

SQL Server 2008: Database Creation and Modification

CIS 3730
Designing and Managing Data

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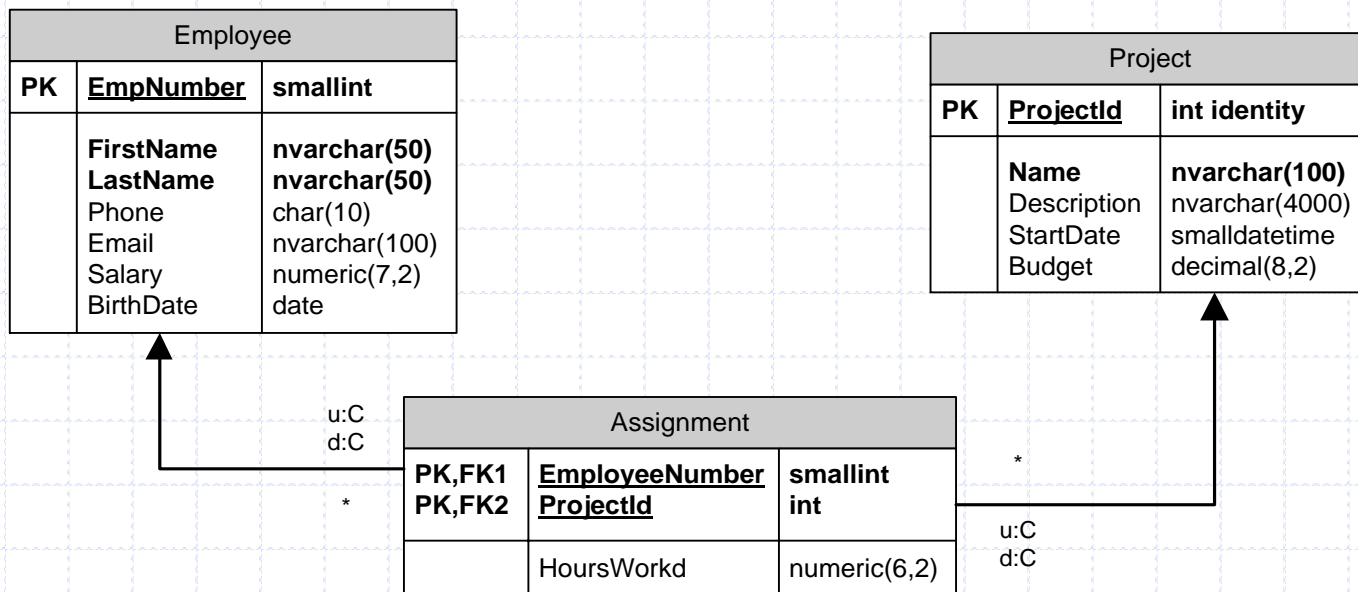


DDL Action in SQL Server

- ◆ Creating and modifying structures using the graphical interface
 - Table designer
 - Relationship diagram designer
 - View designer
- ◆ Executing SQL scripts
- ◆ Generating SQL scripts for existing database and table structures

Example

◆ Logical model in Visio



◆ Other requirements

- Email is unique
- Budget < 500000

Please download the sample SQL script file from the course website.

Create a Database

Right-click and select "New Database"

Microsoft SQL Server Management Studio

File Edit View Project Debug Tools

New Query

Object Explorer

Connect

home-work-jack (SQL Server 10)

- Databases
- System Databases
- Database Snapshots
- Northwind2003-mini
- ReportServer
- ReportServerTempDB
- Project
- Security
- Server Objects
- Replication
- Management
- SQL Server Agent

Connection

Server: home-work-jack

Connection: Home-Work-Jack\Jack

[View connection properties](#)

Progress

Ready

New Database

Select a page

- General
- Options
- Filegroups

Script Help

Database name: Project

Owner: <default>

Use full-text indexing

Database files:

Logical Name	File ...	Fileg...	Initi...	Autogrowth	Path
Project	Ro...	PRI...	2	By 1 ...	D:\Documents\SQL Server 2008\Databases
Project_log	Log	Not ...	1	By 1...	D:\Documents\SQL Server 2008\Data...

