

Course 10265A:

Developing Data Access Solutions with Microsoft Visual Studio 2010

Course Details

Course Outline

Module 1: Architecture and Data Access Technologies

This module describes the commonly used data access technologies and scenarios in which you are likely to use them.

Lessons

- Data Access Technologies
- Data Access Scenarios

Lab : Analyzing Data Access Scenarios

- Identifying Data Access Technologies

After completing this module, students will be able to:

- Describe the key data access technologies available to .NET Framework developers.
- Assign appropriate data access technologies to common data access scenarios.

Module 2: Building Entity Data Models

This module introduces the concepts of data modeling, and in particular, Entity Data Models (EDMs). It explains how you can use EDMs to decouple the conceptual data structure in your applications from the logical data structure in the data store.

Lessons

- Introduction to Entity Data Models
- Modifying the Entity Data Model
- Customizing the Entity Data Model

Lab : Using Entity Data Models

- Generating an EDM from the AdventureWorks Database
- Adding Entities and Associations
- Using the Generate Database Wizard

- Mapping Entities to Multiple Tables
- Implementing an Inheritance Hierarchy
- Using Stored Procedures
- Creating a Complex Type

After completing this module, students will be able to:

- Describe and create an Entity Data Model.
- Modify an Entity Data Model by using the Entity Designer.
- Customize a model to meet their business requirements.

Module 3: Querying Entity Data

This module explains how to query an entity data model by using common methods such as LINQ to Entities, Entity SQL, and the classes in the EntityClient namespace.

Lessons

- Retrieving Data by Using LINQ to Entities
- Retrieving Data by Using Entity SQL
- Retrieving Data by Using EntityClient Provider
- Retrieving Data by Using Stored Procedures
- Unit Testing Your Data Access Code

Lab : Querying Entity Data

- Retrieving All Contact Entities
- Retrieving Contact Entities by Using a Filter
- Retrieving RewardsClaimed Entities
- Querying the Rewards Family of Entities
- Executing a Stored Procedure

After completing this module, students will be able to:

- Retrieve data by using LINQ to Entities.
- Retrieve data by using the Entity SQL language.
- Retrieve data by using the EntityClient Provider.
- Retrieve data by using stored procedures in the entity model.
- Create unit tests for their data access code.

Module 4: Creating, Updating, and Deleting Entity Data

This module introduces you to the ways that the Entity Framework enables you to modify the data in your database. You apply changes to the entities managed by theObjectContext class. TheObjectContext class is responsible for tracking all changes to entities and then persisting these changes to the database on request.

Lessons

- Understanding Change Tracking in the Entity Framework
- Modifying Data in an Entity Data Model

Lab : Creating, Updating, and Deleting Entity Data

- Maintaining Contact and Reward Data
- Maintaining RewardsClaim Data

After completing this module, students will be able to:

- Describe how the Entity Framework implements change tracking.
- Describe how to modify data in the entity model, and persist the changes to the database.

Module 5: Handling Multi-User Scenarios by Using Object Services

This module introduces the concurrency model that the Entity Framework uses to address the issues faced by applications that must support multiple users who access the same data simultaneously. It also describes how the Entity Framework can make use of transactions to ensure data integrity.

Lessons

- Handling Concurrency in the Entity Framework
- Transactional Support in the Entity Framework

Lab : Handling Multi-User Scenarios by Using Object Services

- Handling Concurrency of Rewards Claimed Data
- Updating the RewardsClaimed and ArchivedRewardsClaimed Information by Using a Transaction

After completing this module, students will be able to:

- Describe the optimistic concurrency model that the Entity Framework uses.
- Manage transactions in applications that use the Entity Framework.

Module 6: Building Optimized Solutions by Using Object Services

This module explains best practices for designing and building a scalable, optimized data access layer by using Object Services. The module introduces several techniques that can be used to optimize the performance of queries that execute against the conceptual model.

