Introduction to ERwin

Database Design & Modelling

Hans-Petter Halvorsen, M.Sc.

Software

The following Editions can be downloaded for Free on Internet:

CA ERwin Data Modeler Community Edition

SQL Server Express Edition

Overview

1. Design and Create Tables

2. Make a SQL Script

3. Execute the Script within SQL Server

4. Start using your Database, Insert Data, etc.

Database Design & Modelling

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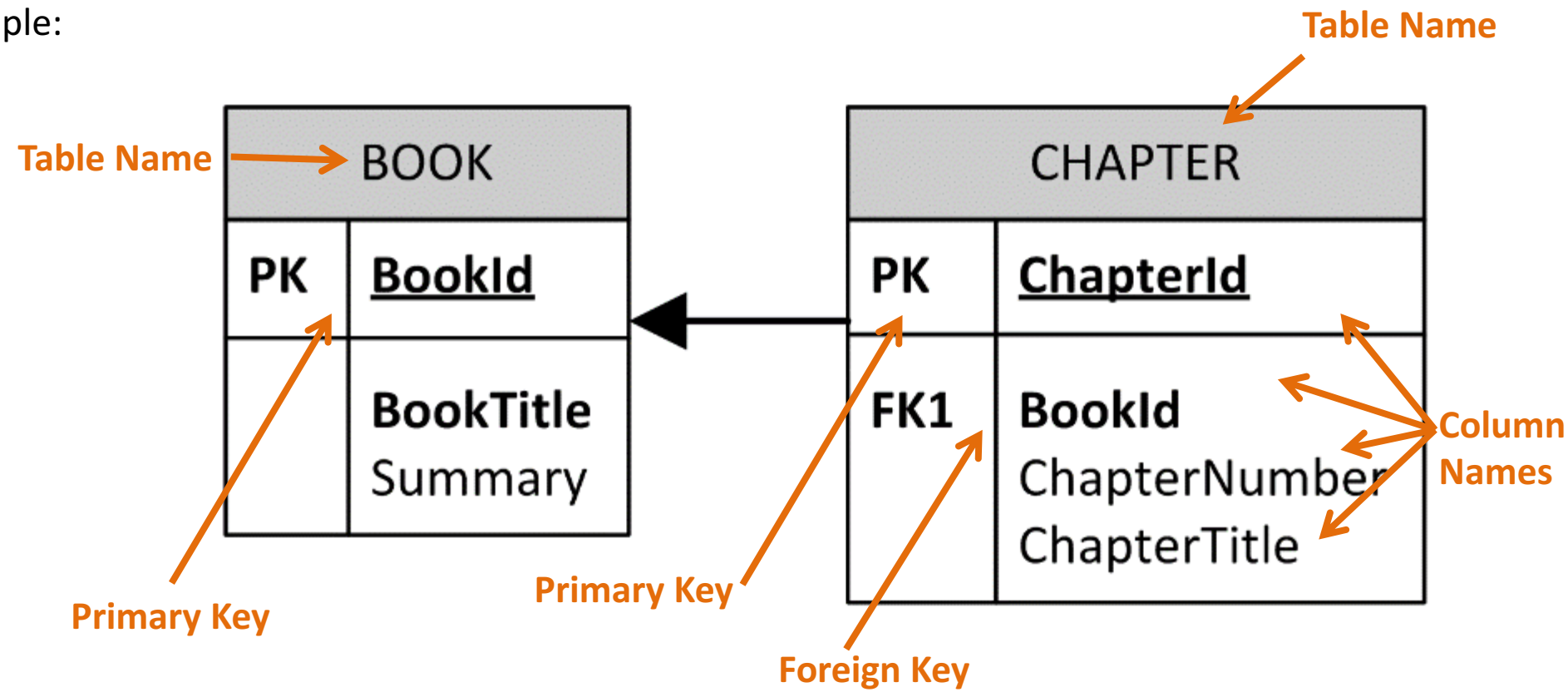
Database Design – ER Diagram

ER Diagram (Entity-Relationship Diagram)

- Used for Design and Modeling of Databases.
- Specify Tables and **relationship** between them (**Primary Keys** and **Foreign Keys**)

Example:



Relational Database. In a relational database all the tables have one or more relation with each other using Primary Keys (PK) and Foreign Keys (FK). Note! You can only have one PK in a table, but you may have several FK's.

Database - “Best Practice”

- **Tables**: Use upper case and singular form in table names – not plural, e.g., “STUDENT” (not “students”)
- **Columns**: Use Pascal notation, e.g., “StudentId”
- **Primary Key**:
  - If the table name is “COURSE”, name the Primary Key column “CourseId”, etc.
  - “Always” use Integer and Identity(1,1) for Primary Keys. Use UNIQUE constraint for other columns that needs to be unique, e.g. “RoomNumber”
- Specify **Required** Columns (NOT NULL) – i.e., which columns that need to have data or not
- Standardize on few/these **Data Types**: *int*, *float*, *varchar(x), datetime*, *bit*
- Use English for table and column names
- Avoid abbreviations! (Use “RoomNumber” – not “RoomNo”, “RoomNr”, ...)

Database Design & Implementation

Recommended Steps:

1. Database Modelling/Design using ERwin
2. Generate SQL Table Script using ERwin (you might need to adjust/improve it in order to make it more robust)
3. Generate Tables in SQL Server using the SQL Script generated by ERwin
4. Create Stored Procedures, View, Triggers, etc. inside SQL Server if needed.

ERwin

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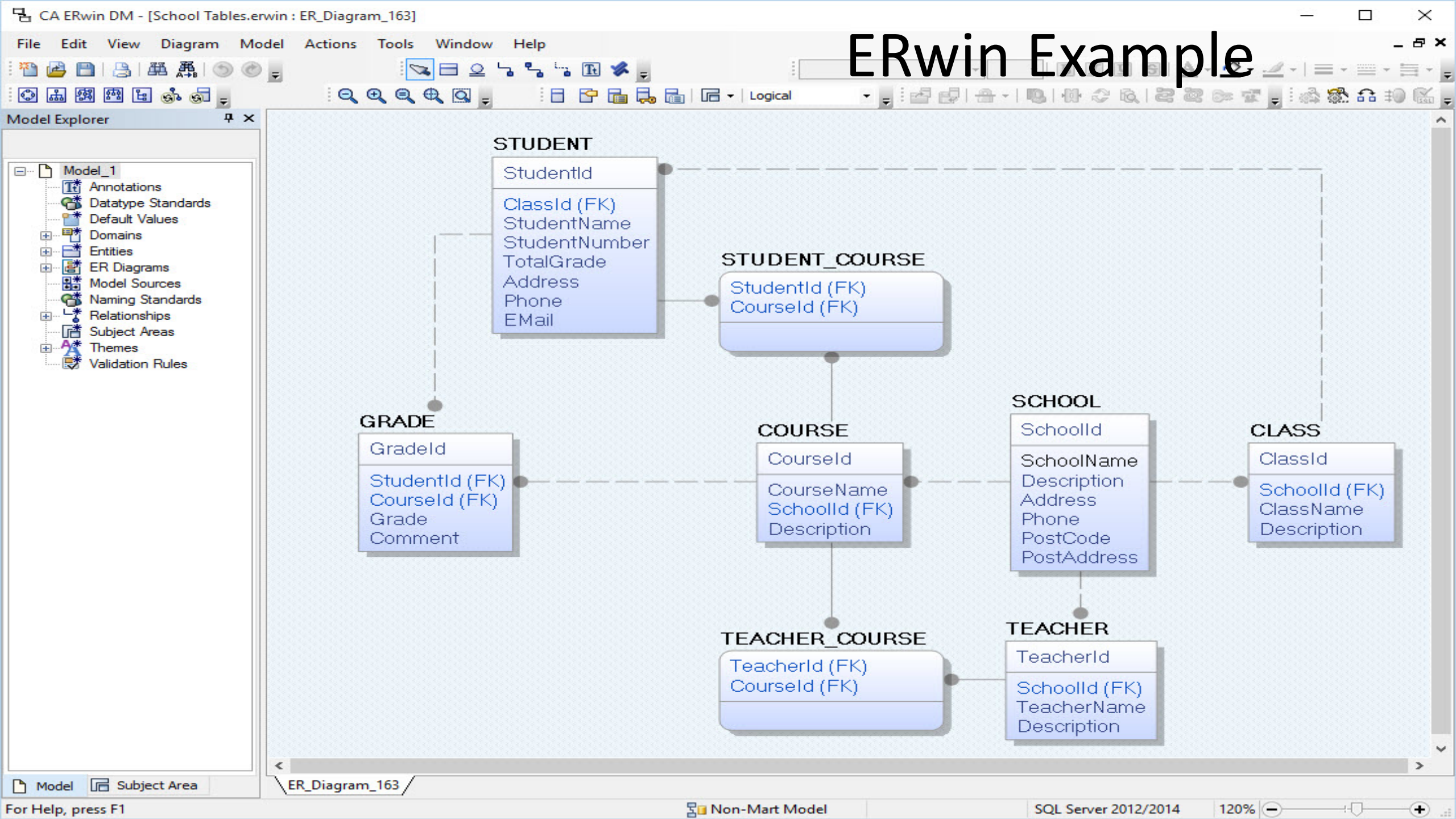
CA ERwin Data Modeler Community Edition

- Tool for Database Modelling (ER Diagrams)
- Free!
- Forward and Reverse Engineering with a 25 object limit

