Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

C# Database

Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Bank Entity Relationships

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Designing a Bank (ERD)

- Objective: Design an ERD for a bank system that includes branches, customers, accounts, and transactions, and to understand the relationships between the entities.
- Attached is a text file for reference.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Designing a Bank (ERD)

- Identify the entities: Begin by identifying the main entities that will be part of the ERD. In this case, the entities would be Branches, Customers, Accounts, and Transactions.
- Define the relationships between entities: Once the entities have been identified, define the relationships between them. For example, a branch can have many customers, but a customer can only be associated with one branch. Similarly, a customer can have multiple accounts, but an account can only belong to one customer. Transactions can be associated with either a customer or an account.
- Create an ERD diagram: Use the identified entities and their relationships to create an ERD diagram. This diagram should visually show how the entities are related to each other.

Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Introduction to SQLClient in C#

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Learning Objectives

- Understand the basics of SQLClient and its role in connecting Windows Forms to a database.
- Create a local database using SQL Server Explorer and connect it to a Windows Forms application using SQLClient.
- Learn to perform basic CRUD (create, read, update, delete) operations using SQLClient in a Windows Forms application.
- Understand how to use SQLClient to execute SQL queries and retrieve data from a database.
- Gain knowledge of how to handle exceptions and errors that can occur when using SQLClient in a Windows Forms application.
- Get familiar with best practices for using SQLClient in a Windows Forms application, including security considerations and performance optimization techniques.
- Gain hands-on experience by completing practical exercises and building real-world Windows Forms applications that use SQLClient to interact with a database.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

SQL Client

- When you connect to a database you can use many different tools.
- We are going to connect to our database using SQLClient
- https://learn.microsoft.com/en-us/dotnet/api/system.data.sqlclient.sqlconnection?view=dotnet-plat-ext-7.0

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Introduction to SQLClient

- SQLClient is a tool in C# that helps programmers connect to and work with data in a SQL Server database.
- Why is it important?
- SQLClient provides an easy and efficient way to interact with the database.
- It allows developers to create connections, execute queries, and retrieve data from the database.
- SQLClient also offers advanced features like transaction handling and error reporting.
- Most importantly, it helps prevent hackers from attacking the database using a technique called SQL injection.
- In short, SQLClient is a crucial tool for any programmer working with SQL Server databases. Understanding how to use it will make it easier to work with data and keep the database secure.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

SQLClient vs. Other Data Providers

SQLClient is just one of several data providers that can be used in C# programming to interact with a SQL Server database. Here are some key differences between SQLClient and other popular data providers:

- OLE DB: OLE DB is an older data provider that can be used to interact with various data sources, including SQL Server. However, it is less efficient than SQLClient and not recommended for new development.
- ODBC: ODBC is another older data provider that provides a generic way to interact with various data sources, including SQL Server. However, like OLE DB, it is less efficient than SQLClient and not recommended for new development.
- ADO.NET: ADO.NET is a higher-level data access layer that sits on top of data providers like SQLClient. It provides a more abstracted way of interacting with data sources, but at the expense of some performance.
- Entity Framework: Entity Framework is an object-relational mapping (ORM) framework that provides a more object-oriented way of working with databases. It can use SQLClient or other data providers under the hood.

In summary, while there are other data providers available for C# database programming, SQLClient is generally the most efficient and recommended for working with SQL Server databases.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

What is a local Windows Forms database?

- A local database is a database that is installed and accessed on a single machine. In Windows Forms, a local database is typically created using SQL Server Compact or SQLite. We will use SQL Server Compact.
- The components of a local database include:
  - Tables: a collection of related data organized into rows and columns
  - Relationships: links between tables that define how they are related to each other
  - Constraints: rules that enforce data integrity and prevent invalid data from being entered
  - Views: virtual tables that display selected data from one or more tables
  - Stored Procedures: precompiled SQL statements that can be executed to perform common tasks
- Using a local database in Windows Forms can provide a convenient and efficient way to manage data within an application, without the need for a dedicated database server.

Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

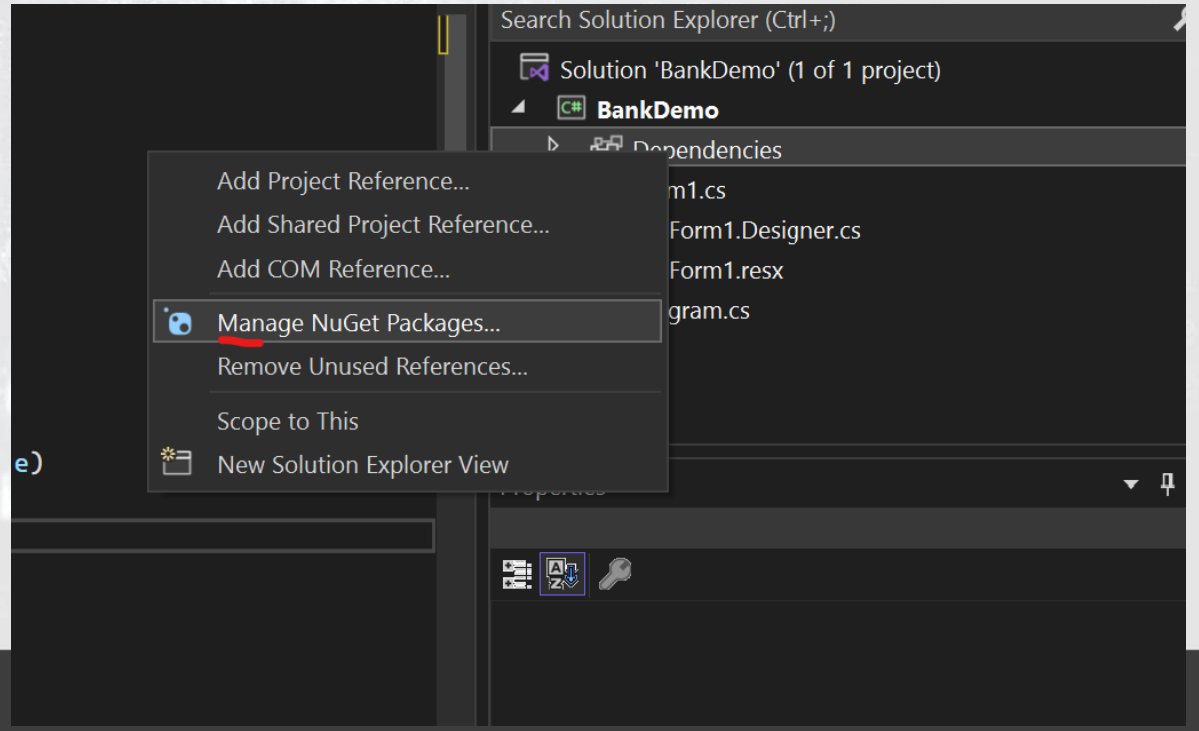
Adding SQL Client

INSTITUTE OF TECHNOLOGY DEVELOPMENT OF CANADA

475 GRANVILLE STREET, VANCOUVER, BC, V6C 1T1
PHONE: +1(604)558-8727, +1(604)409-8200
TOLL FREE: +1(888) 880-4410
FAX: +1(888) 881-6545
WEB: WWW.ITDCANADA.CA
EMAIL: STUDYING@ITDCANADA.CA

INSTALLATION

- Make a new C# Windows form application called Bank
- Right click on dependencies and click Manage NuGet Packages…

