**Лабораторная работа по курсу**

**«Разработка информационных систем»**

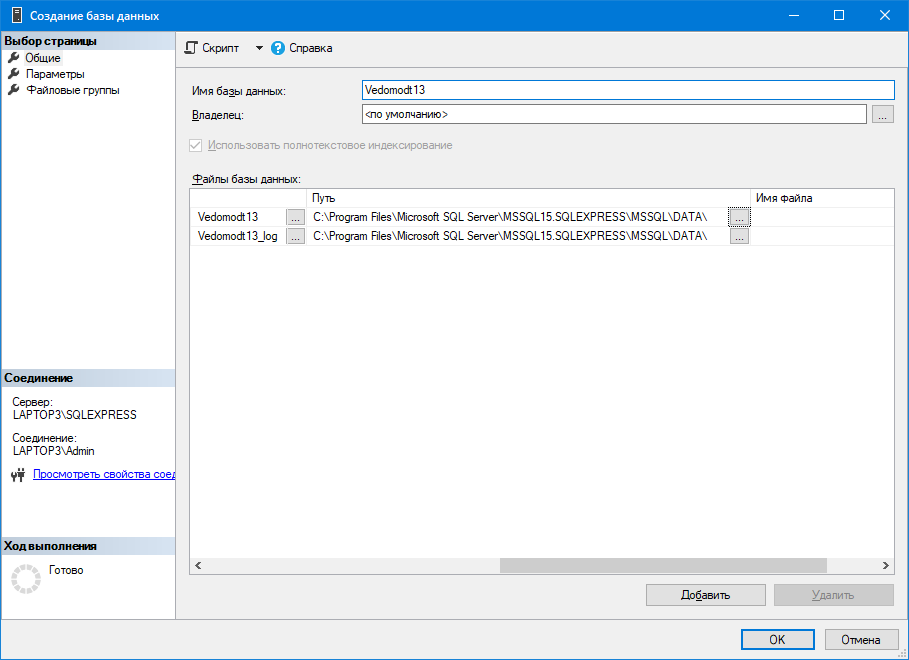
Лабораторная работа № 6

Виды соединений в операторе SELECT и создание представления

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Группа: М8О-303Б-18

**Расположение созданной базы данных**





**SQL-скрипт VedomostNN**

USE [master]

GO

/\*\*\*\*\*\* Object: Database [Vedomodt13] Script Date: 29.04.2021 9:27:17 \*\*\*\*\*\*/

CREATE DATABASE [Vedomodt13]

CONTAINMENT = NONE

ON PRIMARY

( NAME = N'Vedomodt13', FILENAME = N'C:\Program Files\Microsoft SQL Server\MSSQL15.SQLEXPRESS\MSSQL\DATA\Vedomodt13.mdf' , SIZE = 8192KB , MAXSIZE = UNLIMITED, FILEGROWTH = 65536KB )

LOG ON

( NAME = N'Vedomodt13\_log', FILENAME = N'C:\Program Files\Microsoft SQL Server\MSSQL15.SQLEXPRESS\MSSQL\DATA\Vedomodt13\_log.ldf' , SIZE = 8192KB , MAXSIZE = 2048GB , FILEGROWTH = 65536KB )

WITH CATALOG\_COLLATION = DATABASE\_DEFAULT

GO

IF (1 = FULLTEXTSERVICEPROPERTY('IsFullTextInstalled'))

begin

EXEC [Vedomodt13].[dbo].[sp\_fulltext\_database] @action = 'enable'

end

GO

ALTER DATABASE [Vedomodt13] SET ANSI\_NULL\_DEFAULT OFF

GO

ALTER DATABASE [Vedomodt13] SET ANSI\_NULLS OFF

GO

ALTER DATABASE [Vedomodt13] SET ANSI\_PADDING OFF

GO

ALTER DATABASE [Vedomodt13] SET ANSI\_WARNINGS OFF

GO

ALTER DATABASE [Vedomodt13] SET ARITHABORT OFF

GO

ALTER DATABASE [Vedomodt13] SET AUTO\_CLOSE OFF

GO

ALTER DATABASE [Vedomodt13] SET AUTO\_SHRINK OFF

GO

ALTER DATABASE [Vedomodt13] SET AUTO\_UPDATE\_STATISTICS ON

GO

ALTER DATABASE [Vedomodt13] SET CURSOR\_CLOSE\_ON\_COMMIT OFF

GO

ALTER DATABASE [Vedomodt13] SET CURSOR\_DEFAULT GLOBAL

GO

ALTER DATABASE [Vedomodt13] SET CONCAT\_NULL\_YIELDS\_NULL OFF

GO

ALTER DATABASE [Vedomodt13] SET NUMERIC\_ROUNDABORT OFF

GO

ALTER DATABASE [Vedomodt13] SET QUOTED\_IDENTIFIER OFF

GO

ALTER DATABASE [Vedomodt13] SET RECURSIVE\_TRIGGERS OFF

GO

ALTER DATABASE [Vedomodt13] SET DISABLE\_BROKER

GO

ALTER DATABASE [Vedomodt13] SET AUTO\_UPDATE\_STATISTICS\_ASYNC OFF

GO

ALTER DATABASE [Vedomodt13] SET DATE\_CORRELATION\_OPTIMIZATION OFF

GO

ALTER DATABASE [Vedomodt13] SET TRUSTWORTHY OFF

GO

ALTER DATABASE [Vedomodt13] SET ALLOW\_SNAPSHOT\_ISOLATION OFF

GO

ALTER DATABASE [Vedomodt13] SET PARAMETERIZATION SIMPLE

GO

ALTER DATABASE [Vedomodt13] SET READ\_COMMITTED\_SNAPSHOT OFF

GO

ALTER DATABASE [Vedomodt13] SET HONOR\_BROKER\_PRIORITY OFF

GO

ALTER DATABASE [Vedomodt13] SET RECOVERY SIMPLE

GO

ALTER DATABASE [Vedomodt13] SET MULTI\_USER

GO

ALTER DATABASE [Vedomodt13] SET PAGE\_VERIFY CHECKSUM

GO

ALTER DATABASE [Vedomodt13] SET DB\_CHAINING OFF

GO

ALTER DATABASE [Vedomodt13] SET FILESTREAM( NON\_TRANSACTED\_ACCESS = OFF )

GO

ALTER DATABASE [Vedomodt13] SET TARGET\_RECOVERY\_TIME = 60 SECONDS

GO

ALTER DATABASE [Vedomodt13] SET DELAYED\_DURABILITY = DISABLED

GO

ALTER DATABASE [Vedomodt13] SET ACCELERATED\_DATABASE\_RECOVERY = OFF

GO

ALTER DATABASE [Vedomodt13] SET QUERY\_STORE = OFF

GO

ALTER DATABASE [Vedomodt13] SET READ\_WRITE

GO

**Скрипт создания LeftTable**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[LeftTable] Script Date: 29.04.2021 10:31:19 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

CREATE TABLE [dbo].[LeftTable](

[LCode] [smallint] NOT NULL,

[LDescr] [nchar](10) NULL,

[Key2] [smallint] NULL,

[Key3] [smallint] NULL

) ON [PRIMARY]

GO

**Скрипт создания RightTable**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[RightTable] Script Date: 29.04.2021 10:32:10 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

CREATE TABLE [dbo].[RightTable](

[RCode] [smallint] NULL,

[City] [nchar](10) NULL,

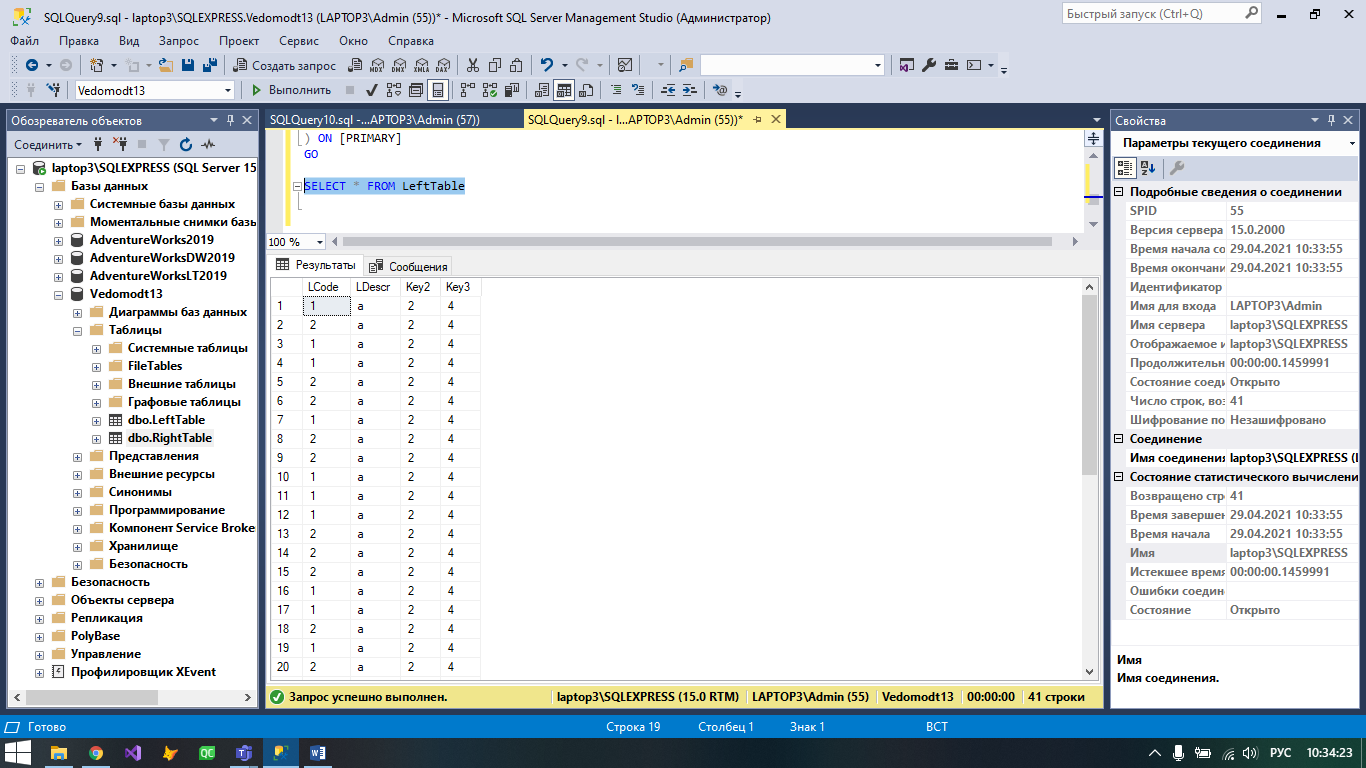
[Key2] [smallint] NULL

) ON [PRIMARY]

