GENERAL ASSEMBLY

# DATA SCIENCE
## DATABASES AND SQL

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# I. INTRODUCTION TO DATABASES

# WHAT IS A DATABASE?

- An organized collection of data
- Organized overall by a schema (like a blueprint of a database)
- Organized into tables with different sets of data
- If each family is a set of data, a house would be the table, and the neighborhood would be the schema.
- Think many Excel sheets/pandas dataframes, but without limitations

# WHY USE A DATABASE?

- You can ask questions of the data
- Has a nice, structured language
- Produce reproducible code
- Access large amounts of data relatively quickly
- Reliable and scalable
- Many are ACID compliant — ensures your transactions are safely processed or that you're notified otherwise

# RELATIONAL VS. NOSQL

- Relational
  - Traditional rows and columns data – like dataframe
  - Strict structure
  - Entire column for each feature
- NoSQL
  - No well defined data structure
  - Works better for unstructured data
  - Commodity hardware

# SQL

- Structured Query Language
- Used to ask questions of the database
- Many different functions for creating, adding, retrieving, transforming, aggregating, and deleting data
- Standard language with some differences among “dialects”

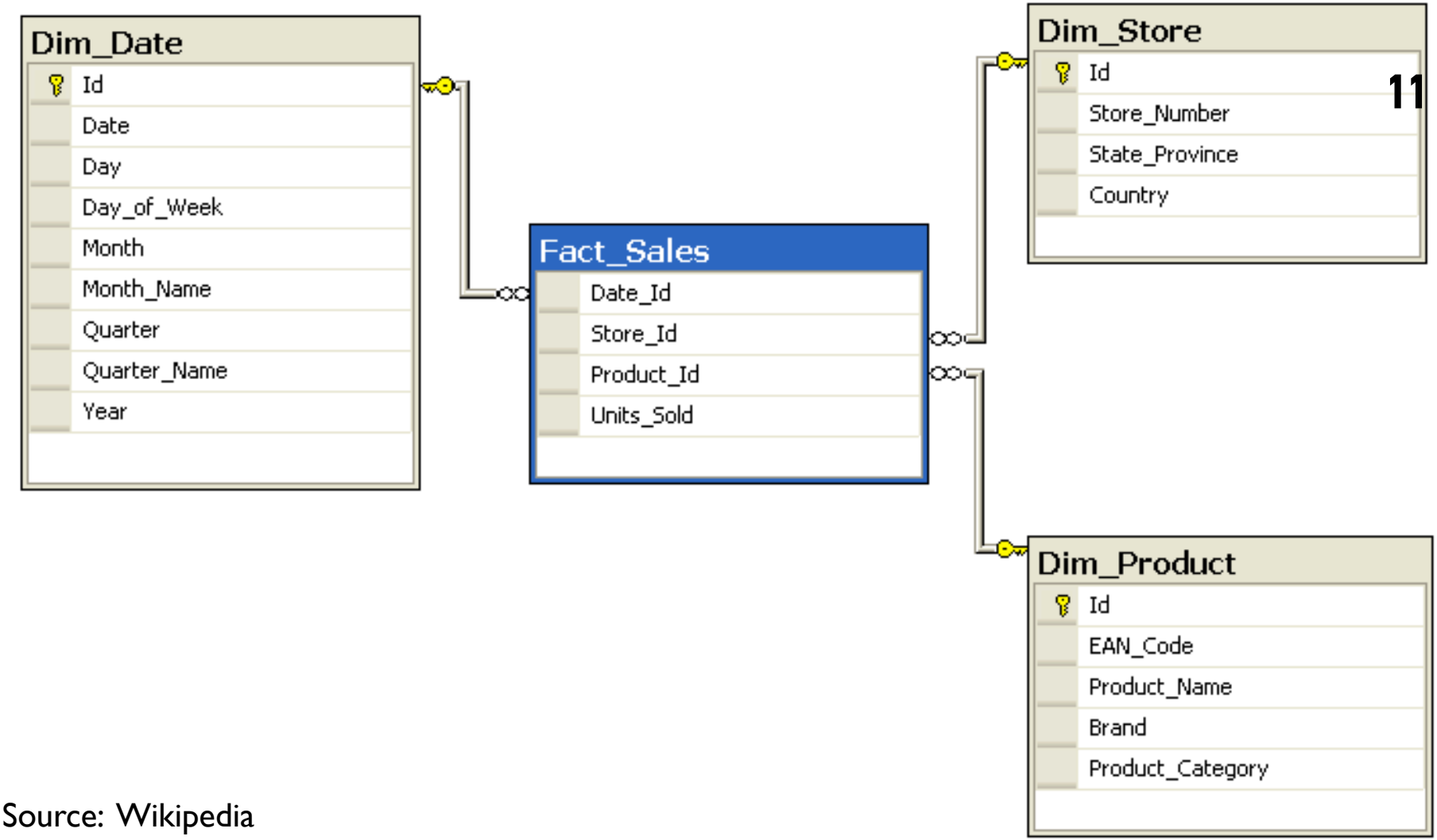
# DATA TYPES

- BOOLEAN/TINY INT– 0/1
- INT – any whole number
- FLOAT(<n>,<m>) – number with n digits before the decimal and m digits after the decimal
- DATETIME, TIMESTAMP, and DATE – various date and time combinations
- CHAR(<length>) – text with a fixed length
- VARCHAR(<length>) – text with a given maximum length
- And many more...

# II. STAR SCHEMAS

- The star schema consists of one or more fact tables referencing any number of dimension tables.
- A fact table contains “event” data. You can think of this as the type of information that we are really measuring (“measurements, metrics, or facts of a business process”).
- A dimension table contains meta data or information that enhances “event” data (“structured labeling information”).

Source: Wikipedia






Source: Wikipedia

# III. WHY DO DATA SCIENTISTS NEED DATABASES?

- In business, data doesn't often live in flat files like CSV's or TXT's.
- Data lives in databases.
- You don't need to know how to build one, just get data out of one.
- This opens up the amount of data you can work with.
- Looks great on your resume!
- This doesn't change modeling approaches or anything else. It only changes where you get your data from.

# IV. LEARNING SQL WITH CODE