



# Module 2 Day 2

Aggregate Functions / Subqueries

# What makes an application?

- Program Data

- ✓ Variables & .NET Data Types
- ✓ Arrays
- ✓ More Collections (list, dictionary, stack, queue)
- ✓ Classes and objects (OOP)

- Program Logic

- ✓ Statements and expressions
- ✓ Conditional logic (if)
- ✓ Repeating logic (for, foreach, do, while)
- ✓ Methods (functions / procedures)
- ✓ Classes and objects (OOP)
- ❑ Frameworks (MVC)

- Input / Output

- User

- ✓ Console read / write
- ❑ HTML / CSS
- ❑ Front-end frameworks (HTML / CSS / JavaScript)

- Storage

- ✓ File I/O
- ❖ Relational database
- ❑ APIs

# Order By

- Sorts rows by the named column(s)
- `SELECT col1, col2`  
`FROM table`  
`WHERE ...`  
`ORDER BY col1 [ASC | DESC], col3 [ASC | DESC]...`
- Order-by column does not need to be in the select list
- Multiple Order-by columns “break ties”
- `ORDER BY n [ASC | DESC]`
  - Uses the nth column in the select list
  - 1-based 😊

# Top N

- Limits the result set to the first N rows
- `SELECT TOP n col1, col2`
- “Top 10 most populous cities”

# Functions

- Use wherever you'd use a column name
- String functions
  - Concatenation with +
  - CONCAT, LEFT/RIGHT, LEN, LOWER, UPPER, LTRIM, RTRIM, TRIM, STR, SUBSTR
- [https://www.w3schools.com/sql/sql\\_ref\\_sqlserver.asp](https://www.w3schools.com/sql/sql_ref_sqlserver.asp)
  - Also Numeric and Date functions
- **ISNULL**(expression, valueIfNull)



Let's  
Code

# Aggregate Functions

- Performs some calculation on multiple rows and summarizes result
- `AVG`, `COUNT`, `MAX`, `MIN`, `SUM`
- `SELECT AVG(col1), MAX(col2)`
- `SELECT COUNT(*) FROM employee`
- This will always return one row!
- Column name will be undefined in the result set
  - You can name the column with `AS`



Let's  
Code

# Grouping Results

- Always used with aggregate functions
- Returns 1 row per “group”
- `SELECT col1, col2, FUNC1(col3)`  
`FROM tablename`  
`WHERE search-condition -- optional`  
`GROUP BY col1, col2`  
`ORDER BY ... -- optional`
- Columns NOT aggregated must be listed in the GROUP BY



# Subquery

- One way of relating data between tables (or between a table and itself)
- `SELECT col1, col2...`  
`FROM table1`  
`WHERE col3 IN | NOT IN`  
`(SELECT col9 FROM table2 WHERE ...)`
- Compares one column in the “outer” query to one column in the “inner” query