

# A quick overview of the databases

Week-02: Database History

# Ancient Origins of Databases

- Ancient civilizations, such as the Sumerians and Egyptians, used archives to keep records of important information
- The Library of Alexandria in ancient Egypt was one of the earliest known examples of a database
- These early databases were used for things like tax records, legal documents, and inventory management



# The Emergence of Mechanical Databases



<https://www.edn.com/hollerith-applies-for-punch-card-counting-machine-patent-june-8-1887/>

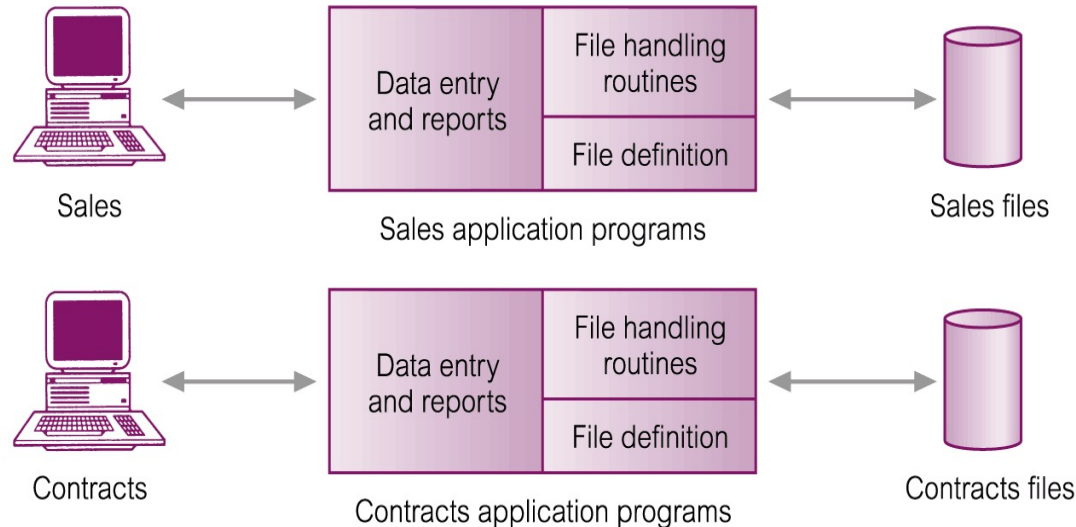
- With the advent of mechanical calculating devices in the 19th century, databases began to take on new forms
- Herman Hollerith's punched card system, used for the 1890 US Census, was one of the first examples of a mechanical database
- Punched card systems were widely used in the early 20th century for things like inventory management and accounting

# Early Electronic Databases

- In the mid-20th century, electronic computers began to be used for storing and managing databases
- The UNIVAC I (UNIVersal Automatic Computer I) was one of the first computers to be used for this purpose
- In the 1960s, IBM developed the Integrated Data Store (IDS), which marked the beginning of modern databases
- Early databases were mainly used by large corporations and government agencies
- Most databases were file-based.

# File-based Systems

## The Deprecated Approach



**Figure 1.5**

File-based processing.