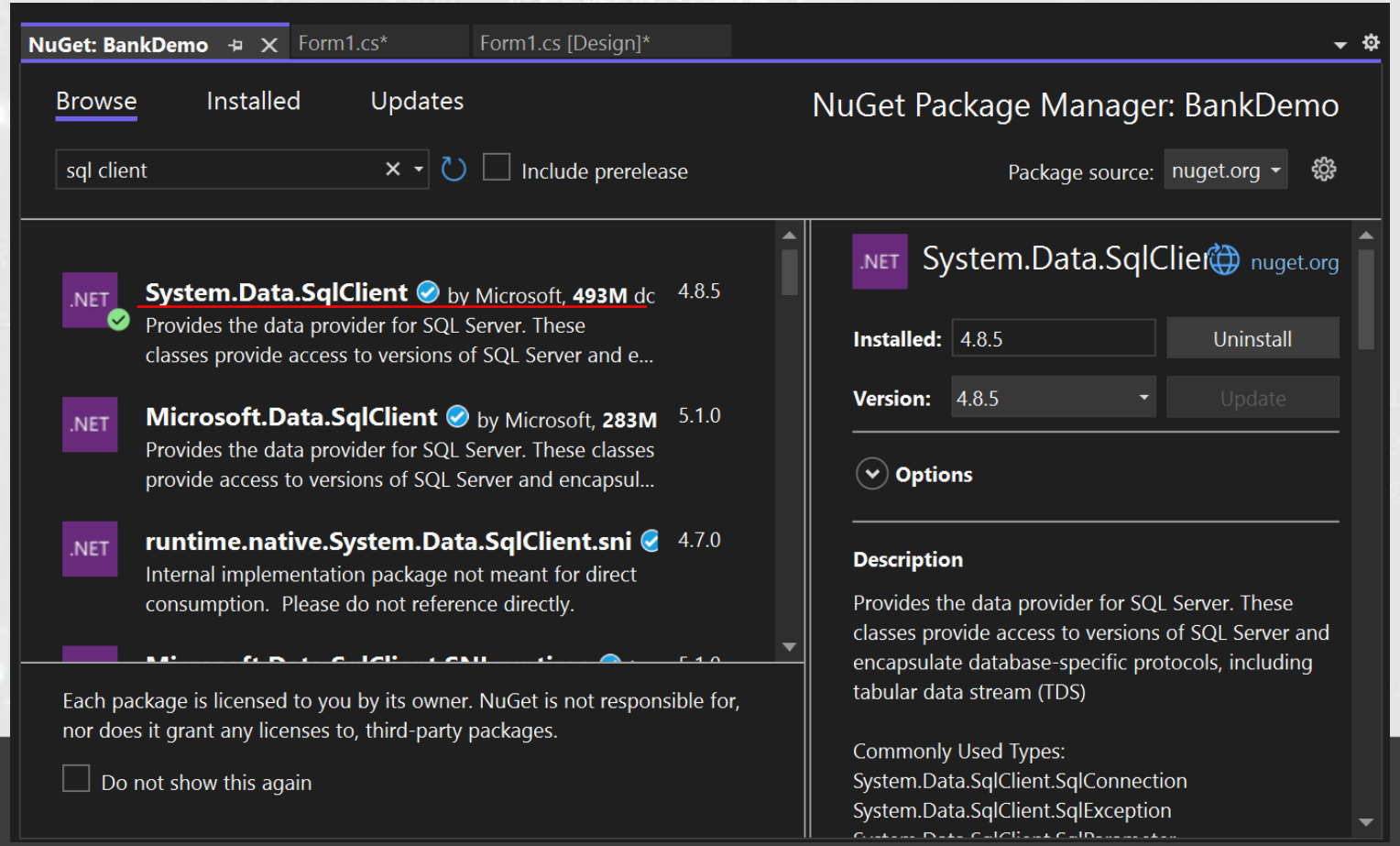


INSTITUTE OF TECHNOLOGY DEVELOPMENT OF CANADA

475 GRANVILLE STREET, VANCOUVER, BC, V6C 1T1
PHONE: +1(604)558-8727, +1(604)409-8200
TOLL FREE: +1(888) 880-4410
FAX: +1(888) 881-6545
WEB: WWW.ITDCANADA.CA
EMAIL: STUDYING@ITDCANADA.CA

INSTALLATION

- Under the brows tab search for sql client, then install



Institute of
Technology
Development
of Canada

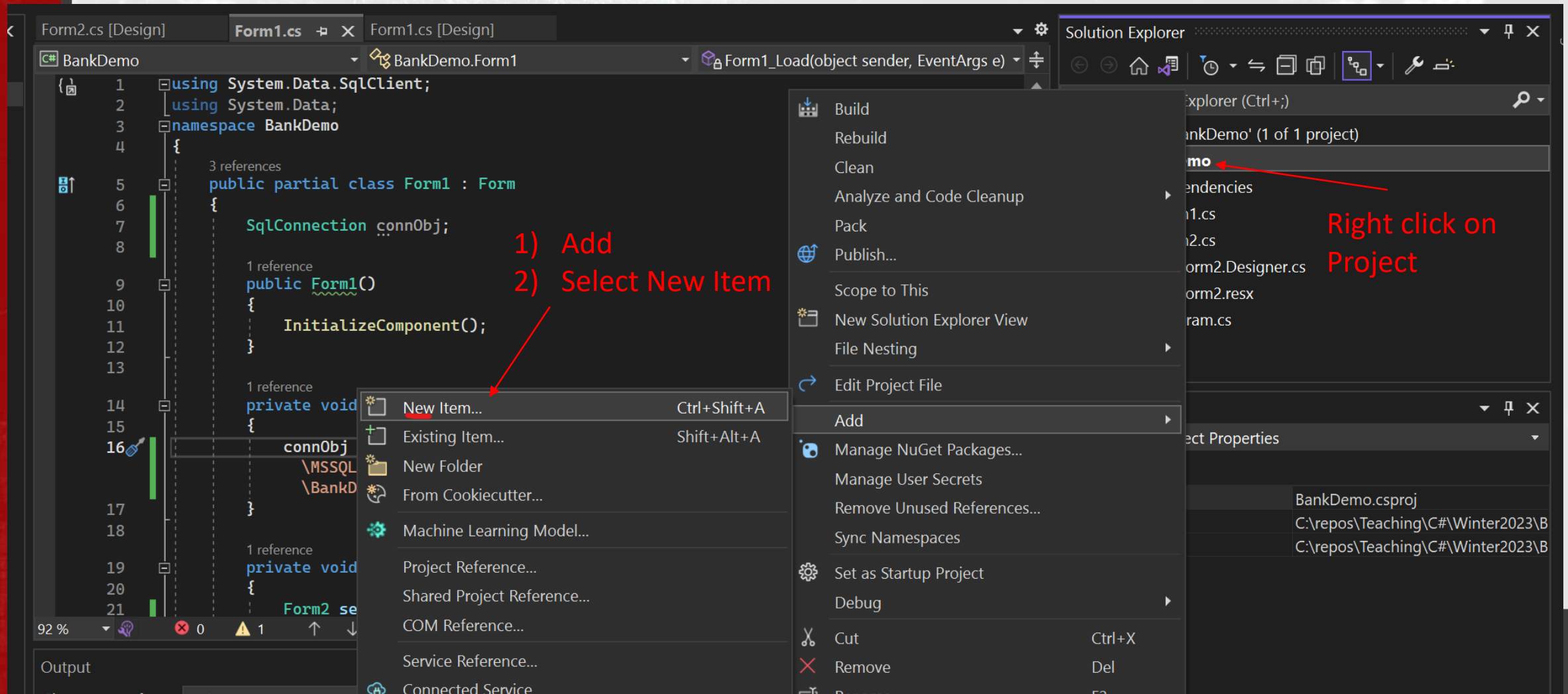
475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Add Local Database

