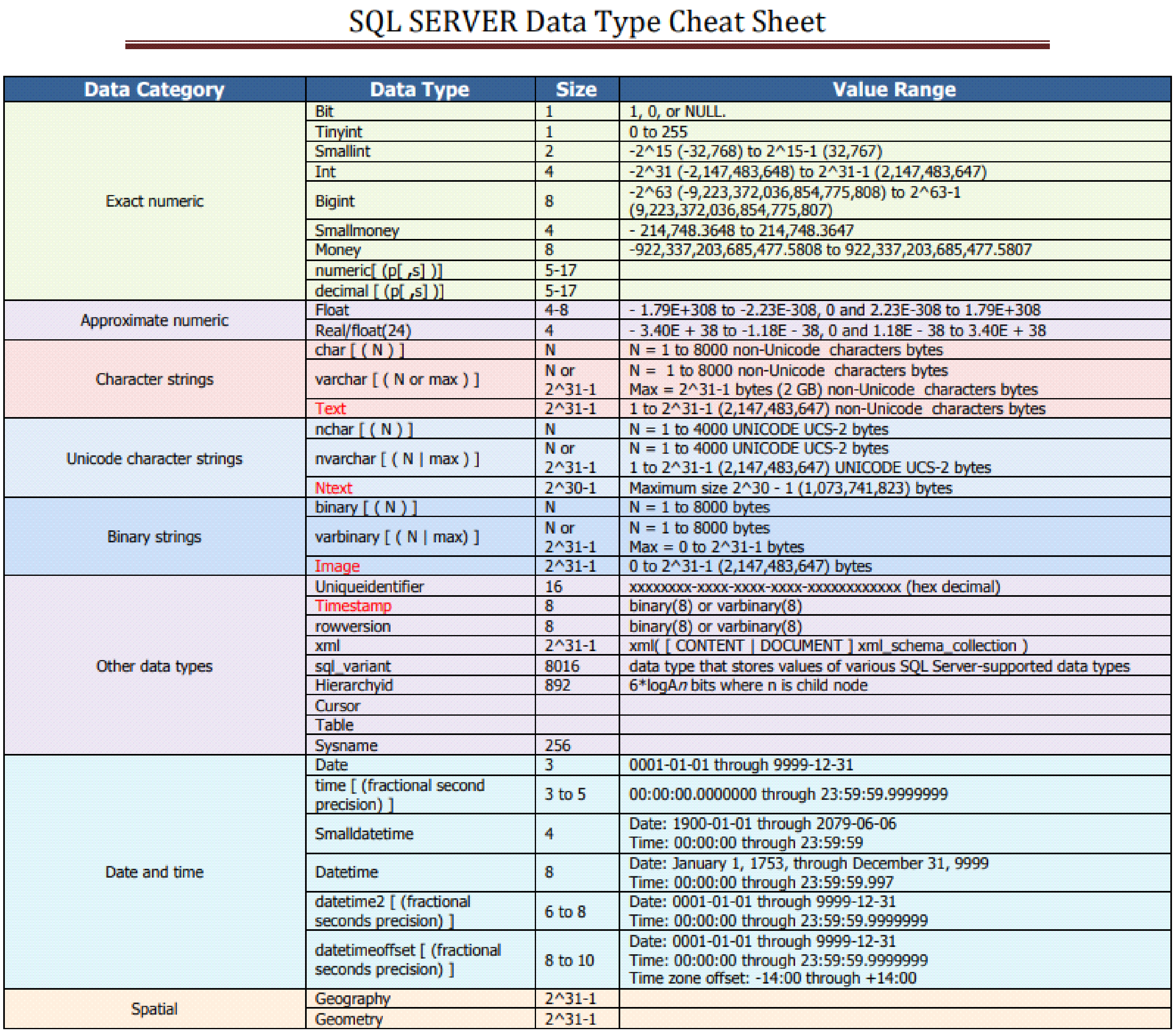
General Types

MODULE 2

Friday, May 19, 2017 11:45 PM



SQL SERVER Data Type Cheat Sheet

Data Category	Data Type	Size	Value Range
Exact numeric	Bit	1	1, 0, or NULL.
	Tinyint	1	0 to 255
	Smallint	2	-2^15 (-32,768) to 2^15-1 (32,767)
	Int	4	-2^31 (-2,147,483,648) to 2^31-1 (2,147,483,647)
	Bigint	8	-2^63 (-9,223,372,036,854,775,808) to 2^63-1 (9,223,372,036,854,775,807)
	Smallmoney	4	- 214,748.3648 to 214,748.3647
	Money	8	-922,337,203,685,477.5808 to 922,337,203,685,477.5807
	numeric[(p[,s])]	5-17	
	decimal [(p[,s])]	5-17	
Approximate numeric	Float	4-8	- 1.79E+308 to -2.23E-308, 0 and 2.23E-308 to 1.79E+308
	Real/float(24)	4	- 3.40E + 38 to -1.18E - 38, 0 and 1.18E - 38 to 3.40E + 38
Character strings	char [(N)]	N	N = 1 to 8000 non-Unicode characters bytes

	varchar [(N or max)]	N or 2^31-1	N = 1 to 8000 non-Unicode characters bytes
			Max = 2^31-1 bytes (2 GB) non-Unicode characters bytes

	Text	2^31-1	1 to 2^31-1 (2,147,483,647) non-Unicode characters bytes
Unicode character strings	nchar [(N)]	N	N = 1 to 4000 UNICODE UCS-2 bytes
	nvarchar [(N | max)]	N or 2^31-1	N = 1 to 4000 UNICODE UCS-2 bytes 1 to 2^31-1 (2,147,483,647) UNICODE UCS-2 bytes
	Ntext	2^30-1	Maximum size 2^30 - 1 (1,073,741,823) bytes
Binary strings	binary [(N)]	N	N = 1 to 8000 bytes

