

## 2003 Paper 13 Question 8

### Databases

- (a) Define the ACID properties of a transaction. [6 marks]
- (b) Define what is meant by *strict two-phase locking* (strict 2PL). [4 marks]
- (c) Assume that in addition to traditional Read and Write actions a DBMS supports increment and decrement actions: Inc and Dec (both are assumed to perform blind writes).

Consider the following two transactions.

$$T1 : [\text{Inc}(A), \text{Dec}(B), \text{Read}(C)]$$
$$T2 : [\text{Inc}(B), \text{Dec}(A), \text{Read}(C)]$$

- (i) By considering some possible schedules of the above transactions, describe carefully the concurrency permitted by strict 2PL using just shared/read and exclusive/write locks. [3 marks]
- (ii) Detail a way to gain more interleaving whilst still maintaining strict 2PL. [7 marks]