JOHN ABBOTT
CEGEP/COLLEGE

(420-PS4-AB)
Developing ASP .NET Web Applications with ADO .NET

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Outline

- Program courses
- Understanding the Web
- Introduction to .NET Framework
- What is C#?
- Visual Studio \ Web Platform Installer
- Introduction to Visual Studio
- Creating ASP .NET Projects
- Demos & Exercises
- Suggested Resources

Program Courses

- Introduction to Computers, the Internet, and the Web
- HTML & XML
- Cascading Style Sheets (CSS)
- JavaScript
- Website Design
- Programming I
- Programming II
- Programming III

- Database I
- Database II
- PHP Programming
- Mobile Applications
- .NET Programming Fundamentals
- Visual Basic .NET and C# .NET Windows Development
- Data Structure and Algorithms
- Developing ASP .NET Web Applications
- Developing Web Services

Components of a Web Application

PCs, Tablets, Smartphones, Kiosks, ATMS,..

Internet
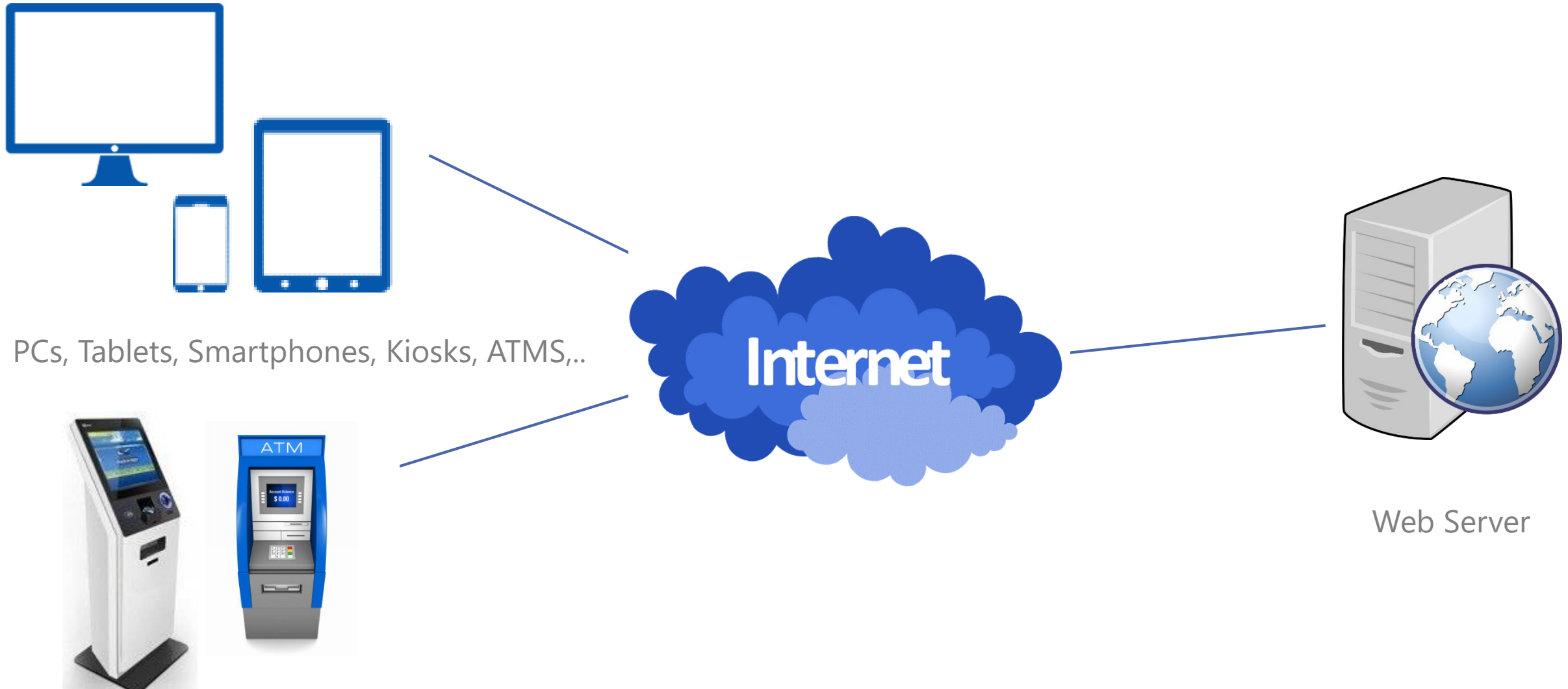
Web Server

Web Server & Browsers

- Web server: software that listens for web page requests
  - Apache
  - Microsoft Internet Information Server (IIS) (part of Windows)
  - nginx and lighttpd -- Lighter weight open source alternatives to Apache

- Web browser: fetches/displays documents from web servers Firefox web browser
  - Mozilla Firefox
  - Microsoft Edge / Internet Explorer (IE)
  - Google Chrome
  - Opera
  - Apple Safari