	varbinary [(N | max)]	N or 2^31-1	N = 1 to 8000 bytes
			Max = 0 to 2^31-1 bytes

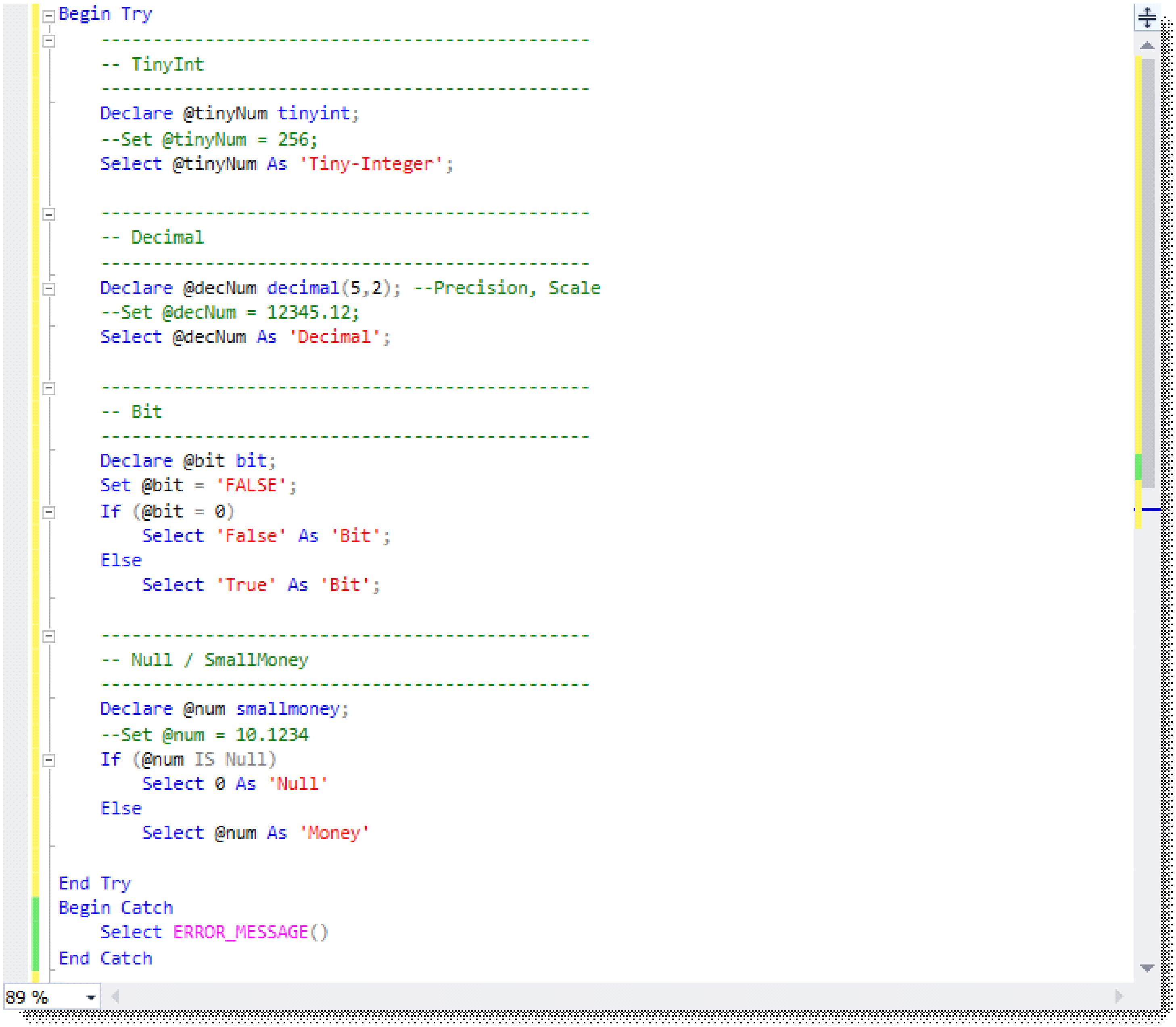
	Image	2^31-1	0 to 2^31-1 (2,147,483,647) bytes
Other data types	Uniqueidentifier	16	xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx (hex decimal)
	Timestamp	8	binary(8) or varbinary(8)
	rowversion	8	binary(8) or varbinary(8)
	xml	2^31-1	xml([CONTENT | DOCUMENT] xml_schema_collection)
	sql_variant	8016	data type that stores values of various SQL Server-supported data types
	Hierarchyid	892	6*logA*n* bits where n is child node
	Cursor		
	Table		
	Sysname	256	
Date and time	Date	3	0001-01-01 through 9999-12-31
	time [(fractional second precision)]	3 to 5	00:00:00.0000000 through 23:59:59.9999999
	Smalldatetime	4	Date: 1900-01-01 through 2079-06-06 Time: 00:00:00 through 23:59:59
	Datetime	8	Date: January 1, 1753, through December 31, 9999 Time: 00:00:00 through 23:59:59.997
	datetime2 [(fractional seconds precision)]	6 to 8	Date: 0001-01-01 through 9999-12-31 Time: 00:00:00 through 23:59:59.9999999
	datetimeoffset [(fractional seconds precision)]	8 to 10	Date: 0001-01-01 through 9999-12-31 Time: 00:00:00 through 23:59:59.9999999 Time zone offset: -14:00 through +14:00
Spatial	Geography	2^31-1	
	Geometry	2^31-1	

Note: text, ntext, image and timestamp data type will be removed from future version.

Numeric Type

Friday, May 19, 2017 11:49 PM

File: NumericNullTypes.sql



```sql
Begin Try
    ----------------------------------------------
    -- TinyInt
    ----------------------------------------------
    Declare @tinyNum tinyint;
    --Set @tinyNum = 256;
    Select @tinyNum As 'Tiny-Integer';

    ----------------------------------------------
    -- Decimal
    ----------------------------------------------
    Declare @decNum decimal(5,2); --Precision, Scale
    --Set @decNum = 12345.12;
    Select @decNum As 'Decimal';

    ----------------------------------------------
    -- Bit
    ----------------------------------------------
    Declare @bit bit;
    Set @bit = 'FALSE';
    If (@bit = 0)
        Select 'False' As 'Bit';
    Else
        Select 'True' As 'Bit';

    ----------------------------------------------
    -- Null / SmallMoney
    ----------------------------------------------
    Declare @num smallmoney;
    --Set @num = 10.1234
    If (@num IS Null)
        Select 0 As 'Null'
    Else
        Select @num As 'Money'

End Try
Begin Catch
    Select ERROR_MESSAGE()
End Catch
```

