

*SchoolNova*



# IT102

History of Databases

# Historical Perspective

- Early 1960s
  - ◆ Integrated data store, first general-purpose DBMS designed by Charles Bachman at GE
- Late 1960s
  - ◆ IBM developed Information Management System (IMS), used even today in many major installations
  - ◆ IMS formed the basis for hierarchical data model
  - ◆ American Airlines and IBM jointly developed SABRE for making airline reservations
  - ◆ SABRE is used today to populate Web-based travel services such as Travelocity
- 1970
  - ◆ Edgar Codd, at IBM's San Jose Research Laboratory, proposed relational data model.
  - ◆ It sparked the rapid development of several DBMSs based on relational model, along with a rich body of theoretical results that placed the field on a firm foundation.
- 1980s
  - ◆ SQL query language, developed as part of IBM's System R project, is now the standard query language

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# Advantages of RDBMS

- File system vs RDBMS

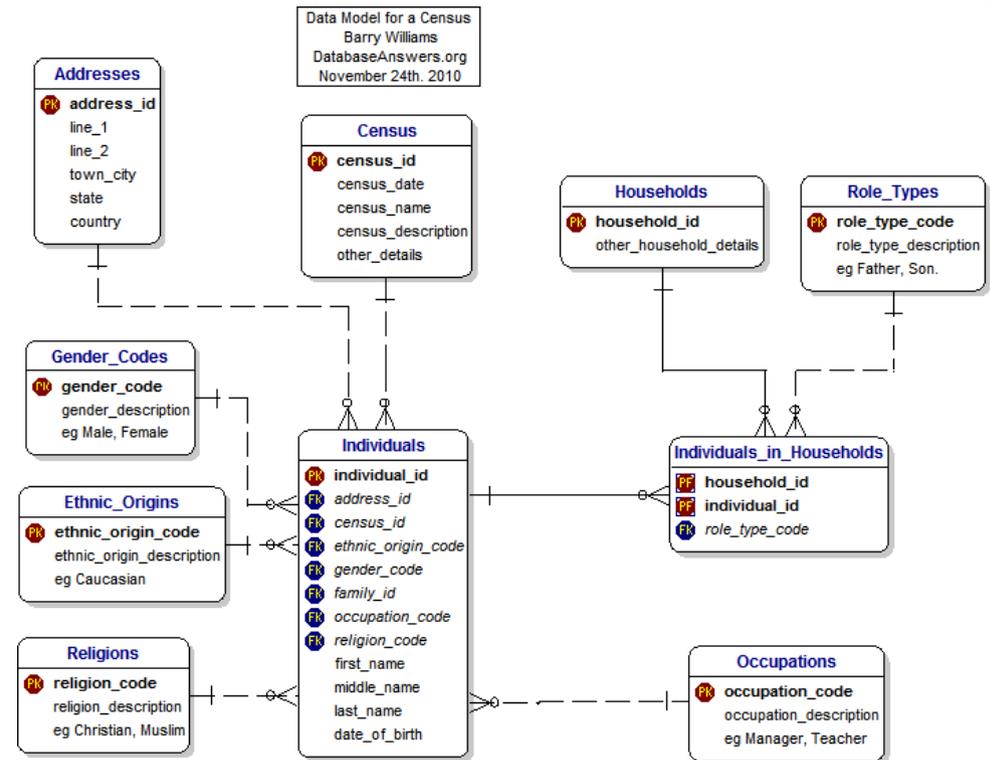
- ◆ Must write special programs to answer each question a user may want to ask about data
- ◆ Must protect data from inconsistent changes made by different users accessing data concurrently
- ◆ Must cope with system crashes to ensure data consistency
- ◆ Need to enforce security policies in which different users have permission to access different subsets of the data

- Why use RDBMS

- ◆ Data independence and efficient access.
- ◆ Reduced application development time.
- ◆ Data integrity and security.
- ◆ Uniform data administration.
- ◆ Concurrent access, recovery from crashes.

# Data Models

- A **data model** is a collection of concepts for describing data.
- A **schema** is a method to group database objects (tables, views etc.). Typically, objects are grouped logically. For example, a schema called “finance” might contain financial data, whereas the schema called “web” might contain the data exposed through a web site.
- The **relational model** of data is the most widely used model today.
- A database can be understood as a collection of related files. How those files are related depends on the model used. Early models included the hierarchical model (where files are related in a parent/child manner, with each child file having at most one parent file), and the network model (where files are related as owners and members, similar to the network model except that each member file can have more than one owner).
- The relational database model was a huge step forward, as it allowed files to be related by means of a common field. In order to relate any two files, they simply need to have a common field, which makes the model extremely flexible.



# MySQL Set Up

## 1. Install software on your workstation:

<http://dev.mysql.com/downloads/>

- **MySQL Community Server**

- For Windows, MSI offers a simpler installation process)
- For Mac use DMG

- **MySQL Workbench**

## 2. (Optional) If you used ZIP, not MSI installation (Windows), you need to create a service for MySQL:

- Open cmd as administrator
- Navigate to the MySQL “bin” folder
- Run the following commands:

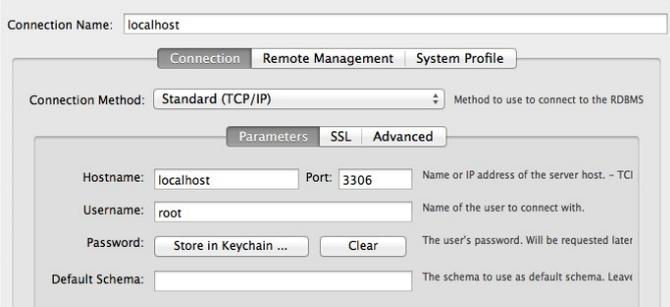
```
mysqld --install mysql
```

```
mysqld --initialize
```

```
sc start mysql
```

## 3. Open MySQL Workbench and connect to the local server instance.

- If you could not install MySQL Server on your workstation, you can access a database on the School Nova server.
- Download and install MySQL Workbench <http://dev.mysql.com/downloads/workbench>
- Open MySQL Workbench and create a connection to the server:
  - ◆ Host: schoolnova.org
  - ◆ Port: 3306 (default)
  - ◆ Ask me for user name and password.
  - ◆ Do not permanently store the password on School Nova computers.



The screenshot shows the MySQL Workbench connection configuration dialog. The 'Connection Name' field is set to 'localhost'. The 'Connection Method' is set to 'Standard (TCP/IP)'. The 'Parameters' tab is selected, showing the following fields: 'Hostname' (localhost), 'Port' (3306), 'Username' (root), and 'Password' (with 'Store in Keychain ...' and 'Clear' buttons). The 'Default Schema' field is empty.

# Homework

- Complete the installations of MySQL Server and Workbench if you have not completed in class.
  - ◆ Workbench for Windows instructions:  
<https://dev.mysql.com/doc/workbench/en/wb-installing-windows.html>
  - ◆ Workbench for Mac instructions:  
<https://dev.mysql.com/doc/workbench/en/wb-installing-mac.html>
- Connect from MySQL Workbench to either remote or local instance of MySQL.
- Create new schema: it102
- Create a database table using SQL:

```
use it102;
```

```
create table student (
```

```
    student_id    bigint    auto_increment    primary key,
```

```
    first_name    varchar(256),
```

```
    last_name     varchar(256),
```

```
    create_ts     timestamp    default current_timestamp
```

```
);
```