Introduction to T-SQL Queries

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Agenda

- Day 1
  - Module 1: What is a database?
  - Module 2: Select
  - Module 3: Filtering
  - Module 4: Expressions
- Day 2
  - Module 5: Joining
  - Module 6: Subqueries and UNION
  - Module 7: Grouping
  - Bonus: Windowing functions

Get started

- Download ebook
  - https://www.apress.com/de/book/9781484200476
  - https://bit.ly/2JyE3WA
  - Use the code given to get the book for free
- Connection
  - Kkellen.database.windows.net
  - Use the student credentials provided
  - SQL Authentication
  - Databases
    - AdventureWorks2017_A, B, or C

What's a database?

Database

A database is an organized collection of data. It is the collection of schemas, tables, queries, reports, views and other objects. The data are typically organized to model aspects of reality in a way that supports processes requiring information, such as modelling the availability of rooms in hotels in a way that supports finding a hotel with vacancies.

Database - Wikipedia
https://en.wikipedia.org/wiki/Database

Tables

UsedCars					
ID	Make	Model	Type	Year	Color
1	Chevrolet	Malibu	Passenger car	2015	Blue
2	Hyundai	Sonata	Passenger car	2011	Silver
3	Chrysler	Pacifica	Minivan	2017	White
4	Toyota	Prius	Hybrid car	2013	White
5	Hyundai	Elantra	Passenger car	2015	Blue
6	Chevrolet	Silverado	Truck	2013	Red

```
SELECT *
FROM UsedCars
WHERE Make = 'Hyundai';
```
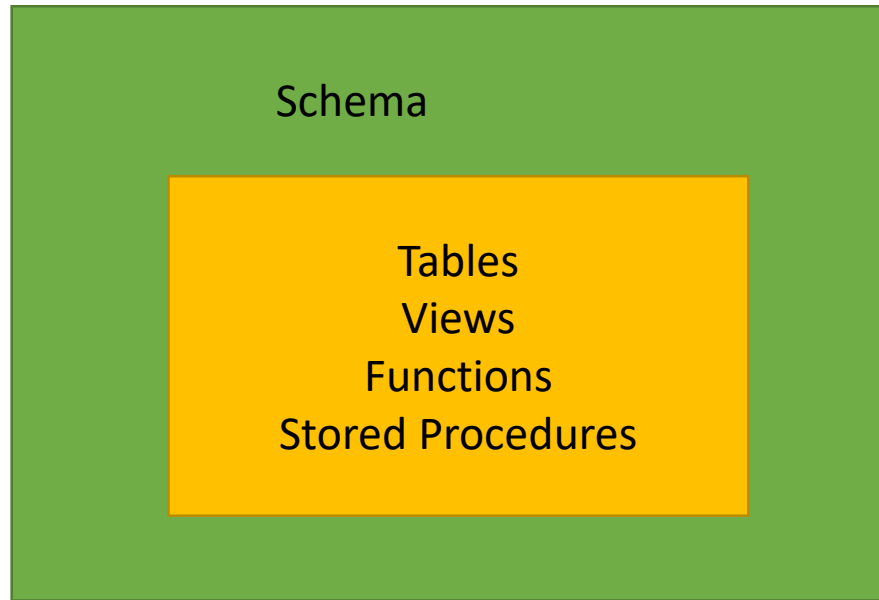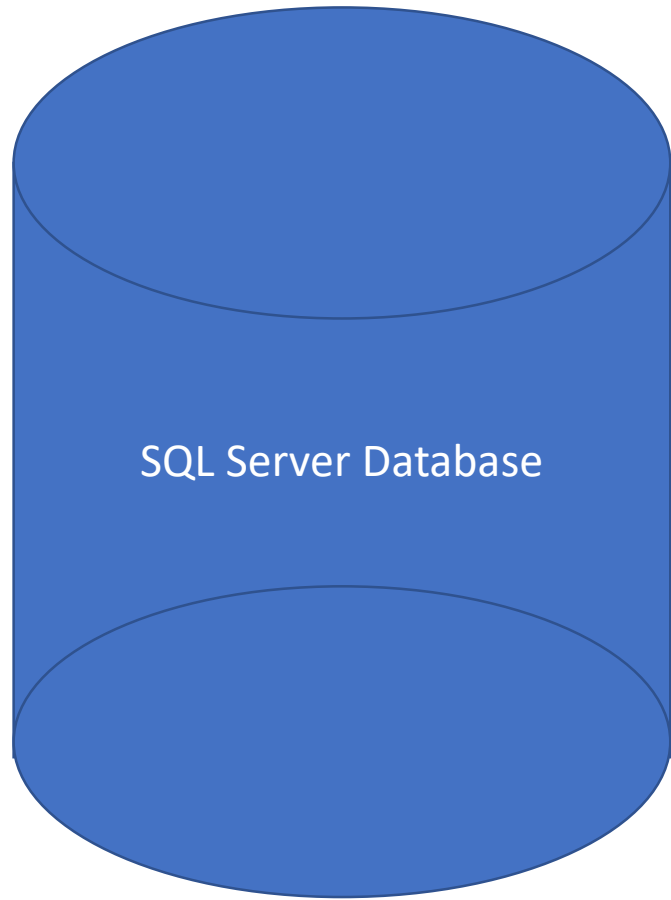
T-SQL