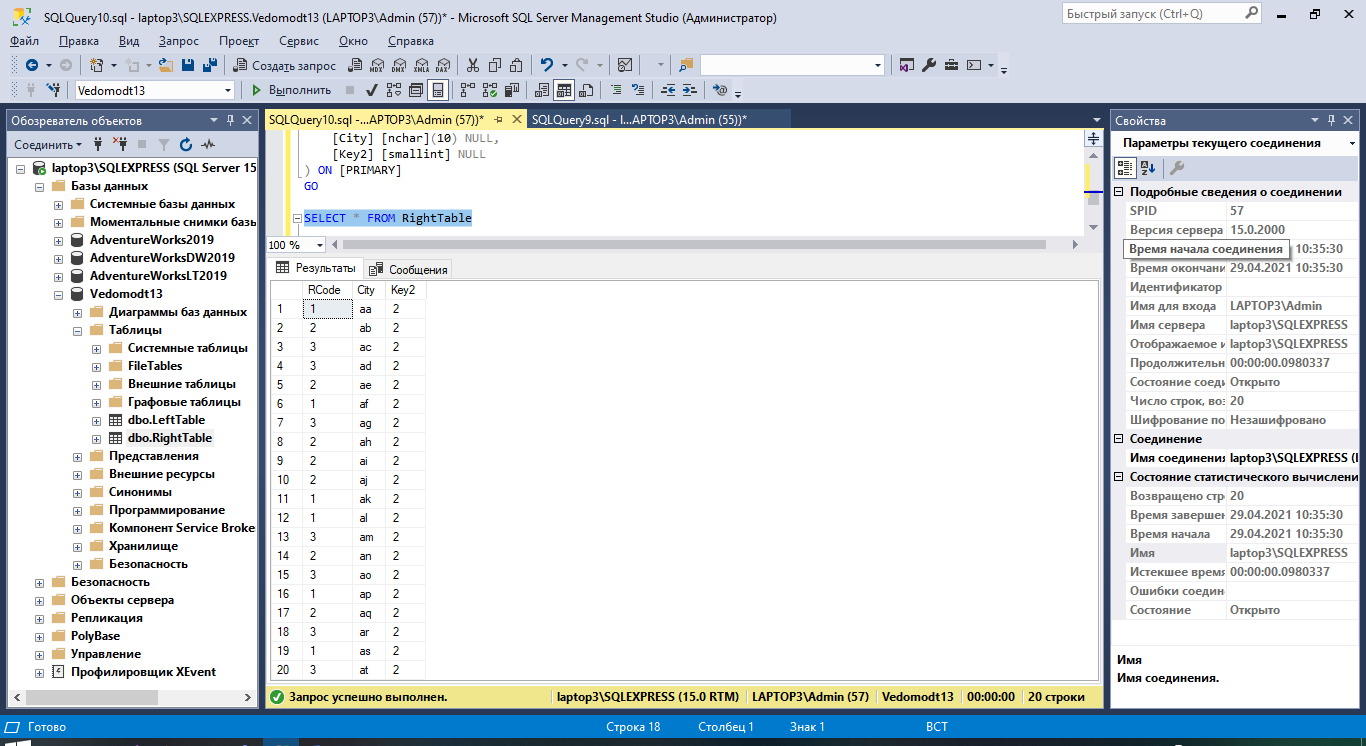
GO

**Выполнение операторов**

SELECT \* FROM LeftTable



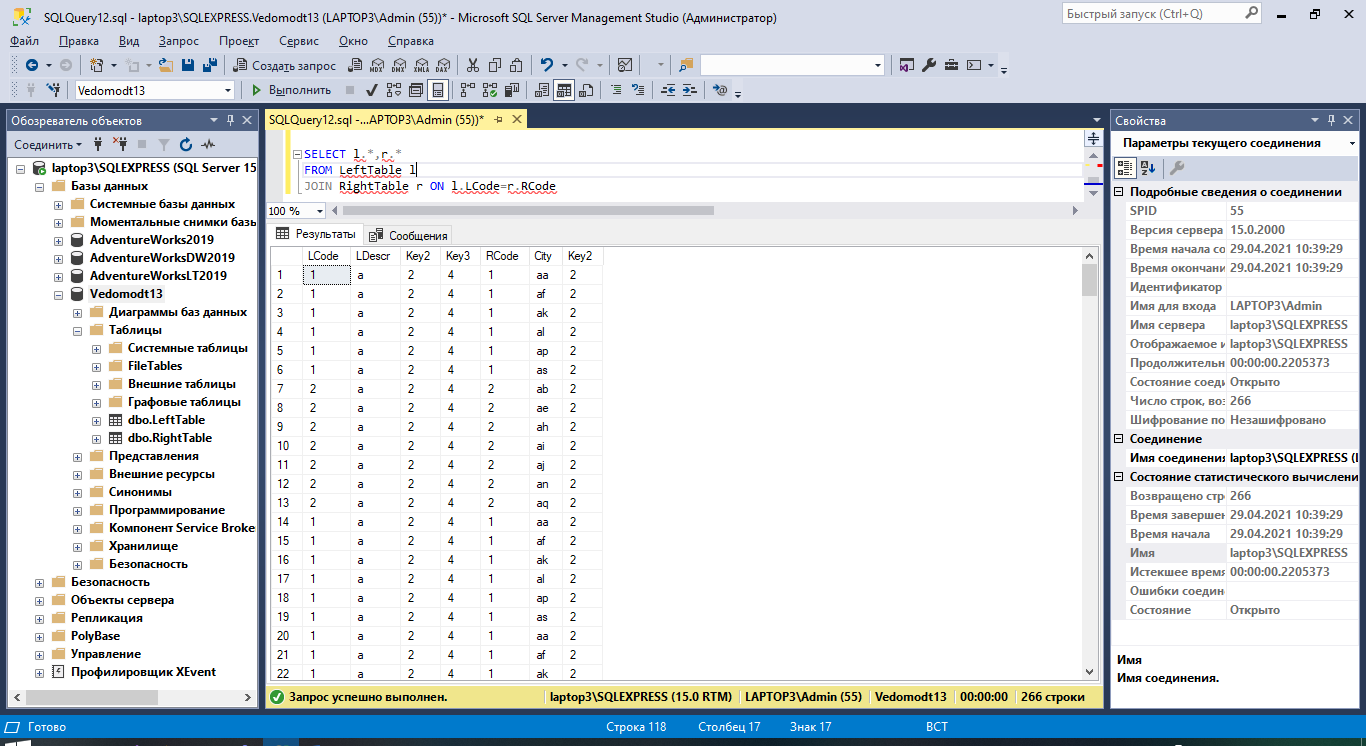
SELECT \* FROM RightTable



SELECT l.\*, r.\*

FROM LeftTable l

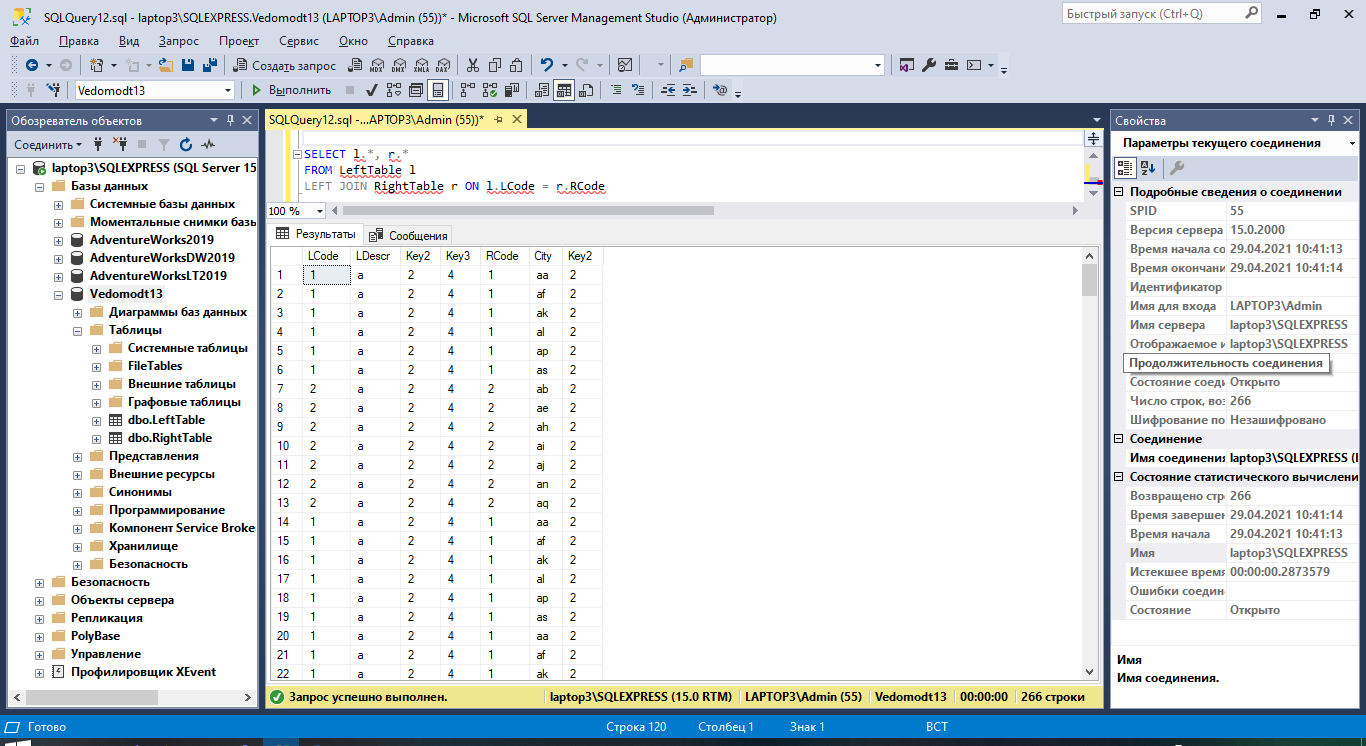
JOIN RightTable r ON l.LCode = r.RCode



SELECT l.\*, r.\*

FROM LeftTable l

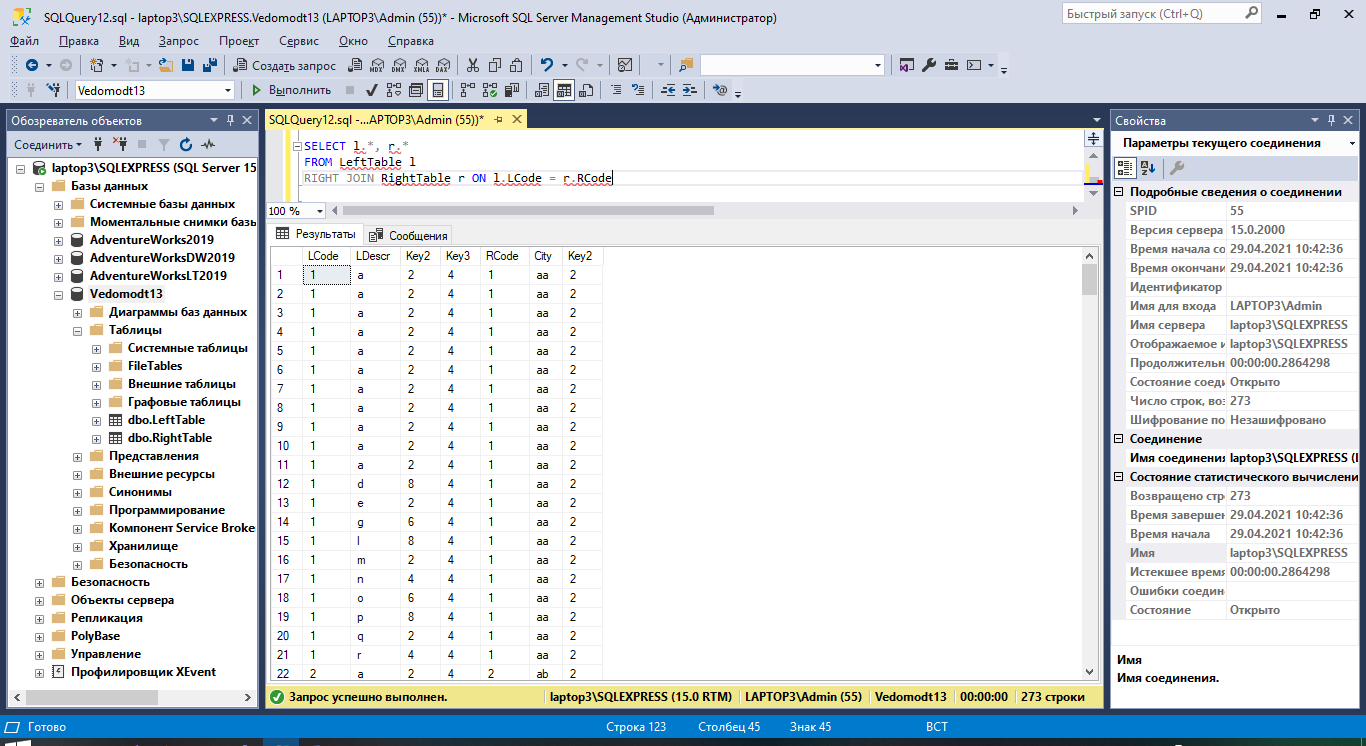
LEFT JOIN RightTable r ON l.LCode = r.RCode



SELECT l.\*, r.\*

FROM LeftTable l

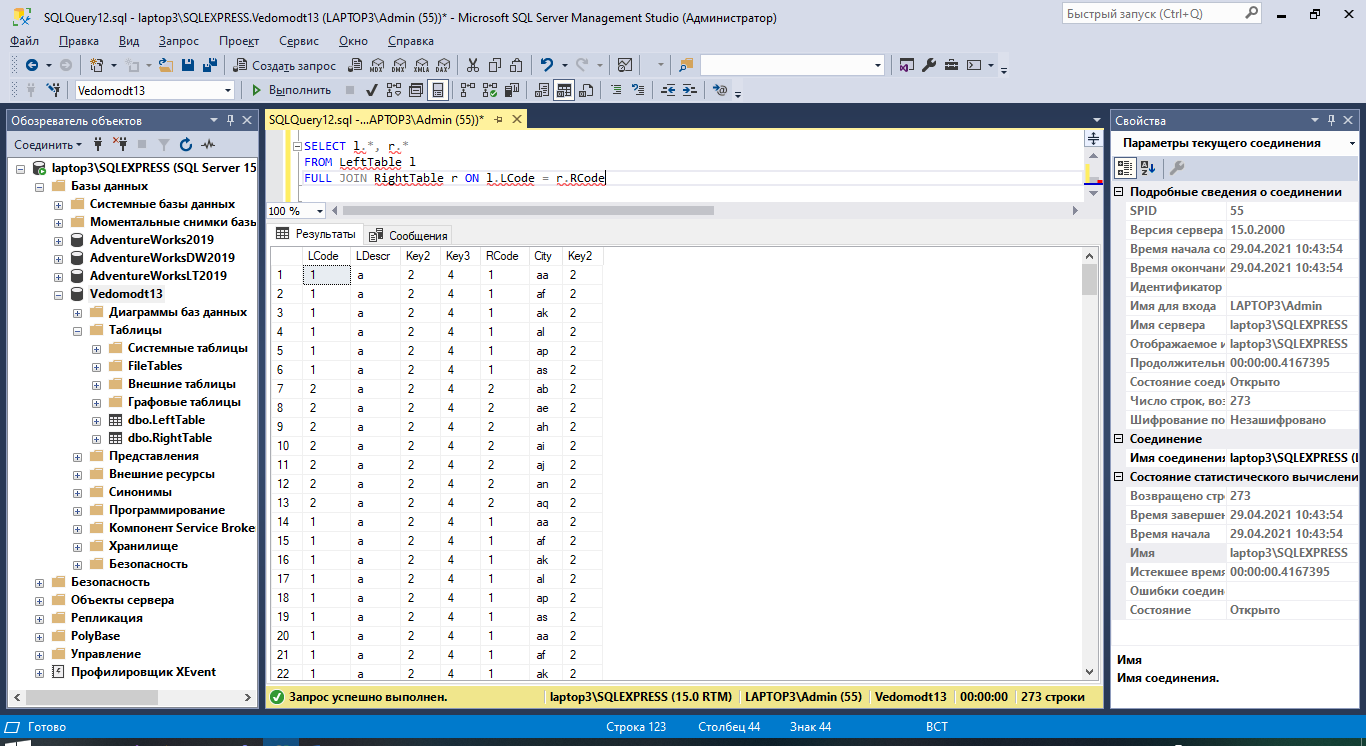
RIGHT JOIN RightTable r ON l.LCode = r.RCode



SELECT l.\*, r.\*

FROM LeftTable l

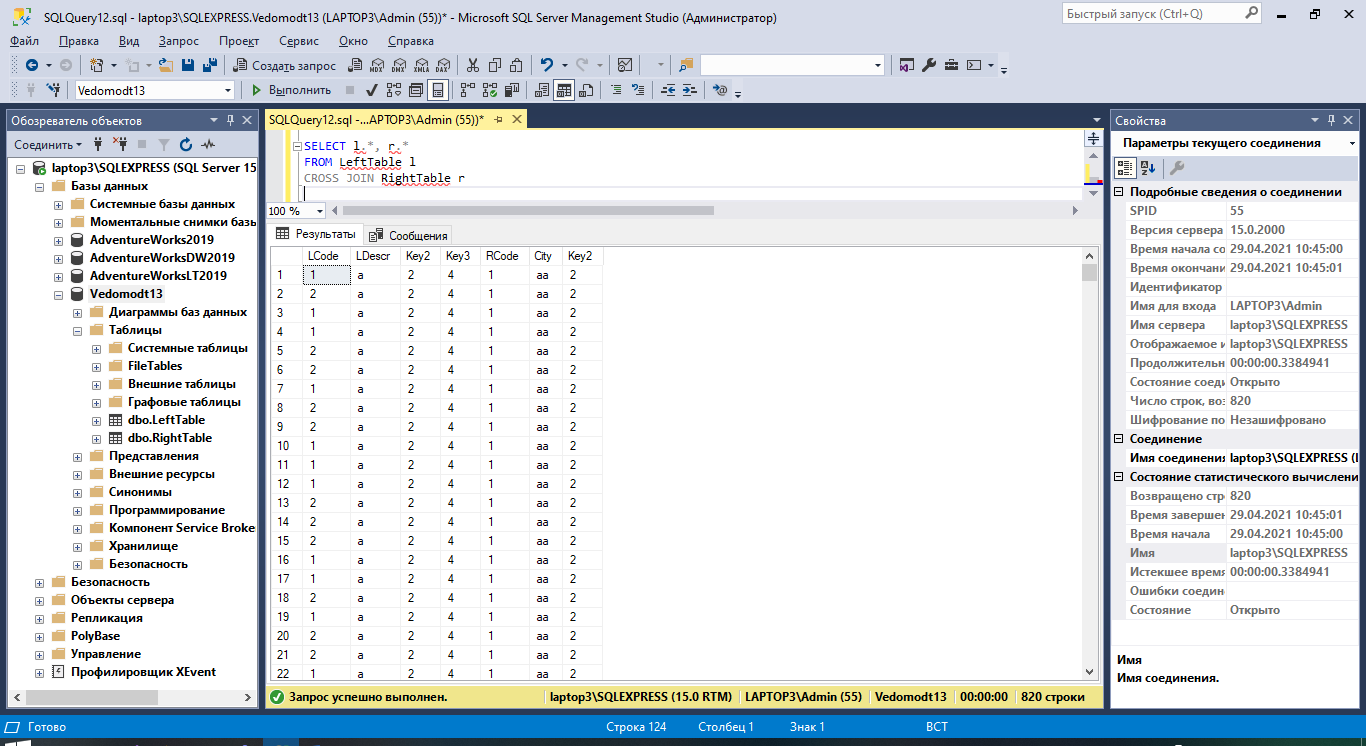
FULL JOIN RightTable r ON l.LCode = r.RCode



