**Week 10 Notes**

Query Optimization

* Tries to do selection first before joining
* SSMS Execution Plan Viewer: analyzes queries
* Allows us to see percentage of time needed per process
* Aim to limit the values of the queries time percentage
* Tips
  + Efficiently joins
  + Optimize WHERE clauses
  + Use proper data types
  + Consider query execution plans
  + Batch queries where possible
  + Avoid nested subqueries
  + Use temporary variables carefully
  + Manage transactions properly
  + Optimize ORDY BY clause
  + Index maintenance
  + Database design considerations

REST API

HTTP Methods

* GET: retrieves all records
* POST: create new record
* PUT: update existing record
* DELETE: delete existing record

Steps

* Docker should be on
* Run properties file
* Create data models
* Create an interface

Postman

* Create connection with backend and database

Transaction & Concurrency

* Transactions: group of operations or sequences of operations that need to be performed together
  + Form single logical unit
* Write-Write: two parties writing at the same time
* Write-Read: read something before the write operation is complete where data is not aligned
  + Dirty Read
* Read-Write:
  + Unrepeatable Read
* ACID Properties
  + Atomicity: all or nothing
  + Consistency: no initial conflicts
  + Isolation
  + Durability
* Only relational databases have ACID properties

Concurrency

* Scheduling takes read/write requests from transactions and either executes them in buffers or delays them
  + Two types of scheduling
    - Pre-emptive
    - Non pre-emptive