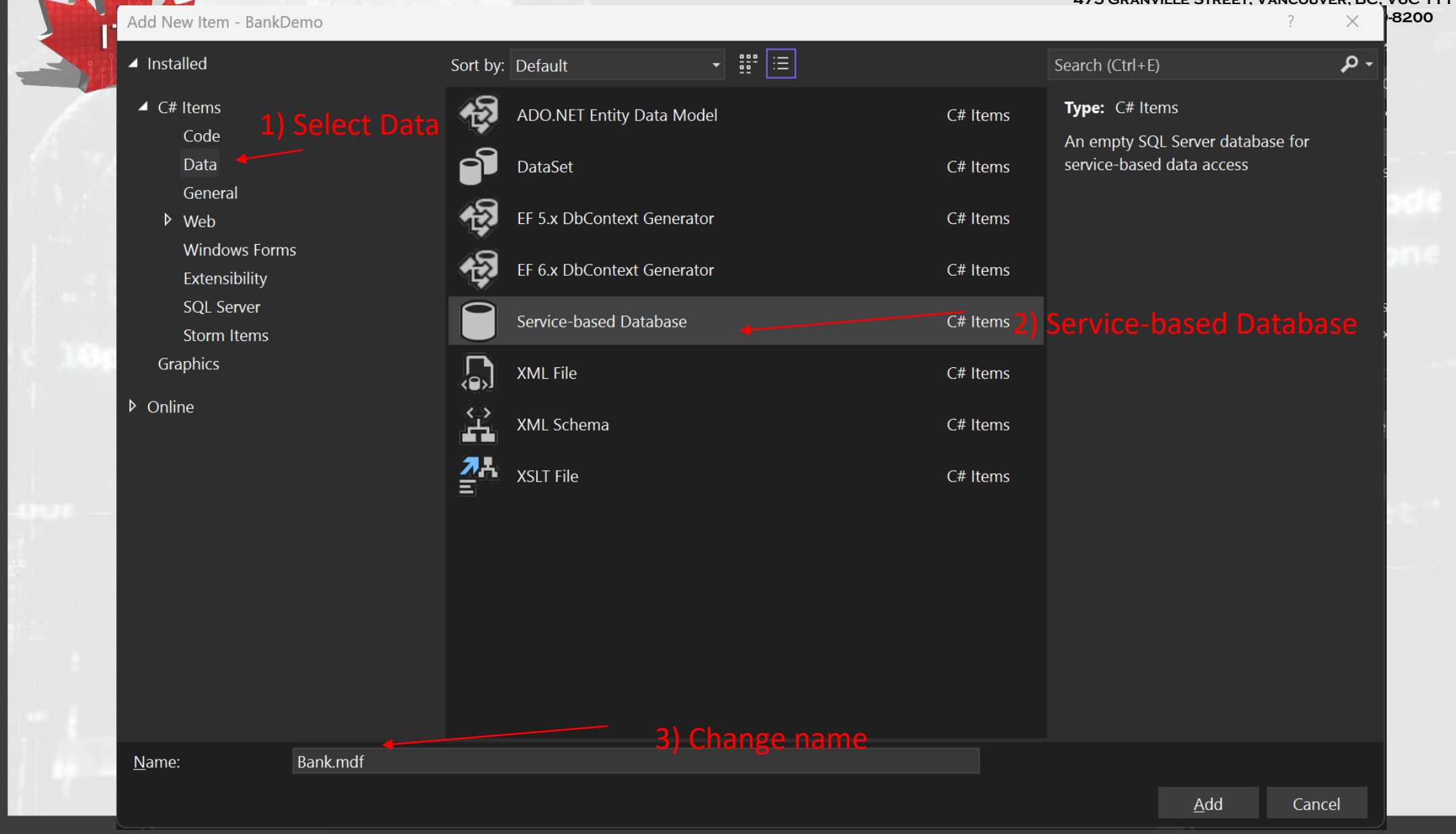
INSTITUTE OF TECHNOLOGY DEVELOPMENT OF CANADA

475 GRANVILLE STREET, VANCOUVER, BC, V6C 1T1
PHONE: +1(604)558-8727, +1(604)409-8200
TOLL FREE: +1(888) 880-4410
FAX: +1(888) 881-6545
WEB: WWW.ITDCANADA.CA
EMAIL: STUDYING@ITDCANADA.CA

LOCAL DB



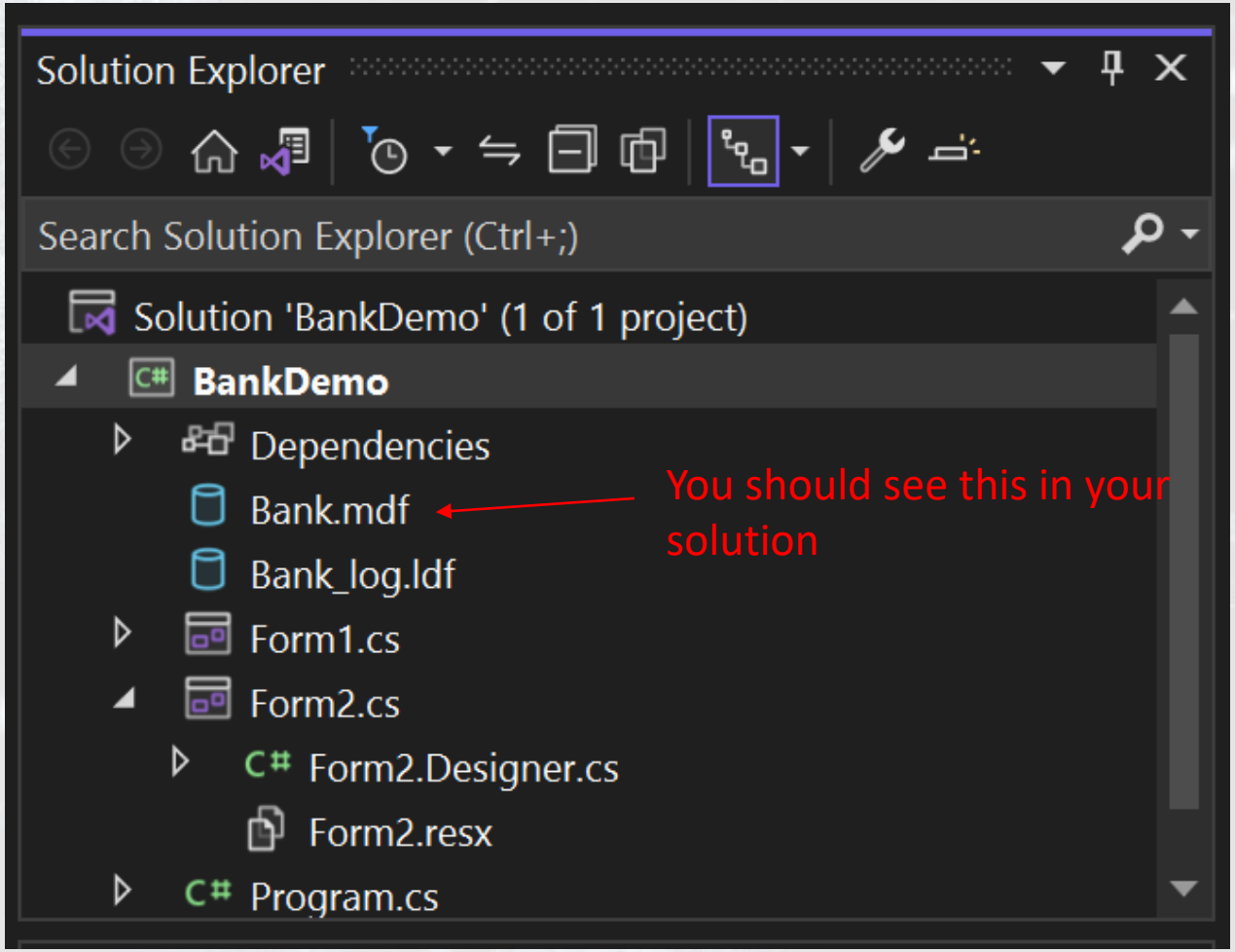
475 GRANVILLE STREET, VANCOUVER, BC, V6C 1T1
-8200



Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Local DB



Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

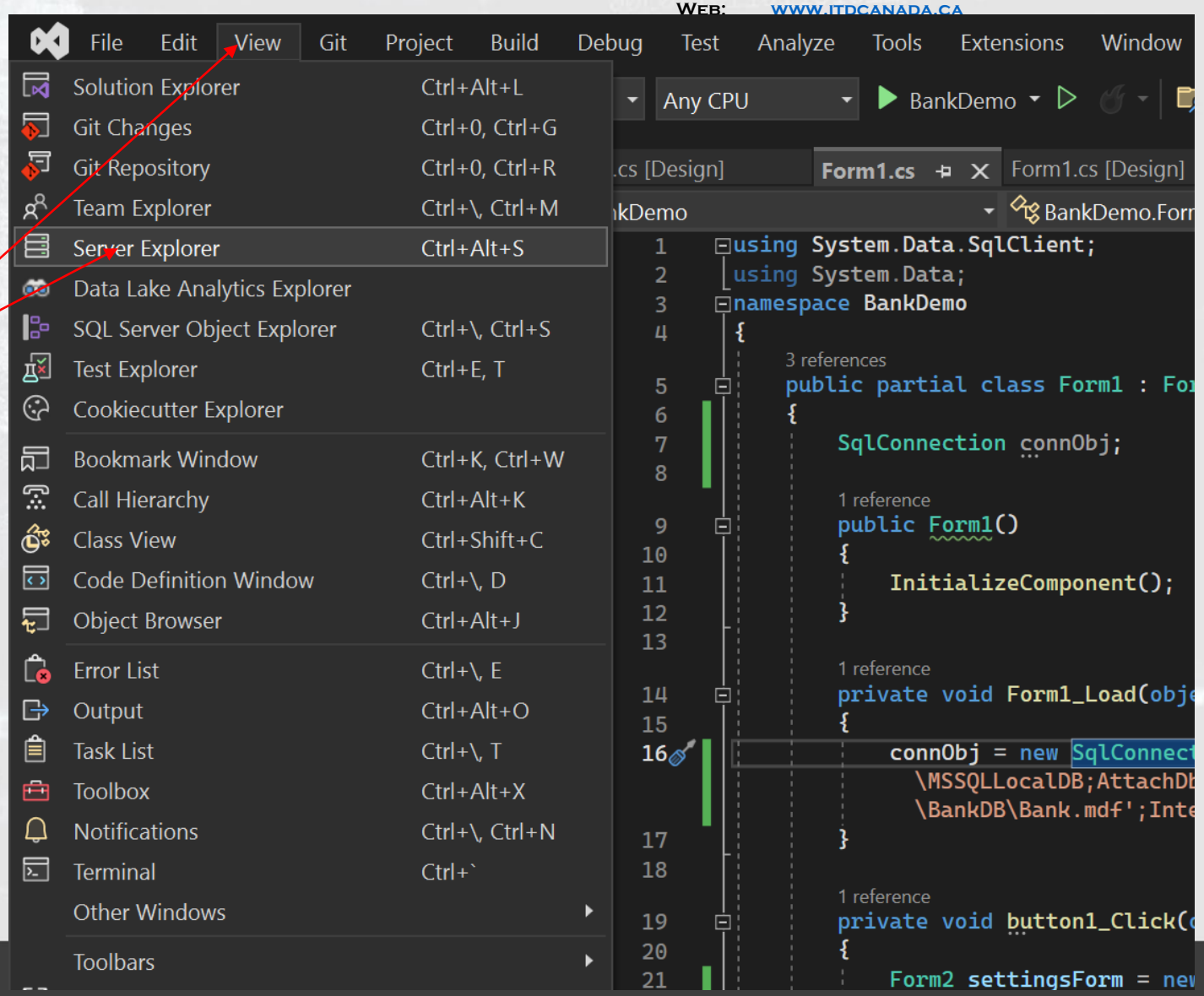
Add Tables

INSTITUTE OF TECHNOLOGY DEVELOPMENT OF CANADA

475 GRANVILLE STREET, VANCOUVER, BC, V6C 1T1
PHONE: +1(604)558-8727, +1(604)409-8200
TOLL FREE: +1(888) 880-4410
FAX: +1(888) 881-6545
WEB: WWW.ITDCANADA.CA