SELECT l.\*, r.\*

FROM LeftTable l

CROSS JOIN RightTable r



**Создание JOIN-соединения с использованием неравенства**

SELECT l.Key3,

l.LCode AS Name,

l.Key2 AS LKey2,

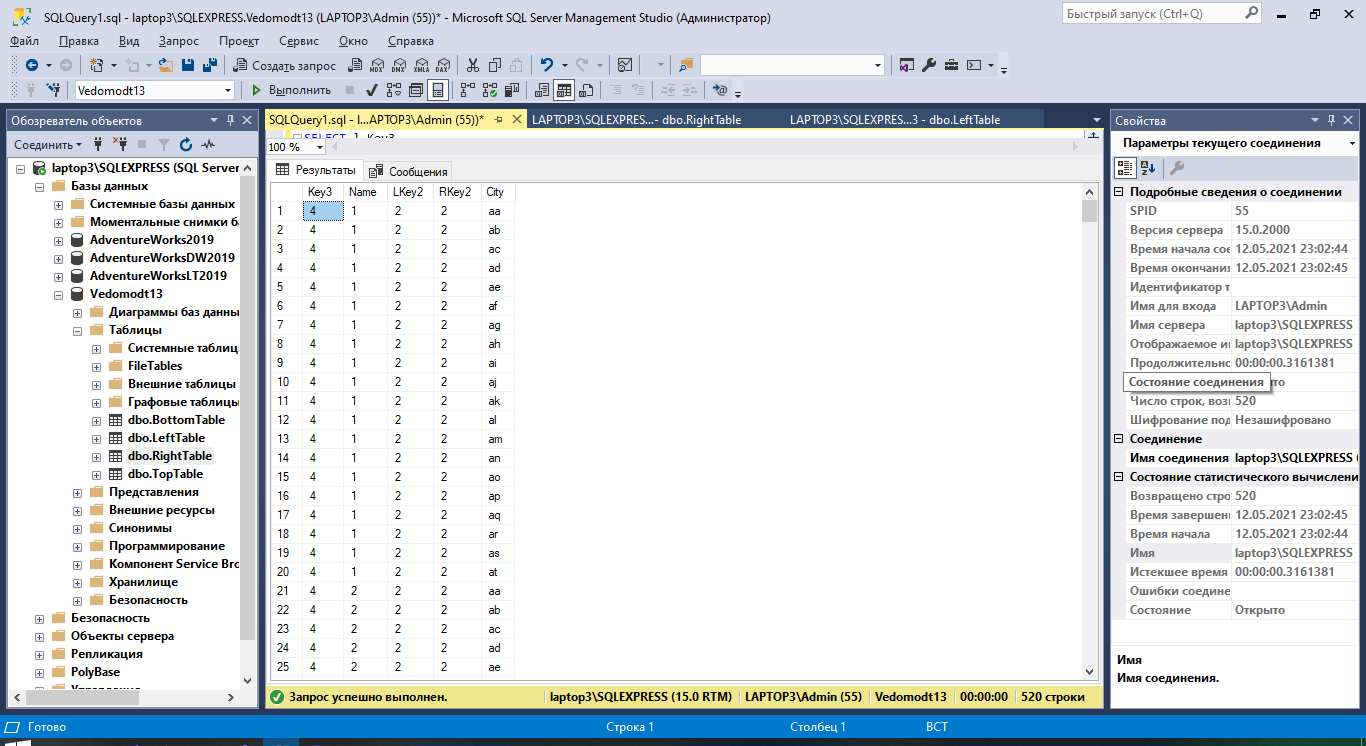
r.Key2 AS RKey2,

r.City AS City

FROM LeftTable l

INNER JOIN RightTable r ON l.Key2 <= r.Key2

WHERE l.Key3 = 4;



**Скрипт создания таблиц TopTable и BottomTable**

**TopTable:**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[TopTable] Script Date: 12.05.2021 23:07:02 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

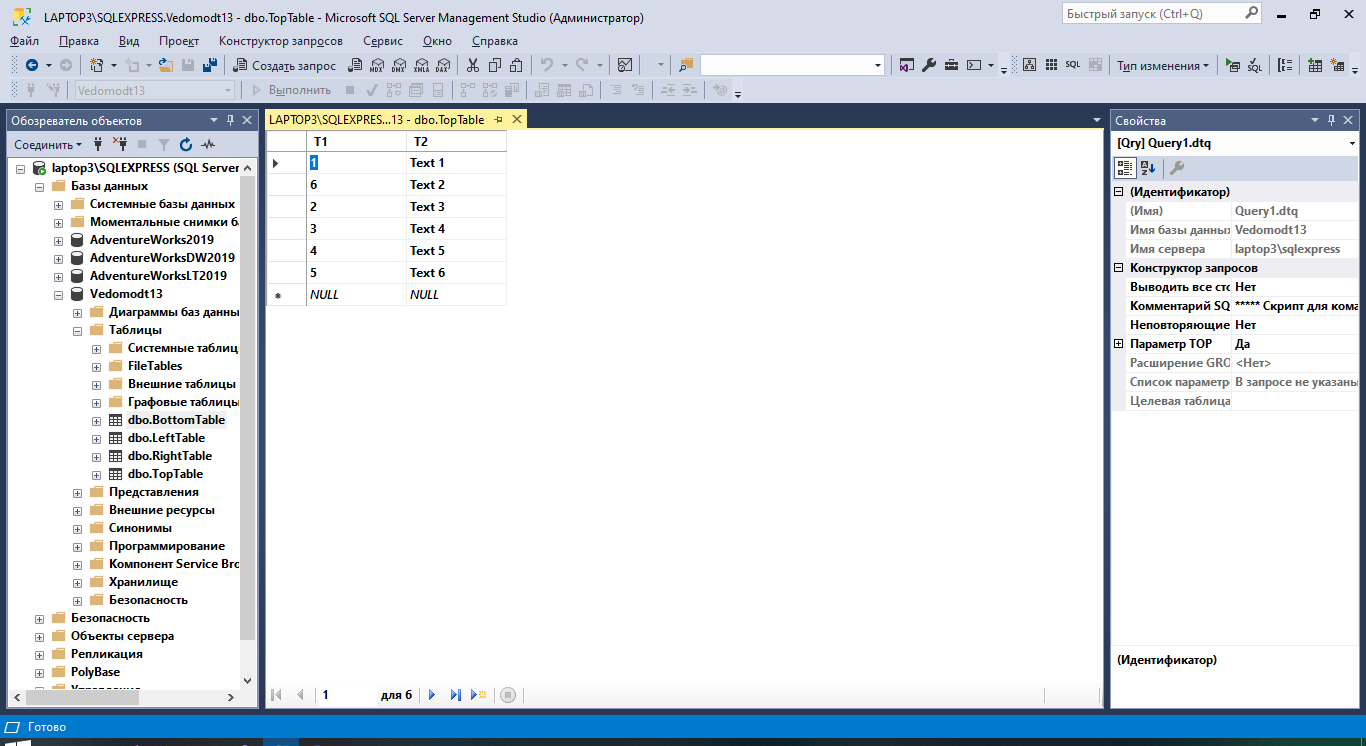
CREATE TABLE [dbo].[TopTable](

[T1] [smallint] NULL,

[T2] [nchar](10) NULL

) ON [PRIMARY]

GO



**BottomTable:**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[BottomTable] Script Date: 12.05.2021 23:07:43 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

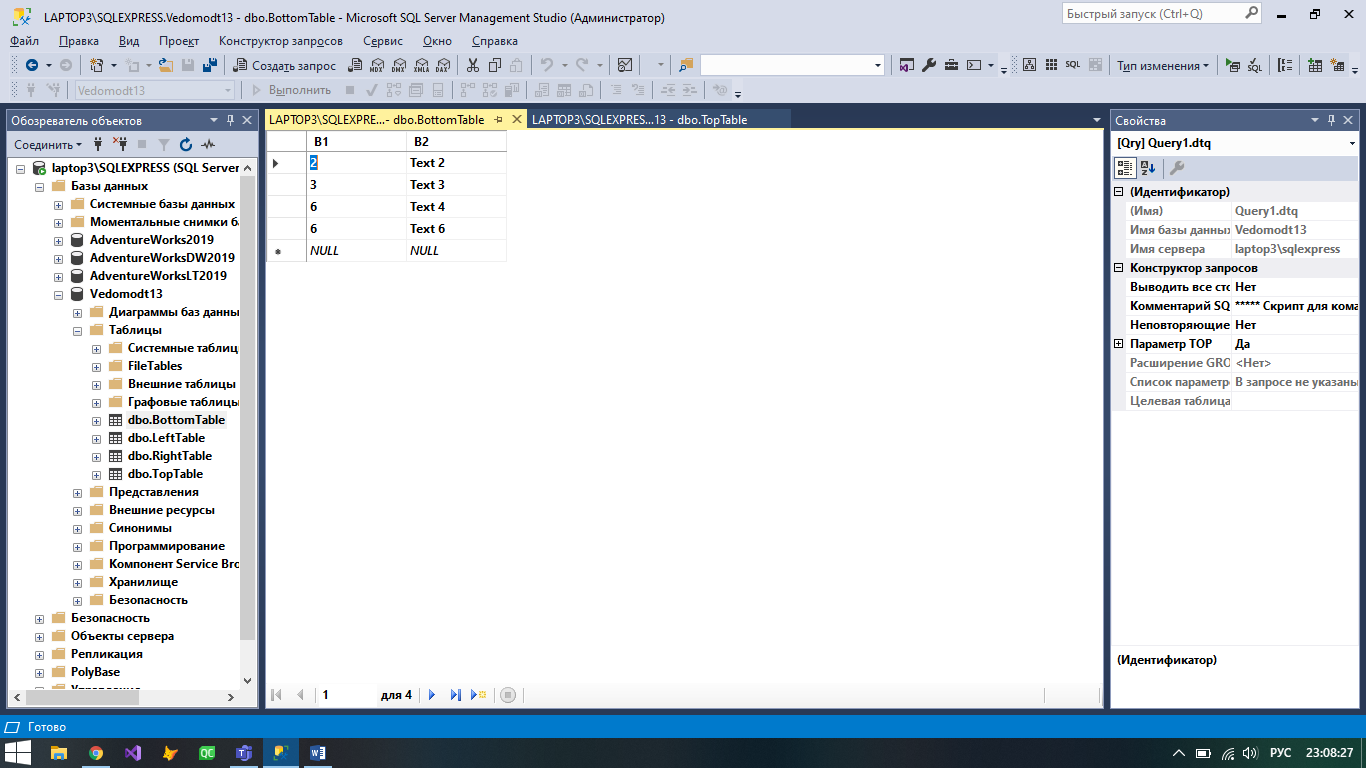
CREATE TABLE [dbo].[BottomTable](

[B1] [smallint] NULL,

[B2] [nchar](10) NULL

) ON [PRIMARY]

