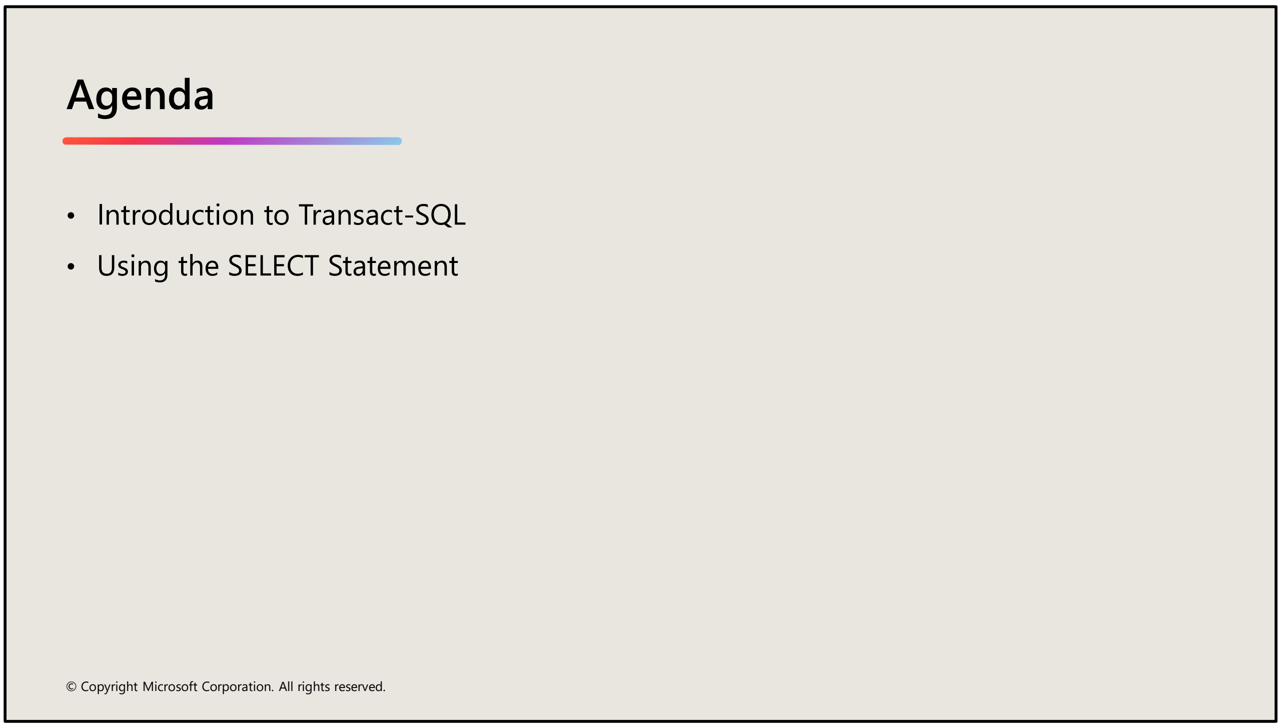
Microsoft

1: Getting started with Transact-SQL



Agenda

- Introduction to Transact-SQL
- Using the SELECT Statement

1: Introduction to Transact-SQL

What is Transact-SQL?

Structured Query Language (SQL)

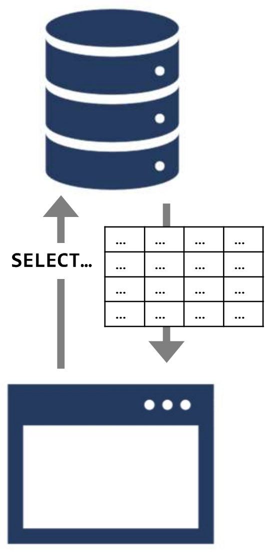
- Developed in the 1970s as a language for querying databases
- Adopted as a standard by ANSI and ISO standards bodies
- Widely used across multiple database systems

