CSE 344 Section 9 Worksheet

1. Consider the relations:

   Purchases(pid, custId, quantity, price)

   Customers(custId, name, city)

Now, consider the following query; which indices will produce a speed up?

```
SELECT * FROM Purchase P, Customer C
WHERE P.custId = C.custId
  AND P.price < 100 AND C.custId = 42
```

- Hashtable index on Purchase(price)

- B-tree index on Purchase(pid, price)

- Hashtable index on Customer(custId)

- B-tree index on Purchase(price, pid)

- Hashtable index on Purchase(price, pid)

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2. Consider these three transactions:

- *T1 : R1(A), R1(B), W1(A), W1(B), Co1*
- *T2 : R2(B), W2(B), R2(C), W2(C), Co2*
- *T3 : R3(C), W3(C), R3(A), W3(A), Co3*

For each schedule, determine whether it is conflict-serializable. If yes, indicate a serialization order.

a. Schedule A:

R2(B), W2(B), R3(C), W3(C), R3(A), W3(A), Co3, R2(C), W2(C), Co2, R1(A), R1(B), W1(A), W1(B), Co1

If helpful, we have provided this schedule in tabular format:

T1											R(A)	R(B)	W(A)	W(B)	Co
T2	R(B)	W(B)						R(C)	W(C)	Co					
T3			R(C)	W(C)	R(A)	W(A)	Co								

b. Schedule B:

R2(B), W2(B), R3(C), W3(C), R1(A), R1(B), W1(A), W1(B), Co1, R2(C), W2(C), Co2, R3(A), W3(A), Co3

If helpful, you can convert this schedule into tabular format here:

T1														
T2														
T3														

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3. Consider a concurrency control manager that uses **strict two phase locking** that schedules three transactions:

- *T1 : R1(A), R1(B), W1(A), W1(B), Co1*
- *T2 : R2(B), W2(B), R2(C), W2(C), Co2*
- *T3 : R3(C), W3(C), R3(A), W3(A), Co3*

Each transaction begins with its first read operation, and commits with the *Co* statement. Answer the following questions for each of the schedules below:

- Is this schedule possible under a strict 2PL protocol?

Note: A common question is if conflict serializability implies the schedule is possible under a strict 2PL protocol, and the answer is Conflict Serializable -/-> strict 2PL but strict 2PL → Conflict Serializable

a. Schedule 1:
R2(B), W2(B), R3(C), W3(C), R3(A), W3(A), Co3, R2(C), W2(C), Co2, R1(A), R1(B), W1(A), W1(B), Co1

i. Is it possible under strict 2PL?

b. Schedule 2:
R2(B), W2(B), R3(C), W3(C), R1(A), R1(B), W1(A), W1(B), Co1, R2(C), W2(C), Co2, R3(A), W3(A), Co3

i. Is it possible under strict 2PL?