Web Languages – Technologies

- Hypertext Markup Language (**HTML**): used for writing web pages

- Cascading Style Sheets (**CSS**): stylistic info for web pages

- PHP Hypertext Processor (**PHP**): dynamically create pages on a web server

- **JavaScript**: interactive and programmable web pages (with libraries like jQuery)

- Asynchronous JavaScript and XML (**Ajax**): retrieving data for web applications from pre-loaded web pages

- eXtensible Markup Language (**XML**) and JavaScript Obejct Notation (**JSON**): meta-languages for organizing data

- **C# / VB .ne**t: Microsoft .net languages used in web development as well as in other contexts

Uniform Resource Locator (URL)

- An identifier for the location of a document on a web site
- A basic URL:
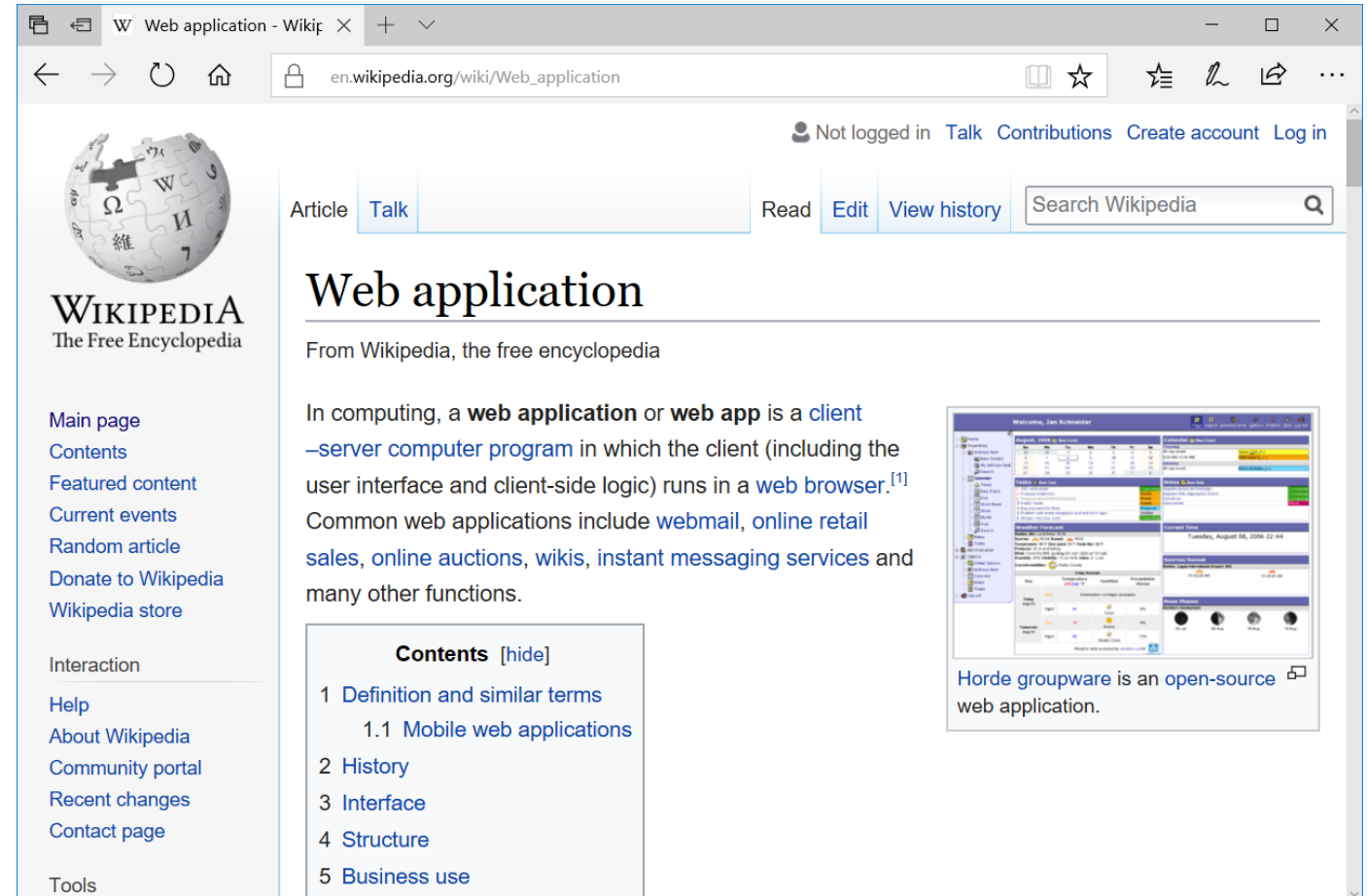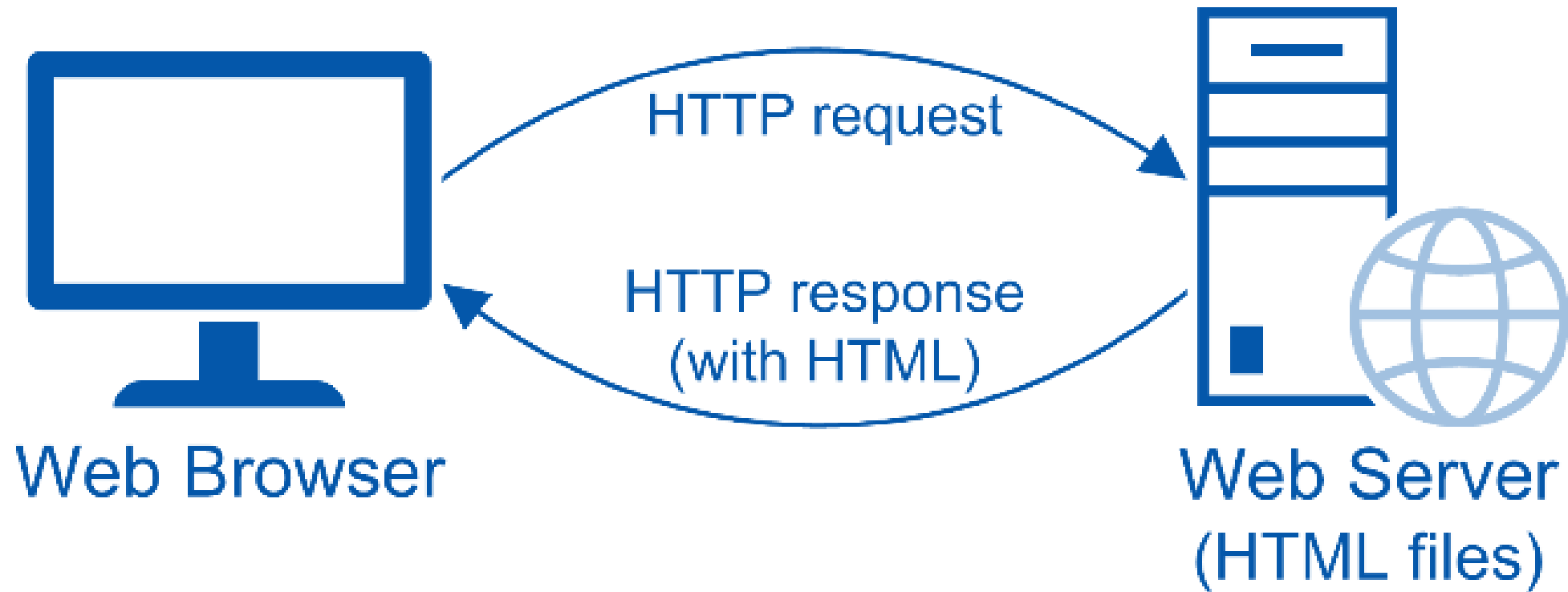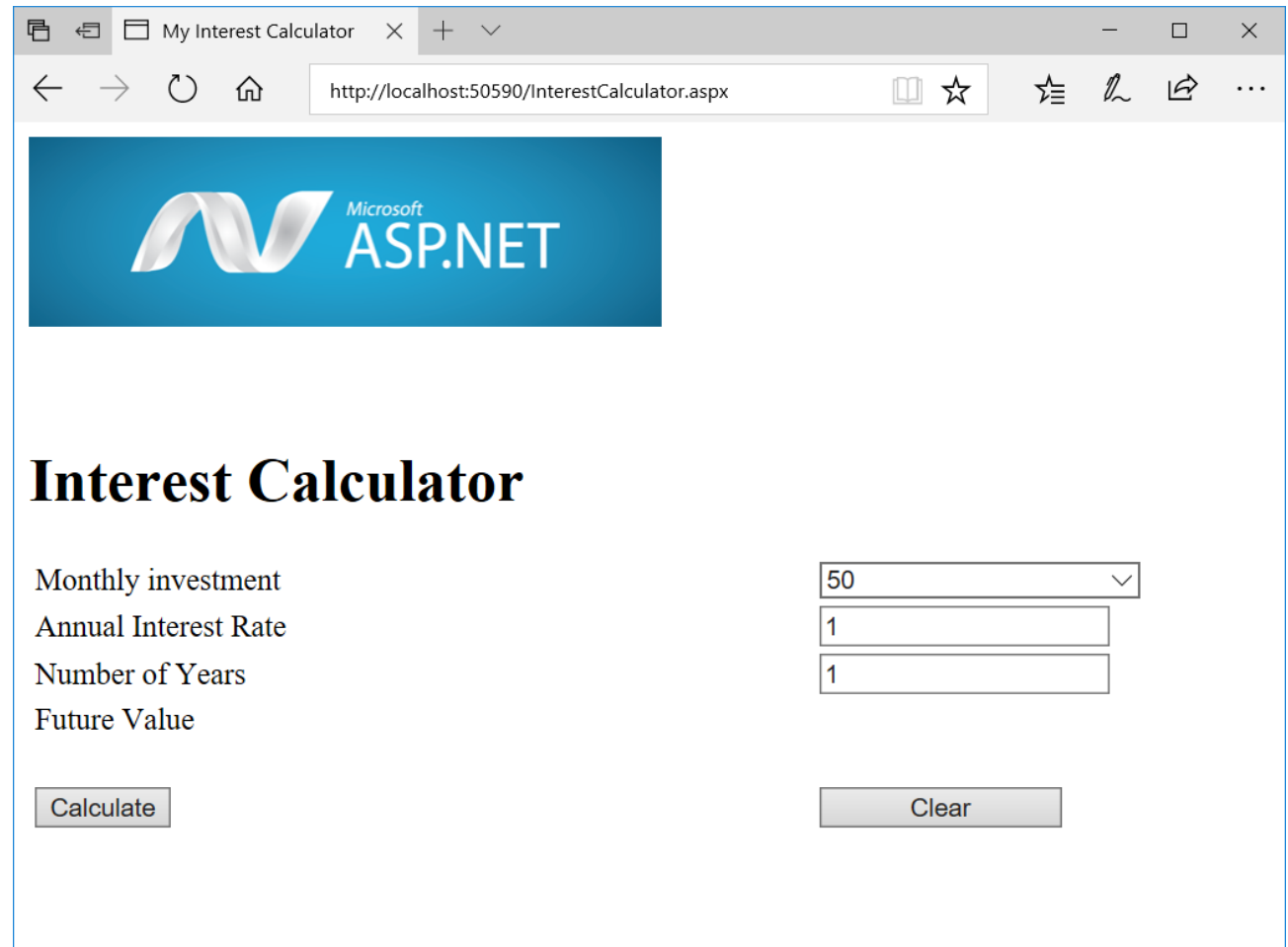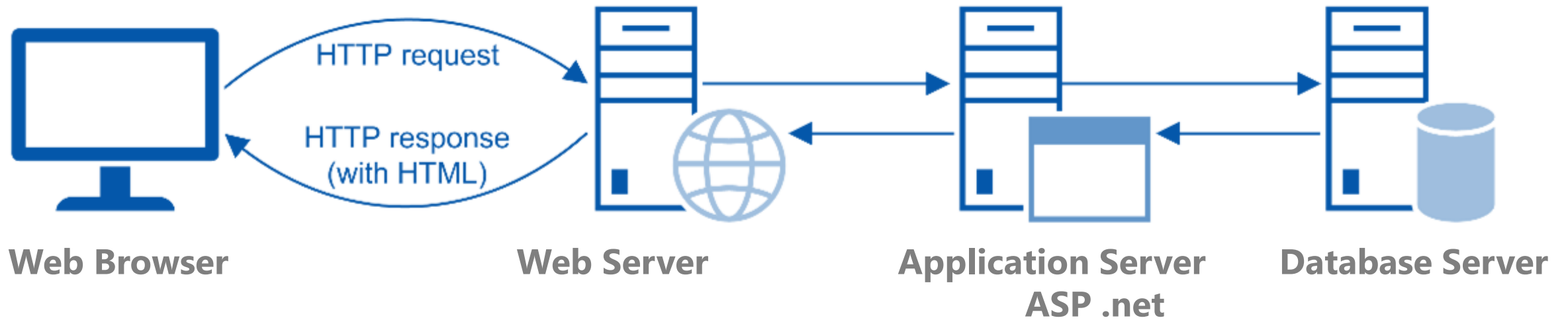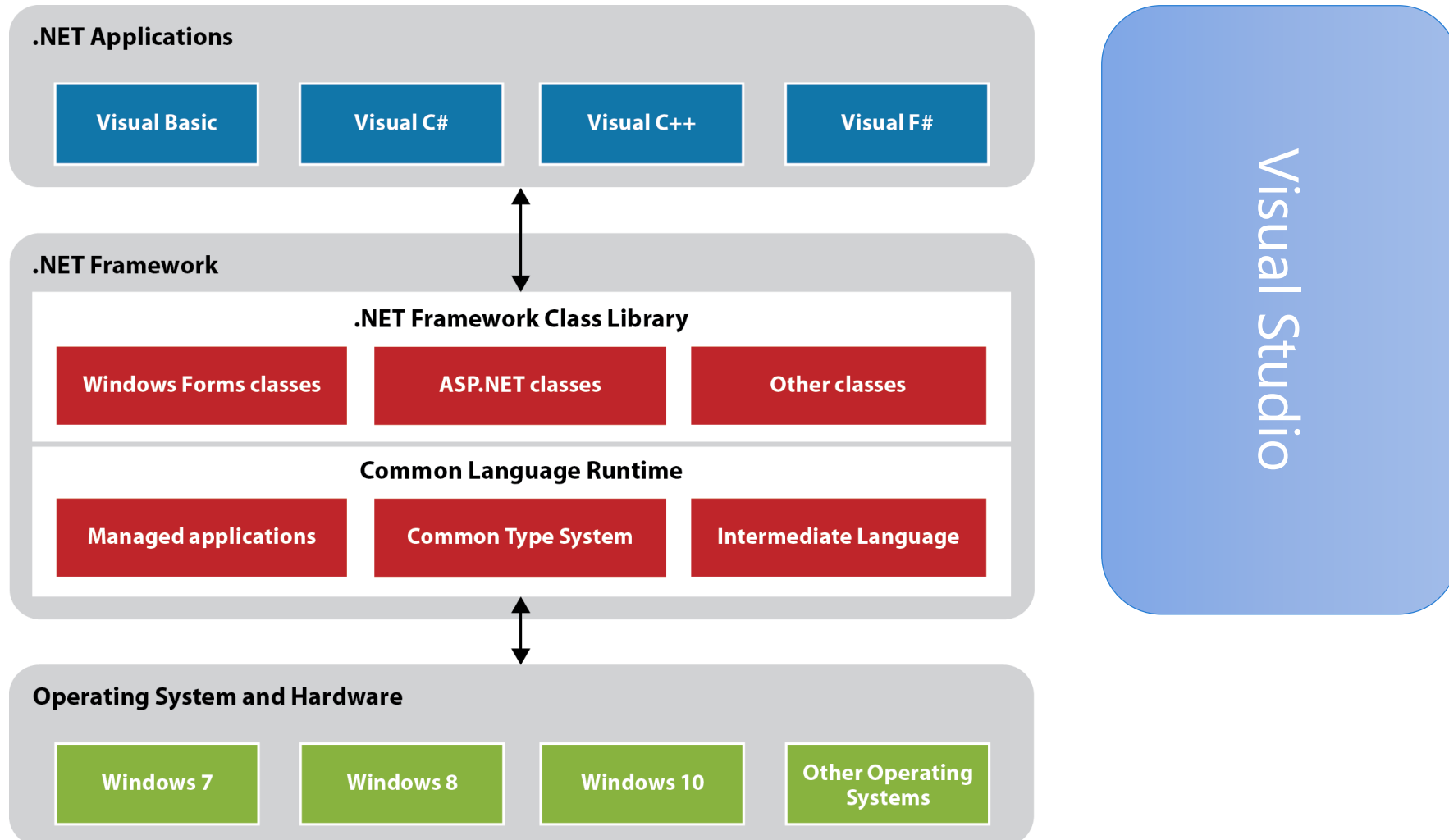
    http://www.johnabbott.qc.ca/ info/index.html
    ~~~   ~~~~~~~~~~~~~~~~~ ~~~ ~~~~~~~
    protocol   host   path file name

