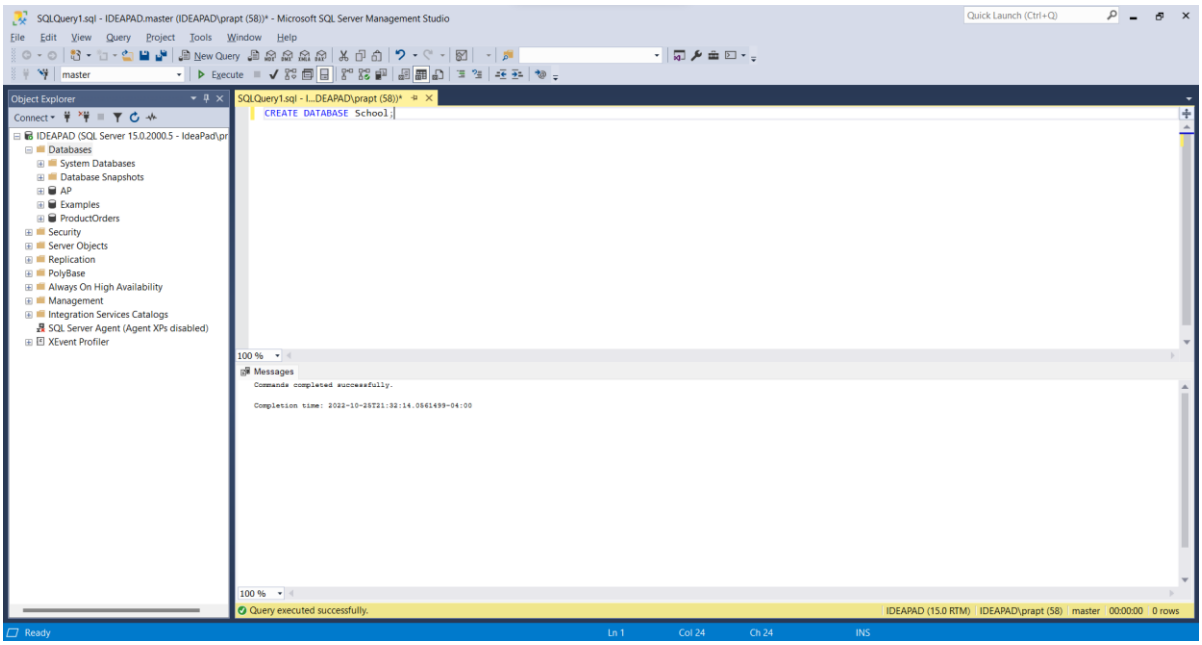
CSE 581 : INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

LAB : 7

DATE : 10/26/2022

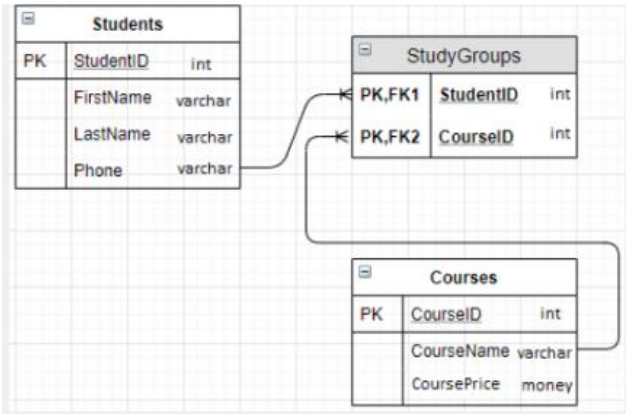
Q1) Create a new database named School.

Ans: CREATE DATABASE School;



Comment: Here CREATE DATABASE statement is used to create a new database of the name School.

Q2) (1) Describe the relationship type shown in figure (one-to-one, one-to-many or many-to-many).