- SQL = Structured Query Language
- Each vendor has own version
- The basics are the same

PRINT, GO, USE, and comments

- Print displays a message
- GO is a batch separator
- USE – switch databases
- -- (two dashes) for a one-line comment
- /* */ for multi line comments
- Use a tick mark aka single quote around strings or dates

Demo : Getting around in ADS

Lab

- Connect to kkellen.database.windows.net with username and password
- Navigate to Databases → AdventureWorks2017_X → Tables → HumanResources.Department
- Right-click and Select TOP 1000 rows
- Comment out the ModifiedDate column and click Run

SELECT

- Keyword for retrieving data from a database
- Return a list of columns or expressions
- Syntax

  SELECT <expr1>[,<expr2>,<expr3>,…]

FROM

- The table where the data can be found
- Syntax

  SELECT *
  FROM <schema>.<table>

  SELECT <expr1>[,<expr2>,<expr3>,…]
  FROM <schema>.<table>

- The schema is often "dbo"

- You join tables together in the FROM clause, but you'll learn about that in a later module

TOP

- Return a number of rows or a percent of rows
- Syntax

```
SELECT TOP(n) <expr1>[,<expr2>,<expr3>,…]
FROM <schema>.<table>

SELECT TOP(n) PERCENT <expr1>[,<expr2>,<expr3>,…]
FROM <schema>.<table>
```

DISTINCT

- Return a unique set of rows
- Syntax
  SELECT DISTINCT <expr1>[,<expr2>,<expr3>,…]
  FROM <schema>.<table>

Aliases

- Give a name to an expression or table
- Syntax

      SELECT <expr1> AS Name1

      FROM <tablename> AS tbl

      SELECT <expr1> AS [The name]

      SELECT <expr1> AS "The name"

Demo: SELECT FROM

Lab: SELECT

- Exercise 3-1, questions 1 - 3, on page 36

Filtering queries

- Use the WHERE clause
- Operators
  - =, <>, !=
  - <, >, <=, >=
  - BETWEEN
  - LIKE (with wildcards %,_ and more)
  - IN
  - AND, OR for multiple expressions
  - NOT
  - Parentheses to enforce logic

WHERE

- Basic Syntax

    SELECT <expr1>[,<expr2>,<expr3>,...]

    FROM <schema>.<table>

    WHERE <expr5> = <expr6>

- Dates example

SELECT SalesORderID, ShipDate

FROM Sales.SalesOrderHeader

WHERE ShipDate >= '2011-06-07' and ShipDate < '2011-06-08'

Demo: The WHERE clause

Lab: WHERE clause practice

- Complete exercise 3-2, questions 1 - 3 on page 45

- Complete exercise 3-3, questions 1 and 2 on page 48
    - Remember tick marks around dates
    - Remember that you can have two or more expressions in the WHERE clause

AdventureWorks2017 dates are 2011 - 2014

Working with NULL

- Unknown
- Can't compare anything to NULL
- When trying to compare to NULL, the row is not returned
- Use ISNULL or COALESCE to replace the NULL
- Use IS NULL or IS NOT NULL to compare

Demo: NULL

Lab: NULLs

- Exercise 3-4 on page 50

- IS NULL or IS NOT NULL for comparisons
- ISNULL(column,substitute) use for comparisons or in SELECT
- COALESCE(column1, expression,expression…) use for comparison or in SELECT

Ordering data

- Use the ORDER BY clause

- One or more columns or expressions

- Ascending by default

- Use DESC to reverse order

Demo: ORDER BY

Demo notes

- Order by.sql

Lab: ORDER BY

- Exercise 3-5 on page 52

Expressions

- Concatenating strings

  <string1> + <string2>

- Math

  <number> <operator> <number>

- Lots of built-in functions!

Demo: Expressions

Demo notes

- Chapter 4 sql 4-1 to 4-6

Lab: Expressions

- Exercise 4-1, questions 2 - 3 on page 65

- Exercise 4-2, questions 1 - 2 on page 66 (+,*,/,-)

- Exercise 4-3, question 1 & 3 on page 75
    - LEFT
    - UPPER

String functions

- RTRIM, LTRIM remove spaces
- LEFT, RIGHT return a number of characters
- LEN, DATALENGTH return the length
- CHARINDEX find a string
- SUBSTRING return part of a string
- REVERSE returns the string backwards
- UPPER, LOWER returns all upper or lower case
- REPLACE replace part of a string

Demo: String functions

Demo notes

- Chapter 4, 4-7 to 4-16

LAB: String functions

- Exercise 4-3, questions 1,2,3 page 75
- Functions needed
  - LEFT
  - SUBSTRING
  - UPPER

Working with Dates

- GETDATE, SYSDATETIME returns the server date
- DATEADD adds a time period to a date
- DATEDIFF subtract a time period from a date
- DATENAME, DATEPART returns part of a date
- DAY, MONTH, YEAR returns part of a date
- CONVERT, FORMAT formatting dates

Demo: Working with dates

Lab: Working with dates

- Exercise 4-4, questions 1, 3, 4 on page 82
- Functions needed
  - DATEDIFF
  - DATEADD
  - YEAR, MONTH