Lecture 1 notes:

**Why are ‘Databases on the Web’ Important?**

* **Efficient Data Management**: Databases are tried-and-tested technology for handling large amounts of data.
* **Effective Information Presentation**: The Web serves as an excellent medium to present information.
* **Separation of Concerns**:
  + Improves efficiency in updating and finding information.

**Key Concepts:**

* **Database**: An organized collection of data, traditionally paper-based.
* **DBMS (Database Management System)**: Software that enables users to create and maintain databases.
* **Relational Database**:
  + Organizes data into tables.
  + Managed by RDBMS (Relational Database Management System).

History:

|  |  |  |
| --- | --- | --- |
| type | example | +/- |
|  |  | ● Advantages:  ○ Simple to read  ● Disadvantages:  ○ Hard to search  ○ Hard to operate with  ○ Hard to use different formats for an attribute  ○ No specific checking |
|  |  | ● Advantages  ○ Data is structured  ○ Simple to implement  ● Disadvantages  ○ Hard to get the data  ○ No checks of consistency  ○ Too many files |
|  |  | ● Advantages  ○ Checks for the consistency and relations  ● Disadvantages  ○ Only tree structure  ○ No many-to-many |
|  |  | ● Advantages  ○ Allow all relations  ○ Mathematical model  ● Disadvantages  ○ Complex implementation  ○ Hard to represent hierarchical data  ○ Hard to make efficient queries (A Join B) Join C or A Join (B Join C) |
|  |  | ● Advantages  ○ Big choice depending on the problem  ○ Flexible  ○ Fast  ● Disadvantages:  ○ Most things are in code  ○ No optimizer  ○ Very easy to make a mistake |

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A diagram of a work flow

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Relational databases:

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Definition:

○ Data stored in tables that are associated by shared attributes (keys).

○ Any data element (or entity) can be found in the database through the name of the table, the attribute name, and the value of the primary key.

Database Table Keys Definition: A key of a relation is a subset of attributes with the following attributes:

• Unique identification • Non-redundancy

PRIMARY KEY

● Serves as the row level addressing mechanism in the relational database model.

● It can be formed through the combination of several items.

FOREIGN KEY

● A column or set of columns within a table that are required to match those of a primary key of a second table.

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Keys

● Candidate keys are any attribute or combination of attributes that uniquely identify a record. The entire record is a candidate key.

● A Primary Key is one candidate key. A good primary key is short and does not change over the life of the database.