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

Department of Computing

Laboratory Manual 07:

Complex Queries in SQL

CS-220: Database Systems

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Class: BS(CS)-6B

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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

Aggregate Functions
The functions are used to summarize information from multiple tuples into a single-tuple summary. Well known built-in aggregate functions are COUNT, SUM, MAX, MIN, and AVG.

Grouping – Group By clause:
It creates subgroups of tuples before summarizing. Grouping is based on grouping attribute(s).

HAVING clause
It provides a condition on the summary information, i.e. grouping.

Note: Aggregate functions can be used in the SELECT clause or in a HAVING clause.

Given the following database schema:

Product (<u>Maker, Model, Type</u>)

PC (<u>Model</u>, PSpeed, RamSize, HdSize, DSpeed, Price)

Laptop (<u>Model</u>, Speed, RamSize, HdSize, Screen, Price)

Printer (<u>Model</u>, Color, Type, Price)

where

- each underlined attribute is the *primary key* of its relation

- *Type* in *Product* is either PC, laptop, or printer.

- *PSpeed* is the speed of a processor (in megahertz).

- *DSpeed* is the speed and type of a removable disk (CD or DVD).

- *Screen* is the screen size (in inches).

- *Color* of a printer is either true (a color printer) or false (a BW printer).

- *Type* in *printer* is either laser, ink-jet, or bubble.

Lab Task

Download the SQL Script: "Production DDL.sql" and run to create and populate tables of the above database.

Q1: Produce the result in Natural Language (i.e., English) of the following queries.

1. select avg(price) from pc;

   1507.3333

2. select sum(price), ramsize from pc group by ramsize;

4295	64
11294	128
4618	256

3. select model, hdsize from pc where hdsize in (select max(hdsize) from pc);

1007	80
1009	80

4. select ramsize, min(price) from laptop group by ramsize;

32	999
64	1148
96	2584
128	3099

256 2599

5. select maker, model from product where model
    in (select model from pc where pspeed
      in (select max(pspeed) from pc where ramsize
        in (select min(ramsize) from pc)));

    A 1003

    B 1004

Q2: Write SQL queries for the following statements that produce the result given below each query.

1. Find of expensive Loptop.

    Result: 3099

2. Select model and hard disk size of those PCs that have maximum hard disk.

    1007 80
    1009 80

3. Find the total cost of all PCs in each Ramsize;

    4295   64
    11294 128
    2499   256

4. Produce the list includes the model and price of printers sorted on price.

    3005 200
    3001 231
    3002 267
    3007 350
    3003 390
    3004 439
    3006 1999

5. Find those manufacturers (makers) of PCs with speeds of at least 1000.

A 1002
B 1005
B 1006
C 1007
D 1009
D 1011

6. Print model, speed, and price of those PCs whose prices are same.

1012 350 64 799
1013 733 256 2499
1008 700 64 999
1004 866 64 999
1001 700 64 799
1002 1500 128 2499

7. Find those manufacturers (makers) that sell laptops, but not PC's.

NULL Result – No such maker

Deliverables

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.

Production Database

Table: Product		
Maker	**Model**	**Type**
A	1001	pc
A	1002	pc
A	1003	pc
A	2004	laptop
A	2005	laptop
A	2006	laptop
B	1004	pc
B	1005	pc
B	1006	pc
B	2001	laptop
B	2002	laptop
B	2003	laptop
C	1007	pc
C	1008	pc
C	2008	laptop
C	2009	laptop
C	3002	printer
C	3003	printer
C	3006	printer
D	1009	pc
D	1010	pc
D	1011	pc
D	2007	laptop
E	1012	pc
E	1013	pc
E	2010	laptop
F	3001	printer
F	3004	printer
G	3005	printer
H	3007	printer

Table: Laptop					
Model	**Speed**	**RAM Size**	**Hd Size**	**Screen**	**Price**
2001	700	64	5	12.1	1148
2002	800	96	10	15.1	2584
2003	850	64	10	15.1	2738
2004	550	32	5	12.1	999
2005	600	64	6	12.1	2399
2006	800	96	20	15.7	2999
2007	850	128	20	15.0	3099
2008	650	64	10	12.1	1249
2009	750	256	20	15.1	2599
2010	366	64	10	12.1	1499

Table: PC					
Model	**PSpeed**	**RAMsize**	**HD size**	**Dspeed**	**Price**
1001	700	64	10	48xCD	799
1002	1500	128	60	12xDVD	2499
1003	866	128	20	8xDVD	1999
1004	866	64	10	12xDVD	999
1005	1000	128	20	12xDVD	1499
1006	1300	256	40	16xDVD	2119
1007	1400	128	80	12xDVD	2299
1008	700	64	30	24xCD	999
1009	1200	128	80	16xDVD	1699
1010	750	64	30	40xCD	699
1011	1100	128	60	16xDVD	1299
1012	350	64	7	48xCD	799
1013	733	256	60	12xDVD	2499

Table: Printer			
Model	**Color**	**Type**	**Price**
3001	true	ink-jet	231
3002	true	ink-jet	267
3003	false	laser	390
3004	true	ink-jet	439
3005	true	bubble	200
3006	true	laser	1999
3007	false	laser	350