### Sales Files

**PropertyForRent** (propertyNo, street, city, postcode, type, rooms, rent, ownerNo)

**PrivateOwner** (ownerNo, fName, lName, address, telNo)

**Client** (clientNo, fName, lName, address, telNo, prefType, maxRent)

### Contracts Files

**Lease** (leaseNo, propertyNo, clientNo, rent, paymentMethod, deposit, paid, rentStart, rentFinish, duration)

**PropertyForRent** (propertyNo, street, city, postcode, rent)

**Client** (clientNo, fName, lName, address, telNo)

*Pearson Education © 2009*

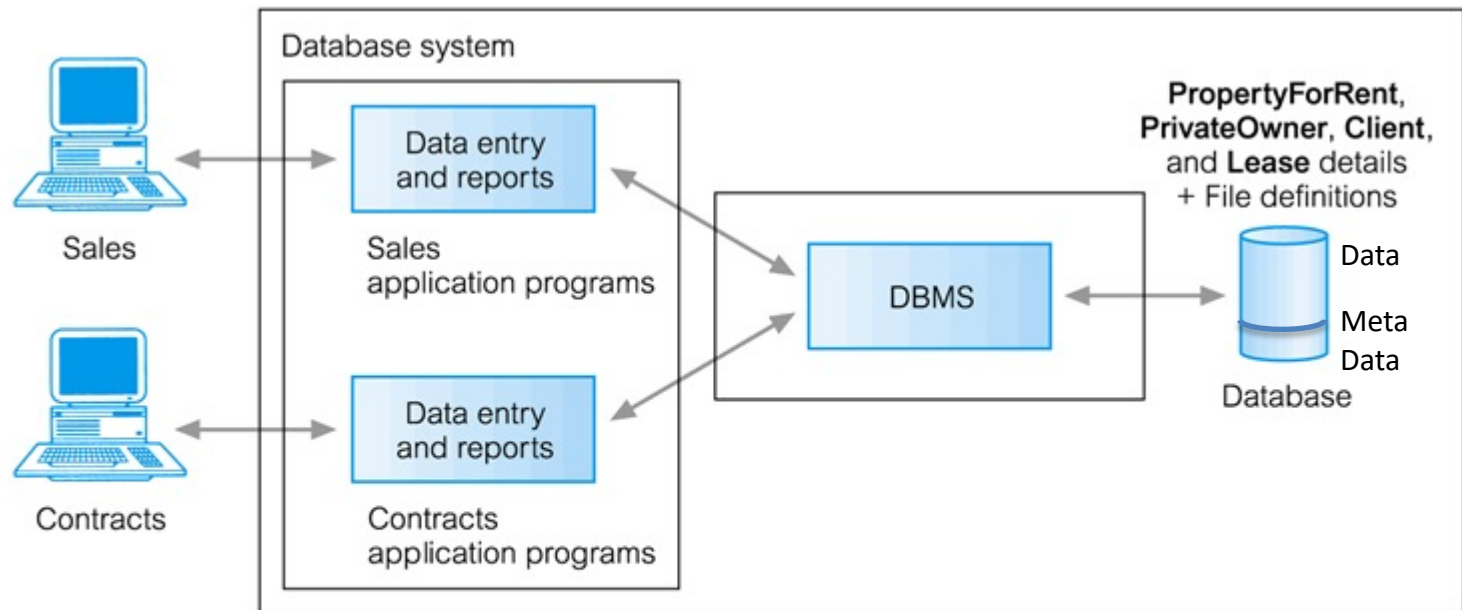
# The birth of the relational model

- In the 1970s, IBM researcher E.F. Codd proposed the relational model for databases.
- This model represented data in the form of tables with rows and columns, making it easy to query and manipulate data
- Codd's paper, "A Relational Model of Data for Large Shared Data Banks," laid the foundation for the development of relational databases

First Name	Last Name	Address	City	Age
Mickey	Mouse	123 Fantasy Way	Anaheim	73
Bat	Man	321 Cavern Ave	Gotham	54
Wonder	Woman	987 Truth Way	Paradise	39
Donald	Duck	555 Quack Street	Mallard	65
Bugs	Bunny	567 Carrot Street	Rascal	58
Wiley	Coyote	999 Acme Way	Canyon	61
Cat	Woman	234 Purrfect Street	Hairball	32
Tweety	Bird	543	Itotltaw	28

Table source: [https://www.teach-ict.com/gcse\\_new/databases/terminology/miniweb/pg2.htm](https://www.teach-ict.com/gcse_new/databases/terminology/miniweb/pg2.htm)

# The Database Approach



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*Adopted from Pearson Education © 2009*



# The rise of relational databases

- In the 1980s, relational databases began to gain widespread acceptance
- Companies like Oracle, IBM, and Microsoft developed their own relational database management systems (RDBMS)
- Relational databases became the dominant model for database management, and they continue to be widely used today



# Object-oriented Databases

- In the 1980s and 1990s, object-oriented databases began to emerge
- These databases added support for objects and classes, allowing for more advanced modeling of data
- Object-oriented databases never gained widespread acceptance, but they did find use in certain niche areas such as CAD/CAM and geographic information systems

# The emergence of NoSQL Databases

- In the late 2000s, a new type of database called NoSQL (short for "not only SQL") emerged
- NoSQL databases were designed to handle big data and high-performance workloads
- They use a variety of data models, such as document, key-value, and graph, and are often distributed across multiple machines

