

# Database Management Systems

## Homework #3

An international company is interested in analyzing the number of working and non-working hours (paid holidays) of their employees in its different branches all over the world and in different periods of the year.

Each employee works in a specific department in one of the branches, and, in a specific date, he/she can sum up a given number of working hours and a given number of non-working hours (even zero). Each day can be a working day or a holiday.

The company is particularly interested in analyzing the number of hours in the following periods of the year: from January to May (period 1), from June to September (period 2), and from October to December (period 3) of each year.

Each branch is located in a region, which belongs to a state. States are grouped into disjoint sale areas of the world. Each department has a specific activity sector, for instance: administration, financial, production, sales, etc.

Each employee is characterized by a role and a salary level.

The company is interested in analyzing the number of working hours, non-working hours (paid holidays), working days, and holidays, according to:

- month, 2-month period, 3-month period, semester, year
- month of the year, semester of the year, period (1-2-3), period (1-2-3) of the year
- department, branch, region, state, sale area, activity sector
- role and salary level

### Query 1

Separately for each period (1-2-3) of each year, select

- the total number of non-working hours for each department,
- the percentage of non-working hours for each department with respect to the total of its activity sector

### Query 2

For each year, separately for each branch, select

- the number of daily-average working hours (considering only the working days),
- the number of daily-average non-working hours (considering only the working days),
- the percentage of non-working hours with respect to the total of the working hours,
- the percentage of working hours with respect to the total of the working hours of all branches of the state

### Design

- (a) Design the data warehouse, including both the conceptual model and the fact and dimension tables, to address the given specifications. The data warehouse must allow efficient execution of queries 1 and 2.
- (b) Write Queries 1 and 2 using the extended SQL language.