Introduction to Databases and SQL

CGT 356
Web Programming, Development, & Database Integration
Lecture 6

Data
- Data:
  - Known facts that can be stored, be it textual, graphical, sound, video, etc.
- Database (DB):
  - Collection of related data that is self-describing
- MetaData:
  - Data about the data
  - Data that describes your database

DBMS
- DataBase Management System (DBMS)
  - Software that allows users to define, create, and manipulate a database
    - MySQL
    - Microsoft SQL Server
    - Oracle
    - Microsoft Access
    - Many others...

Prereq’s to the DB
- File Systems
  - Duplicate data
    - Filing cabinets, multiple copies of same document in different folders
  - Cannot share data (easily)
  - Data dependence on a program
    - Without that software, the data is not useful
  - Proprietary
    - Companies have their own systems
      - Expensive to maintain

SQL
- Structured Query Language (SQL)
  - Pronounced sequel (see - kwel) or S-Q-L
  - A structured language that is used to query a database to create, update, delete, select, and insert data.

Tables
- What is a table?
  - A spreadsheet
  - An arrangement of rows & columns
  - An arrangement of tuples & fields
  - A row is typically referred to as a record
    - A set of rows would be called a RecordSet
### Tables (cont.)

- **Record**
- **Row**
- **Tuple**

### Fields (columns)

- Where a field is concerned, in PHP you will see:
  - `$row[“FieldName”]`
  - `$row` is an array of columns (or fields)
  - Use `$row` as a method of retrieving the value stored in the `<fieldname>` of that record (or row)
  - `FieldName` is a field (or column) in the database

### Primary Key

- Every table you see and use in this class will have a Primary Key
- **What is a Primary Key?**
  - It is a field in a table that uniquely identifies a single record in that table.
  - A Primary Key is always:
    - Unique
    - Not Null

### SQL

- **General Form of a SELECT statement**
  
  ```sql
  SELECT <columnName>
  FROM <tableName>
  WHERE <condition>
  GROUP BY <attribute>
  HAVING <condition>
  ORDER BY <columnName>
  ```

  Most queries in this class are only concerned with these first three
Capitalization

- When writing SQL, list all SQL keywords in all caps:
  SELECT ....
  FROM ....
  WHERE ....

- Also note that each clause starts on its own line.

Single Table SELECT

- What is the name of the employee whose employee ID is 125775?

```sql
SELECT LastName, FirstName
FROM Employee
WHERE EmployeeID = 125775;
```

- This query assumes that EmployeeID is an integer in the database.

Single Table SELECT

- List all of the information for the employee whose employee ID is 125775.

```sql
SELECT *
FROM Employee
WHERE EmployeeID = 125775
```

- * is a wildcard
- When you see the word “all,” you probably need to use a SELECT *

SELECT *

- SELECT *
  - Returns ALL of the fields in a table, whether you want all of them or not.
  - Do not use * unless you have to.
  - Most of the time, list the field names

Multiple Columns

- Selecting multiple field names:
  - SELECT LastName, FirstName, Address1
    FROM Employee;
  - Separate field names with commas

Multiple WHERE conditions

- Selecting with multiple where conditions
  - SELECT LastName, FirstName, Address1
    FROM Employee
    WHERE LastName = 'Jenkins'
    AND FirstName = 'Bob';
  - Notice the names are in single quotes
  - AND is used when multiple WHERE conditions are needed
Further Thought

- Work on these questions:
  - List the names of the employees whose salary is greater than $40,000
    - Assuming there is a salary field in the employee table
  - List all of the names of the employees whose employee ID is not 125775