Microsoft's implementation is Transact-SQL

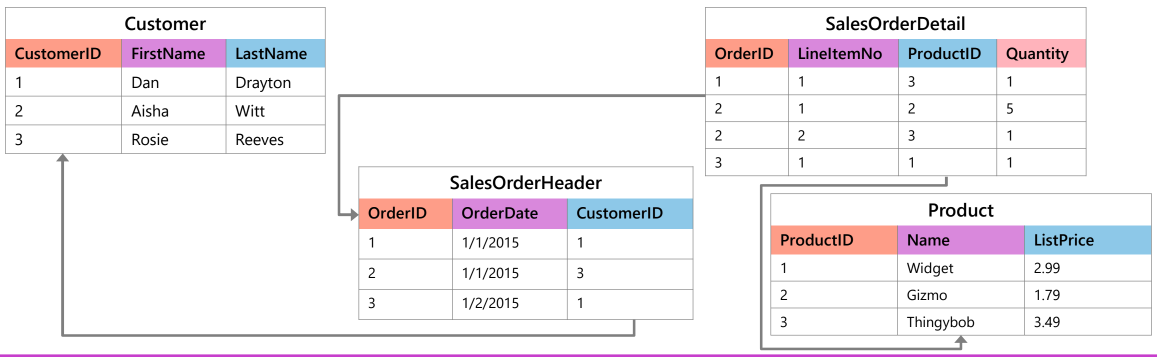
- Often referred to as T-SQL
- Query language for SQL Server, Azure SQL Database, and other Microsoft relational database services

SQL is *declarative*, not *procedural*

- Describe what you want, don't specify steps



Relational databases



Customer

CustomerID	FirstName	LastName
1	Dan	Drayton
2	Aisha	Witt
3	Rosie	Reeves

SalesOrderHeader

OrderID	OrderDate	CustomerID
1	1/1/2015	1
2	1/1/2015	3
3	1/2/2015	1

SalesOrderDetail

OrderID	LineItemNo	ProductID	Quantity
1	1	3	1
2	1	2	5
2	2	3	1
3	1	1	1

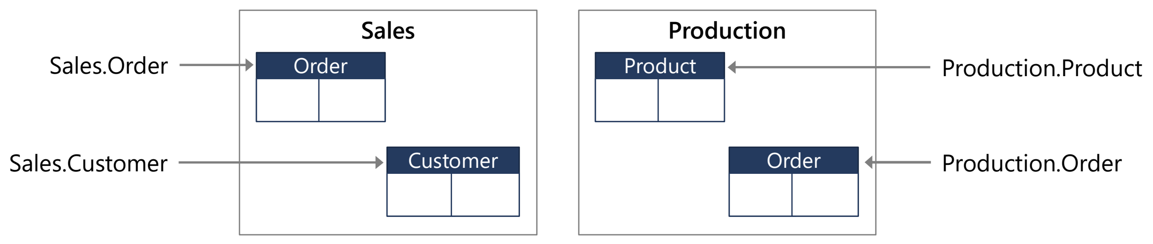
Product

ProductID	Name	ListPrice
1	Widget	2.99
2	Gizmo	1.79
3	Thingybob	3.49

Entities are represented as *relations* (tables), in which their attributes are represented as domains (columns)

