CO550 – Web Applications

Unit 1 - Intro to Server Side Programming

Module Plan

- Learning objectives
- ASP.NET tutorials
- Assignment Schedule
- Logbook

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HISTORICAL PERSPECTIVE

- Static Websites and HTML
- Client Side Scripting and JavaScript
- Some Dynamic Web Applications

- Databases in Web Applications and SQL
- Server Side Scripting
- Client / Server Technology

Client Side Technology: HTML

- HyperText Markup Language
- Current version is …
- Uses pairs of tags (elements)
- Creates the application interfaces
- Provides an ability to navigate between pages
- Provides a means of capturing data via forms

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Client Side Technology

- Downloaded to the client machine
- Executed by the client browser
- HyperText Markup Language
- Formatting language (CSS)
- Interface, Navigation, Data Capture
- Common client side scripting languages
  - JavaScript (heard of jQuery?)
  - VBScript (only kidding!)
- Uses
  - Validation of data entered into forms

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Server Side Scripting

- Executed on server
- Provides connectivity to databases
- Implements the systems business logic
- Generates dynamic web pages
- Examples are ASP, PHP, Python, etc…

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Interacting With Databases

A key characteristic of web applications is that they interact with databases.

In our case ASP scripts and .NET environment will be responsible for carrying out the typical database interactions:

- retrieving records from tables in database
- updating, inserting and deleting records

It is also possible to write scripts that create tables dynamically.

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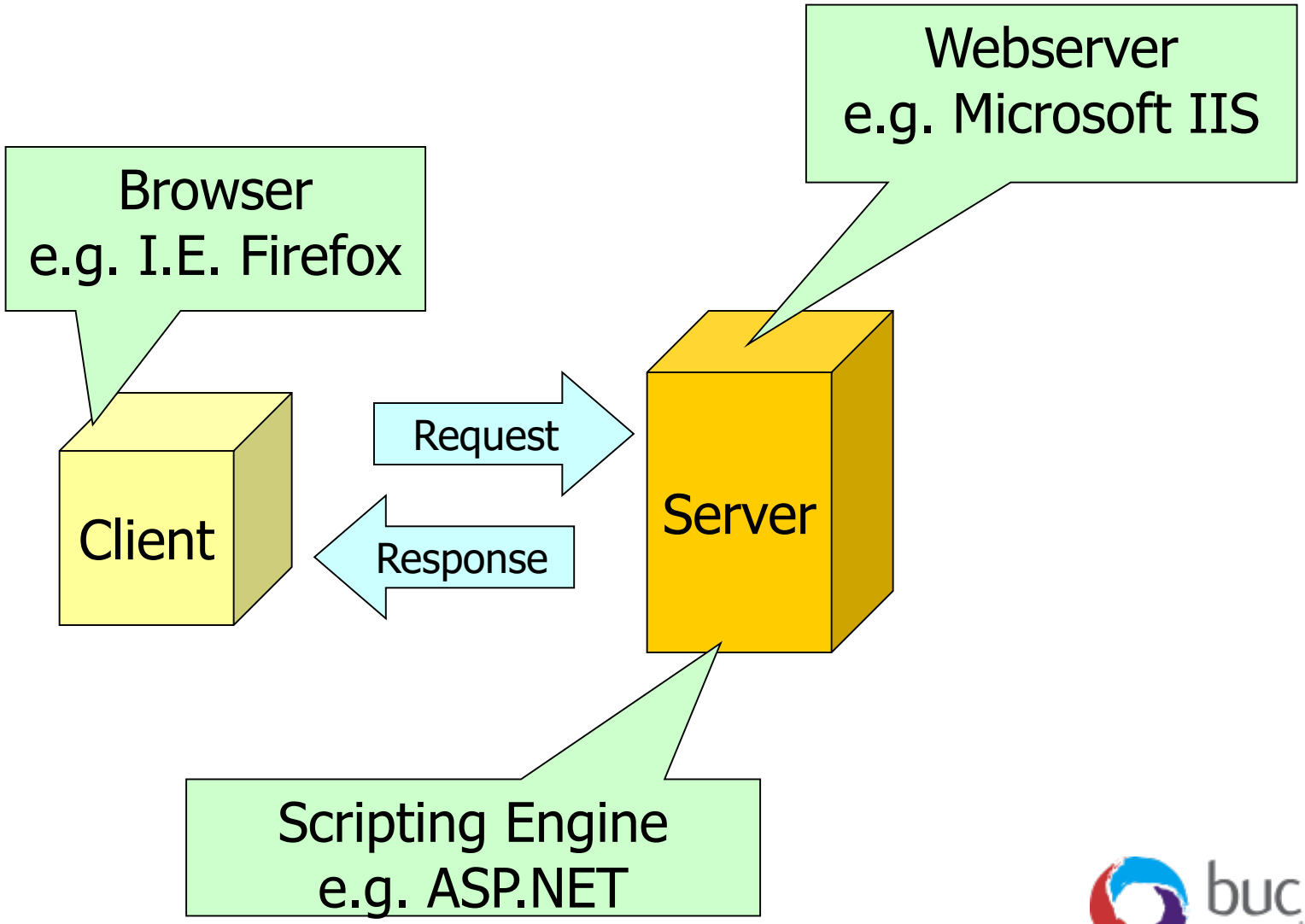
The Architecture



