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What is a Data Model?

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What we discussed in the last class

- How did the Big Data Revolution happen?
- What are structured and unstructured data?
- What is the difference between a Data Lake and a Data Warehouse?
- Finally, what is the formal definition of Big Data?

What is a Data Model?

A Data Model is an abstract design that specifies the following two things.

- **How to store a data:** When a new piece of data is generated or acquired by your system, how that data should be stored.
- **How to perform query for a data:** When someone performs a query for any data, how that query should be handled.

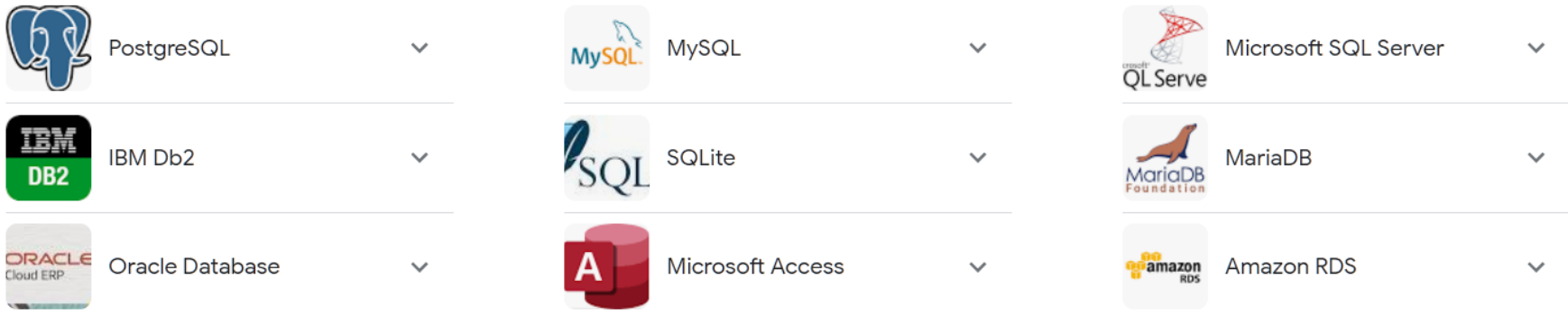
What is a Database Management System (DBMS)?

A DBMS is a **physical implementation** of one or more abstract Data Models.

Example:

The **Relational Data Model** is a data model that exists only on pen and paper.

The following **DBMS software suites** physically implement the Relational data model. The list is not exhaustive.



Keywords related to a DBMS software

Database(s): It is simply the **physical storage** underlying a DBMS software where the data gets stored, e.g., hard disks.

Query Language(s): It is a **programming language** used for performing queries in a DBMS software.

An example from SQL (Structured Query Language):

SELECT eMail from StudentsTable;

#	Roll No	Student Name	eMail	Registered_as	Course Type
1	B21AI001	KAMUJU AASHISH	kamuju.1@iitj.ac.in	Credit	PC
2	B21AI002	ABHISHEK ARYA	arya.7@iitj.ac.in	Credit	PC
3	B21AI003	ADARSH RAJ SHRIVASTAVA	shrivastava.10@iitj.ac.in	Credit	PC
4	B21AI004	ADEEM HARIS	haris.1@iitj.ac.in	Credit	PC
5	B21AI005	AKRITI GUPTA	gupta.97@iitj.ac.in	Credit	PC
6	B21AI006	ARVIND KUMAR SHARMA	sharma.126@iitj.ac.in	Credit	PC
...

How many Data Models are there?

- Hierarchical model (IBM, 1960s)
- Network model (Charles Bachman, GE, 1970s)
- Relational model (Edgar Codd, IBM, 1970s)
- Document model (The #NoSQL movement, 2010s)
 - “Not only SQL”
- etc.

What we discussed today

- What is a Data Model?
- What is a Database Management System (DBMS)?
- How many data models are there?

What we will discuss in the next class

- What are the properties of each Data Model?

Thank you

Development of the World Wide Web

In 1970, Dr. Edgar Codd at IBM wrote a paper proposing the Relational Data Model.

