Chapter Objectives – 1

- Describe the process of visual program design and development
- Explain the term object-oriented programming
- Explain the concepts of classes, objects, properties, methods, and events
- Describe the various files that make up a C# project

Chapter Objectives – cont’d

- Identify the elements in the Visual Studio environment
- Define design time, run time, and debug time
- Identify syntax errors, run-time errors, and logic errors
- Look up C# topics in Help
Your C# programs will look and act like standard Windows programs. Use tools to create:
- Labels
- Text boxes
- Buttons
- Radio buttons
- Picture box
- Check box
- Menu Bar
- Drop-down list
- List box
- Group box

Windows GUI defines how elements look and function. Windows are called forms. Elements are called controls. Add controls to your forms using the toolbox. C# projects follow the object-oriented programming (OOP) technique.

Procedural — Basic, C, Cobol, Fortran, PL/1, Pascal
- Program specifies exact sequence of operations

Object Oriented Programming (OOP) — C#, Java, Visual Basic
- User controls the sequence
- User actions cause events to occur which trigger methods
The Object Model

- Objects have properties, methods and events
- An object is based on a class
  - Objects (noun or thing)
  - Properties (adjectives)
    - Name, Color, Size, Location
  - Methods (verbs)
    - Close, Show, Clear
  - Events (occurs when user takes action)
    - Click, KeyPress, Scroll, Close window
- Classes (template or blueprint)
  - Contain definition of all available properties, methods and events

Object Model Analogy

- Class = automobile
- Object = one individual automobile
  - Object is an instance of the automobile class
- Properties = make, model, color, engine, number of doors
- Methods = start, speedup, slowdown, stop
- Events = arrive, crash

OOP Terminology

- Object.Property
  - SalesForm.Text
- Object.Method
  - BillingForm.Show()
  - exitButton.Show()
Microsoft's Visual Studio 2008

.NET 3.5 Framework
- Environment that allows objects from different languages to operate together, standardizes references to data and objects
- .NET languages all compile (translate) to Microsoft Intermediate Language (MSIL)
- MSIL runs in the Common Language Runtime (CLR)

Programming Languages
- Visual C#, Visual C++, Visual Basic

C# Versions

C# Application Files

- Solution file
  - A C# application is called a solution and can consist of one or more projects
  - .sln extension
- Project file
  - Describes project and lists files included
  - .csproj extension
- Form files
  - .cs, .Designer.cs, .resx extensions
- The Visual Studio environment creates several more files

The Visual Studio Environment

- .NET Framework – Three major components
  - Common Language Runtime (CLR)
  - Class Library
  - ASP.NET
- Integrated Development Environment
Common Language Runtime (CLR)

- Manages execution of code
- Integrates components developed in different languages (a.k.a. managed code)
- Handles errors across languages
- Provides security
- Manages storage and destruction of objects (garbage collector)
- Manages data

Class Library

- Stores all classes and interfaces of the .NET language
- Stored in a library known as the .NET Framework class library
- Namespaces – sections within the library that contain classes, structures, enumerations, delegates, interfaces
- Standardized through the Common Language Specifications (CLS)

ASP.NET

- ASP.NET 3.0 is the newest version of Active Server Pages (ASP)
- Web development environment that compiles applications written in .NET compatible languages
- Uses CLR and managed code features
- Makes Web development easier by providing development and debugging support for Web applications and Web Services similar to that for Windows applications
Integrated Development Environment (IDE)

- Includes various tools
  - Form designer
  - Editor for entering and modifying C# code
  - Compiler
  - Debugger
  - Object Browser
  - Help

Default Environment Settings

- Visual Studio 2008 allows selection of default IDE profile
  - Available with full version of Visual Studio
  - Choose Visual C# Development Settings
    - Text uses the Visual C# settings
    - Settings can be saved for more than one language
    - To switch between the settings for languages:
      - Select Tools/Import and Export Settings
      - Choose Reset all settings

The New Project Dialog

- Select File/New Project
  - New Project Dialog Box Opens

Select Visual C# Windows
Select the Windows Forms Application template
Enter the Project Name
The IDE Main Window

- Each window can be moved, resized, closed, or customized

The Toolbars

- Toolbar buttons are shortcuts
- Each button’s command is also a menu selection
- Select View/Toolbars to display or hide a toolbar
- Three commonly used toolbars
  - Standard
  - Layout
  - Text Editor

Document Window

- Use tabs to switch between open documents
- Items in Document window
  - Form Designer
  - Code Editor
  - Project Designer
  - Database Designer
  - Object Browser
The Form Designer

- Design forms for user interface
- Change size of form using sizing handles or selection border
- A new default form is added when a new C# application is started

The Solution Explorer and Properties Windows

- Solution Explorer window
  - Holds filenames for project files
  - Lists classes referenced
  - Holds name of solution (.sln) file
- Properties Window
  - Used to set properties for objects in project

Toolbox

- Holds tools to place controls on form
- Tools vary depending on edition of C#
Design Time, Run Time, Debug Time

- **Design Time**
  - Design user interface (forms)
  - Write code
- **Run Time**
  - Testing project
  - Running project
- **Debug Time**
  - Run-time errors
  - Pause program execution