Concurrent Systems. Paper 4 Outline solution. P4 q7
JMB

(a)

D & I single object tx's.
3. inconsistent behaviour if D before I for some & not others

(b)

2PL has no effect.

(c)

inconsistency can only be corrected outside scheduler

D & T. eg:

2 T: check(A, £1000) → OK
2 D: debit (A, £(x))
1 T: debit (A, £1000) → RED
etc

2PL: T < D
A can still go red
T > D T aborts.

correct outside scheduler

I & T.

T: check (A, £1000) → OK
2 T: debit (A, £1000)
2 I: interest (A) } interest lost on £1000 in transit
1 I: interest (B) }
T: credit (B, £1000)

2PL can delay I but customer can still lose interest

correct outside scheduler

(a)

T & T. assume checks OK
Tx: debit (A, £1000)
2 Ty: debit (B, £200)
Tx: credit (B, £1000)
3 Ty: ~~debit~~ credit (A, £200)

(b)

2PL could deadlock
Tx: lock (A)
Ty: lock (B)
Tx: debit (A, £1000)
Ty: debit (B, £200)
Tx: lock (B) – fail }
Ty: lock (A) – fail }

2 c) if we can say that debit and credit do not conflict there is no need to lock & the deadlock & detection ~~were~~ unnecessary.

20 We have assumed that object operations such as debit/credit can be made atomic.