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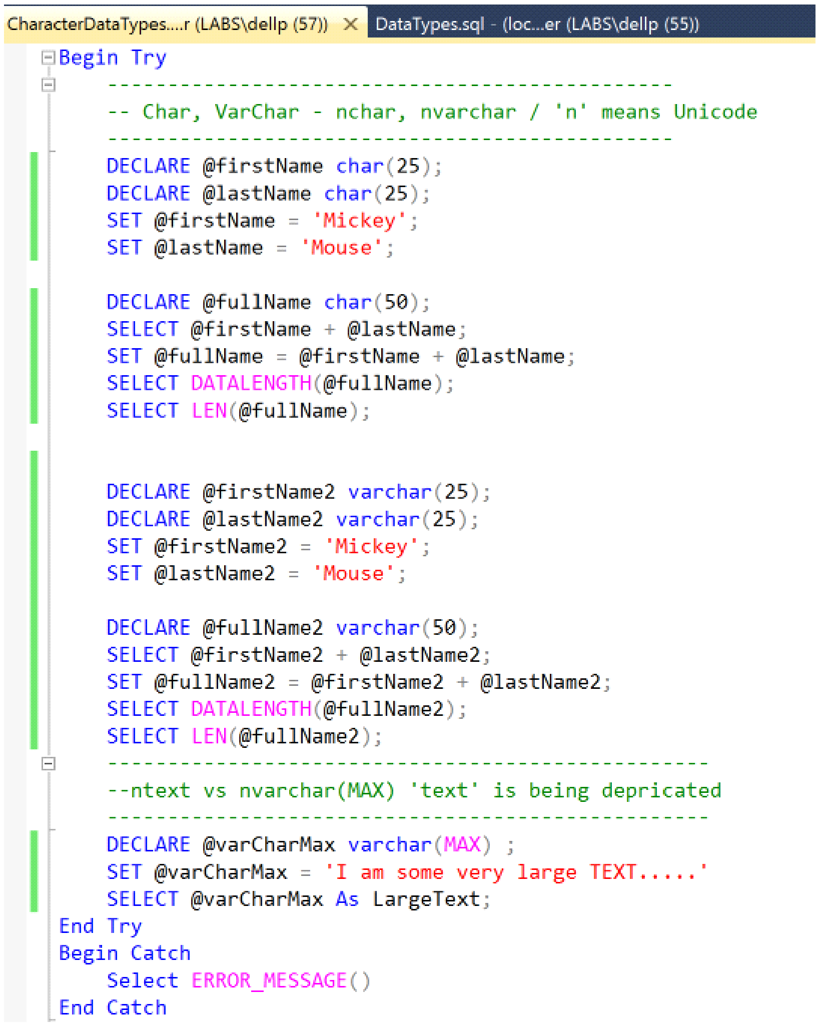
Character Types

Saturday, May 20, 2017 12:18 AM

VarChar = ASCII 1-Byte
nVarChar = Unicode (Multi-Language) 2-Bytes

https://www.w3schools.com/sql/sql_datatypes.asp

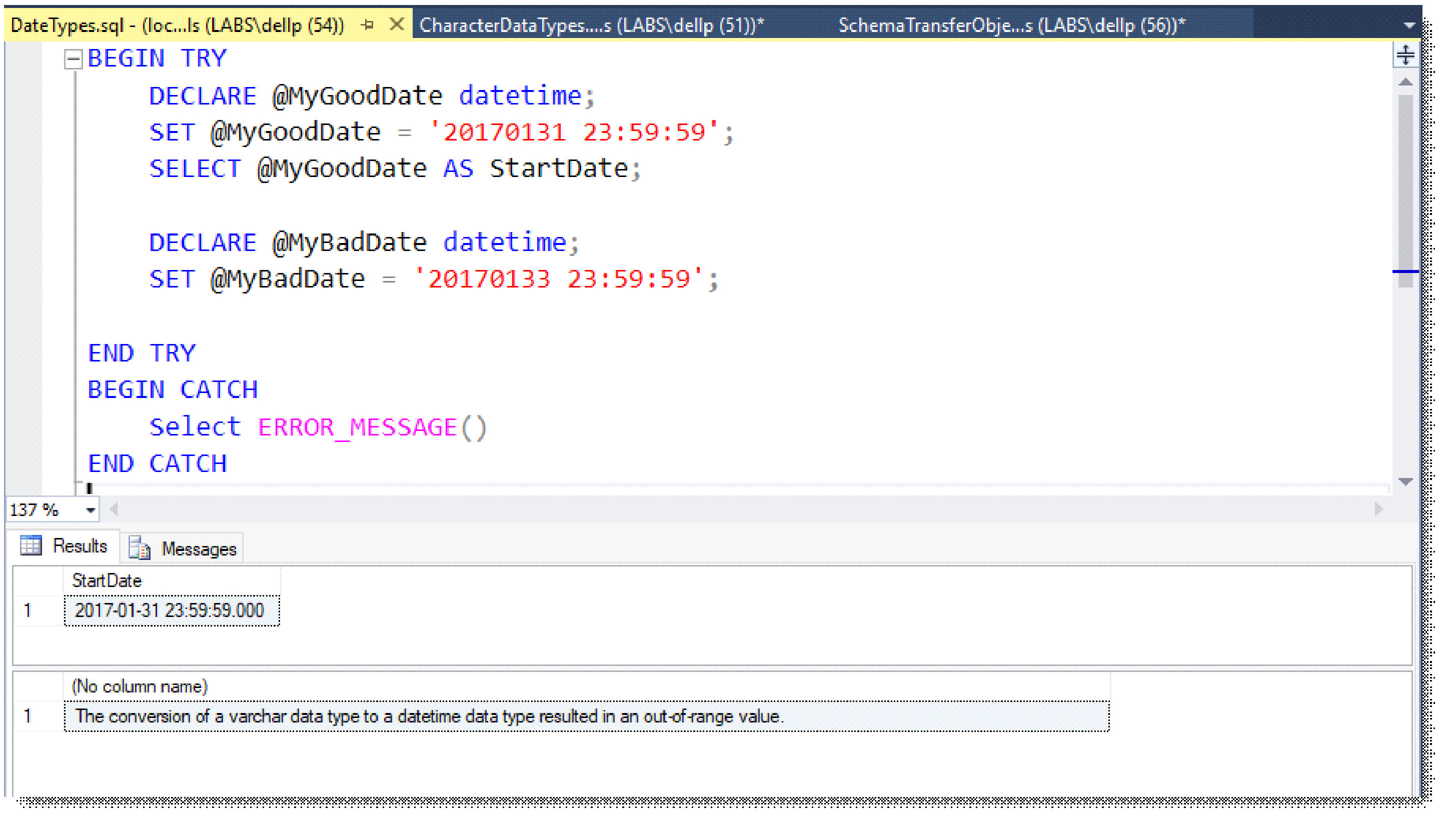


CharacterDataTypes....r (LABS\dellp (57)) DataTypes.sql - (loc...er (LABS\dellp (55))

```
Begin Try
    ------------------------------------------------
    -- Char, VarChar - nchar, nvarchar / 'n' means Unicode
    ------------------------------------------------
    DECLARE @firstName char(25);
    DECLARE @lastName char(25);
    SET @firstName = 'Mickey';
    SET @lastName = 'Mouse';

    DECLARE @fullName char(50);
    SELECT @firstName + @lastName;
    SET @fullName = @firstName + @lastName;
    SELECT DATALENGTH(@fullName);
    SELECT LEN(@fullName);


    DECLARE @firstName2 varchar(25);
    DECLARE @lastName2 varchar(25);
    SET @firstName2 = 'Mickey';
    SET @lastName2 = 'Mouse';

    DECLARE @fullName2 varchar(50);
    SELECT @firstName2 + @lastName2;
    SET @fullName2 = @firstName2 + @lastName2;
    SELECT DATALENGTH(@fullName2);
    SELECT LEN(@fullName2);
    ---------------------------------------------------
    --ntext vs nvarchar(MAX) 'text' is being depricated
    ---------------------------------------------------
    DECLARE @varCharMax varchar(MAX) ;
    SET @varCharMax = 'I am some very large TEXT.....'
    SELECT @varCharMax As LargeText;
End Try
Begin Catch
    Select ERROR_MESSAGE()
End Catch
```

