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Computer Visions Course Outline

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#2957: Advanced Foundations of Microsoft .NET 2.0 Development

Description: This three-day instructor-led course provides students with the knowledge and skills to program Microsoft .NET Framework applications by using Microsoft Visual Studio 2005 development system.

Course Outline:

Module 1: Enhancing User Interfaces by Using System.Drawing
This module describes the key features of the **System.Drawing** namespace that the .NET Framework provides. It also explains how to create and modify your own custom drawings.

Lessons

- Drawing Fundamentals
- Drawing Lines and Shapes
- Rendering Bitmaps and Icons

Lab : Drawing to a Windows Form

- Drawing a Feedback Bar
- Drawing a Feedback Pie Chart
- Implementing an Automatic Double Buffer
- Adding Fonts to Your Application
- Saving Your Scaled Image

After completing this module, students will be able to:

- Use points, sizes, brushes, pens, colors, and fonts.
- Draw lines and shapes.
- Create and use images, bitmaps, and icons.

Module 2: Working with Cultures by Using System.Globalization

This module describes how to use the **System.Globalization** namespace to work with culture information and perform culture-sensitive string comparisons. It also describes how to create a custom culture.

Lessons

- Working with Culture Information
- Formatting and Sorting Culture-Sensitive Data
- Creating a Custom Culture

Lab : Working with Cultures by Using System Globalization

- Managing Culture Information
- Creating a Custom Culture

After completing this module, students will be able to:

Explain the purpose of the **System Globalization** namespace and describe how to access culture information by using the **Culture Info** class.

- Format values by using the supporting classes in the **System Globalization** namespace and explain how to perform culture-sensitive string comparisons.
- Create a custom culture by using the **Culture And Region Info Builder** class.

Module 3: Processing Text by Using Regular Expressions and Encodings

This module describes the key features of the **System Text** namespace that the .NET Framework provides. It explains how to store and manipulate strings, how and when to implement regular expressions, and how to customize encodings to produce the correct results when you process text

Lessons

- Handling Text and Large Strings
- Using Regular Expressions
- Encoding Text

Lab : Processing Text by Using Regular Expressions and Encodings

- Handling Text and Strings

Creating and Using Regular Expressions
Working with Encoding

After completing this module, students will be able to:

Explain the purpose of and use the **StringBuilder** class.

Describe the purpose of and create regular expressions by using the classes in the **System Text Regular Expressions** namespace.

Describe text encoding and how to encode and decode text by using the encoding classes.

Module 4: Encrypting and Hashing Data by Using Cryptography

This module describes when to use data encryption and hashing and explains how to use the classes in the .NET Framework 2.0 to perform these cryptographic tasks. It also discusses how to customize the implementation of specific algorithms by extending base classes in the **System Security Cryptography** namespace.

Lessons

Working with Encryption and Hashing
Encrypting and Decrypting Data
Hashing Data
Extending Cryptography

Lab : Creating a Cryptographic Application

Creating an Asymmetric Key
Encrypting a File
Decrypting a File
Exporting and Importing a Public Key
Getting a Private Key

After completing this module, students will be able to:

Explain the purpose of encryption and hashing algorithms.
Describe the algorithms available for hashing and encryption.
Describe the difference between symmetrical and asymmetrical algorithms.
Encrypt and decrypt data by using the classes in the **System.Security.Cryptography** namespace.
Create custom classes that extend the .NET Framework

cryptography model.

Module 5: Securing Code Execution and Resources
This module describes how code access security (CAS) works, how to make CAS permission checks in code, and how to configure CAS security policy. It also introduces Windows operating system access checks and explains how to use the .NET Framework base class library to read and modify Windows access control lists (ACLs). This module also describes how .NET Framework security performs authorization checks and how to customize the mechanism.
Lessons

Using Code Access Security
Securing Code Execution by Using Policy
Securing Resources by Using Access Control
Customizing Authentication and Authorization

Lab : Custom Authentication by Using Principal Objects

Viewing the Starter Solution
Adding Role-Based Security
Testing the Application

After completing this module, students will be able to:

Describe and implement CAS by using the **System Security** and **System Security Permissions** namespaces.
Explain how to control code privileges by using the **System Security Policy** namespace, and describe how to use the utilities provided with the .NET Framework to manage computer, user, and enterprise-level policy.
Describe and use access control by using the classes in the **System.Security.AccessControl** namespace.
Explain how to authenticate and authorize users by using the **System.Security.Principal** namespace.

Module 6: Application Interoperability
This module describes how to invoke functions that are implemented in unmanaged DLLs, and how to use various techniques for integrating Component Object Model (COM) components into managed applications. It also explains how to make managed components that are built by using the .NET Framework available to unmanaged COM client applications
Lessons

Using the Platform Invoke Service

Integrating COM Components into a .NET Framework Application
Integrating Managed Components into an Unmanaged Application

Lab : Application Interoperability

Integrating Unmanaged Functions into a Managed Application
Integrating a COM Component into a Managed Application by Creating an Interop Assembly
Integrating a COM Component into a Managed Application by Using Late Binding
Manually Creating an Interop Assembly for a COM Component

After completing this module, students will be able to:

Use the Platform Invoke service to incorporate unmanaged functions into a .NET Framework application.
Integrate unmanaged COM components into a .NET Framework application.
Incorporate components that are built by using the.NET Framework into unmanaged applications.

Module 7: Reflection, Metadata, and Emitting Objects
This module describes how to use the classes in the .NET Framework 2.0 class library to examine a program, alter the behavior or structure of the program as it runs, and create and run new code.
Lessons

Reflecting on Objects
Adding Assembly Metadata
Emitting Objects by Using Builder Classes

Lab : Creating an Add-in Framework by Using Reflection

Creating a Custom Attribute to Decorate Add-in Classes
Using Reflection to Discover the Add-in Classes
Creating a Mapping from Columns to Properties
Creating a Dynamic Method to Set a Property Value
Invoking the Row Handler

After completing this module, students will be able to:

Explain and use reflection in .NET Framework applications by using the **System Reflection** namespace.
Describe and create application metadata.
Describe and create Microsoft intermediate language (MSIL) and portable executable (PE) files by using the **System Reflection**

Emit namespace.

Module 8: Services, Threading, and Application Domains This module describes how to use the Microsoft .NET Framework classes to write Windows services and classes to install services. It also explains how to use the .NET Framework classes to create thread objects to execute code and to synchronize execution between threads. Finally, this module describes how to access and configure application domains.

Lessons

Creating and Installing Windows Services
Creating Multithreaded Applications
Manually Working with Application Domains

Lab : Creating a Windows Service Application

Creating a Service Project
Creating the Installation Project
Creating a Client Application
Writing the Service Code

After completing this module, students will be able to:

Explain how to create, install, and control a Windows service by using the **System Service Process** namespace.
Describe and implement multithreaded applications by using the **System Threading** namespace.
Describe and create application domains.