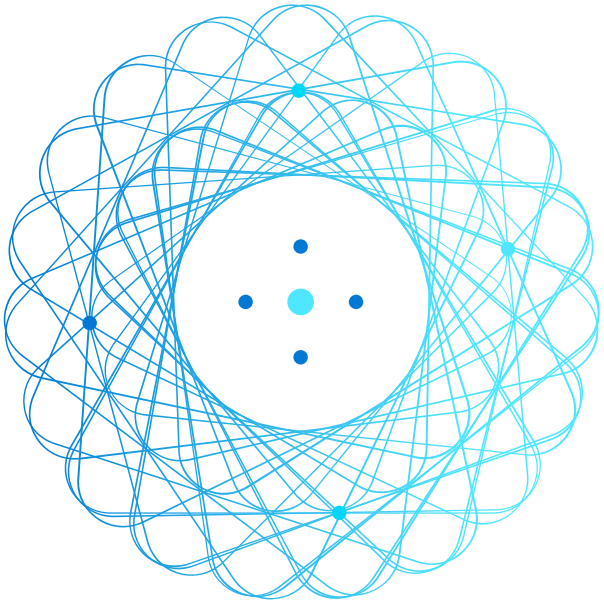
Microsoft Azure

Module 4: Using Built-in Functions



Module Agenda

Getting Started with Scalar Functions

Grouping Aggregated Results

Lesson 1: Getting Started with Scalar Functions

Introduction to Built-In Functions

Function Category	Description
Scalar	Operate on a single row, return a single value
Logical	Compare multiple values to determine a single output
Ranking	Operate on a partition (set) of rows
Rowset	Return a virtual table that can be used subsequently in a Transact-SQL statement
Aggregate	Take one or more input values, return a single summarizing value

Scalar Functions

Operate on elements from a single row as inputs, return a single value as output

- Return a single (scalar) value
- Can be used like an expression in queries
- May be deterministic or non-deterministic

```
SELECT UPPER(ProductName) AS Product,
       ROUND(ListPrice, 0) AS ApproxPrice,
       YEAR(SaleStartDate) AS SoldSince
FROM Production.Product;
```

Scalar Function Categories

- Configuration
- Conversion
- Cursor
- Date and Time
- Mathematical
- Metadata
- Security
- String
- System
- System Statistical
- Text and Image

Logical Functions

Output is determined by comparative logic

IIF

- Evaluate logical expression, return first value if true and second value if false

```
SELECT AddressType,
       IIF(AddressType = 'Main Office', 'Billing', 'Mailing') AS UseFor
FROM Sales.CustomerAddress;
```

CHOOSE

- Return value based ordinal position of expression in 1-based list

```
SELECT SalesOrderID, Status,
       CHOOSE(Status, 'Ordered', 'Shipped', 'Delivered') AS OrderStatus
FROM Sales.SalesOrderHeader;
```

Ranking Functions

Functions applied to a partition, or set of rows

```
SELECT TOP(3) ProductID, Name, ListPrice,
       RANK() OVER(ORDER BY ListPrice DESC) AS RankByPrice
FROM Production.Product
ORDER BY RankByPrice;
```

ProductID	Name	ListPrice	RankByPrice
8	Gizmo	263.50	1
29	Widget	123.79	2
9	Thingybob	97.00	3

Ranking functions are an advanced technique. They're included here for completeness, but a detailed exploration is beyond the scope of this course.

Rowset Functions

Return a rowset that can be used in a FROM clause

- OPENDATASOURCE – Get data from an object on a remote server
- OPENROWSET – Run an ad-hoc query on a remote server or file
- OPENQUERY - Get query results from a linked server
- OPENXML – Read elements and attributes from XML into a rowset
- OPENJSON – Read values from JSON objects into a rowset

```
SELECT a.*
FROM OPENROWSET('SQLNCLI',
     'Server=server1;Trusted_Connection=yes;',
     'SELECT Name, ListPrice
      FROM adventureworks.SalesLT.Product') AS a;
```

Rowset functions are generally only used in specialized scenarios.

Like ranking functions, they're included here for completeness, but a detailed exploration is beyond the scope of this course.

Aggregate Functions

Functions that operate on sets, or rows of data

- Summarize input rows
- Without GROUP BY clause, all rows are arranged as one group

```
SELECT COUNT(*) AS OrderLines,
       SUM(OrderQty*UnitPrice) AS TotalSales
FROM   Sales.OrderDetail;
```

OrderLines	TotalSales
542	714002.9136

Lesson 2: Grouping Aggregated Results

Grouping with GROUP BY

- GROUP BY creates groups for output rows, according to unique combination of values specified in the GROUP BY clause
- GROUP BY calculates a summary value for aggregate functions in subsequent phases
- Detail rows are not available after GROUP BY clause is processed

```
SELECT CustomerID, COUNT(*) AS OrderCount
FROM Sales.SalesOrderHeader
GROUP BY CustomerID;
```

Filtering Groups with HAVING

HAVING clause provides a search condition that each group must satisfy

WHERE clause is processed before GROUP BY, HAVING clause is processed after GROUP BY

```
SELECT CustomerID, COUNT(*) AS Orders
FROM Sales.SalesOrderHeader
GROUP BY CustomerID
HAVING COUNT(*) > 10;
```

Lab: Using Built-In Functions

Use scalar functions

Use logical functions

Use aggregate functions

Group aggregated results with GROUP BY clause

Filter groups with the HAVING clause

Module Review

Which OrderState value does this query return for rows with a Status value of 2:

```
SELECT OrderNo, CHOOSE(Status, 'Ordered', 'Shipped', 'Delivered') AS OrderState FROM Sales.Order;
```

- [x] Shipped
- [ ] Delivered
- [ ] NULL

Which query returns the number of customers in each city?

- [ ] `SELECT City, COUNT(*) AS CustomerCount FROM Sales.Customer;`
- [x] `SELECT City, COUNT(*) AS CustomerCount FROM Sales.Customer GROUP BY City;`
- [ ] `SELECT City, COUNT(*) AS CustomerCount FROM Sales.Customer ORDER BY City;`

Which query returns a row for each category with an average price over 10.00?

- [ ] `SELECT Category, AVG(Price) FROM Store.Product WHERE AVG(Price) > 10.00;`
- [ ] `SELECT Category, AVG(Price) FROM Store.Product GROUP BY Category WHERE AVG(Price) > 10.00;`
- [x] `SELECT Category, AVG(Price) FROM Store.Product GROUP BY Category HAVING AVG(Price) > 10.00;`

Use the slide animation to reveal the correct answers.

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