

INF 272

Advanced Programming

Date: 04-08-2025

Session 15



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Session 15:

Processing data with database coding and C# within MVC (Part 1)



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Lecture Outline and Objectives

- **Lecture Outline**
- Where are we in this course?
- Data Persistence
- Working with Databases
- A process guide for programming databases (SQL Server)
- Code Example
- Helpful Resources

Objectives of this lecture

- Learn how to store data in a database from a webform
- Update data stored in a database
- Delete data stored in a database



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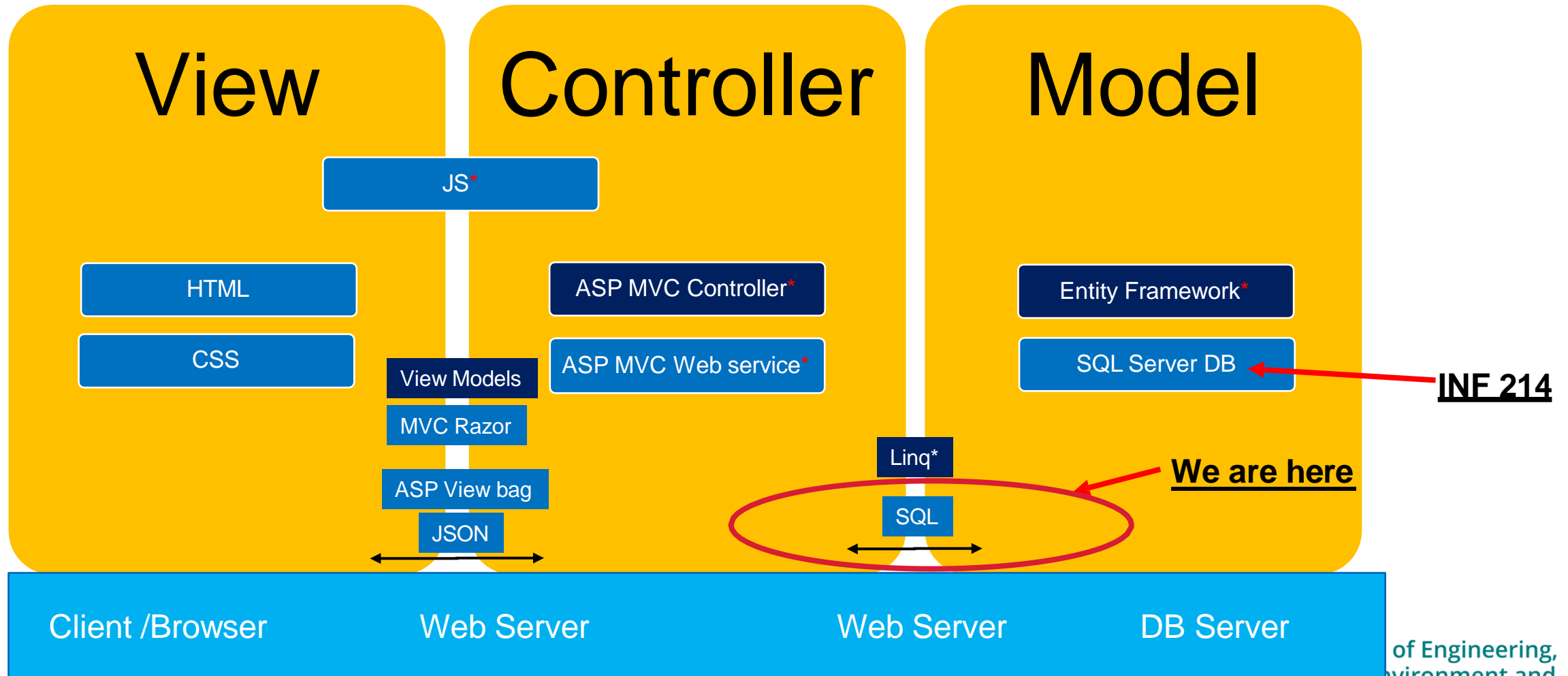
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Where we are?

