Data Manipulation Language

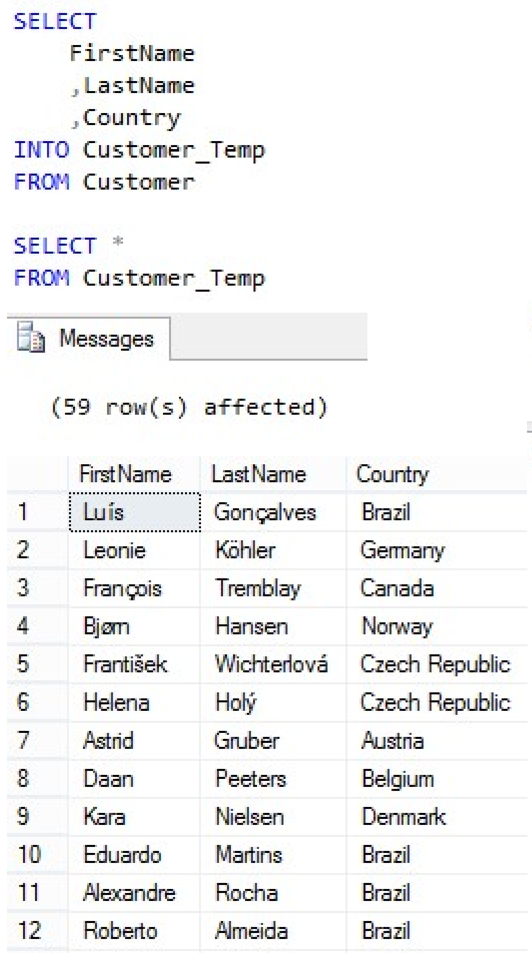
- SELECT
  - SELECT INTO
  - Temp Tables
- INSERT
  - Basic Insert
  - Using OpenRowset
  - External Data into SQL Server
- UPDATE
- DELETE
- TRUNCATE TABLE

SELECT Statement

- The SELECT statement is a member of the DML family
- Used to read data from a database
- SELECT syntax covered in previous lessons

SELECT…INTO and DROP TABLE

- SELECT..INTO is a syntax used to create a new table based on the result set of a SELECT statement
- The INTO keyword identifies the name of the table to create
- The INTO keyword is placed after the last column name in the SELECT clause and before the FROM clause
- Both permanent and temporary tables can be created using this method
- DROP TABLE is a command used to remove tables from a database

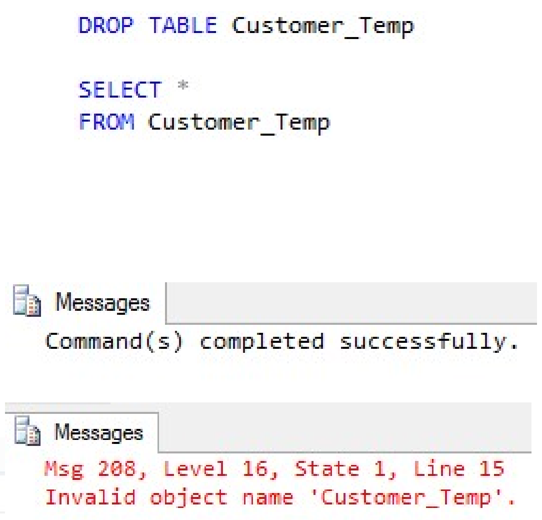


```
SELECT
    FirstName
   ,LastName
   ,Country
INTO Customer_Temp
FROM Customer

SELECT *
FROM Customer_Temp
```

Messages

```
(59 row(s) affected)
```

	FirstName	LastName	Country
1	Luís	Gonçalves	Brazil
2	Leonie	Köhler	Germany
3	François	Tremblay	Canada
4	Bjørn	Hansen	Norway
5	František	Wichterlová	Czech Republic
6	Helena	Holý	Czech Republic
7	Astrid	Gruber	Austria
8	Daan	Peeters	Belgium
9	Kara	Nielsen	Denmark
10	Eduardo	Martins	Brazil
11	Alexandre	Rocha	Brazil
12	Roberto	Almeida	Brazil



```
DROP TABLE Customer_Temp

SELECT *
FROM Customer_Temp
```

Messages

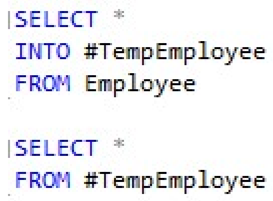
```
Command(s) completed successfully.
```

Messages

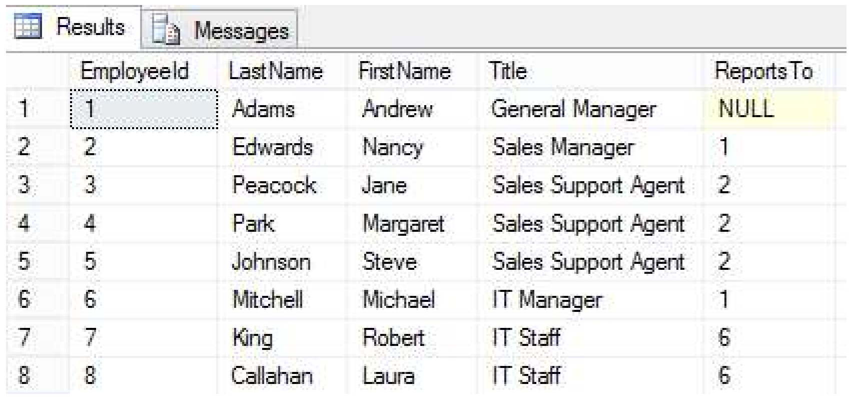
```
Msg 208, Level 16, State 1, Line 15
Invalid object name 'Customer_Temp'.
```

Local Temp Tables

- Temp tables are temporary tables that only last for the duration of your SQL Server session
- Local temp tables are prefixed with a hash tag (#)
- Once created temp tables can be referenced within the session
- Local temp tables can only be viewed by the session that created them
- When the session is closed the all temp tables associated with that session are deleted.



