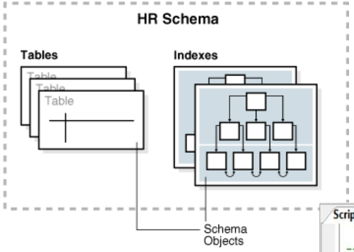
DDL STATEMENTS

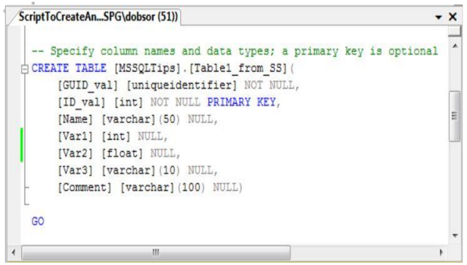
Instructor:

Learning Goals

By the end of this lecture students should be able to:

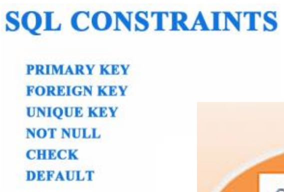
- ✓ Categorize the main database objects
- ✓ Create a simple table
- ✓ Understand how constraints are created at the time of table creation
- ✓ Describe how schema objects work
- ✓ Understand and use to be commands create, alter, drop, truncate table





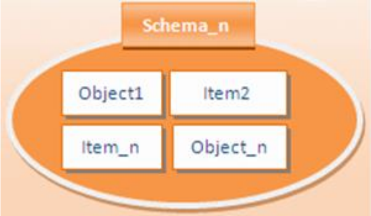
```
-- Specify column names and data types; a primary key is optional
CREATE TABLE [MSSQLTips].[Table1_from_SS](
    [GUID_val] [uniqueidentifier] NOT NULL,
    [ID_val] [int] NOT NULL PRIMARY KEY,
    [Name] [varchar](50) NULL,
    [Var1] [int] NULL,
    [Var2] [float] NULL,
    [Var3] [varchar](10) NULL,
    [Comment] [varchar](100) NULL)

GO
```



SQL CONSTRAINTS

PRIMARY KEY
FOREIGN KEY
UNIQUE KEY
NOT NULL
CHECK
DEFAULT



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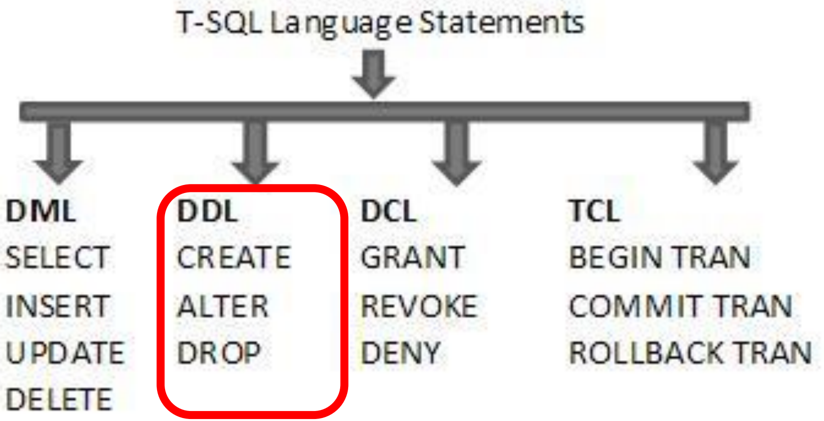
- Database Object
- Schema Object
- Table and Constraints
- Truncate
- View

Section1

INTRODUCTION TO DDL STATEMENTS

Introduction to DDL Statements

- **DDL** stands for **D**ata **D**efinition **L**anguage
- Define data structures in SQL Server as creating, altering, and dropping tables and establishing constraints…