GO



**Выполнение операторов вертикального объединения UNION, EXCEPT и INTERSECT**

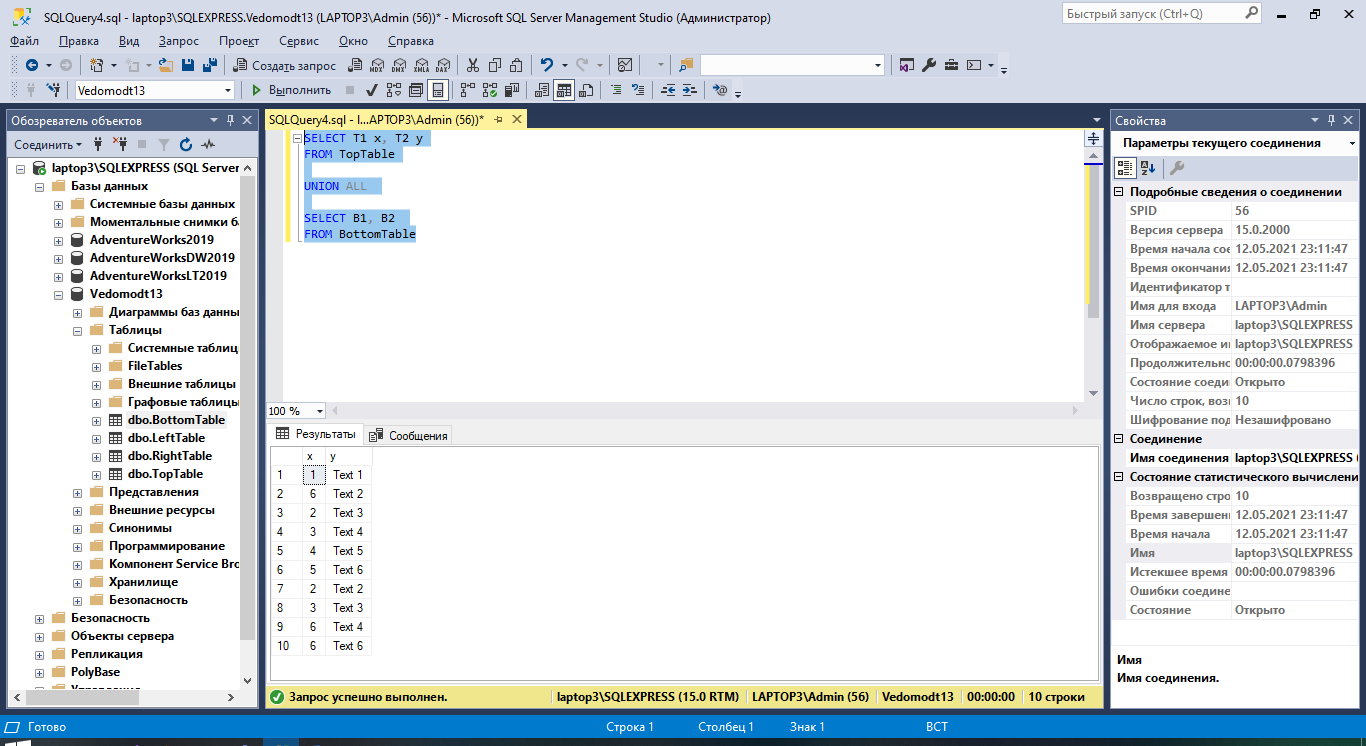
SELECT T1 x, T2 y

FROM TopTable

UNION ALL

SELECT B1, B2

FROM BottomTable



SELECT T1 x, T2 y

FROM TopTable

UNION

SELECT B1, B2

FROM BottomTable



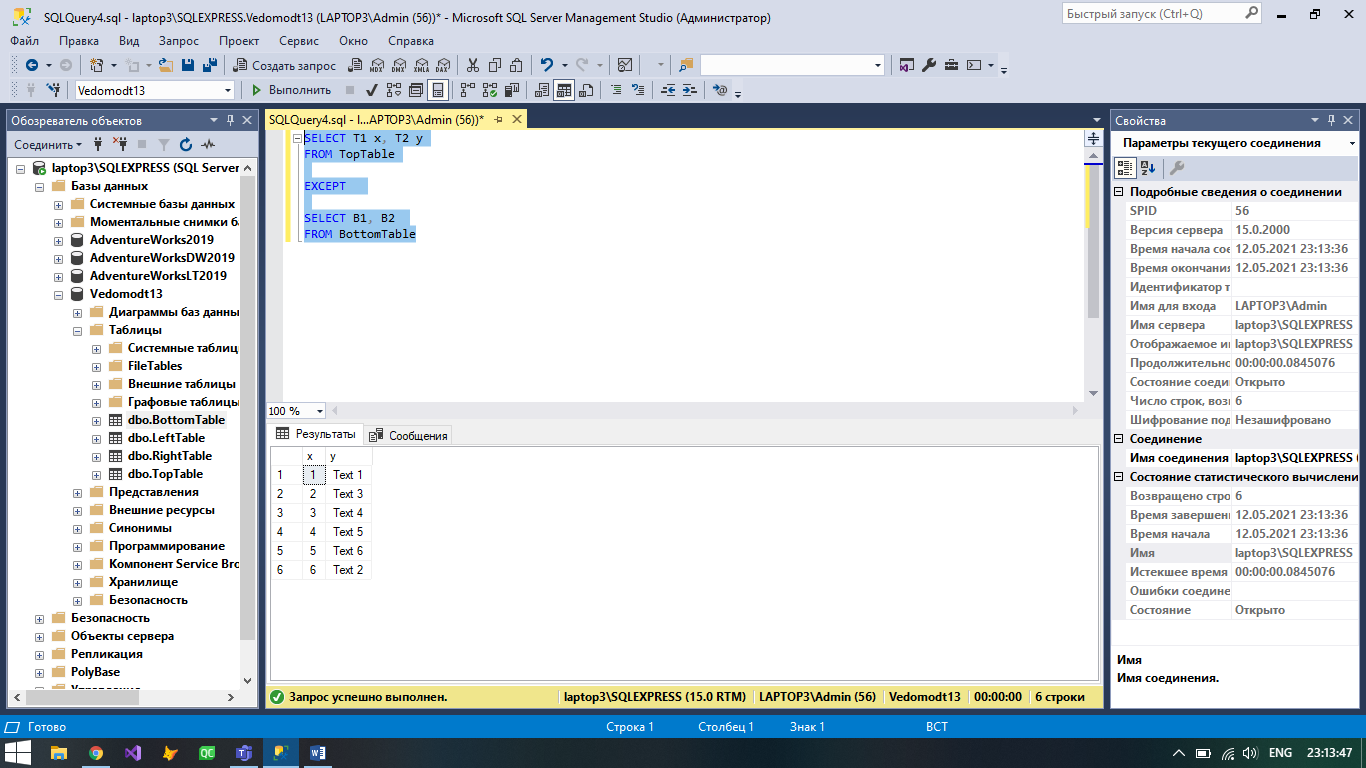
SELECT T1 x, T2 y

FROM TopTable

EXCEPT

SELECT B1, B2

FROM BottomTable



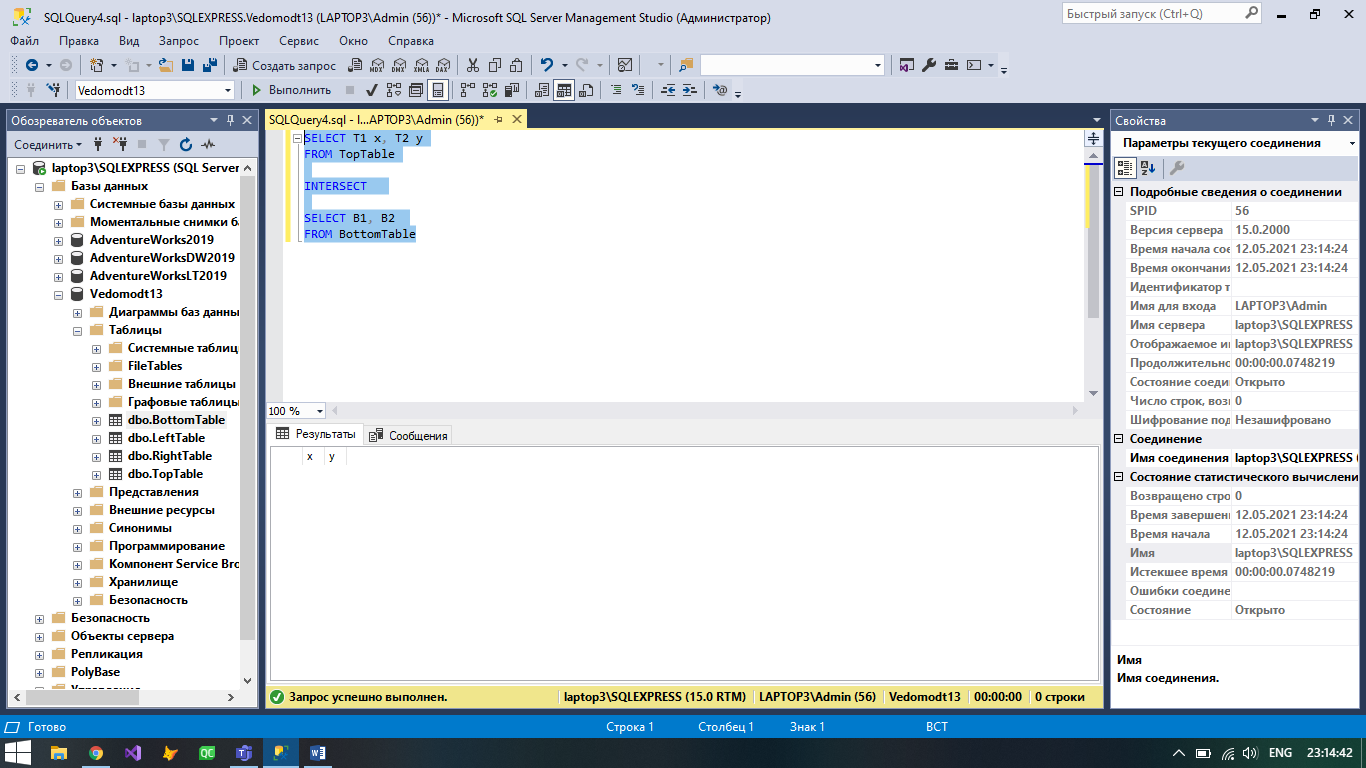
SELECT T1 x, T2 y

FROM TopTable

INTERSECT

SELECT B1, B2

FROM BottomTable



**Создание таблиц Students3c и Teachers**

**Students3c:**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[Students3c] Script Date: 12.05.2021 23:26:24 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

CREATE TABLE [dbo].[Students3c](

[IDStudent] [smallint] NOT NULL,

[Gr] [nchar](10) NULL,

[SSurName] [nchar](10) NULL,

[SName] [nchar](10) NULL,

[SLastName] [nchar](10) NULL,

[NZach] [nchar](10) NULL,

[SKaf] [nchar](10) NULL,

[GradYear] [nchar](10) NULL,

CONSTRAINT [PK\_Students3c] PRIMARY KEY CLUSTERED

(

[IDStudent] ASC

)WITH (PAD\_INDEX = OFF, STATISTICS\_NORECOMPUTE = OFF, IGNORE\_DUP\_KEY = OFF, ALLOW\_ROW\_LOCKS = ON, ALLOW\_PAGE\_LOCKS = ON, OPTIMIZE\_FOR\_SEQUENTIAL\_KEY = OFF) ON [PRIMARY]

) ON [PRIMARY]

GO

**Teachers:**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[Teachers] Script Date: 12.05.2021 23:26:48 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

CREATE TABLE [dbo].[Teachers](

[IDTeacher] [smallint] NOT NULL,

[TSurName] [nchar](10) NULL,

[TName] [nchar](10) NULL,

[TLastName] [nchar](10) NULL,

[TKaf] [nchar](10) NULL,

CONSTRAINT [PK\_Teachers] PRIMARY KEY CLUSTERED

(

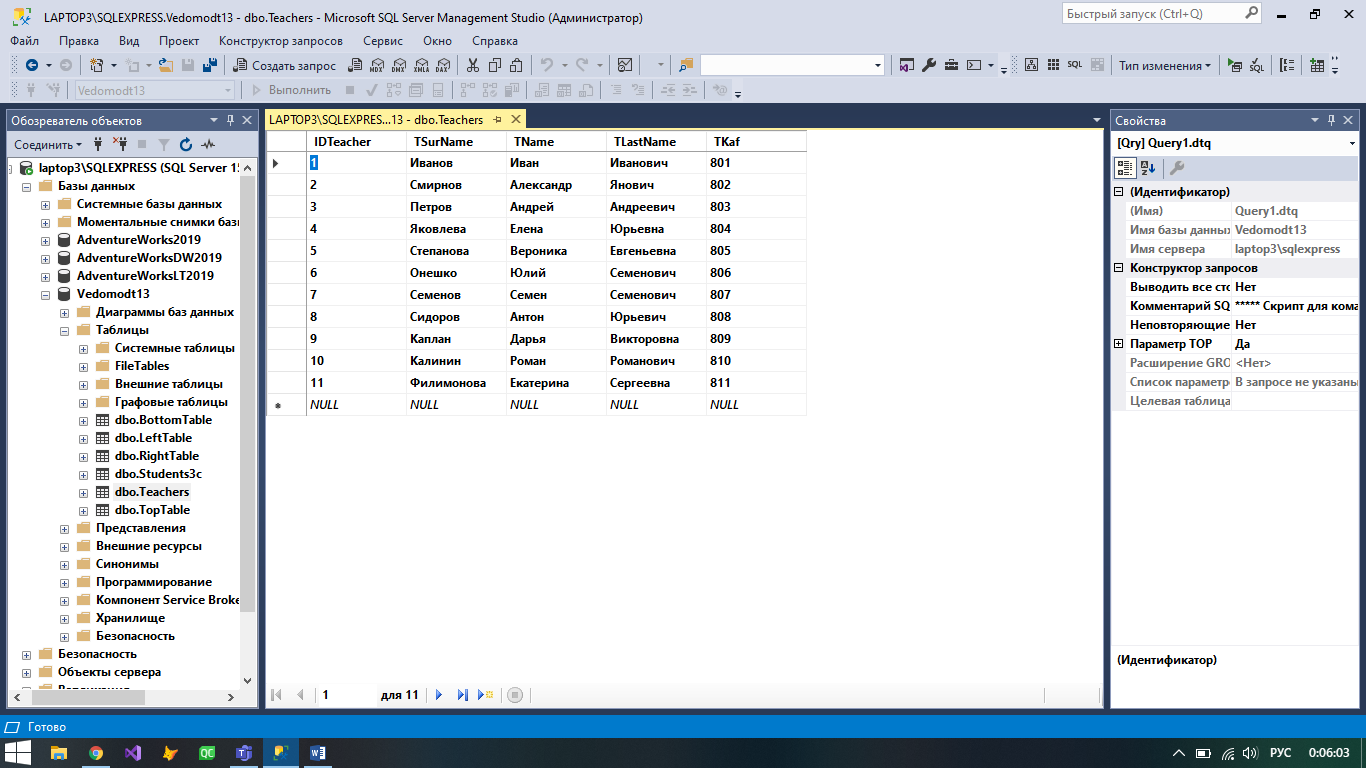
[IDTeacher] ASC

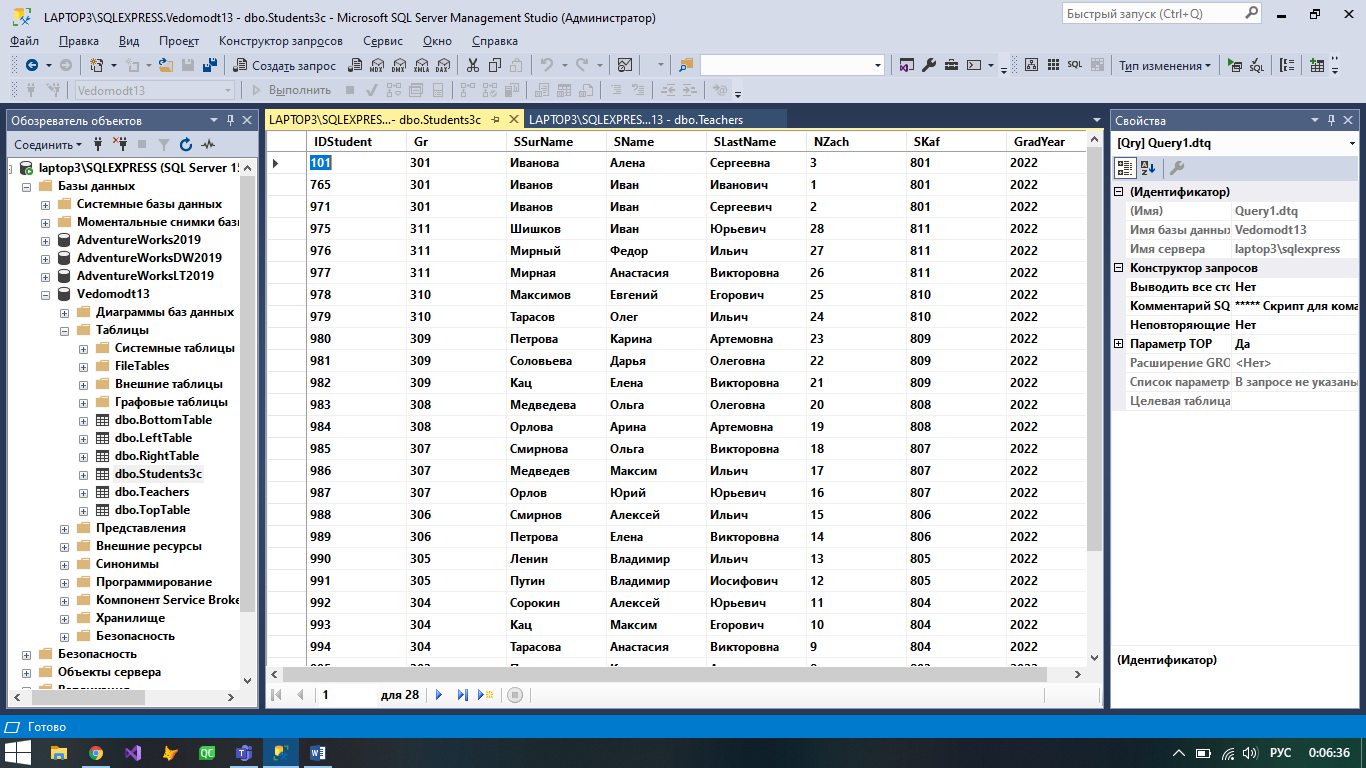
)WITH (PAD\_INDEX = OFF, STATISTICS\_NORECOMPUTE = OFF, IGNORE\_DUP\_KEY = OFF, ALLOW\_ROW\_LOCKS = ON, ALLOW\_PAGE\_LOCKS = ON, OPTIMIZE\_FOR\_SEQUENTIAL\_KEY = OFF) ON [PRIMARY]

) ON [PRIMARY]