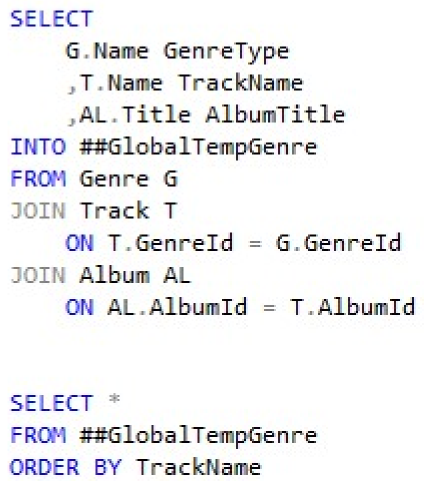
```
SELECT *
INTO #TempEmployee
FROM Employee

SELECT *
FROM #TempEmployee
```



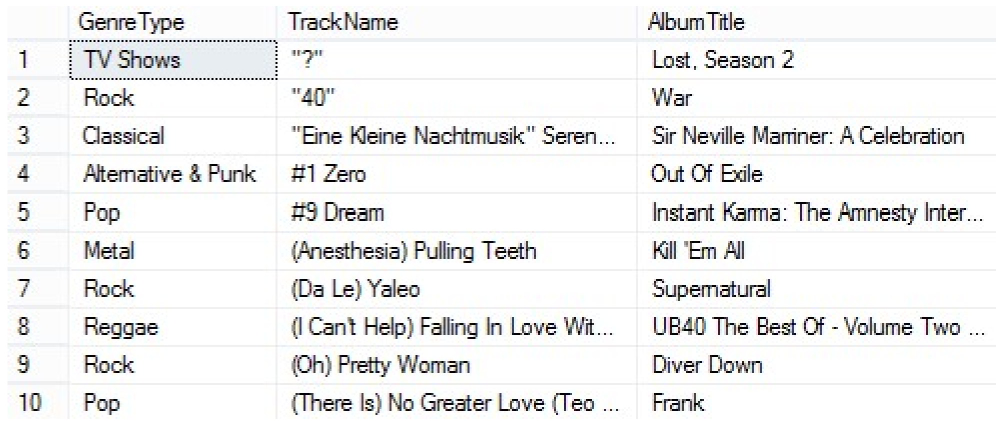
	EmployeeId	LastName	FirstName	Title	ReportsTo
1	1	Adams	Andrew	General Manager	NULL
2	2	Edwards	Nancy	Sales Manager	1
3	3	Peacock	Jane	Sales Support Agent	2
4	4	Park	Margaret	Sales Support Agent	2
5	5	Johnson	Steve	Sales Support Agent	2
6	6	Mitchell	Michael	IT Manager	1
7	7	King	Robert	IT Staff	6
8	8	Callahan	Laura	IT Staff	6

Global Temp Tables

- Global temp tables are defined by two hash tags in front of the name (##)
- Like local temp tables a global temp table is deleted once the session that created it is closed
- Unlike local temp tables a global temp table can be viewed by other sessions



```
SELECT
    G.Name GenreType
    ,T.Name TrackName
    ,AL.Title AlbumTitle
INTO ##GlobalTempGenre
FROM Genre G
JOIN Track T
    ON T.GenreId = G.GenreId
JOIN Album AL
    ON AL.AlbumId = T.AlbumId


SELECT *
FROM ##GlobalTempGenre
ORDER BY TrackName
```



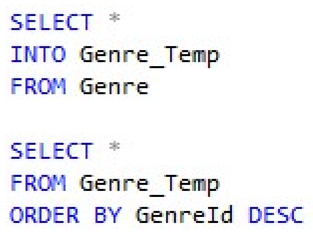
	GenreType	TrackName	AlbumTitle
1	TV Shows	"?"	Lost, Season 2
2	Rock	"40"	War
3	Classical	"Eine Kleine Nachtmusik" Seren...	Sir Neville Marriner: A Celebration
4	Alternative & Punk	#1 Zero	Out Of Exile
5	Pop	#9 Dream	Instant Karma: The Amnesty Inter...
6	Metal	(Anesthesia) Pulling Teeth	Kill 'Em All
7	Rock	(Da Le) Yaleo	Supernatural
8	Reggae	(I Can't Help) Falling In Love Wit...	UB40 The Best Of - Volume Two ...
9	Rock	(Oh) Pretty Woman	Diver Down
10	Pop	(There Is) No Greater Love (Teo ...	Frank

INSERT Statement

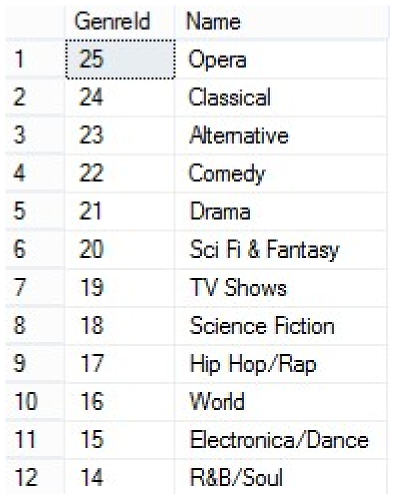
- INSERT statement is used to add one or more rows of data into an existing table
- The data inserted can come from different sources
  - Data values are typed directly into the INSERT statement using the VALUES keyword
  - Data is read from a different table in SQL Server
  - Data comes from an external source such as a text file or Excel spreadsheet
- 2 different ways to insert data in T-SQL
  - Enter data manually using the VALUES clause
  - Insert data from another table using the INSERT INTO clause

INSERT INTO with VALUES

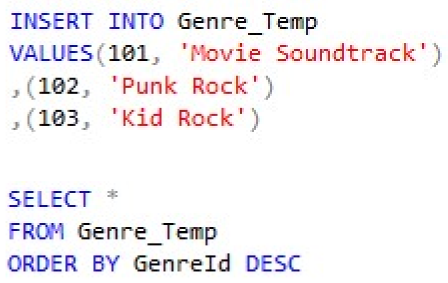
- Using INSERT INTO with the VALUES keyword allows you to type in directly the data you wish to insert
- The VALUES keyword is followed by parenthesis with the content for each row contained within
- Each row beyond the first has its own parenthesis and content separated by a comma



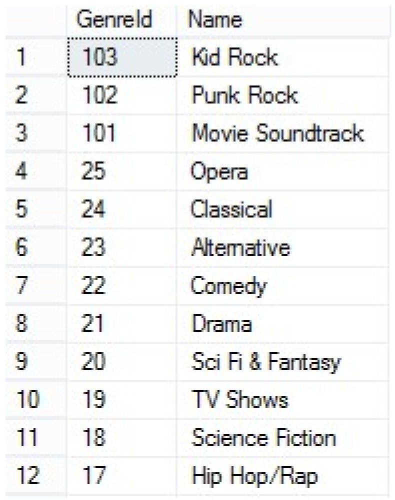
```sql
SELECT *
INTO Genre_Temp
FROM Genre

SELECT *
FROM Genre_Temp
ORDER BY GenreId DESC
```



