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The adaptive serializable snapshot isolation protocol for managing database transactions

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The Adaptive Serializable Snapshot Isolation Protocol for Managing Database Transactions

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Dedicated to

My parents

Declaration

This is to certify that the work reported in this thesis was done by the author, unless specified otherwise, and that no part of it has been submitted in a thesis to any other university or similar institution.

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Abstract

In this thesis, concept of database concurrency control, computational models of database transaction, the correct criterias of concurrent execution of transactions and concurrency control algorithms such as two phase locking, serialization graph testing, Snapshot Isolation are reviewed. A graph based mechanism is proposed for preserving Snapshot Isolation protocol(SI) serializable at run-time. Firstly, we present Dynamic Managed Snapshot Isolation Serialization Graph(called DSISG). By using this mechanism, non-serializable transactions under Snapshot Isolation protocol can be detected at run-time. Secondly, in order to guarantee the effectivity of DSISG, a new model of database transaction(segmented transaction model) is proposed. Thirdly, an algorithm of managing a hierarchical structured acyclic graph is presented. The run-time characterzing of non-serializable transaction under Snapshot Isolation protocol will be more efficient when this hierachical graph structure is applied to DSISG. We also summarize the contributions of this thesis and formulate some open problems.

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