T-SQL Language Statements

DML	DDL	DCL	TCL
SELECT	CREATE	GRANT	BEGIN TRAN
INSERT	ALTER	REVOKE	COMMIT TRAN
UPDATE	DROP	DENY	ROLLBACK TRAN
DELETE			

SQL Server Database Objects

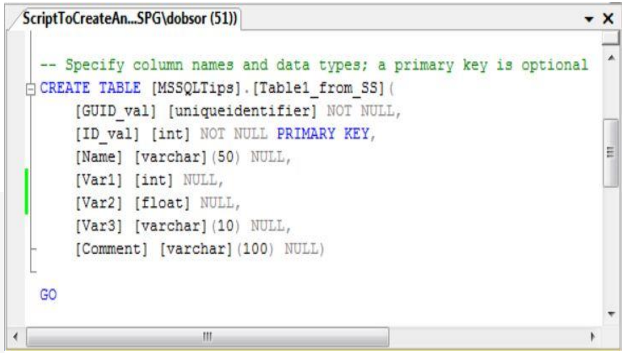
- **A SQL Server database has lot of objects like:**
  - Database
  - Schema
  - Tables
  - Views
  - Stored Procedures
  - Functions
  - Rules
  - Defaults
  - Triggers

Section2

DATABASE & SCHEMA OBJECTS

Database

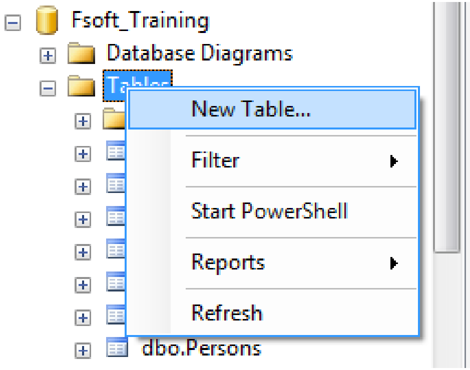
- **SQL Server supports both scripts editor and graphic tool in order to:**
  - Create a database
  - Rename a database
  - Drop a database



ScriptToCreateAn...SPG\dobsor (51))

```sql
-- Specify column names and data types; a primary key is optional
CREATE TABLE [MSSQLTips].[Table1_from_SS](
    [GUID_val] [uniqueidentifier] NOT NULL,
    [ID_val] [int] NOT NULL PRIMARY KEY,
    [Name] [varchar](50) NULL,
    [Var1] [int] NULL,
    [Var2] [float] NULL,
    [Var3] [varchar](10) NULL,
    [Comment] [varchar](100) NULL)

GO
```

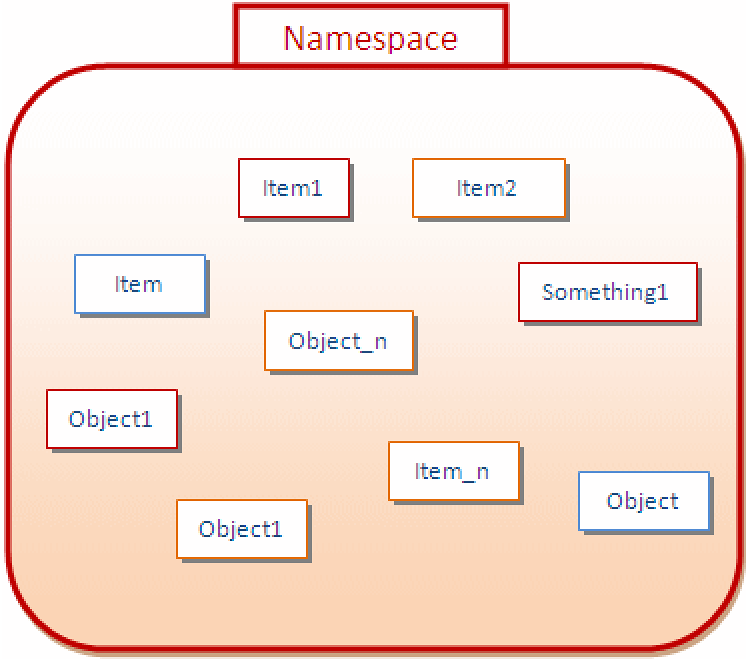


Database Demo

- **Scripts editor:**
  - Create a database
  - Rename a database
  - Drop a database
- **Graphic tool**
  - Create a database
  - Rename a database
  - Drop a database
- **Create database by using a template**