	GenreId	Name
1	25	Opera
2	24	Classical
3	23	Alternative
4	22	Comedy
5	21	Drama
6	20	Sci Fi & Fantasy
7	19	TV Shows
8	18	Science Fiction
9	17	Hip Hop/Rap
10	16	World
11	15	Electronica/Dance
12	14	R&B/Soul



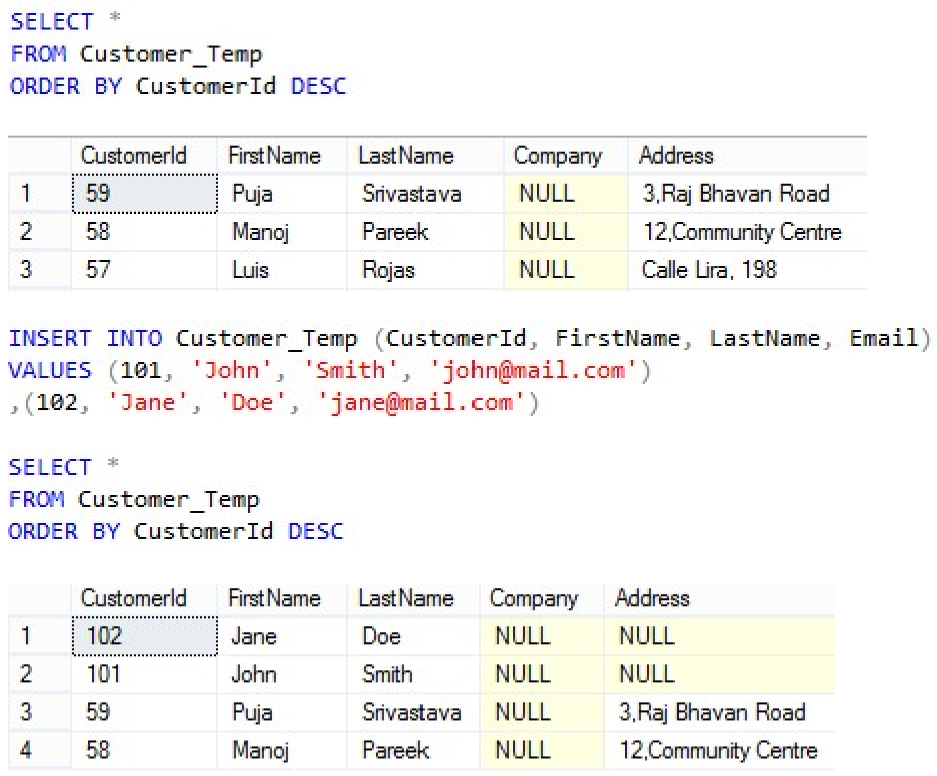
```sql
INSERT INTO Genre_Temp
VALUES(101, 'Movie Soundtrack')
,(102, 'Punk Rock')
,(103, 'Kid Rock')

SELECT *
FROM Genre_Temp
ORDER BY GenreId DESC
```



	GenreId	Name
1	103	Kid Rock
2	102	Punk Rock
3	101	Movie Soundtrack
4	25	Opera
5	24	Classical
6	23	Alternative
7	22	Comedy
8	21	Drama
9	20	Sci Fi & Fantasy
10	19	TV Shows
11	18	Science Fiction
12	17	Hip Hop/Rap

INSERT INTO specific Columns

- When the order and number of source columns doesn’t exactly match the destination then you must define the destination columns in your INSERT INTO statement
- The destination columns are enclosed in parenthesis and separated by commas
- The destination column order must be the same as the source column order



```
SELECT *
FROM Customer_Temp
ORDER BY CustomerId DESC
```

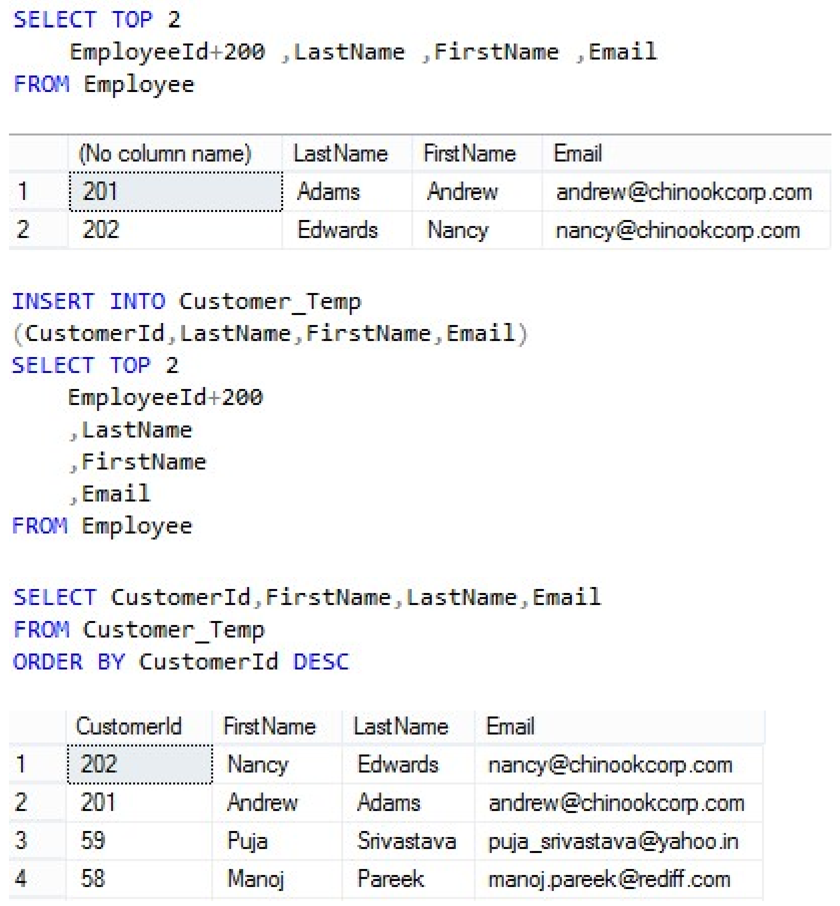
	CustomerId	FirstName	LastName	Company	Address
1	59	Puja	Srivastava	NULL	3,Raj Bhavan Road
2	58	Manoj	Pareek	NULL	12,Community Centre
3	57	Luis	Rojas	NULL	Calle Lira, 198

```
INSERT INTO Customer_Temp (CustomerId, FirstName, LastName, Email)
VALUES (101, 'John', 'Smith', 'john@mail.com')
,(102, 'Jane', 'Doe', 'jane@mail.com')

SELECT *
FROM Customer_Temp
ORDER BY CustomerId DESC
```

