

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is a light green. They are positioned diagonally, with the blue one partially covering the green one.

ITCC121: Week 7

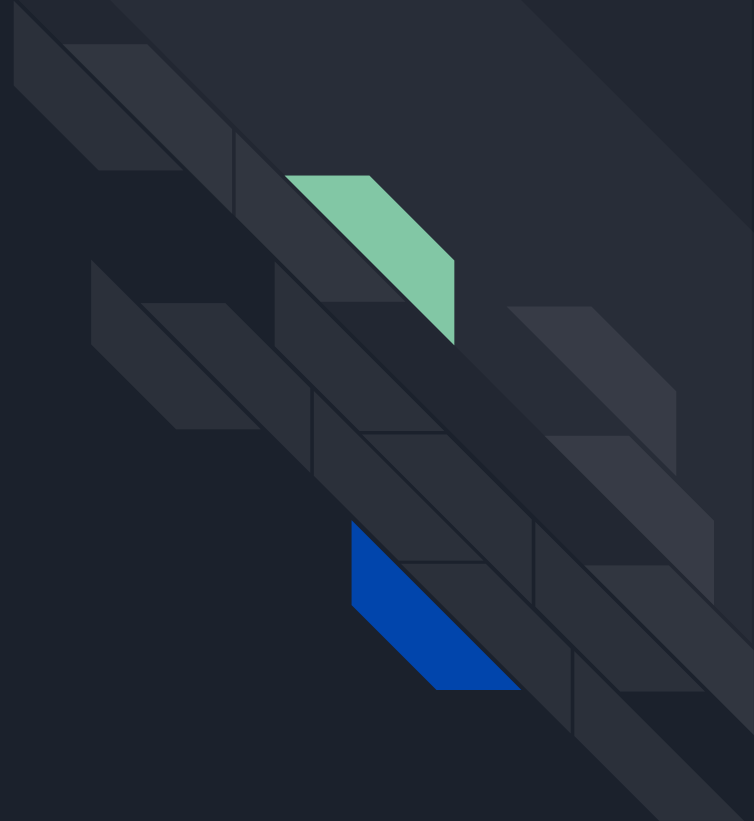
Database Management Systems



Topics

- Database management systems
- Database models
- Relationship between databases and e-commerce
- Information Systems in organization
- Database administration
- Specialized databases

Database management basics



What is a Database?

A **Database Management System (DBMS)** is a piece of software (either online or local) that “allows users to create, define, manipulate and manage databases”.

- Efficient way for businesses to store, organize and find large amounts of data
- “Electronic filing cabinet”

(Chia, 2023)



Components of a DBMS

Databases include several difference components including:

- Hardware
- Software
- Data procedures
- Database access query language (e.g. SQL)
- Users (e.g. database admin and developers)

(2023)





Types of Database Models

Database model - a structure that describes the way data is organized.

Examples include:

1. Relational Database Management Systems (RDBMS)
2. NoSQL (“Not only SQL”)
3. Object-Oriented DBMS (OODBMS)
4. Hierarchical DBMS
5. Network DBMS

(2023)

What are Specialized Databases?

A **specialized database** is a DBMS that stores a specific type of information (GeeksforGeeks, 2022).

Purpose: increased data accuracy, “full text access” (2022)

Example: [PubMed](https://pubmed.ncbi.nlm.nih.gov/)



Why use a DBMS?

Using a digital database has several benefits such as:

- Improved data legitimacy
- Backup and recovery opportunity
- Data scalability

(Chia, 2023)

