Course Summary

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Roles and Responsibilities

Developer **Transactions**	**Database Engine** **ACID**
Explicit vs. Implicit **Autocommit**	**Savepoints** **Checkpointing**

Pessimistic Concurrency

ANSI Isolation levels
- READ UNCOMMITTED (NOLOCK)
- READ COMMITTED
- REPEATABLE READ
- SERIALIZABLE

Anomalies
- Dirty reads
- Non-repeatable reads
- Phantom reads

Isolation vs concurrency

Optimistic Concurrency

Snapshot Isolation

Row versioning instead of locking

Better for read-heavy loads

Extra load on tempdb

Locking

Everything depends on locking

Transactions block each other

Lock granularity and hierarchy

Lock modes: IS to X

Lock escalation

Optimizing Concurrency

Lock (In)Compatibility
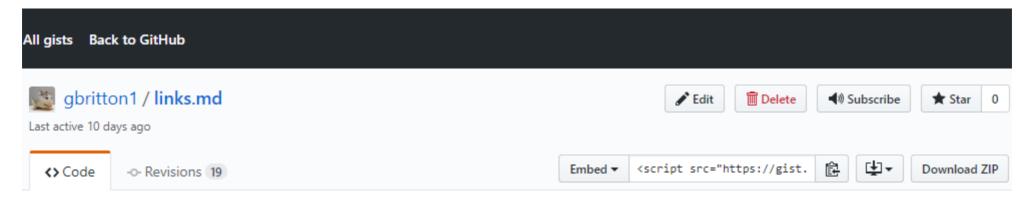
Deadlocks

Extended Events
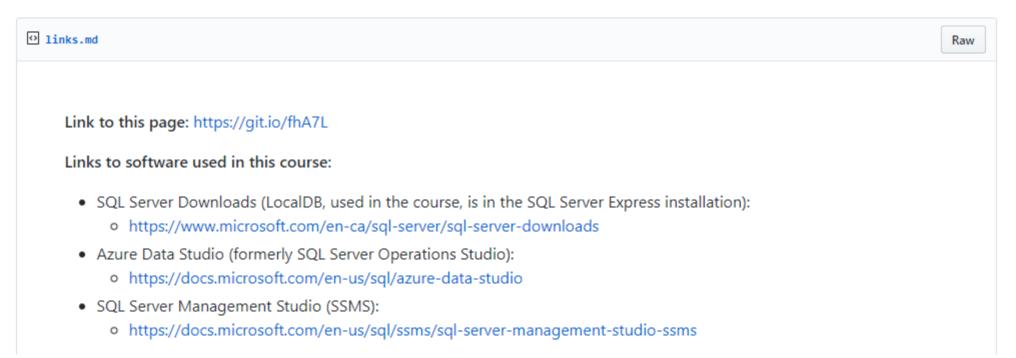
Handling and Avoiding Deadlocks

More Information

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Managing SQL Server Database Concurrency

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Links to software used in this course:

- SQL Server Downloads (LocalDB, used in the course, is in the SQL Server Express installation):
  - https://www.microsoft.com/en-ca/sql-server/sql-server-downloads
- Azure Data Studio (formerly SQL Server Operations Studio):
  - https://docs.microsoft.com/en-us/sql/azure-data-studio
- SQL Server Management Studio (SSMS):
  - https://docs.microsoft.com/en-us/sql/ssms/sql-server-management-studio-ssms

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