	CustomerId	FirstName	LastName	Company	Address
1	102	Jane	Doe	NULL	NULL
2	101	John	Smith	NULL	NULL
3	59	Puja	Srivastava	NULL	3,Raj Bhavan Road
4	58	Manoj	Pareek	NULL	12,Community Centre

INSERT INTO with SELECT

- A SELECT statement can be used to define the insert data source
- The INSERT INTO syntax is the same
- Instead of VALUES you use a SELECT statement to define the insert source data
- The source column number and order must match the destination



```
SELECT TOP 2
    EmployeeId+200 ,LastName ,FirstName ,Email
FROM Employee
```

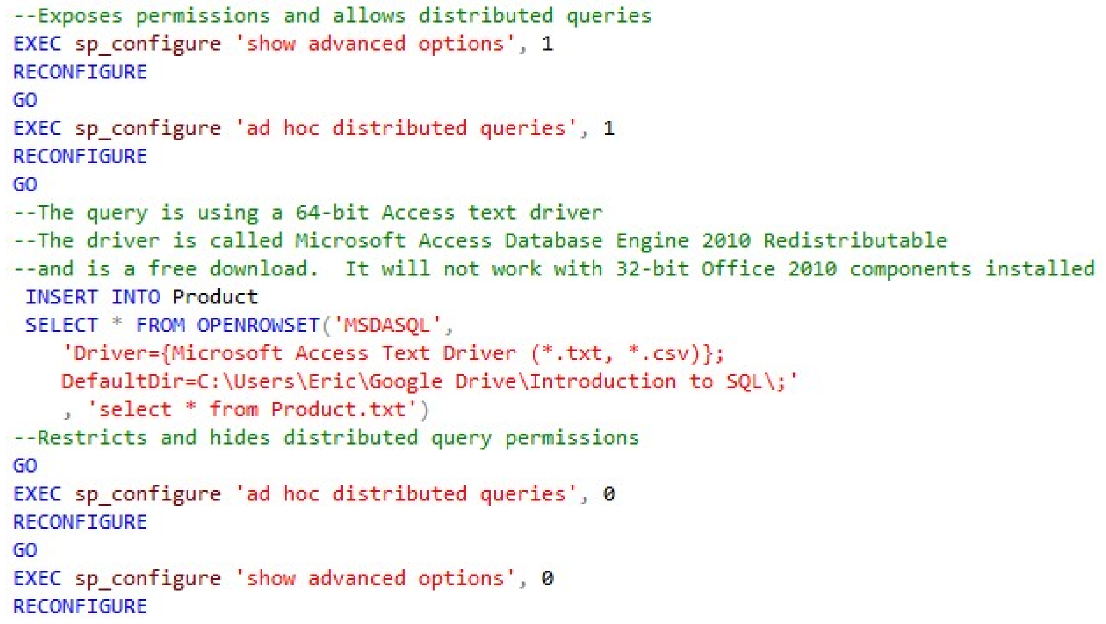
	(No column name)	LastName	FirstName	Email
1	201	Adams	Andrew	andrew@chinookcorp.com
2	202	Edwards	Nancy	nancy@chinookcorp.com

```
INSERT INTO Customer_Temp
(CustomerId,LastName,FirstName,Email)
SELECT TOP 2
    EmployeeId+200
    ,LastName
    ,FirstName
    ,Email
FROM Employee

SELECT CustomerId,FirstName,LastName,Email
FROM Customer_Temp
ORDER BY CustomerId DESC
```

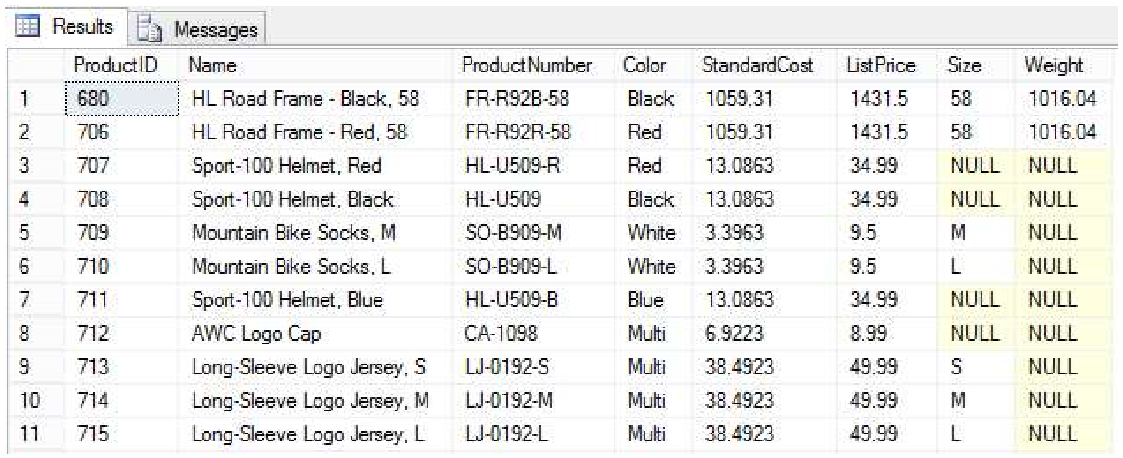
	CustomerId	FirstName	LastName	Email
1	202	Nancy	Edwards	nancy@chinookcorp.com
2	201	Andrew	Adams	andrew@chinookcorp.com
3	59	Puja	Srivastava	puja_srivastava@yahoo.in
4	58	Manoj	Pareek	manoj.pareek@rediff.com

Inserting from External Data Sources using OPENROWSET

- OPENROWSET uses ODBC drivers to connect directly to an external data source such as text, csv, or excel files
- SQL Server needs to be configured to allow OPENROWSET to work with “distributed queries”
- The drivers needed to make OPENROWSET work may need to be downloaded to the server. Especially if the server is running the 64-bit version
- Configuring OPENROWSET to work can be a real pain. This is not a beginners topic and is provided for informational purposes only



```
--Exposes permissions and allows distributed queries
EXEC sp_configure 'show advanced options', 1
RECONFIGURE
GO
EXEC sp_configure 'ad hoc distributed queries', 1
RECONFIGURE
GO
--The query is using a 64-bit Access text driver
--The driver is called Microsoft Access Database Engine 2010 Redistributable
--and is a free download.  It will not work with 32-bit Office 2010 components installed
 INSERT INTO Product
 SELECT * FROM OPENROWSET('MSDASQL',
    'Driver={Microsoft Access Text Driver (*.txt, *.csv)};
    DefaultDir=C:\Users\Eric\Google Drive\Introduction to SQL\;'
    , 'select * from Product.txt')
--Restricts and hides distributed query permissions
GO
EXEC sp_configure 'ad hoc distributed queries', 0
RECONFIGURE
GO
EXEC sp_configure 'show advanced options', 0
RECONFIGURE
```

