

1996 Paper 3 Question 1

Concurrent Systems

For a transaction model based on objects:

- (a) Define how conflict may be specified in terms of object operation semantics. Give an example of conflicting operations. Give an example of non-conflicting operations that would conflict with read–write semantics. [3 marks]
- (b) Define the necessary and sufficient condition for two transactions to be serializable. Give an example of a non-serializable pair of transactions. [2 marks]
- (c) Define the necessary and sufficient condition for a concurrent execution schedule of a number of transactions to be serializable. Give an example of a serialization graph for four transactions that are non-serializable. [2 marks]
- (d) Discuss how the three general approaches to providing concurrency control for transaction systems are designed to enforce the property you have defined in (c) above. [13 marks]