SPRING FRAMEWORK

GURU

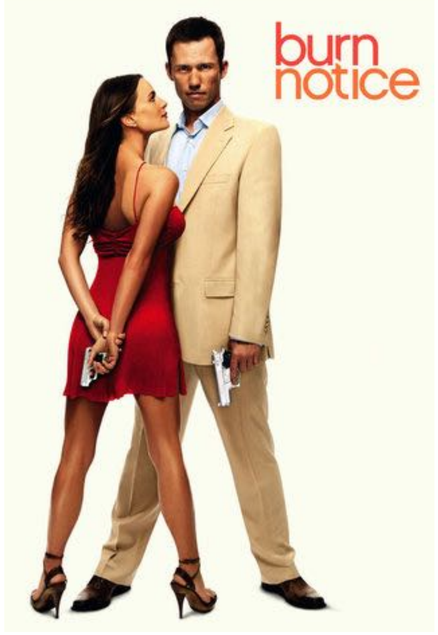
# **SQL** Beginner to Guru

## MySQL Edition

What is a Database???

# What is a Database?

- A “Database” is a set of related data and how it is organized.
- A spreadsheet tracking data could be considered a database.
  - For example, you use a spreadsheet for time tracking.
    - This would be a set of related data - ie an employee’s hours for the week.
    - The ‘Data’ could grow over time.
    - The ‘Data’ could be for more than one employee.
    - The ‘Data’ could serve as record for what you need to pay the employee.




D14

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | | Time Sheet | | | | | |
| 2 | | Employee Details: | Michael Weston | michael@burnnotice.com | unlisted | | |
| 3 | | Manager Details: | John Thompson | john@springframework.guru | | | |
| 4 | | Period Start Date | Period End Date | | | | |
| 5 | | Total Work Week Hours | Total Hours Worked | Regular Hours | Overtime Hours | | |
| 6 | | 40.00 | 46.00 | 40.00 | 6.00 | | |
| 7 | | Date(s) | Time In | Lunch Start | Lunch End | Time Out | Hours Worked |
| 8 | | 3/20/18 | 8:00 AM | 12:00 PM | 1:00 PM | 5:00 PM | 8.00 |
| 9 | | 3/21/18 | 8:00 AM | 12:00 PM | 1:00 PM | 5:00 PM | 8.00 |
| 10 | | 3/22/18 | 8:00 AM | 12:00 PM | 1:00 PM | 6:00 PM | 9.00 |
| 11 | | 3/23/18 | 8:00 AM | 12:00 PM | 1:00 PM | 7:00 PM | 10.00 |
| 12 | | 3/24/18 | 8:00 AM | 12:00 PM | 1:00 PM | 8:00 PM | 11.00 |

# Characteristics of Data

- Databases, like spreadsheets make important distinctions about the data elements.
  - Element being a piece of data, like “name” - ie Michael Weston
- The name “Michael Weston” is considered a **String**
- “3/20/18” is considered a **Date**.
- Time in of 8:00 am is considered a **Time**.
- Total Hours worked (46.00) is considered a **Number**.
- We will be looking at data types much closer in an upcoming lecture.

# Database Management Systems

- **Database Management Systems** are specialized computer programs for databases. Often abbreviated as DMBS.
- DBMS's have 4 important characteristics:
  - **Data Definition** - define the data being tracked.
  - **Data Manipulation** - add, update or remove data.
  - **Data Retrieval** - extract and report on the data in the database.
  - **Administration** - defining users on the system, security, monitoring, system administration

# Types of Databases

- The are a number of different types of databases. Some are general purpose, others are very specialized.
- **Flat File Database** - Data is kept in a file on the operating system. Very simple, generally considered out-dated.
- **Relational Database** - Data is kept in database tables, which have 'Relations' to each other.
  - We will be exploring Relational Databases much more in-depth in an upcoming lecture.
- **Hierarchical Database** - Data is kept in a tree like structure.

# Types of Databases

- **NoSQL Database** - This segment is a group of specialized databases which have a variety of data models - but do not use SQL.
  - Data models include: Key-Value Store, Document Based, Column Based
- **Distributed / "Cloud" Databases** - Designed to run on many servers for massively scalable and highly available systems. Often, NoSQL.
  - Think Facebook, Amazon, and Google
  - "Cloud" scale companies

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