Lectures

a. Yup, was there.
b. Nothing really missing.
c. The extent to which transaction deadlocks were handled i found were a bit too much. I assume this is common knowledge to most of your students.

Exercise 1 of Chapter 2.3

$r_1(A); r_2(B); r_3(C); w_1(B); w_2(C); w_3(A);$

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-X(B)		
$w_1(B)$		
unlock(B)		
unlock(A)		
	lock-X(C)	
	$w_2(C)$	
	unlock(C)	
	unlock(B)	
		lock-X(A)
		$w_3(A)$
		unlock(A)
		unlock(C)

Deadlock.

E.G. T1 will wait for lock-s on B, which can only be released by T2 which waits on T3 which waits on T1

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-X(B)		
$w_1(B)$		
unlock(B)		
unlock(A)		
	lock-X(C)	
	$w_2(C)$	
	unlock(C)	
	unlock(B)	
		lock-X(A)
		$w_3(A)$
		unlock(A)
		unlock(C)

Still Deadlocks.

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-X(B)		

$w_1(B)$		
unlock(B)		
unlock(A)		
	lock-X(C)	
	$w_2(C)$	
	unlock(C)	
	unlock(B)	
		lock-X(A)
		$w_3(A)$
		unlock(A)
		unlock(C)

Still Deadlocks.....

$$r_1(A); r_2(B); r_3(C); r_1(B); r_2(C); r_3(D); w_1(C); w_2(D); w_3(E);$$

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-S(B)		
$r_1(B)$		
	lock-S(C)	
	$r_2(C)$	
		lock-S(D)
		$r_3(D)$
lock-X(C)		
$w_1(C)$		
unlock(C)		
unlock(B)		
unlock(A)		
	lock-X(D)	
	$w_2(D)$	
	unlock(D)	

	unlock(D)	
	unlock(C)	
	unlock(B)	
		lock-X(E)
		$w_3(E)$
		unlock(E)
		unlock(D)
		unlock(C)

Deadlock after last read of T3, T1 wont be able to acquire the lock on resource C.

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-S(B)		
$r_1(B)$		
	lock-S(C)	
	$r_2(C)$	
		lock-S(D)
		$r_3(D)$
lock-X(C)		
$w_1(C)$		
unlock(C)		
unlock(B)		
unlock(A)		
	lock-X(D)	
	$w_2(D)$	
	unlock(D)	
	unlock(C)	
	unlock(B)	
		lock-X(E)
		$w_3(E)$

		unlock(E)
		unlock(D)
		unlock(C)

Still deadlock after last read of T3, T1 wont be able to acquire the lock on resource C.

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-S(B)		
$r_1(B)$		
	lock-S(C)	
	$r_2(C)$	
		lock-S(D)
		$r_3(D)$
lock-X(C)		
$w_1(C)$		
unlock(C)		
unlock(B)		
unlock(A)		
	lock-X(D)	
	$w_2(D)$	
	unlock(D)	
	unlock(C)	
	unlock(B)	
		lock-X(E)
		$w_3(E)$
		unlock(E)
		unlock(D)
		unlock(C)

Samesies.

$r_1(A); r_2(B); r_3(C); r_1(B); r_2(C); r_3(A); w_1(A); w_2(B); w_3(C);$

T_1	T_2	T_3
lock-X(A)		
$r_1(A)$		
	lock-X(B)	
	$r_2(B)$	
		lock-X(C)
		$r_3(C)$
lock-S(B)		
$r_1(B)$		
	lock-S(C)	
	$r_2(C)$	
		lock-S(A)
		$r_3(A)$
$w_1(A)$		
unlock(A)		
unlock(B)		
	$w_2(B)$	
	unlock(B)	
	unlock(C)	
		$w_3(C)$
		unlock(C)
		unlock(A)

Deadlock after first read of T3, T1 wont be able to acquire the lock-s on resource B.

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-S(B)		
$r_1(B)$		
	lock-S(C)	

	$r_2(C)$	
		lock-S(A)
		$r_3(A)$
lock-X(A)		
$w_1(A)$		
unlock(A)		
unlock(B)		
	lock-X(B)	
	$w_2(B)$	
	unlock(B)	
	unlock(C)	
		lock-X(C)
		$w_3(C)$
		unlock(C)
		unlock(A)

Deadlock after second read of T3, T1 wont be able to acquire the lock-X on resource A.