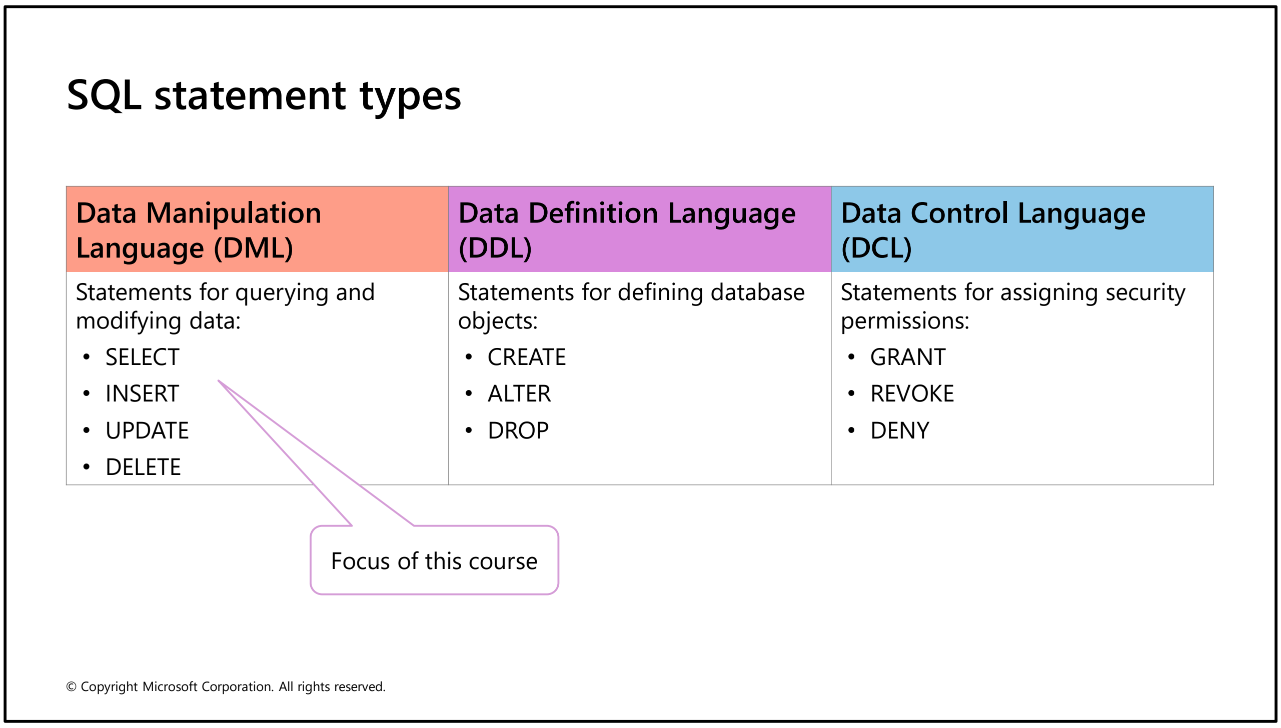
Most relational databases are *normalized*, with relationships defined between tables through primary and foreign *keys*

Schemas and object names



Schemas are namespaces for database objects

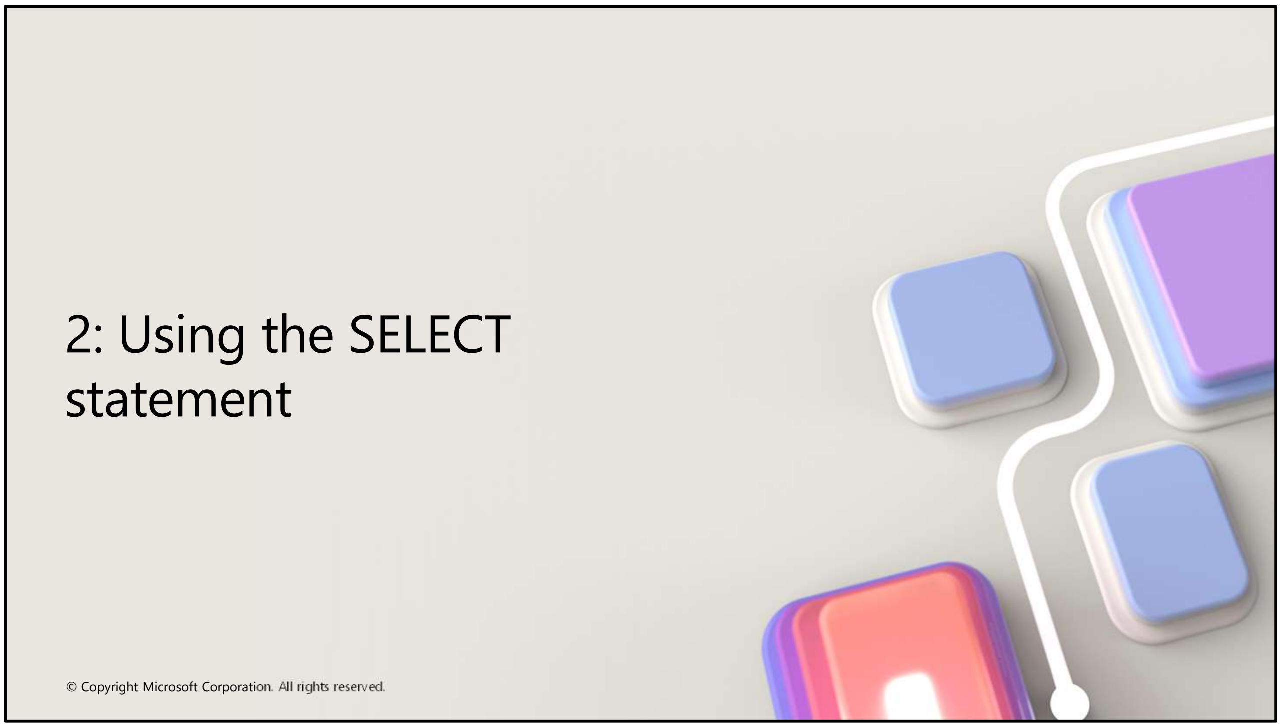
- Fully-qualified names:
  [*server_name*.][*database_name*.][*schema_name*.]*object_name*
- Within database context, best practice is to include schema name:
  schema_name.object_name