Lessons

- The Stages of Query Execution
- Change Tracking and Object Materialization
- Using Compiled Queries
- Using Design-Time Generated Entity Framework Views
- Monitoring Performance

- Performing Asynchronous Data Modifications

Lab : Building Optimized Solutions by Using Object Services

- Improving the Performance of Query Operations
- Improving the Performance of Update Operations

After completing this module, students will be able to:

- Explain how the Entity Framework executes queries.
- Understand the impact of tracking and object materialization on query performance.
- Describe how to use compiled queries.
- Describe how to use design-time generated views.
- Describe how to monitor query performance.
- Describe how to perform asynchronous data modifications.

Module 7: Customizing Entities and Building Custom Entity Classes

This module describes how to customize and extend entities with your own business logic.

Lessons

- Overriding Generated Classes
- Using Templates to Customize Entities
- Creating and Using Custom Entity Classes

Lab : Customizing Entities and Building Custom Entity Classes

- Using a Template to Add Custom Functionality to Entity Classes
- Creating Custom Entity Classes

After completing this module, students will be able to:

- Use partial classes and methods to add business logic to generated code.
- Create and use templates to customize code generation.
- Modify existing business classes to take advantage of entity functionality.

Module 8: Using POCO Classes with the Entity Framework

This module introduces the ways in which you can define custom entity classes in your Entity Framework application. By default, Microsoft Visual Studio generates a set of entity classes for you from the Entity Data Model (EDM). Instead of these generated classes, you may want to use an existing set of "plain old" CLR objects (POCO) business classes in your application. You can also extend the generated entity classes to add custom business functionality to your entity objects.

Lessons

- Requirements for POCO Classes
- POCO Classes and Lazy Loading
- POCO Classes and Change Tracking

- Extending Entity Types

Lab : Using POCO Classes with the Entity Framework

- Using POCO Classes
- Extending Your POCO Classes

After completing this module, students will be able to:

- List the requirements that their POCO classes must meet.
- Create POCO entities that support automatic lazy loading.
- Create POCO entities that support automatic change tracking.
- Describe the options for using interfaces and inheritance to create custom entity objects.

Module 9: Building an N-Tier Solution by Using the Entity Framework

This module explains how to address the architectural issues that can arise when building an N-Tier enterprise application by using the Entity Framework.

Lessons

- Designing an N-Tier Solution
- Defining Operations and Implementing Data Transport Structures
- Protecting Data and Operations

Lab : Building an N-Tier Solution by Using the Entity Framework

- Creating the Contacts and Orders Data Access Tier
- Protecting Data Access Operations

After completing this module, students will be able to:

- Describe the issues and strategies that are relevant to building n-tier applications.
- Understand the key components that they must create in order to implement an n-tier application.
- Describe how to protect operations and data in an n-tier application.

Module 10: Handling Updates in an N-Tier Solution by Using the Entity Framework

This module describes how you can handle data modifications in an n-tier solution. The module describes the different strategies for handling modifications that you should use for the different alternative formats for transporting data between tiers: data transfer objects (DTOs), self-tracking entities (STEs), and simple entities (SEs). The module also describes how to manage the exceptions that can occur during the data modification process.

Lessons

- Tracking Entities and Persisting Changes
- Managing Exceptions in an N-Tier Solution

Lab : Handling Updates in an N-Tier Solution by Using the Entity Framework

- Handling Updates in the Data Access Tier
- Detecting and Handling Order Conflicts

After completing this module, students will be able to:

- Describe strategies that they can adopt for tracking changes in the client application, and persisting those changes in the database.
- Describe how to trap and handle update and concurrency exceptions in the an n-tier solution.

Module 11: Building Occasionally Connected Solutions

This module describes how to access offline or occasionally connected data in client applications.

Lessons

- Offline Data Caching by Using XML
- Using the Sync Framework

Lab : Building Occasionally Connected Solutions

- Modifying the Orders Application to Use Offline XML Data
- Modifying the Orders Application to Synchronize Locally Cached Data

After completing this module, students will be able to:

- Cache data in local XML files by using LINQ to XML.
- Implement an occasionally connected application by using the Microsoft Sync Framework.

