

Week10 Notes

Introduction to Database

- What is a database? Great overview: <https://www.guru99.com/what-is-dbms.html>
- What is SQL and NoSQL?: <https://www.guru99.com/sql-vs-nosql.html>
- We will only cover how to consume data.
- As an industrial engineer, you do not need to be an expert on databases. However, it is crucial to know how to consume and structure the data!
- W3school is a good starting point for learning SQL. You can try queries in their database and solve examples. Link: <https://www.w3schools.com/sql/> Note: You should use Firefox or Chrome as web-browser.
- We recommend Database System Concepts as a reference book. You can check the slides of the book <https://www.db-book.com/db7/slides-dir/index.html>
- Simplest Queries:
 - SELECT <set_of_columns> FROM <table_name>
 - INSERT INTO <table_name> (<set_of_columns>) VALUES (<set_of_values>)
 - DELETE FROM <table_name> WHERE <condition>

Accessing a MySQL Database

- MySQL JDBC Link: <https://mvnrepository.com/artifact/mysql/mysql-connector-java/8.0.16>
- Go to the link, download the JAR file, and add jar to the path of your Java project.
- For connection: (you can check LMS for full version of the code)
Connection con = null;
String url = "jdbc:mysql://sql9.freemysqlhosting.net";
String username = "sql9379593";
String password = "xiUymS7XsA";
Class.forName("com.mysql.cj.jdbc.Driver");
con = DriverManager.getConnection(url, username, password);
- Statement statement = con.createStatement(); >> Creating statement. Later we will use it for queries.
- ResultSet resultSet = statement.executeQuery("<query>");
 - resultSet.next() >> returns boolean whether there is another row or not.
 - resultSet.get<Datatype> (<index>) >> returns value type: <data type>, column: <index>
- Data Types:

MySQL DATATYPES

DATE TYPE	SPEC	DATA TYPE	SPEC
CHAR	String (0 - 255)	INT	Integer (-2147483648 to 2147483647)
VARCHAR	String (0 - 255)	BIGINT	Integer (-9223372036854775808 to 9223372036854775807)
TINYTEXT	String (0 - 255)	FLOAT	Decimal (precise to 23 digits)
TEXT	String (0 - 65535)	DOUBLE	Decimal (24 to 53 digits)
BLOB	String (0 - 65535)	DECIMAL	"DOUBLE" stored as string
MEDIUMTEXT	String (0 - 16777215)	DATE	YYYY-MM-DD
MEDIUMBLOB	String (0 - 16777215)	DATETIME	YYYY-MM-DD HH:MM:SS
LONGTEXT	String (0 - 4294967295)	TIMESTAMP	YYYYMMDDHHMMSS
LOBLOB	String (0 - 4294967295)	TIME	HH:MM:SS
TINYINT	Integer (-128 to 127)	ENUM	One of preset options

SMALLINT	Integer (-32768 to 32767)	SET	Selection of preset options
MEDIUMINT	Integer (-8388608 to 8388607)	BOOLEAN	TINYINT(1)

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Source: MySQLTutorial

- There are many other datatypes: <https://www.mysqltutorial.org/mysql-data-types.aspx/>
- In database, indexing starts with 1.

Consuming MetaData from a MySQL Database

- `ResultSetMetaData resultSetMetaData = resultSet.getMetaData();` >> Initialize ResultSetMetaData object.
- `resultSetMetaData.getColumnCount();` >> returns number of columns
- `resultSetMetaData.getColumnName(<index>);` >> returns <index>th column (Recall: starts with 1)
- `statement.executeUpdate(<insert_query>)` >> Inserts values to the corresponding table.

Output to File

- `BufferedWriter bufferedWriter = new BufferedWriter(new FileWriter("<output_file>"));`
- `bufferedWriter.write("<some text>");` >> writes to the <output_file>. As with `System.out.print`, you can use escape characters: `\n` moves to the new line, `\t` inserts a tab etc..
- `bufferedWriter.close();` >> After your writing task is finished, you have to close the file.