Date Types

Saturday, May 20, 2017 6:43 PM



DateTypes.sql - (loc...ls (LABS\dellp (54))
CharacterDataTypes....s (LABS\dellp (51))*
SchemaTransferObje...s (LABS\dellp (56))*
137 %
Results
Messages

```
BEGIN TRY
    DECLARE @MyGoodDate datetime;
    SET @MyGoodDate = '20170131 23:59:59';
    SELECT @MyGoodDate AS StartDate;

    DECLARE @MyBadDate datetime;
    SET @MyBadDate = '20170133 23:59:59';

END TRY
BEGIN CATCH
    Select ERROR_MESSAGE()
END CATCH
```

```
   StartDate
1  2017-01-31 23:59:59.000
```

```
   (No column name)
1  The conversion of a varchar data type to a datetime data type resulted in an out-of-range value.
```

Unique Guids

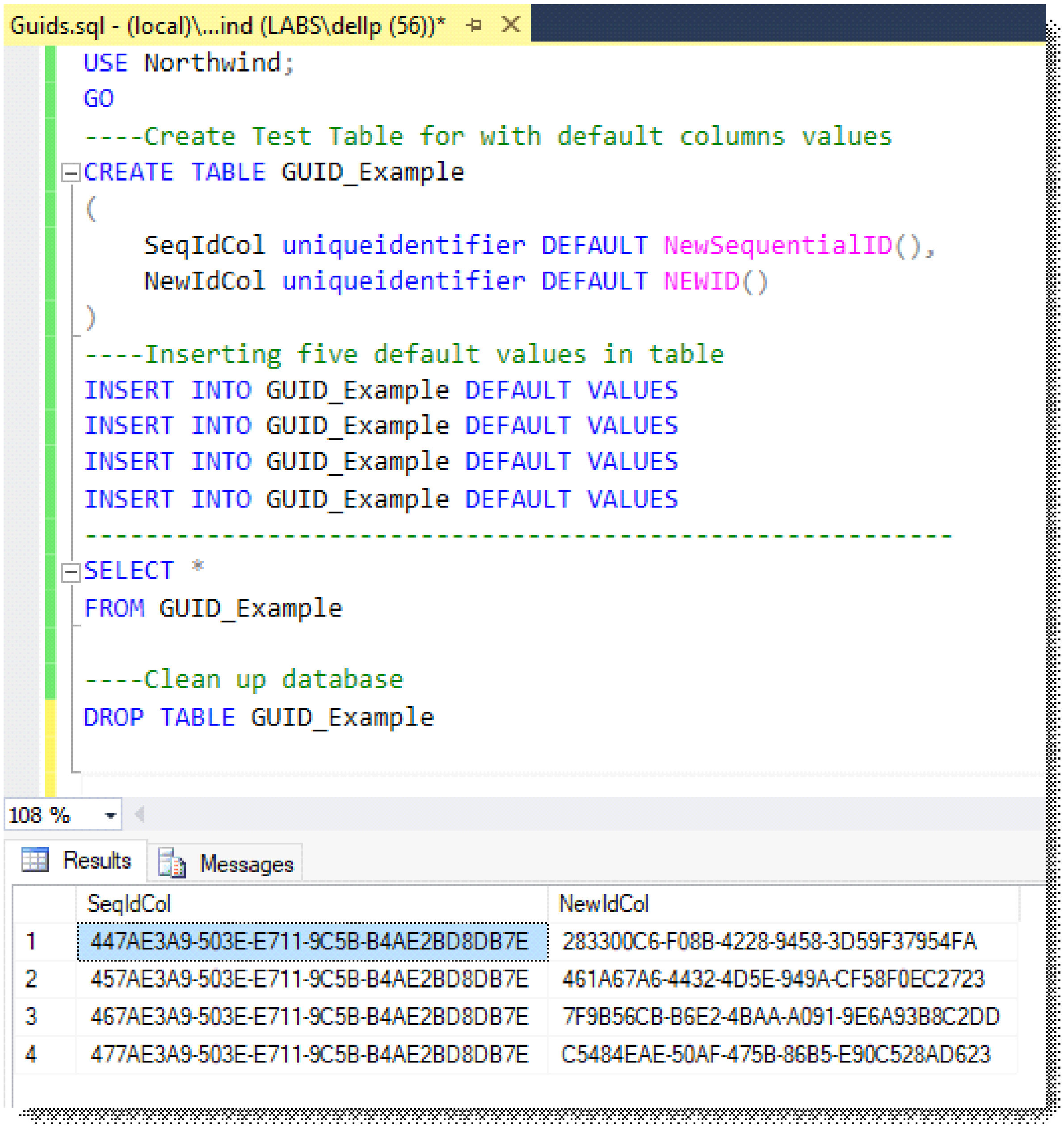
Sunday, May 21, 2017 10:52 AM

NEWID() generates the GUID in random order vs NEWSEQUENTIALID() which generates the GUID in sequential order.

Key Facts

- NewsequentialID() are sequential
- NewsequentialID() are best insert performance.
- NewsequentialID() **NOT** good for privacy.

- NewID() are Random
- NewID() is RFC4122 compliant.