ADD TABLES

1) View
2) Server Explorer

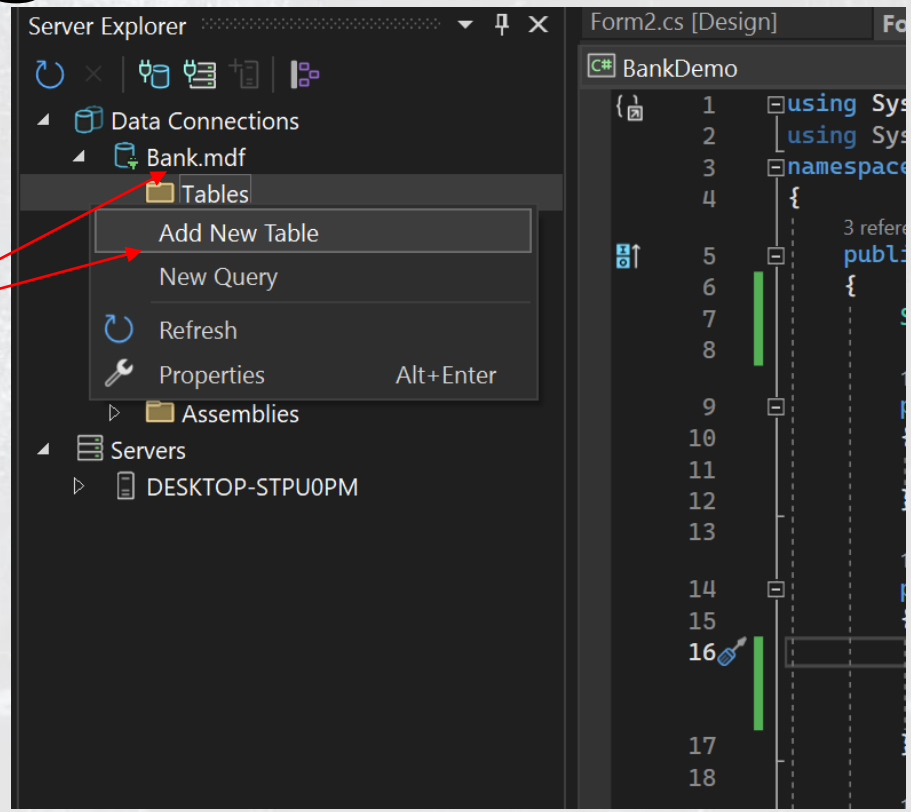


Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Add Tables

1) Right click on tables
2) Add New Table



INSTITUTE OF TECHNOLOGY DEVELOPMENT OF CANADA

475 GRANVILLE STREET, VANCOUVER, BC, V6C 1T1
PHONE: +1(604)558-8727, +1(604)409-8200
TOLL FREE: +1(888) 880-4410
FAX: +1(888) 881-6545
WEB: WWW.ITDCANADA.CA

	Name	Data Type	Allow Nulls	Default
🔑	CustomerId	int	☐	
	BranchID	int	☑	
	FirstName	varchar(50)	☐	
	LastName	varchar(50)	☐	
	DOB	date	☐	
	StreetNo	int	☐	
	StreetName	varchar(50)	☐	
	City	varchar(50)	☐	
	Province	varchar(50)	☐	
	PostalCode	varchar(6)	☐	
	Country	varchar(50)	☐	
	PhoneNo	varchar(50)	☐	
	Email	varchar(50)	☐	
			☐	

- **Keys** (1)
  - <unnamed> (Primary Key, Clustered: CustomerId)
- **Check Constraints** (0)
- **Indexes** (0)
- **Foreign Keys** (0)
- **Triggers** (0)

