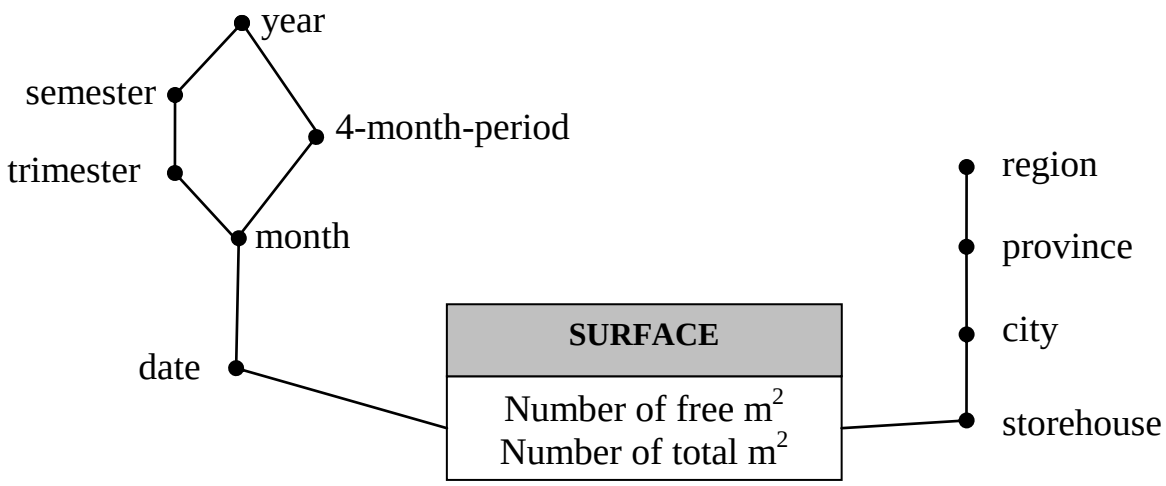
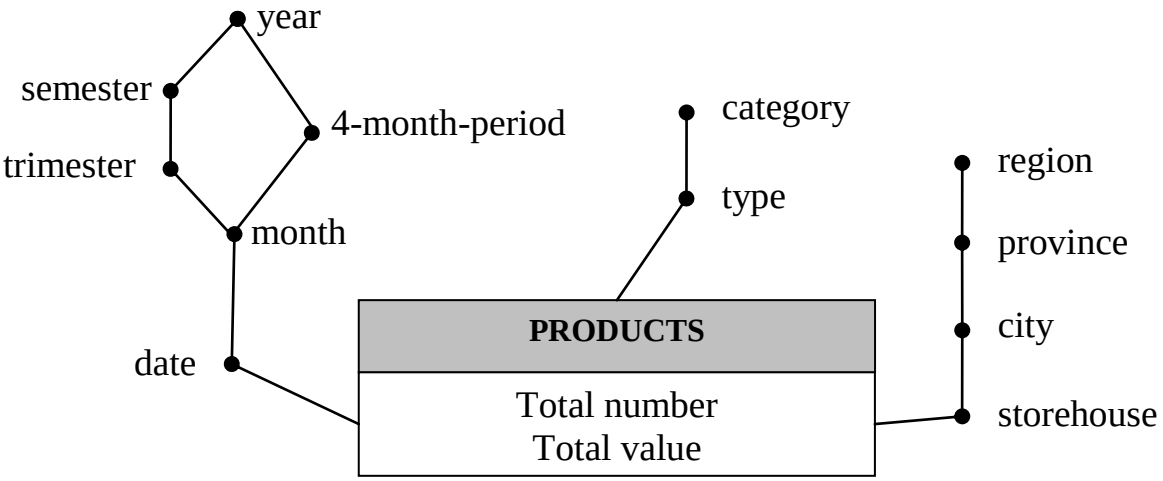
Data Base and Data Mining Group of Politecnico di Torino

Database Management Systems

Politecnico di Torino - School of Information Engineering
Master of Science in Computer Engineering

Conceptual design





Logical design

Primary keys are underlined.