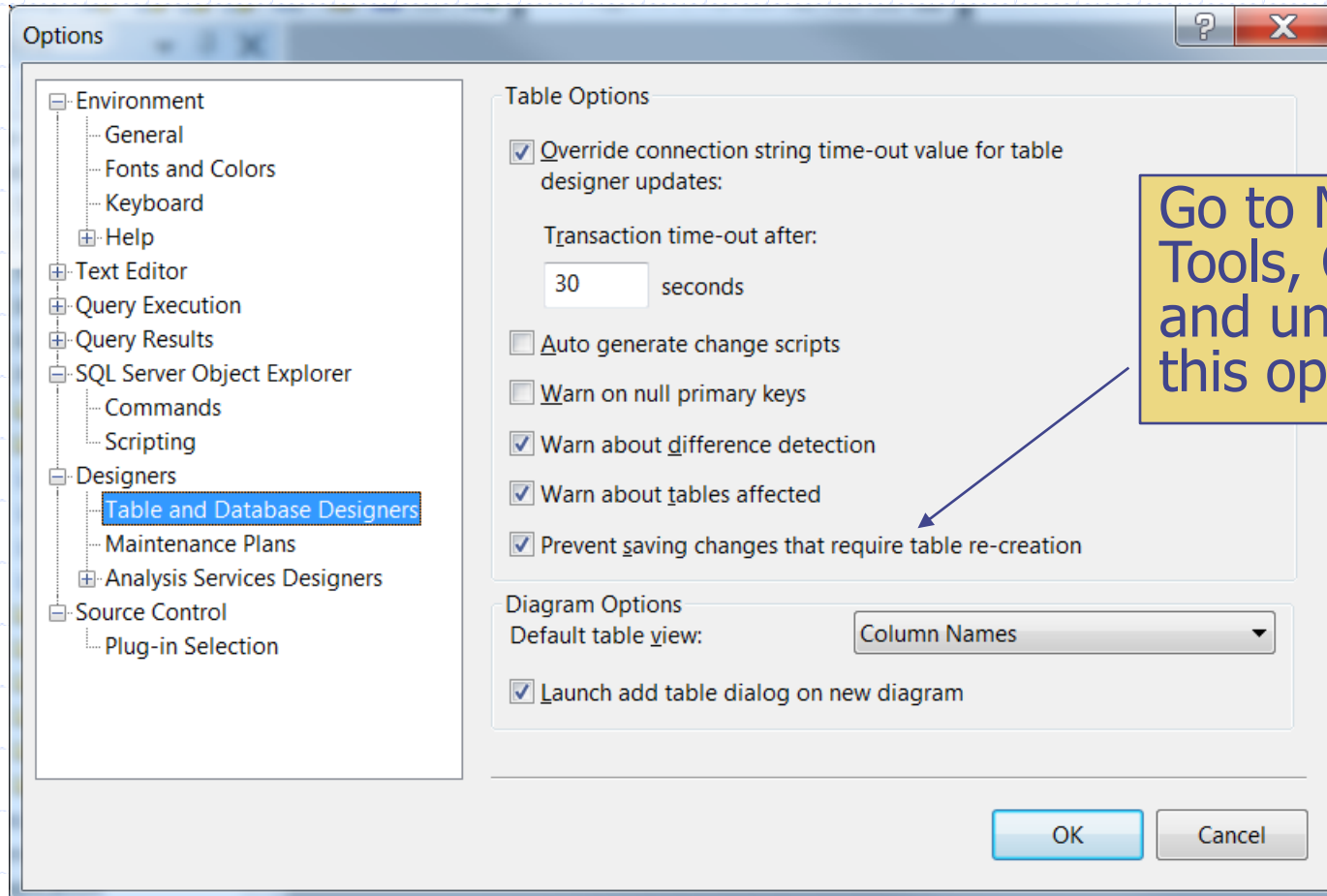
Add Remove

OK Cancel

Name the "New Database"

Customize and remember the file location.

