# Advance Programming Techniques (APT)

Lecture # 40

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# What is ADO.NET?

- **ADO.NET** stands for **ActiveX Data Objects for .NET**
- It is the default library in .NET for interacting with databases
- It provides:
  - **Connection** → communicates with database
  - **Command** → executes SQL
  - **DataReader** → fast, forward-only reading
  - **DataAdapter** → fills DataSet/DataTable
  - **DataSet/DataTable** → in-memory tables
  - **Transaction** → ensures safe multi-step operations

# Understanding Connection String

- Every database connection needs:
  - Server name
  - Database name
  - Authentication method
- Example:
  - string connString = "Data Source=<computer-name>\\SQLEXPRESS;Initial Catalog=<db-name>;Integrated Security=True;";
  - string connString = "Data Source=DESKTOP-12345\\SQLEXPRESS;Initial Catalog=StudentDB;Integrated Security=True;";
- First create database in SQL Server

# Creating a SQL Server Database

```sql
CREATE DATABASE StudentDB;

USE StudentDB;

CREATE TABLE Students (
    Id INT IDENTITY PRIMARY KEY,
    Name NVARCHAR(100),
    Age INT,
    Department NVARCHAR(50)
);
```

```sql
INSERT INTO Students (Name, Age, Department)
VALUES ('Ali', 22, 'CS'), ('Ayesha', 21, 'IT');
```

# Connecting to the Database in C#

```
using System.Data.SqlClient;


SqlConnection conn = new SqlConnection(connString);


conn.Open();
MessageBox.Show("Connection Successful!");
conn.Close();
```

# Why DataReader is FAST?

- Because:
  - It does **not load the entire table into memory**
  - Connection stays open only while reading
  - Very lightweight
- Use DataReader when you want:
  - Fast, forward-only reading
  - Lightweight access
- Do NOT use DataReader when you need:
  - Editing rows
  - Holding data in memory
  - Navigating forward/backward (For that → DataSet / DataTable.)