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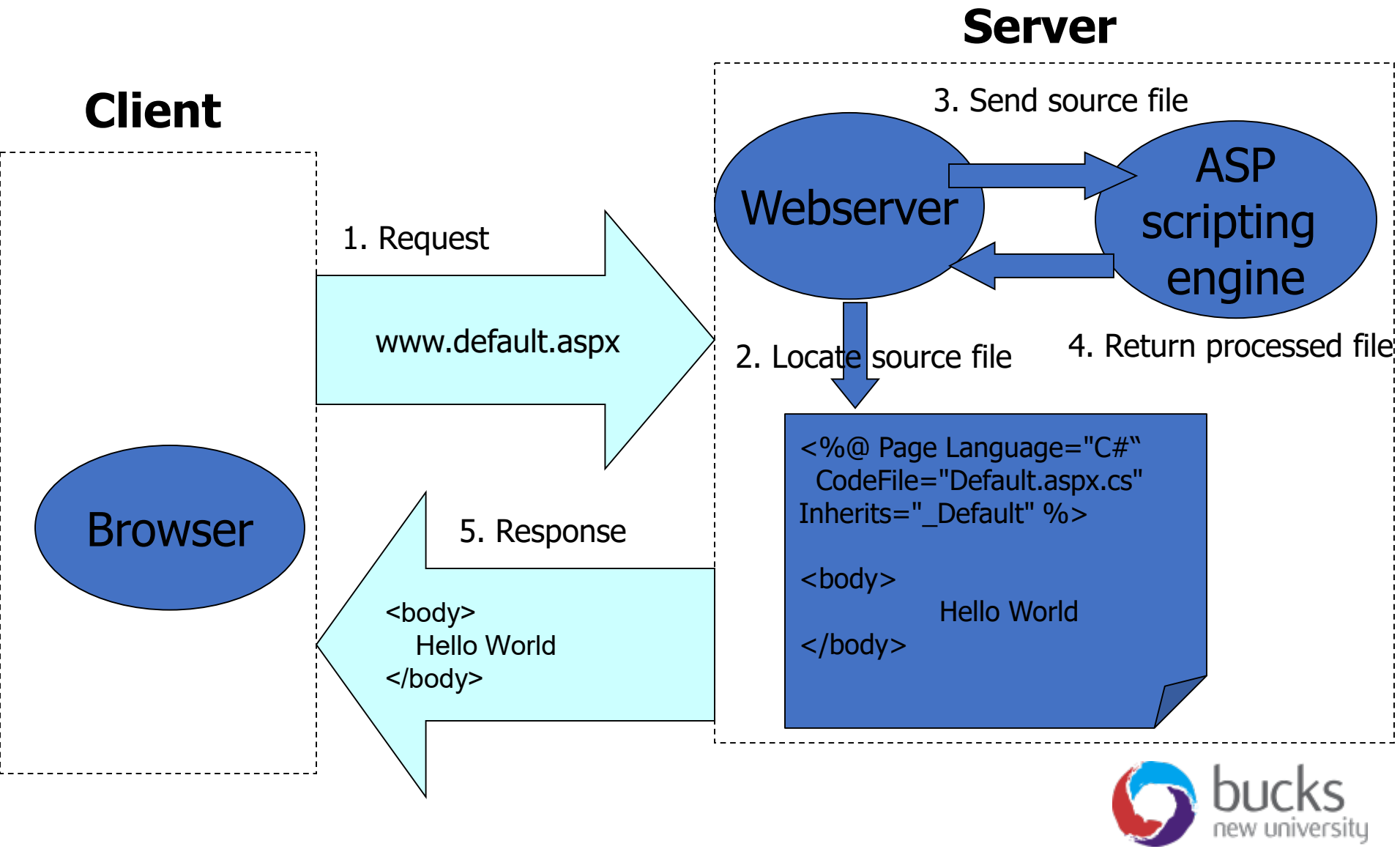
Client Server Interaction