# Timeline

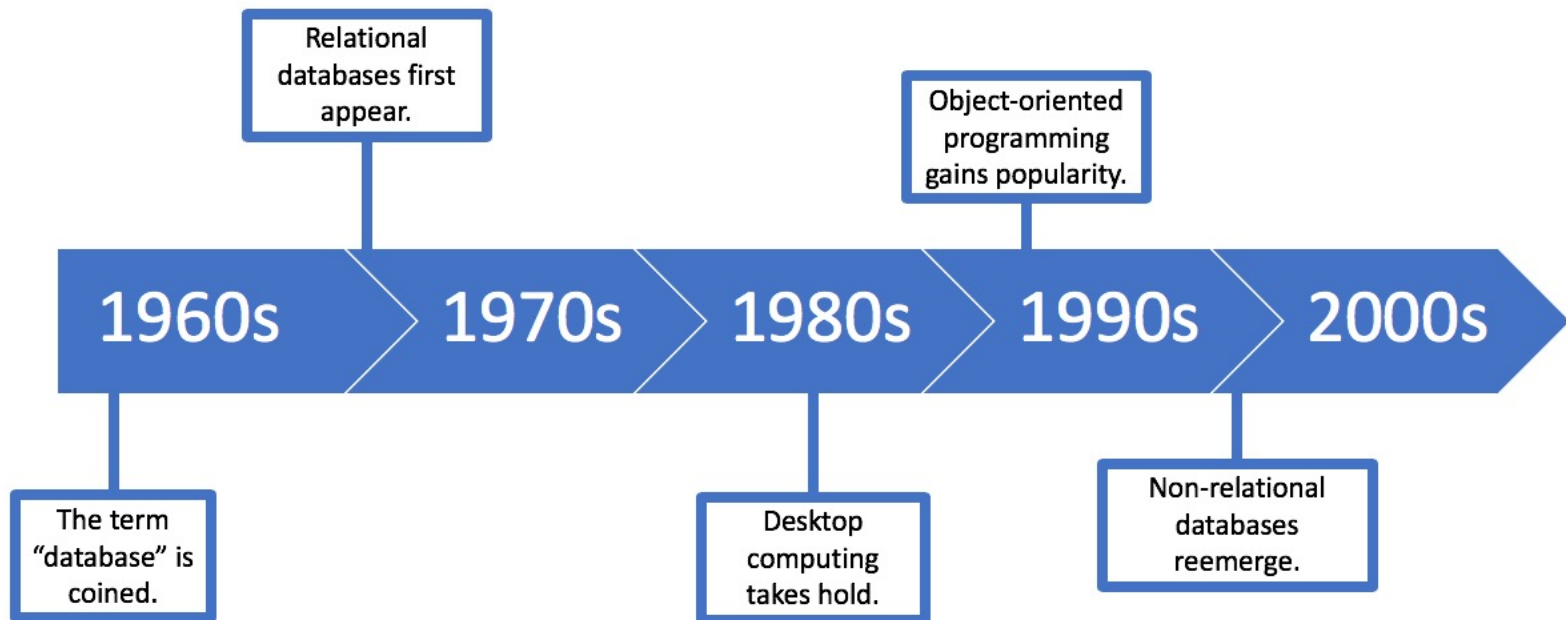


Image source: <https://trailhead.salesforce.com/content/learn/modules/big-data-strategy/understand-the-basics-of-databases>

# Cloud Databases

- With the rise of cloud computing, databases began to move to the cloud.
- This allowed companies to easily scale and manage their databases without having to invest in expensive hardware.
- Amazon, Microsoft, and Google, among others, now offer cloud database services such as Amazon RDS, Azure Cosmos DB, and Google Cloud SQL

# The future of Databases

- With the increasing amount of data being generated, the demand for databases that can handle big data and real-time data is only going to increase
- Databases are also becoming more intelligent, with features such as machine learning and artificial intelligence
- Multi-model databases, which allows for different type of data storage and querying, is seen as the potential future of databases
- Edge databases are expected to increase as well with the increasing use of IoT devices.

# What's Happening this Week?

- Relational algebra – getting ready to learn SQL
- Challenge:
  - Finding a productive way to work in this setup
  - Be ready to assist your classmates
- Fill out the background survey.
- Establishing the reference group.
- Establishing groups for project work.
- Go through the lecture videos on relational algebra.