Database
Introduction to concepts

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Introduction

The Data Base concepts allow that connect the technology and aplicatons in the real world. This document has key concepts, technologies used and applications about these topics.

Previous concepts #0

Degrees of Abstraction

- **Physical level data**: This is the lowest level of data abstraction. It tells us how the data is actually stored in memory.

- **Logical level data:** This level comprises the information that is actually stored in the database in the form of tables.

- **View level data**: This is the highest level of abstraction. Only a part of the actual database is viewed by the users.

Diagram Degrees of Abstraction
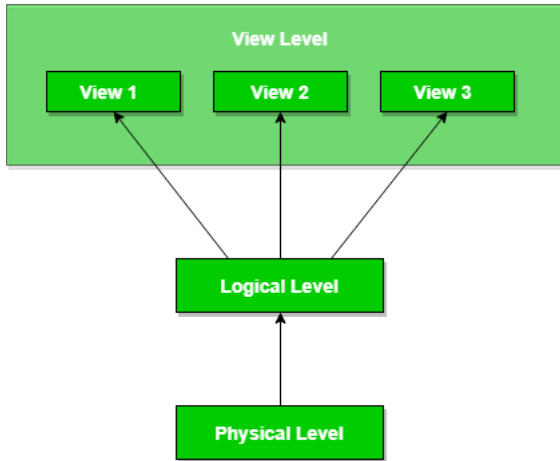
What is DataBase #1

Concepts of Database

- A database is a collection of persistent data that is used by the aplication systems of some gives enterprise, (Date, 2004, p.24)

- The purpose of a database is to store and retrieve related information. A database server is the key to solving the problems of information management (Oracle, 2022)

- A collection of related data stored in a manner that enables information to be retrieved as needed, (Morley & Parket, 2017)

About DataBase #2

What is Database Management System

(DBMS) is used to create, maintain, and access a database. A DBMS also controls the organization of the data and protects the integrity and security of the data so it is entered accurately into the database and then protected against both intentional and accidental damage. While batch processing can be used with databases, most database applications today occur in real time. (Morley & Parket, 2017, p.549)
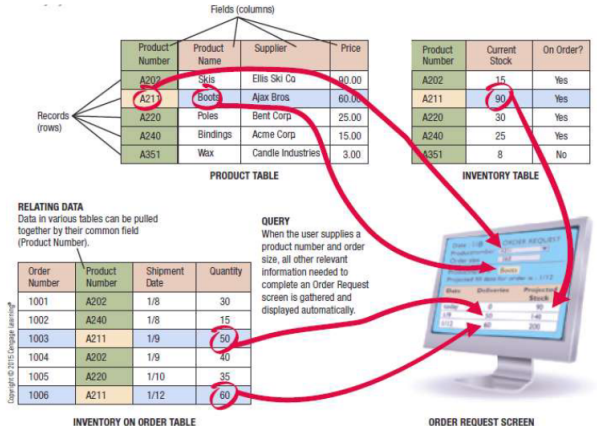
Software to Database Management System

- Oracle Database
- SQL Server Database
- MySql
- PostgreSQL
- Acces
- MariaDB

Database typically consists of

- **Tables** - Collection of related records
- **Fields (colu3ns)** - Single category of data to be stored in a database (name, telephone number, etc.)
- **Records (rows)** - Collection of related fields in a database (all the fields for one customer, for example)

A Simple Relational Database Example

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Individuals Involved with a Database Management System

- **Database Designers**: Design the database
- **Database Developers**: Create the database
- **Database Programmers**: Write the programs needed to access the database or tie the database to other programs
- **Database Administrator**s: Responsible for managing the databases within an organization
- **Users**: Individuals who enter data, update data, and retrieve information from the database