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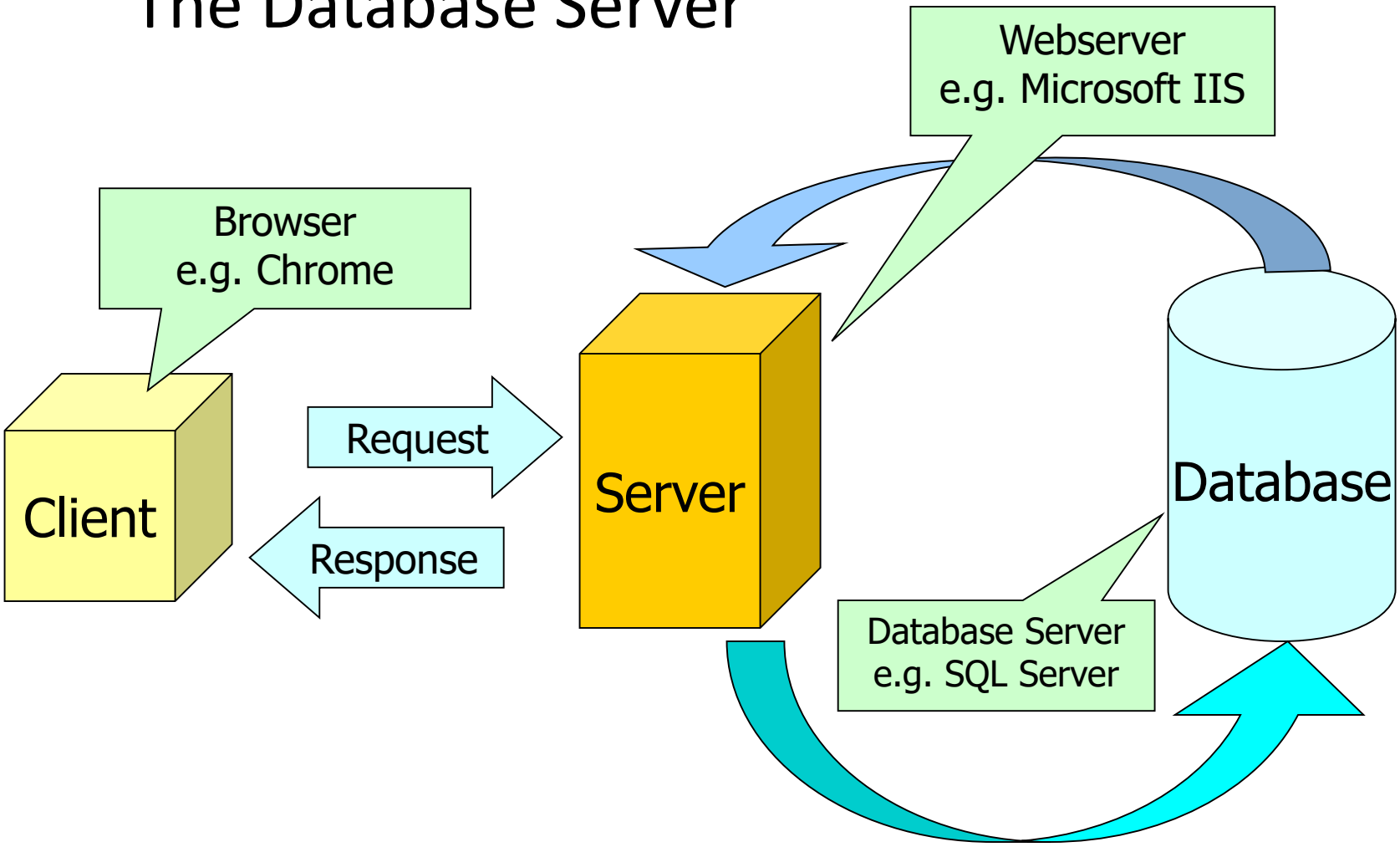
The Database Server



