CS579
Homework Assignment 7

Due: 12/12

Problem 1 (10 points). This question is about the heuristic query optimization algorithm we discussed in the class. Show a step-by-step optimization process of the following query. You must show a sequence of trees.

```
select    Fname, Lname
from      Project p, Works_on w, Employee e
where     p.Pnumber = w.Pno AND w.Essn = e.Ssn AND p.Plocation = 'Houston'
              and e.Ssn = '123456789';
```

Problem 2 (10 points). Suppose that two customers, John and Susan, shares a bank account. Consider the following scenario:

- The current balance of the account is $1,000.
- John is depositing $100 to the account. Let T1 denote this transaction.
- Susan is withdrawing $200 from the account. Let T2 denote this transaction.

If the two transactions are executed concurrently and no concurrency control mechanism is implemented, a "lost update" problem may occur. Show one possible schedule that illustrates this problem. Your answer should look like the Figure 20.3 in Slide 20-13.

Problem 3 (10 points). Consider the following two transactions, T1 and T2. Both transactions are accessing the data item *X* and they are run in an interleaved manner. Assume that the initial value of *X* is 1000.

Time	T1	T2
1	Read(X)	
2		Read(X)
3		x = x - 200
4		Write(X)
5		commit;
6	Read(X)	
7		

(1). What is the value of *X* read by T1 at time 6 if the transaction isolation level is read uncommitted?
(2). What is the value of *X* read by T1 at time 6 if the transaction isolation level is read committed?
(3). What is the value of *X* read by T1 at time 6 if the transaction isolation level is repeatable read?
(4). What is the value of *X* read by T1 at time 6 if the transaction isolation level is serializable?

Include all your answers in a single file and name it *LastName_FirstName_Hw7.doc* or *LastName_FirstName_Hw7.pdf*, and submit it on Blackboard.