1) Change Table Name
2) Add fields above

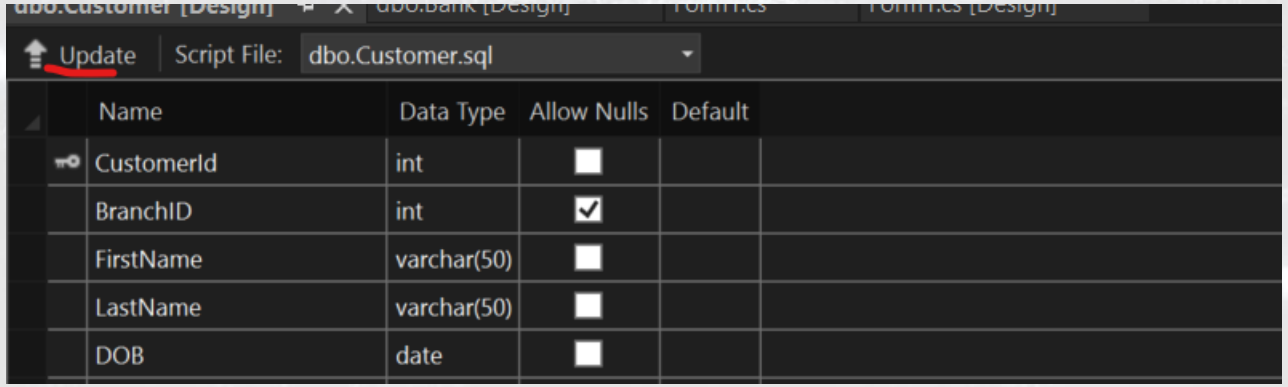
Design | T-SQL

```
1  CREATE TABLE [dbo].[Customer] (
2      [CustomerId] INT          IDENTITY (1, 1) NOT NULL,
3      [BranchID]   INT          NULL,
4      [FirstName]  VARCHAR (50) NOT NULL,
5      [LastName]   VARCHAR (50) NOT NULL,
6      [DOB]        DATE         NOT NULL,
7      [StreetNo]   INT          NOT NULL,
8      [StreetName] VARCHAR (50) NOT NULL,
9      [City]       VARCHAR (50) NOT NULL,
10     [Province]   VARCHAR (50) NOT NULL,
11     [PostalCode] VARCHAR (6)  NOT NULL,
12     [Country]    VARCHAR (50) NOT NULL,
13     [PhoneNo]    VARCHAR (50) NOT NULL,
14     [Email]      VARCHAR (50) NOT NULL,
15     PRIMARY KEY CLUSTERED ([CustomerId] ASC)
16 );
17
```

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

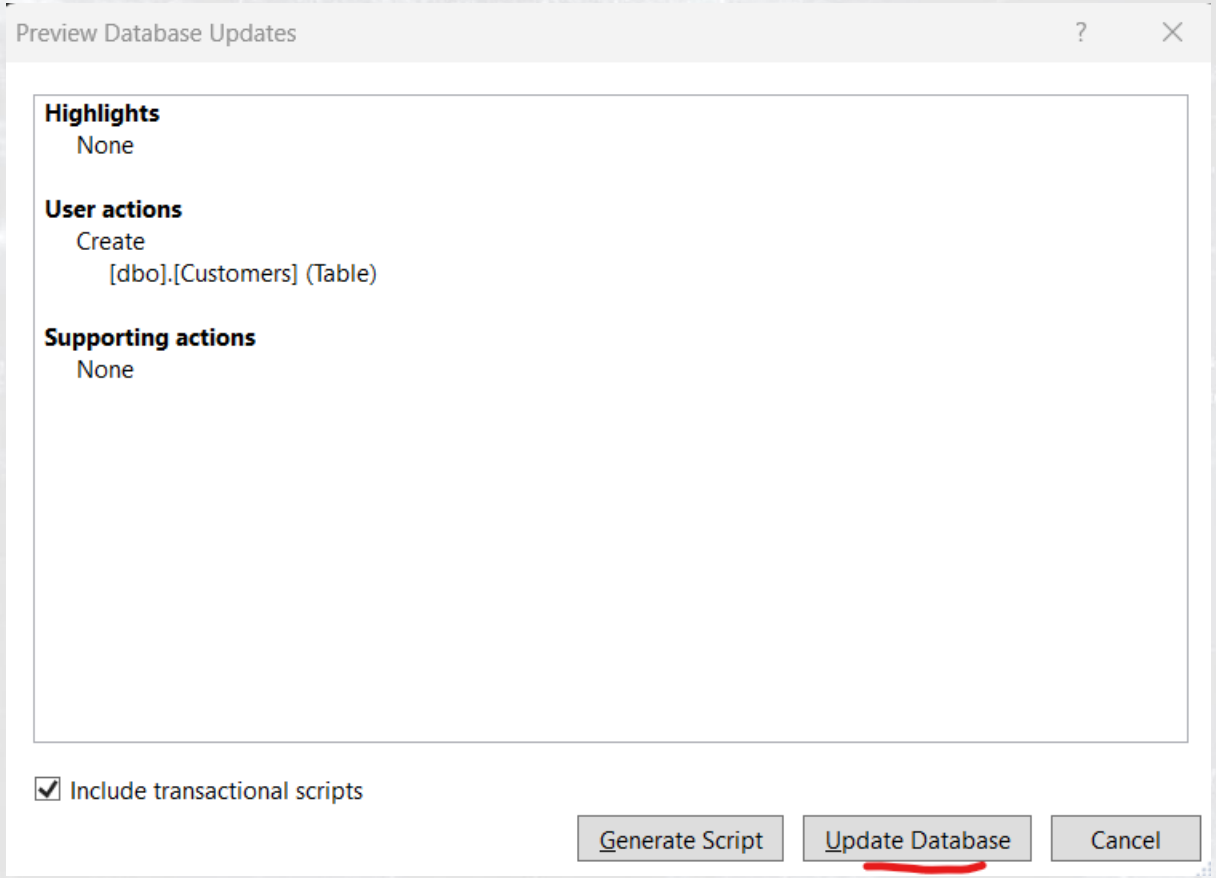
Add Tables



Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Add Tables



Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Database Connection

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Connecting to a Database

- When connecting to a database from a front-end application there are two things to consider:
  1. How to connect to the database
  2. How to changing data in the database