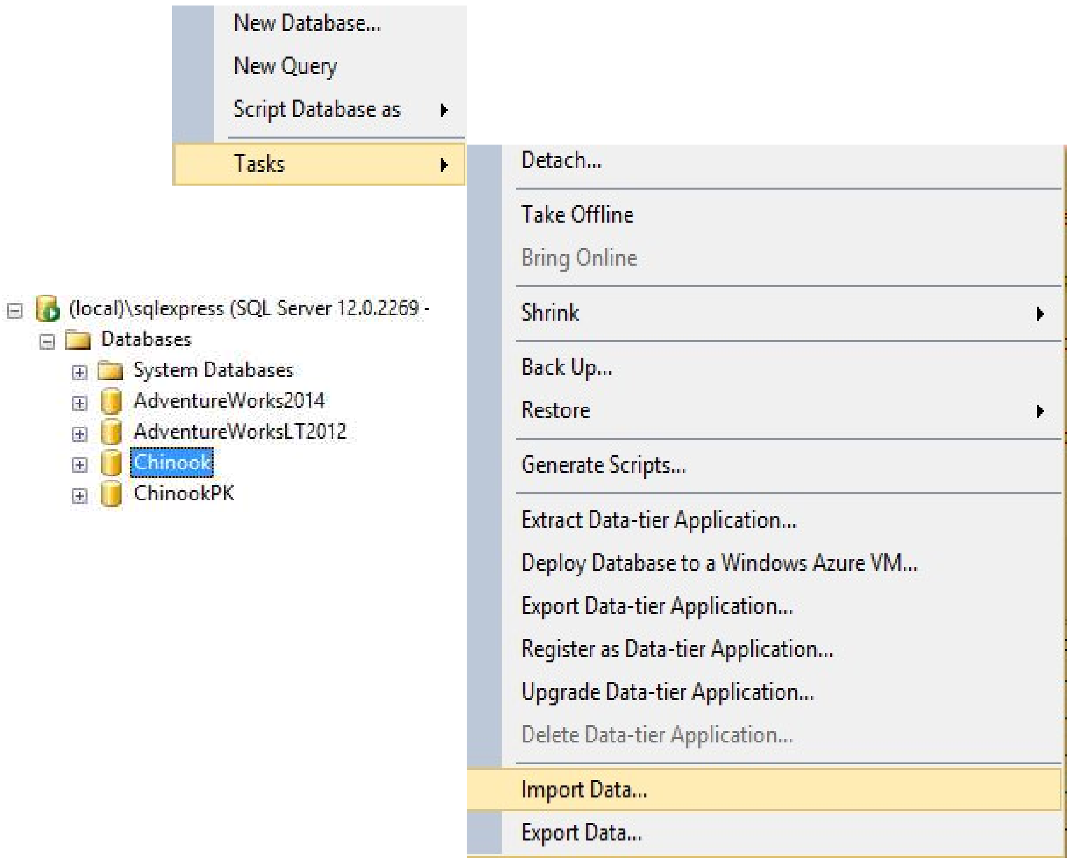


Results | Messages

	ProductID	Name	ProductNumber	Color	StandardCost	ListPrice	Size	Weight
1	680	HL Road Frame - Black, 58	FR-R92B-58	Black	1059.31	1431.5	58	1016.04
2	706	HL Road Frame - Red, 58	FR-R92R-58	Red	1059.31	1431.5	58	1016.04
3	707	Sport-100 Helmet, Red	HL-U509-R	Red	13.0863	34.99	NULL	NULL
4	708	Sport-100 Helmet, Black	HL-U509	Black	13.0863	34.99	NULL	NULL
5	709	Mountain Bike Socks, M	SO-B909-M	White	3.3963	9.5	M	NULL
6	710	Mountain Bike Socks, L	SO-B909-L	White	3.3963	9.5	L	NULL
7	711	Sport-100 Helmet, Blue	HL-U509-B	Blue	13.0863	34.99	NULL	NULL
8	712	AWC Logo Cap	CA-1098	Multi	6.9223	8.99	NULL	NULL
9	713	Long-Sleeve Logo Jersey, S	LJ-0192-S	Multi	38.4923	49.99	S	NULL
10	714	Long-Sleeve Logo Jersey, M	LJ-0192-M	Multi	38.4923	49.99	M	NULL
11	715	Long-Sleeve Logo Jersey, L	LJ-0192-L	Multi	38.4923	49.99	L	NULL

Importing Data into SQL Server

- SQL Server has tools for importing data
- Right-click on the database into which you want to import data
- Click on the Import Data… link in the Tasks section
- Follow the wizard instructions to insert data as a new table into your database
- You can then copy the data to other tables in your database using the INSERT INTO syntax