The Evolution of Databases

| MODEL	FLAT FILES	HIERARCHICAL	NETWORK	RELATIONAL	OBJECT-ORIENTED	MULTI-DIMENSIONAL
YEAR BEGAN	1940s	1960s	1960s	1970s	1980s	1990s
DATA ORGANIZATION	Flat files	Trees	Trees	Tables and relations	Objects	Data cubes, tables and relations, or a combination
DATA ACCESS	Low-level access	Low-level access with a standard navigational language	Low-level access with a standard navigational language	High-level, nonprocedural languages	High-level, nonprocedural, object-oriented languages	OLAP tools or programming languages
SKILL LEVEL REQUIRED TO ACCESS DATA	Programmer	Programmer	Programmer	User	User	User
ENTITY RELATIONSHIPS SUPPORTED	One-to-one	One-to-one, one-to-many	One-to-one, one-to-many, many-to-many	One-to-one, one-to-many, many-to-many	One-to-one, one-to-many, many-to-many	One-to-one, one-to-many, many-to-many
DATA AND PROGRAM INDEPENDENCE	No	No	No	Yes	Yes	Yes

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Data base Model

A database model shows the logical structure of a database, including the relationships and constraints that determine how data can be stored and accessed. Individual database models are designed based on the rules and concepts of whichever broader data model the designers adopt. Most data models can be represented by an accompanying database diagram.

Data base Model
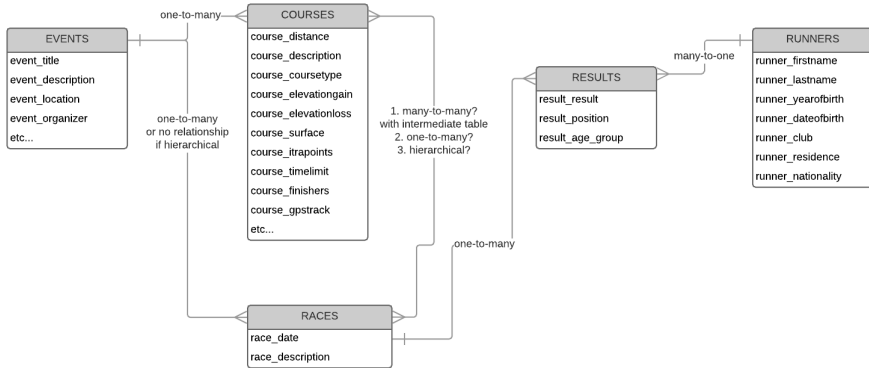
Type of Data base Model

- Hierarchical database model model model
- Object-oriented database model
- Entity-relationship model
- Document model
- Entity-attribute-value model
- Star schema
- The object-relational model, which combines the two that make up its name

Typical Applications#3

Some aplications

- Enterprise Information Systems
- Gobernance Information Systems
- Internet Platforms
- Health Information Systems
- Educational Information Systems
- City Information Systems
- Moblie Apps

[a]World Health Organization

[b]Open Data Platform

[c]Google Search

[d]SIGEPII

[e]SAP

Concepts of Information Systems

- **A system**: is a collection of elements and procedures that interact to accomplish a goal
- **An information system (IS)**: is a collection of elements (people, hardware, software, and data) and procedures that interact to generate information needed by the users in an organization.
- **Digital ecosystem**, which is the collection of people, products, services, and business processes related to a digital element.

Concepts of Information Systems

- **A system development**: is the process of analyzing a work environment, designing a new system or modifying the exisiting system to fit current needs, acquiring any needed hardware and software, training users, and getting the new or modified system to work
- **Enterprise architecture**: is a conceptual blueprint that defines the structure and operations of an enterprise (a business, organization, government agency, or other entity).

Concepts of Information Systems

- **business intelligence (BI)**: is the process of gathering, storing, accessing, and analyzing data about a company in order to make better business decisions.

Bibliography, Tools and Resources

- Date, CJ. (2004). Introduction to Dabase Systems. Pearson.

- Oracle. (2022). http://www.oracle.com

- Morley, D. & Parker, C. (2017). Understanding Computers: Today and Tomorrow.

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