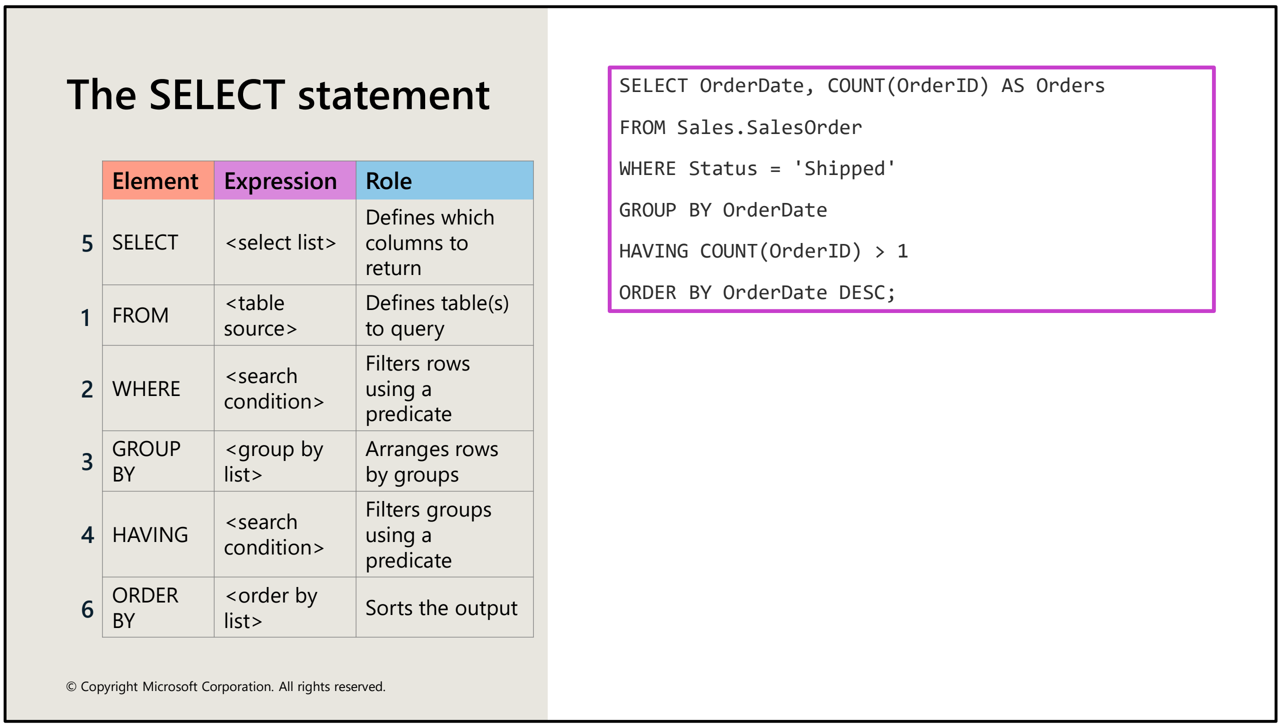
SQL statement types

Data Manipulation Language (DML)	Data Definition Language (DDL)	Data Control Language (DCL)
Statements for querying and modifying data: • SELECT • INSERT • UPDATE • DELETE	Statements for defining database objects: • CREATE • ALTER • DROP	Statements for assigning security permissions: • GRANT • REVOKE • DENY

