**SQL for Beginners**

**What is a Database (DB)?**

* **Any collection of related information**
* Phone Book
* Shopping list
* To-do list
* Your 5 best friends
* Facebook’s User Base
* **Database can be stored in different ways**
* On paper
* In your mind
* On a computer
* This PowerPoint
* Comments Section

**Computer + Database = <3**

|  |  |
| --- | --- |
| **Amazon.com** | **Shopping List** |
| * Keeps track of Products, Reviews, Purchase Orders, Credit Cards, users, Media, etc. | * Keeps track of consumer products that need to be purchased |
| * Trillions of pieces of information need to be stored and readily available | * 10-20 pieces of information need to be stored and readily available |
| * Information is extremely valuable and critical to Amazon.com’s functioning | * Security is not important |
| * Security is essential, Amazon stores people’s personal information (Credit Card #, SSN, Address, phone) | * Information is stored on a piece of paper or even just in someone’s memory |
| * Information is stored on a computer |

Computers are great at keeping track of large amounts of information

**Database Management Systems (DBMS)**

* **A special software program that helps users create and maintain a database**
* Makes it easy to manage large amounts of information
* Handles Security
* Backups
* Importing/exporting data
* Concurrency
* Interacts with software applications
* Programing Languages

**Two Types of Databases**

|  |  |
| --- | --- |
| **Relational Databases (SQL)** | **Non-Relational (noSQL / not just SQL)** |
| * Organize data into one or more tables * Each table has columns and rows * A unique key identifies each row | * Organize data is anything but a traditional table * Key-value stores * Documents (JSON, XML, etc.) * Graphs * Flexible Tables |

**Relational Databases (SQL)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Student Table** | | | **Users Tabel** | | |
| **\*ID#** | **Name** | **Major** | **\*Username** | **Password** | **Email** |
| 1 | Jacke | Biology | Jsmith22 | wordpass | … |
| 2 | Kate | Sociology | Catlover45 | Apple223 | … |
| 3 | Claire | English | gamerkid | … | … |
| 4 | John | Chemistry | giraffe | … | … |

* Relational Database Management Systems (RDBMS)
  + Help users create and maintain a relational database
* mySQL, Oracle, PostgreSQL, MariaDB, etc.
* Structured Query Language (SQL)
  + Standardized language for interacting with RDBMS
  + Used to perform C.R.U.D operations, as well as other administrative tasks (user management, security, backup, etc.).
  + Used to define on one RDBMS is not always portable to another without modification

**Non-Relational Databases (noSQL / not just SQL)**

* Non-Relational Database Management Systems (NRDBMS)
  + Help users create and maintain a non-relational database
* mongoDB, DynamoDB, apache Cassandra, firebase, etc.
* Implementation Specific
  + Any non-relational database falls under this category, so there is no set language standard
  + Most NRDBMS will implement their own language for performing C.R.U.D and administrative operations on the database

**Database Queries**

Queries are requests mad to the database management system for specific information

As the database’s structure become more and more complex, it becomes mor difficult to get the specific pieces of information we want

A google search is a query

**Wrap Up**

* Database is any collection of related information
* Computer are great for storing databases
* Database Management Systems (DBMS) make it easy to create, maintain and secure a database.
* DBMS allow you to perform the C.R.U.D operations and other administrative tasks
* Two types of Databases, Relational & Non-Relational
* Relational databases use SQL and store data in tables with rows and columns
* Non-Relational databases store data using other data structures

**Structured Query Language (SQL)**

* **SQL is a Language used for interacting with Relational Database Management Systems (RDBMS)**
  + You can use SQL to get the RDBMS to do things for you
    - Create, retrieve, update & delete data
    - Create & manage databases
    - Design & create database tables
    - Perform administration tasks (security, user management, import/export, etc.)
* **SQL implementations vary between systems**
  + Not all RDBMS follow the SQL standard to a ‘T’
  + The concepts are the same, but the implementation may vary
* **SQL is actually a hybrid language, it’s basically 4 types of languages in one**
  + Data Query Language (DQL)
    - Used to query the database for information
    - Get information that is already stored there
  + Data Definition Language (DDL)
    - Used for defining database schemas
  + Data Control Language (DCL)
    - Used for controlling access to the data in the database
    - User & permissions management
  + Data Manipulation Language (DML)
    - Used for inserting, updating, and deleting data from the database

**Queries**

* **A query is a set of instructions given to the RDBMS (written is SQL) that tell the RDBMS what information you want it to retrieve for you**
  + TONS of data in a DB
  + Often hidden in a complex schema
  + Goal is to only get the data you need

**SELCT employee.name, employee.age**

**FROM employee**

**WHERE employee.salary > 30000**