

## Class Test I

### Course Id: 406035 Data Warehousing and Data Mining

**Date: August 29<sup>th</sup>, 2003.**  
**Max. Marks: 60**

**Total Time: 60 minutes**

A consortium of banks wants to develop a data warehouse for effective decision-making about their loan schemes. The banks provide loans to customers for various purposes like House Building Loan, Car Loan, Educational Loan, Personal Loan, etc. The whole country is categorized into a number of regions, namely, North, South, East and West. Each region consists of a set of states. Loan is disbursed to customers at interest rates that change from time to time. Also, at any given point of time, the different types of loans have different rates. The data warehouse should record an entry for each disbursement of loan to customer.

With respect to the above business scenario, answer the following questions. Clearly state any reasonable assumptions you make.

**10+5+5+5+10+5+10+10+(2)**

1. Design a star schema for the data warehouse clearly identifying the fact table(s), dimensional table(s), their attributes and measures along with the primary key and foreign key relationships.
2. Write an SQL query by which you can display region-wise, bank-wise, year-wise total amount of loans disbursed from your schema.
3. Draw a cuboid that would display the result of the query specified in Q. 2 above.
4. From the cuboid of Q. 3 above, if we want to see the amount of loan disbursed during the year 2000 for the state of Maharashtra, which sequence of OLAP operations would you need to perform?
5. Show the lattice of cuboids for the multi-dimensional data considering all the dimensions in your schema using a single level of hierarchy for each dimension.
6. Draw possible schema hierarchies for each dimension.
7. Based on the schema hierarchies drawn in Q. 6 above, determine the total number of cuboids, considering all the aggregation levels.
8. Once your data warehouse is ready and operational, there is a new requirement to maintain the amount of loan re-paid at the same level of granularity. Extend your star schema to a fact constellation schema to take care of the new requirement.

**Bonus Question:** What is the additivity of the fact(s) in your fact table(s)?