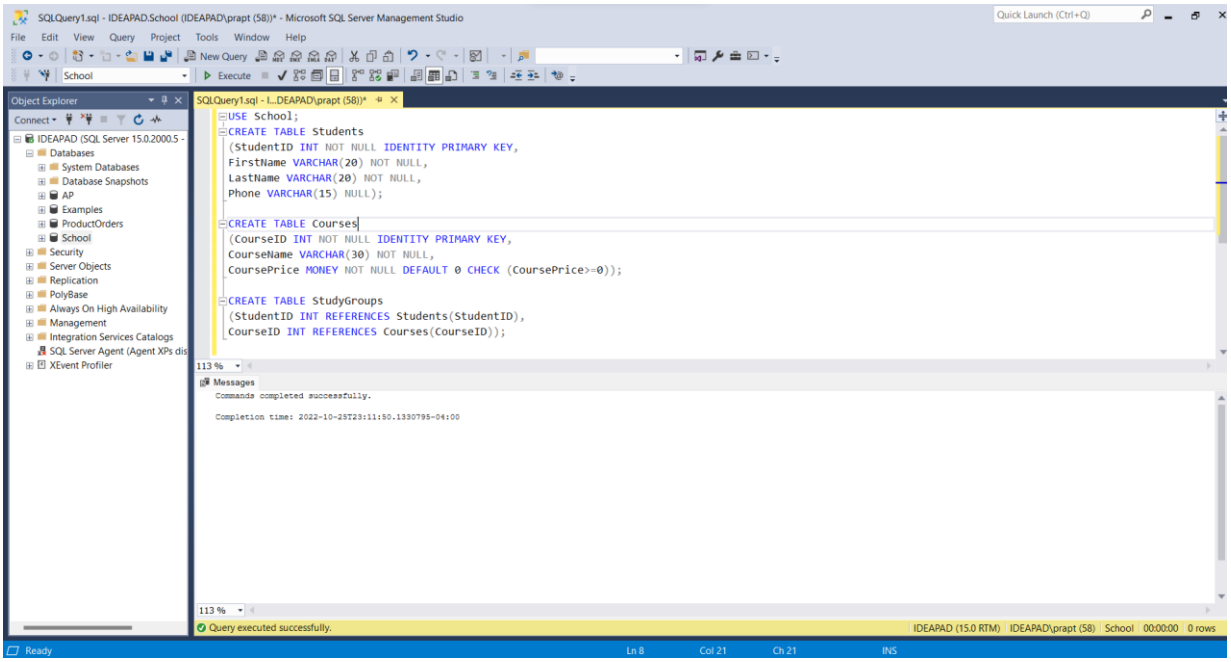
Ans: There is a one-to-many relationship between the Students table and the StudyGroups table as there can be many StudyGroups for one student to be present in.

There is a one-to-many relationship between the Courses table and the StudyGroups table as there can be many StudyGroups a subject can be there.

(2) Write the CREATE TABLE statements needed to implement the following design in the School database. Include foreign key constraints. Define StudentID and CourseID as identity columns. Decide which columns should allow null values, if any, and explain your decision. Define the Course Price column with a default zero and a check constraint to allow only positive values.

Ans: USE School;

```
CREATE TABLE Students
(StudentID INT NOT NULL IDENTITY PRIMARY KEY,
FirstName VARCHAR(20) NOT NULL,
LastName VARCHAR(20) NOT NULL,
Phone VARCHAR(15) NULL);
CREATE TABLE Courses
(CourseID INT NOT NULL IDENTITY PRIMARY KEY,
CourseName VARCHAR(30) NOT NULL,
CoursePrice MONEY NOT NULL DEFAULT 0 CHECK (CoursePrice>=0));
CREATE TABLE StudyGroups
(StudentID INT REFERENCES Students(StudentID),
CourseID INT REFERENCES Courses(CourseID));
```



Comment: Here, USE is used to select the School Database. CREATE TABLE statement is used to make a table in the database that is selected. Students table is created and the column names, data types, constraints are added as the parameters of the table created. StudentID column is created of the Int datatype and NOT NULL constraint. It is made an identity column and a primary key. FirstName and LastName columns are made with VARCHAR(20) datatype and NOT NULL constraint. Phone column is made with the datatype VARCHAR(15) and NULL constraint. Courses table is created using the CREATE TABLE statement where CourseID column is created of the Int datatype and NOT NULL constraint. It is made an identity column and a primary key. CourseName column is made with VARCHAR(30) datatype and NOT NULL constraint. CoursePrice column is made with the datatype MONEY and the NOT NULL constraint. DEFAULT constraint is used to set the default value of the column to be 0 and a check constraint is given to check whether the inserted value is greater than or equal to 0. StudyGroups table is created using the CREATE TABLE statement. StudentID is taken as a foreign key from the Students table where StudentID is the primary key of the type int using REFERENCES. Similarly, CourseID is taken as a foreign key from the Courses table where CourseID is the primary key of the type int using REFERENCES.

