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Chapter 10, Problem 2P

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Problem

Describe the three most common problems with concurrent transaction execution. Explain how concurrency control can be used to avoid those problems.

Step-by-step solution

Step 1 of 7

Concurrency control

Concurrency control checks the activities for the coordination of transaction processes executed at the same time on multi processors or multi user database system.

The concurrency control is the process which coordinates between the transactions that are being executed at the same time when a number of users are acting on the same DBMS.

The concurrency control confirms the data integrity and serializability that it ensures that the correct result are produces for all the transactions done at the same time.

For example:

Consider the condition when two travelers are going to buy the air ticket for the same flight in which only one seat is available.

Without concurrency control mechanism it may be possible that the ticket can be purchased by both the travelers. But if the concept of concurrency control is applied on the database then database will not allow both the travelers to purchase the ticket because there is only one seat.

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Step 2 of 7

Problems with concurrent transaction execution and their solution using concurrency control

If concurrency control is not taken seriously it gives rise to these problems:

a. Lost update: This problem arises when same data object is updated by two transactions at the same time and the update from one transaction lost.

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Step 3 of 7

For example: A person A is withdrawing an amount of Rs.500 from ATM from account P which already possesses Rs.2000. Now at the same time a person B is depositing the amount of Rs 500 to the same account P. According to the situation the amount should be Rs.2000. But update of B will be overridden by updation of A which will create lost update anomaly.

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Step 4 of 7

b. Uncommitted data: This problem arises when a transaction is made to access data from the place which is changed by some other transaction but has not committed yet.

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Step 5 of 7

For example: Consider two transactions T1 and T2 in transaction T1 the salary is incremented by 20% and in transaction T2 the tax is reduced from basic salary. Now suppose initial salary is Rs 500 it will be incremented to Rs.600 and now T2 is allowed to read this value even when T1 has not been committed yet. But, now T1 has decided to abort and T2 has read the salary as rs.600 and will make the salary deduction according to this. Thus here the value read by T2 is dirty read which gives rise to dirty read anomaly.

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Step 6 of 7

The concurrency control ensures that one transaction taken place at a time so when one transaction completes it commits that and after that it proceeds to the other transaction. Hence the problem of uncommitted data resolves.

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Step 7 of 7

c. Inconsistent retrieval: This occurs when more than one result of same problem came out when the same object is read more than once.

For example:

A transaction T1 is reading the value of the quantity of shoes and transaction T2 is updating the data at the same time. Now if T1 will be made to read the value different value will be read as it has been updated by T2. Thus fuzzy read anomaly is taking place.

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