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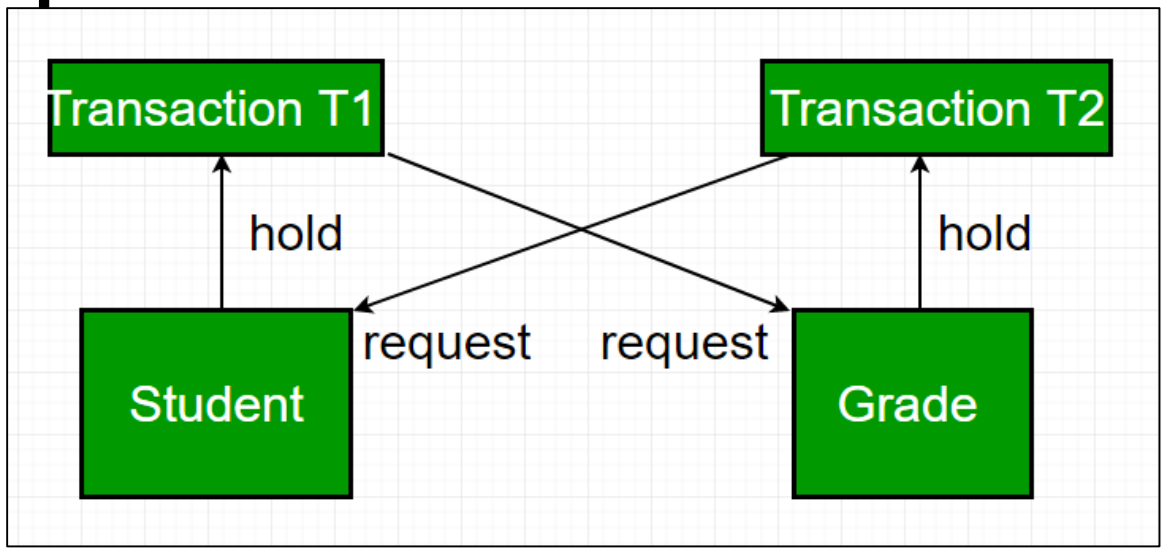
Database Management System (BCSC – 0003)

Topic: Deadlock in DBMS



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Topics to be covered

- Deadlock in DBMS
- Deadlock Avoidance
- Deadlock Detection
- Deadlock Prevention

Deadlock in DBMS

- In a database, a deadlock is an unwanted situation in which two or more transactions are waiting indefinitely for one another to give up locks.

- Deadlock is said to be one of the most feared complications in DBMS as it brings the whole system to a Halt.

Deadlock in DBMS

For example:

In the STUDENT table, transaction T1 holds a lock on some rows and needs to update some rows in the GRADE table. Simultaneously, transaction T2 holds locks on some rows in the GRADE table and needs to update the rows in the STUDENT table held by Transaction T1.

Now, the main problem arises. Transaction T1 is waiting for T2 to release its lock and similarly, transaction T2 is waiting for T1 to release its lock. All activities come to a halt state and remain at a standstill. It will remain in a standstill until the DBMS detects the deadlock and aborts one of the transactions.