Q3) Write the CREATE INDEX statements to create a clustered index on the StudentID column and a Non clustered index on the CourseID column of the StudyGroups table.

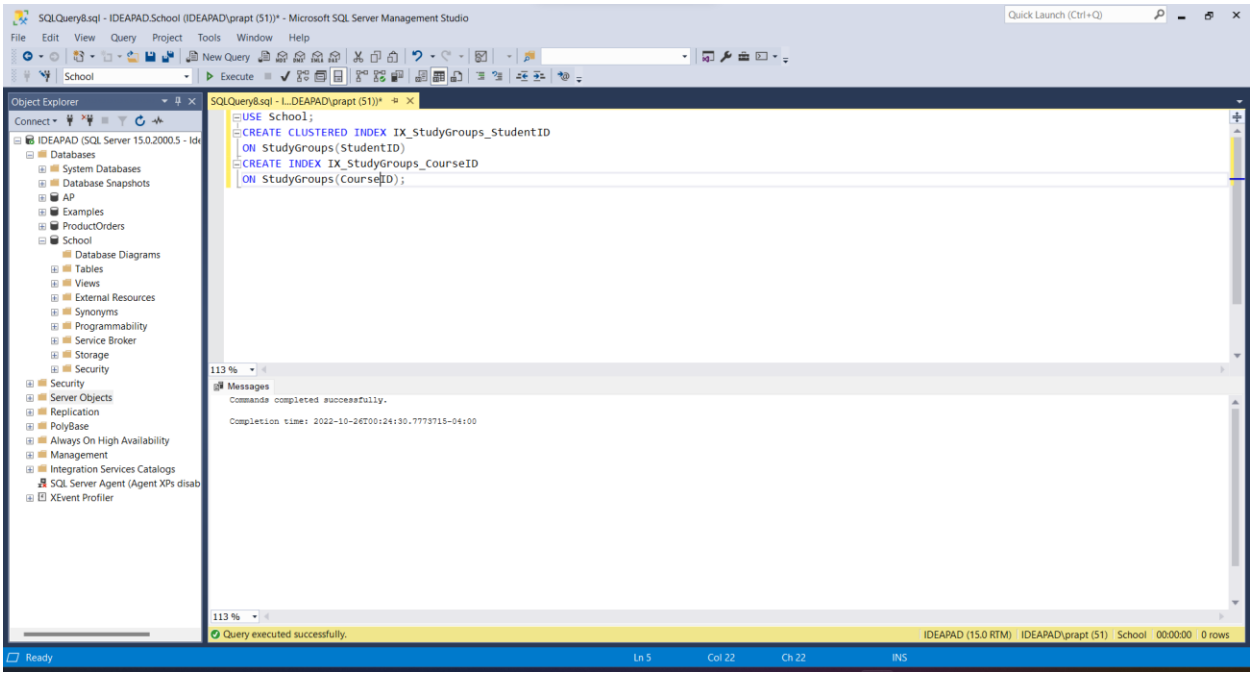
Ans: USE School;

CREATE CLUSTERED INDEX IX_StudyGroups_StudentID

ON StudyGroups(StudentID)

CREATE INDEX IX_StudyGroups_CourseID

ON StudyGroups(CourseID);



