Introduction to Database

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Today's topics

- What is a Database?
- Data
- Information
- Database Applications
- What was used before databases?
  - Manual or paper based approach
  - File based approach
- Limitations of File based approach
- Lecture summary

Database

- Database is an oraganized collection of logically related data
- The main funtion of a database is
  - Record keeping & Retrieval...موندنه

Data

- Data are raw facts from which the required information is produced.
- Data are distinct pieces of information, usually formatted in a special way.
- Examples of data:

In Employer's Mind	In Sales Person's View
ID	Customer_name
Emp-name	Customer_Account
Department	Address
DOB	City
Qualification	Ph_Number
	State

Information

- Information is processed, organized or summarized data.
- Data are processed to create information, which is meaningful to the recipient.
- Examples of Information:
  - List of students studying DBA
  - Exam grades of a particular student
  - Bank statement of the past 3 months

- Data and information are closely related and are often used interchangeably.

Data vs Information

Here are three additional examples of how data differs from information:

- While data does not depend on information, information does depend on data.
- Data is “input” and information is “output”.
- Data is raw material and information is the product.

Database Applications

Databases touch all aspects of our lives including:

- **Banking:** all transactions
- **Airlines:** reservations, schedules
- **Universities:** registration, grades
- **Sales:** customers, products, purchases
- **Manufacturing:** production, inventory, orders, supply chain
- **Human resources:** employee records, salaries, tax deductions
- And many more…

What was used before databases?

- **Paper based systems**
  - Data was written on papers
  - Stored in hard files & archives for latter use
- **Disadvantages:**
  - Rudandancy, Lack of security, Difficult to find records
  - Difficult to produce useful information, Time consuming
- **Flat File Systems**
  - Data was stored in plain documents such as word, excel, and so on
  - Discussed next…

Flat File Systems

- A flat file system is a type of database that stores data in a single table.
- Flat file databases are generally in plain-text form, where each line holds only one record.
- The fields in the record are separated using delimiters such as tabs and commas.
- Flat file database tables can be set in various application types, including HTML documents, simple word processors or worksheets in spreadsheet applications.

Flat File Systems

Flat-File (one table)

Patient Id	Name	D.o.B	Gender	Phone	Doctor Id	Doctor	Room
134	Jeff	4-Jul-1993	Male	7876453	01	Dr Hyde	03
178	David	8-Feb-1987	Male	8635467	02	Dr Jekyll	06
198	Lisa	18-Dec-1979	Female	7498735	01	Dr Hyde	03
210	Frank	29-Apr-1983	Male	7943521	01	Dr Hyde	03
258	Rachel	8-Feb-1987	Female	8367242	02	Dr Jekyll	06

Limitations of Flat File Systems

We list five problems:

Separation and isolation of data

- Each program maintains its own set of data.
- Users of one program may be unaware of potentially useful data held by other programs.

Duplication of data

- Same data is held by different programs.
- Wasted space and potentially different values and/or different formats for the same item.

Limitations of Flat File Systems

Data dependence

- File structure is defined in the program code.

Incompatible file formats.

- Programs are written in different languages, and so cannot easily access each other's files.

Fixed Queries/Proliferation of application programs

- Programs are written to satisfy particular functions.
- Any new requirement needs a new program.

Lecture summary

- Database in an organized collection of logically related data.
- Databases touch nearly every aspect of our life.
- File based approach has many limitations.
- Database is the alternate solution which provides:
  - Security
  - Integrity
  - Consistency
  - Transparancy
    - To data and information