Download here:

http://erwin.com/products/data-modeler/community-edition

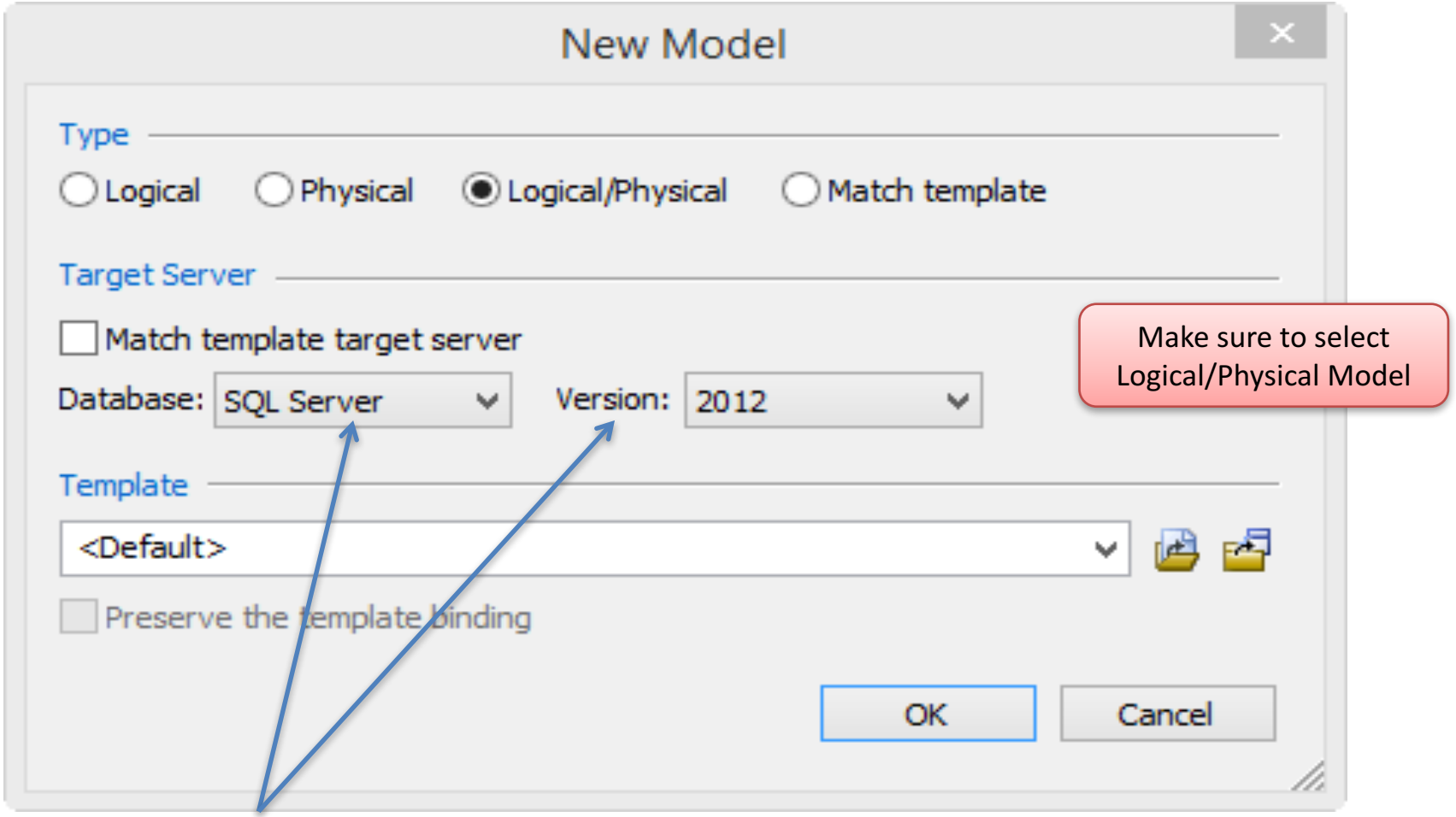
ERwin Example



New Database Model

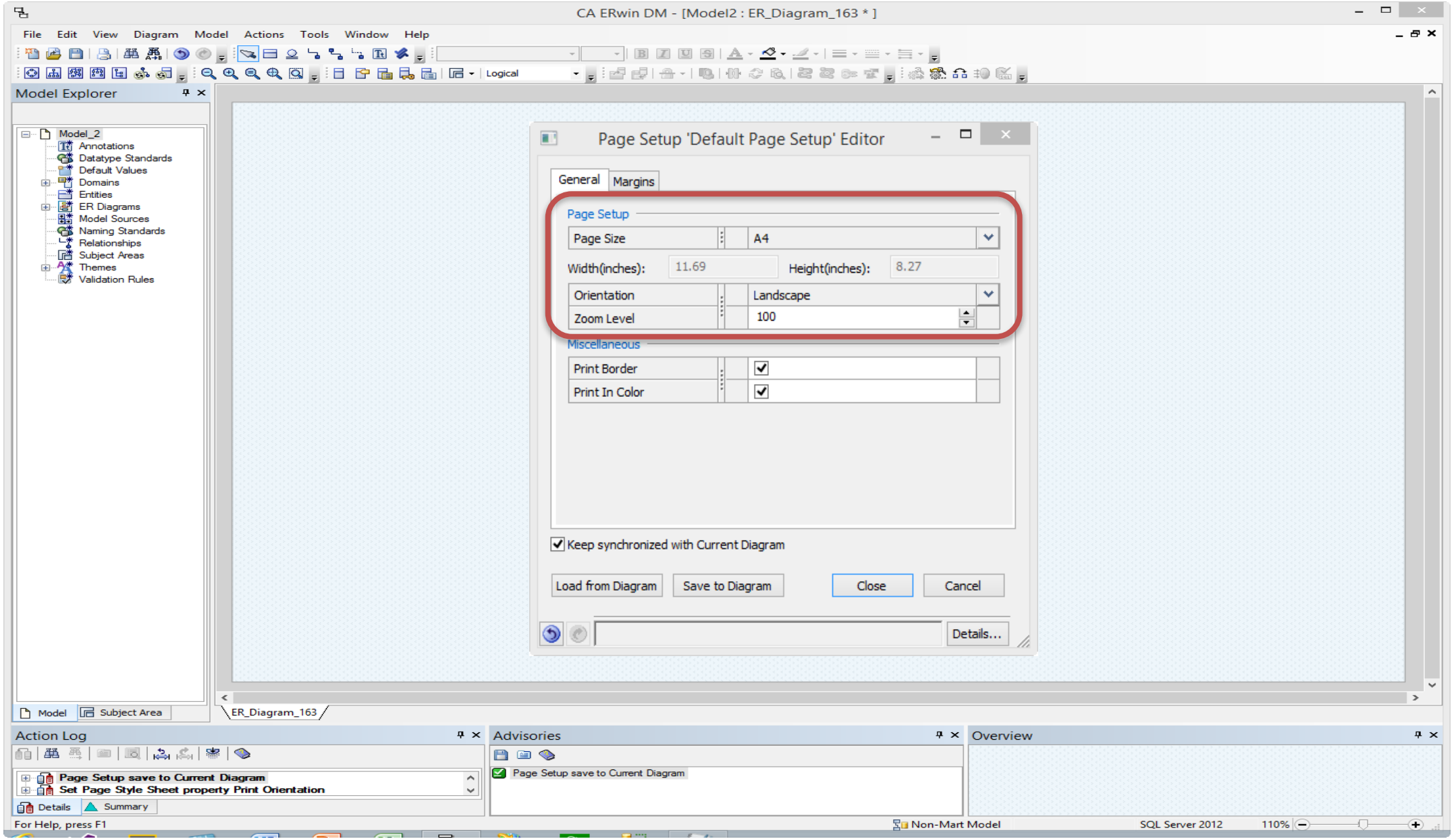
Open ERwin and select File->New...

The following window appears (New Model):

