Microsoft TSQL Query Optimization, Tips and Tricks

Instructor: Jeremy Henry (Director of I.S. with ERS, Inc. - 18+ years with MS SQL and Software Development)

## Summary:

In this course, we will be covering do’s and don’ts of writing SQL queries, views and stored procedures with a focus on making your queries run as fast as possible. We will cover the various “gotchas” that can severely inhibit query performance and common bad habits that could really be costing you. We will also take a look at analyzing execution plans in SQL Management Studio… and hopefully provide enough best practice knowledge so that you will almost never need to. Finally, the course will finish out with as many tips and tricks for accomplishing common – and sometimes complex - querying and reporting tasks as we can fit in.

# Prerequisites:

* General/Basic knowledge of RDBMS concepts such as normalization and indexing.
* General/Basic knowledge of writing Microsoft TSQL queries, views and Stored Procedures
* Laptop running Windows 7, 8, or 8.1 with SQL Server Express 2008|2012|2014 installed (or at least downloaded)
* AdventureWorks2014 sample database installed (or at least downloaded)

# Week 1

* (QUICK) Installing SQL Server Express 2014, AdventureWorks database and Overview
* GitHub repository for this class
* Optimizing your SQL
  + 12+ Key Rules
  + Proper JOINs

# Week 2

* More Optimizing
  + How TO and NOT TO use Sub-Queries
  + Providing hints for execution plan with and without using SQL HINTs
* Indexes
  + Clustered, non-clustered, unique
* Analyzing Execution Plans
  + Understanding the diagram
  + Problem indicators
  + "Deep trees" vs "Bushy trees"

# Week 3

* Advanced Indexing
  + Filtered Indexes
  + Indexed Views
  + Filegroup considerations
  + Partitioning indexes
  + Columnstore indexes
* Updating table stats
* Isolation levels and locking
  + Understanding Isolation Levels
  + Pages, locking and deadlocks
  + Viewing locks on objects
    - Types of locks
  + NOLOCK option and when to use it
* Temp Tables, Table Variables, and CTEs

# Week 4

* Tips & Hacks
  + Some specific "Gotchas"
  + FULL OUTER, CROSS JOIN, and SELF JOINs
  + Adding and Using Record Sequence (Row) # with Grouping
    - New LAG, LEAD, FIRST\_VALUE and LAST\_VALUE keywords (new since 2012)
  + Pivoting (flattening) data
  + Running Totals & Summary Totals
  + Calculating distance between GPS locations/Zip Codes
  + + more…