* - Contains Object Orientation



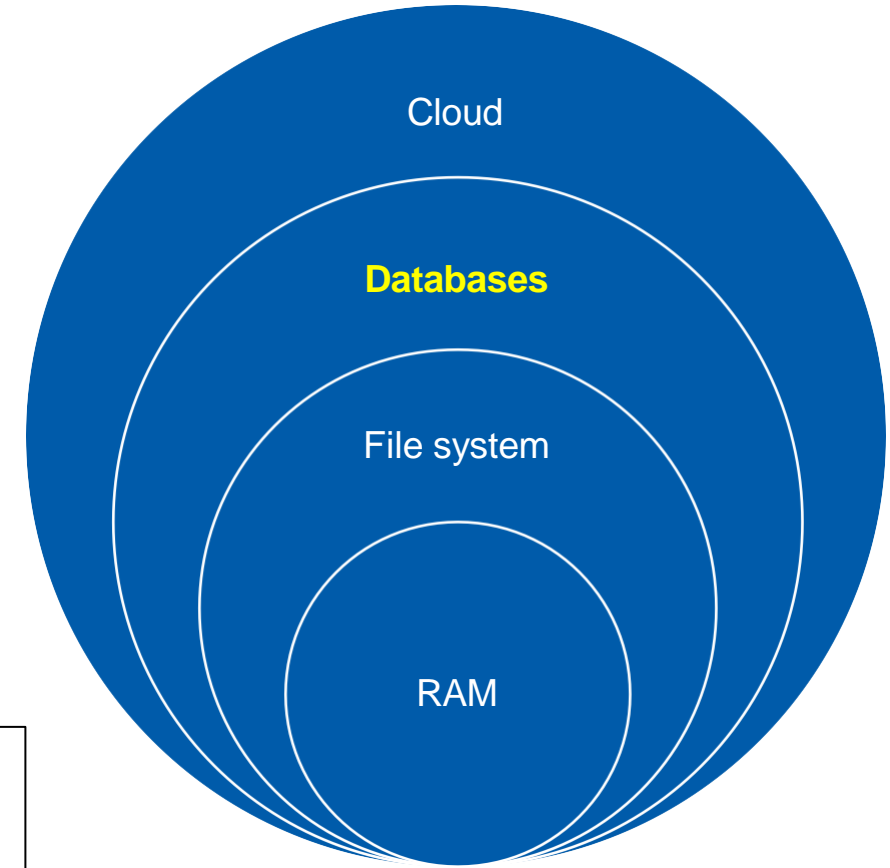
Data Persistence in Programming

Data persistence in programming refers to the storage and retention of data beyond the lifetime of a program's execution. It entails the perpetual storage of data for future use (retrieval, update, computation, analysis, etc.)

Databases:

Relational databases – SQL Server, Postgres, Oracle etc.

NoSQL databases – MongoDB, Redis, Apache Casandra etc.