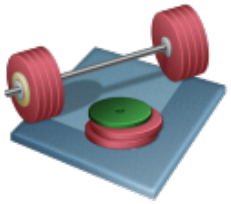


Select the Database Type and Version you shall use

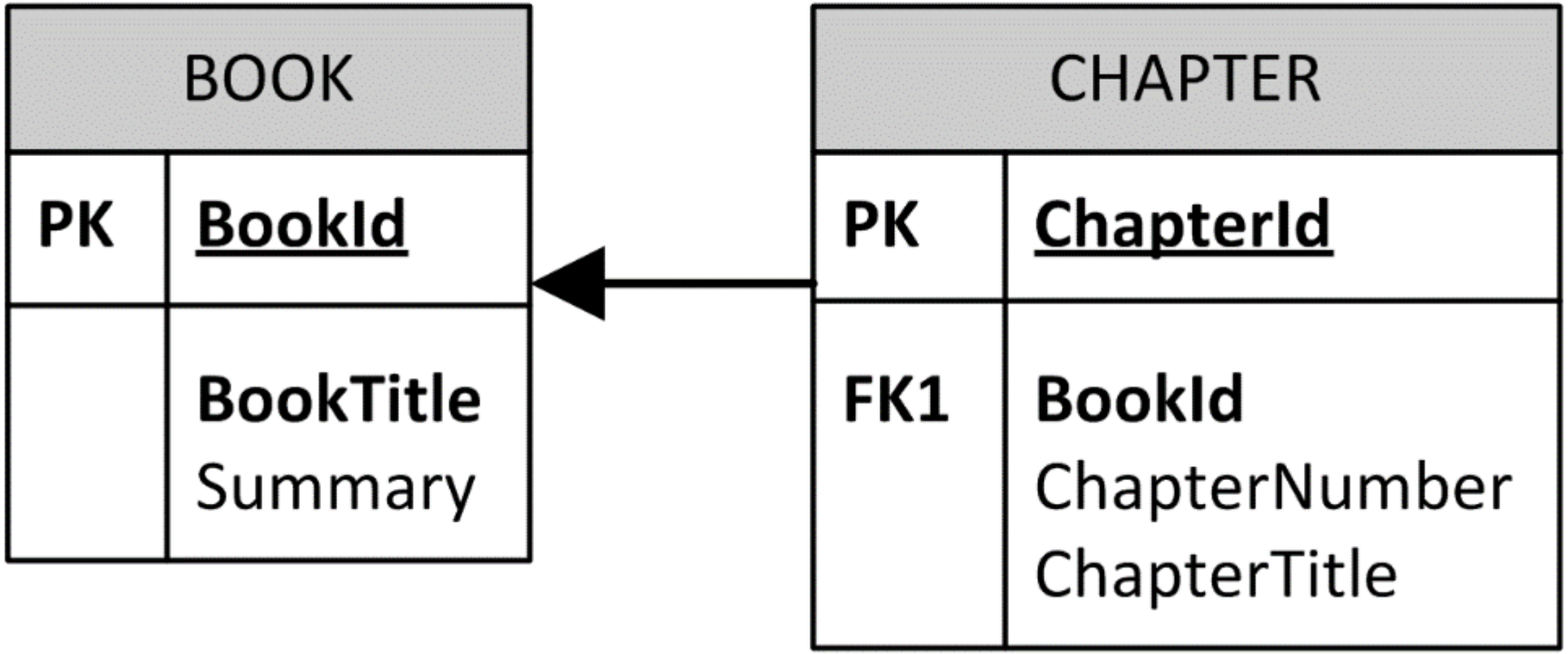
Page Setup

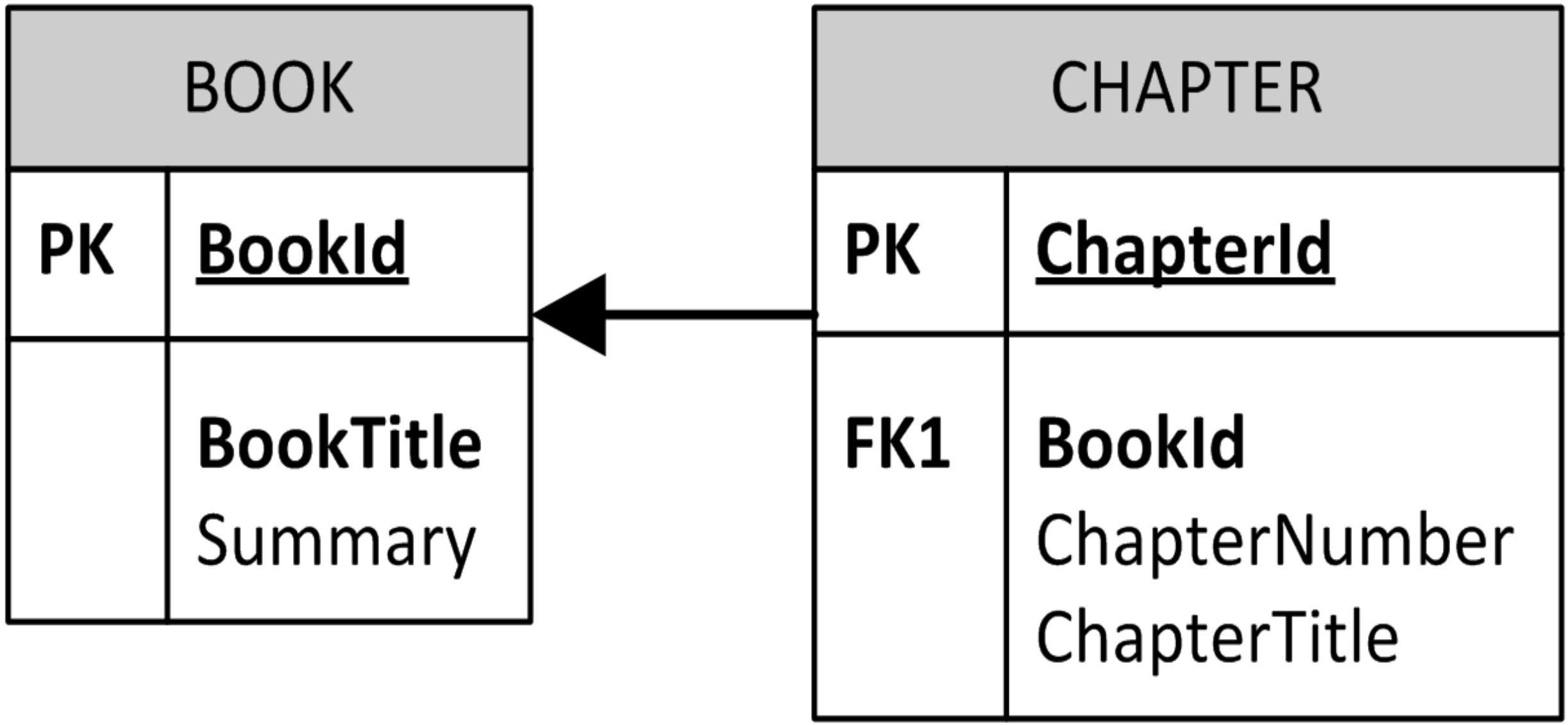

CA ERwin DM - [Model2 : ER_Diagram_163 *]
File Edit View Diagram Model Actions Tools Window Help
Logical
Model Explorer
Model_2
Annotations
Datatype Standards
Default Values
Domains
Entities
ER Diagrams
Model Sources
Naming Standards
Relationships
Subject Areas
Themes
Validation Rules
Page Setup 'Default Page Setup' Editor
General
Margins
Page Setup
Page Size
A4
Width(inches):
11.69
Height(inches):
8.27
Orientation
Landscape
Zoom Level
100
Miscellaneous
Print Border
Print In Color
Keep synchronized with Current Diagram
Load from Diagram
Save to Diagram
Close
Cancel
Details...
Model
Subject Area
ER_Diagram_163
Action Log
Page Setup save to Current Diagram
Set Page Style Sheet property Print Orientation
Details
Summary
Advisories
Page Setup save to Current Diagram
Overview
For Help, press F1
Non-Mart Model
SQL Server 2012
110%

Exercise

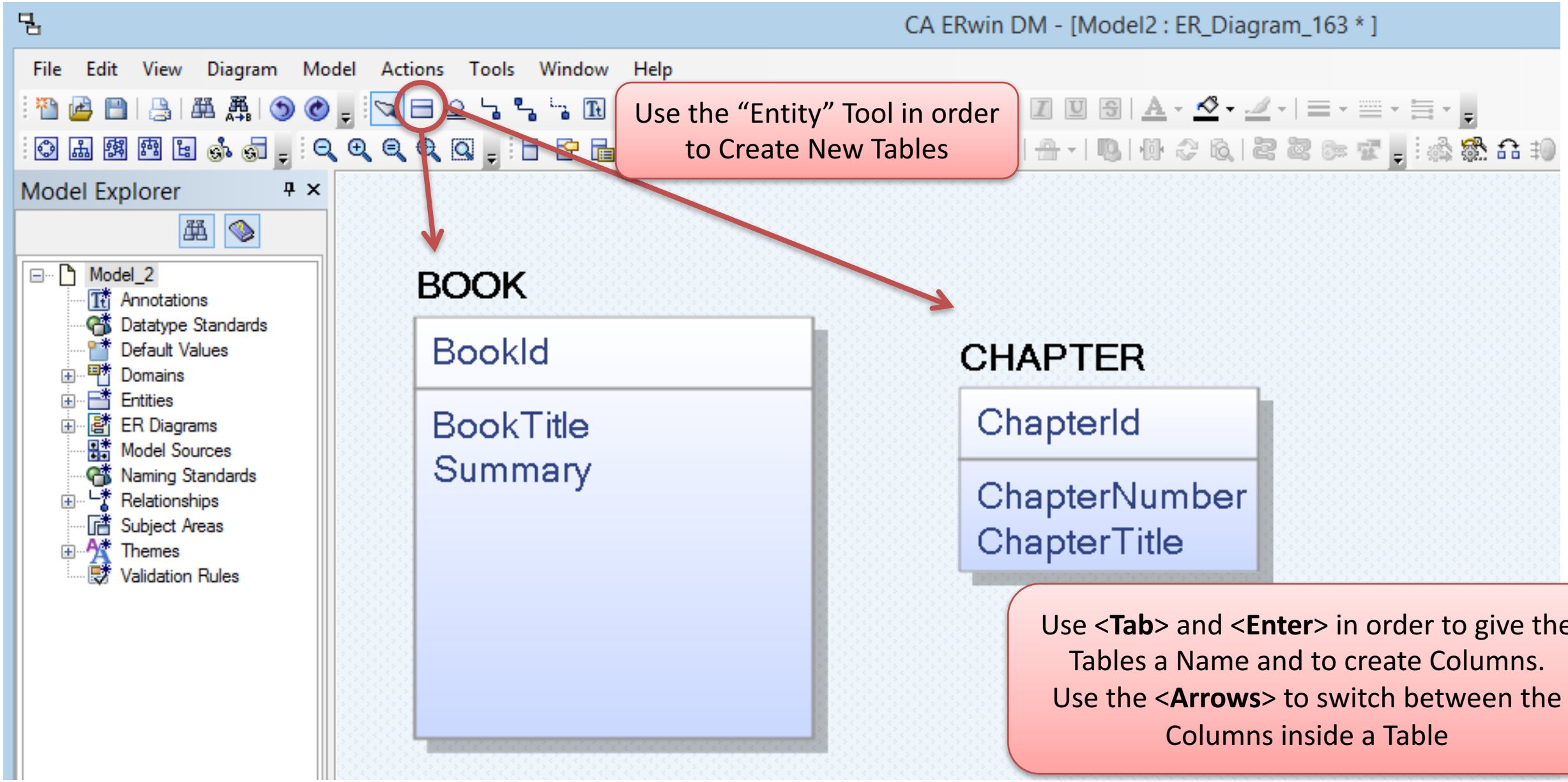


Lets try to create the following Tables, Columns, Primary Keys and Foreign Keys using ERwin:

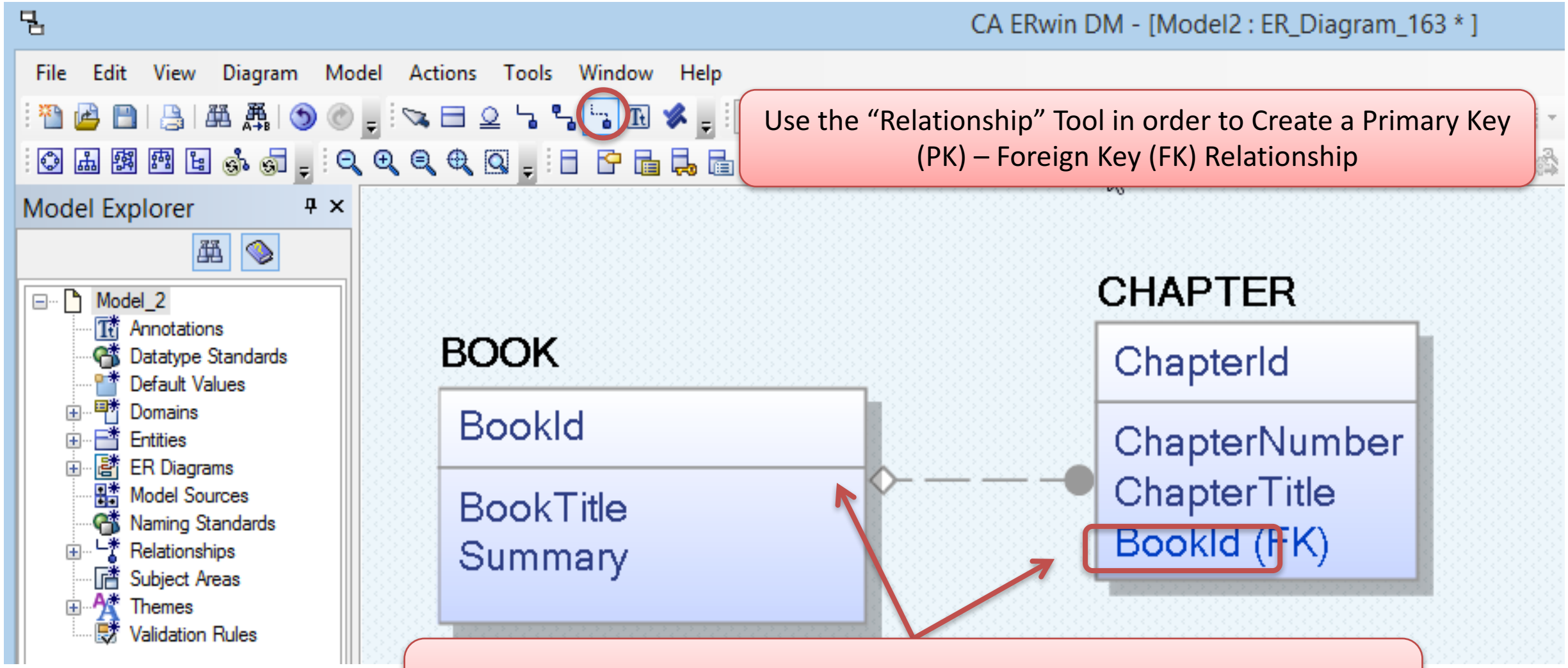



BOOK
PK
BookId
BookTitle
Summary
CHAPTER
PK
ChapterId
FK1
BookId
ChapterNumber
ChapterTitle