- Upon entering this URL into the browser, it would:
    - Ask the DNS server for the IP address of www.johnabbott.qc.ca
    - connect to that IP address at port 80
    - ask the server to GET /info/index.html
    - display the resulting page on the screen

Static Web Pages

When a browser requests a `.html` file (static content)

Server just sends that file

Processing a Static Web Page

Web Browser ← → Web Server (HTML files)

HTTP request

HTTP response (with HTML)

Dynamic Web Pages

When a browser requests a `.aspx` file (dynamic content)

- Server reads it, runs any code inside it or that is called by the page, then sends result across the network
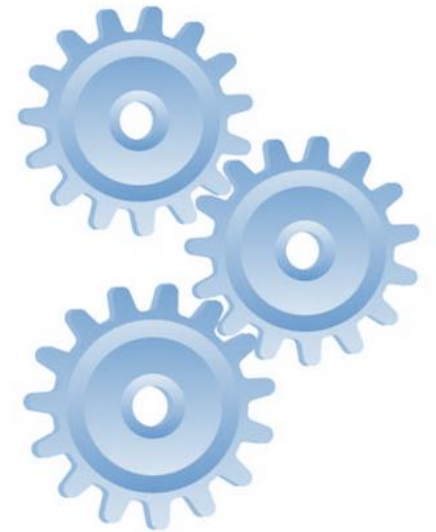- aspx produces output that becomes the response sent back

Processing Dynamic Web Pages

HTTP request

HTTP response
(with HTML)

Web Browser   **Web Server**   **Application Server**   **Database Server**
ASP .net

Introduction to .NET Framework

- .NET Framework is a software platform that provides:
    - A managed computing platform
    - A secure runtime/execution environment
    - Memory management
    - Language choice: common language runtime (CLR)
    - Desktop, web and distribution systems
    - Object-Oriented environment

What is inside the .NET Framework?

What is C#?

- C# was released by Microsoft in 2002

- A server-side compiled language

- Used to make web pages dynamic:
  - provide different content depending on context
  - Interface with other services: database, e-mail, etc
  - Authenticate users
  - Process form information