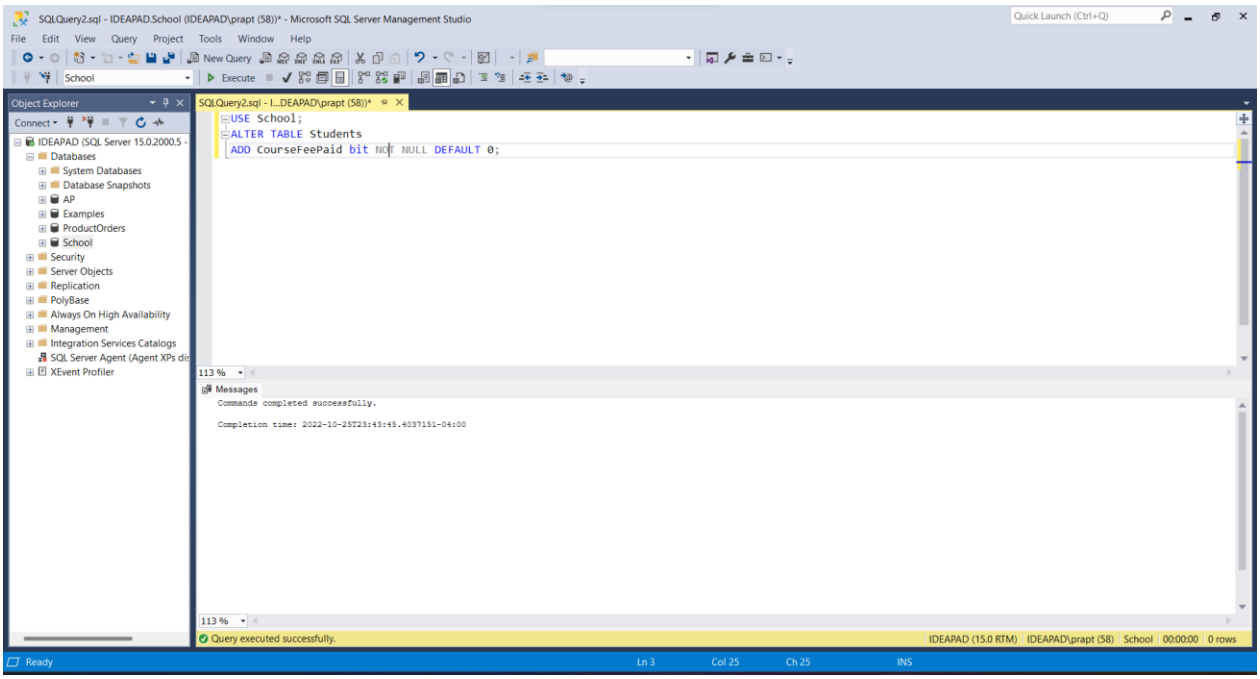
Comment: Here, USE is used to select the School Database. CREATE CLUSTERED INDEX statement is used to create clustered index on the StudentID column in the StudyGroups table and CREATE INDEX is used to create non-clustered index on the CourseID column in the StudyGroups table.

Q4) Write an ALTER TABLE statement that adds a new column, CourseFeePaid, to the Students table. Use the bit data type, disallow null values, and assign a default Boolean value of False.

Ans: USE School;

ALTER TABLE Students

ADD CourseFeePaid bit NOT NULL DEFAULT 0;



Comment: Here, USE is used to select the School Database. ALTER TABLE statement is used to make changes in the existing table. Here, to add a new column in the Students table we use ADD command with the column name CourseFeePaid with bit datatype, NOT NULL and DEFAULT constraints with the default value set to 0.