Create Tables and Columns

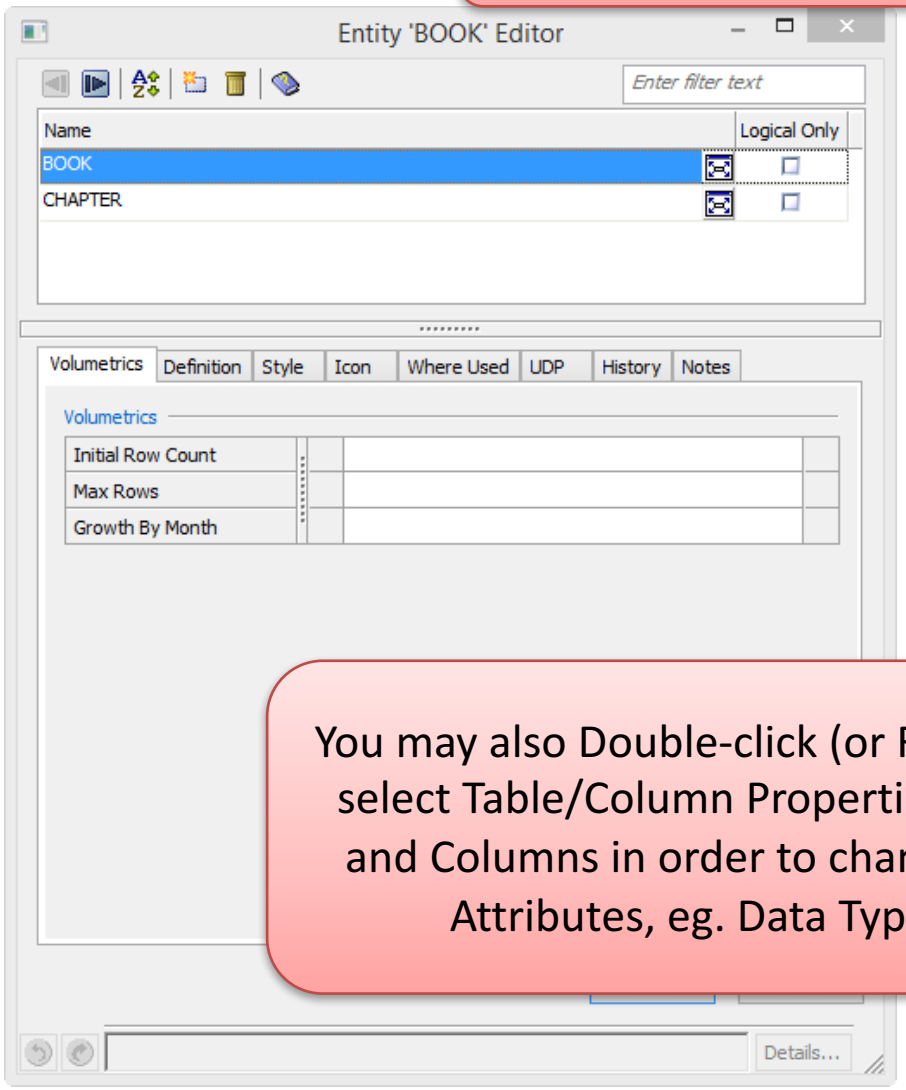


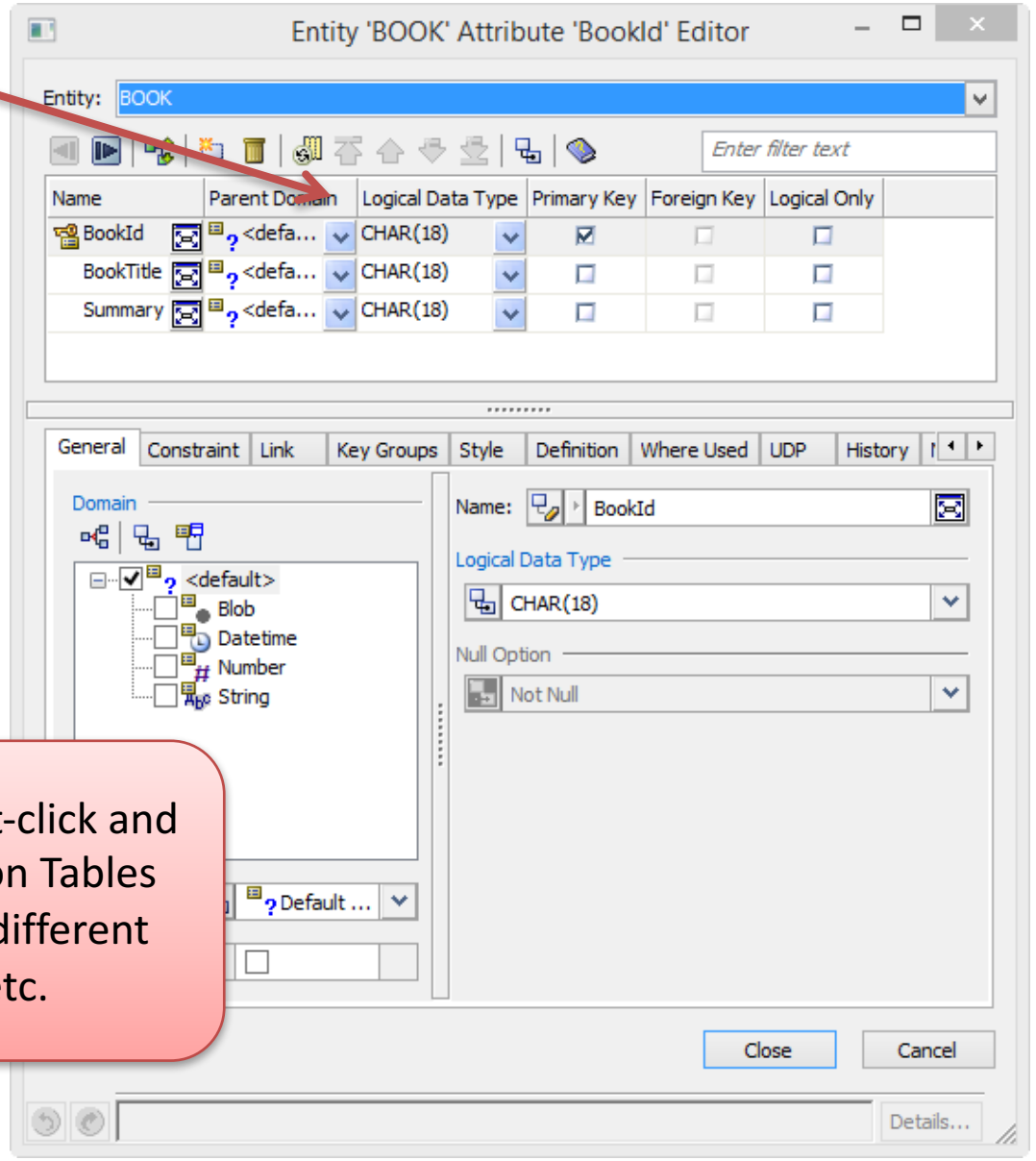
Create Primary Key (PK) – Foreign Key (FK) Relationships