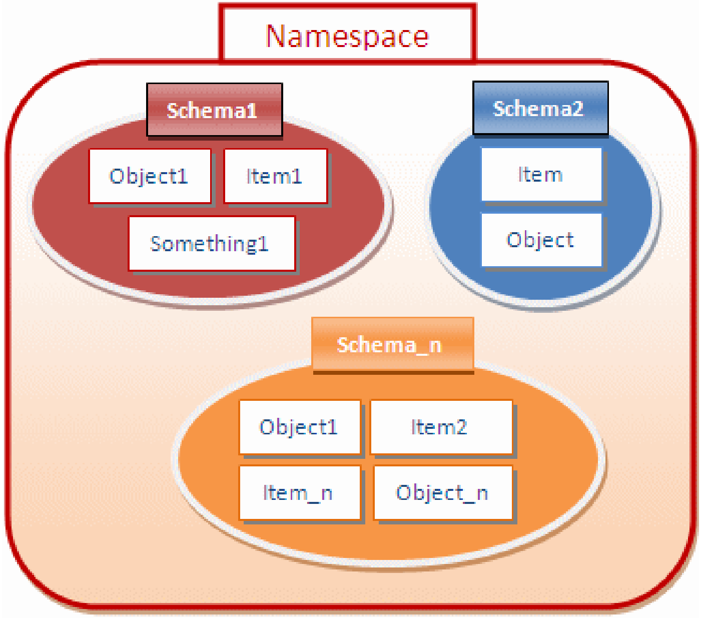
Schema Object (1/3)

- A **namespace** can have objects inside



Schema Object (2/3)

- To further control and manage the objects inside of a namespace, you can put them in *sub-groups* called **schemas**.



Schema Object (3/3)

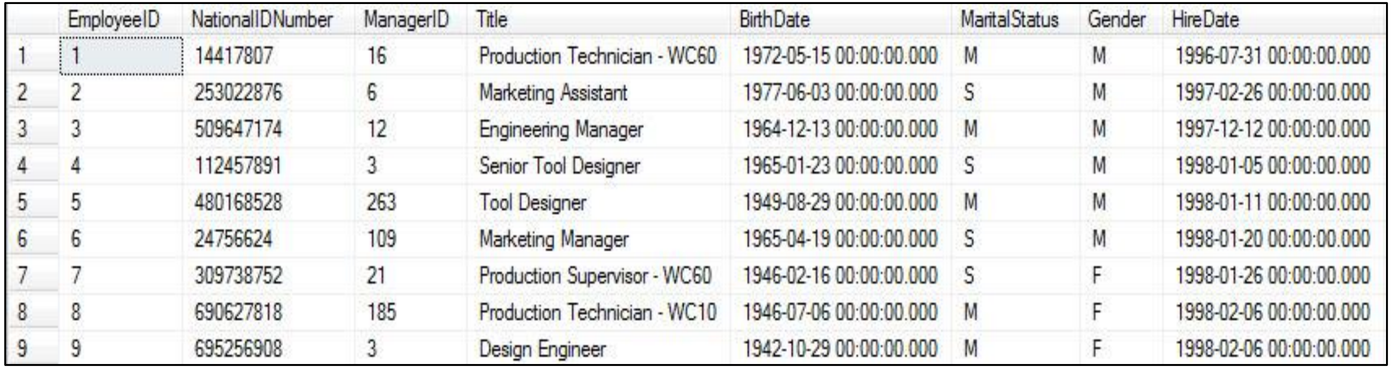
- **Schema default:**
  - **dbo** is default schema in every database
  - Ex: SalesOrderDetail, HumanResources.Department
  - [**linked-server**].[**DBName**].[**SchemaName**].[**Objectname**]
- **Schema as:**
  - naming boundaries
  - security boundaries

Section3

TABLE AND CONSTRAINTS

Table

- Table is a repository for data, with items of data grouped in one or more columns
  - Data types
  - Constraints
  - Index



	EmployeeID	NationalIDNumber	ManagerID	Title	BirthDate	MaritalStatus	Gender	HireDate
1	1	14417807	16	Production Technician - WC60	1972-05-15 00:00:00.000	M	M	1996-07-31 00:00:00.000
2	2	253022876	6	Marketing Assistant	1977-06-03 00:00:00.000	S	M	1997-02-26 00:00:00.000
3	3	509647174	12	Engineering Manager	1964-12-13 00:00:00.000	M	M	1997-12-12 00:00:00.000
4	4	112457891	3	Senior Tool Designer	1965-01-23 00:00:00.000	S	M	1998-01-05 00:00:00.000
5	5	480168528	263	Tool Designer	1949-08-29 00:00:00.000	M	M	1998-01-11 00:00:00.000
6	6	24756624	109	Marketing Manager	1965-04-19 00:00:00.000	S	M	1998-01-20 00:00:00.000
7	7	309738752	21	Production Supervisor - WC60	1946-02-16 00:00:00.000	S	F	1998-01-26 00:00:00.000
8	8	690627818	185	Production Technician - WC10	1946-07-06 00:00:00.000	M	F	1998-02-06 00:00:00.000
9	9	695256908	3	Design Engineer	1942-10-29 00:00:00.000	M	F	1998-02-06 00:00:00.000