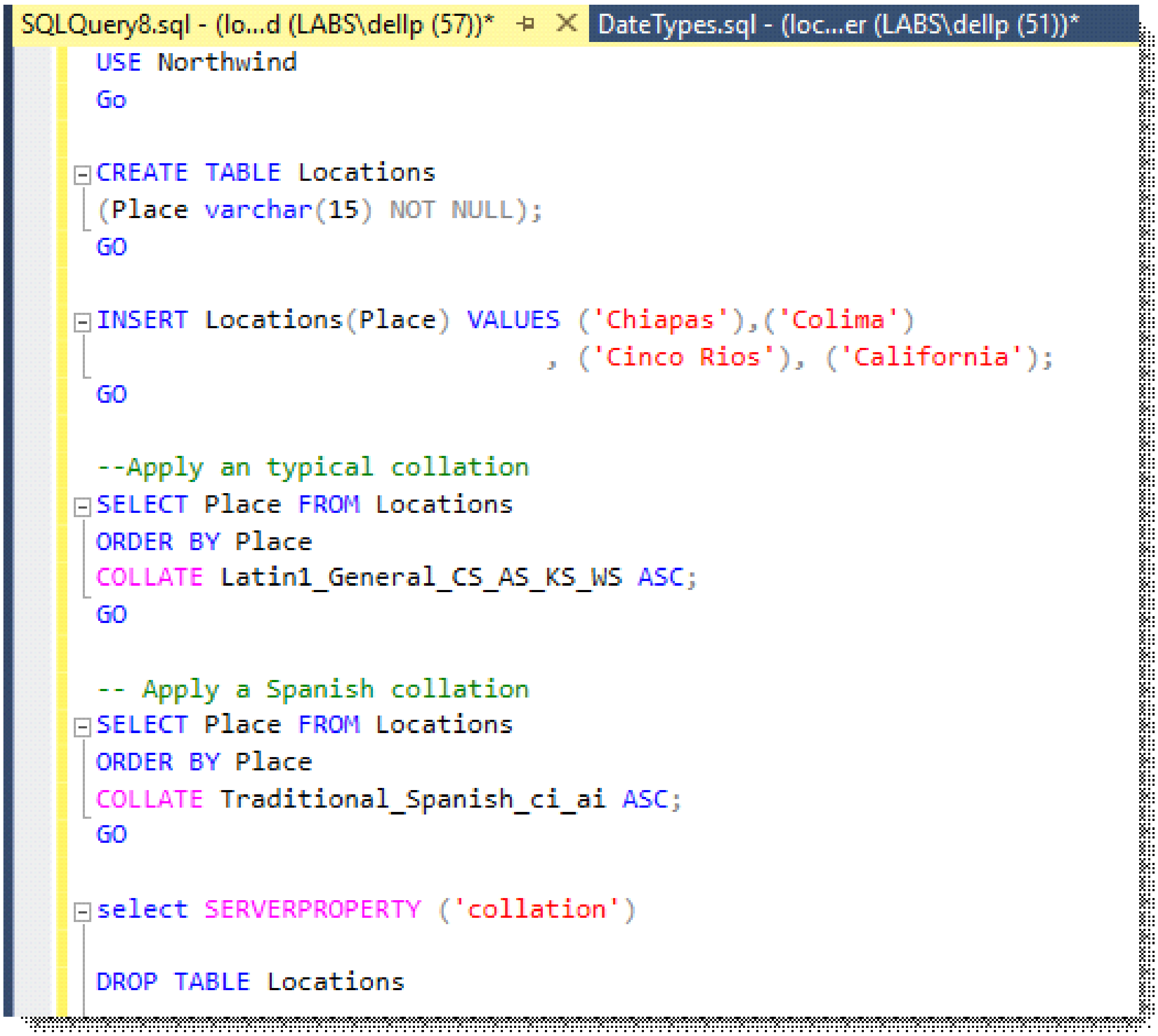
```sql
USE Northwind;
GO
----Create Test Table for with default columns values
CREATE TABLE GUID_Example
(
    SeqIdCol uniqueidentifier DEFAULT NewSequentialID(),
    NewIdCol uniqueidentifier DEFAULT NEWID()
)
----Inserting five default values in table
INSERT INTO GUID_Example DEFAULT VALUES
INSERT INTO GUID_Example DEFAULT VALUES
INSERT INTO GUID_Example DEFAULT VALUES
INSERT INTO GUID_Example DEFAULT VALUES
----------------------------------------------------------
SELECT *
FROM GUID_Example

----Clean up database
DROP TABLE GUID_Example
```

	SeqIdCol	NewIdCol
1	447AE3A9-503E-E711-9C5B-B4AE2BD8DB7E	283300C6-F08B-4228-9458-3D59F37954FA
2	457AE3A9-503E-E711-9C5B-B4AE2BD8DB7E	461A67A6-4432-4D5E-949A-CF58F0EC2723
3	467AE3A9-503E-E711-9C5B-B4AE2BD8DB7E	7F9B56CB-B6E2-4BAA-A091-9E6A93B8C2DD
4	477AE3A9-503E-E711-9C5B-B4AE2BD8DB7E	C5484EAE-50AF-475B-86B5-E90C528AD623