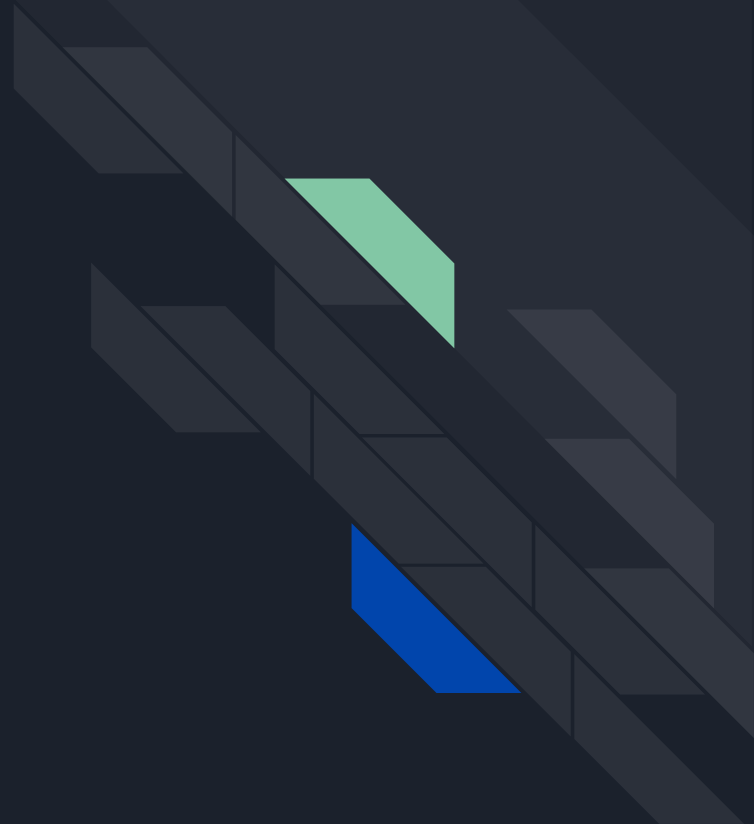
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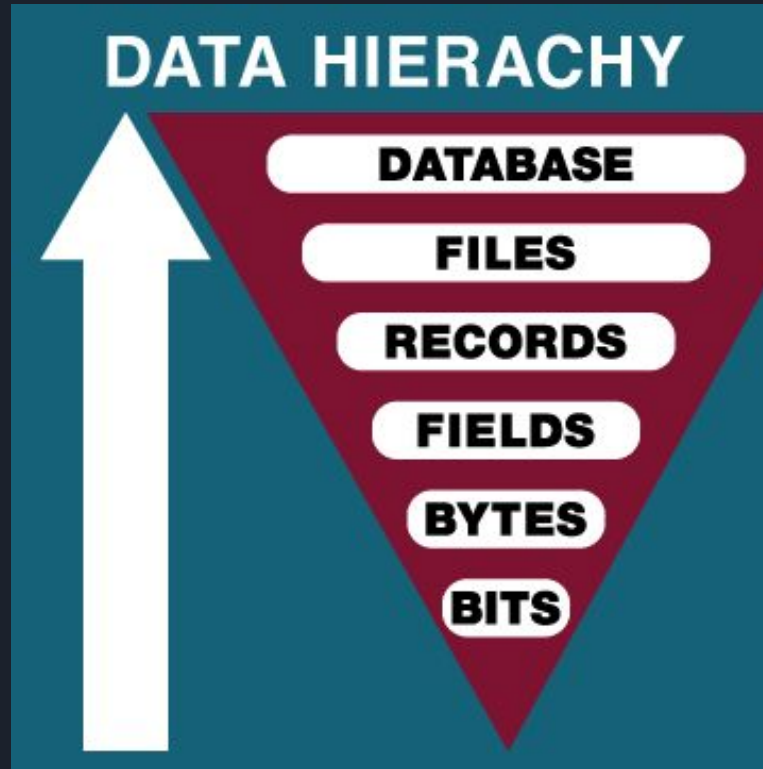
- Efficiency with identifying, labeling and analyzing data
- Data portability and sharing

(Williams, 2015)



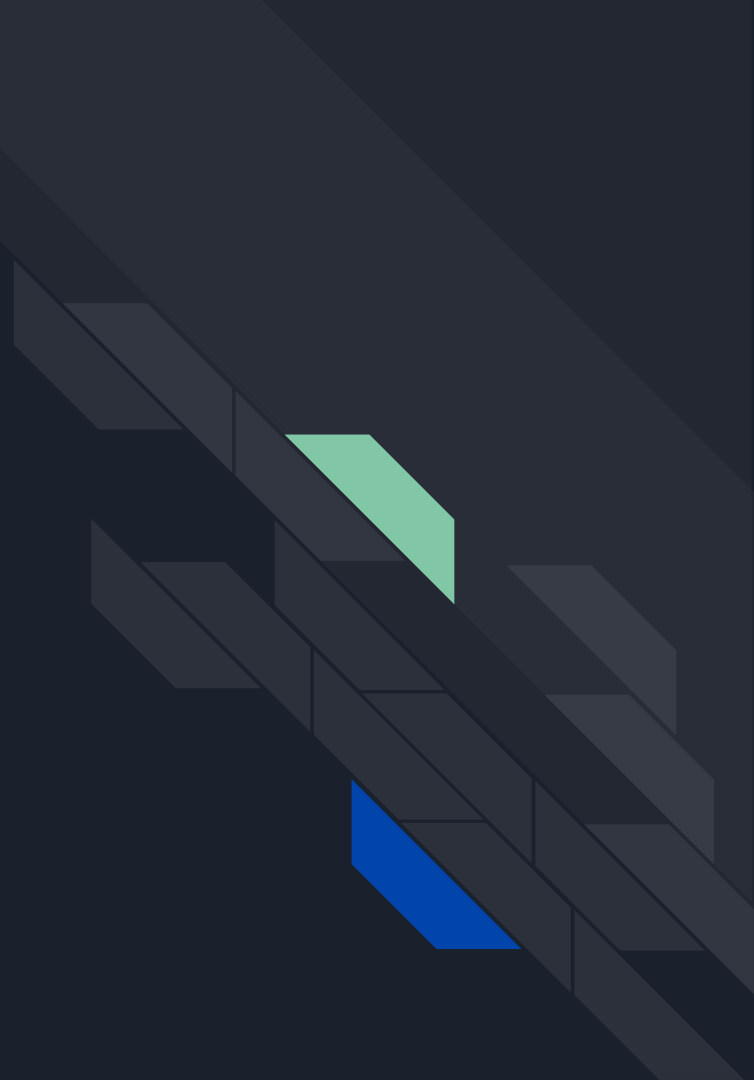
How is data stored?