Focus of this course



2: Using the SELECT statement

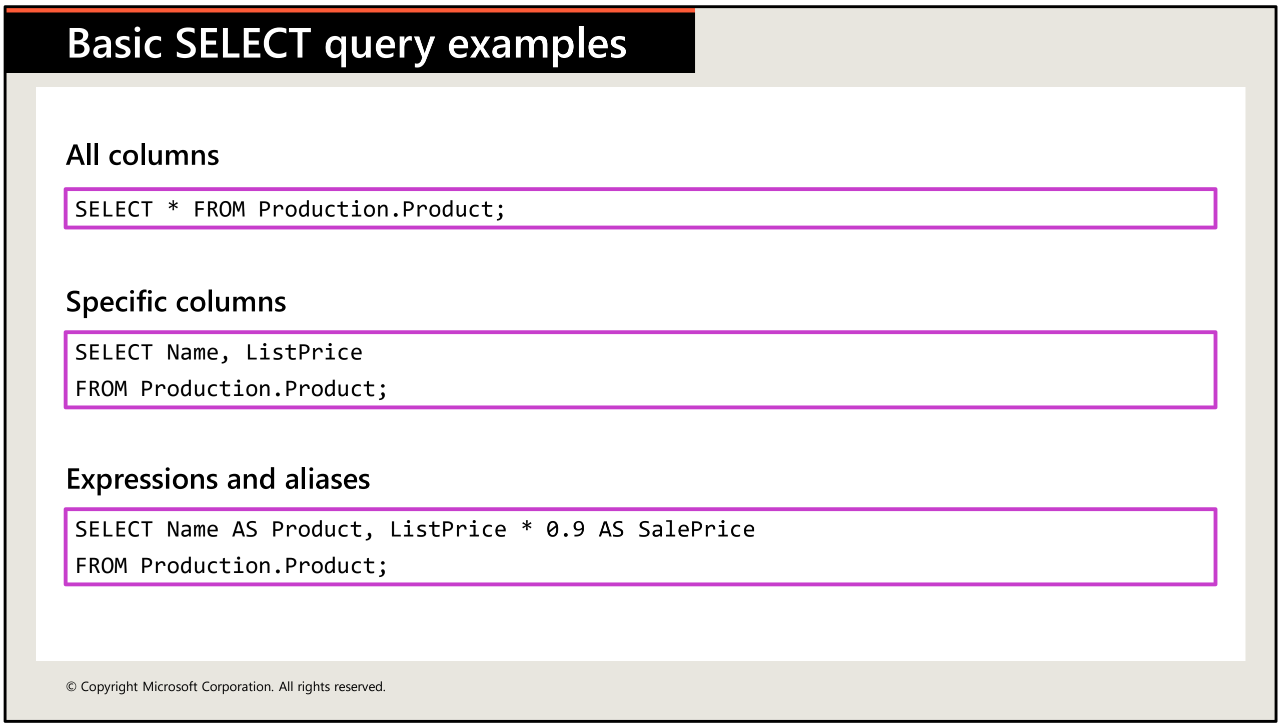


The SELECT statement

	Element	Expression	Role
5	SELECT	<select list>	Defines which columns to return
1	FROM	<table source>	Defines table(s) to query
2	WHERE	<search condition>	Filters rows using a predicate
3	GROUP BY	<group by list>	Arranges rows by groups
4	HAVING	<search condition>	Filters groups using a predicate
6	ORDER BY	<order by list>	Sorts the output

```
SELECT OrderDate, COUNT(OrderID) AS Orders
FROM Sales.SalesOrder
WHERE Status = 'Shipped'
GROUP BY OrderDate
HAVING COUNT(OrderID) > 1
ORDER BY OrderDate DESC;
```

This slide is a build slide.
Use the animated build to show how the order of statement processing is different from the order in which the clauses appear in the statement – this has some implications for the way queries are written, so bear it in mind as we progress through the course.
We'll explore each of the clauses shown in the example, starting with SELECT...FROM and adding clauses as the course progresses.