Set Data Types

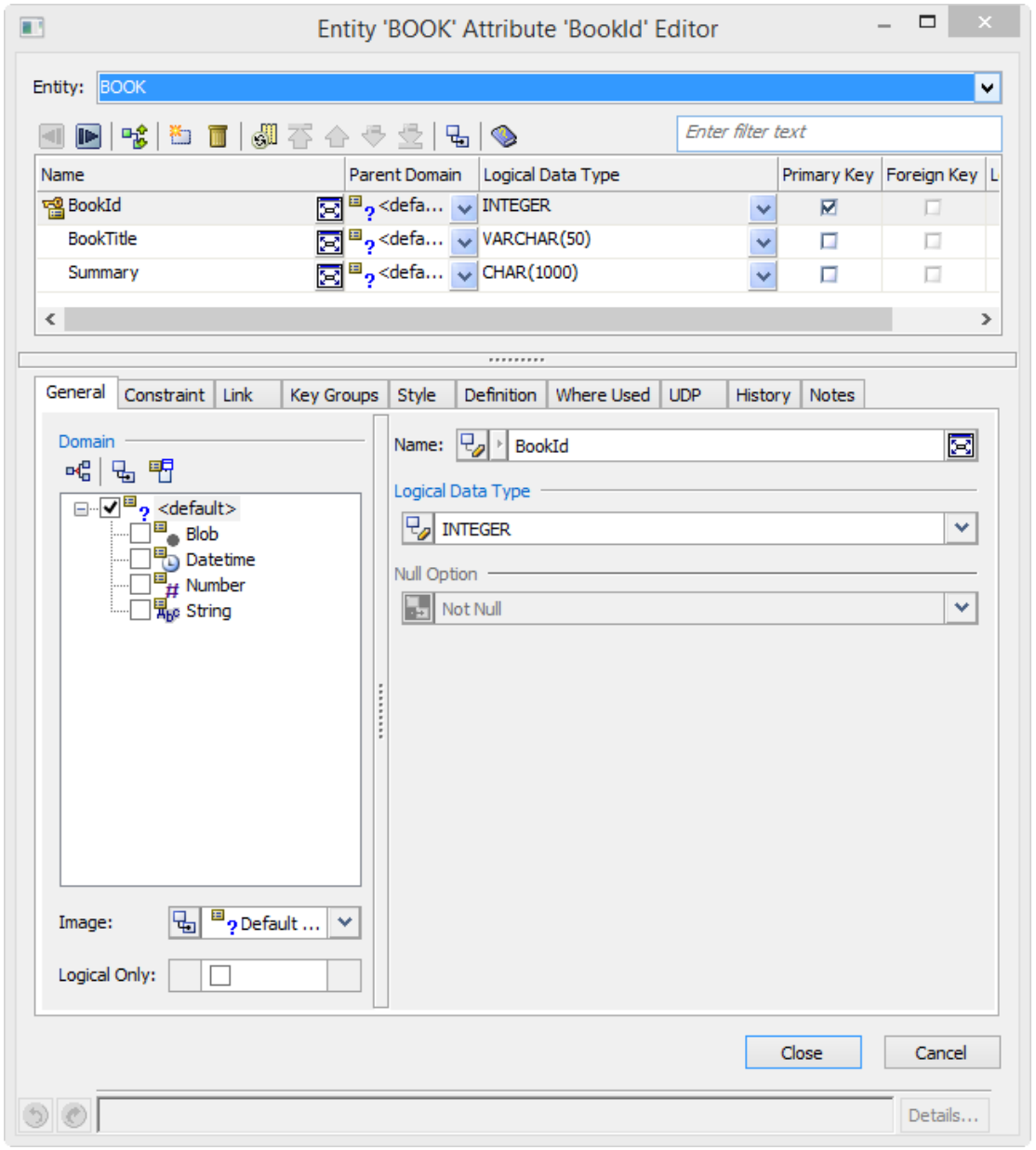
Make sure to set proper Data Types

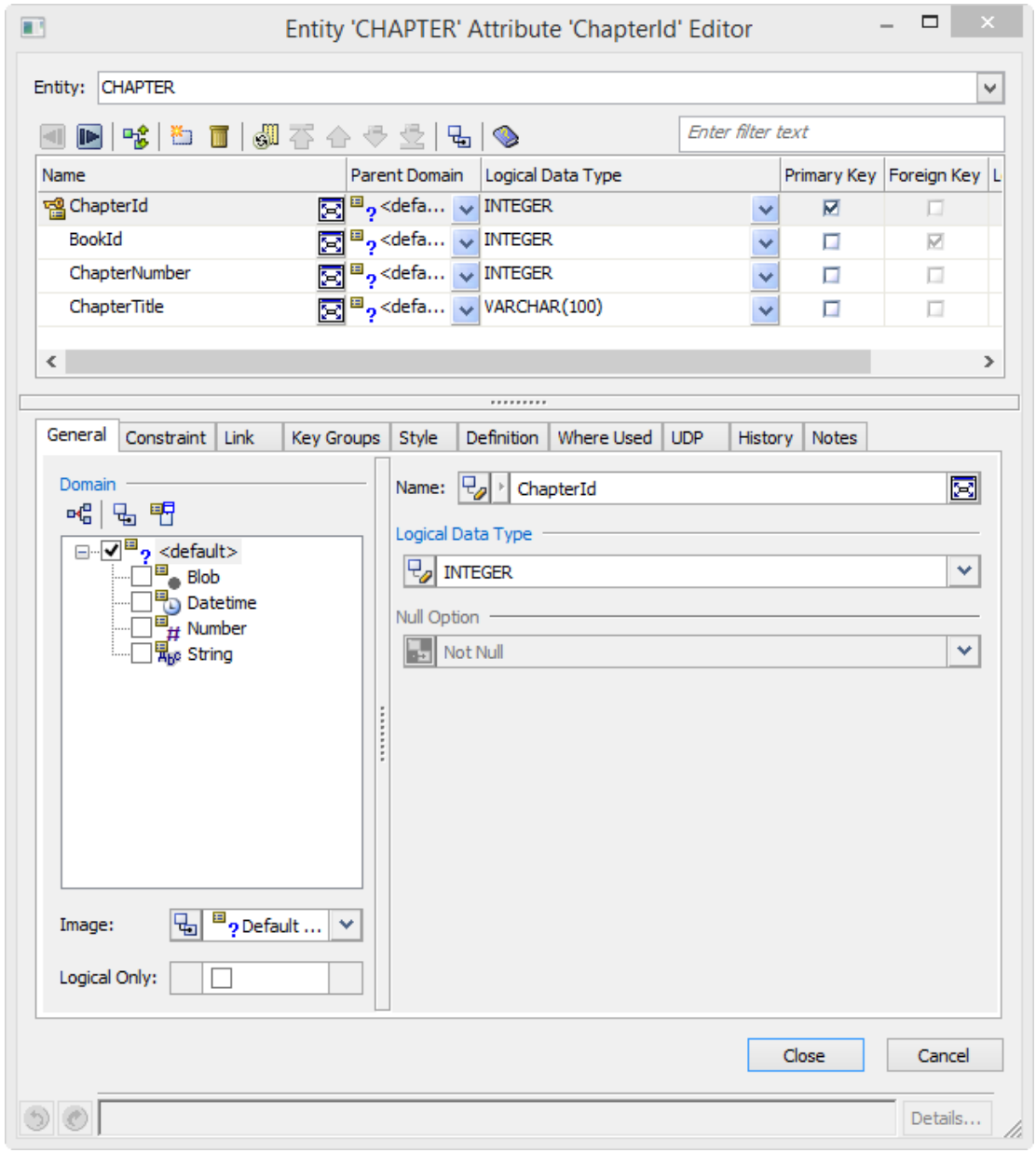




You may also Double-click (or Right-click and select Table/Column Properties) on Tables and Columns in order to change different Attributes, eg. Data Types, etc.

Attributes


Entity 'BOOK' Attribute 'BookId' Editor
Entity: BOOK
Enter filter text
Name
Parent Domain
Logical Data Type
Primary Key
Foreign Key
BookId
<defa...
INTEGER
BookTitle
<defa...
VARCHAR(50)
Summary
<defa...
CHAR(1000)
General
Constraint
Link
Key Groups
Style
Definition
Where Used
UDP
History
Notes
Domain
<default>
Blob
Datetime
Number
String
Name: BookId
Logical Data Type
INTEGER
Null Option
Not Null
Image:
Default ...
Logical Only:
Close
Cancel
Details...


Entity 'CHAPTER' Attribute 'ChapterId' Editor
Entity: CHAPTER
Enter filter text
Name
Parent Domain
Logical Data Type
Primary Key
Foreign Key
ChapterId
<defa...
INTEGER
BookId
<defa...
INTEGER
ChapterNumber
<defa...
INTEGER
ChapterTitle
<defa...
VARCHAR(100)
General
Constraint
Link
Key Groups
Style
Definition
Where Used
UDP
History
Notes
Domain
<default>
Blob
Datetime
Number
String
Name: ChapterId
Logical Data Type
INTEGER
Null Option
Not Null
Image:
Default ...
Logical Only:
Close
Cancel
Details...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More Tables...

We can extend our Database Design/Modell with, e.g.:

- AUTHOR
- PUBLISHER
- CATEGORY (e.g., Programming, Control Systems, ..)

…

(You can try this on your own)

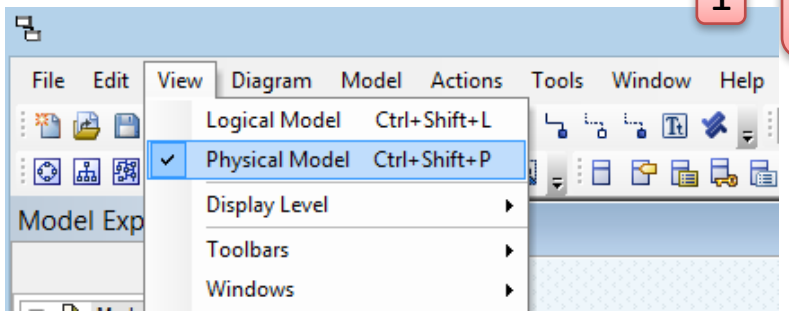
Create SQL Scripts with ERwin

Hans-Petter Halvorsen, M.Sc.