T_1	T_2	T_3
lock-U(A)		
$r_1(A)$		
	lock-U(B)	
	$r_2(B)$	
		lock-U(C)
		$r_3(C)$
lock-S(B)		
$r_1(B)$		
	lock-S(C)	
	$r_2(C)$	
		lock-S(A)
		$r_3(A)$
lock-X(A)		
$w_1(A)$		
unlock(A)		
unlock(B)		

	lock-X(B)	
	$w_2(B)$	
	unlock(B)	
	unlock(C)	
		lock-X(C)
		$w_3(C)$
		unlock(C)
		unlock(A)

Still deadlocks because the read locks wont be granted.

$r_1(A); r_2(B); r_3(C); w_1(B); w_2(C); w_3(D);$

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-X(B)		
$w_1(B)$		
unlock(B)		
unlock(A)		
	lock-X(C)	
	$w_2(C)$	
	unlock(C)	
	unlock(B)	
		lock-X(D)
		$w_3(D)$
		unlock(D)
		unlock(C)

No Deadlock! T3 will finish resulting in a finish of T2 resulting in a finish of T1

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		

$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-X(B)		
$w_1(B)$		
unlock(B)		
unlock(A)		
	lock-X(C)	
	$w_2(C)$	
	unlock(C)	
	unlock(B)	
		lock-X(D)
		$w_3(D)$
		unlock(D)
		unlock(C)

No Deadlock! Stayed the same.

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	
		lock-S(C)
		$r_3(C)$
lock-X(B)		
$w_1(B)$		
unlock(B)		
unlock(A)		
	lock-X(C)	
	$w_2(C)$	
	unlock(C)	
	unlock(B)	
		lock-X(D)

		$w_3(D)$
		unlock(D)
		unlock(C)

No Deadlock! Stayed the same.

$r_1(A); r_2(B); r_3(C); r_1(B); r_2(C); r_3(D); w_1(A); w_2(B); w_3(C);$

T_1	T_2	T_3
lock-X(A)		
$r_1(A)$		
	lock-X(B)	
	$r_2(B)$	
		lock-X(C)
		$r_3(C)$
lock-S(B)		
$r_1(B)$		
	lock-S(C)	
	$r_2(C)$	
		lock-S(D)
		$r_3(D)$
$w_1(A)$		
unlock(B)		
unlock(A)		
	$w_2(B)$	
	unlock(C)	
	unlock(B)	
		$w_3(C)$
		unlock(D)
		unlock(C)

No Deadlock! T3 will be able to finish which makes T2 able to finish and then T1.

T_1	T_2	T_3
lock-S(A)		
$r_1(A)$		
	lock-S(B)	
	$r_2(B)$	

	$r_2(D)$	
		lock-S(C)
		$r_3(C)$
lock-S(B)		
$r_1(B)$		
	lock-S(C)	
	$r_2(C)$	
		lock-S(D)
		$r_3(D)$
lock-X(A)		
$w_1(A)$		
unlock(B)		
unlock(A)		
	lock-X(B)	
	$w_2(B)$	
	unlock(C)	
	unlock(B)	
		lock-X(C)
		$w_3(C)$
		unlock(D)
		unlock(C)

No Deadlock! All transactions will be able to run without waits following the schedule.

T_1	T_2	T_3
lock-U(A)		
$r_1(A)$		
	lock-U(B)	
	$r_2(B)$	
		lock-U(C)
		$r_3(C)$
lock-S(B)		
$r_1(B)$		
	lock-S(C)	
	$r_2(C)$	
		lock-S(D)
		$r_3(D)$

		$r_3(D)$
lock-X(A)		
$w_1(A)$		
unlock(B)		
unlock(A)		
	lock-X(B)	
	$w_2(B)$	
	unlock(C)	
	unlock(B)	
		lock-X(C)
		$w_3(C)$
		unlock(D)
		unlock(C)

No Deadlock! Schedule will follow the same wait schedule as the first of this schedule.

Exercise 4 of Chapter 2.3

```
insert into instrument (name, gid, comment) values ('mayonaise', uuid_gene
rate_v4(), 'mayonaise is geen instrument');
```

```
delete from instrument where name='mayonaise');
```

```
select artist.name, track.name from track left join artist on track.artist
_credit=artist.id where artist.id=1;
```