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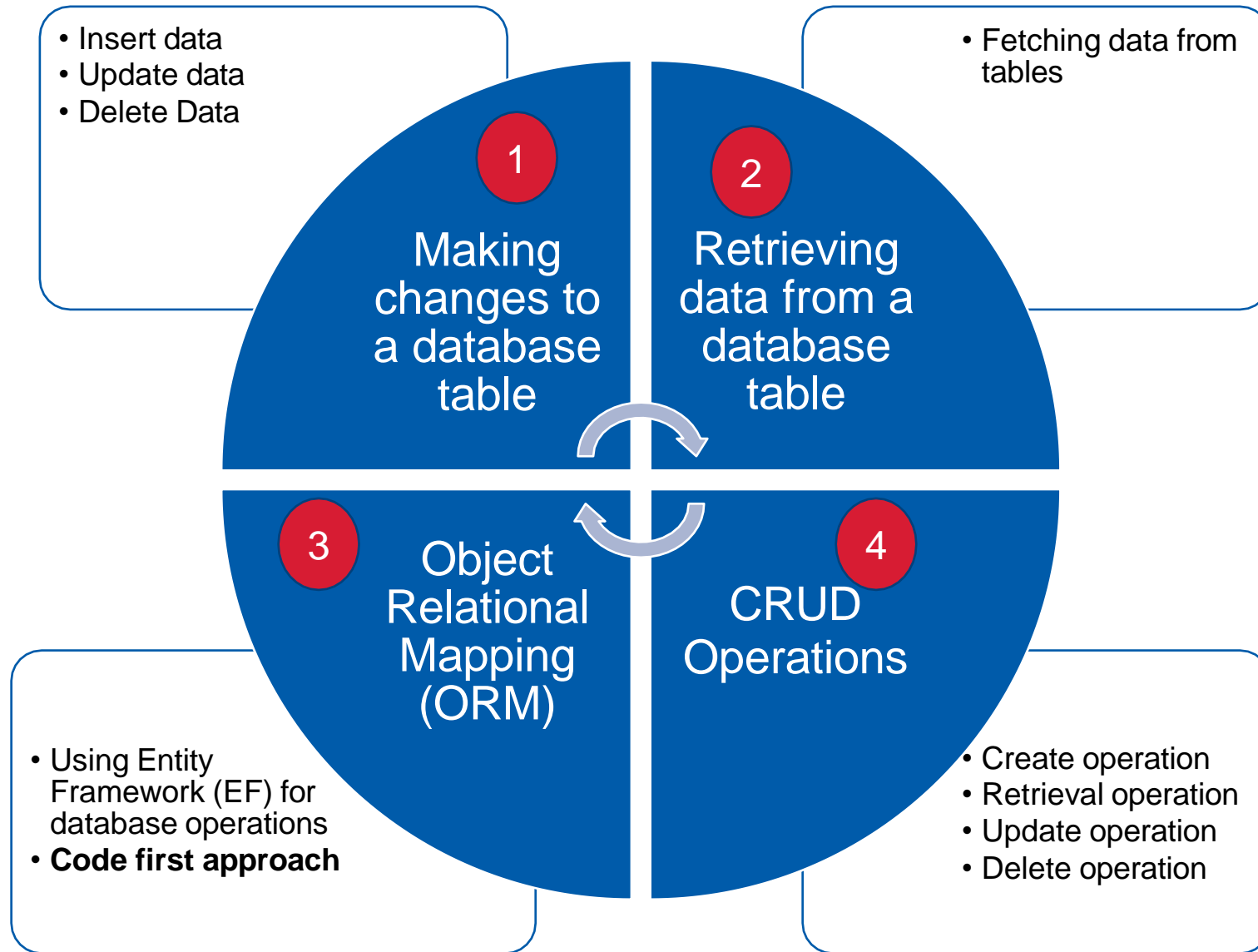
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Database Operations



Key things to note

1. Import the library for SQL operations – “SqlClient”
2. There should be a consistent connection between your application and the external data source (**Connection string**)
3. Exception handling is vital (using of **try-catch-finally statements**)
4. Use of the right SQL query statement and option
 - Insert query – *ExecuteNonQuery()*
 - Update query – *ExecuteNonQuery()*
 - Delete query – *ExecuteNonQuery()*
 - Select Query – *ExecuteReader()*
5. *Follow the MVC - protocol*



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Key things to note

```
using Microsoft.Data.SqlClient;
```

Or

```
Using System.Data.SqlClient;
```

- the library for sqlClient

```
public static string ConnectionString = "Data Source=.;Initial  
Catalog=ClubMembership;Integrated Security=True"
```

Connection string: you can copy this string from the data connection window after connecting to the SQL Server database on your system