Deadlock in DBMS

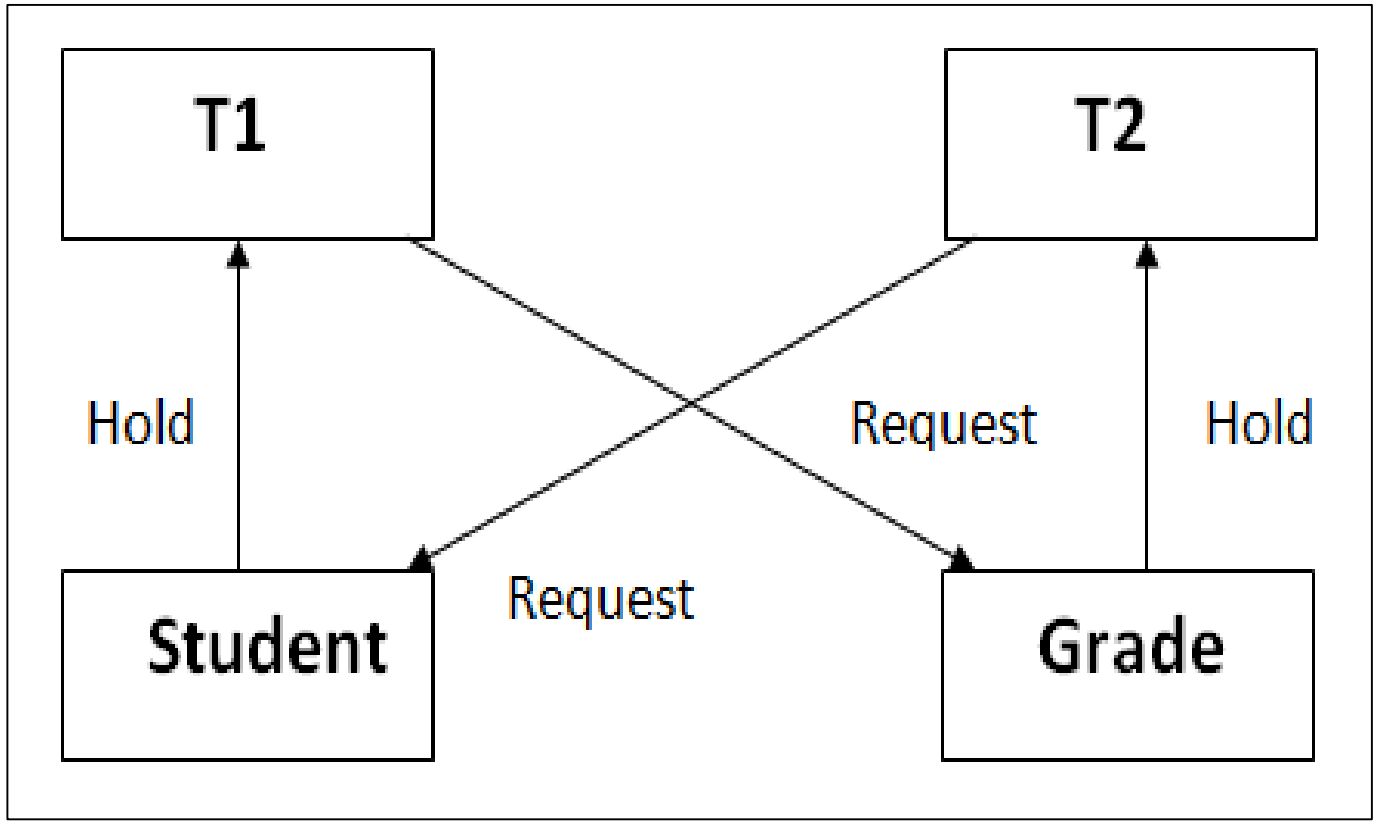


Figure: Deadlock in DBMS

Deadlock Avoidance

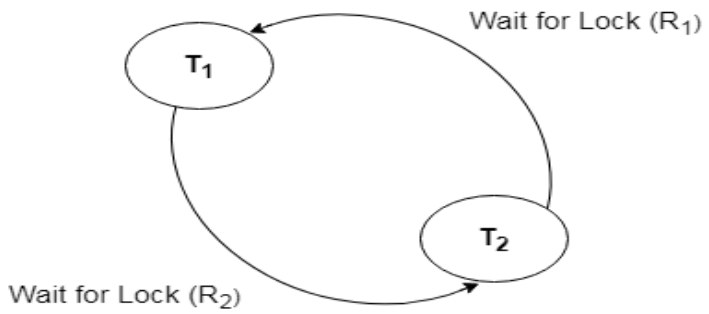
- When a database is stuck in a deadlock, It is always better to avoid the deadlock rather than restarting or aborting the database.

- Deadlock avoidance method is suitable for smaller databases whereas deadlock prevention method is suitable for larger databases.

Deadlock Detection

- In a database, when a transaction waits indefinitely to obtain a lock, then the DBMS should detect whether the transaction is involved in a deadlock or not.

Wait-for-graph is one of the methods for detecting the deadlock situation. This method is suitable for smaller database. In this method a graph is drawn based on the transaction and their lock on the resource. If the graph created has a closed loop or a cycle, then there is a deadlock.



Deadlock Prevention

- Deadlock prevention method is suitable for a large database. If the resources are allocated in such a way that deadlock never occurs, then the deadlock can be prevented.

- The DBMS analyzes the operations of the transaction whether they can create a deadlock situation or not. If they do, then the DBMS never allowed that transaction to be executed.

References

- Korth, Silbertz and Sudarshan (1998), “Database Concepts”, 4th Edition, TMH.
- Elmasri and Navathe (2010), “Fundamentals of Database Systems”, 5th Edition, Addision Wesley.
- Date C J,” An Introduction to Database Systems”, 8th Edition, Addision Wesley.
- M. Tamer Oezsu, Patrick Valduriez (2011). “Principles of Distributed Database Systems”, 2nd Edition, Prentice Hall.
- https://www.javatpoint.com/deadlock-in-dbms/ last accessed on 28 September' 2021.


Thank
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