

Computers I

6. Databases

Database means an organized collection of data. Databases have become a standard component of systems and are found in every great system. Databases are crucial in the daily functioning of businesses and even governments.

6.1 Database Concepts

Data is increasing exponentially

Data degrades over time and becomes outdated this is known as **data rot**.

Data must have the bellow always

- Security
- Quality
- Integrity

This can be easily jeopardized because data can be

- Inconsistent
- Conflicting

Without a database, a company can drown in unstructured data.

In order to solve this, data must be **governed**.

Data Governance – is the process of managing information across an entire organization.

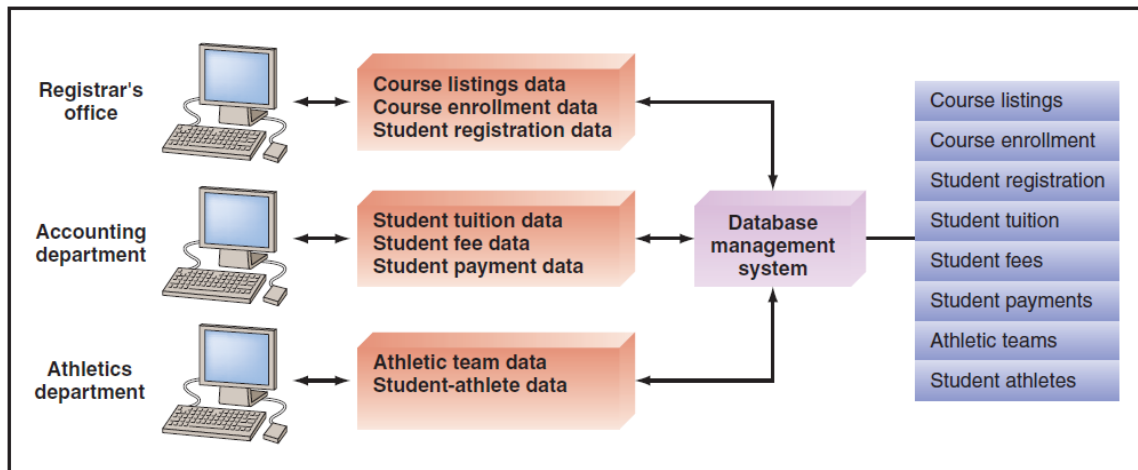
Data Governance involves master data.

Master Data -

- Span all aspect of an organization
- Allows an organization to store, maintain, exchange, and synchronize a consistent, and accurate **single version** of the truth.

Database solved all of these issues

- **Data redundancy** - The same data are stored in many places
- **Data isolation** - Applications cannot access data associated with other applications
- **Data inconsistency** - Various copies of the data do not agree.



6.2 Object and Relational Databases

There are two types of database architectures.

Object Oriented and Relational

Relational Databases are the most popular and are widely used by organizations.

Examples include Microsoft Access and Oracle.

In relational databases each row must have a unique primary key.

This primary key serves as the identifier.

Hypothetical Relational Database Model

PubID	Publisher	PubAddress
03-4472822	Random House	123 4th Street, New York
04-7733903	Wiley and Sons	45 Lincoln Blvd, Chicago
03-4859223	O'Reilly Press	77 Boston Ave, Cambridge
03-3920886	City Lights Books	99 Market, San Francisco

AuthorID	AuthorName	AuthorBDay
345-28-2938	Haile Selassie	14-Aug-92
392-48-9965	Joe Blow	14-Mar-15
454-22-4012	Sally Hemmings	12-Sept-70
663-59-1254	Hannah Arendt	12-Mar-06

ISBN	AuthorID	PubID	Date	Title
1-34532-482-1	345-28-2938	03-4472822	1990	Cold Fusion for Dummies
1-38482-995-1	392-48-9965	04-7733903	1985	Macrame and Straw Tying
2-35921-499-4	454-22-4012	03-4859223	1952	Fluid Dynamics of Aqueducts
1-38278-293-4	663-59-1254	03-3920886	1967	Beads, Baskets & Revolution

6.3 Database Management Systems

Databases are integrated via a Database Management System or DBMS.

DBMS – A type of software that

- Creates
- Stores
- Organizes
- And access data from a database.

A database management system uses a query language to request information from a database.

Query is a synonym for question

The most popular is SQL

SQL – Structured Query Language

SQL is a great query language because

- Allows users to perform complicated searches using simple statements

Some simple statements

- SELECT – specifies an attribute
- FROM – specifies the table to be used
- WHERE – specifies condition to apply

SQL Example:

```
SELECT Student Name
```

```
FROM Student Database
```

```
WHERE Grade Point Average > 3.40 and Grade Point Average < 3.60
```

```
SELECT      EmployeeID, FirstName, LastName, HireDate, City
FROM        Employees
WHERE       HireDate NOT BETWEEN '1-june-1992' AND '15-May 1993'
```

6.3.1 MySQL, Access, and Oracle

Some examples of DBMS are MySQL, Access, and Oracle.

These databases can be described as RDBMS because they all have a relational architecture.

RDBMS ranks based on users as of May 2014

Oracle is ranked first

MySQL is ranked second

Access is ranked seventh

MySQL does not have a GUI and you simply input the commands and read the output.

However, MySQL Workbench is available and provides an interface. Developed by Oracle

