

ITEC 212 Database Management Systems Overview of the Laboratory Material

The aim of the laboratories in this course is to teach students SQL (Structured Query Language) which is the standard language for creating and querying relational DBMSs. We use Oracle as the DBMS in the course. Each student can login to the database server of the department to experiment with the SQL commands.

A student who completes the course is expected to be able to create tables populate the tables, modify or delete data in the tables and query the data using SQL in any RDBMS and specifically in SQL*Plus environment of Oracle.

SQL commands can be classified briefly as

- Data Control Language (DCL) Commands Data
- Definition Language (DDL) Commands Data
- Manipulation Language (DML) Commands

DCL commands are normally issued by the DBA (Database administrator) to control the database. They include, among others, commands for granting or revoking privileges to objects in the database, for storing or removing transactions that might affect the database. We will not be dealing with these commands, this semester. DCL commands and much more related to DBA activities are included in the advanced courses.

DDL commands are used to create / modify data structures that store and somehow control the data. When a DDL command is complied, their effects are stored in the data dictionary (also known as directory or system catalog). The contents of the data dictionary are known as metadata. Metadata means data about data and is actually information about all the data structures that are needed to store, secure, and access data as well as information about the data structures that are used to make all these actions more efficient and reliable. (For us, at this point in the course, this definition translates to table names, column names, data types of columns, constraints on the data (such as gender is either male or female, cgpa must be between 0.00 and 4.00), names of users, privileges of users etc.) Most DDL commands start with CREATE, ALTER or DROP. We will use CREATE TABLE, ALTER TABLE AND DROP TABLE statements in this course. If time permits we will also learn about a few other DDL statements.

DML commands are used to insert data into tables, modify data already stored in the tables and delete rows of data from the tables. A very important command in the DML class is the SELECT command that is used to query the database. As you might guess Query means asking questions. The SELECT command is used to retrieve / list data from the database. In some classifications, instead of being included in the DML commands, it is listed separately as the QUERY command.

The emphasis of the laboratories is on Select Statement of SQL. This is the statement that is used most frequently. Select is also used as part of the DML commands.

In the first half of the course SELECT command is used in the laboratories to retrieve data from the tables. Each user has the same set of tables in its account. We start with simple select statement. Then we learn how to combine results of two select statements using set operators (UNION, INTERSECT, MINUS). The following laboratory teaches how to use single row functions to modify the data included in the output. Then we learn about group functions and group by and having clauses. Group by clause is used to group

rows of a table so that all rows that have the same value for an attribute or set of attributes are grouped together. Then they can be selected using the having clause. Up to this lab all the select statements use, a single table. Then we learn how to retrieve information that resides in more than one table. This is done using joins and sub queries. Assuming that each lab will take about a week, by the time we finish all the important aspects of select statement, it will be the 6th week of the semester. The rest of the material is usually less tricky. All DML commands (INSERT, DELETE, UPDATE) can be finished in less than one lab session. After that the only mandatory topic left for us will be table related DDL statements: CREATE TABLE, ALTER TABLE and DROP TABLE.

To connect to our course database you can use any user from USER1 to USER50. Password of each user is the same as the username. The connect string should be ORCL.