- C# code can be embedded in XHTML code
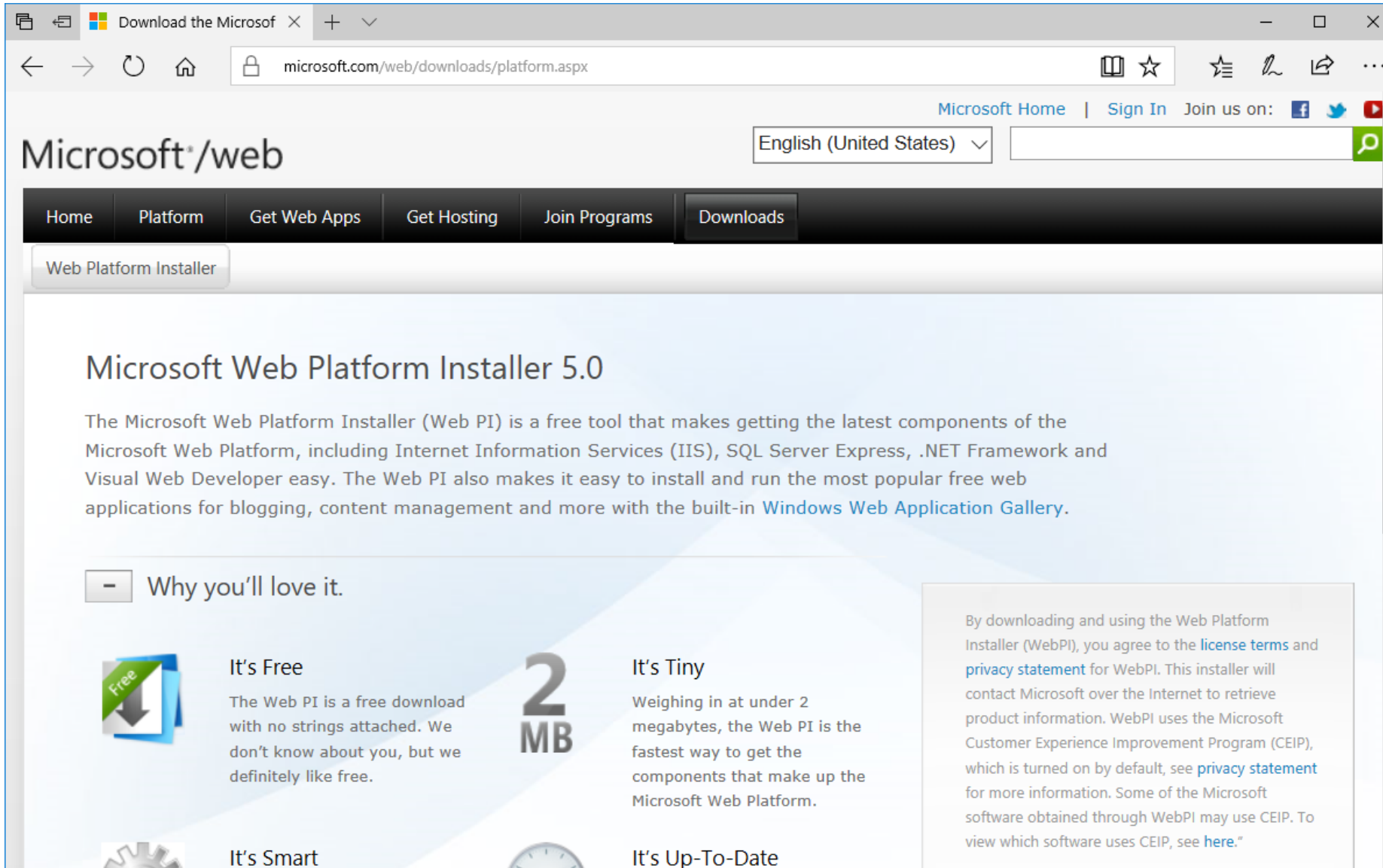
Visual Studio Installation

- Windows 7 or later
- .NET Framework 4.6
- Visual Studio 2015
  - Other versions?
- IIS Express
- SQL Server Express (LocalDB)

Visual Studio Editions

Edition	Description
Visual Studio Community 2015	Free edition for Windows, web, and mobile apps.
Visual Studio Professional 2015	For individuals or small teams, it includes basic tools for testing, database deployment, and change and lifecycle management.
Visual Studio Enterprise 2015	For teams, it includes full testing, modeling, database, and lifecycle management tools.

Web Platform Installer

Visual Studio Editor Environment

- Visual Studio has many different window, toolbars and menus that can be used to build, design, test and deploy application:
  - Code Editor
  - Solution Explorer
  - Server Explorer
  - Toolbox
  - Debugger
  - Design/ Source views
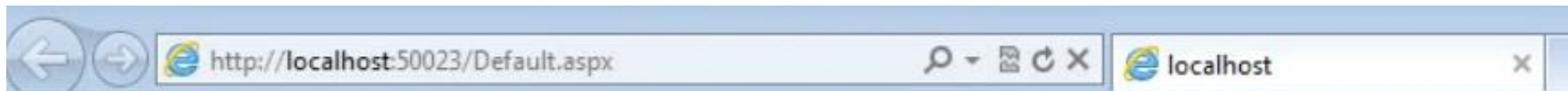 - Many other

ASP .NET Web Forms Project

- ASP .NET support two different types of projects:
  - Web Site Project
    - Folder based
    - Compiled at web server
  - Web Application Project
    - Solution based
    - Tracks all components
    - Compiled before deployment.
    - DLL.

Demo: First Project

- Simple form:
  - Take the user "Name" and display it back on the same page.

Demo: Investment Calculator (1)

- Write an ASP .NET Web form to calculate investment value given a monthly investment value, the annual interest rate and the number of year.
  - Predefined values of monthly investment.
    - [50,100,150,200....500]
  - Annual Interest Rate
  - Number of years
  - Calculate & Clear operations.
  - Add a logo and let it look nice.