!!Set Option!!



Create Tables

Right-click and select "New Table"

Object Explorer

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home-work-jack (SQL Server 10)

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 - Programmability
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 - Storage
 - Security
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Column Name	Data Type	Allow Nulls
EmpNumber	smallint	<input type="checkbox"/>
Email	nvarchar(50)	<input checked="" type="checkbox"/>
FirstName	nchar(10)	<input type="checkbox"/>

Column Properties

(General)

(Name)	EmpNumber
Allow Nulls	No
Data Type	smallint
Default Value or Binding	

Table Designer

Collation	<database default>
Computed Column Specification	
Condensed Data Type	smallint
Description	
Deterministic	Yes
DTS-published	No
Full-text Specification	No

Identity Specification

Column definitions.

More Column definitions.

Default value.

Primary Key

Choose a column and set as PK.

Save table as "Employee"

Enter more columns

The screenshot shows the Microsoft SQL Server Management Studio interface. The main window displays the Table Designer for a table named 'Employee' in the 'HOME-WORK-JACK...t - dbo' database. The table has three columns: 'EmpNumber' (smallint, not nullable), 'Email' (nvarchar(50), nullable), and 'FirstName' (nchar(10), not nullable). The 'EmpNumber' column is highlighted, and a callout box points to it with the text 'Choose a column and set as PK.'. Another callout box points to the 'Save' button in the top toolbar with the text 'Save table as "Employee"'. A third callout box points to the 'Add Column' button in the bottom toolbar with the text 'Enter more columns'. The 'Column Properties' window is open at the bottom, showing the 'General' tab for the 'EmpNumber' column, with fields for Name, Allow Nulls, Data Type, and Default Value or Binding.

Column Name	Data Type	Allow Nulls
EmpNumber	smallint	<input type="checkbox"/>
Email	nvarchar(50)	<input checked="" type="checkbox"/>
FirstName	nchar(10)	<input type="checkbox"/>

Column Properties	
(General)	
(Name)	EmpNumber
Allow Nulls	No
Data Type	smallint
Default Value or Binding	
Table Designer	
Collation	<database default>
Computed Column Specification	
(General)	

Surrogate Key (Identity Column)

The screenshot shows the Microsoft SQL Server Management Studio interface. The Object Explorer on the left shows the 'Project' table under the 'dbo' schema. The Table Designer window is open, showing the table structure with two columns: 'ProjectId' (int) and 'Description' (nchar(10)). The 'ProjectId' column is highlighted in the Column Properties window, and its 'Is Identity' property is set to 'Yes' with an increment of 1 and a seed of 1.

Column Name	Data Type	Allow Nulls
ProjectId	int	<input type="checkbox"/>
Description	nchar(10)	<input checked="" type="checkbox"/>

Property	Value
(Name)	ProjectId
Allow Nulls	No
Data Type	int
Default Value or Binding	
Collation	<database default>
Computed Column Specification	
Condensed Data Type	int
Description	
Deterministic	Yes
DTS-published	No
Full-text Specification	No
Has Non-SQL Server Subscriber	No
Identity Specification	Yes
(Is Identity)	Yes
Identity Increment	1
Identity Seed	1

Create the second "Project" table.

ProjectId is the PK. To make it a surrogate key (auto number), first change the data type to one of the integer types.

