Hibernate & Spring Data JPA

Beginner to Guru

What is a Database?

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- 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 DBMS.
- 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

SPRING FRAMEWORK

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