

More Example Problems (Transactions and Locks)

1 Implicit Locks III: Row Level

Problem 1:

Session 1	Session 2
1 CREATE TABLE t (a INT UNIQUE);	1
2 INSERT INTO t VALUES (9);	2
3 INSERT INTO t VALUES (10);	3
4 BEGIN;	4
5 DELETE FROM t WHERE a=9;	5
6	6 BEGIN;
7	7 UPDATE t SET a=11 WHERE a=9;
8	8 DELETE FROM t;
9 INSERT INTO t VALUES (9);	9
10 DELETE FROM t;	10
11	11 INSERT INTO t VALUES (8);
12 ABORT;	12
	13 INSERT INTO t VALUES (9);
	14 COMMIT;
	15 SELECT count(*) FROM t;

2 Implicit Locks IV: Unique Constraints

Problem 2:

Session 1	Session 2
1 CREATE TABLE t (a INT UNIQUE);	1
2	2 CREATE TABLE u (a INT UNIQUE
3 BEGIN;	3
4 INSERT INTO t VALUES (9);	4
5 INSERT INTO t VALUES (10);	5
6	6 BEGIN;
7	7 INSERT INTO t VALUES (8);
8 INSERT INTO t VALUES (8);	8
9	9 INSERT INTO t VALUES (9);
10	10 COMMIT;
11	11 SELECT count(*) FROM t;
12 ABORT;	

3 Isolation Levels II: Row Level

Problem 3:

Session 1

```
1 CREATE TABLE t ( a INT );
2 INSERT INTO t VALUES (9);
3 INSERT INTO t VALUES (10);
4
5 UPDATE t SET a = a+1;
```

Session 2

```
1
2
3
4 BEGIN;
5
6 DELETE FROM t WHERE a=10;
7 COMMIT;
8 SELECT count(*) FROM t;
```

Problem 4:

Session 1

```
1 CREATE TABLE t ( a INT );
2 INSERT INTO t VALUES (9);
3 INSERT INTO t VALUES (10);
4
5
6 UPDATE t SET a = a+1;
```

Session 2

```
1
2
3
4 BEGIN;
5 SELECT count(*) FROM t;
6
7 DELETE FROM t WHERE a=10;
8 COMMIT;
9 SELECT count(*) FROM t;
```

Problem 5:

Session 1

```
1 CREATE TABLE t ( a INT );
2 INSERT INTO t VALUES (9);
3 INSERT INTO t VALUES (10);
4
5
6
7 UPDATE t SET a = a+1;
```

Session 2

```
1
2
3
4 BEGIN ISOLATION LEVEL
5 READ COMMITTED;
6 SELECT count(*) FROM t;
7
8 DELETE FROM t WHERE a=10;
9 COMMIT;
10 SELECT count(*) FROM t;
```

Problem 6:

Session 1

```
1 CREATE TABLE t ( a INT );
2 INSERT INTO t VALUES (9);
3 INSERT INTO t VALUES (10);
4
5
6
7 UPDATE t SET a = a+1;
```

Session 2

```
1
2
3
4 BEGIN ISOLATION LEVEL
5 READ UNCOMMITTED;
6 SELECT count(*) FROM t;
7
8 DELETE FROM t WHERE a=10;
9 COMMIT;
10 SELECT count(*) FROM t;
```

Problem 7:

Session 1

```
1 CREATE TABLE t ( a INT );
2 INSERT INTO t VALUES (9);
3 INSERT INTO t VALUES (10);
4
5
6
7 UPDATE t SET a = a+1;
```

Session 2

```
1
2
3
4 BEGIN ISOLATION LEVEL
5 REPEATABLE READ;
6 SELECT count(*) FROM t;
7
8 DELETE FROM t WHERE a=10;
9 COMMIT;
10 SELECT count(*) FROM t;
```

4 Foreign Keys (+Isolation Levels)

Problem 8:

Session 1

```
1 CREATE TABLE t(a INT UNIQUE);
2 CREATE TABLE u(b INT REFERENCES t(a));
3 BEGIN;
4
5 INSERT INTO t VALUES (9);
6
7 COMMIT;
```

Session 2

```
1
2
3
4 BEGIN;
5
6 SELECT count(*) FROM u;
7
8 INSERT INTO u VALUES (9);
9 COMMIT;
```

Problem 9:

Session 1

```
1 CREATE TABLE t(a INT UNIQUE);
2 CREATE TABLE u(b INT REFERENCES t(a));
3 BEGIN;
4
5
6 INSERT INTO t VALUES (9);
7
8 COMMIT;
```

Session 2

```
1
2
3
4 BEGIN ISOLATION LEVEL
5 REPEATABLE READ;
6
7 SELECT count(*) FROM u;
8
9 INSERT INTO u VALUES (9);
10 COMMIT;
```

5 Foreign Keys (+Isolation Levels +Deferred Constraints)

Problem 10:

Session 1

```
1 CREATE TABLE t(a INT UNIQUE);
2 CREATE TABLE u(
3     b INT REFERENCES t(a)
4     DEFFERABLE INITIALLY DEFERRED
5 );
6 BEGIN;
7
8 INSERT INTO t VALUES (9);
9
10 COMMIT;
```

Session 2

```
1
2
3
4
5
6
7 BEGIN;
8
9 SELECT count(*) FROM u;
10
11 INSERT INTO u VALUES (9);
12 COMMIT;
```

Problem 11:

Session 1	Session 2
1 CREATE TABLE t(a INT UNIQUE);	1
2 CREATE TABLE u(2
3 b INT REFERENCES t(a)	3
4 DEFFERABLE INITIALLY DEFERRED	4
5);	5
6 BEGIN;	6
7	7 BEGIN ISOLATION LEVEL
8	8 REPEATABLE READ;
9 INSERT INTO t VALUES (9);	9
10	10 SELECT count(*) FROM u;
11 COMMIT;	11
	12 INSERT INTO u VALUES (9);
	13 COMMIT;

Problem 12:

Session 1	Session 2
1 CREATE TABLE t(1
2 a INT UNIQUE	2
3 DEFFERABLE INITIALLY DEFERRED	3
4);	4
5 CREATE TABLE u(b INT REFERENCES t(a));	5
6 BEGIN;	6
7	7 BEGIN;
8 INSERT INTO t VALUES (9);	8
9	9 SELECT count(*) FROM u;
10 COMMIT;	10
	11 INSERT INTO u VALUES (9);
	12 COMMIT;

Problem 13:

Session 1	Session 2
1 CREATE TABLE t (1
2 a INT UNIQUE	2
3 DEFFERABLE INITIALLY DEFERRED	3
4);	4
5 CREATE TABLE u(b INT REFERENCES t(a));	5
6 BEGIN;	6
7	7 BEGIN ISOLATION LEVEL
8	8 REPEATABLE READ;
9 INSERT INTO t VALUES (9);	9
10	10 SELECT count(*) FROM u;
11 COMMIT;	11
	12 INSERT INTO u VALUES (9);
	13 COMMIT;