CS 313: Databases and Information Systems Laboratory Assignment - 1

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1.

   a. Michael Ralph Stonebraker is a renowned computer scientist specialising in database systems. In 2014 he was awarded the Turing Award for his contributions to database research. He is the mind behind some of the most well-known database management systems, such as Ingres, Postgres, C-Store, H-Store and SciDB. Stonebraker's early work in relational database systems was done at the University of California, Berkeley, where he was an assistant professor. It was here that he and his colleague started work on Ingres or Interactive Graphics and Retrieval System. Ingres was one of the first practical and efficient implementations of the relational model along with R-Systems from IBM. Ingres was even used as a basis for the Microsoft SQL Server. He later began work on the Postgres or Post Ingres project, which aimed to overcome the relational model's limitations. Postgres added support for complex datatypes and also improved end-to-end performance. The project later formed the basis for today's PostgreSQL.

   b. A data model is an abstract model which standardizes the organisation of data and its relations within the data and with the real world. A good data model allows for the development of an information system which makes it easy to store and access data for various applications. It must also consider the stored data's consistency, completeness and cost of access and storage. The data models must be system independent to ensure widespread usability and consistency. This was the goal of the earliest data models. Then came the relation data models proposed by Edgar F. Codd, which were based on first-order predicate logic. This concept formed the basis for many modern SQL-like data models.

2.

   a. Flipkart (Indian)
   b. UIDAI (Indian)
   c. Sharechat (Indian)
   d. Moj (Indian)
   e. Paytm (Indian)
   f. IRCTC (Indian)
   g. Twitter
   h. Google
   i. Wikipedia

      j. Facebook

3. OLAP stands for online analytical processing. OLAP systems are useful for performing analysis at high speeds on large amounts of multidimensional data, making them ideal for data analytics, business intelligence and other types of complex analysis. Most OLAP databases have an OLAP core that allows for quick querying on multidimensional data. It extends the row-by-column format of traditional relational models into higher dimensions. OLTP stands for online transactional processing. OLTP systems are useful for handling large volumes of real-time transactions, usually over the internet. OLTP databases typically use relational databases which are fine-tuned to be able to handle a large number of relatively simple transactions and enable multi-user access while ensuring integrity, rapid response times and reliability.
OLAP and OLTP vary in the following points,
- OLAP systems can handle much more complex queries, whereas OLTP systems typically handle relatively simple ones.
- The response times of OLTP systems are very low compared to OLAP systems, which are much slower.
- OLAP systems typically store complex multidimensional data, whereas OLTP systems store simple transactions as relational data.
- OLAP systems aren't real-time and need not be backed up frequently to ensure integrity, unlike OLTP systems which need to be backed up frequently due to their real-time nature.

References:

- [Michael Stonebraker - Wikipedia](#)
- [Data Model - Wikipedia](#)
- [Relational Model - Wikipedia](#)
- [OLAP vs OLTP: What's the Difference? - IBM](#)