Table demo

- **Create table**
- **Alter table**
  - Add new column
  - Change data type of existing column
  - Delete a column
  - Add or remove constraints
- **Drop table**
  - Remove table structure and its data.

Table Constraints (1/4)

- **Table Constraints:** Are used to limit the type of data that can go into a table.
- We will focus on the following constraints:
  - NOT NULL
  - CHECK
  - UNIQUE
  - PRIMARY KEY
  - DEFAULT
  - FOREIGN KEY

Table Constraints (2/4)

- NOT NULL: Specifies that the column does not accept NULL values.

- CHECK: Enforce domain integrity by limiting the values that can be put in a column.
  - **Syntax**:

    [CONSTRAINT *constraint_name]*

    CHECK (*condition)*

Table Constraint (3/4)

- UNIQUE: Enforce the uniqueness of the values in a set of columns
  - **Synstax:**

    CONSTRAINT unique_name UNIQUE (col_names)
- PRIMARY KEY: Specify primary key of table.
  - **Syntax:**

    [CONSTRAINT *PK_Name]*

    PRIMARY KEY [col_names*]*

Table Constraint (4/4)

- FOREIGN KEY: Used to define relationships between tables in the database.
  - **Syntax:**

    [CONSTRAINT *FK_Name]*

    FOREIGN KEY [(*col_names)]*

    REFERENCES *reference_table(col_names)*

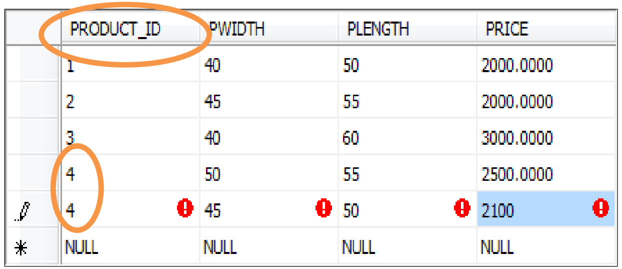
- DEFAULT: Defaults specify what values are used in a column if you do not specify a value for the column when you insert a row.

SQL Constraints Scope

- SQL constraints can be applied at:
  - **Table level**
    - ✓ Are declared independently from the column definition
    - ✓ declare table-level constraints at the end of the CREATE TABLE statement
  - **Column level:**
    - ✓ Are declared when define columns for the table.
    - ✓ It is applied particularly to the column where it attached to

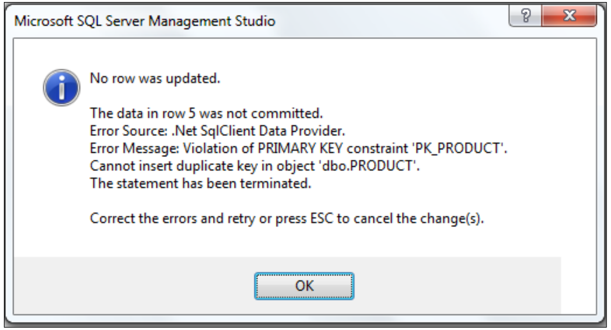
Identity (1/1)

Primary key



	PRODUCT_ID	PWIDTH	PLENGTH	PRICE
	1	40	50	2000.0000
	2	45	55	2000.0000
	3	40	60	3000.0000
	4	50	55	2500.0000
✎	4 ❗	45 ❗	50 ❗	2100 ❗
*	NULL	NULL	NULL	NULL

Error



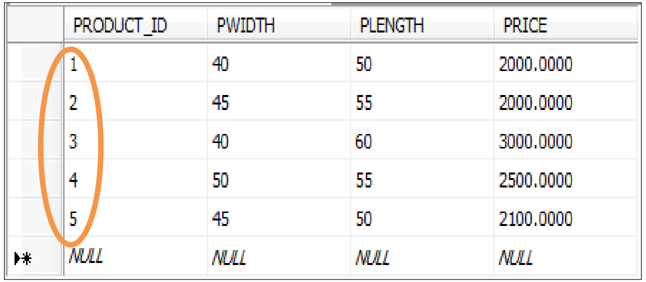
Microsoft SQL Server Management Studio

No row was updated.