Then set the (Is Identity) property to Yes with increment and seed (starting value)

Composite Key

Microsoft SQL Server Management Studio

File Edit View Project Debug Table Designer Tools Window Community Help

Object Explorer

Connect

home-work-jack (SQL Serve

Databases

System Databases

Database Snapshots

Northwind2003-mini

ReportServer

ReportServerTempDB

Project

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System Tables

dbo.Employee

dbo.Project

dbo.Assignment

Views

Synonyms

Programmability

Service Broker

Storage

Security

Security

Server Objects

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Management

HOME-WORK-JACK... dbo.Assignment

Column Name	Data Type	Allow Nulls
ProjectId	int	<input type="checkbox"/>
EmployeeNumber	nchar(10)	<input type="checkbox"/>
Hours	int	<input checked="" type="checkbox"/>

Column Properties

(General)

Allow Nulls No

Data Type

Default Value or Binding

Table Designer

Collation <database default>

Computed Column Specification

Condensed Data Type

(General)

Item(s) Saved

Create the intersection table.

Highlight two columns (hold Ctrl key) and set PK.

Relationship Diagram

Microsoft SQL Server Management Studio

File Edit View Project Debug Table Designer Database Diagram

New Query

Object Explorer

Connect

home-work-jack (SQL Serve

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Security

Server Objects

Replication

HOME-WORK-JACK...ect - Diagram_0*

Employee

- EmpNumber
- Email
- FirstName

Project

- ProjectId
- Description

Assignment

- ProjectId
- EmployeeNumber
- Hours

Right click here to create a new relationship diagram

New Database Diagram

- Filter
- Reports
- Refresh

First, add all tables and arrange them nicely in the work area.

Item(s) Saved

View More Metadata

Right click a table to change its table view. Use "standard" to display data type and null constraint.

Use this button to add tables

The screenshot shows the Microsoft SQL Server Management Studio interface. The main window displays a database diagram titled 'HOME-WORK-JACK...ect - Diagram_0*' containing three tables: Employee, Project, and Assignment. The Employee table has columns EmpNumber (smallint), Email (nvarchar(50)), and FirstName (nchar(10)). The Project table has columns ProjectId and Description. The Assignment table has columns ProjectId, EmployeeNumber, and Hours. A context menu is open over the Assignment table, with the 'Table View' option selected, showing a sub-menu with 'Standard' highlighted. The Object Explorer on the left shows the database structure, including the 'Tables' folder expanded to show 'dbo.Employee', 'dbo.Project', and 'dbo.Assignment'. The status bar at the bottom indicates 'Item(s) Saved'.

Use these buttons to arrange tables, such as auto-sizing a table. You can also move table around and zoom the view manually.

Modify Columns in Relationship Diagram

Microsoft SQL Server Management Studio

HOME-WORK-JACK....ect - Diagram_0*

Table	Column Name	Data Type	Allow Nulls
Employee	EmpNumber	smallint	<input type="checkbox"/>
	Email	nvarchar(50)	<input checked="" type="checkbox"/>
	FirstName	nchar(10)	<input type="checkbox"/>
Project	ProjectId		<input type="checkbox"/>
	Description		<input type="checkbox"/>
Assignment	ProjectId	int	<input type="checkbox"/>
	EmployeeNumber	nchar(10)	<input type="checkbox"/>
	Hours	nchar(10)	<input checked="" type="checkbox"/>

Item(s) Saved

The FK and PK pair have to have the same data type. Change it to "smallint" and save the diagram.

Note: you may encounter a error message to prevent you to do it. If so, see slide #5.

Create Relationship

The screenshot shows the Microsoft SQL Server Management Studio interface. The Object Explorer on the left shows the database structure for 'home-work-jack (SQL Server)'. The main window displays a diagram titled 'HOME-WORK-JACK....ect - Diagram_0*'. It contains three tables: 'Employee *', 'Project', and 'Assignment *'. The 'Employee *' table has columns: EmpNumber (smallint, primary key), Email (nvarchar(50)), and FirstName (nchar(10)). The 'Project' table has columns: ProjectId (primary key) and Description. The 'Assignment *' table has columns: ProjectId (foreign key), EmployeeNumber (foreign key), and Hours (int). A relationship line connects 'ProjectId' in 'Assignment *' to 'ProjectId' in 'Project'. A context menu is open over this relationship line, showing 'Delete Relationships from Database'. Annotations with arrows point to the asterisks on the table names, the relationship line, and the context menu.

