# Lab 1 – Understanding ORM with a Retail Inventory System

## 1. What is ORM (Object-Relational Mapping)?

ORM is a technique that enables developers to interact with a relational database using object-oriented code.

Concept Mapping:

|  |  |
| --- | --- |
| Relational Concept | Object-Oriented Concept |
| Table | Class |
| Row | Object (Instance) |
| Column | Property |
| Primary Key | Object Identifier |

Benefits of ORM:

- Abstraction from raw SQL  
- Productivity — auto-generates schema and queries  
- Maintainability — use familiar C# constructs  
- Cross-platform — works on Windows, Linux, MacOS

## 2. EF Core vs EF Framework (EF6)

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| --- | --- | --- |
| Feature | EF Core | EF Framework (EF6) |
| Platform Support | Cross-platform (Windows, Linux) | Windows-only |
| .NET Version | .NET 6 / .NET 7 / .NET 8 | .NET Framework only |
| Performance | Lightweight & high-perf | Mature but heavier |
| LINQ + Async Support | Fully supported | Partial |
| In-Memory DB for Testing | Yes | No |
| Open Source & Active Dev | Yes | No new major versions |

## 3. EF Core 8.0 Features

EF Core 8.0 introduces multiple performance and usability enhancements:

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| --- | --- |
| Feature | Description |
| JSON Column Mapping | Store and query JSON within SQL Server columns |
| Compiled Models | Improve startup performance for large models |
| Bulk Updates | Better support for mass updates/deletes |
| Interceptors | Hook into EF events for logging, caching |
| Improved LINQ Translations | More LINQ queries work out-of-the-box |

## 4. Creating the Console App Using EF Core

Step-by-Step Commands:

dotnet new console -n RetailInventory  
cd RetailInventory

## 5. Installing EF Core Packages

Inside the RetailInventory project folder:

dotnet add package Microsoft.EntityFrameworkCore.SqlServer  
dotnet add package Microsoft.EntityFrameworkCore.Design