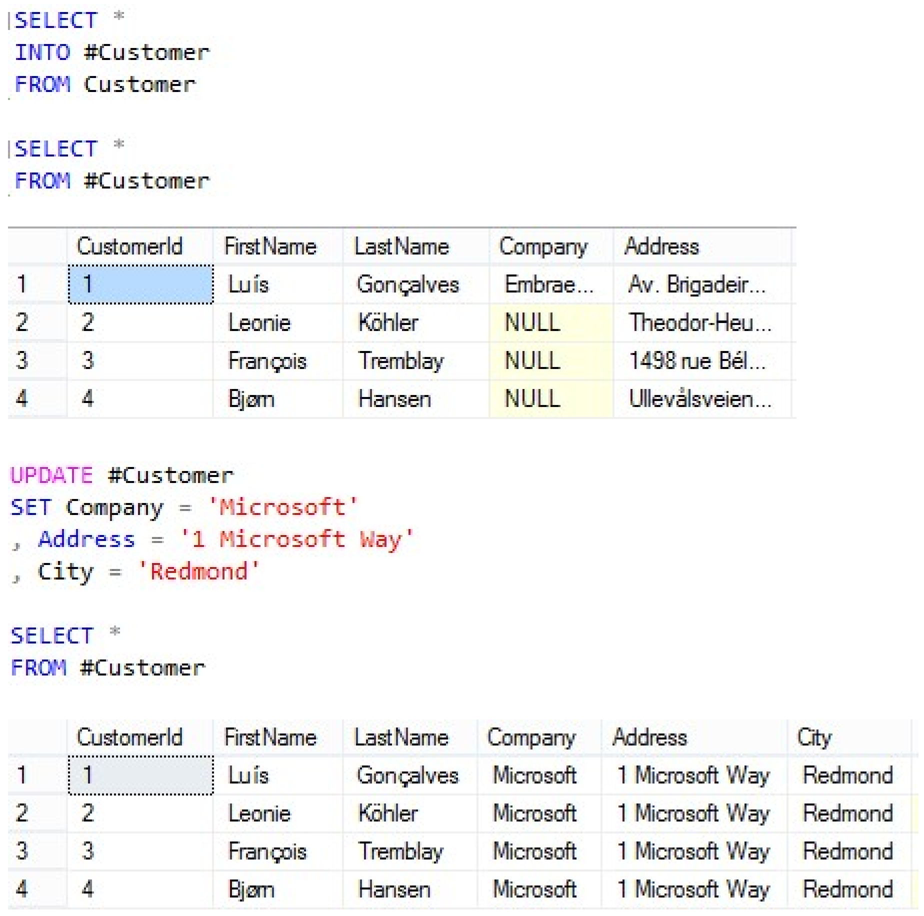

New Database...
New Query
Script Database as
Tasks
(local)\sqlexpress (SQL Server 12.0.2269 -
Databases
System Databases
AdventureWorks2014
AdventureWorksLT2012
Chinook
ChinookPK
Detach...
Take Offline
Bring Online
Shrink
Back Up...
Restore
Generate Scripts...
Extract Data-tier Application...
Deploy Database to a Windows Azure VM...
Export Data-tier Application...
Register as Data-tier Application...
Upgrade Data-tier Application...
Delete Data-tier Application...
Import Data...
Export Data...

UPDATE Statement

- The UPDATE statement is used to update one or more rows of existing data in a table
- The SET keyword is required with an UPDATE statement. It defines which columns to update as well as to which values to update them
- A WHERE clause is used to define which rows the UPDATE clause will update
- If no WHERE clause is used then the entire table will be updated by the UPDATE statement

Simple UPDATE

- The UPDATE keyword is immediately followed by the table name to update
- The SET keyword immediately follows the UPDATE statement
- SET syntax is the column name followed by the equal sign and an expression
- If more than one column is being updated, each column must be separated by a comma



```
SELECT *
INTO #Customer
FROM Customer

SELECT *
FROM #Customer
```

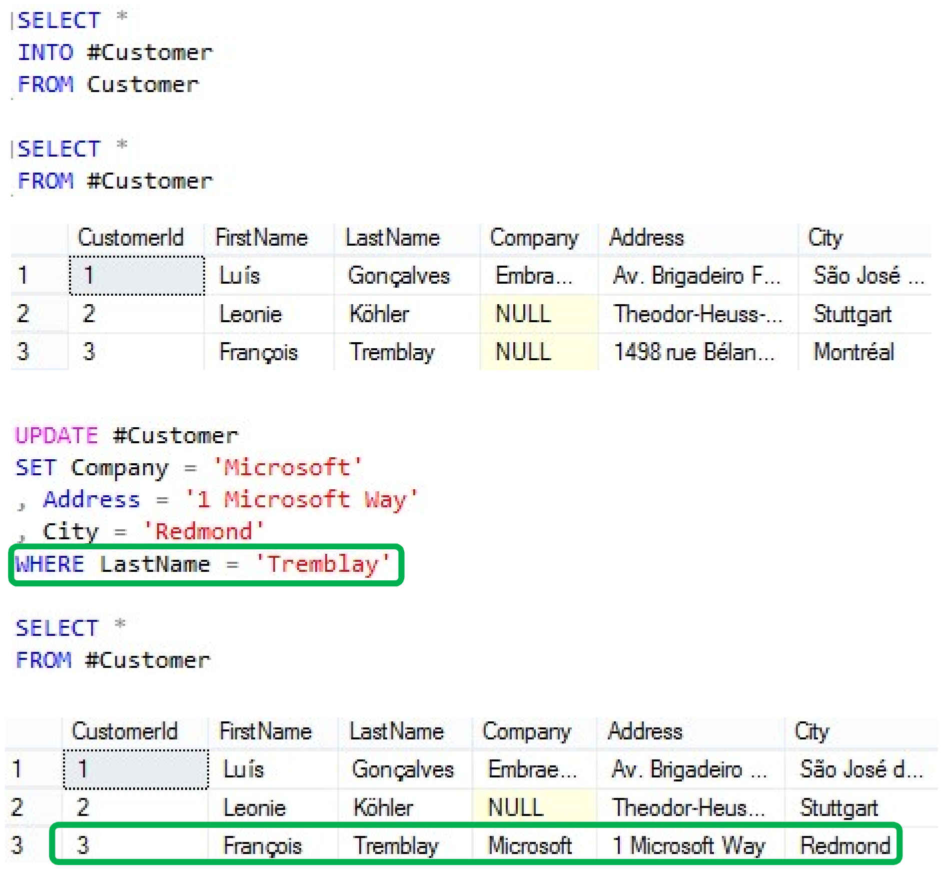
	CustomerId	FirstName	LastName	Company	Address
1	1	Luís	Gonçalves	Embrae...	Av. Brigadeir...
2	2	Leonie	Köhler	NULL	Theodor-Heu...
3	3	François	Tremblay	NULL	1498 rue Bél...
4	4	Bjørn	Hansen	NULL	Ullevålsveien...

```
UPDATE #Customer
SET Company = 'Microsoft'
, Address = '1 Microsoft Way'
, City = 'Redmond'

SELECT *
FROM #Customer
```

	CustomerId	FirstName	LastName	Company	Address	City
1	1	Luís	Gonçalves	Microsoft	1 Microsoft Way	Redmond
2	2	Leonie	Köhler	Microsoft	1 Microsoft Way	Redmond
3	3	François	Tremblay	Microsoft	1 Microsoft Way	Redmond
4	4	Bjørn	Hansen	Microsoft	1 Microsoft Way	Redmond

UPDATE with WHERE clause

- The WHERE clause is used to filter which rows to update in a table
- A FROM clause is not required if the filter is being performed on the same table being updated



```
SELECT *
INTO #Customer
FROM Customer

SELECT *
FROM #Customer
```