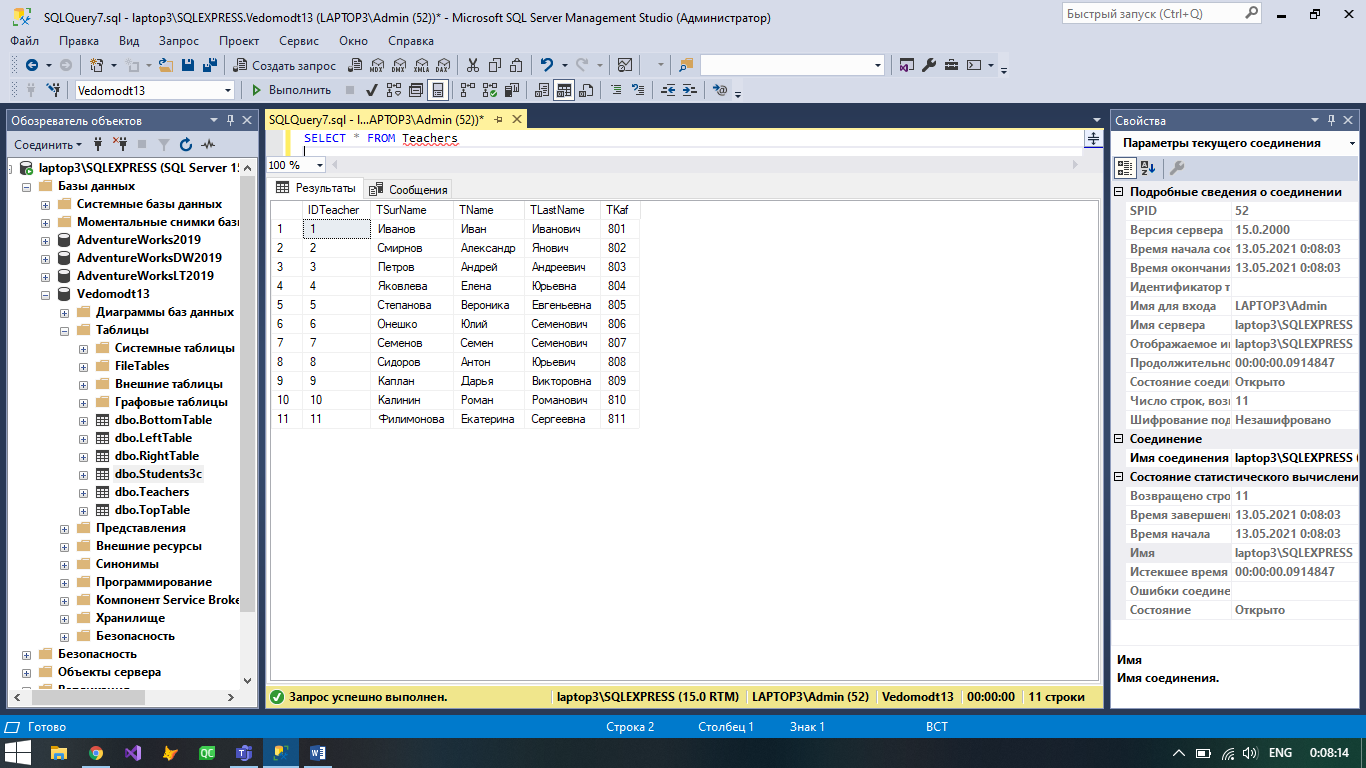
GO

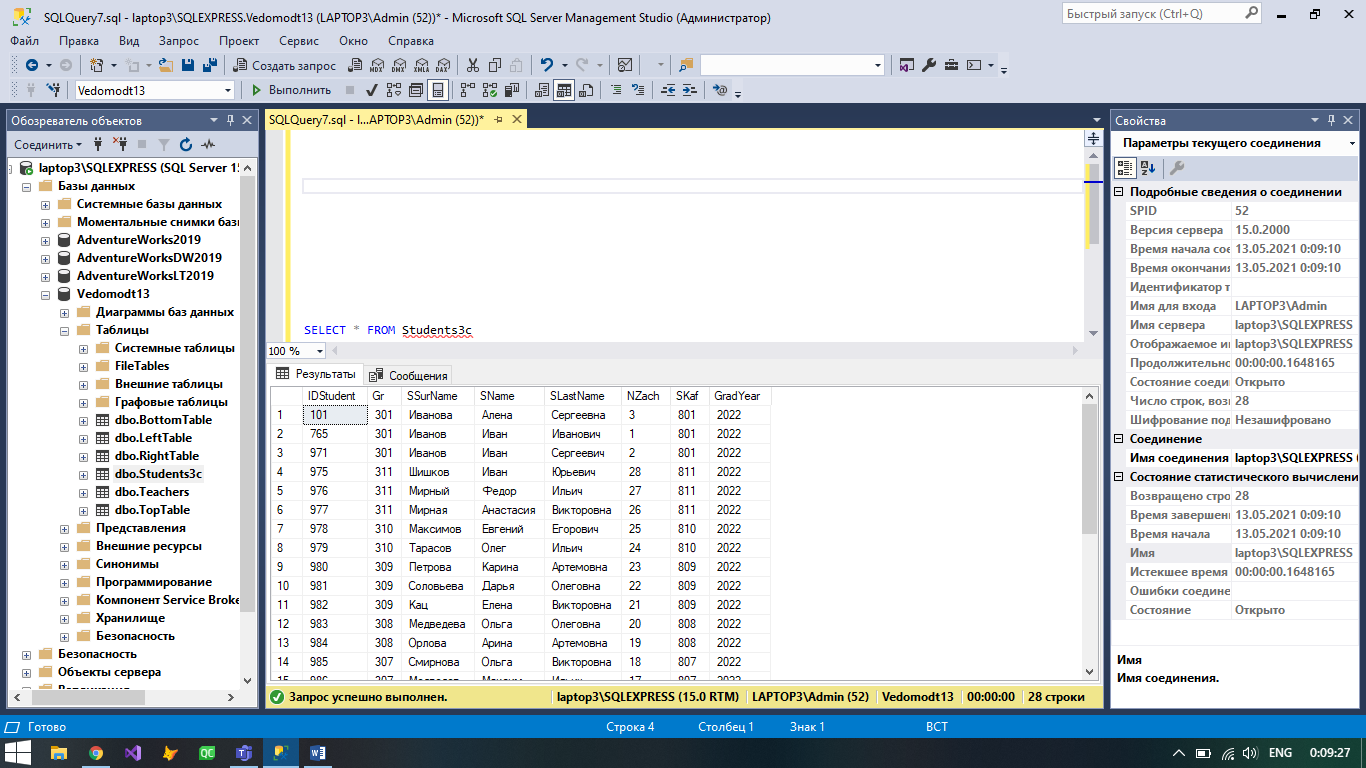
**Заполнение таблиц:**

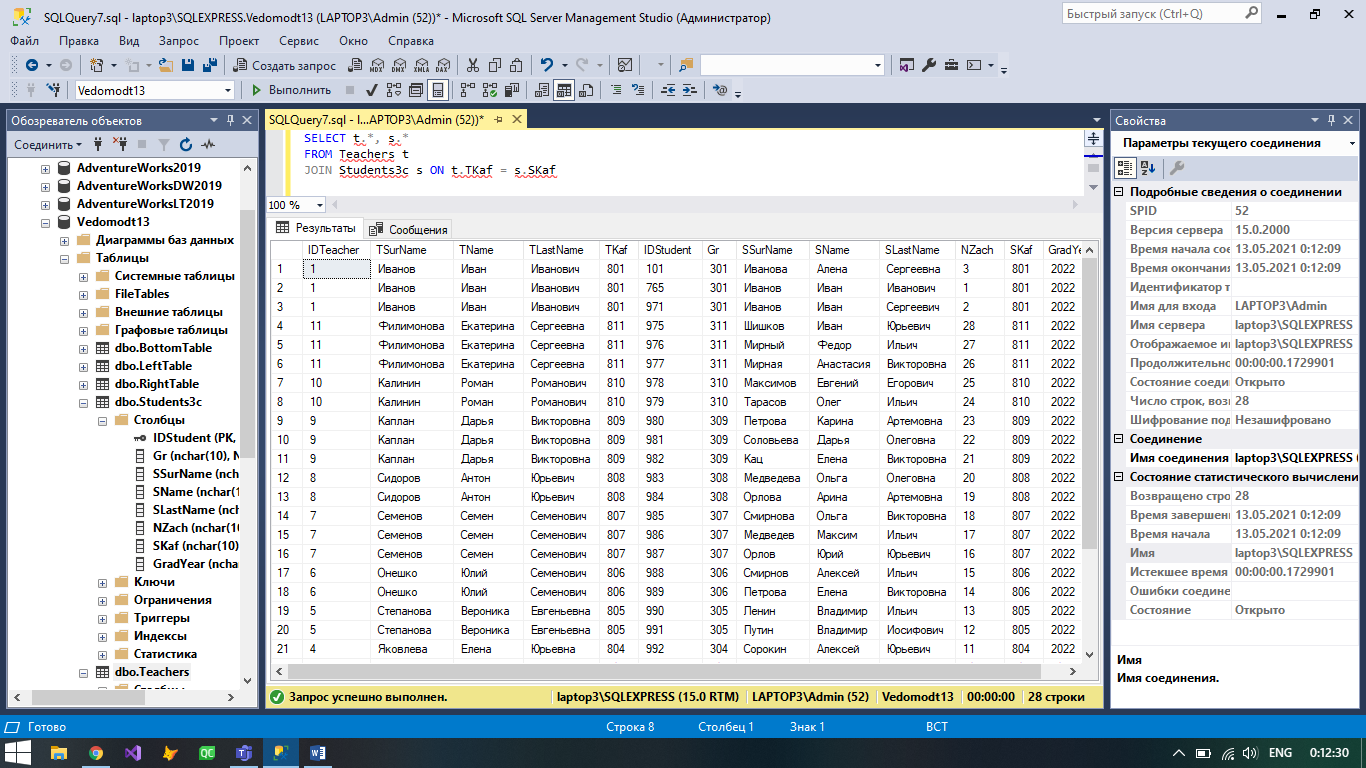


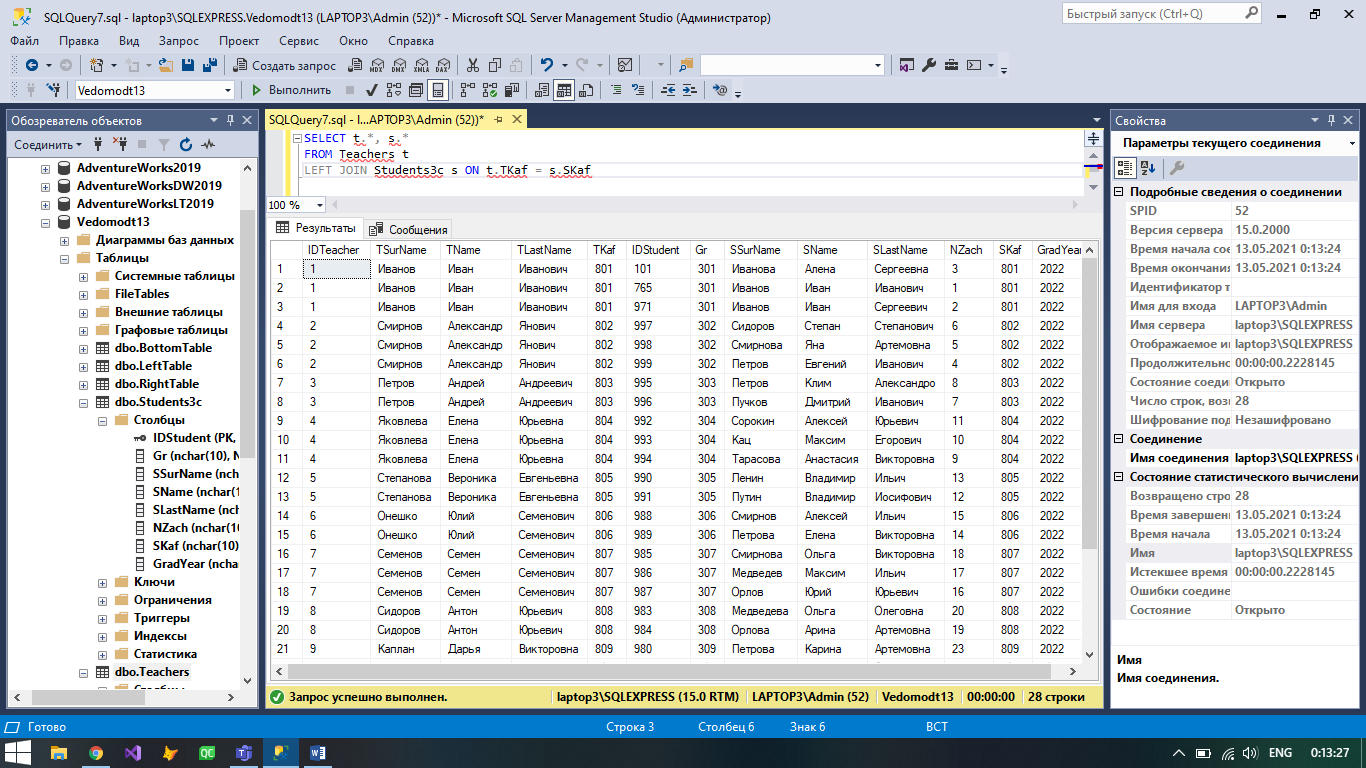


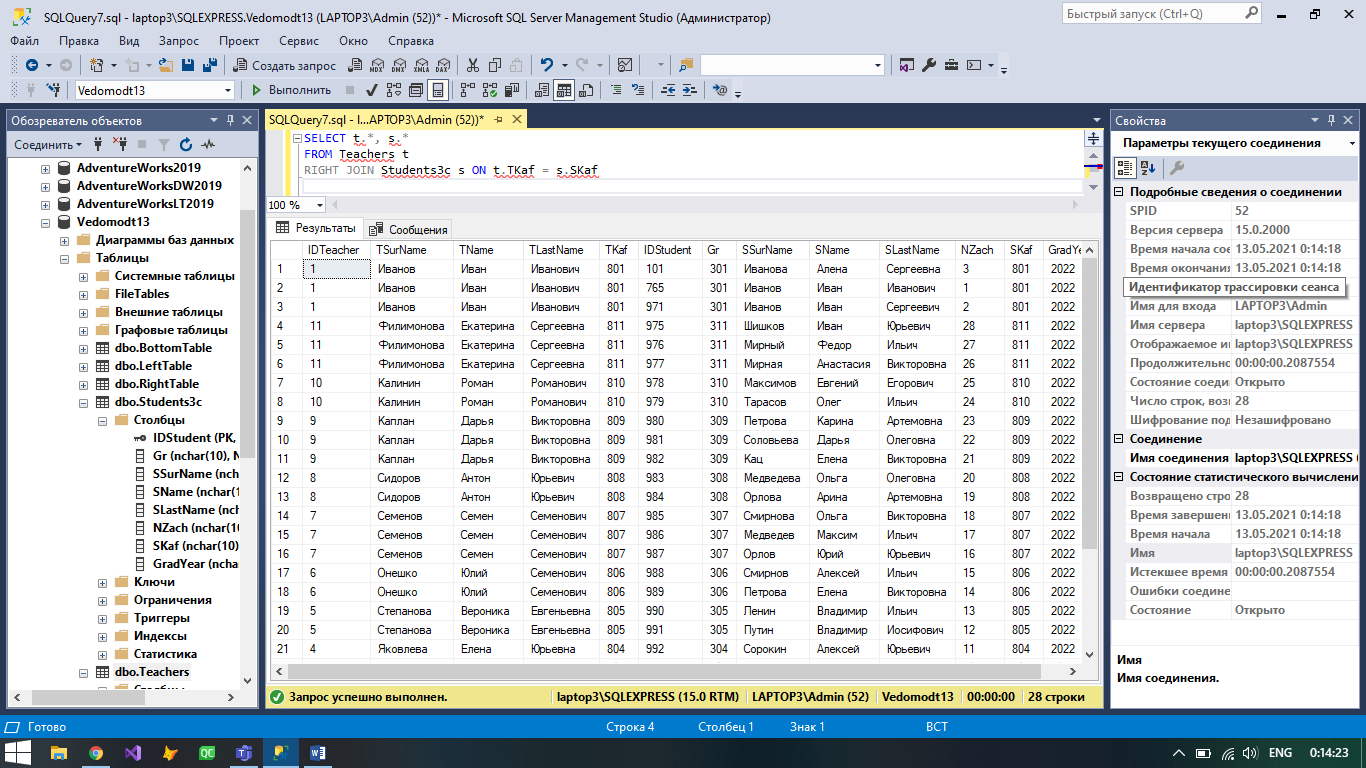
**Выполнение запросов**

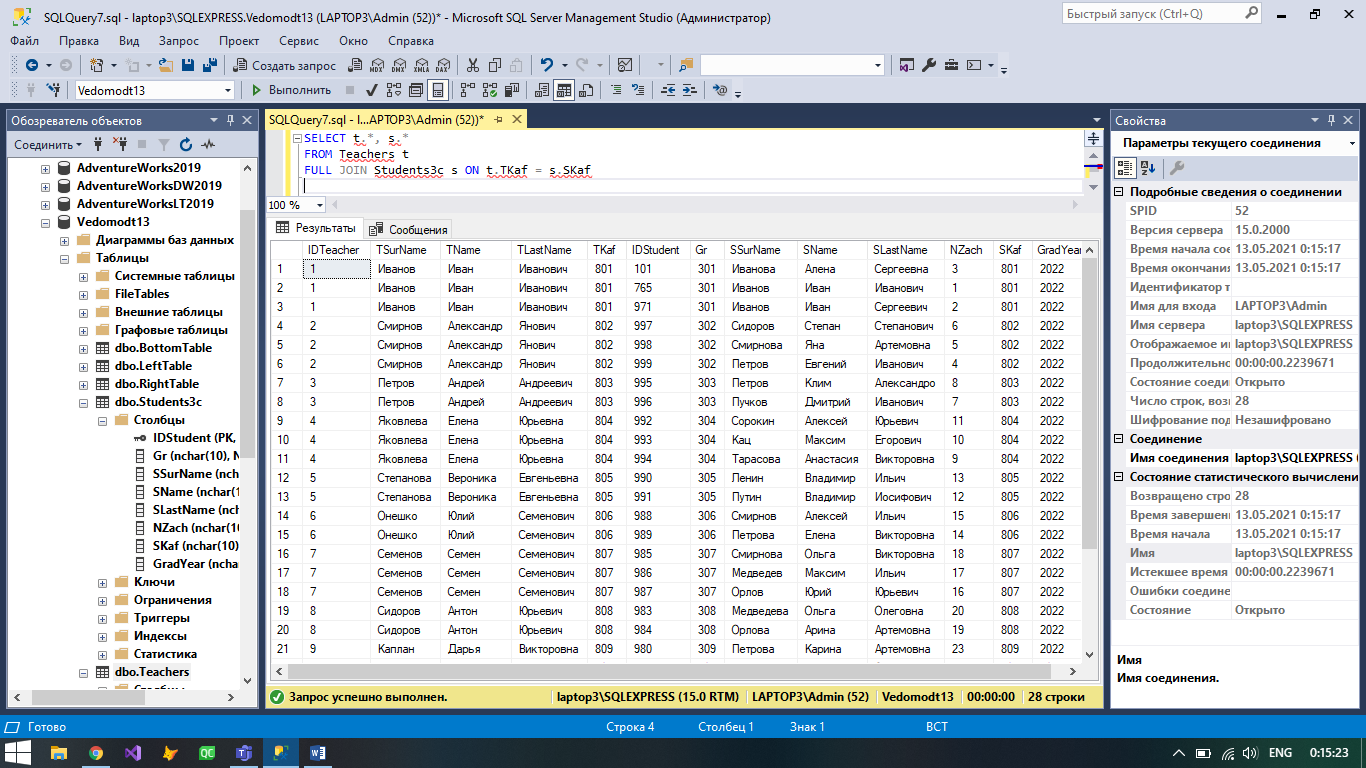














**Скрипты создания таблиц с ограничениями внешнего ключа: Teachers, Students4c, Disciplines, Grades**

**Teachers:**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[Teachers] Script Date: 13.05.2021 2:17:16 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

CREATE TABLE [dbo].[Teachers](

[IDTeacher] [smallint] NOT NULL,

[TSurName] [nchar](10) NULL,

[TName] [nchar](10) NULL,

[TLastName] [nchar](10) NULL,

[TKaf] [nchar](10) NULL,

CONSTRAINT [PK\_Teachers] PRIMARY KEY CLUSTERED

(

[IDTeacher] ASC

)WITH (PAD\_INDEX = OFF, STATISTICS\_NORECOMPUTE = OFF, IGNORE\_DUP\_KEY = OFF, ALLOW\_ROW\_LOCKS = ON, ALLOW\_PAGE\_LOCKS = ON, OPTIMIZE\_FOR\_SEQUENTIAL\_KEY = OFF) ON [PRIMARY]

) ON [PRIMARY]

GO

ALTER TABLE [dbo].[Teachers] WITH CHECK ADD CONSTRAINT [FK\_Teachers\_Teachers] FOREIGN KEY([IDTeacher])

REFERENCES [dbo].[Teachers] ([IDTeacher])

GO

ALTER TABLE [dbo].[Teachers] CHECK CONSTRAINT [FK\_Teachers\_Teachers]

GO

**Students4c:**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[Students4c] Script Date: 13.05.2021 2:17:51 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

CREATE TABLE [dbo].[Students4c](

[IDStudent4] [smallint] NOT NULL,

[Gr] [nchar](10) NULL,

[SSurName] [nchar](10) NULL,

[SName] [nchar](10) NULL,

[SLastName] [nchar](10) NULL,

[NZach] [nchar](10) NULL,

[SKaf] [nchar](10) NULL,

[GradYear] [nchar](10) NULL,

CONSTRAINT [PK\_Students4c] PRIMARY KEY CLUSTERED

(

[IDStudent4] ASC

)WITH (PAD\_INDEX = OFF, STATISTICS\_NORECOMPUTE = OFF, IGNORE\_DUP\_KEY = OFF, ALLOW\_ROW\_LOCKS = ON, ALLOW\_PAGE\_LOCKS = ON, OPTIMIZE\_FOR\_SEQUENTIAL\_KEY = OFF) ON [PRIMARY]

) ON [PRIMARY]

GO

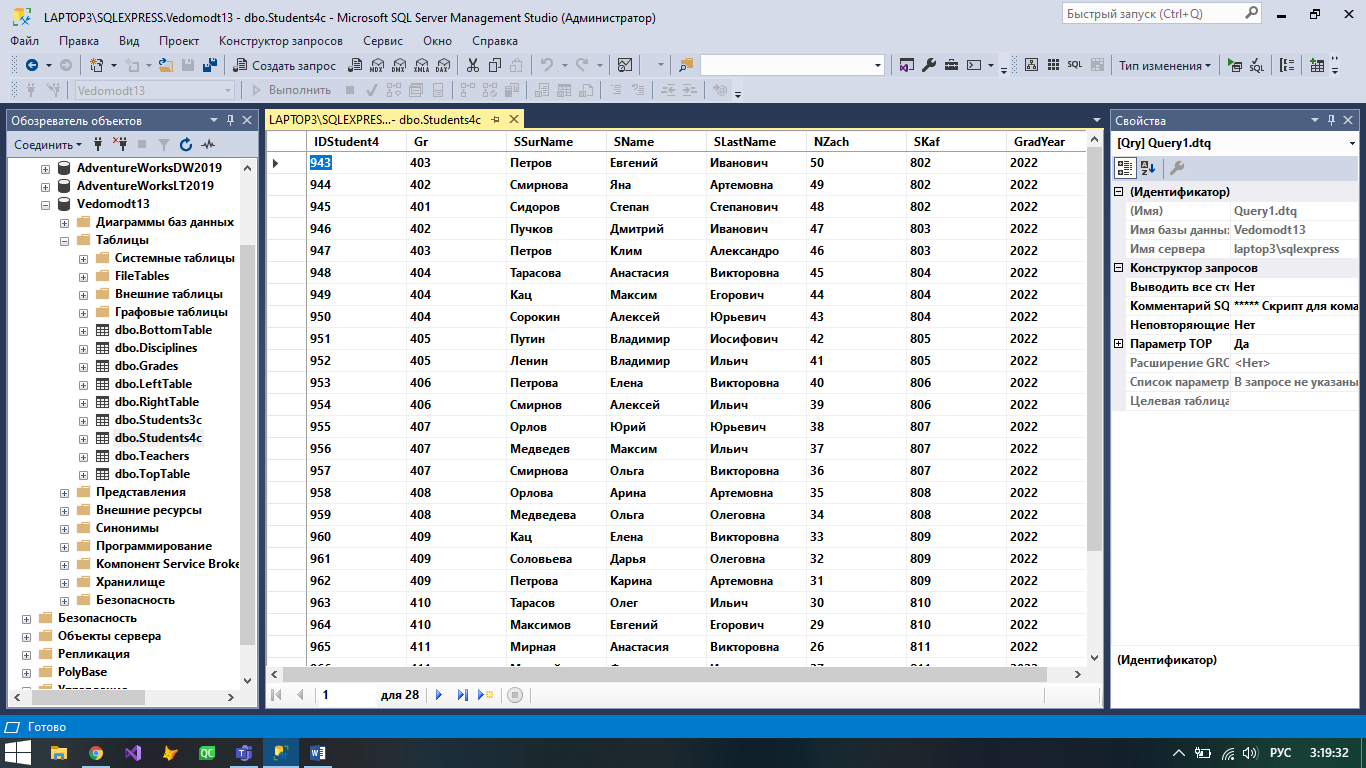
ALTER TABLE [dbo].[Students4c] WITH CHECK ADD CONSTRAINT [FK\_Students4c\_Students4c] FOREIGN KEY([IDStudent4])

REFERENCES [dbo].[Students4c] ([IDStudent4])

GO