Demo: Investment Calculator (2)

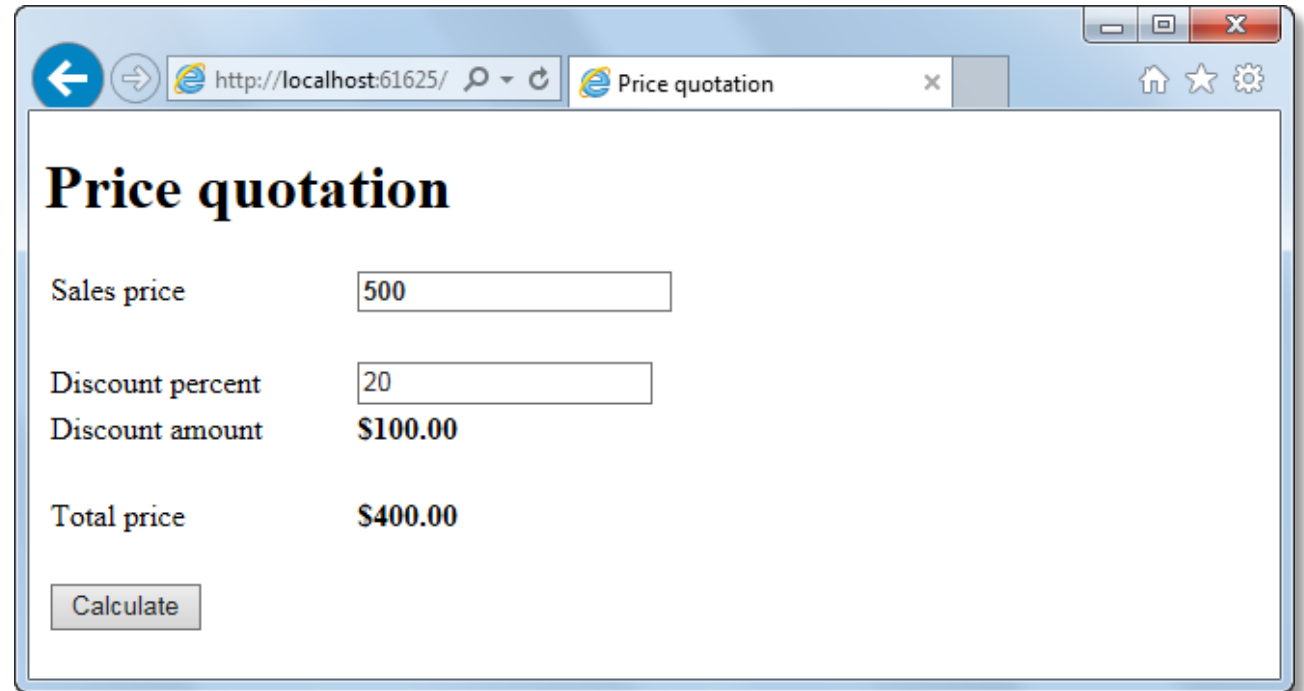- Method for the investment value.

```
protected decimal CalculateValue(int monthlyInvestment, decimal yearlyInterestRate, int years)
    {
        int months = years * 12;
        decimal monthlyInterestRate = yearlyInterestRate / 12 / 100;
        decimal futureValue = 0;
        for (int i = 0; i < months; i++)
        {
            futureValue = (futureValue + monthlyInvestment) * (1 + monthlyInterestRate);
        }
        return futureValue;
    }
```

Demo: Investment Calculator (3)

- Add validations:
  - Annual Interest Rate: decimal [1.0 – 20.0]
  - Number of years: integer [1-45]

  - Framework 4.5 and later
    - UnobtrusiveValidationMode = UnobtrusiveValidationMode.None

Exercise: QuotationBuilder

- Build a quotation application

- Apply proper validation

Exercise: ShapeAreaCalculator (1)

- Write an ASP .NET web form to allow a user to choose among different geometric shapes and then ask for required measurement to calculate the area.