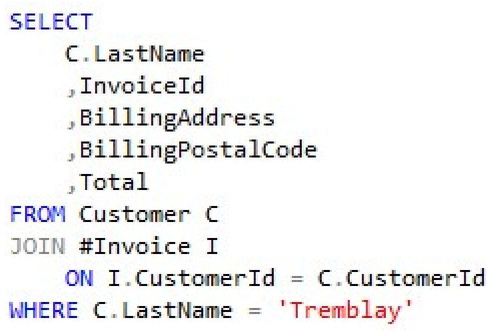
	CustomerId	FirstName	LastName	Company	Address	City
1	1	Luís	Gonçalves	Embra...	Av. Brigadeiro F...	São José ...
2	2	Leonie	Köhler	NULL	Theodor-Heuss-...	Stuttgart
3	3	François	Tremblay	NULL	1498 rue Bélan...	Montréal

```
UPDATE #Customer
SET Company = 'Microsoft'
, Address = '1 Microsoft Way'
, City = 'Redmond'
WHERE LastName = 'Tremblay'

SELECT *
FROM #Customer
```

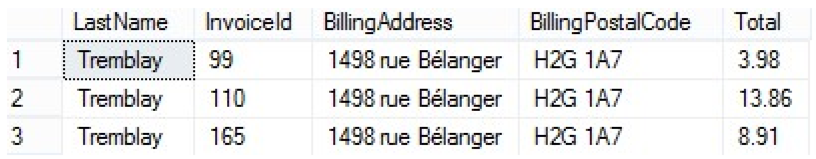
	CustomerId	FirstName	LastName	Company	Address	City
1	1	Luís	Gonçalves	Embrae...	Av. Brigadeiro ...	São José d...
2	2	Leonie	Köhler	NULL	Theodor-Heus...	Stuttgart
3	3	François	Tremblay	Microsoft	1 Microsoft Way	Redmond

UPDATE with FROM Clause

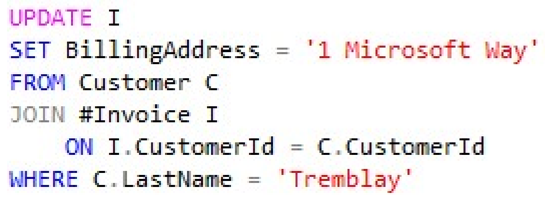
- Multiple tables can be joined together in an UPDATE clause
- Only one table can be updated at a time
- If the update table is aliased in the FROM clause, you can use the Alias instead of the table name after the UPDATE keyword



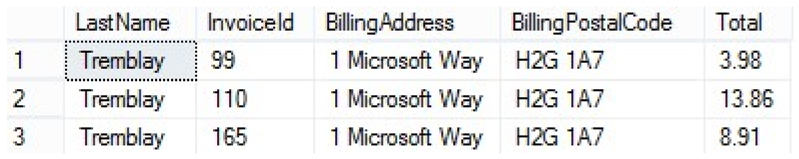
```sql
SELECT
    C.LastName
    ,InvoiceId
    ,BillingAddress
    ,BillingPostalCode
    ,Total
FROM Customer C
JOIN #Invoice I
    ON I.CustomerId = C.CustomerId
WHERE C.LastName = 'Tremblay'
```



	LastName	InvoiceId	BillingAddress	BillingPostalCode	Total
1	Tremblay	99	1498 rue Bélanger	H2G 1A7	3.98
2	Tremblay	110	1498 rue Bélanger	H2G 1A7	13.86
3	Tremblay	165	1498 rue Bélanger	H2G 1A7	8.91



```sql
UPDATE I
SET BillingAddress = '1 Microsoft Way'
FROM Customer C
JOIN #Invoice I
    ON I.CustomerId = C.CustomerId
WHERE C.LastName = 'Tremblay'
```



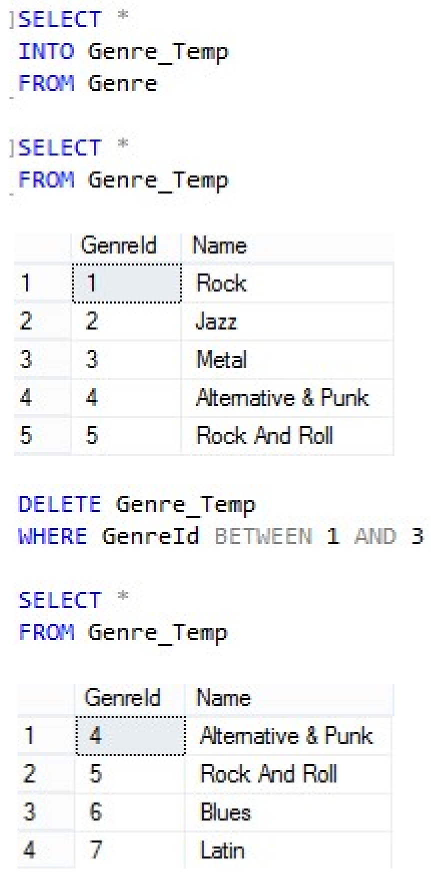
	LastName	InvoiceId	BillingAddress	BillingPostalCode	Total
1	Tremblay	99	1 Microsoft Way	H2G 1A7	3.98
2	Tremblay	110	1 Microsoft Way	H2G 1A7	13.86
3	Tremblay	165	1 Microsoft Way	H2G 1A7	8.91

DELETE Statement

- The DELETE statement is used to remove one or more rows of existing data in a table
- DELETE Syntax is similar to UPDATE syntax except there is no SET keyword
- A WHERE clause is used to define which rows the DELETE clause will delete
- If no WHERE clause is used then the entire table content will be deleted by the DELETE clause. The table itself will not be deleted

Simple DELETE

- Syntax for DELETE is the DELETE keyword followed by the table name
- Use a WHERE clause to identify which rows to delete



```
SELECT *
INTO Genre_Temp
FROM Genre

SELECT *
FROM Genre_Temp
```

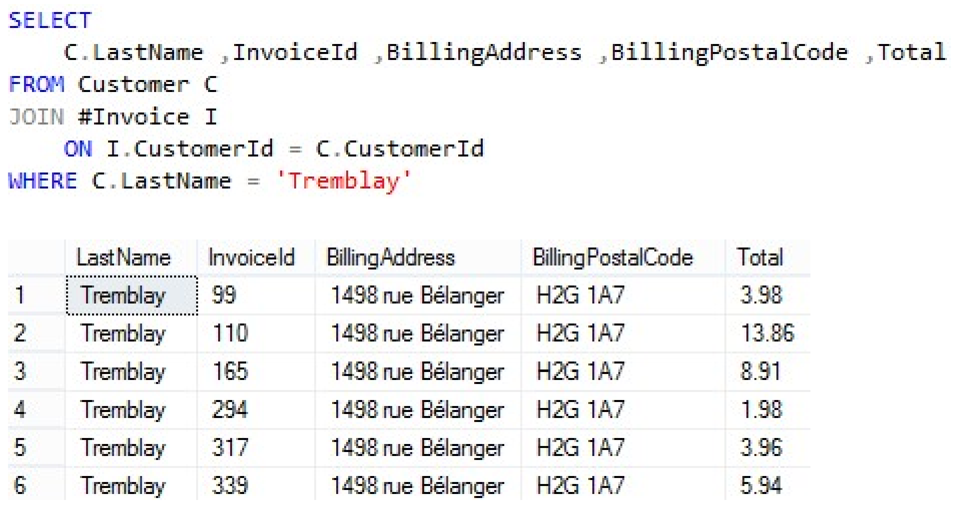
	GenreId	Name
1	1	Rock
2	2	Jazz
3	3	Metal
4	4	Alternative & Punk
5	5	Rock And Roll

```
DELETE Genre_Temp
WHERE GenreId BETWEEN 1 AND 3

SELECT *
FROM Genre_Temp
```

