CSC540 Fall 2009

Assignment 2

Due date is 9/29/2009 at 11.59pm

This is an individual assignment.

You will be using the following database schema for all the questions in the assignment: For the sample database instance see Appendix A.

Product (maker, model, type)
PC (model, speed, ram, hd, price)
Laptop (model, speed, ram, hd, screen, price)
Printer (model, color, type, price)

The **Product** relation gives the manufacturer, model number and type (PC, laptop. Or printer) of various products. We assume for convenience that model numbers are unique over all manufacturers and product types; that assumption is not realistic, and a real database would include a code for the manufacturer as part of the model number. The **PC** relation gives for each model number that is a PC the speed (of the processor, in gigahertz), the amount of RAM (in megabytes), the size of the hard disk (in gigabytes) and the price. The **Laptop** relation is similar, except that the screen size (in inches) is also included. The **Printer** relation records for each printer model whether the printer produces color output (true, if so), the process type (laser or ink-jet, typically), and the price.

Qu. 1. Write SQL queries to answer the following questions. Print the results of your queries on the database instance in Appendix A. However, note that your answers should work for arbitrary data, not just the data of these figures.

a) For those manufacturers that sell Laptops, but not PC's.
b) For those pairs of PC models that have both the same speed and RAM. A pair should be listed only once; e.g., list(I,j) but not (j,i).
c) Find the manufacturer(s) of the computer (PC or laptop) with the highest available speed.
a) Find the average price of PC's and laptops made by manufacturer "D".
b) Find, for each speed of PC above 2.0, the average price.
c) Find the average hard disk size of a PC for all those manufacturers that make printers.

Qu.2. CONSTRAINTS IN SQL

(a) Write the following assertions in SQL for the database schema in Qu1.

i) NO manufacturer of PC's may also make laptops.

ii) If a laptop has a larger main memory than a PC, then the laptop must also have a higher price than the PC.

(b) Write the following trigger in SQL. In each case, disallow or undo the modification if it does not satisfy the stated constraint.

a) When updating the RAM or hard disk of any PC, check that the updated PC has at least 100 times as much hard disk as RAM.

Qu. 3. Using the database schema in Qu. 1 write a Java application that embeds SQL queries to do the following:

a) Ask the user for a "budget" (total price of a PC and printer), and a minimum speed of the PC. Find the cheapest "System" (PC plus printer) that is within the budget and minimum speed, but make the printer a color printer if possible. Print the model numbers for the chosen system.

b) Ask the user for a manufacturer, model number, speed, RAM, hard-disk size, and price of a new PC. Check that there is no PC with that model number. Print a warning if so, and otherwise insert the information into tables **Product** and **PC**.

WHAT TO SUBMIT (tentative).

You will submit the assignment in two parts. One is a hardcopy of the printout of your SQL statements for Qu 1 and its results on database instance of Appendix A, then SQL statements of Appendix A.

Then an electronic version of file with two documents. The first document is contains the SQL statements for questions 1 and 2 as well as the print out for question 1. Then, a java with Qu.3 and

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	2007	laptop
C	1007	pc
D	1008	pc
D	1009	pc
D	1010	pc
D	3004	printer
D	3005	printer
E	1011	pc
E	1012	pc
E	1013	pc
E	2001	laptop
E	2002	laptop
E	2003	laptop
E	3001	printer
E	3002	printer
E	3003	printer
F	2008	laptop
F	2009	laptop
G	2010	laptop
H	3006	printer
H	3007	printer

fig1.1 Sample data for Product

model	speed	ram	hd	price
1001	2.66	1024	250	2114
1002	2.10	512	250	995
1003	1.42	512	80	478
1004	2.80	1024	250	649
1005	3.20	512	250	630
1006	3.20	1024	320	1049
1007	2.20	1024	200	510
1008	2.20	2048	250	770
1009	2.00	1024	250	650
1010	2.80	2048	300	770
1011	1.86	2048	160	959
1012	2.80	1024	160	649
1013	3.06	512	80	529

(a) Sample data for relation PC

model	speed	ram	hd	screen	price
2001	2.00	2048	240	20.1	3673
2002	1.73	1024	80	17.0	949
2003	1.80	512	60	15.4	549
2004	2.00	512	60	13.3	1150
2005	2.16	1024	120	17.0	2500
2006	2.00	2048	80	15.4	1700
2007	1.83	1024	120	13.3	1429
2008	1.60	1024	100	15.4	900
2009	1.60	512	80	14.1	680
2010	2.00	2048	160	15.4	2300

(b) Sample data for relation Laptop

model	color	type	price
3001	true	ink-jet	99
3002	false	laser	239
3003	true	laser	899
3004	true	ink-jet	120
3005	false	laser	120
3006	true	ink-jet	100
3007	true	laser	200

(c) Sample data for relation Printer

fig1.2