1. Briefly describe the following terms occurring in Database (20%)
   a. stored procedure
   b. atomicity
   c. Concurrent-access anomaly
   d. consistence
   e. physical data model

2. Please consider the following scenario of a library: A library has a set of classified readers, like undergraduate students, graduate students, teachers, and staffs, each of which has attributes of name, ID, telephone no. (three at most), address and so on. In addition, the books stored in the library have the attributes category, name, publisher, authors (ten at most), year, and so on. A reader can borrow and return the book. The borrowing and return actions of a reader should be recorded. Please think what the records of borrowing and return actions should be kept, and construct the E-R diagram for the above scenario (20%).

3. Consider the following two B-trees (denoted as "a" and "b") that are constructed for the same set of key values but with the difference that whose number of pointers that will fit in one node is 4 and 6, respectively. (15 marks)
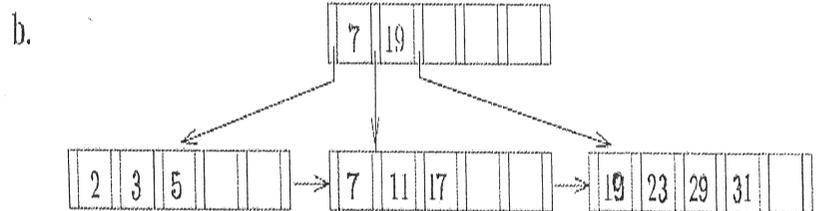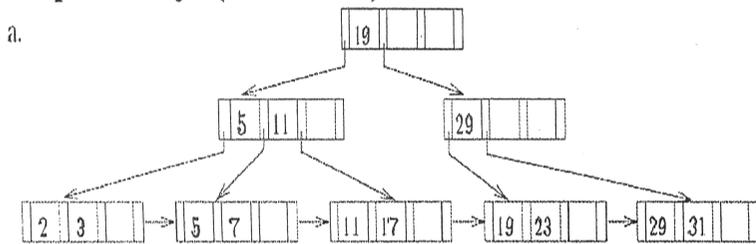
   Please show the form of the two trees "after" the following series of operations: a. Insert 10; b. Insert 9; c. Insert 7; d. Delete 23; e. Delete 19 (20%).

4. The table STUDENTA has the following meaning. A student may have several major habits and several minor habits; the choice of majors and minors is independent of each other. Each student has a unique name. The table has only one candidate key.

Name	gender	Major habits	Minor habits
Jack	Male	dancing	Basketball
Jack	Male	swimming	Baseball
Jack	Male	piano	
KiKi	Female	singing	dancing
KiKi	Femal	travelling	reading
BiBi	Male	Computer game	basketball
BiBi	Male		Volleyball

Please (a) draw the functional dependency, (b) decompose the table into the highest normal form (20%).

5. The following is a set of table schemas in the database. Branch (Branch Name, Branch city, Assets); Customer (Customer Name, Customer address, Gender); (20%)

Loan (Branch name, Loan number, amount), Borrower (Customer name, Loan number)

Please write SQL statements for the following queries:

(a) For all customers who have a loan from the bank, find their names and loan numbers.

(b) Find the names and loan numbers of all customers who have a loan at the "中正" branch.