	GenreId	Name
1	4	Alternative & Punk
2	5	Rock And Roll
3	6	Blues
4	7	Latin

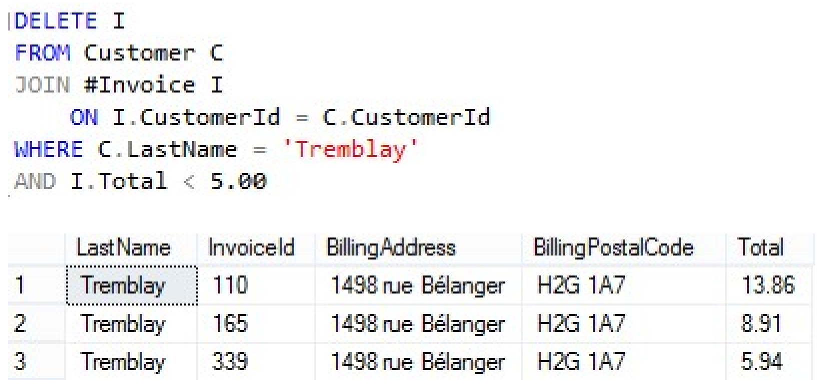
DELETE with FROM Clause

- Like the UPDATE syntax multiple tables can be joined together in a DELETE clause
- Only one table can be deleted at a time
- If the delete table is aliased in the FROM clause, you can use the Alias instead of the table name after the DELETE keyword



```sql
SELECT
    C.LastName ,InvoiceId ,BillingAddress ,BillingPostalCode ,Total
FROM Customer C
JOIN #Invoice I
    ON I.CustomerId = C.CustomerId
WHERE C.LastName = 'Tremblay'
```

	LastName	InvoiceId	BillingAddress	BillingPostalCode	Total
1	Tremblay	99	1498 rue Bélanger	H2G 1A7	3.98
2	Tremblay	110	1498 rue Bélanger	H2G 1A7	13.86
3	Tremblay	165	1498 rue Bélanger	H2G 1A7	8.91
4	Tremblay	294	1498 rue Bélanger	H2G 1A7	1.98
5	Tremblay	317	1498 rue Bélanger	H2G 1A7	3.96
6	Tremblay	339	1498 rue Bélanger	H2G 1A7	5.94

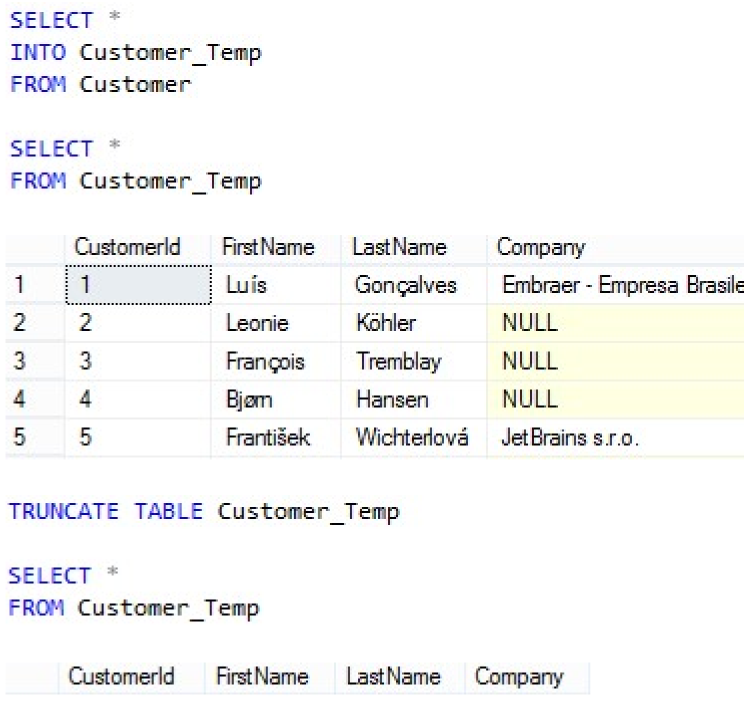


```sql
DELETE I
FROM Customer C
JOIN #Invoice I
    ON I.CustomerId = C.CustomerId
WHERE C.LastName = 'Tremblay'
AND I.Total < 5.00
```

	LastName	InvoiceId	BillingAddress	BillingPostalCode	Total
1	Tremblay	110	1498 rue Bélanger	H2G 1A7	13.86
2	Tremblay	165	1498 rue Bélanger	H2G 1A7	8.91
3	Tremblay	339	1498 rue Bélanger	H2G 1A7	5.94

TRUNCATE TABLE

- The TRUNCATE TABLE command removes all data from a table
- It performs the same way as a DELETE statement without the WHERE clause
- The difference between TRUNCATE TABLE and DELETE is delete is logged while truncate is not logged. This matters if you are working with transaction control language



```
SELECT *
INTO Customer_Temp
FROM Customer

SELECT *
FROM Customer_Temp
```

	CustomerId	FirstName	LastName	Company
1	1	Luís	Gonçalves	Embraer - Empresa Brasile
2	2	Leonie	Köhler	NULL
3	3	François	Tremblay	NULL
4	4	Bjørn	Hansen	NULL
5	5	František	Wichterlová	JetBrains s.r.o.

```
TRUNCATE TABLE Customer_Temp

SELECT *
FROM Customer_Temp
```

	CustomerId	FirstName	LastName	Company

Summary

- SELECT
  - SELECT INTO
  - Temp Tables
- INSERT
  - Basic Insert
  - Using OpenRowset
  - External Data into SQL Server
- UPDATE
- DELETE
- TRUNCATE TABLE