Create SQL Script

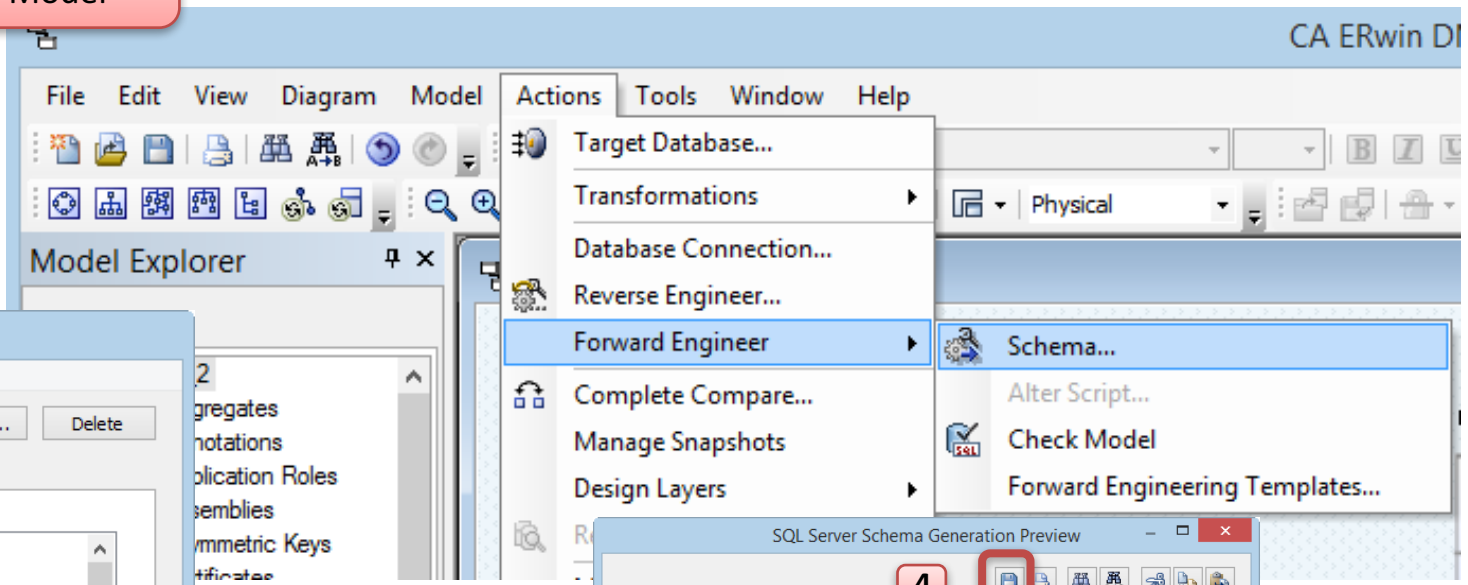
1

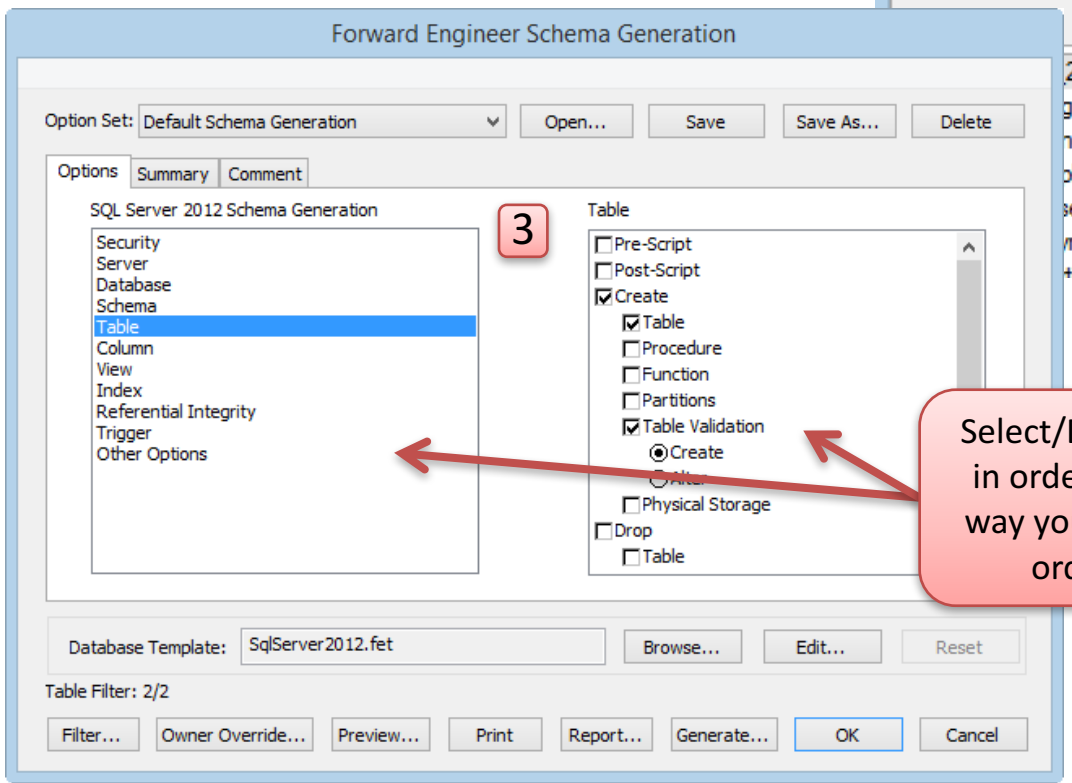
Make sure you are using the Physical Model



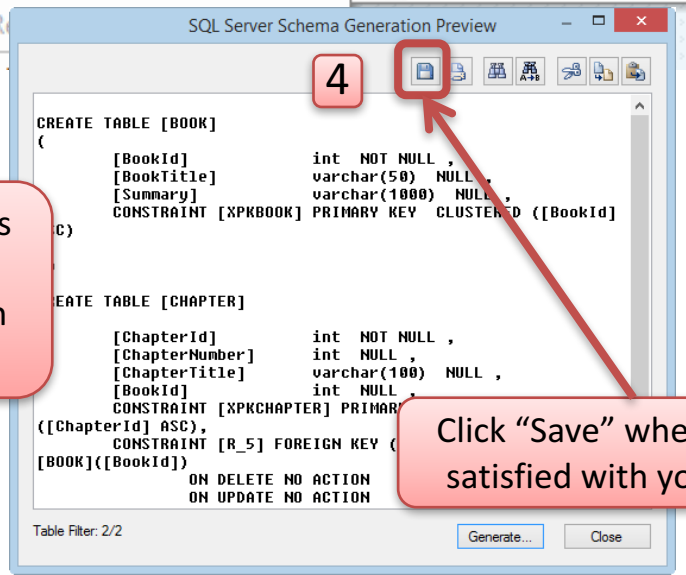
2

Select “Forward Engineering” and “Schema...”





Select/Deselect different Options in order to make your script the way you want. Click “Preview” in order to see the results.



Click “Save” when you are satisfied with your Script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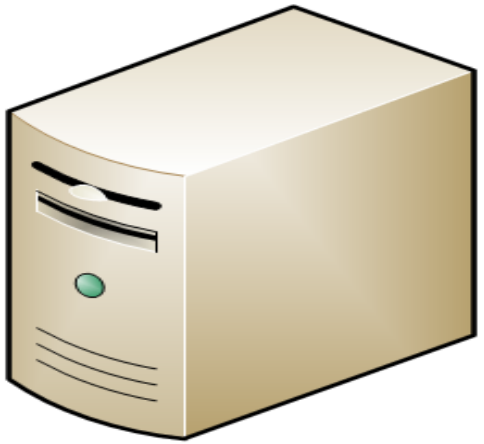
SQL Server

Execute the SQL Script within SQL Server

Hans-Petter Halvorsen, M.Sc.

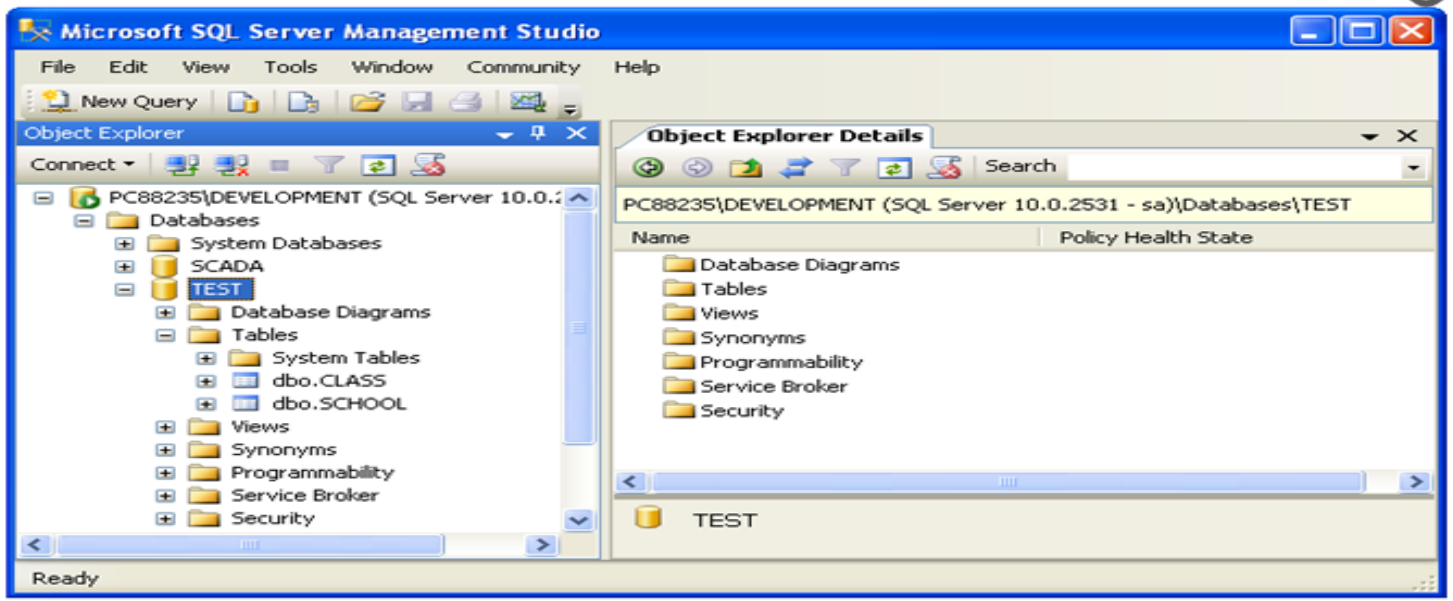
Microsoft SQL Server



Database Engine

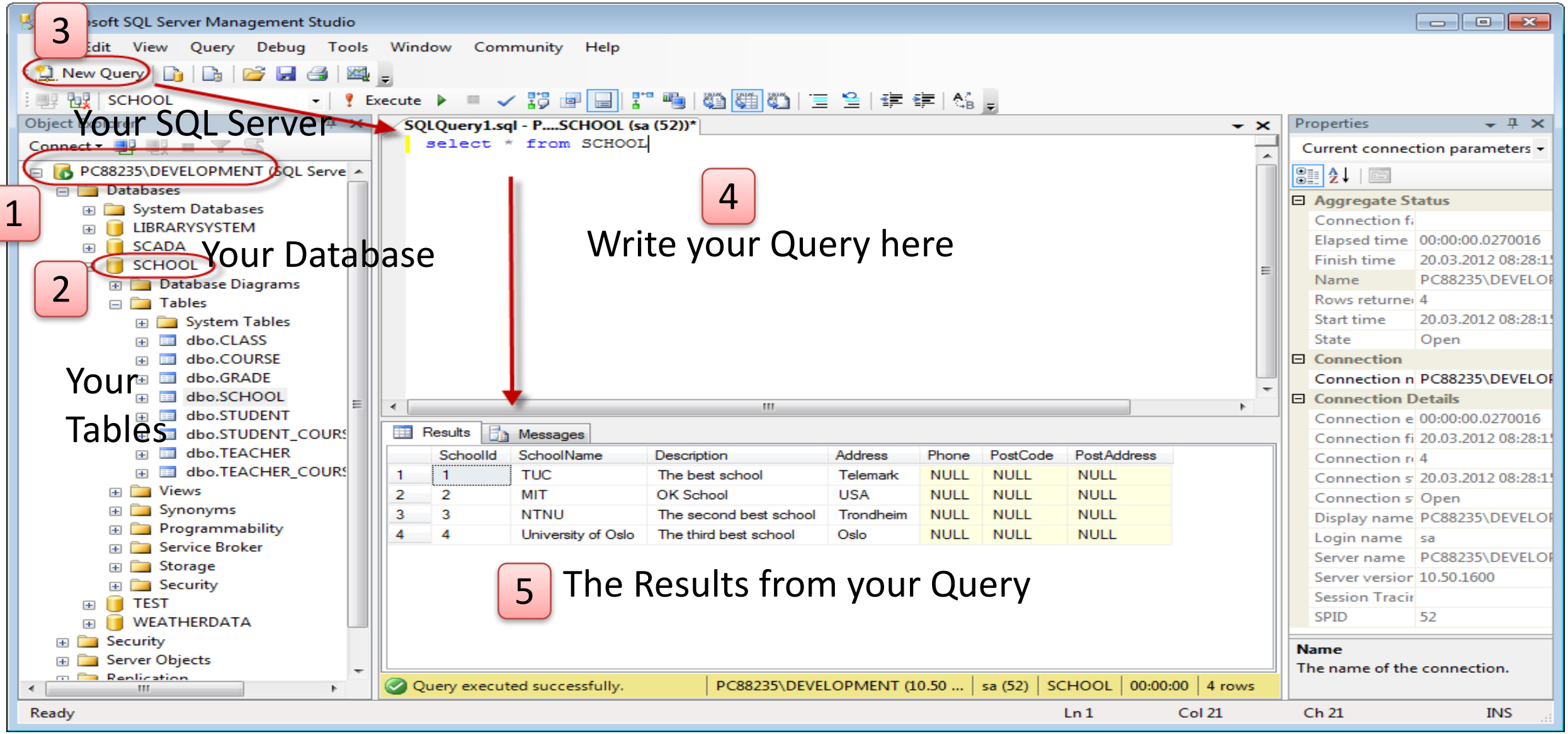
A Service running on the computer in the background