Module 12: Querying Data by Using WCF Data Services

Windows Communication Foundation (WCF) Data Services enable you to create highly flexible data services that can be used to provide access to data across the Internet or a corporate network. You can access these services by using REST-style URIs, and they can be easily consumed by a wide variety of applications. As WCF Data Services are build on top of standard Internet protocols such as HTTP and the Atom Publishing Protocol, they are an ideal choice for delivering data to AJAX applications and Rich Interactive Applications built using technologies such as Microsoft Silverlight.

Lessons

- Introduction to WCF Data Services
- Creating a WCF Data Service
- Consuming a WCF Data Service
- Protecting Data and Operations in a WCF Data Service

Lab : Creating and Using WCF Data Services

- Exposing Order Data as a WCF Data Service
- Consuming a WCF Data Service
- Restricting Access to Data Exposed by a WCF Data Service

- Implementing a Business Operation in a WCF Data Service

After completing this module, students will be able to:

- Describe the purpose and features of WCF Data Services.
- Expose data by using a WCF Data Service.
- Implement a client application that can consume a WCF Data Service.
- Grant and restrict access to resources exposed by a WCF Data Service.

Module 13: Updating Data by Using WCF Data Services

This module describes how to use WCF Data Services to create, update, and delete data. WCF Data Services use standard internet protocols such as HTTP and the Atom Publishing Protocol to enable update access to data across the Internet or a corporate network.

Lessons

- Creating, Updating, and Deleting Data in a WCF Data Service
- Preventing Unauthorized Updates and Improving Performance
- Using WCF Data Services with Nonrelational Data

Lab : Updating Data by Using WCF Data Services

- Updating Entities by Using a WCF Data Service
- Creating and Deleting Entities by Using a WCF Data Service
- Restricting Create, Update, and Delete Requests

After completing this module, students will be able to:

- Create, update, and delete entities by using a WCF Data Service.
- Control access to data modification functionality, and improve performance by batching commands together.
- Use WCF Data Services to access and modify nonrelational data.

Module 14: Using ADO.NET

ADO.NET is a highly flexible framework for building applications that require access to data held in a data source. This module introduces ADO.NET and explains how you can use it to develop scalable, high-performance, data-driven applications.

Lessons

- Retrieving and Modifying Data by Using ADO.NET Commands
- Retrieving and Modifying Data by Using DataSets
- Managing Transactions and Concurrency in Multiuser Scenarios

Lab : Using ADO.NET

- Using ADO.NET to Retrieve Read-Only Information Quickly and Perform Simple Data Modifications

- Developing the Product List Web Application
- Enabling Data Modifications

After completing this module, students will be able to:

- Retrieve and update data by using ADO.NET commands and stored procedures.
- Retrieve and update data by using DataSet objects.
- Implement transactions and handle concurrency exceptions.

Module 15: Using LINQ to SQL

ADO.NET provides a mechanism that enables you to build applications that can query and maintain data that is held in a variety of sources in a database-agnostic manner. However, building applications by using ADO.NET requires that you are familiar with the Structured Query Language (SQL) language and features of the database management system that you are connecting to. Language-Integrated Query (LINQ) to SQL provides a higher-level abstraction for managing data that is held in a Microsoft SQL Server database, and is an ideal stepping stone for migrating ADO.NET applications toward the ADO.NET Entity Framework. This module introduces LINQ to SQL and explains how you can use it to abstract the low-level details of ADO.NET queries by developing against a logical data model.

Lessons

- Implementing a Logical Data Model by Using LINQ to SQL
- Managing Performance and Handling Concurrency

Lab : Using LINQ to SQL

- Using LINQ to SQL to Build a Data Access Layer
- Updating a Database by Using a Stored Procedure
- Building a Custom Entity Class

After completing this module, students will be able to:

- Design a logical data model by using LINQ to SQL.
 - Manage performance by using LINQ to SQL, and handle concurrency.
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