  - Choose a shape (use any suitable control)
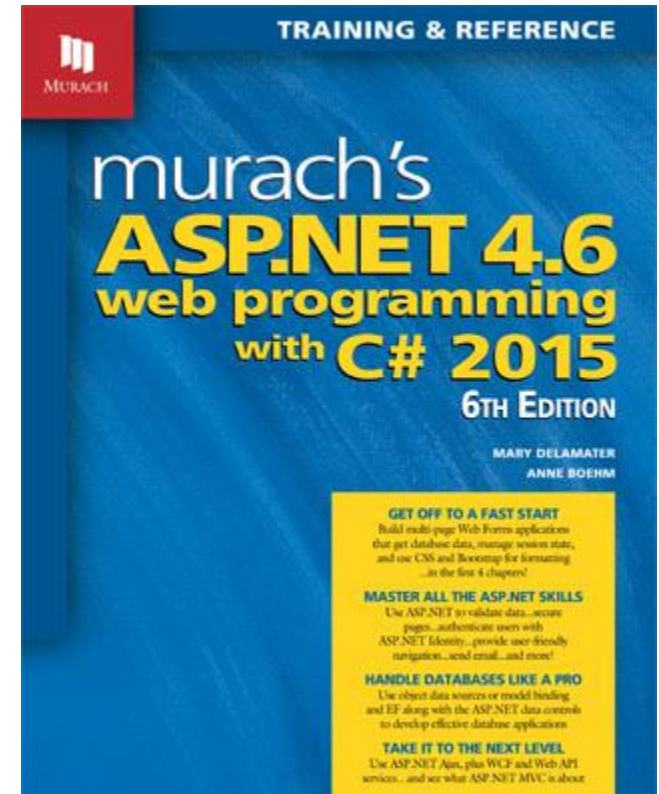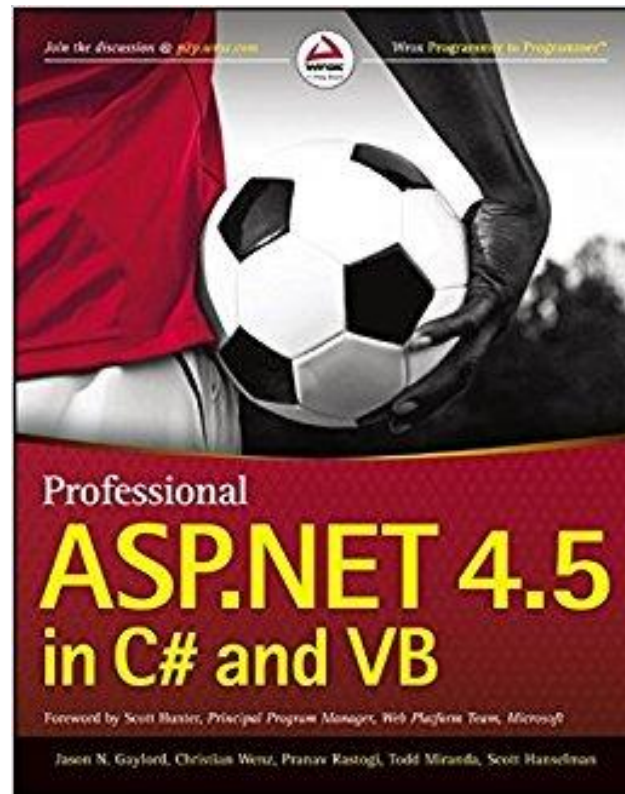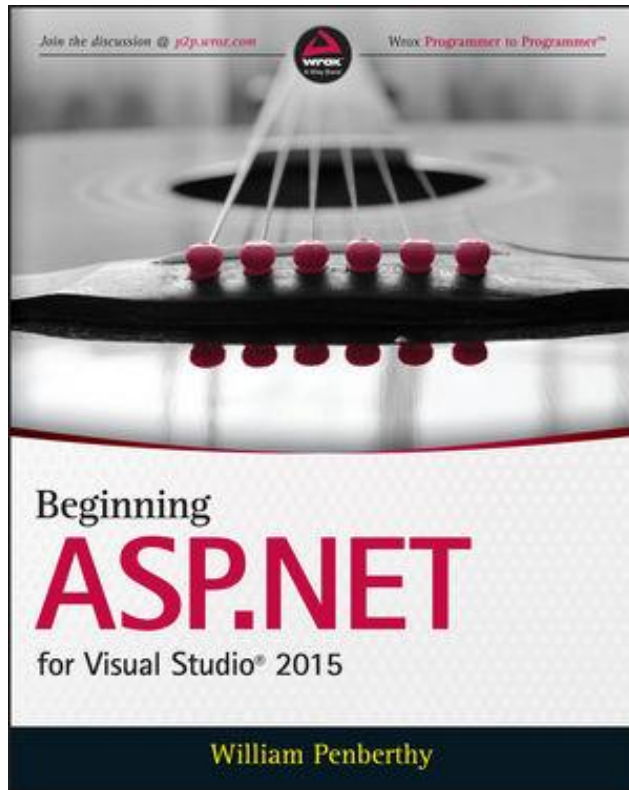
  - Add images

  - Add proper validations

Exercise: ShapeAreaCalculator (2)

- Write an ASP .NET web form to allow user to choose among different geometric shapes and the ask for required measurement to calculate the area.
  - Square = width * width
  - Rectangle = width * height
  - Triangle = ½ base * height
  - Circle = Pi * radius * radius
  - Ellipse = Pi * radius1 * radius2
  - Trapezoid = ½ height (base1+base2)

Suggested Textbooks

Other Recourses

- <u>Microsoft's Site on ASP.NET</u> - Official site maintained by Microsoft with links to information.

- <u>ASP.NET Weblogs</u> - NET Developers Group that will be held at the Microsoft offices in Farmington.

- <u>MSDN Library</u> - An essential source of information for developers using Microsoft® tools, products, technologies and services

- <u>.NET Framework</u> - The .NET Framework is an integral Windows component that supports building and running the next generation of applications and Web services

Q & A

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