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```
public static string ConnectionString = "Data Source=.;Initial  
Catalog=ClubMembership;Integrated Security=True"
```

It is good practice to make your connection string a global variable

```
public ActionResult InsertMember()  
{  
    return View();  
}  
public ActionResult DoInsertMember(string name)  
{  
    try  
    {  
        SqlCommand myInsertCommand = new SqlCommand("Insert into ClubMembership Values('" +  
            Name + "')" , myConnection);  
  
        myConnection.Open();  
        int rowsAffected = myInsertCommand.ExecuteNonQuery();  
        ViewBag.Message = "Success: " + rowsAffected + " rows added.";  
    }  
  
    catch (Exception err)  
    {  
        ViewBag.Message = "Error: " + err.Message;  
    }  
  
    finally  
    {  
        myConnection.Close();  
    }  
    return View("Index");  
}
```

try: preempts any exception (run-time event) that can occur when you open the database connection.

Catch: will report if there is indeed an exception (run-time event) when an attempt was made to open the database connection.

finally: will ensure that the database connection is closed no matter what happens after it was opened.

INSERT query statement

```
public static string ConnectionString = "Data Source=.;Initial  
Catalog=ClubMembership;Integrated Security=True"
```

It is good practice to make your connection string a global variable

```
public ActionResult DoUpdateMember(int id, string name)
```

```
{  
    try
```

```
{  
    SqlCommand myUpdateCommand = new SqlCommand("Update Name Set Name=" + name + "  
    where ID=" + id, myConnection);
```

```
    myConnection.Open();
```

```
    int rowsAffected = myUpdateCommand.ExecuteNonQuery();  
    ViewBag.Message = "Success: " + rowsAffected + " rows.updated.";
```

```
}
```

```
    catch (Exception err)
```

```
{  
    ViewBag.Message = "Error: " + err.Message;  
}
```

```
    finally
```

```
{  
    myConnection.Close();  
}  
    return View("Index");  
}
```

```
}
```

This opens the data source connection (table)

This executes an update query transaction in the table and returns the number of rows affected

This closes the connection to the data source (table)

UPDATE query statement



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```
public static string ConnectionString = "Data Source=.;Initial  
Catalog=ClubMembership;Integrated Security=True"
```

It is good practice to make your connection string a global variable

```
public ActionResult DoDelete(int id)
```

```
{  
    try  
    {
```

```
        SqlCommand myDeleteCommand = new SqlCommand("Delete from Name where ID=" + id,  
        myConnection);
```

```
        myConnection.Open();  
        int rowsAffected = myDeleteCommand.ExecuteNonQuery();  
        ViewBag.Message = "Success: " + rowsAffected + " rows deleted.";
```

```
    }
```

```
    catch (Exception err)
```

```
    {  
        ViewBag.Message = "Error: " + err.Message;  
    }
```

```
    finally
```

```
    {  
        myConnection.Close();  
    }
```

```
    return View("Index");
```

```
}
```

The Action method in the controller that implements the Delete operation

Returns control to the view()