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Making the Connection

```
using System.Data.SqlClient;
using System.Data;
namespace BankDemo
{
    3 references
    public partial class Form1 : Form
    {
        SqlConnection connObj;

        1 reference
        public Form1()
        {
            InitializeComponent();
        }

        1 reference
        private void Form1_Load(object sender, EventArgs e)
        {
            connObj = new SqlConnection(@"Data Source=(LocalDB)
              \MSSQLLocalDB;AttachDbFilename='C:\repos\Teaching\C#\C# summer 2022\BankDB
              \BankDB\Bank.mdf';Integrated Security=True");
        }
```

Add Using to access the SQL Client and Data libraries

Make a Variable for the connection object and instantiate on the form load

** you can make a global variable which can establish a single connection while the program is running or make a connection every time you do a CRUD

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Connecting to a Database

- Connection String: This is a string that contains information such as the database name, location, and authentication credentials. It's used to establish a connection to the database.
- This is different than the file path
- You can find it by:
  - Opening server explorer > right click on the database you want > Open Properties > Connection String

Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

SQLClient Objects

Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

SQL Client Objects

- The objects we are going to use are
- SqlConnection
- SqlCommand
- SqlDataReader

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

SQL Client Objects

```
// Create a new SQL connection object using a connection string
SqlConnection conn = new SqlConnection("Data Source=YOUR_SERVER_NAME;Initial Catalog=YOUR_DATABASE_NAME;Integrated Security=True");
try
{
    // Open the connection to the database
    conn.Open();
    // Create a new SQL command object to execute a query
    SqlCommand cmd = new SqlCommand("SELECT * FROM Customers", conn);
    // Execute the query and create a SQL data reader object
    SqlDataReader reader = cmd.ExecuteReader();
    // Loop through the results of the query and print each row to the console using interpolated strings
    while (reader.Read())
    {
        Console.WriteLine($"{reader.GetInt32(0)}\t{reader.GetString(1)}\t{reader.GetString(2)}");
    }
    // Close the reader when finished
    reader.Close();
}
catch (Exception ex)
{
    // Print an error message if an exception occurs
    Console.WriteLine("Error: " + ex.Message);
}
finally
{
    // Close the database connection
    conn.Close();
}

// Wait for user input before closing the console window
Console.ReadLine();
```

Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

SQL Connection

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Connecting to a Database

- Connection Object: This is used to connect to the database and provides the methods and properties to interact with it. It's created using a connection string that contains the necessary information to establish a connection. Once created, the connection object is used to execute SQL commands and retrieve results from the database.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Connecting to a Database

- Connection String: This is a string that contains information such as the database name, location, and authentication credentials. It's used to establish a connection to the database.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Making the Connection

- SqlConnection is an object that takes in a Data string as the constructor.

```
connObj = new SqlConnection(@"Data Source=(LocalDB)
  \MSSQLLocalDB;AttachDbFilename=C:\repos\Teaching\C#\Winter2023\BankDemo\BankDemo
  \Bank.mdf;Integrated Security=True");
connObj.Open();
SqlCommand command = new SqlCommand("select * from Customers;", connObj);
```

Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

SQL Command

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Connecting to a Database

- Command Object: This is used to execute SQL commands or queries against the database. It represents a single SQL statement to be executed on the database and can be used to retrieve or modify data. It can be used to perform CRUD operations (Create, Read, Update, Delete) on the database by sending SQL statements to the database. Once the command is executed, it returns a result set, or the number of rows affected.

Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

Data Reader

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

SQLDataReader

- DataReader is an efficient way of retrieving data from a database in C#. It allows for fast, forward-only access to data, enabling efficient data processing and retrieval. The data is read in a sequential manner and allows for accessing large amounts of data without the need for storing it in memory. Overall, DataReader is a great choice for performance-critical applications that require efficient data access.

Institute of
Technology
Development
of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

C.R.U.D

INSTITUTE OF
TECHNOLOGY
DEVELOPMENT
OF CANADA

475 GRANVILLE STREET, VANCOUVER, BC, V6C 1T1
PHONE: +1(604)558-8727, +1(604)409-8200
TOLL FREE: +1(888) 880-4410
FAX: +1(888) 881-6545
WEB: WWW.ITDCANADA.CA
EMAIL: STUDYING@ITDCANADA.CA

C.R.U.D

- CRUD, a fundamental concept in database management. CRUD is an acronym that stands for Create, Read, Update, and Delete. These are the four basic operations that can be performed on a database.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

C.R.U.D

- Create: This operation is used to add new data to a database. It involves inserting a new record into a table. For example, if you're working with a database for a music store, you could use the Create operation to add a new album to the "Albums" table.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

C.R.U.D

- Read: This operation is used to retrieve data from a database. It involves selecting data from one or more tables. If you're working with a database for a music store, you could use the Read operation to retrieve a list of all the albums in the "Albums" table.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

C.R.U.D

- Update: This operation is used to modify existing data in a database. It involves changing the value of one or more fields in a record. If you're working with a database for a music store, you could use the Update operation to change the price of an album in the "Albums" table.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

C.R.U.D

- Delete: This operation is used to remove data from a database. It involves deleting a record from a table. If you're working with a database for a music store, you could use the Delete operation to remove an album from the "Albums" table.

Institute of Technology Development of Canada

475 Granville Street, Vancouver, BC, V6C 1T1
Phone: +1(604)558-8727, +1(604)409-8200
Toll Free: +1(888) 880-4410
Fax: +1(888) 881-6545
Web: www.itdcanada.ca
Email: studying@itdcanada.ca

C.R.U.D

- CRUD operations are the foundation of database management, and they are used in almost all database applications. By understanding CRUD, you can start building more complex queries and applications that interact with databases.