

# *Design Strategies*

RAMNA SATTAR



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## **Design Strategies:**

### ➤ **Top-down approach**

Designing systems from scratch

Homogeneous systems

### ➤ **Bottom-up approach**

The databases already exist at a number of sites

The databases should be connected to solve common tasks



# *Design Strategies*

## **1. Top Down Design Method**

The top-down design method starts from the general and moves to the specific.

In other words, you start with a general idea of what is needed for the system and then work your way down to the more specific details of how the system will interact.

This process involves the identification of different entity types and the definition of each entity's attributes.



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## **2. Bottom Up Design Method**

The bottom-up approach begins with the specific details and moves up to the general.

This is done by first identifying the data elements (items) and then grouping them together in data sets.

In other words, this method first identifies the attributes, and then groups them to form entities.



# *Design Issues*

## **Distributed Design Issues:**

The relations in a database schema are usually decomposed into smaller fragments, but we did not offer any justification or details for this process. The following set of interrelated questions covers the entire issue.

1. Why fragment at all?
2. How should we fragment?
3. How much should we fragment?
4. Is there any way to test the correctness of decomposition?
5. How should we allocate?
6. What is the necessary information for fragmentation and allocation?



# *Data Replication*

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# *Data Replication*

## **Data Replication in DBMS:**

Data Replication is the process of storing data in more than one site or node. It is useful in improving the availability of data. It is simply copying data from a database from one server to another server so that all the users can share the same data without any inconsistency. The result is a distributed database in which users can access data relevant to their tasks without interfering with the work of others.

There can be full replication, in which the whole database is stored at every site. There can also be partial replication, in which some frequently used fragment of the database are replicated and others are not replicated.



# *Data Replication*

## **Types of Data Replication:**

- 1) Transactional Replication*
- 2) Snapshot Replication*
- 3) Merge Replication*

### **■Transactional Replication:**

In Transactional replication users receive full initial copies of the database and then receive updates as data changes. Data is copied in real time from the publisher to the receiving database(subscriber) in the same order as they occur with the publisher therefore in this type of replication , transactional consistency is guaranteed. Transactional replication is typically used in server-to-server environments. It does not simply copy the data changes, but rather consistently and accurately replicates each change.





# *Data Replication*

## ■ **Snapshot Replication:**

Snapshot replication distributes data exactly as it appears at a specific moment in time does not monitor for updates to the data. The entire snapshot is generated and sent to Users. Snapshot replication is generally used when data changes are infrequent. It is bit slower than transactional because on each attempt it moves multiple records from one end to the other end.

## ■ **Merge Replication:**

Data from two or more databases is combined into a single database. Merge replication is the most complex type of replication because it allows both publisher and subscriber to independently make changes to the database. Merge replication is typically used in server-to-client environments. It allows changes to be sent from one publisher to multiple subscribers.



# *Data Replication*

## **Advantages of Data Replication**

### **❑Reliability:**

In case of failure of any site, the database system continues to work since a copy is available at another site(s).

### **❑Reduction in Network Load:**

Since local copies of data are available, query processing can be done with reduced network usage, particularly during prime hours. Data updating can be done at non-prime hours.

### **❑Quicker Response:**

Availability of local copies of data ensures quick query processing and consequently quick response time.

### **❑Simpler Transactions:**

Transactions require less number of joins of tables located at different sites and minimal coordination across the network.



# *Data Replication*

## **Disadvantages of Data Replication**

### **❑ Increased Storage Requirements:**

Maintaining multiple copies of data is associated with increased storage costs. The storage space required is in multiples of the storage required for a centralized system.

### **❑ Increased Cost and Complexity of Data Updating:**

Each time a data item is updated, the update needs to be reflected in all the copies of the data at the different sites. This requires complex synchronization techniques and protocols.

### **❑ Undesirable Application – Database coupling:**

If complex update mechanisms are not used, removing data inconsistency requires complex co-ordination at application level. This results in undesirable application – database coupling.



*THANK YOU*

ANY QUERY???