DELETE query statement



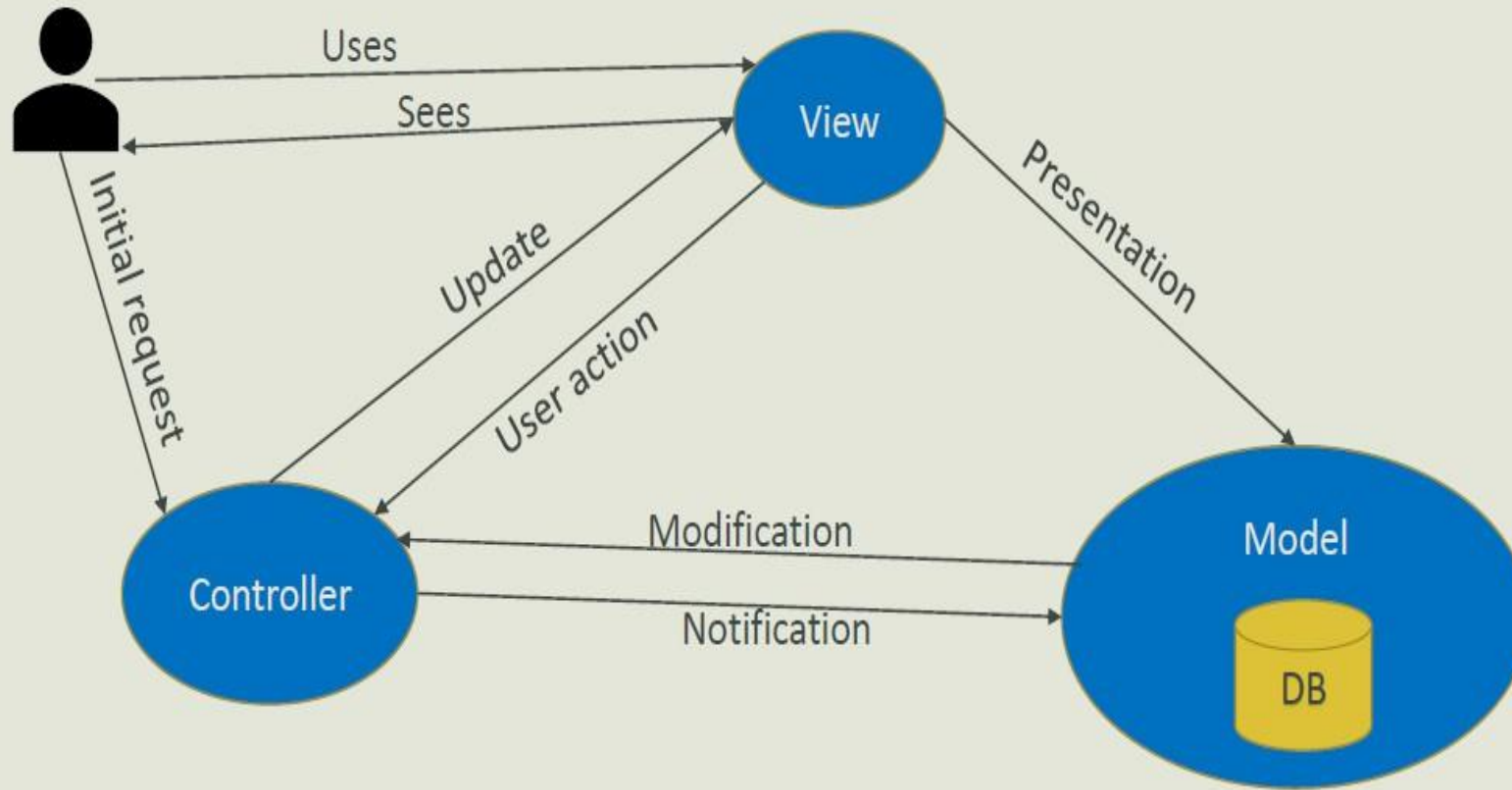
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The pattern of interaction in MVC



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After Class Activity

Watch this video tutorial for a demonstration of what was taught in this class today. The code snippets shown in today's class is an adaption of the problem example that was shared in the tutorial. You will need the knowledge gained from this tutorial for the practical of this week.

<https://youtu.be/QBfh1br5rLA>



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Additional Resources

<https://learn.microsoft.com/en-us/dotnet/api/system.data.sqlclient?view=dotnet-plat-ext-7.0>

<https://www.dotnetperls.com/sqlclient>

<https://docs.microsoft.com/en-us/dotnet/framework/data/adonet/ado-net-code-examples#sqlclient>

<https://www.codeproject.com/Articles/823854/How-to-connect-SQL-Database-to-your-Csharp-program>



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ANY
Questions?



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Good Bye

Until next time 😊



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