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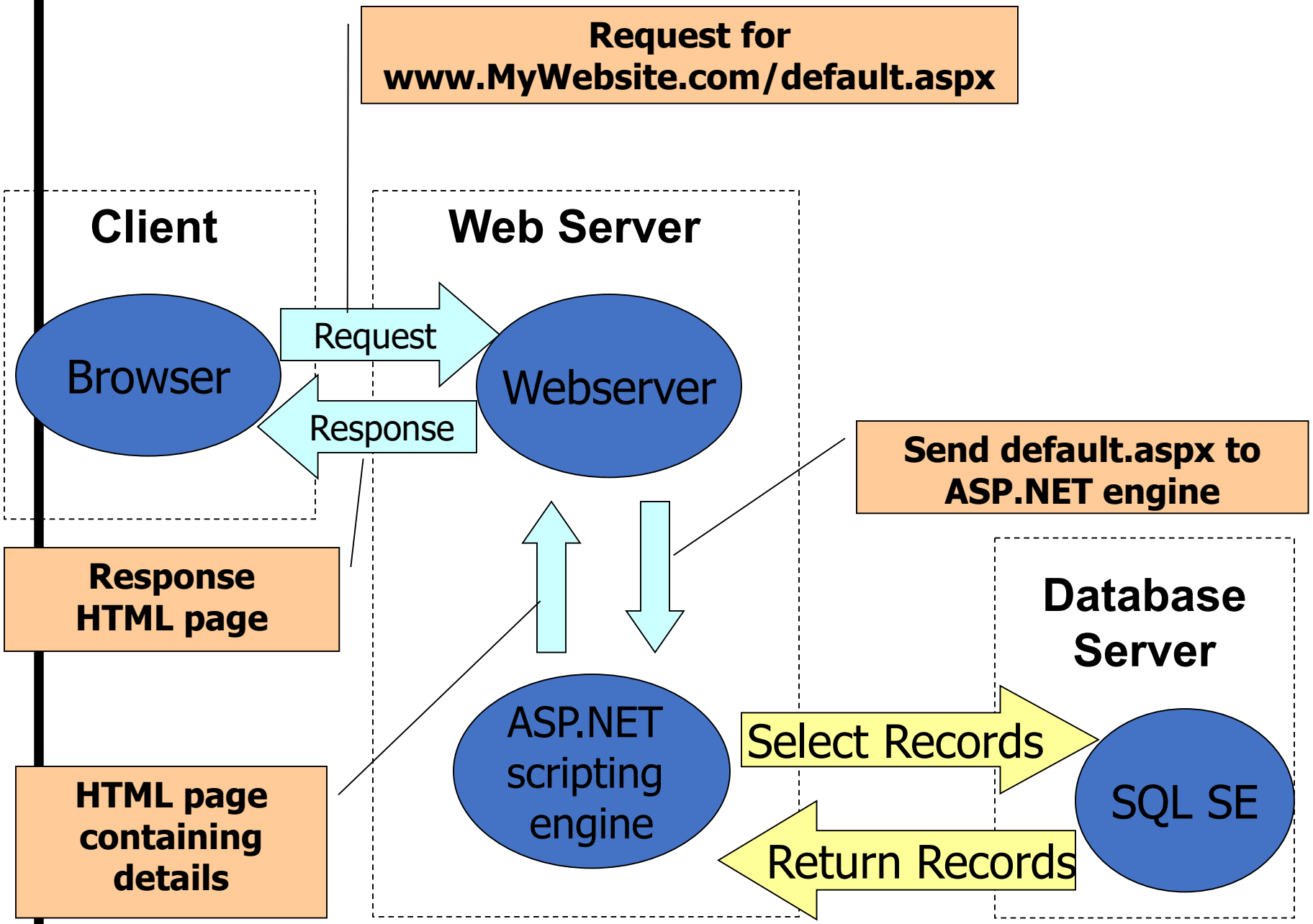
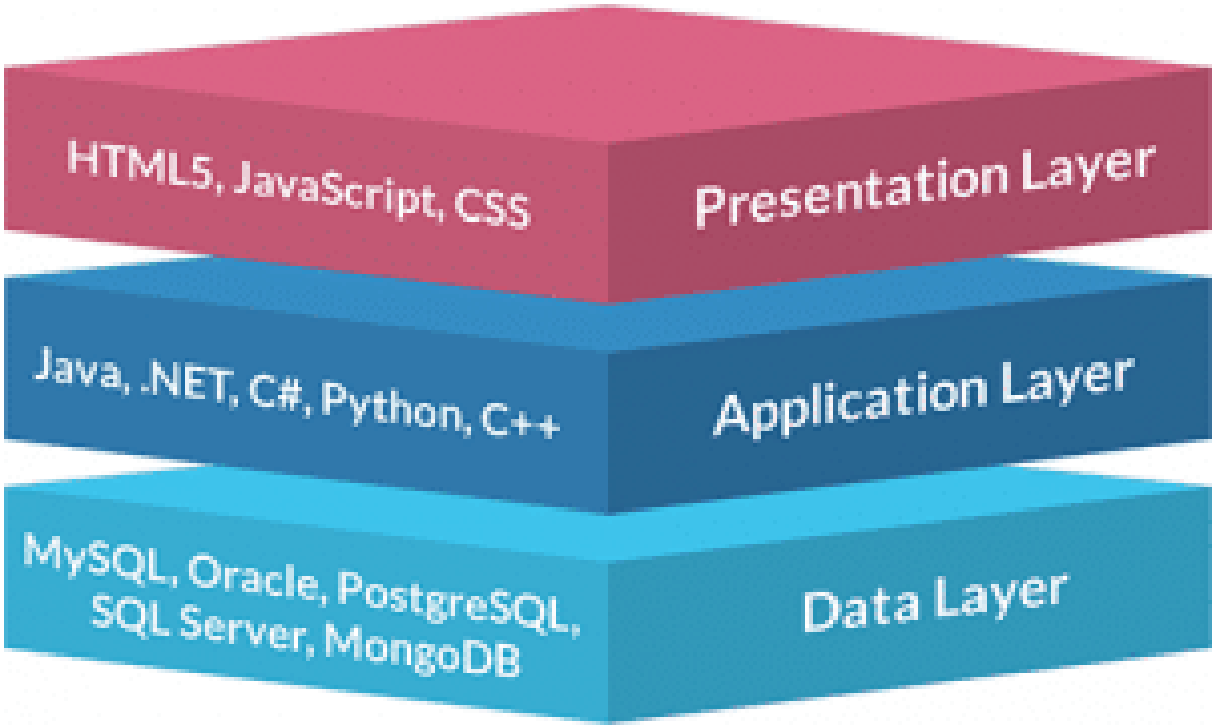