The data in row 5 was not committed.
Error Source: .Net SqlClient Data Provider.
Error Message: Violation of PRIMARY KEY constraint 'PK_PRODUCT'.
Cannot insert duplicate key in object 'dbo.PRODUCT'.
The statement has been terminated.

Correct the errors and retry or press ESC to cancel the change(s).

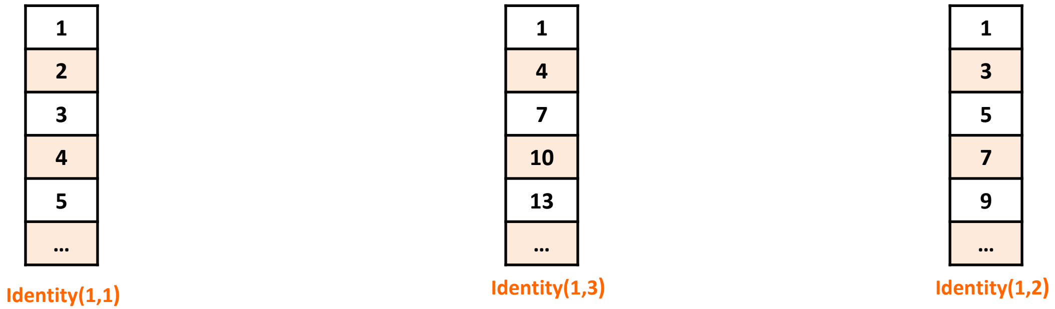
Auto increment



	PRODUCT_ID	PWIDTH	PLENGTH	PRICE
	1	40	50	2000.0000
	2	45	55	2000.0000
	3	40	60	3000.0000
	4	50	55	2500.0000
	5	45	50	2100.0000
▸*	NULL	NULL	NULL	NULL

Identity (1/2)

- Identity has:
  - A seed
  - An increment
- Seed is the initial value
- Increment is the value by which we need to skip to fetch the next value
- **For example:**
  - Identity(1,2) will generate sequence numbers 1,3,5,7…



1	1	1
2	4	3
3	7	5
4	10	7
5	13	9
…	…	…
Identity(1,1)	Identity(1,3)	Identity(1,2)

Truncate statement

- Removes all rows in a table.
- Table structure and its columns, constraints, indexes, …remain.
  - Resets the identity value.
  - Releases the memory used.

Section4

VIEWS

What is a view?

- A View is a logical or virtual table. The fields in a view are fields from one or more real tables in the database.
- There are two major reasons you might want to use views:
  - ✓ Views allow you to limit the data users can access
  - ✓ Views reduce complexity for end users.

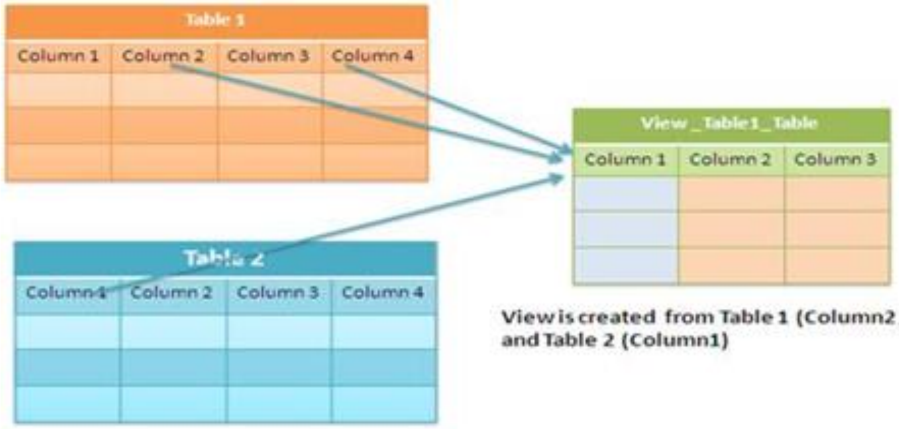


Table 1

Column 1	Column 2	Column 3	Column 4

Table 2

Column 1	Column 2	Column 3	Column 4

View _Table1_Table

Column 1	Column 2	Column 3

View is created from Table 1 (Column2, Column 3) and Table 2 (Column1)