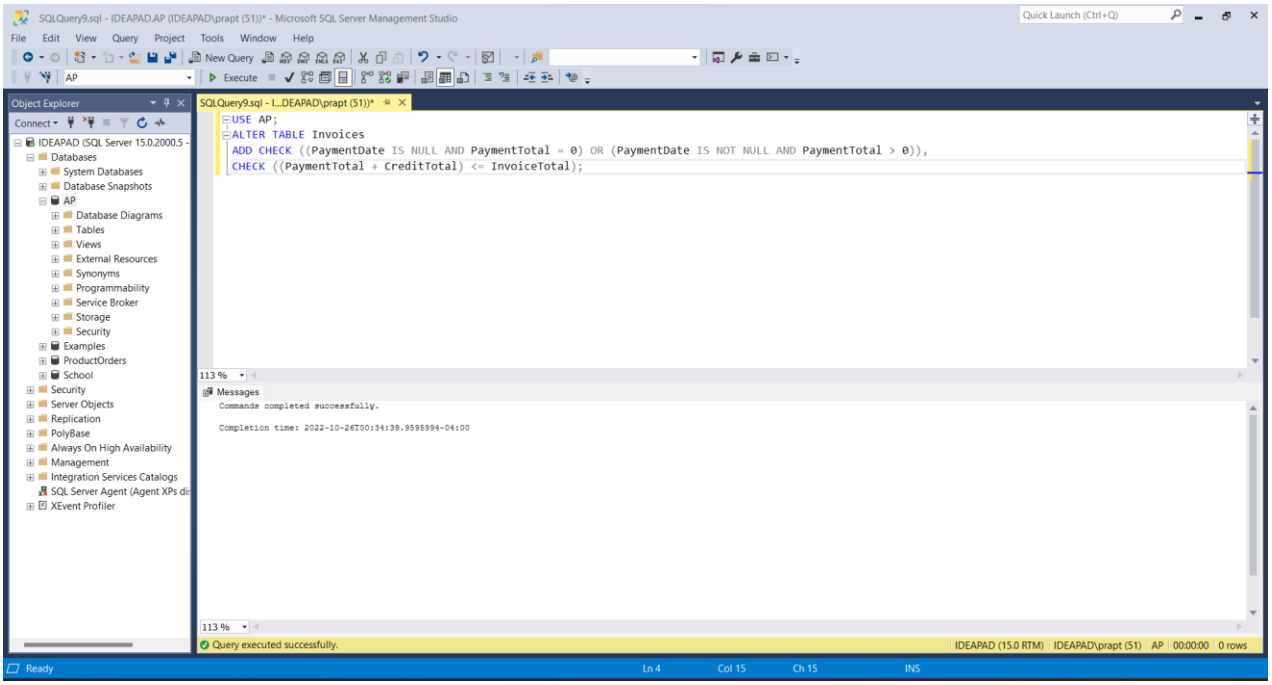
Q5) Write an ALTER TABLE statement that adds two new check constraints to the Invoices table in *the AP database*. The first should allow (1) PaymentDate to be null only if PaymentTotal is zero and (2) PaymentDate to be not null only if PaymentTotal is greater than zero. The second constraint should prevent the sum of PaymentTotal and CreditTotal from being greater than InvoiceTotal.

Ans: USE AP;

ALTER TABLE Invoices

ADD CHECK ((PaymentDate IS NULL AND PaymentTotal = 0) OR (PaymentDate IS NOT NULL AND PaymentTotal > 0)),

CHECK ((PaymentTotal + CreditTotal) <= InvoiceTotal);



Comment: Here, USE is used to select the AP Database. ALTER TABLE statement is used to make changes in the existing table. Here, to add constraints to existing columns we use the ADD command. PaymentDate IS NULL AND PaymentTotal = 0 is to checked or PaymentDate IS NOT NULL AND PaymentTotal > 0 is checked by using the check constraint to let PaymentDate to be null only if the PaymentTotal is zero or else the PaymentDate to be null only if the PaymentTotal is greater than 0. Furthermore, sum of PaymentTotal and CreditTotal should be less than or equal to the InvoiceTotal.

Q6) Delete the StudyGroups table from the School database. Then, write a CREATE TABLE statement that recreates the table, this time with a unique constraint that prevents a student from being a study-group member in the same course twice.

Ans: USE School;