Hierarchy of data graph (Roch et al., 2022)

Database Trends with the Digital Economy



Digital Economy

The **digital economy** - large online business place where users and businesses can connect through digital means.

- **E-commerce** - the online exchange of goods, usually through platforms such as Amazon or eBay
- **E-business** - broad term used to describe selling, purchasing, or other business activities online

(Yasar & Pratt, 2023)



Business and Data Management

Why should businesses use DBMS's?

- Better-informed business decisions
- Improved campaigns
- Optimize business operations
- Reduce business costs

All used to **increase revenue**.

(Stedman & Vaughn, 2024)





Database trends with E-Business

Some popular trends include:

- Usage of cloud-based services
- Modern technology integration (e.g. AI)
- Edge computing

Less-popular trends include:

- Data fabric
- Data mesh

(2024)



Database Administration

Purpose: to maintain,
secure and operate
databases

(Oracle, 2020)



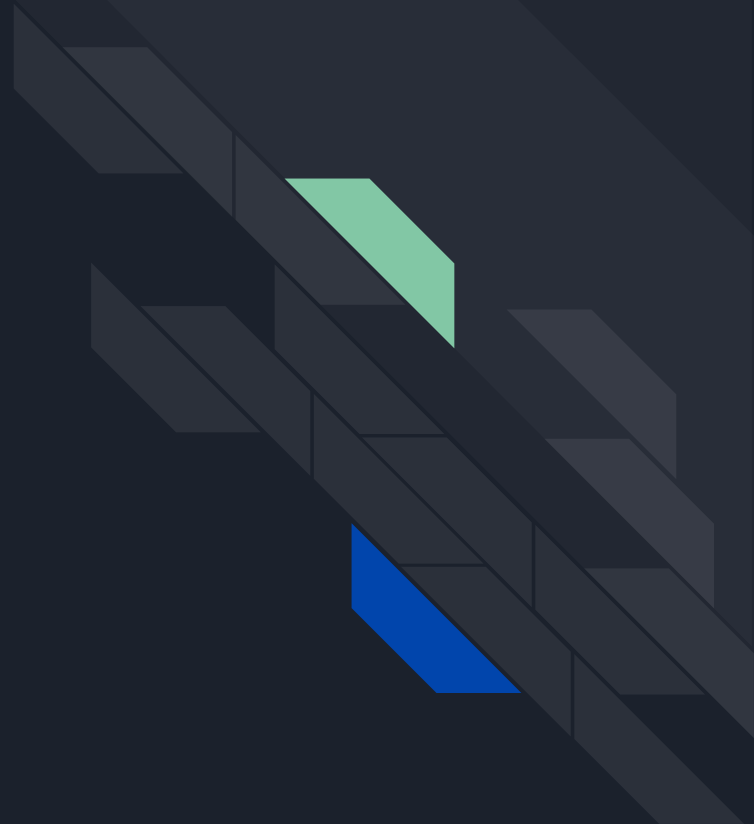
Types of Database Administration

1. System admin
2. Database architect
3. Data modeler
4. Application DBA
5. Task-oriented DBA
6. Performance analyst
7. Data warehouse admin
8. Cloud DBA

(2020)



Summary





Discussed topics

- Data management basics
- Components and types of DBMS's
- Function of specialized databases
- Advantages of using a DBMS
- How data is stored and organized
- How businesses use DBMS's
- Database trends with eCommerce
- Database administrators



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