National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Computing

Laboratory Manual 04:

DML Queries

CS-220: Database Systems

Fall 2017

Class: BS(CS)-6B

Dr. Amanullah Yasin

Mr. Ahmed Shahzaib Abid Bhatti

Date:06-Oct-17

Timings:1415-1700

Introduction

- SQL DDL (Data Definition Language) commands are used to create and modify the databases. Data Manipulation Language (DML) commands are used to query the databases.

Objectives

After performing this lab students should be able to:

1. Create tables in SQL using DDL commands.
2. Perform DML operations on created tables.

Tools/Software Requirement

- MySQL Community Server 5.6
- MySQL Workbench 6.1

Description

Nested Queries/Subqueries
A nestested/subquery is a SQL query nested inside a larger query, such inner-outer queries are called nested queries
A subquery may occur in:

- A SELECT clause
- A FROM clause
- A WHERE clause

Rule of thumb: avoid writing nested queries when possible; keep in mind that sometimes it's impossible

Nested queries

- can return a single constant and this constant can be compared with another value in a WHERE clause

- Can return relations that can be used in various ways in WHERE clauses
- Can appear in FROM clauses, followed by a tuple variable that represents the tuples in the result of the subquery
- Can appear as computed values in a SELECT clause

Given the following **database schema**:

Student (snum: integer, sname: char(30), major: char(25), level: char(2), age: integer)

Faculty (fid: integer, fname: char(30), deptid: integer)

Class (cname: char(40), meets_at: char(20), room: char(10), fid: integer | fid REFS Faculty.fid)

Enrolled (snum: integer, cname: char(40) | snum REFS student.snum, cname REFS class.name)

1. **Find the name of faculty members who do not teach any course**.

```
select distinct f.fname
from faculty f
where f.fid not in
  (select c.fid from class c);
```

2. **Find the names of students who are enrolled in a course taught by I. Teach**.

```
Select s. snames
From student s
where S.snum in
(Select E.snum
 From class C, enrolled E, faculty F
 Where E.cname = C. cname and C.fid = F.fid
 and f.fname = 'I. Teach')
```

3. **Find the names of all students who are enrolled in two classes that meet at the same time**.

```
select distinct S.sname
from student S
Where S.snum in
 (select E1.snum
 from enrolled E1, enrolled E2, class C1, class C2
 where E1.snum = E2.snum and E1.cname <> E2.cname
 and E1.cname = C1.cname
 and E2.cname = C2.cname and C1.meets_at = C2.meets_at)
```

Lab Task

Write SQL expressions for each of the following queries and execute them:

1. Find the names of all juniors (Level = JR) who are enrolled in a class taught by 'Ivana Teach'.
2. Find the names of faculty members that has taught classes only in room R128.
3. Find the names of classes taught by 'Richard Jackson' and their times when a class meet there.
4. Find the names of students majoring in 'Computer Science'.
5. Find the names of classes taught by 'John Williams' in dept # 68.
6. For each class taught by 'John Williams', retrieve the name and age for students.
7. Find the names of students in 'Computer Science' major in descending age-wise.
8. Find distinct student ages in 'Database Systems' class in descending order.
9. List the name of 'Christopher Garcia's teachers.
10. Retrieve the snum and sname of students who have taken classes from both 'Ivana Teach' and 'Linda Davis'. (Both with simple and nested queries)

Deliverables

1. Complete your lab tasks in SQL workbench and submit a word file in with queries along with the screenshots of the results to all the questions attempted. Upload it on LMS. The marking will be based on viva/lab task submitted.