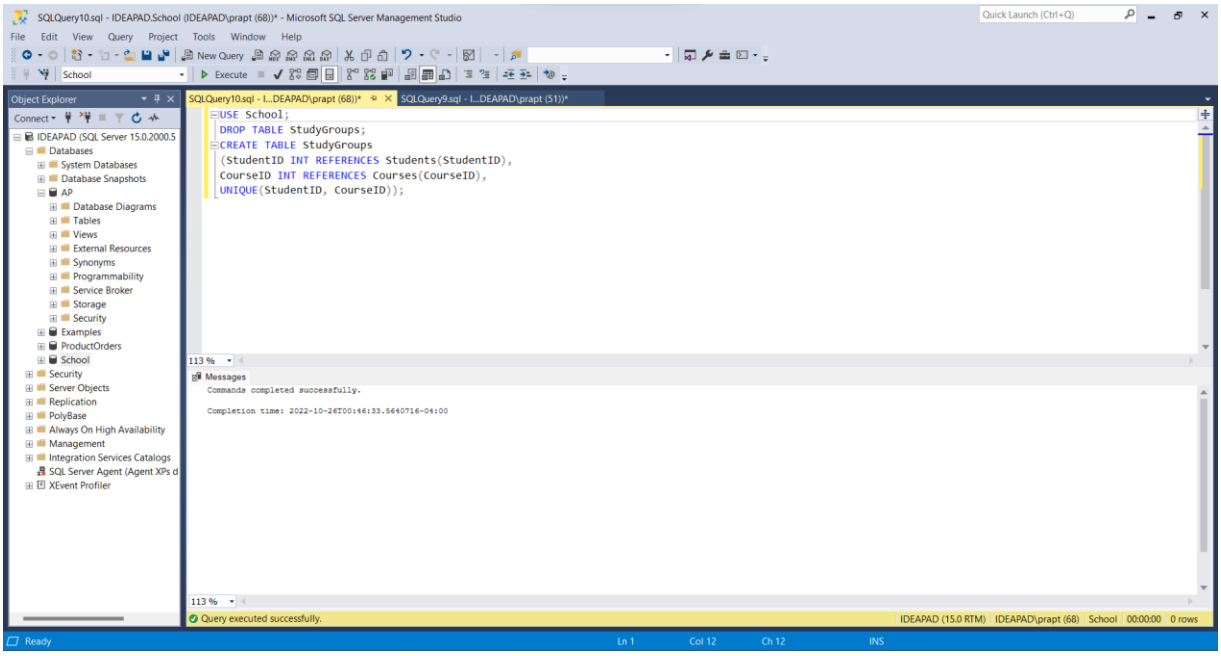
DROP TABLE StudyGroups;

CREATE TABLE StudyGroups

(StudentID INT REFERENCES Students(StudentID),

CourseID INT REFERENCES Courses(CourseID),

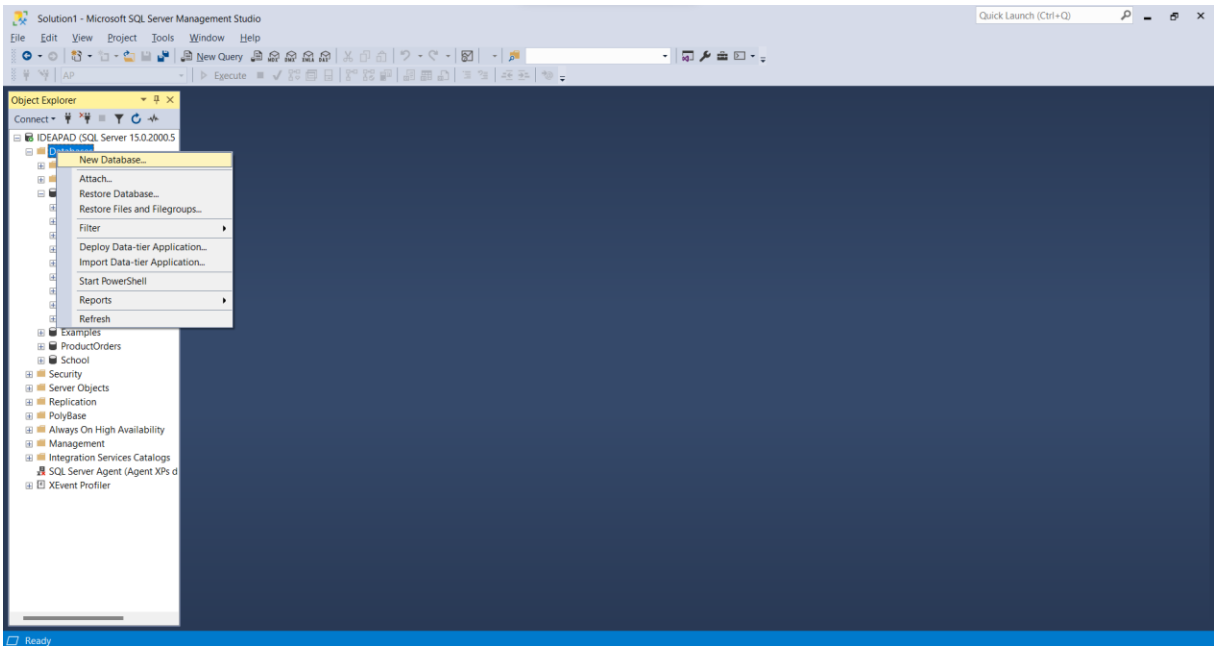
UNIQUE(StudentID, CourseID));