Management Studio

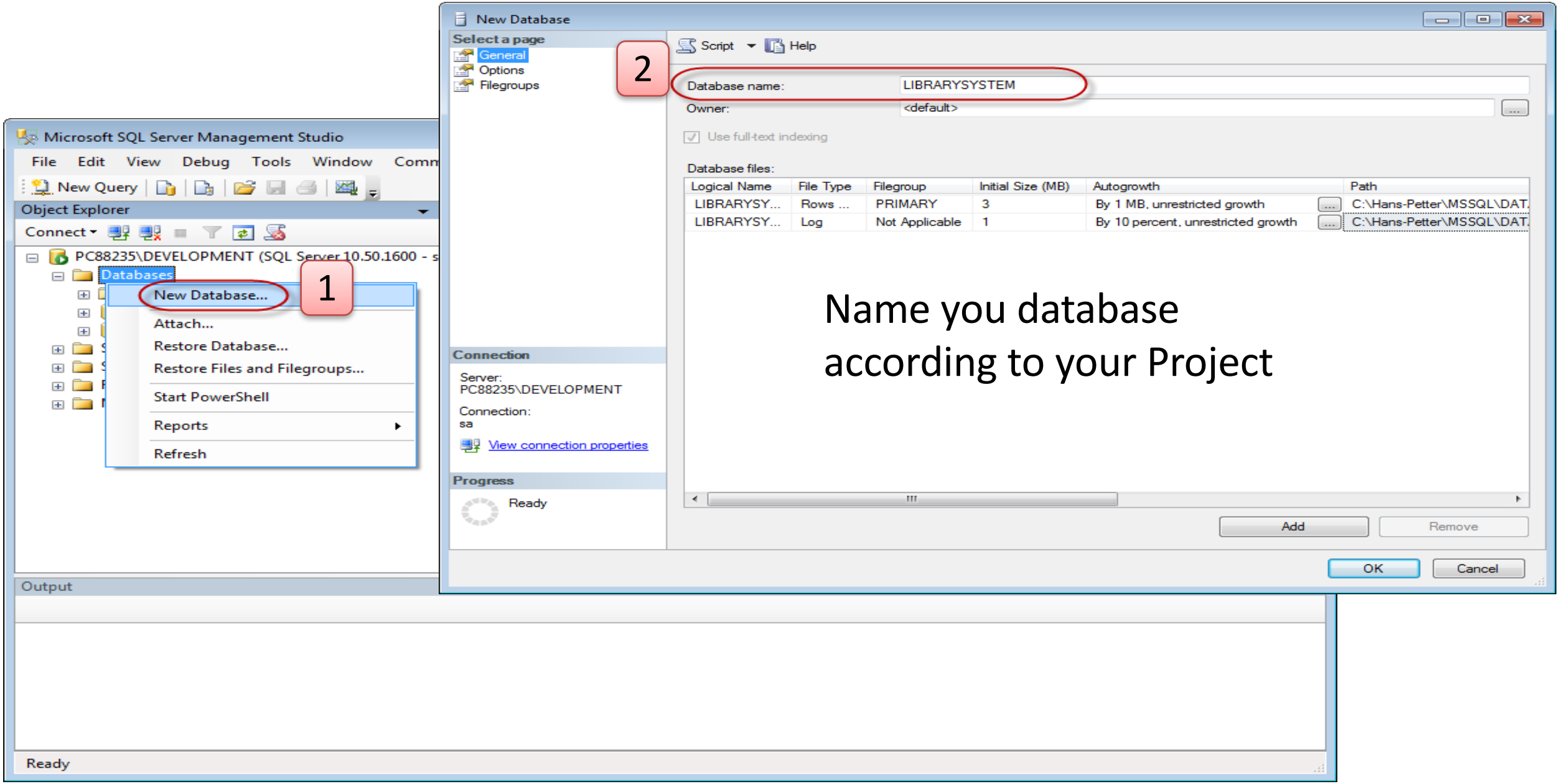


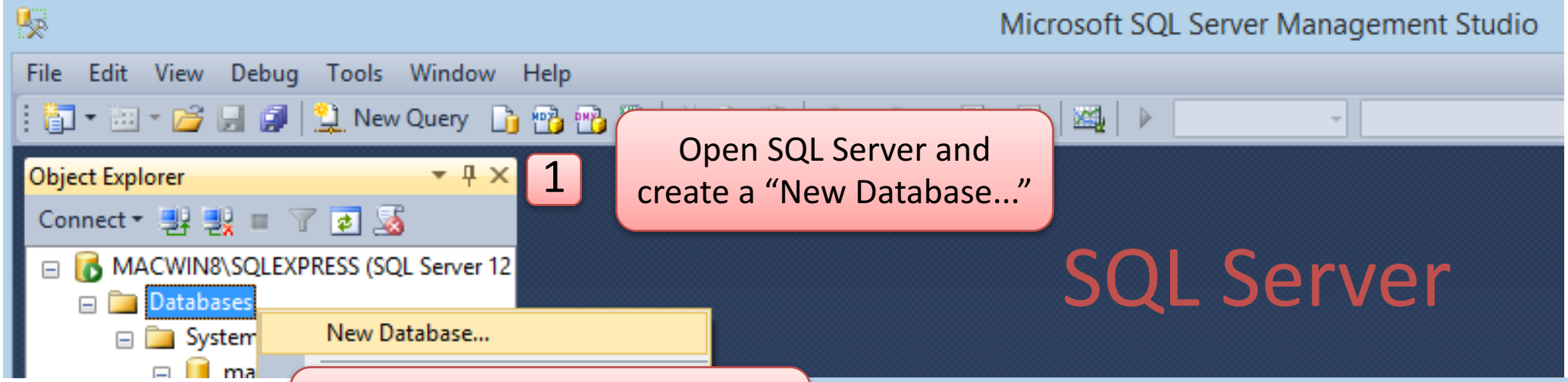
A Graphical User Interface to the database used for configuration and management of the database

