Data Warehousing

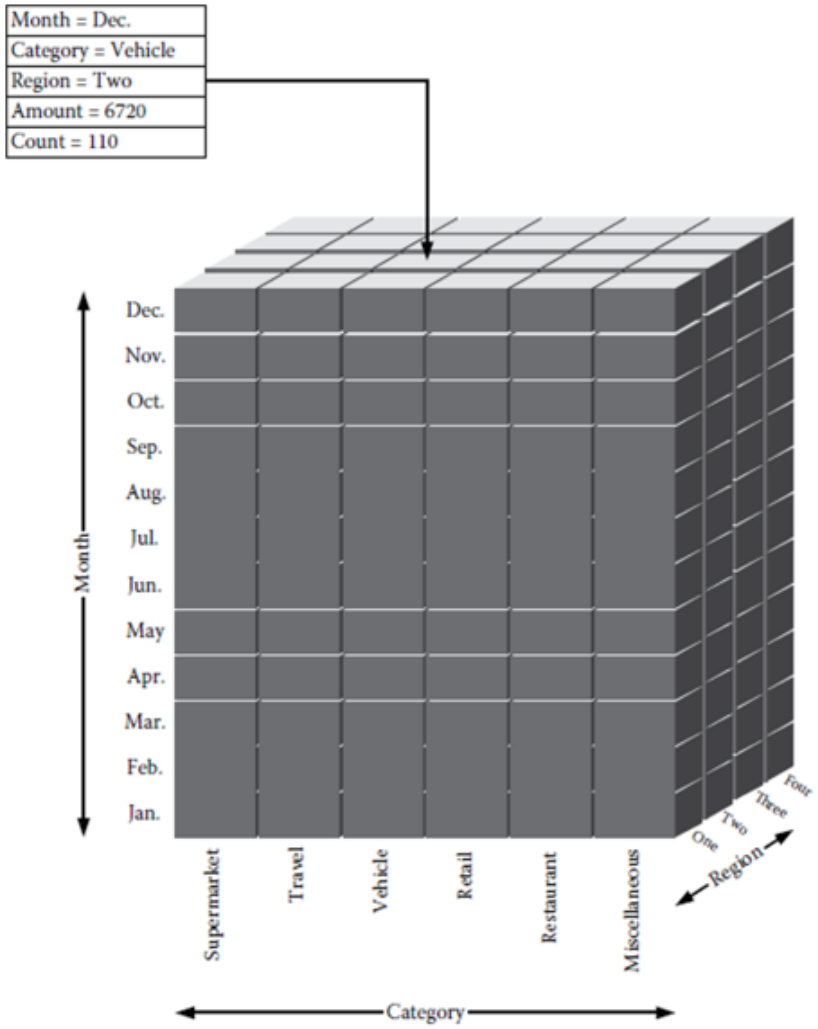
Practical Task # 05 **OLAP**

Task 5a

1. Suppose that a data warehouse for Big University consists of the four dimensions student, course, semester, and instructor, and two measures count and avg grade. At the lowest conceptual level (e.g., for a given student, course, semester, and instructor combination), the avg grade measure stores the actual course grade of the student. At higher conceptual levels, avg grade stores the average grade for the given combination.

a. Draw a snowflake schema diagram for the data warehouse.
b. Starting with the base cuboid [student, course, semester, instructor], what specific OLAP operations (e.g., roll-up from semester to year) should you perform in order to list the average grade of CS courses for each Big University student.
c. If each dimension has five levels (including all), such as "student < major < status < university < all", how many cuboids will this cube contain (including the base and apex cuboids)?

2. Consider the following data cube.



Consider the common OLAP operations: *slice*, *dice*, *roll-up*, *drill-down*, *and pivot*. For each question (query) below, identify which operation(s) are needed to obtain the answer.

a. When (month) is the highest total expenditure?
b. Are restaurant expenditures higher in Toronto in the first quarter or the third quarter?