Facts

SURFACE (storehouseID, timeID, m2free, m2tot)
PRODUCTS (storehouseID, timeID, typeID, totNumber, totValue)

Dimensions

TIME (timeID, date, month, trimester, 4month-period, semester, year) → shared both facts
TYPES (typeID, type, category) → only for Products fact
STOREHOUSES (storehouseID, storehouse, city, province, region) → shared both facts

Query A

```
select
    storehouse, date, sum(totValue),
    avg( sum(totValue) ) over (partition by storehouse order by date range between interval '6' day preceding and current row)
from
    products p, storehouses sh, time t
where
    p.storehouseID=sh.storehouseID and p.timeID=t.timeID and
    t.trimester=1/2003 and sh.city='Turin'
group by
    storehouseID, storehouse, date;
```

Card: 5 x (30 x 3) = 450 << 7300k → a materialized view on this query is convenient.
Removing the constraints on trimester and city, the view would be useful to answer query **d** and **e** too.

NB: averaging the daily total value over the last week could be done using the *sum(sum(totValue)/7)* expression, which handles missing days as if their *totValue* were 0, while the proposed solution fills missing values with the week average; furthermore note that *totValue* is a level measure, thus there should be no missing values in the data warehouse.

Query B

```
select
    city, date,
    sum(m2free)/sum(m2tot)*100,
    rank() over (order by sum(m2free)/sum(m2tot) asc)
from
    surface s, storehouses sh, time t
where
    s.storehouseID=sh.storehouseID and s.timeID=t.timeID and t.year=2004
group by
    city, date;
```

Card: 90 x 365 = 32850 ≈ 73000 → a materialized view on this query is NOT convenient.

Query C

```
select
    storehouse, date, (m2free/m2tot)*100,
from
    products p, storehouses sh, time t
where
    p.storehouseID=sh.storehouseID and p.timeID=t.timeID and
    t.month>=1/2004 and t.month<=6/2004
group by
    storehouseID, storehouse, date;
```

Card: 100 x (30 x 6) = 18000 ≈ 73000 → a materialized view on this query is NOT convenient.

Query D

```
select
    storehouse, month,
    sum(totValue)/count(distinct date)
from
    products p, storehouses sh, time t
where
    p.storehouseID=sh.storehouseID and p.timeID=t.timeID and t.year=2003
group by
    storehouseID, storehouse, month;
```

Alternative solution:

```
select distinct
    storehouse, month,
    avg( sum(totValue) ) over (partition by storehouse, month)
from
    products p, storehouses sh, time t
where
    p.storehouseID=sh.storehouseID and p.timeID=t.timeID and t.year=2003
group by
    storehouseID, storehouse, date, month;
```

Card: 100 x 12 = 1200 << 7300k → a materialized view on this query is convenient and it helps to answer query **e** too.

NB: the DISTINCT command does **not** remove rows with the same storehouse; it removes duplicate rows considering all attribute values of each row.

Query E

```
select
    region, sum(totValue)/count(distinct date)
from
    products p, storehouses sh, time t
where
    p.storehouseID=sh.storehouseID and p.timeID=t.timeID and t.year=2003
group by
    region;
```

Alternative solution:

```
select distinct
    region, avg(sum(totValue)) over (partition by region)
from
    products p, storehouses sh, time t
where
    p.storehouseID=sh.storehouseID and p.timeID=t.timeID and t.year=2003
group by
    region, date;
```

Card: 40 << 7300k → a materialized view on this query is convenient.

Query F

```
select distinct
    region, month,
    avg(sum(m2free)/sum(m2tot)*100) over (partition by region, month)
from
    surface s, storehouses sh, time t
where
    s.storehouseID=sh.storehouseID and s.timeID=t.timeID and t.year=2004
group by
    region, month, date;
```

Card: 40 x 12 = 480 << 7300k → a materialized view on this query is convenient.