Creating a view

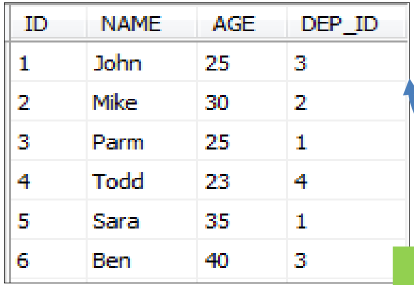
```
CREATE VIEW  View_Name [list of column names]
AS
SELECT…
```

Example:

```
CREATE VIEW view_EmployeeByDpt
AS
SELECT  ID, NAME, AGE, DEPT_NAME
FROM     EMP, DEPARTMENT
WHERE  EMP.DEP_ID = DEPARTMENT.DEPT_ID
```

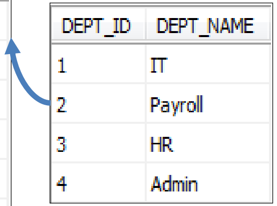
```
SELECT * FROM view_EmployeeByDpt
```

Table: EMP



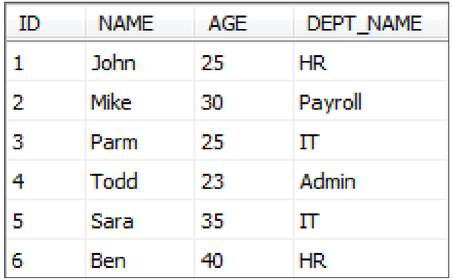
ID	NAME	AGE	DEP_ID
1	John	25	3
2	Mike	30	2
3	Parm	25	1
4	Todd	23	4
5	Sara	35	1
6	Ben	40	3

Table: DEPARTMENT



DEPT_ID	DEPT_NAME
1	IT
2	Payroll
3	HR
4	Admin

view_EmployeeByDpt



ID	NAME	AGE	DEPT_NAME
1	John	25	HR
2	Mike	30	Payroll
3	Parm	25	IT
4	Todd	23	Admin
5	Sara	35	IT
6	Ben	40	HR

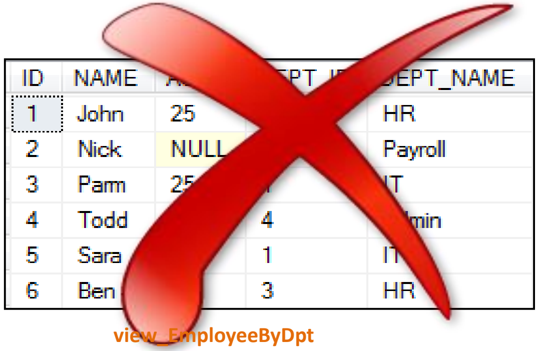
Deleting a view

- Syntax:

```
DROP VIEW View_Name
```

- Example:

```
DROP VIEW view_EmployeeByDpt
```



ID	NAME	[illegible]	[illegible]	DEPT_NAME
1	John	25	[illegible]	HR
2	Nick	NULL	[illegible]	Payroll
3	Pam	25	1	IT
4	Todd	[illegible]	4	[illegible]min
5	Sara	[illegible]	1	IT
6	Ben	[illegible]	3	HR

view_EmployeeByDpt

Summary

- ✓ Introduction to DDL Statements
  - ❿ SQL Server Database Objects
- ✓ Database Object
  - ❿ Create, Rename, Drop a database: Graphic, Scripts, Template
- ✓ Schema Object
  - ❿ What is schema in database? Schema default?
- ✓ Table and Constraints
  - ❿ Create, Alter, Drop Table. NOT NULL, CHECK, UNIQUE, PRIMARY KEY, DEFAULT, FOREIGN KEY
- ✓ SQL View

Thank you