Basic SELECT query examples

All columns

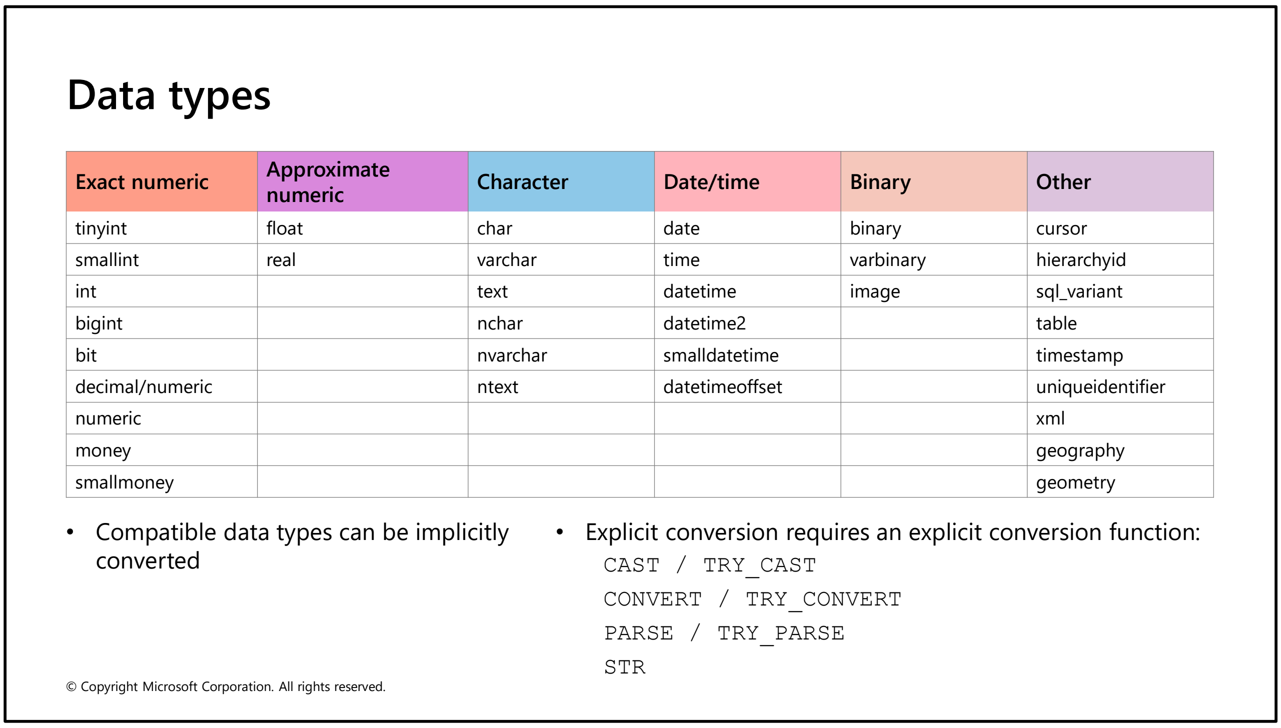
```
SELECT * FROM Production.Product;
```

Specific columns

```
SELECT Name, ListPrice
FROM Production.Product;
```

Expressions and aliases

```
SELECT Name AS Product, ListPrice * 0.9 AS SalePrice
FROM Production.Product;
```



Data types

Exact numeric	Approximate numeric	Character	Date/time	Binary	Other
tinyint	float	char	date	binary	cursor
smallint	real	varchar	time	varbinary	hierarchyid
int		text	datetime	image	sql_variant
bigint		nchar	datetime2		table
bit		nvarchar	smalldatetime		timestamp
decimal/numeric		ntext	datetimeoffset		uniqueidentifier
numeric					xml
money					geography
smallmoney					geometry

- Compatible data types can be implicitly converted
- Explicit conversion requires an explicit conversion function:

```
CAST / TRY_CAST
CONVERT / TRY_CONVERT
PARSE / TRY_PARSE
STR
```

NULL values

NULL represents a *missing* or *unknown* value

ANSI behaviour for NULL values:

- The result of any expression containing a NULL value is NULL

```
2 + NULL = NULL
'MyString: ' + NULL = NULL
```

- Equality comparisons (=) always return false for NULL values, use IS NULL

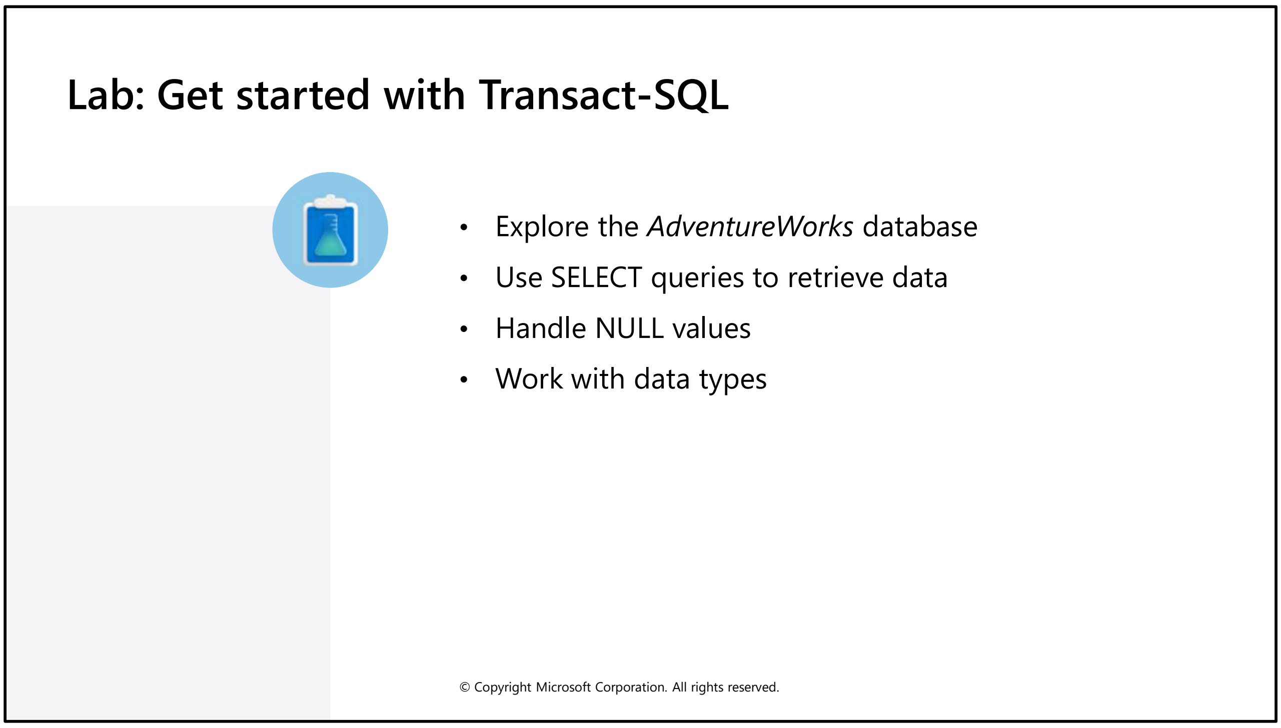
```
NULL = NULL returns false
NULL IS NULL returns true
```

Useful functions:

`ISNULL(column/variable, value)`: Returns *value* if the column or variable is NULL

`NULLIF(column/variable, value)`: Returns NULL if the column or variable is *value*

