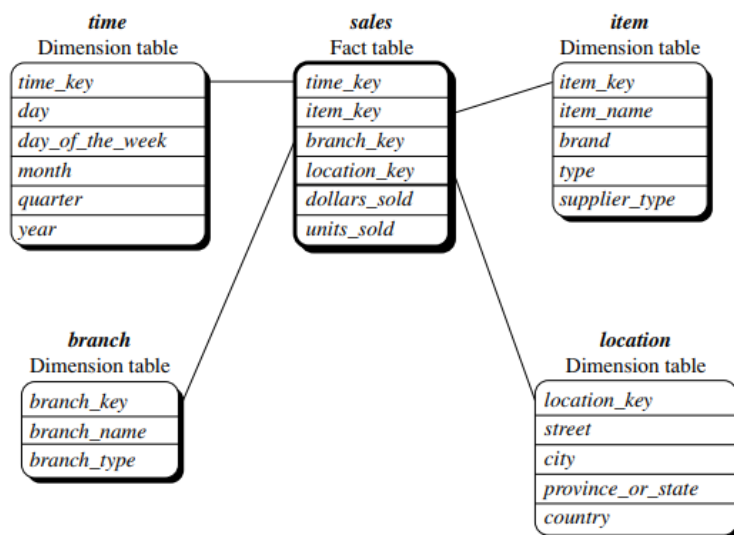


Q1.

**Example 4.1 Star schema.** A star schema for *AllElectronics* sales is shown in Figure 4.6. Sales are considered along four dimensions: *time*, *item*, *branch*, and *location*. The schema contains a central fact table for *sales* that contains keys to each of the four dimensions, along

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**figure 4.6** Star schema of *sales* data warehouse.

**OLAP query processing.** Suppose that we define a data cube for *AllElectronics* of the form “*sales\_cube* [*time*, *item*, *location*]: *sum(sales.in\_dollars)*.” The dimension hierarchies used are “*day* < *month* < *quarter* < *year*” for *time*; “*item\_name* < *brand* < *type*” for *item*; and “*street* < *city* < *province\_or\_state* < *country*” for *location*.

Then perform the following operations:

- “Compute the sum of sales, grouping by city and item.”
- “Compute the sum of sales, grouping by city.”
- “Compute the sum of sales, grouping by item.”
- What is the maximum number of cells in the base cuboid.
- What is the minimum number of cells in base cuboid.

Q2.

Suppose that a data warehouse consists of the four dimensions *date*, *spectator*, *location*, and *game*, and the two measures *count* and *charge*, where *charge* is the fare that a spectator pays when watching a game on a given date. Spectators may be students, adults, or seniors, with each category having its own charge rate.

Starting with the base cuboid [*date*, *spectator*, *location*, *game*], what specific *OLAP operations* should you perform in order to list the total charge paid by student spectators at *GM\_Place* in 2010?

- (i) And implement that operation using OLAP query language.
- (ii) Perform roll up operation from date to year.
- (iii) What is the average charge paid by students, adults and seniors for each category you need to compute average?
- (iv) Draw the snowflake schema diagram for the data ware house.