CHAPTER-11
DATABASE FUNDAMENTALS

Database Transaction:

A transaction is a logical unit of work(LUW) that must succeed or fail in its eternity.
A user views a transaction as a logical sequence of read and write operations whereas
The system views a transaction as a logical sequence of read and write operations.

Transaction Handling Issues:

A transaction can be handled in either of the following two ways:
i) Serially ie. Serial Execution of transactions.
ii)Concurrently ie.Simultaneous execution of transactions.

Transaction Properties:

To ensure data integrity, the database system maintains the following properties of a transaction termed as **ACID** properties.

    a) Atomicity.
    b) Consistency.
    c) Isolation.
    d) Durability.

Data Communication and DBMS:

What is Client /Server computing?

A client is any process that requests to the server for specific services.A server is a process that provides requests for the clients.Both clients and server can reside in the same computer or in different computers connected by a network.

The three components of Client/Server Architecture:

- The Client or The Front End application.
- The Server or The Back End Application.
- The Communication Layer or Middleware.

Network Protocol for Data Communication:

      A protocol means the rules that are applicable for a network.Protocol defines the standardized formats for data packets,techniques for detecting and correcting errors and so on.

There are various protocols that work on the network.TCP/IP (Transmission Control Protocol/internet protocol) is the native protocol of Internet.

TCP/IP is called as a reliable delivery protocol. The TCP layer of TCP/IP is used to verify that whatever was sent by sending machine is received intact by the destination.

The IP layer of TCP/IP determines the route for sending packets from sending machine to the receiving machine. Also it packs the messages into small network transportable packets called datagrams. (A datagram is a collection of the data that is sent as a single message.)

Distributed Databases:

The distributed database may be defined as a database stored and running on a collection of machines that do not have shared memory, yet looks its users like a single database on single computer.

Advantages of distributed databases:

- Sharing.
- Availability.
- Reliability.
- Incremental Growth.
- Distributed Query/Parallel Evaluation.
- Improved Performance.

Allocation of Data in Distributed Database:

A distributed database is broken up into logical units called fragments,which may be assigned for storage at various sites.also,certain data may be stored at more than one site ie.Replication of data.

In a distributed database there are various approaches of data allocation:

- Centralized data at one location.
- Partitioned or fragmented data.
- Complete replication.
- Selective replication.

Data Fragmentation:

Distributed database supports data fragmentation.Data fragmentation can be in any of following Ways.
- Horizontal Fragmentation.
- Vertical Fragmentation.
- Mixed Fragmentation.

Data Replication:

Data replication means storing some data at more than one site.Dat acan be replicated in any of the following ways:

- No replication.
- Partial replication.
- Full replication.

Advantages of distributed database:

- Organizational structure.
- Share ability.
- Improved availability.
- Improved reliability.
- Local autonomy.
- Improved performance.
- Incremental Growth.
- Local autonomy.

Disadvantages of distributed database:

- Complexity.
- Increased Cost.
- Increased Security requirements.
- Lack of Standards.

Assignments

o What is the concept of database transaction?

o What is the function of redo and undo logs?

o Explain the ACID properties of a transaction.

o What is the role of TCP/IP protocol?

o Discuss the problems that are encountered in concurrent execution of transactions.

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