ALTER TABLE [dbo].[Students4c] CHECK CONSTRAINT [FK\_Students4c\_Students4c]

GO



**Disciplines:**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[Students4c] Script Date: 13.05.2021 2:17:51 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

CREATE TABLE [dbo].[Students4c](

[IDStudent4] [smallint] NOT NULL,

[Gr] [nchar](10) NULL,

[SSurName] [nchar](10) NULL,

[SName] [nchar](10) NULL,

[SLastName] [nchar](10) NULL,

[NZach] [nchar](10) NULL,

[SKaf] [nchar](10) NULL,

[GradYear] [nchar](10) NULL,

CONSTRAINT [PK\_Students4c] PRIMARY KEY CLUSTERED

(

[IDStudent4] ASC

)WITH (PAD\_INDEX = OFF, STATISTICS\_NORECOMPUTE = OFF, IGNORE\_DUP\_KEY = OFF, ALLOW\_ROW\_LOCKS = ON, ALLOW\_PAGE\_LOCKS = ON, OPTIMIZE\_FOR\_SEQUENTIAL\_KEY = OFF) ON [PRIMARY]

) ON [PRIMARY]

GO

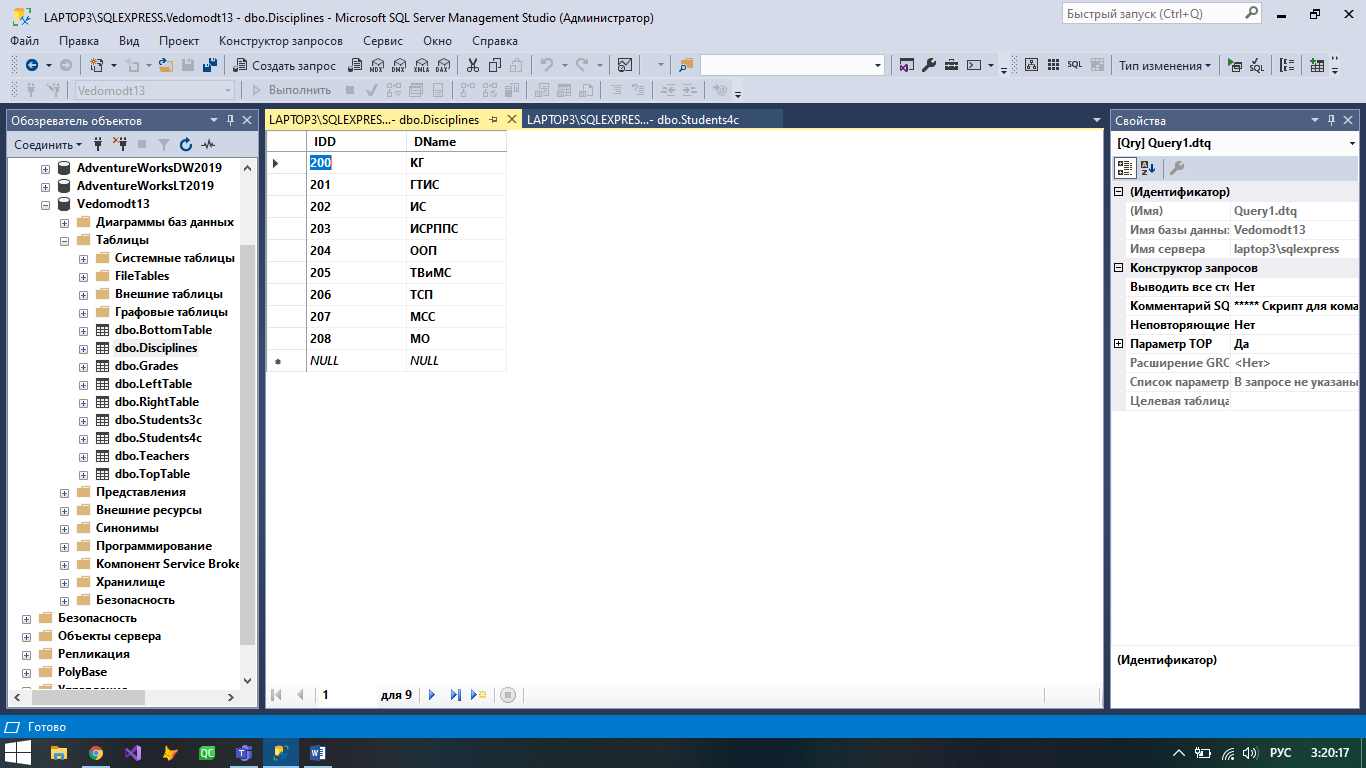
ALTER TABLE [dbo].[Students4c] WITH CHECK ADD CONSTRAINT [FK\_Students4c\_Students4c] FOREIGN KEY([IDStudent4])

REFERENCES [dbo].[Students4c] ([IDStudent4])

GO

ALTER TABLE [dbo].[Students4c] CHECK CONSTRAINT [FK\_Students4c\_Students4c]

GO



**Grades (содержит ограничение внешнего ключа и ограничение CHECK на значения столбца с оценками):**

USE [Vedomodt13]

GO

/\*\*\*\*\*\* Object: Table [dbo].[Grades] Script Date: 13.05.2021 2:19:31 \*\*\*\*\*\*/

SET ANSI\_NULLS ON

GO

SET QUOTED\_IDENTIFIER ON

GO

CREATE TABLE [dbo].[Grades](

[ID] [smallint] NOT NULL,

[FS] [smallint] NULL,

[FD] [smallint] NULL,

[FT] [smallint] NULL,

[Grade] [nchar](10) NULL,

[Date] [smalldatetime] NULL,

CONSTRAINT [PK\_Grades] PRIMARY KEY CLUSTERED

(

[ID] ASC

)WITH (PAD\_INDEX = OFF, STATISTICS\_NORECOMPUTE = OFF, IGNORE\_DUP\_KEY = OFF, ALLOW\_ROW\_LOCKS = ON, ALLOW\_PAGE\_LOCKS = ON, OPTIMIZE\_FOR\_SEQUENTIAL\_KEY = OFF) ON [PRIMARY]

) ON [PRIMARY]

GO

ALTER TABLE [dbo].[Grades] WITH CHECK ADD CONSTRAINT [FK\_Grades\_Disciplines] FOREIGN KEY([FD])

REFERENCES [dbo].[Disciplines] ([IDD])

GO

ALTER TABLE [dbo].[Grades] CHECK CONSTRAINT [FK\_Grades\_Disciplines]

GO

ALTER TABLE [dbo].[Grades] WITH CHECK ADD CONSTRAINT [FK\_Grades\_Students4c] FOREIGN KEY([FS])

REFERENCES [dbo].[Students4c] ([IDStudent4])

GO

ALTER TABLE [dbo].[Grades] CHECK CONSTRAINT [FK\_Grades\_Students4c]