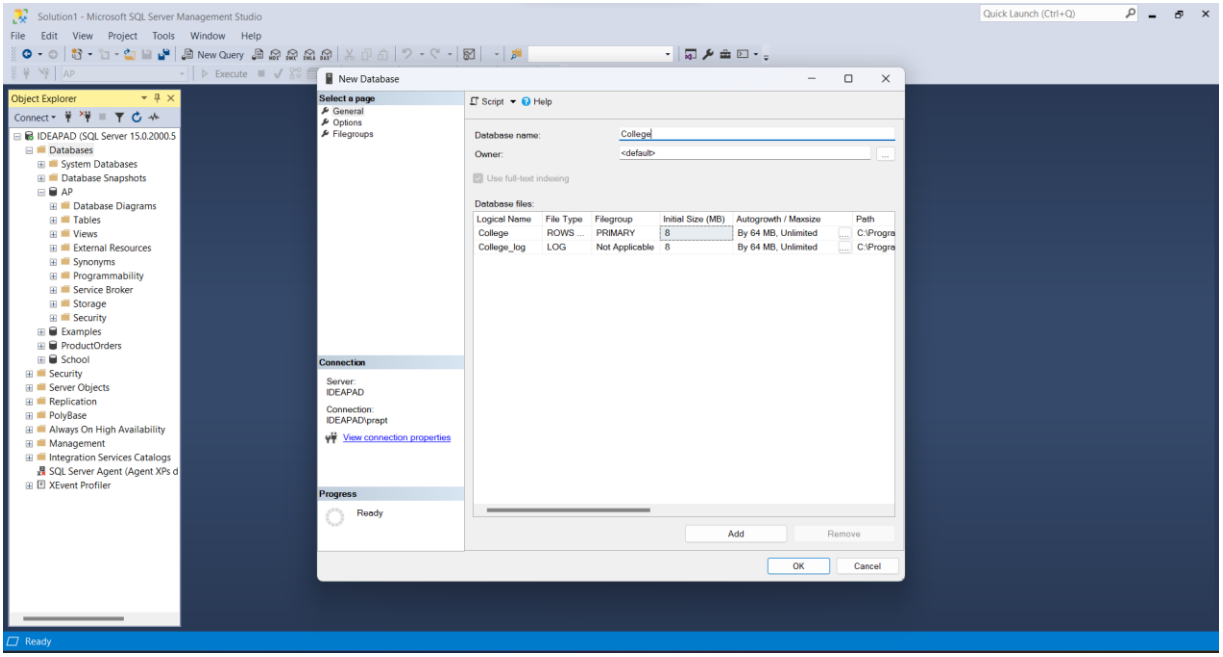


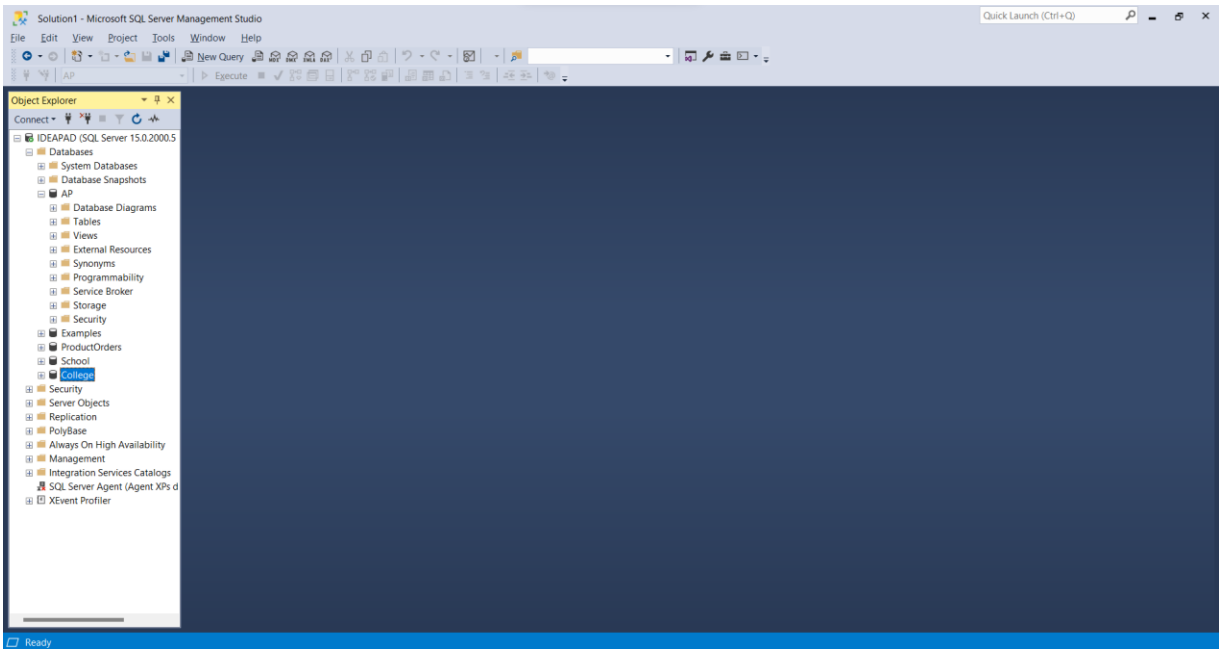
Comment: Here, USE is used to select the School database. DROP TABLE statement is used to delete the StudyGroups table. StudyGroups table is created using the CREATE TABLE statement. StudentID is taken as a foreign key from the Students table where StudentID is the primary key of the type int using REFERENCES. Similarly, CourseID is taken as a foreign key from the Courses table where CourseID is the primary key of the type int using REFERENCES. UNIQUE constraint is used to not allow the same student to be in a group in the same course more than once.

Q7) Use the Management Studio to create a new database called College using the default settings. (Do not use SQL query to do this).

Ans:


Solution1 - Microsoft SQL Server Management Studio
File Edit View Project Tools Window Help
New Query
Execute
Object Explorer
Connect
IDEAPAD (SQL Server 15.0.2000.5
New Database...
Attach...
Restore Database...
Restore Files and Filegroups...
Filter
Deploy Data-tier Application...
Import Data-tier Application...
Start PowerShell
Reports
Refresh
Examples
ProductOrders
School
Security
Server Objects
Replication
PolyBase
Always On High Availability
Management
Integration Services Catalogs
SQL Server Agent (Agent XPs d
XEvent Profiler
Ready


Solution1 - Microsoft SQL Server Management Studio