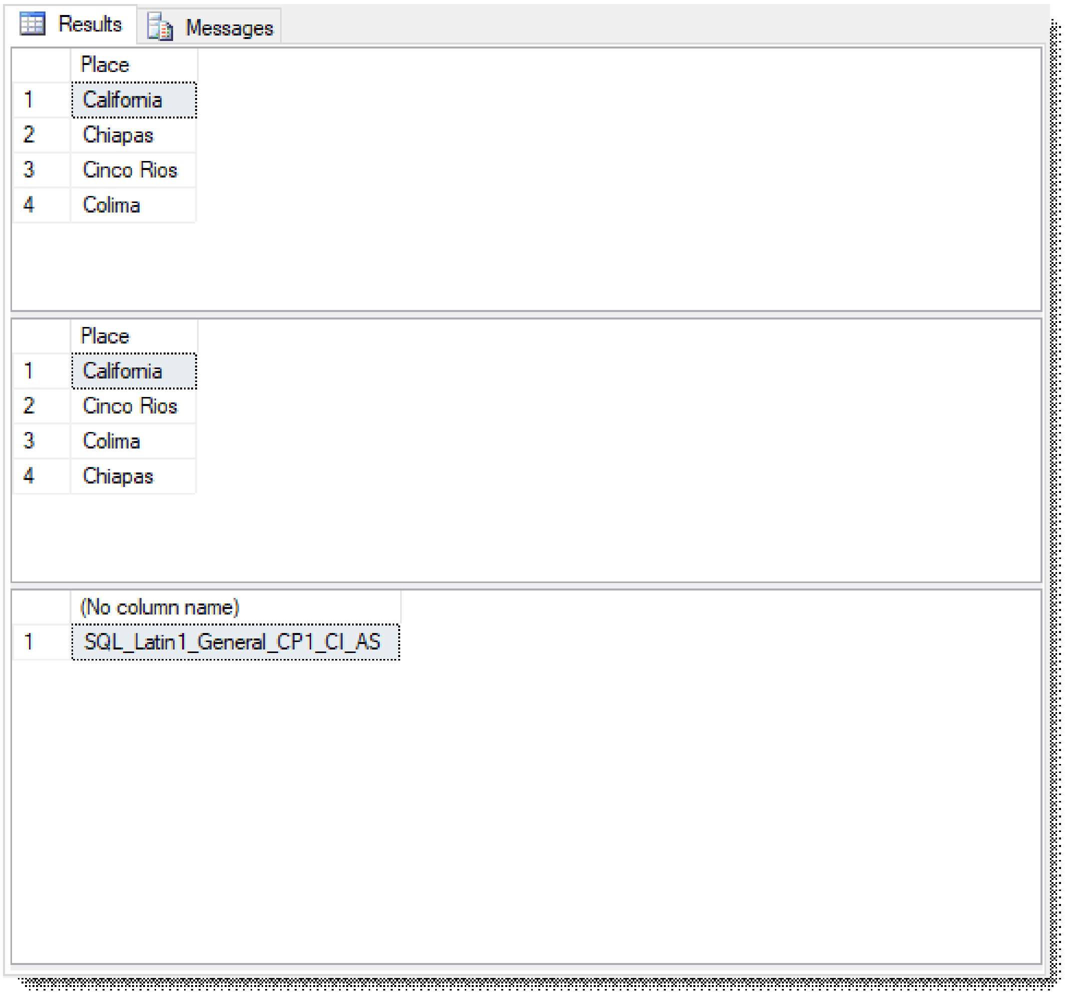
Collation

Saturday, May 20, 2017 6:46 PM

- [ ] USE the SchoolsDatabase
  File:Collation.sql


SQLQuery8.sql - (lo...d (LABS\dellp (57))*
DateTypes.sql - (loc...er (LABS\dellp (51))*

```sql
USE Northwind
Go

CREATE TABLE Locations
(Place varchar(15) NOT NULL);
GO

INSERT Locations(Place) VALUES ('Chiapas'),('Colima')
                            , ('Cinco Rios'), ('California');
GO

--Apply an typical collation
SELECT Place FROM Locations
ORDER BY Place
COLLATE Latin1_General_CS_AS_KS_WS ASC;
GO

-- Apply a Spanish collation
SELECT Place FROM Locations
ORDER BY Place
COLLATE Traditional_Spanish_ci_ai ASC;
GO

select SERVERPROPERTY ('collation')

DROP TABLE Locations
```



	Place
1	California
2	Chiapas
3	Cinco Rios
4	Colima

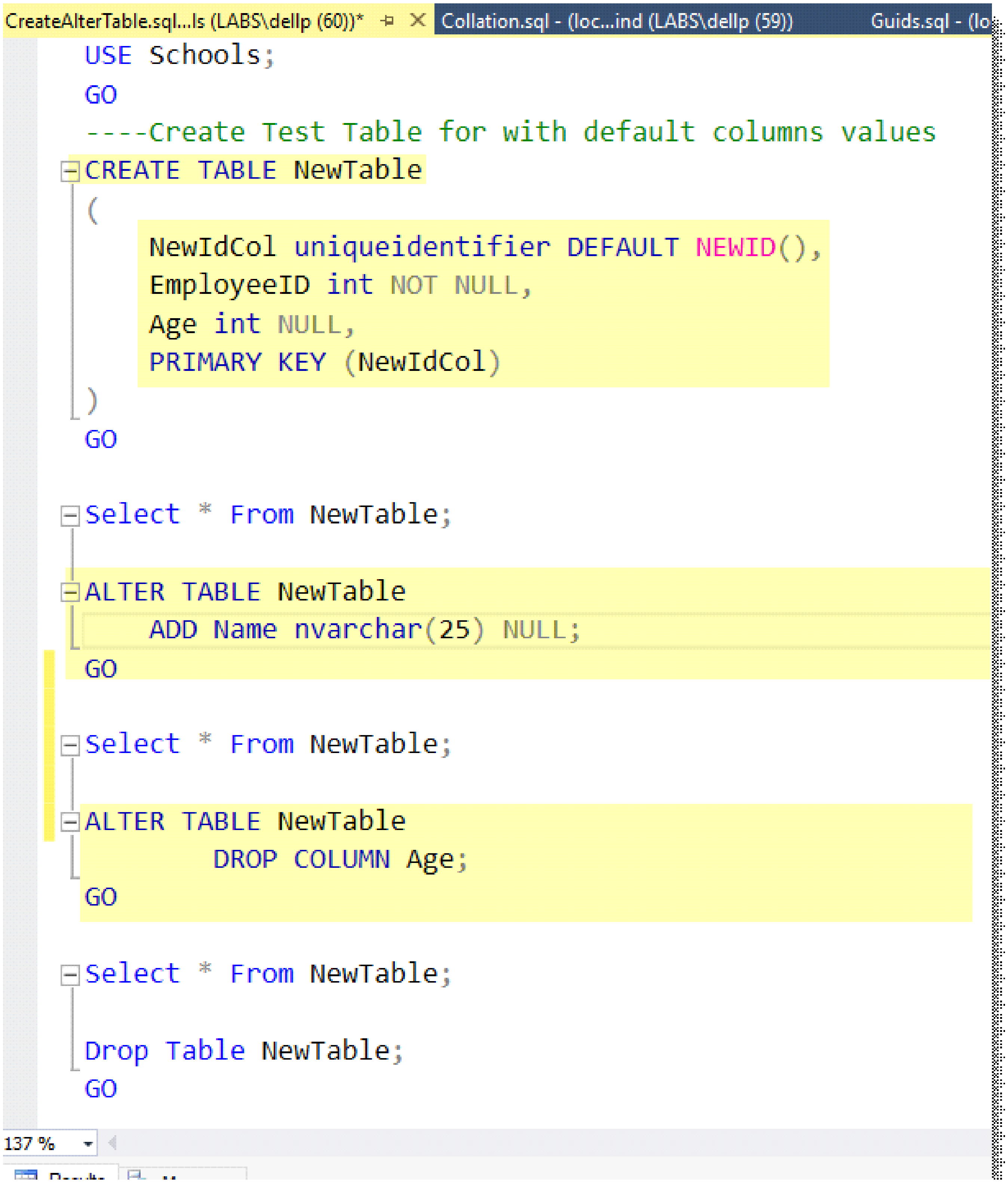
	Place
1	California
2	Cinco Rios
3	Colima
4	Chiapas

