# Week 2 Day 2

## Introduction to RDBMS

# Intro to RDBMS

REVATURE

- DMBS: Database Management System
  - Helps persist data
  - Manages databases
- RDBMS: Relational Database Management System
  - Manages relational databases
  - Structured for security, accuracy, integrity, and consistency of data
- Non-relational Database Management Systems
  - Uses tools other than tables to store information
  - NoSQL

# RDBMS: Data and Databases

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- Data
  - Any information
- Database
  - Collection of structured data
  - Typically structured in tables with rows and columns
    - Row has info on individual entry
    - Column has attributes of the table

Grid | Text

| | invoiceid | customerid | invoicedate | billingaddress | billingcity | billingstate | billingcountry | billingpostalcode | total |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | 2009-01-01 | Theodor-Heuss-Straße 34 | Stuttgart | [NULL] | Germany | 70174 | 1.98 |
| 2 | 2 | 4 | 2009-01-02 | Ullevålsveien 14 | Oslo | [NULL] | Norway | 0171 | 3.96 |
| 3 | 3 | 8 | 2009-01-03 | Grétrystraat 63 | Brussels | [NULL] | Belgium | 1000 | 5.94 |
| 4 | 4 | 14 | 2009-01-06 | 8210 111 ST NW | Edmonton | AB | Canada | T6G 2C7 | 8.91 |
| 5 | 5 | 23 | 2009-01-11 | 69 Salem Street | Boston | MA | USA | 2113 | 13.86 |

# SQL

Structured Query Language

# SQL: Overview

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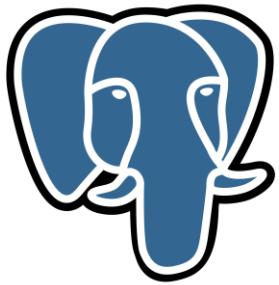
- Structured Query Language
- Underlying Language for relational databases
- Many vendors
  - Oracle
  - PostgreSQL (training)
  - MySQL
  - Microsoft SQLServer
  - Microsoft Access



# SQL: Attribute Datatypes

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Attributes in the column describe what data is stored there

- A column can store a single datatype including
  - Boolean (bool)
  - Characters (char[n])
  - Character Varying (varchar[n])
  - Date
  - Integer (int)
  - Numeric/decimal

# SQL: Schemas and Constraints

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The structure of the database

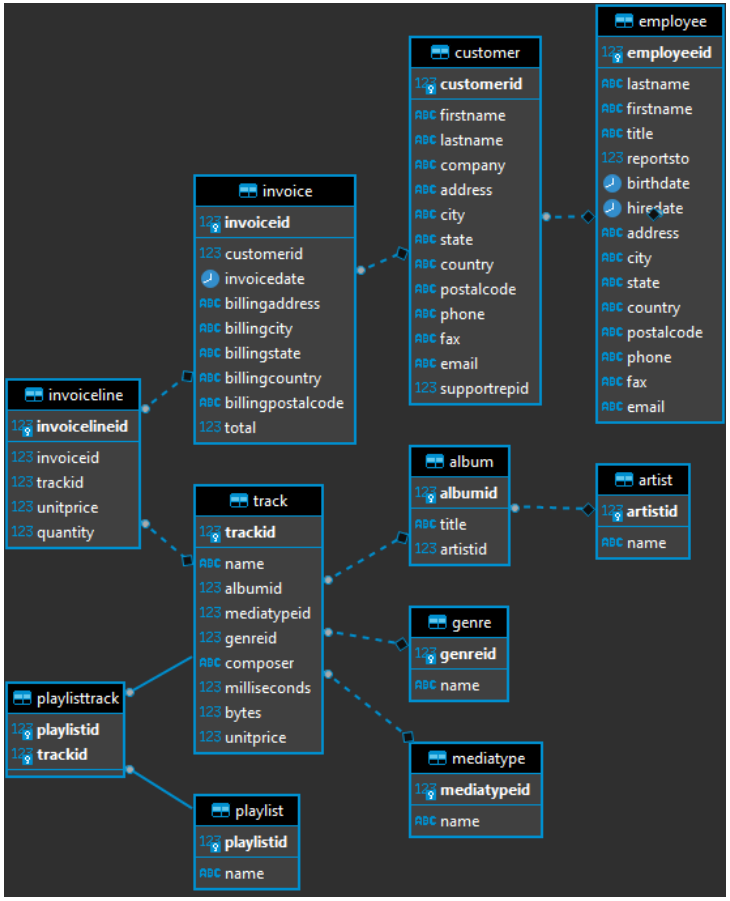
- The tables and their attributes and constraints
- Relationships between tables

Constraints

- Enforce restrictions on table columns
  - Not Null
  - Unique
  - Primary Key
  - References
  - Identity

# SQL: Entity Relationship Diagram

- Schemas in SQL can be illustrated with ERD's
- Three main components
  - Entity: tables
  - Attributes: columns of tables
  - Relationships: connections



# SQL: Primary and Foreign Keys

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- Primary Key
  - Unique identifier for the row
  - Always none null and unique
  - Every table MUST have a primary key column
- Foreign Key
  - Makes the table relationships
  - Can be unique or none unique
  - Can be made of multiple columns
  - References a column of another table

# SQL: DDL Sublanguage

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Data Definition Sublanguage

- Used to define the database
- Syntax keywords:
  - CREATE
  - ALTER
  - DROP
  - TRUNCATE

# SQL: DCL Sublanguage

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Data Control Sublanguage

- Used to manage the security and control
- Syntax keywords:
  - GRANT
  - REVOKE

# SQL: DML Sublanguage

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Data Manipulation Sublanguage

- Manipulate the data inside of the database
- Syntax Keywords
  - INSERT
  - SELECT
  - UPDATE
  - DELETE

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# Start our Postgres DB with Docker and Create a DB

# SQL: DQL Sublanguage

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Data Query Sublanguage

- Used to narrow down query results
- Syntax Keywords
  - SELECT
- Other associated keywords
  - WHERE
  - ORDER BY
  - GROUP BY
  - HAVING

# SQL: TCL Sublanguage

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Transaction Control Sublangauage

- Manage the transactions of the database
  - Transaction is saving any changes
- Syntax Keywords
  - COMMIT
  - ROLLBACK
  - SAVEPOINT

# SQL: QC Tip

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- Know the difference between DROP, DELETE, and TRUNCATE!
  - DROP: DDL keyword, typically used to remove tables
  - TRUNCATE: DDL keyword clears data, but keeps the table
  - DELETE: DML keyword to delete specified data

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# Querying with DQL