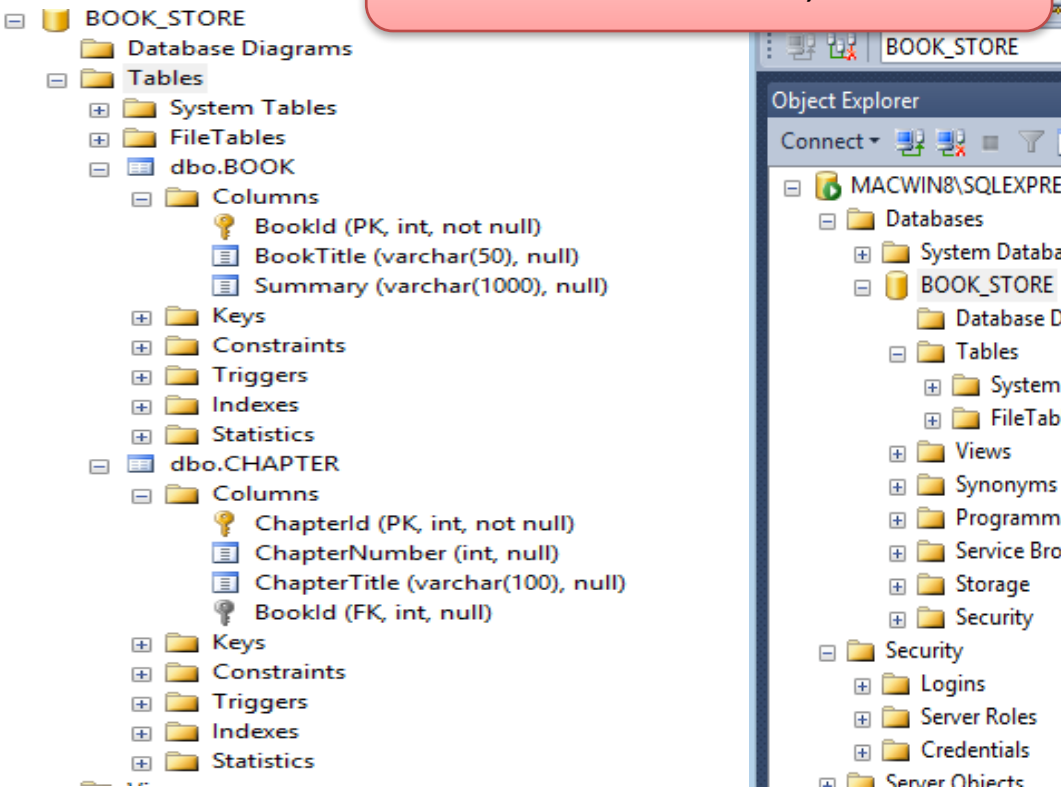
Microsoft SQL Server Management Studio



Microsoft SQL Server – Create a New Database

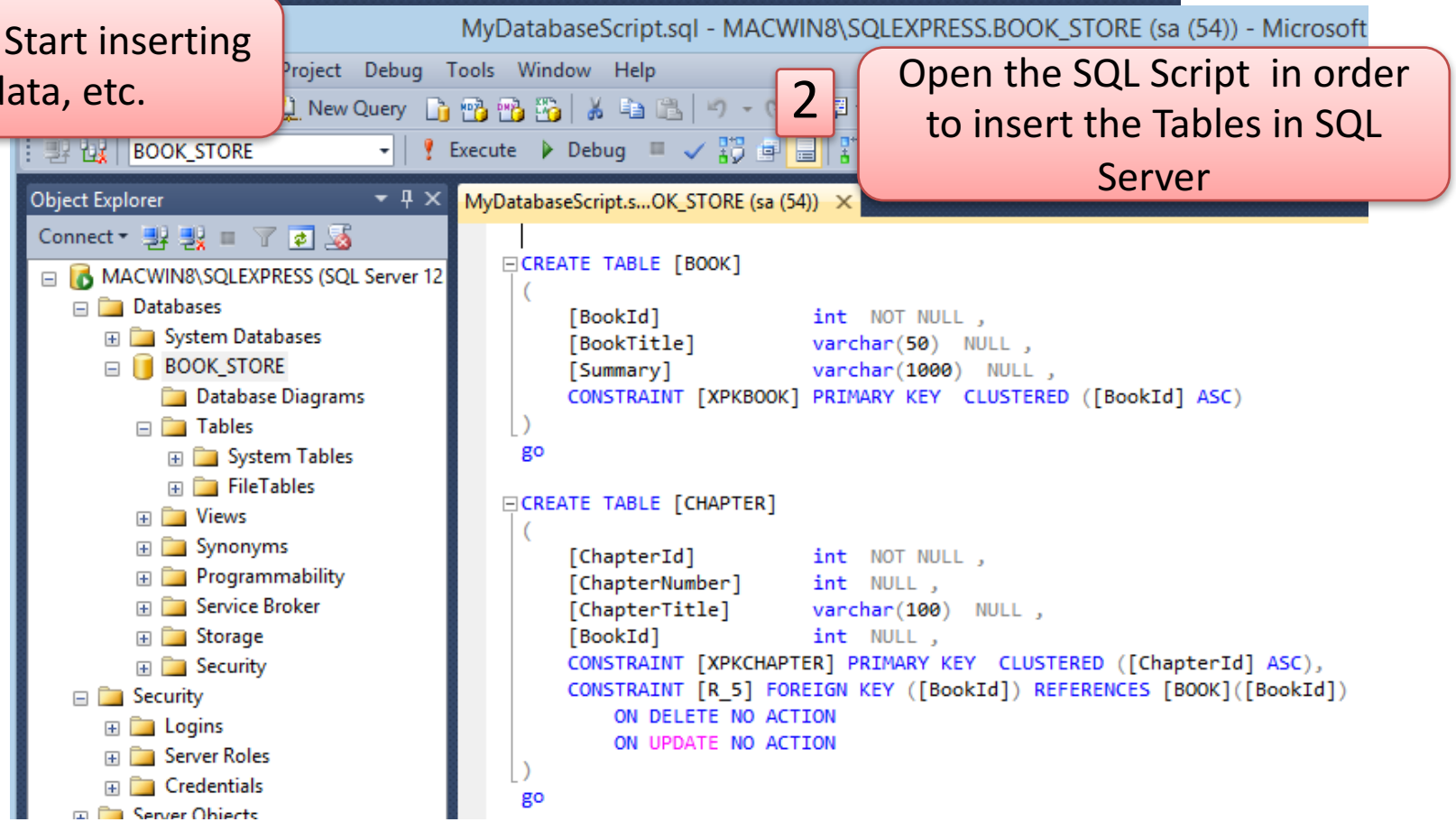






3

You are Finished. Start inserting some test data, etc.

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Identity (1,1)

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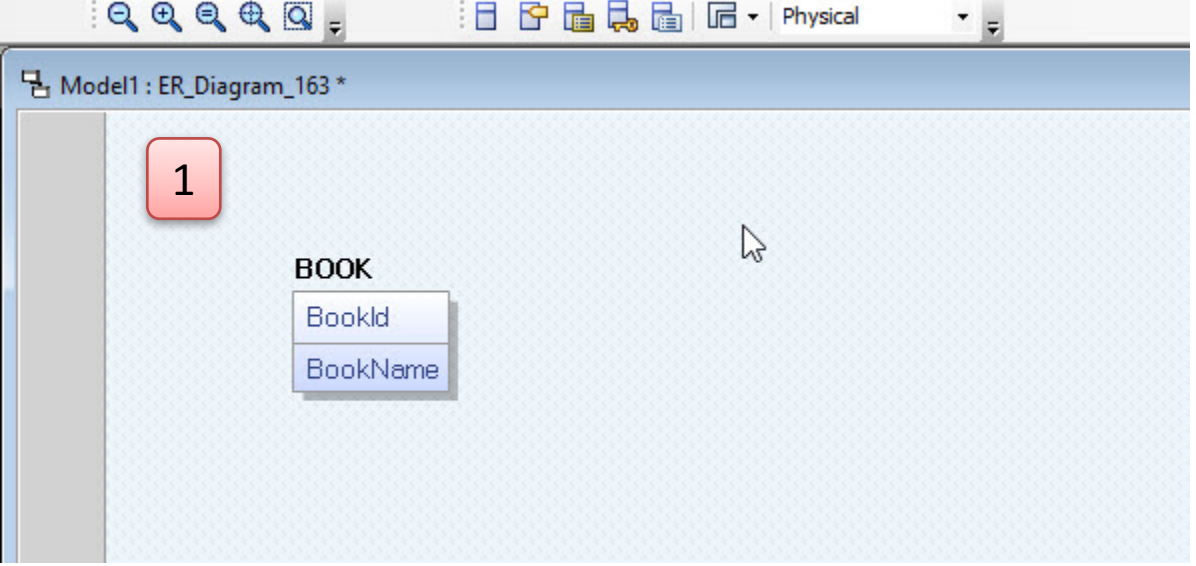
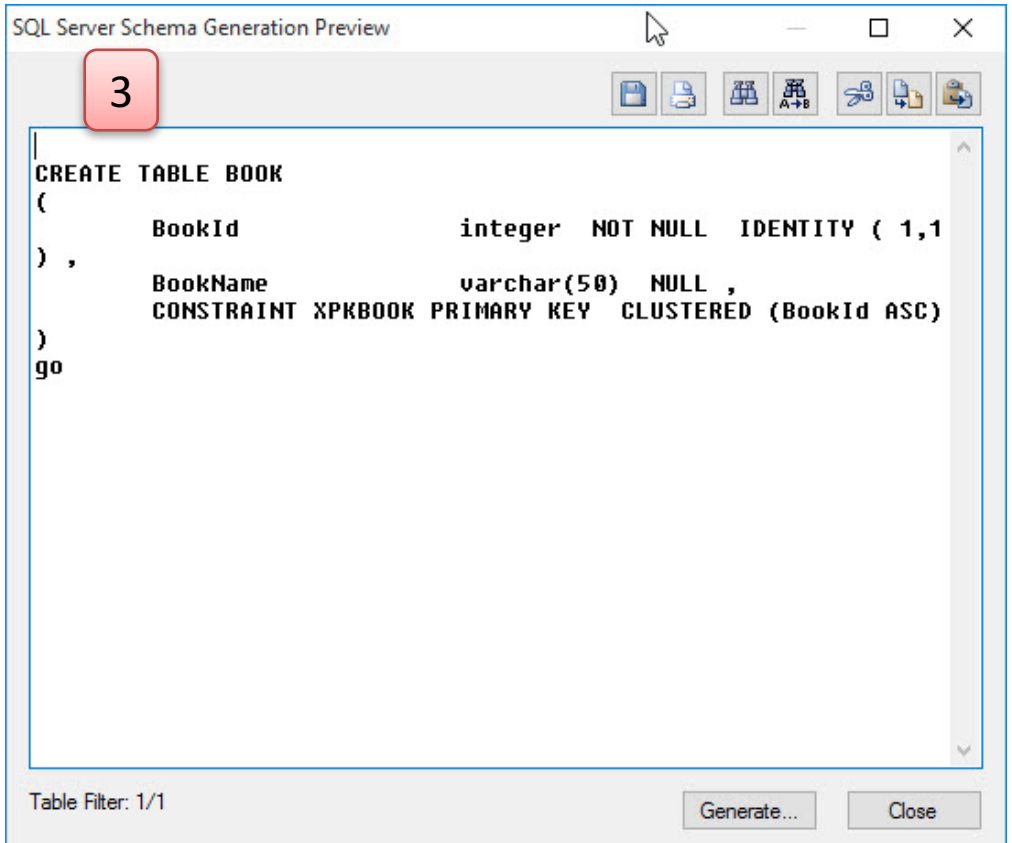
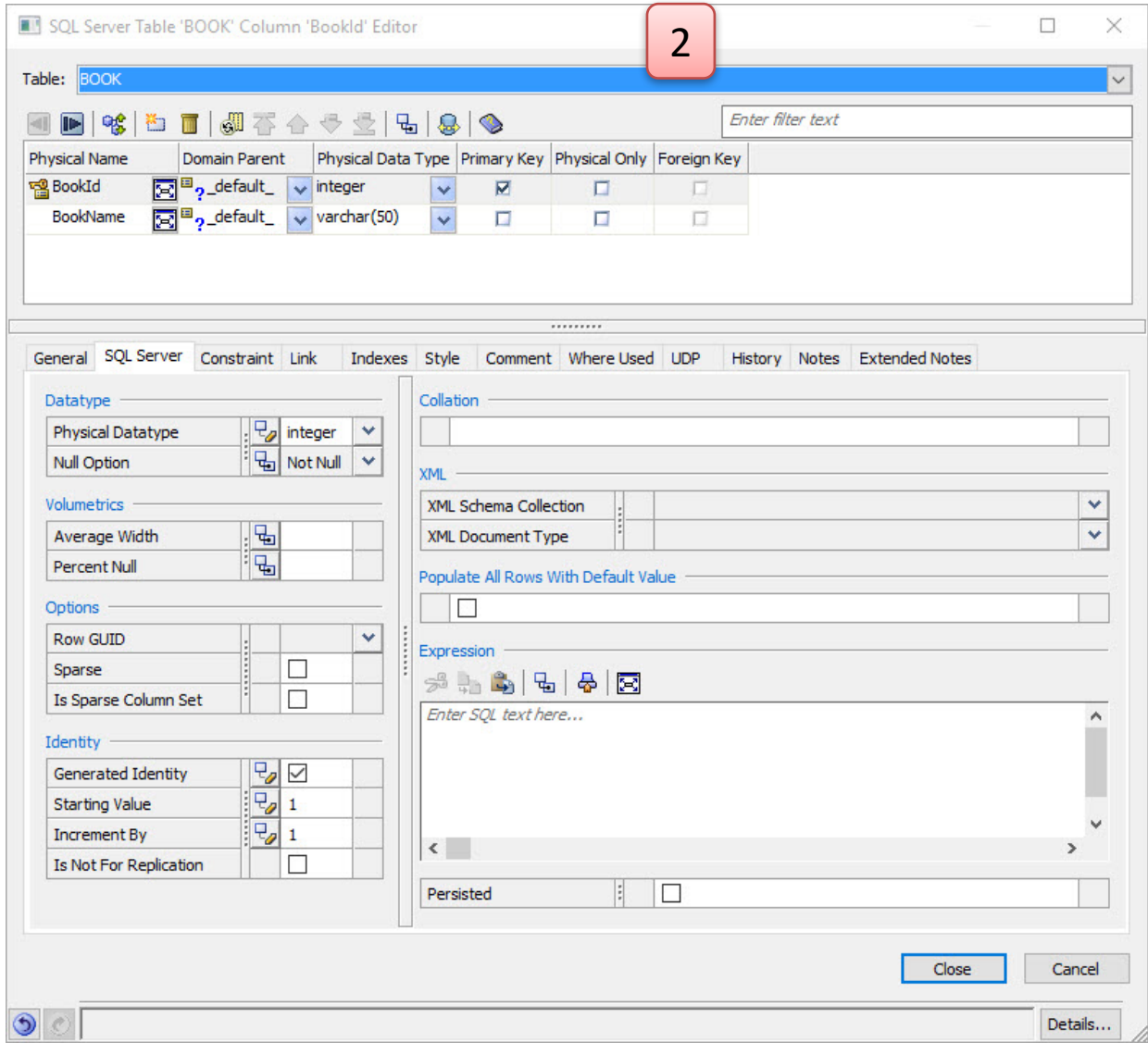
Setting the Identity(1,1) Property in ERwin





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Exercise

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Database Design & Modelling Exercise

Create this Example using ERwin.
Create a Script and execute it within SQL Server.

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