Midterm Exam (15%)
10 March 2011

Name:_____

ID:_____

Consider the relations:

    Product(maker, <u>model</u>, type)
    PC(<u>model</u>, speed, ram, hd, price)
    Laptop(<u>model</u>, speed, ram, hd, screen, price)

    Key attributes are underlined.

Q1. Write relation algebra expressions to answer the following queries:

  a. **(1.5 marks)**
    Find the model number and price of all laptops with ram greater than 512.

  b. **(3.5 marks)**
    Find the makers which make at least one product (PC or laptop) with ram greater than 512.

Try to use only the operators projection (π), selection (σ), product (×), union(∪), intersection(∩), set difference (-) and rename(ρ).

Q2. Write SQL expressions to answer the following queries

  a. **(2 marks)**
    Find the PC models with speed at least 2.2 and hd at least 250.

  b. **(4 marks)**
    Find the makers which do not make products (PCs or laptops) with speed less than 2.2.

  c. **(4 marks)**
    Print a list of makers and the average laptop price per maker. Include only those makers which make laptops with ram at least 512.

Example data:

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	2007	laptop
C	1007	pc
D	1008	pc
D	1009	pc
D	1010	pc
E	1011	pc
E	1012	pc
E	1013	pc
E	2001	laptop
E	2002	laptop
E	2003	laptop
F	2008	laptop
F	2009	laptop
G	2010	laptop

PC

model	Speed	ram	hd	price
1001	2.66	1024	250	2114
1002	2.1	512	250	995
1003	1.42	512	80	478
1004	2.8	1024	250	649
1005	3.2	512	250	630
1006	3.2	1024	320	1049
1007	2.2	1024	200	510
1008	2.2	2048	250	770
1009	2	1024	250	650
1010	2.8	2048	300	770
1011	1.86	2048	160	959
1012	2.8	1024	160	649
1013	3.06	512	80	529

Laptop

model	Speed	ram	hd	screen	price
2001	2	2048	240	20.1	3673
2002	1.73	1024	80	17	949
2003	1.8	512	60	15.4	549
2004	2	512	60	13.3	1150
2005	2.16	1024	120	17	2500
2006	2	2048	80	15.4	1700
2007	1.83	1024	120	13.3	1429
2008	1.6	1024	100	15.4	900
2009	1.6	512	80	14.1	680

Answer to Q1

Answer to Q2

Answer to Q2 (contd.)

Rough Work

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