	(No column name)
1	SQL_Latin1_General_CP1_CI_AS

Create - Alter- Drop

Tuesday, May 16, 2017 5:33 PM

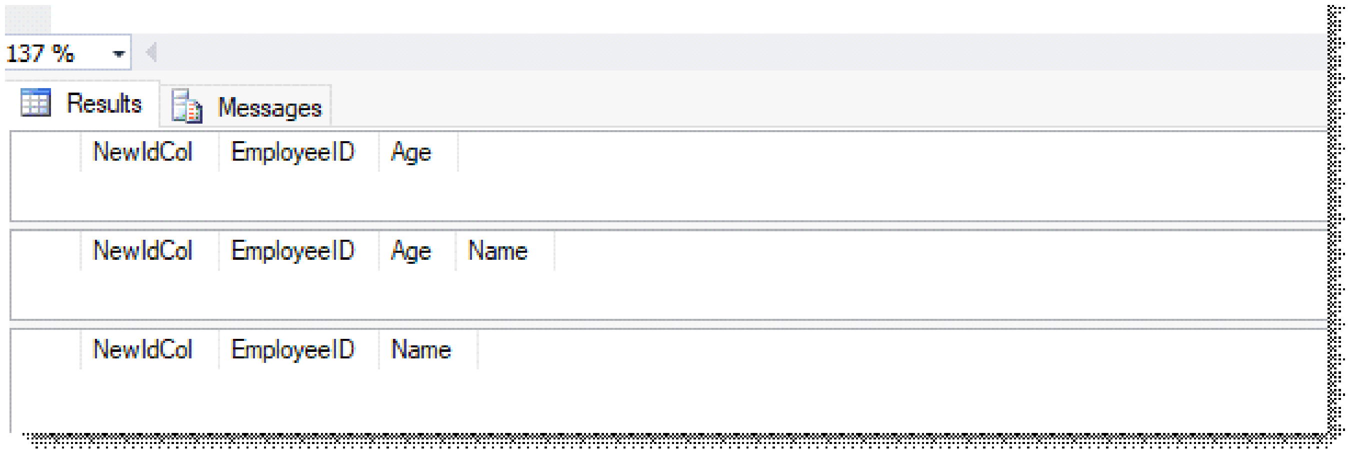
☐ USE Schools or Northwind



CreateAlterTable.sql...ls (LABS\dellp (60))* Collation.sql - (loc...ind (LABS\dellp (59)) Guids.sql - (lo

```
USE Schools;
GO
----Create Test Table for with default columns values
CREATE TABLE NewTable
(
    NewIdCol uniqueidentifier DEFAULT NEWID(),
    EmployeeID int NOT NULL,
    Age int NULL,
    PRIMARY KEY (NewIdCol)
)
GO

Select * From NewTable;

ALTER TABLE NewTable
    ADD Name nvarchar(25) NULL;
GO

Select * From NewTable;

ALTER TABLE NewTable
        DROP COLUMN Age;
GO

Select * From NewTable;

Drop Table NewTable;
GO
```

137 %


137 %

Results | Messages

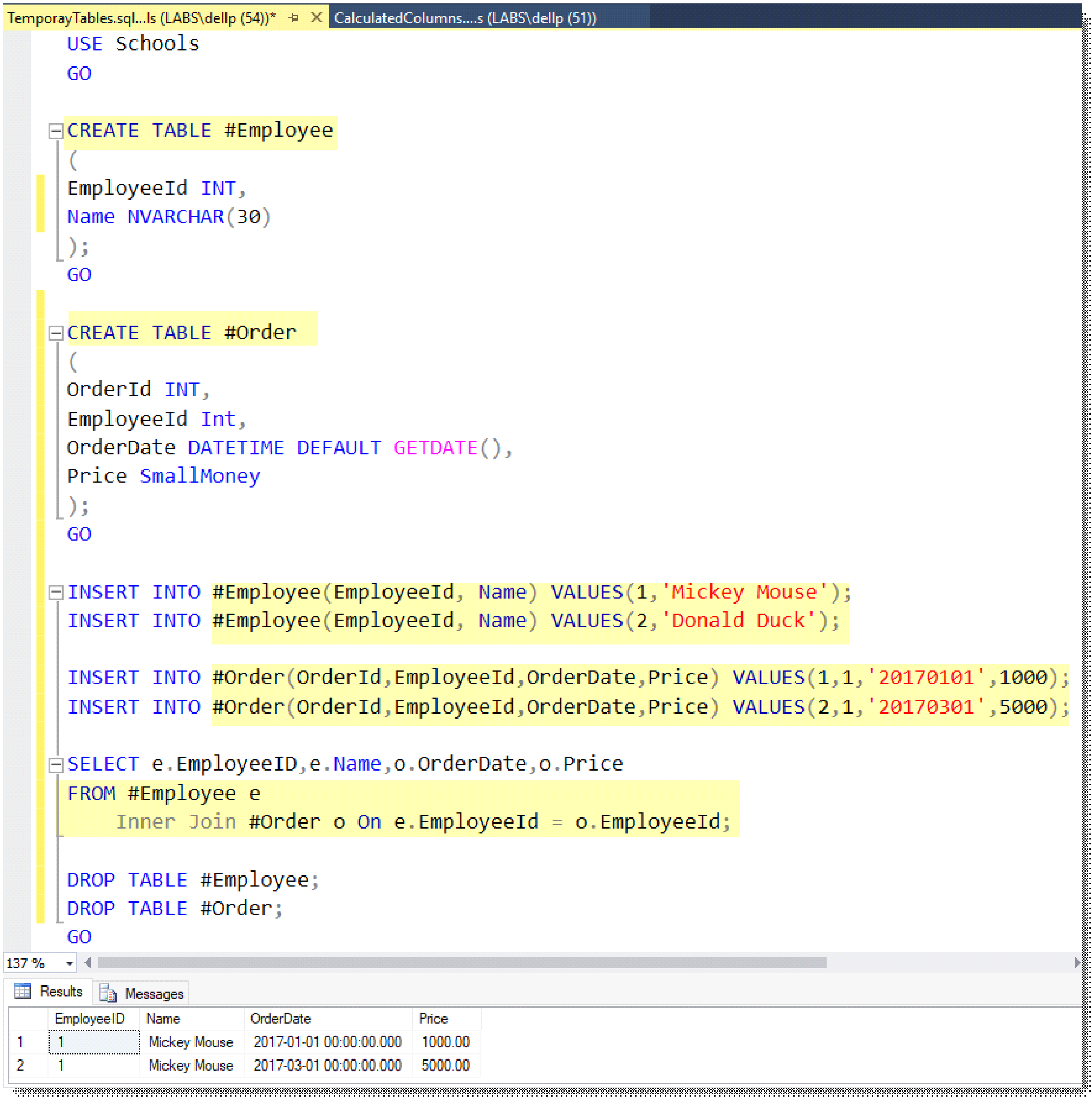
	NewIdCol	EmployeeID	Age

	NewIdCol	EmployeeID	Age	Name

	NewIdCol	EmployeeID	Name

Temporary Tables

Sunday, May 21, 2017 12:42 PM



TemporayTables.sql...ls (LABS\dellp (54))*
CalculatedColumns....s (LABS\dellp (51))
137 %
Results
Messages