* means not saved.

Drag the FK column to the primary key column. When releasing the mouse, a dialog will pop up to finish the rest steps. Once the relationship is created, you will see a symbol like this.

Delete Relationships from Database

Relationship 'FK_Assignment_Employee' between 'Employee' and 'Assignment'

Right click on the relationship line and you can delete it.

More Commands

Remove a table from diagram

Show relationship labels

View and configure foreign keys

Highlight a table and you can see these command buttons enabled.

Column Name	Data Type	Allow Nulls
EmpNumber	smallint	<input type="checkbox"/>
Email	nvarchar(50)	<input checked="" type="checkbox"/>
FirstName	nchar(10)	<input type="checkbox"/>

Column Name	Data Type	Allow Nulls
ProjectId	int	<input type="checkbox"/>
EmployeeNumber	smallint	<input type="checkbox"/>
Hours	int	<input checked="" type="checkbox"/>

Referential Actions

Microsoft SQL Server Management Studio

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home-work-jack

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Foreign Key Relationships

Selected Relationship:

FK_Assignment_Employee

Editing properties for existing relationship.

(General)

Check Existing Data On Cre Yes

Tables And Columns Specific

Database Designer

Enforce For Replication Yes

Enforce Foreign Key Constr: Yes

INSERT And UPDATE Specifications

Delete Rule No Action

Update Rule No Action

Identity

(Name) FK_Assignment_Employee

Description

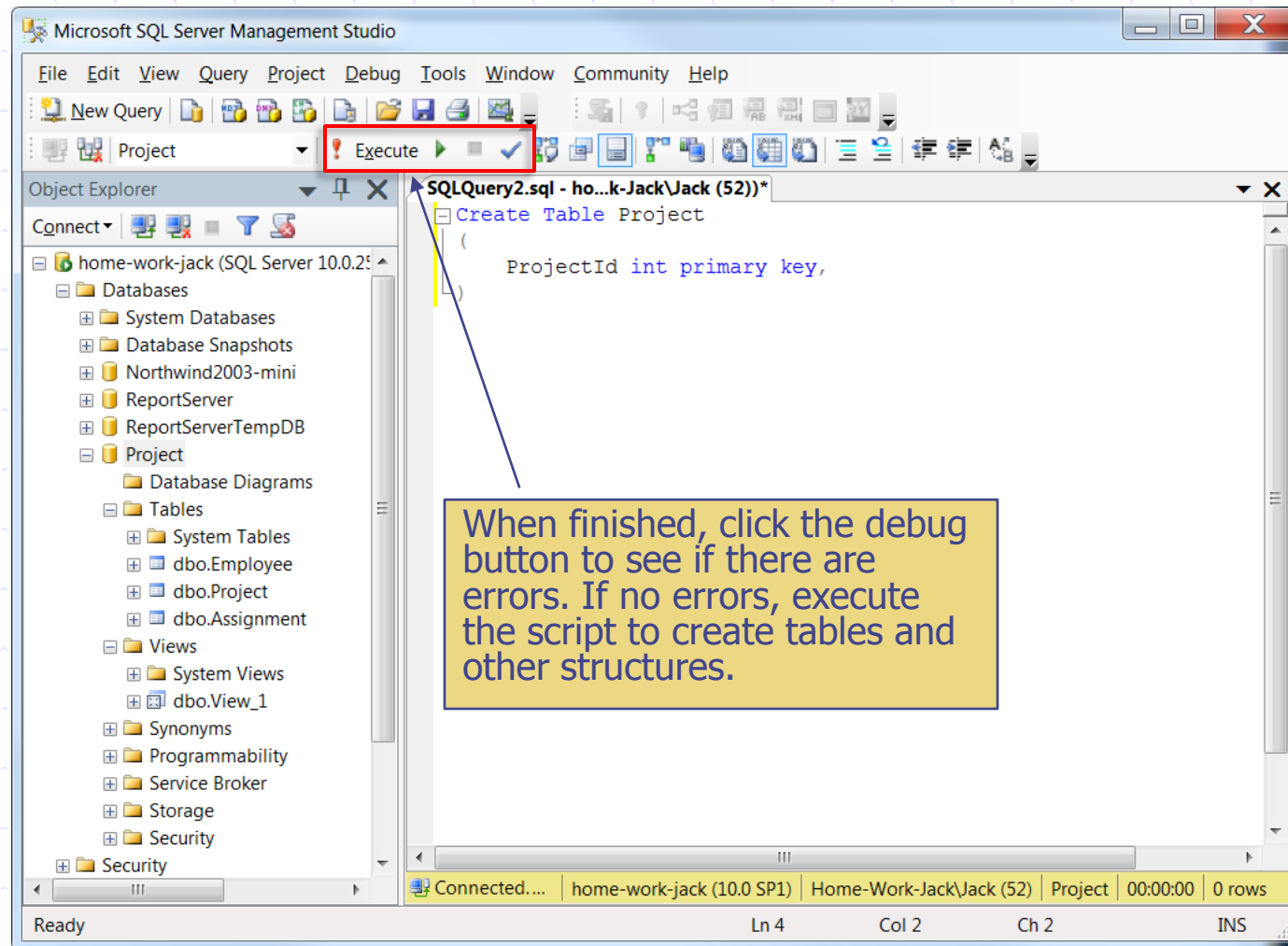
Add Delete Close

Ready

First, select a table and view its foreign keys

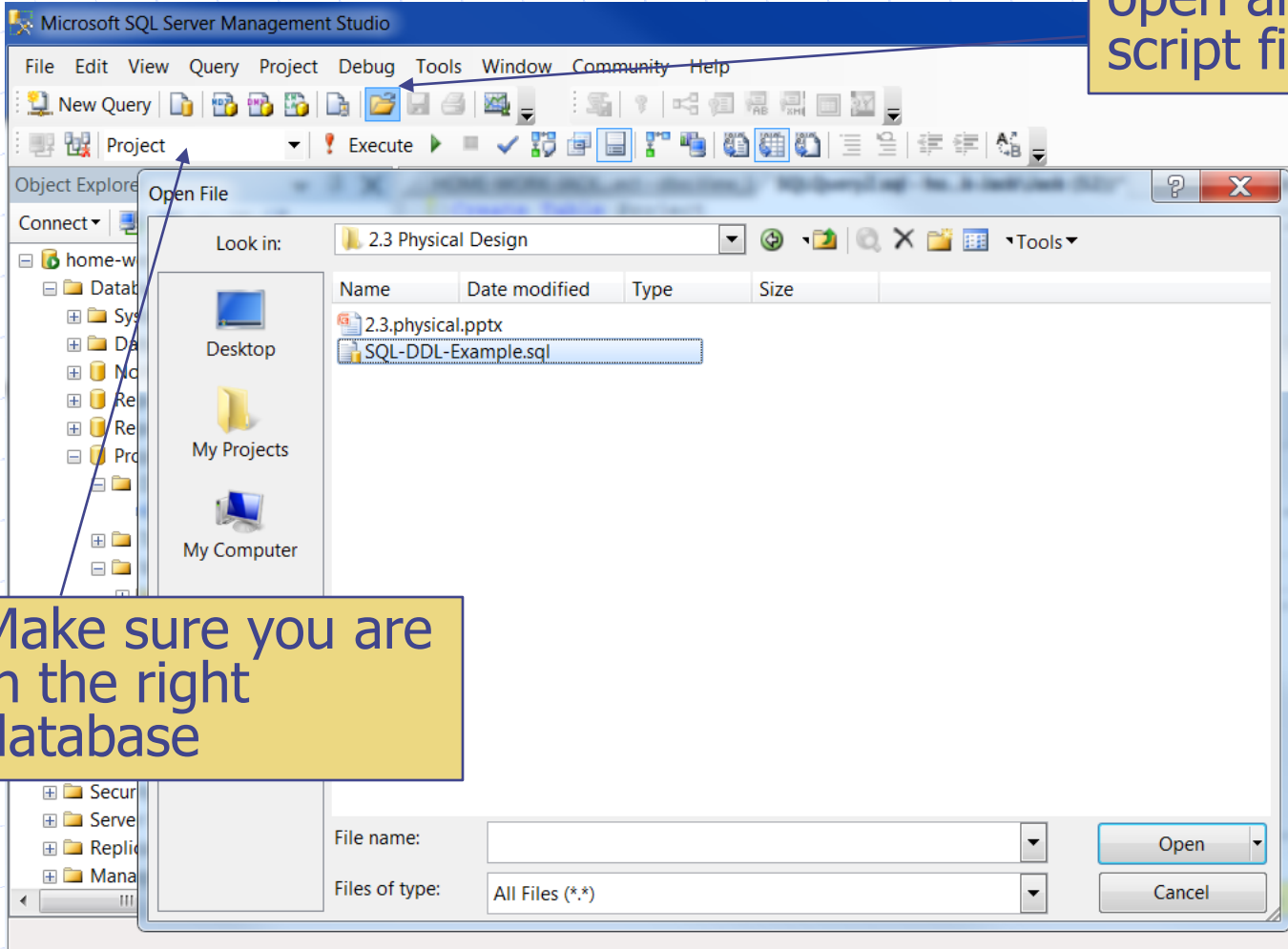
Change referential actions

Type SQL DDL in Query Window



Open a Script File

You can save and open an existing script file.



Make sure you are in the right database

Enter and Update Data

The screenshot shows Microsoft SQL Server Management Studio with a table named 'dbo.Employee' in the 'HOME-WORK-JACK...t' database. The table has three columns: 'EmpNumber', 'Email', and 'FirstName'. The data is as follows:

EmpNumber	Email	FirstName
101	2@j.com	jack
102	444@d.com	NULL
*	NULL	NULL

A context menu is open over the table, showing options: 'New Table...', 'Design', 'Select Top 1000 Rows', 'Edit Top 200 Rows', 'Script Table as', 'View Dependencies', 'Full-Text index', 'Storage', 'Policies', 'Facets', 'Start PowerShell', and 'Reports...'. A red mark is visible in the 'Email' column of the second row.

Annotations:

- The red mark indicates the data is not saved to table yet. Select another row to save the data.
- New record
- Right-click the table and select "Edit Top 200 Rows" to enter and modify data.
- Right-click the table and select "Design" to modify the metadata.

Error Message

Microsoft SQL Server Management Studio

File Edit View Project Debug Query Designer Tools Window Community Help

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home-work-jack (SQL Serve

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HOME-WORK-JACK...t - dbo.Employee

EmpNumber	Email	FirstName
101	2@j.com	jack
102	444@d.com	peter
103	NULL	NULL
* NULL	NULL	NULL

Microsoft SQL Server Management Studio

No row was updated.

The data in row 3 was not committed.
Error Source: .Net SqlClient Data Provider.
Error Message: Cannot insert the value NULL into column 'FirstName', table 'Project.dbo.Employee'; column does not allow nulls. INSERT fails.
The statement has been terminated.