File Edit View Project Tools Window Help
New Query
Execute
Object Explorer
Connect
IDEAPAD (SQL Server 15.0.2000.5
Databases
System Databases
Database Snapshots
AP
Database Diagrams
Tables
Views
External Resources
Synonyms
Programmability
Service Broker
Storage
Security
Examples
ProductOrders
School
Security
Server Objects
Replication
PolyBase
Always On High Availability
Management
Integration Services Catalogs
SQL Server Agent (Agent XPs d
XEvent Profiler
New Database
Select a page
General
Options
Filegroups
Script
Help
Database name:
College
Owner:
<default>
Use full-text indexing
Database files:
Logical Name
File Type
Filegroup
Initial Size (MB)
Autogrowth / Maxsize
Path
College
ROWS ...
PRIMARY
8
By 64 MB, Unlimited
C:\Progra
College_log
LOG
Not Applicable
8
By 64 MB, Unlimited
C:\Progra
Connection
Server:
IDEAPAD
Connection:
IDEAPAD\prapt
View connection properties
Progress
Ready
Add
Remove
OK
Cancel
Ready



Comment: Here, the database is created by right clicking on the Database folder in the Object Explorer of the Management studio. To keep the default settings intact just give the name of the database and click OK. This will create a new database.

Remarks: Concepts related to keys, database implementation, Creating database, Creating, altering, dropping tables, adding columns, constraints, data types, are used in this lab.