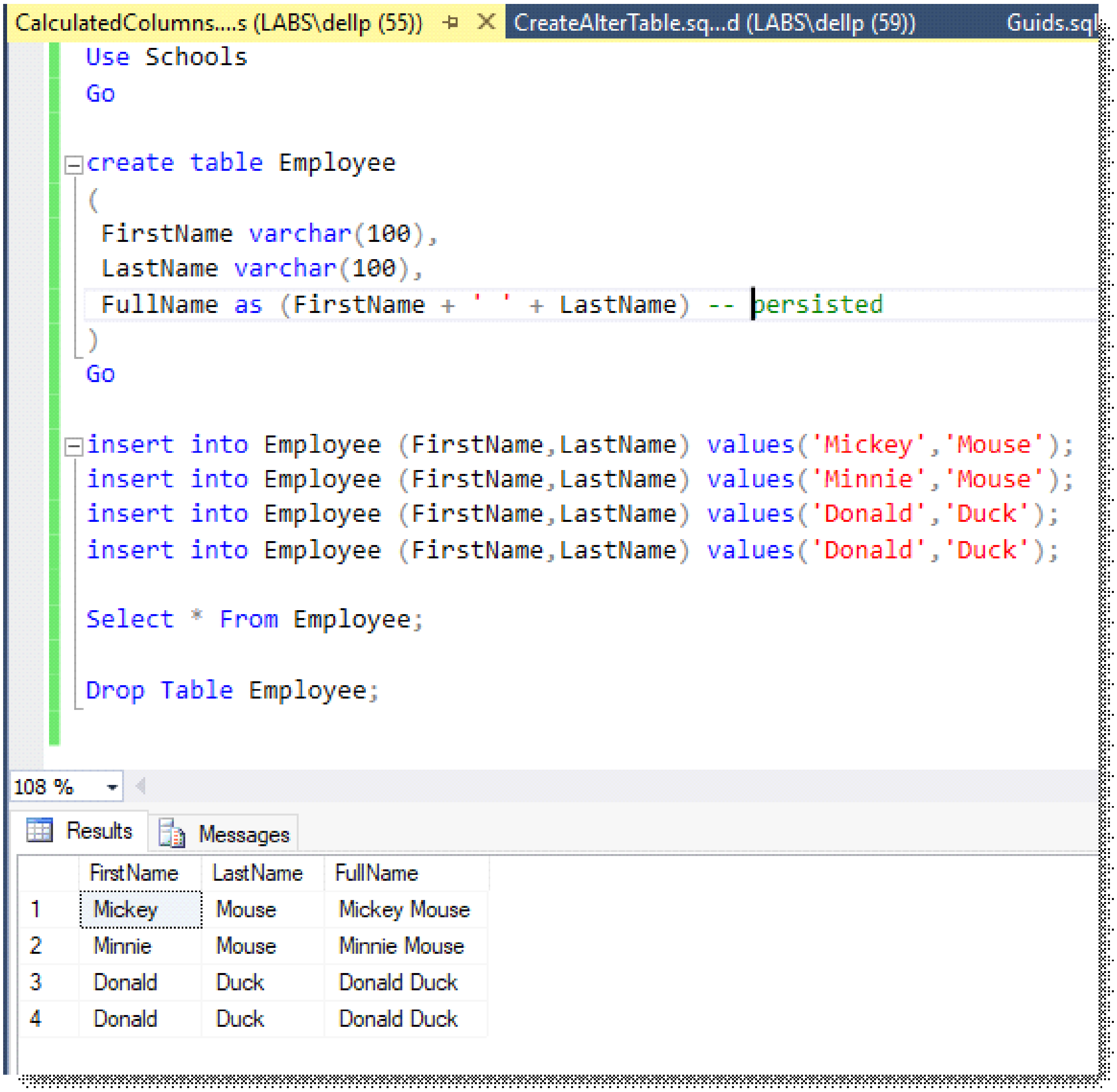
```sql
USE Schools
GO

CREATE TABLE #Employee
(
EmployeeId INT,
Name NVARCHAR(30)
);
GO

CREATE TABLE #Order
(
OrderId INT,
EmployeeId Int,
OrderDate DATETIME DEFAULT GETDATE(),
Price SmallMoney
);
GO

INSERT INTO #Employee(EmployeeId, Name) VALUES(1,'Mickey Mouse');
INSERT INTO #Employee(EmployeeId, Name) VALUES(2,'Donald Duck');

INSERT INTO #Order(OrderId,EmployeeId,OrderDate,Price) VALUES(1,1,'20170101',1000);
INSERT INTO #Order(OrderId,EmployeeId,OrderDate,Price) VALUES(2,1,'20170301',5000);

SELECT e.EmployeeID,e.Name,o.OrderDate,o.Price
FROM #Employee e
    Inner Join #Order o On e.EmployeeId = o.EmployeeId;

DROP TABLE #Employee;
DROP TABLE #Order;
GO
```

	EmployeeID	Name	OrderDate	Price
1	1	Mickey Mouse	2017-01-01 00:00:00.000	1000.00
2	1	Mickey Mouse	2017-03-01 00:00:00.000	5000.00

Computed Fields

Sunday, May 21, 2017 12:26 PM

- [ ] A Computed Column is a Virtual Column that is not Physically Stored in the Table, unless it is Marked as PERSISTED.



CalculatedColumns....s (LABS\dellp (55)) CreateAlterTable.sq...d (LABS\dellp (59)) Guids.sql

```sql
Use Schools
Go

create table Employee
(
 FirstName varchar(100),
 LastName varchar(100),
 FullName as (FirstName + ' ' + LastName) -- persisted
)
Go

insert into Employee (FirstName,LastName) values('Mickey','Mouse');
insert into Employee (FirstName,LastName) values('Minnie','Mouse');
insert into Employee (FirstName,LastName) values('Donald','Duck');
insert into Employee (FirstName,LastName) values('Donald','Duck');

Select * From Employee;

Drop Table Employee;
```

108 %

Results | Messages

	FirstName	LastName	FullName
1	Mickey	Mouse	Mickey Mouse
2	Minnie	Mouse	Minnie Mouse
3	Donald	Duck	Donald Duck
4	Donald	Duck	Donald Duck