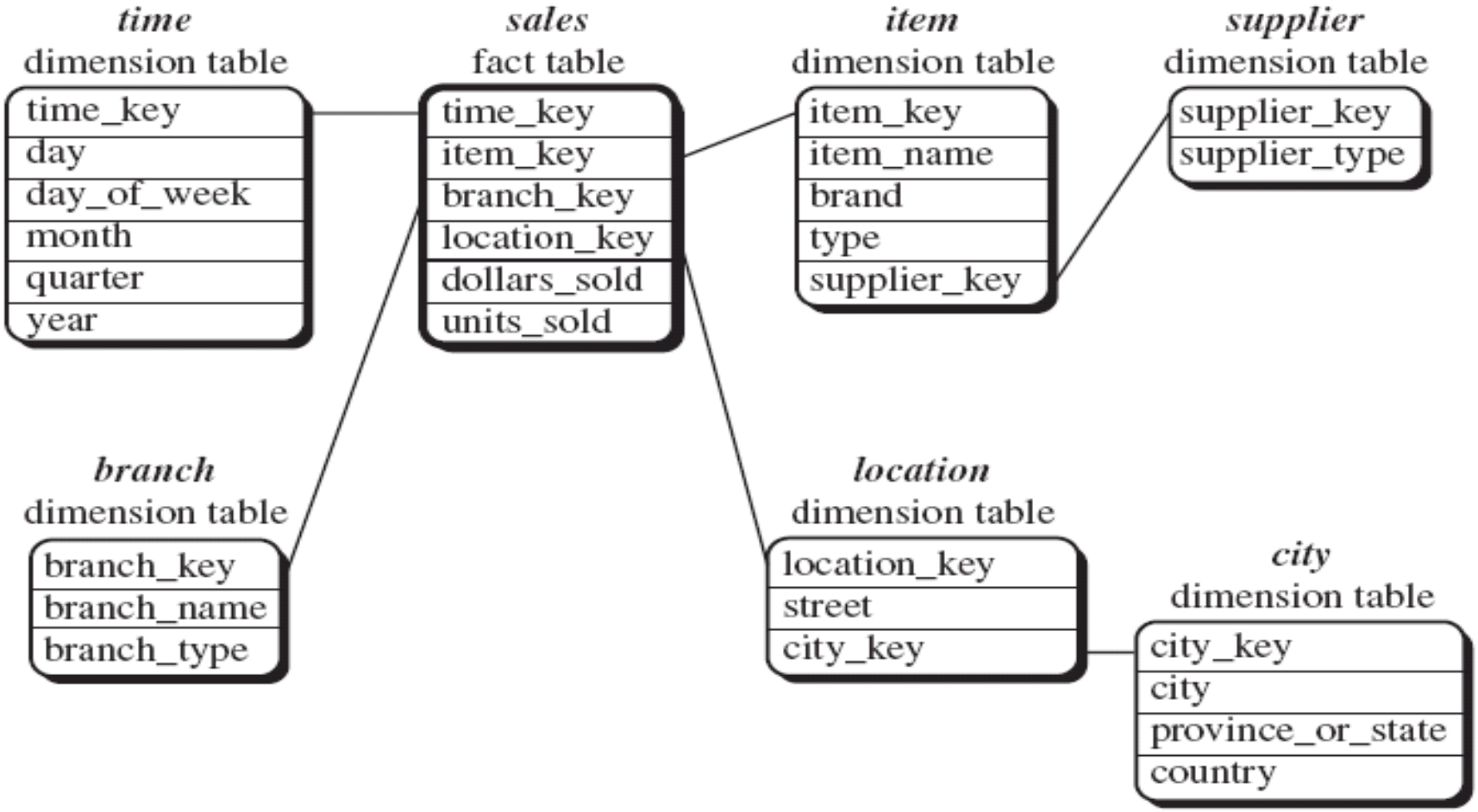
Conceptual Modeling of Data Warehouses



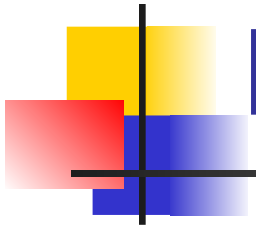
- Snowflake schema: A refinement of star schema where some dimensional hierarchy is further splitting (normalized) into a set of smaller dimension tables, forming a shape similar to snowflake

- However, the snowflake structure can reduce the effectiveness of browsing, since more joins will be needed

Snowflake schema



Conceptual Modeling of Data Warehouses



- Fact constellations: Multiple fact tables share dimension tables, viewed as a collection of stars, therefore called galaxy schema or fact constellation

Fact constellations