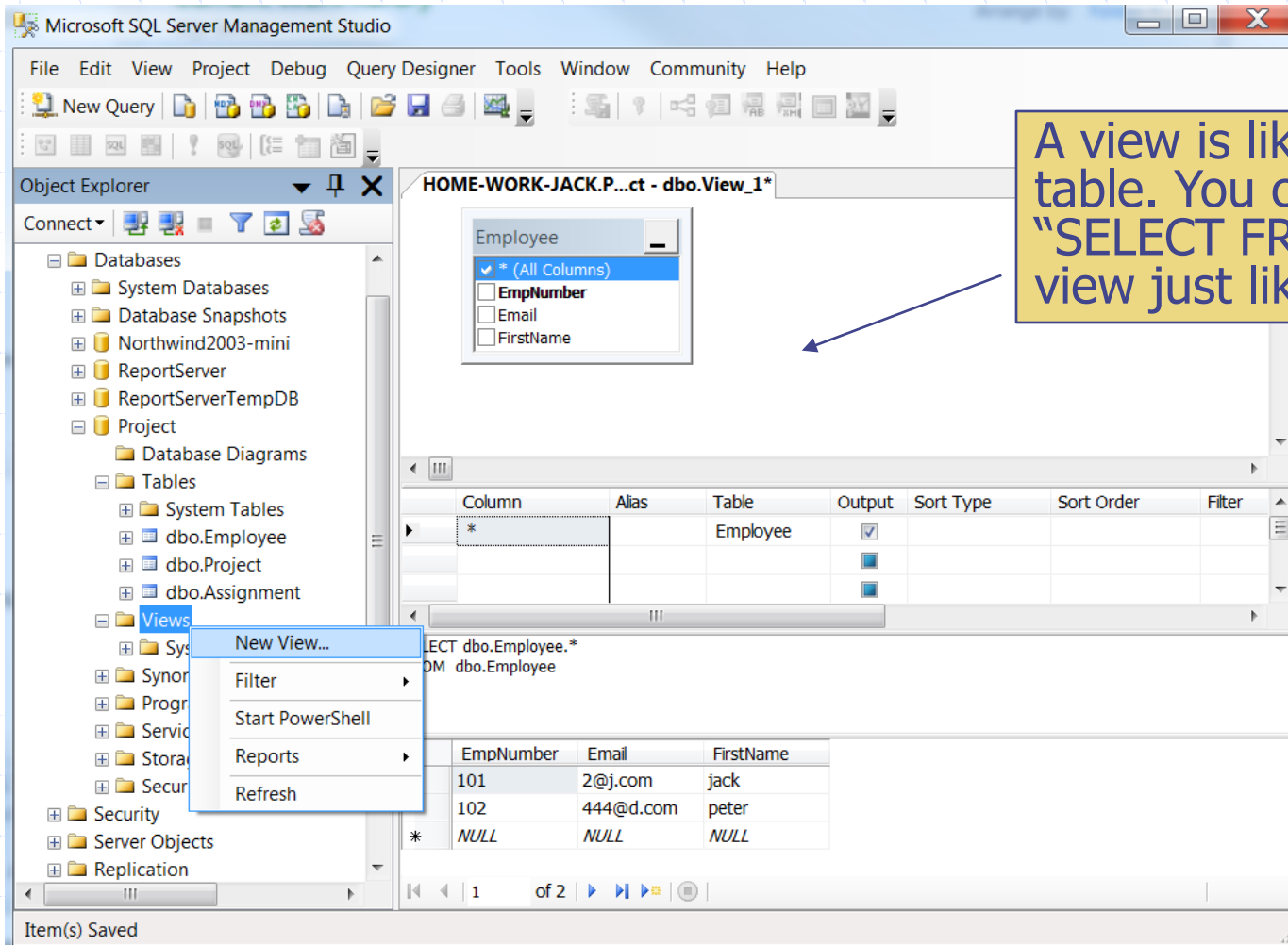
Correct the errors and retry or press ESC to cancel the change(s).

OK

Ready

If you move away from the current record without entering a value for the "required" column, you will get this error message.

Create Views



A view is like a virtual table. You can "SELECT FROM" a view just like a table.