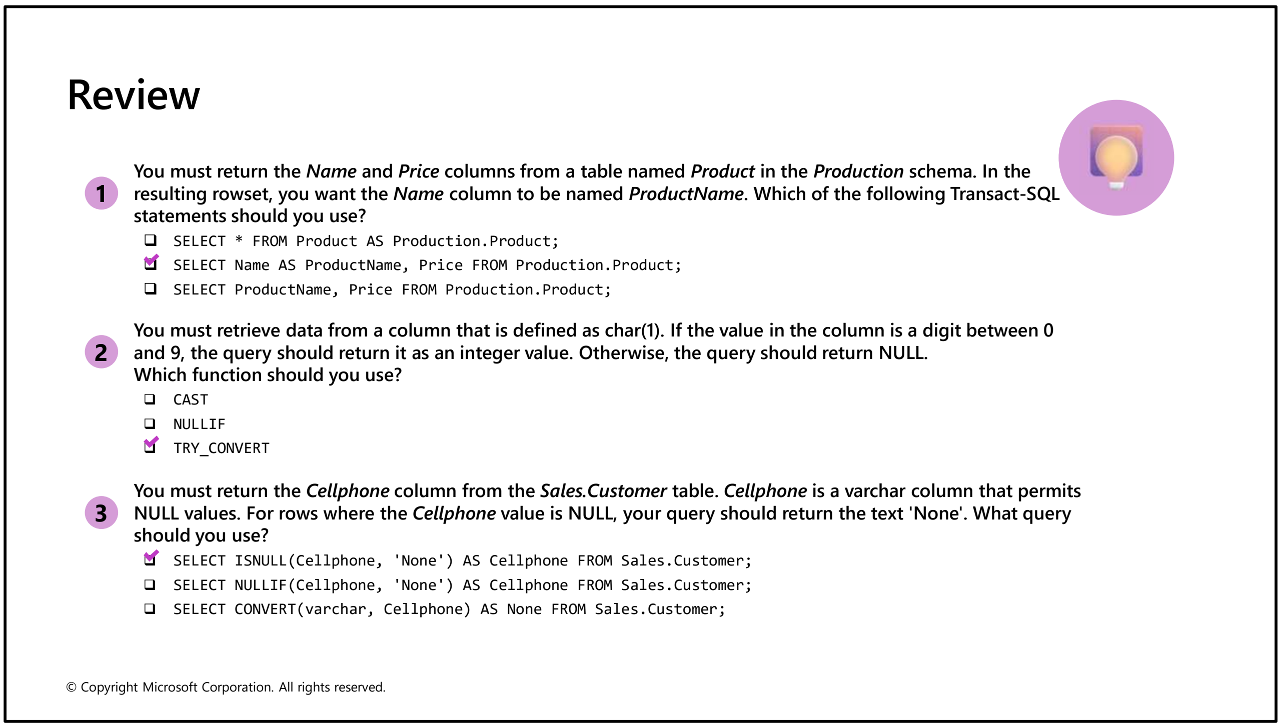
`COALESCE(column/variable1, column/variable2, ...)`: Returns the value of the first non-NULL column or variable in the list



Lab: Get started with Transact-SQL

- Explore the *AdventureWorks* database
- Use SELECT queries to retrieve data
- Handle NULL values
- Work with data types

Use the hosted lab environment provided by the lab hosting provider.
The lab instructions are also in GitHub at https://microsoftlearning.github.io/dp-080-Transact-SQL/



Review

1. You must return the *Name* and *Price* columns from a table named *Product* in the *Production* schema. In the resulting rowset, you want the *Name* column to be named *ProductName*. Which of the following Transact-SQL statements should you use?
   - ☐ `SELECT * FROM Product AS Production.Product;`
   - [✓ `SELECT Name AS ProductName, Price FROM Production.Product;`]
   - ☐ `SELECT ProductName, Price FROM Production.Product;`

2. You must retrieve data from a column that is defined as char(1). If the value in the column is a digit between 0 and 9, the query should return it as an integer value. Otherwise, the query should return NULL. Which function should you use?
   - ☐ `CAST`
   - ☐ `NULLIF`
   - [✓ `TRY_CONVERT`]

3. You must return the *Cellphone* column from the *Sales.Customer* table. *Cellphone* is a varchar column that permits NULL values. For rows where the *Cellphone* value is NULL, your query should return the text 'None'. What query should you use?
   - [✓ `SELECT ISNULL(Cellphone, 'None') AS Cellphone FROM Sales.Customer;`]
   - ☐ `SELECT NULLIF(Cellphone, 'None') AS Cellphone FROM Sales.Customer;`
   - ☐ `SELECT CONVERT(varchar, Cellphone) AS None FROM Sales.Customer;`

Use the slide animation to reveal the correct answers.