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SQL for Data Science

Module 4: Database Structures

Learning Objectives of this module

What is SQL?

SQL is the standard language to communicate with Relational Databases

Quick Internet Search

Structured Query Language or SQL

is a standard Database language

which is used to create, maintain and retrieve the relational database

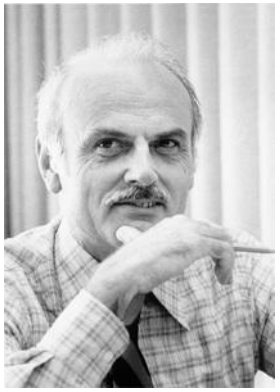
Important Concepts

- It's a Language to communicate with Database
- Its Standard
- You can create, maintain and retrieve the database and its data using this language

History of SQL

SQL started with IBM Researcher Edgar Codd's Research on Relational Databases

1972



Edgar Codd

- **Researcher at IBM Research Center**
- **Mathematician trained from Oxford**
- **Researching on Relational Databases**
- **Chamberlin and Boyce come up with SEQUEL (Structured English Query Language to interact with IBM System R database)**

1979

- **Trademark Issue with a Firm**
- **SEQUEL was changed to SQL**

Connecting to MySQL Server

Connecting to MySQL Server is pretty straightforward

Goto Terminal/ Command Prompt and type

```
anands-MacBook-Pro:~ analytics$ mysql -uroot -p
Enter password:
```

Types of Commands - DDL

Data Definition Language

Commands used to

- Define the schema of database or its objects (like tables and indexes)
- Create and Modify the structure of database objects
- Examples:
  - CREATE
  - DROP
  - ALTER

Data Manipulation Language

Commands used to

- Manipulate and Select data in the database
- Examples:
  - SELECT
  - INSERT
  - UPDATE
  - DELETE

Data Control Language

Commands dealing with

- Rights, permissions and other controls of the database system
- Examples:
  - GRANT
  - REVOKE

Exploring databases

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Here we explore some simple commands. Note that all commands end with ; or \G in MySQL

Show all databases

```
mysql> show databases;
```

Work with a particular database

```
mysql> use <database_name>;
```

Get help about commands

```
mysql> help;
```

Get topicwise help

```
mysql> help contents;
```

```
mysql> help Data Manipulation;
```

Creating Tables

Here we explore some simple commands. Note that all commands end with ; or \G in MySQL

Show all databases

```
mysql> show databases;
```

Work with a particular database

```
mysql> use <database_name>;
```

Get help about commands

```
mysql> help;
```

Get topicwise help

```
mysql> help contents;
```

```
mysql> help Data Manipulation;
```

Datatypes in MySQL

We have listed the most commonly used datatypes here. There are a lot more, to learn more: Refer to https://dev.mysql.com/doc/refman/8.0/en/data-types.html

Most Popular

- int(10)
- varchar(255)
- text
- TIMESTAMP
- ENUM ('Choice1', 'Choice2', …)

Not so common

- FLOAT
- DECIMAL
- BLOB
- TINYBLOB
- MEDIUMBLOB
- BIGINT
- SMALLINT
- TINYINT
- DATE
- TIME
- SET
- DOUBLE
- CHAR

NULL vs NOT NULL

Some fields we can keep optional – Others are Mandatory

Difference between NULL and NOT NULL Columns/ Fields

- A column which has NOT NULL constraint means it is mandatory to put some value for the column while inserting the row
- A column which has NULL constraint means its ok to give NULL value – a special value which means blank
- This is defined in the structure of the table