GO

ALTER TABLE [dbo].[Grades] WITH CHECK ADD CONSTRAINT [FK\_Grades\_Teachers] FOREIGN KEY([FT])

REFERENCES [dbo].[Teachers] ([IDTeacher])

GO

ALTER TABLE [dbo].[Grades] CHECK CONSTRAINT [FK\_Grades\_Teachers]

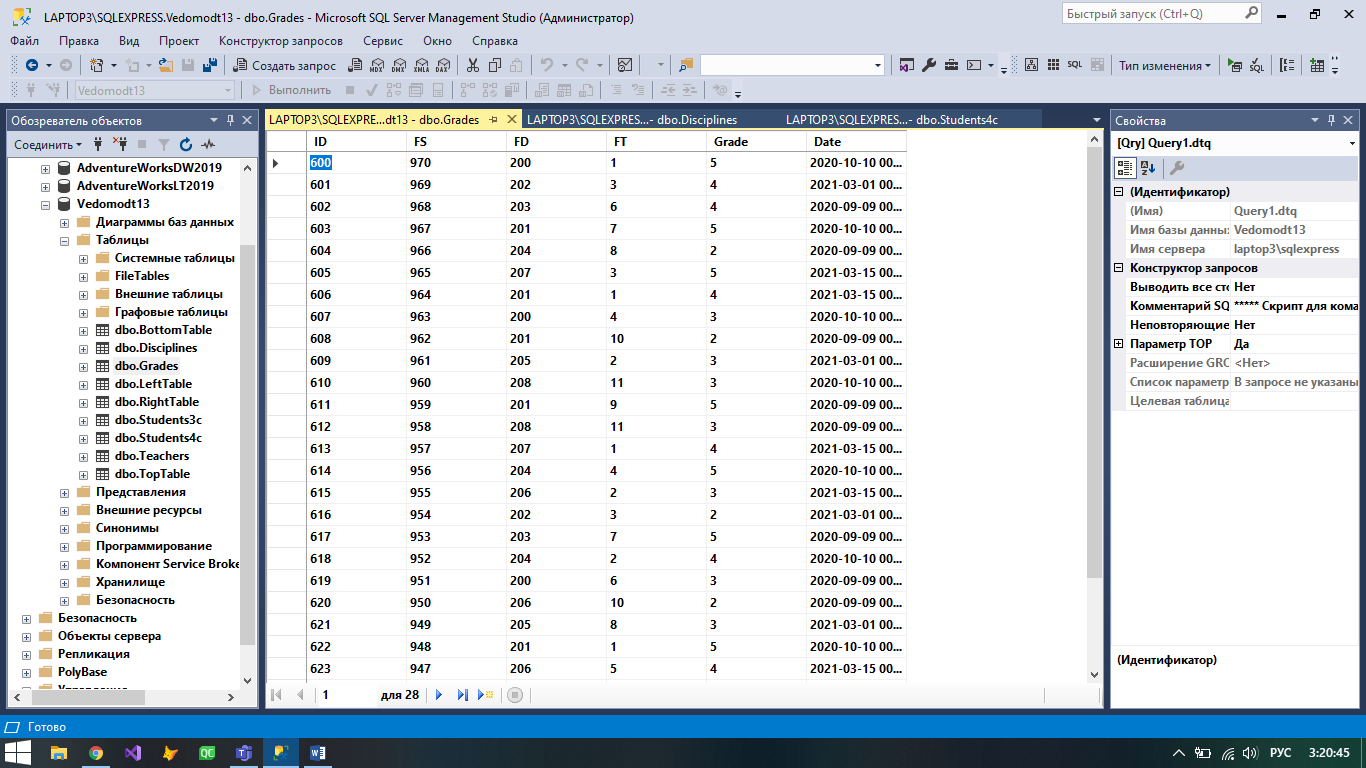
GO

ALTER TABLE [dbo].[Grades] WITH CHECK ADD CONSTRAINT [CK\_Grades] CHECK (([Grade]>=(2) AND [Grade]<=(5)))

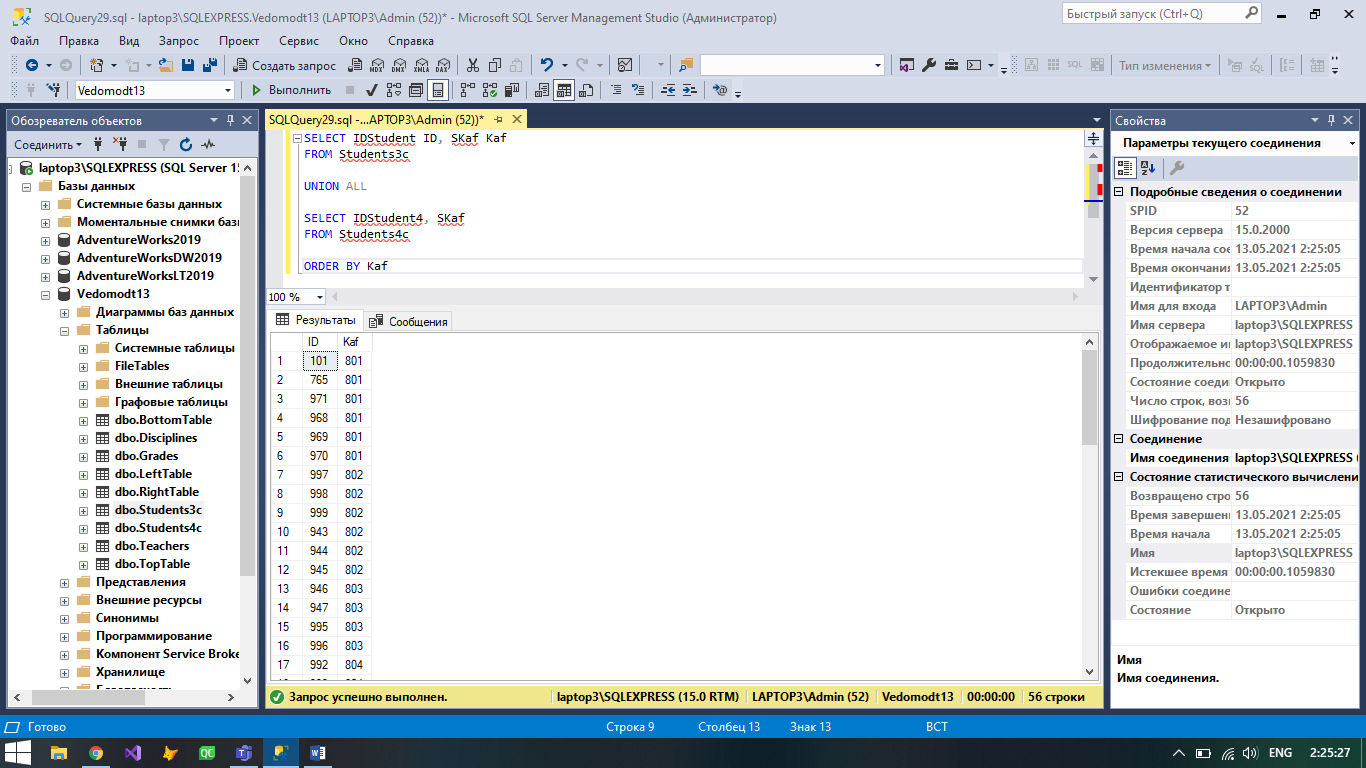
GO

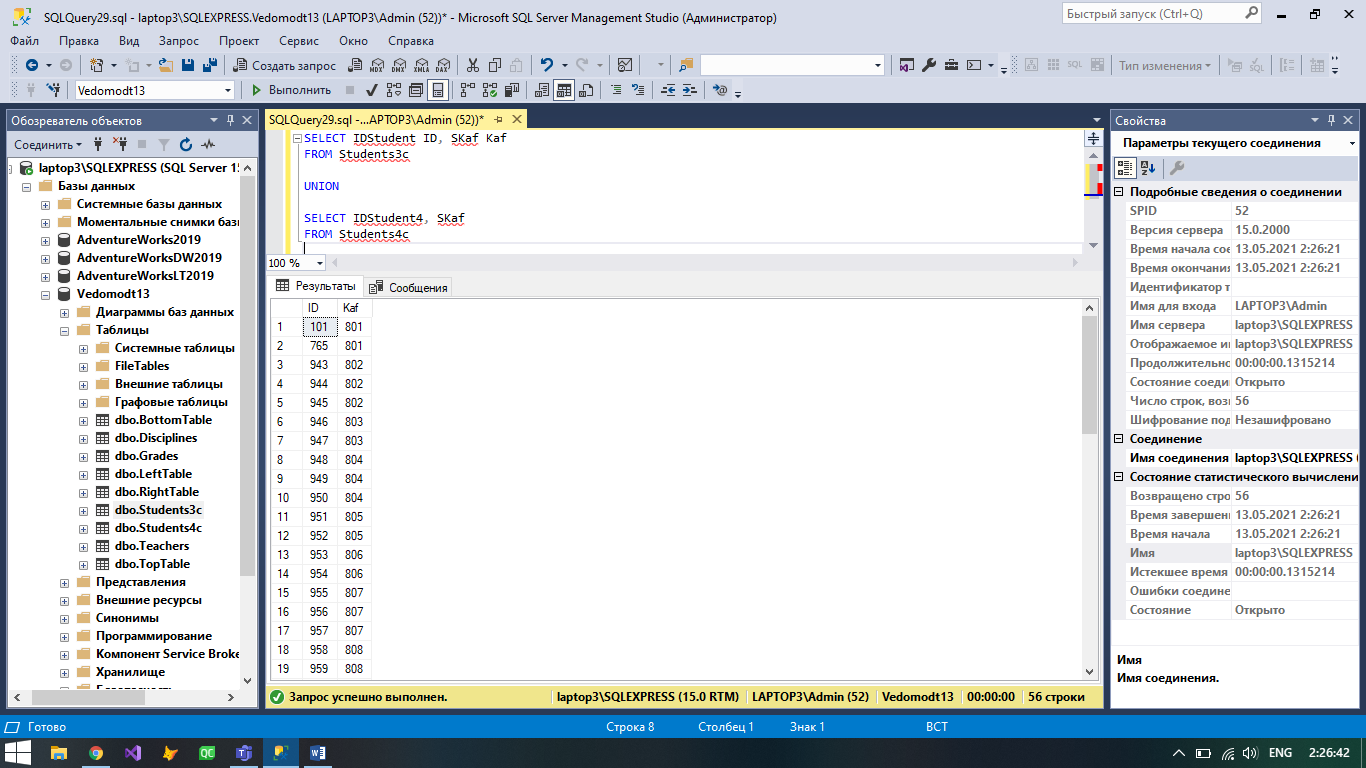
ALTER TABLE [dbo].[Grades] CHECK CONSTRAINT [CK\_Grades]

