

File Based System vs. Database Approach

concurrency: the ability of the database to allow multiple users access to the same record without adversely affecting transaction processing

data element: a single fact or piece of information

data inconsistency: a situation where various copies of the same data are conflicting

data isolation: a property that determines when and how changes made by one operation become visible to other concurrent users and systems

data integrity: refers to the maintenance and assurance that the data in a database are correct and consistent

data redundancy: a situation that occurs in a database when a field needs to be updated in more than one table

database approach: allows the management of large amounts of organizational information

database management software: a powerful software tool that allows you to store, manipulate and retrieve data in a variety of ways

file-based system: an application program designed to manipulate data files

Database Management Systems Fundamental Concepts

concurrency control strategies: features of a database that allow several users access to the same data item at the same time

data elements: facts that represent real-world information

data type: determines the sort of data permitted in a field, for example numbers only

data uniqueness: ensures that no duplicates are entered

database: a shared collection of related data used to support the activities of a particular organization

database constraint: a restriction that determines what is allowed to be entered or edited in a table

database management system (DBMS): a collection of programs that enables users to create and maintain databases and control all access to them

metadata: defines and describes the data and relationships between tables in the database

read and write privileges: the ability to both read and modify a file

read-only access: the ability to read a file but not make changes

self-describing: a database system is referred to as self-describing because it not only contains the database itself, but also metadata which defines and describes the data and relationships between tables in the database

table: a combination of fields

view: a subset of the database

Database Management Systems Classification

Database management systems can be classified based on several criteria, such as the data model, user numbers and database distribution, all described below.

centralized database system: the DBMS and database are stored at a single site that is used by several other systems too

distributed database system: the actual database and the DBMS software are distributed from various sites that are connected by a computer network

heterogeneous distributed database system: different sites might use different DBMS software, but there is additional common software to support data exchange between these sites

homogeneous distributed database systems: use the same DBMS software at multiple sites

multi user database system: a database management system which supports multiple users concurrently

single-user database system: a database management system which supports one user at a time

traditional models: data models that preceded the relational model

Types of Data Models

hierarchical model: represents data as a hierarchical tree structure

instance: a record within a table

network model: represents data as record types

nosql model: represents data as documents, key-values, columns or graphs

object oriented model: represents data as objects

relation: another term for table

relational model: represents data as relations or tables

set type: a limited type of one to many relationship

Database Users

application programmer: user who implements specific application programs to access the stored data

application user: accesses an existing application program to perform daily tasks.

database administrator (DBA): responsible for authorizing access to the database, monitoring its use and managing all the resources to support the use of the entire database system

end user: people whose jobs require access to a database for querying, updating and generating reports

sophisticated user: those who use other methods, other than the application program, to access the database