RDBMS III assignment 2014

1A. Given following relational schema, write expressions of relational algebra to answer the following queries. (3+2)

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

a. Find the model number and price of all products (of any type) made by manufacturer "Shiva".
b. Find those manufacturers of at least two different computers (PC's or laptops) with speeds of at least 2.80.
c. Find the manufacturers who sell exactly 3 different models of PC.

1B. What is schema diagram ? Draw a schema diagram for the above relational schema.

2A. Given following relational schema, write expressions of relational algebra to answer the following queries. (3+2)

Athlete(id, name, birthdate, country, height, weight)
Sports(id, name, description, category, mw)
Participate(athlete, sport, pr)
Records(type, sport, recordtime, athlete, date)

a. Find names of all athletes who participate in only one sport.
b. Find all athletes who are not record holders for a specific sport and are faster than at least one of the current record holders for this sport. Return the name of the athlete and the name of the sport.
c. Find all pairs of sports S1, S2 such that there does not exist an athlete that participate in both S1 and S2. Return pairs of sports ids. Do not return repetitive tuples such as "(1,2)" and "(2,1)".

2B. List and explain any two reasons why null values might be introduced into the database.

3A. Given following relational schema, write expressions of relational algebra to answer the following queries. (3+2)

EMPLOYEE(ssn, first-name, last-name, address, salary, supervisor-ssn)
DEPARTMENT(dept-no, name, manager-ssn)
WORKS-IN(employee-ssn, dept-no)
INVENTORY(dept-no, item-id, quantity)
ITEMS(item-id, item-name, type)

a. Return the firstname and lastname of all employees who work in the same department as their supervisor.
b. List the names of all items of type 'CD' that are NOT in any inventory.
c. Display the names of all employees who do not work in the same department as their supervisor work and gets more salary than the manager.

3B. Explain any two design goals for relational database

4A Given following relational schema, write expressions of relational algebra to answer the following queries. (3+2)

Student(ssn, name, major, year)
Course (cid, name, description, department)
Offered(cid, semester, section, ins id, location)
Instructor(ins_id, name, department)
Took(ssn, cid, semester, section, grade)
Required(major, cid)

a. Find all students who have taken the same course (given by cid) twice.
a. Return pairs of student name and course names such that the student is required take this course for his/her listed major.
b. Find the name of all courses (from Course) that have never been offered according to Offered.

4B. List and explain any two reasons why decomposition of relations is necessary.