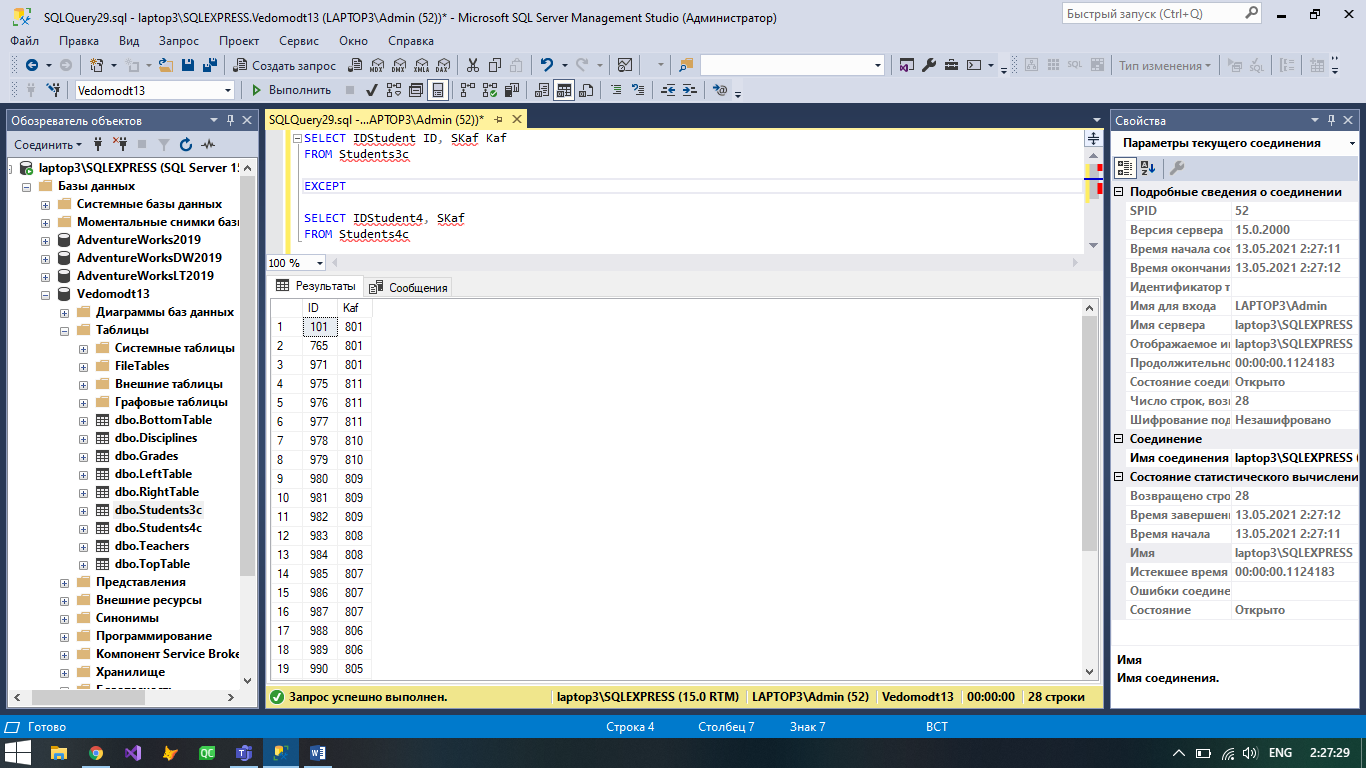
GO

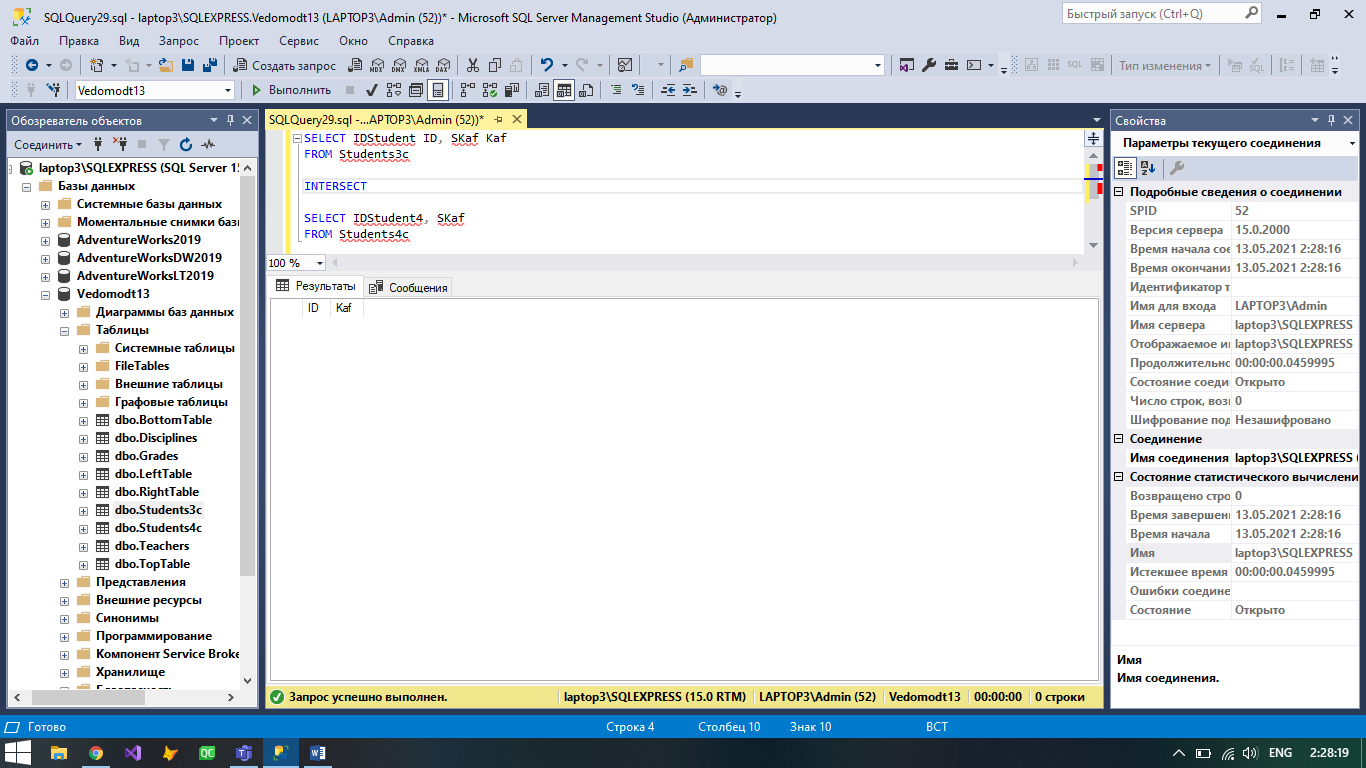


**Вертикальные объединения Students3c и Students4c**

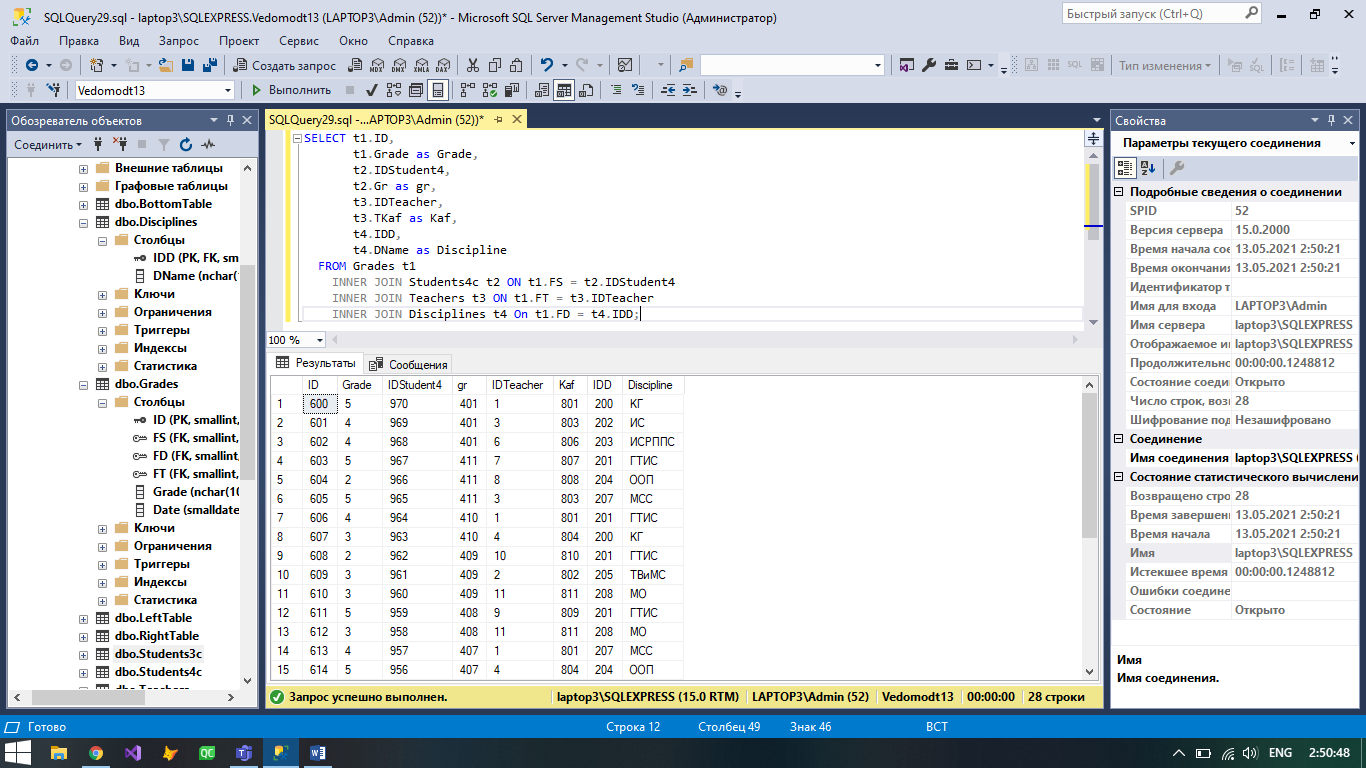




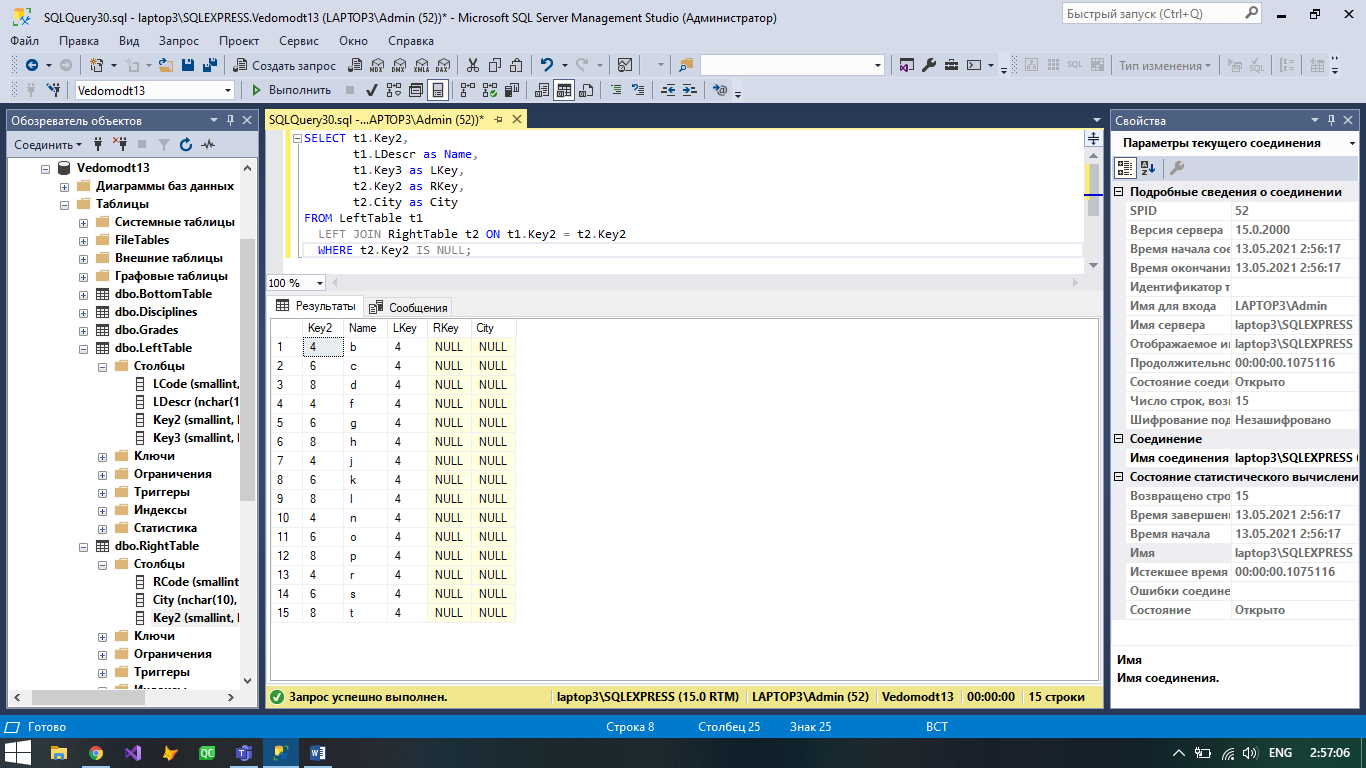




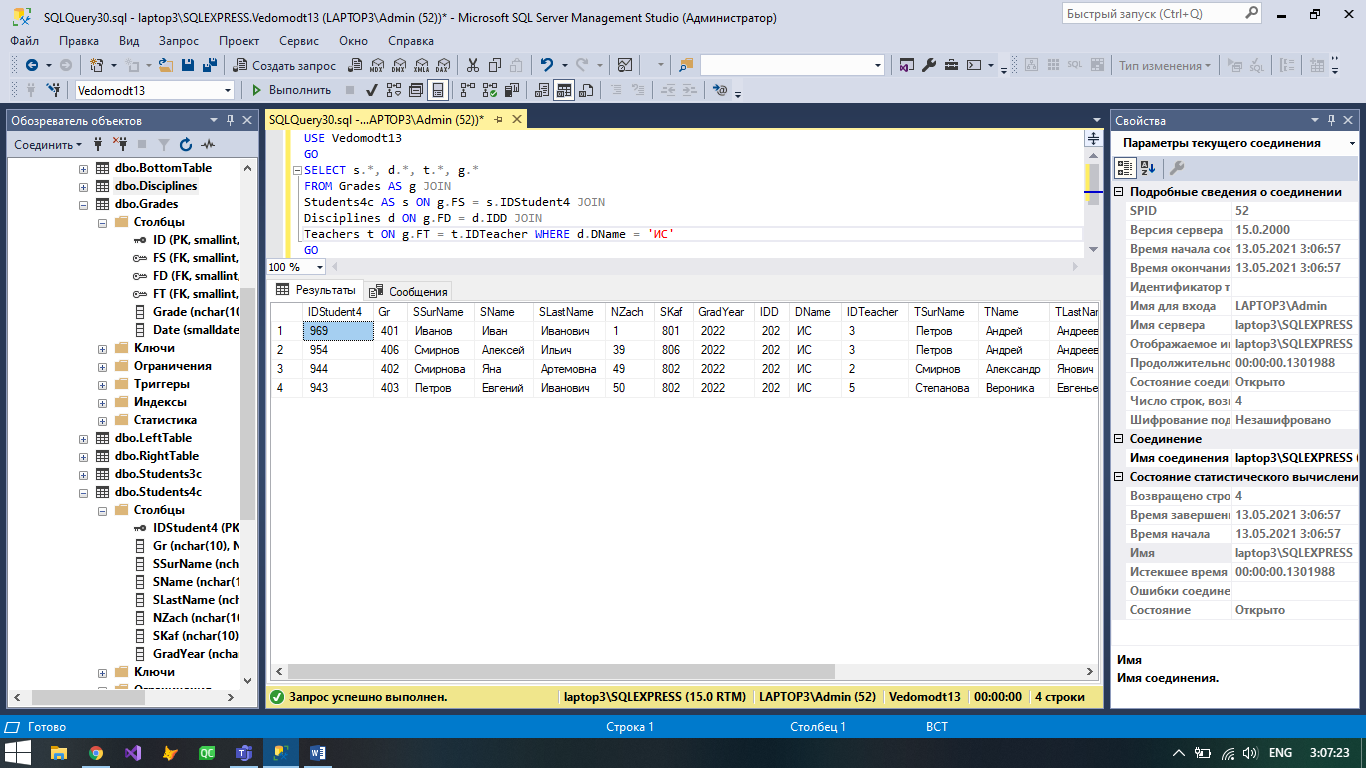
**Множественное JOIN-соединение таблиц: Оценки, Студенты, Дисциплины, Преподаватели**



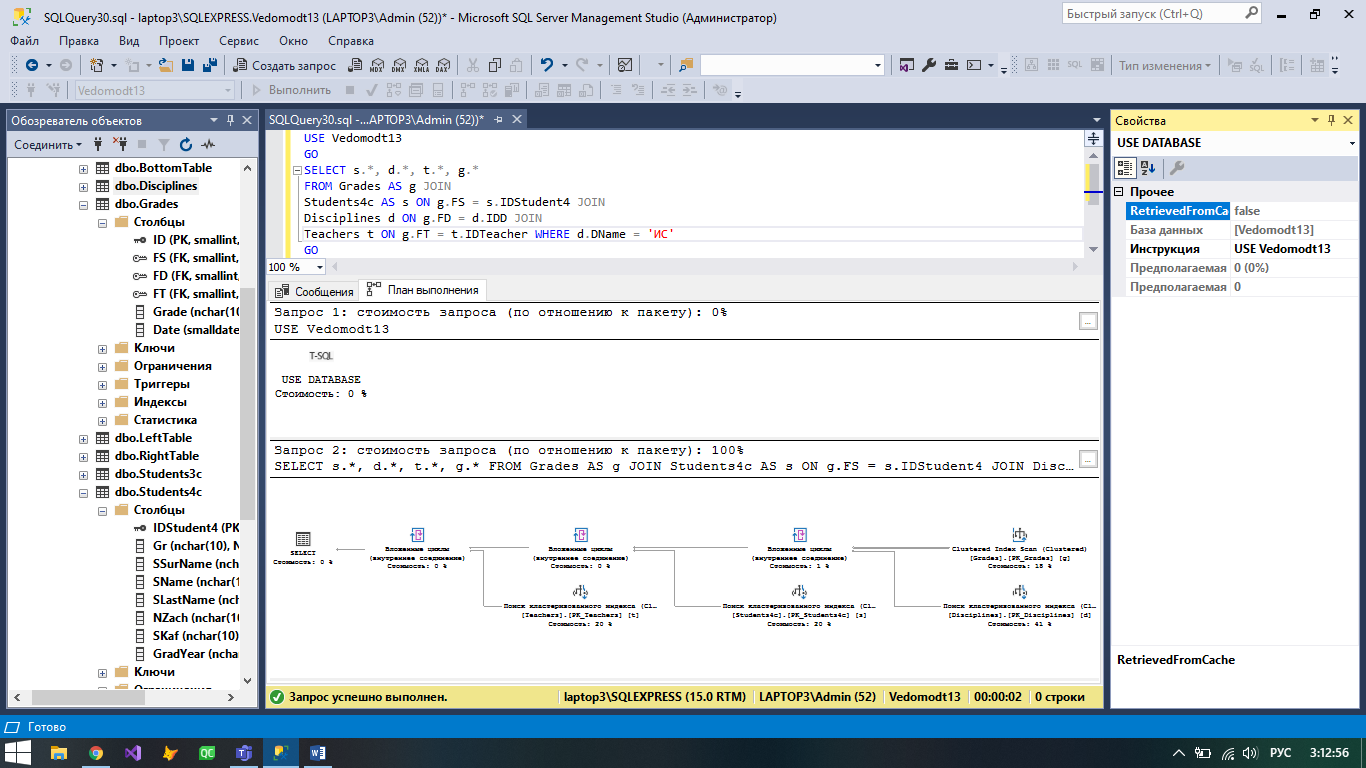
**JOIN-соединение для получения исключения пересечения таблиц LeftTable и RightTable**



**Запрос «Оценки по ИС»**



**План выполнения SELECT-запроса**



**Создание представления View на основе SELECT-запроса**