Request for
www.MyWebsite.com/default.aspx
Client
Web Server
Browser
Request
Response
Webserver
Send default.aspx to
ASP.NET engine
Response
HTML page
Database
Server
ASP.NET
scripting
engine
Select Records
SQL SE
HTML page
containing
details
Return Records

3-tier architecture



Source: https://www.jinfonet.com/resources/bi-defined/3-tier-architecture-complete-overview/

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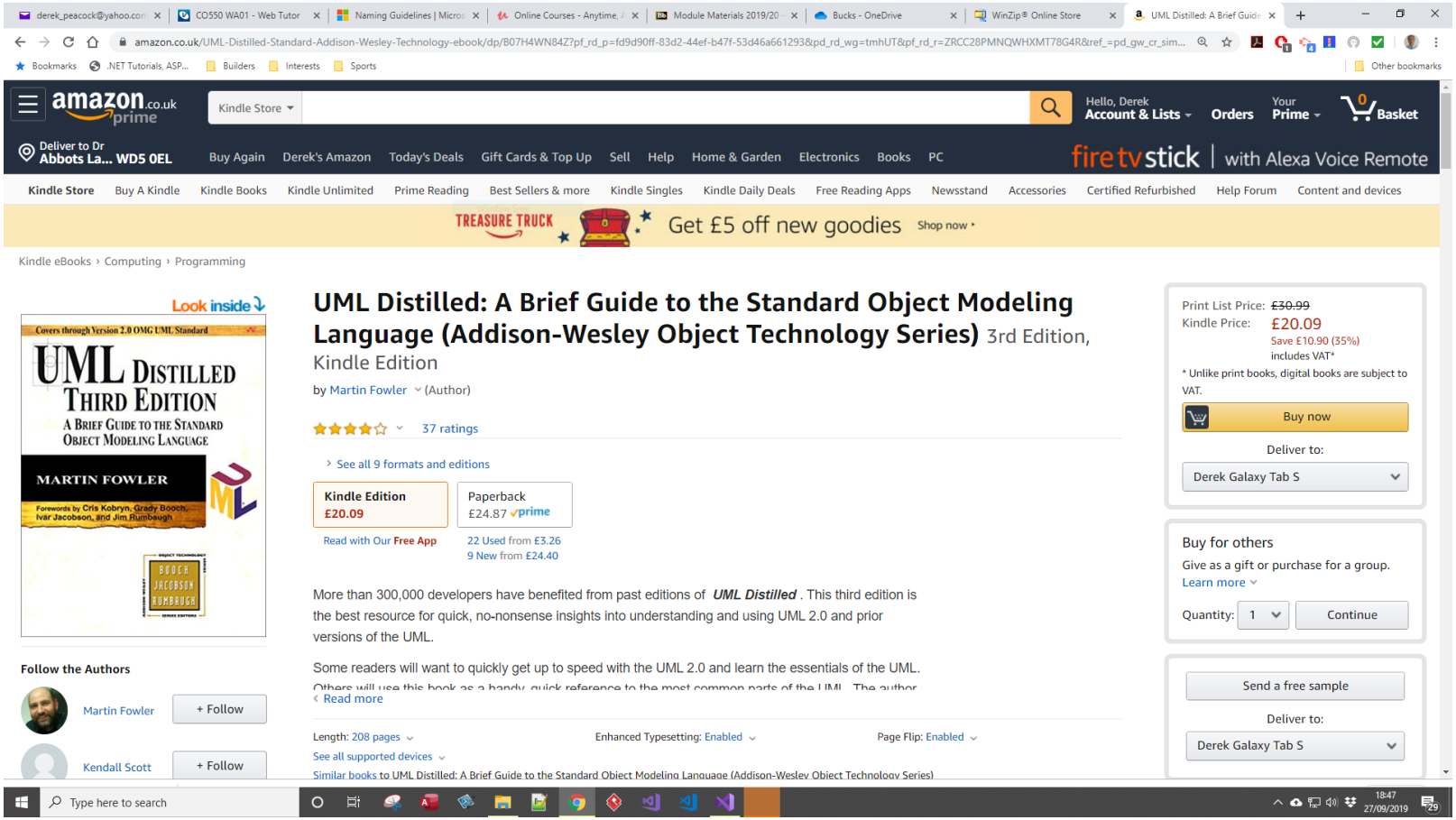
Dynamic Web Page



ASP.NET

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ASP.NET CORE vs ASP.NET

ASP.NET Core	ASP.NET
Build for Windows, macOS, or Linux	Build for Windows
Razor Pages is the recommended approach to create a Web UI as of ASP.NET Core 2.x. See also MVC, Web API, and SignalR.	Use Web Forms, SignalR, MVC, Web API, WebHooks, or Web Pages
Multiple versions per machine	One version per machine
Develop with Visual Studio, Visual Studio for Mac, or Visual Studio Code using C# or F#	Develop with Visual Studio using C#, VB, or F#
Higher performance than ASP.NET	Good performance
Choose .NET Framework or .NET Core runtime	Use .NET Framework runtime

Source: https://docs.microsoft.com/en-us/aspnet/core/fundamentals/choose-aspnet-framework?view=aspnetcore-2.1

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ASP.NET Framework

A collection of several technologies:

- The .NET Languages
- The Common Language Runtime (CLR)
- The .NET Framework class library

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The .NET Languages

- .NET environment supports many Microsoft languages:
  - Visual Basic,
  - C#,
  - F#,
  - C++
  - ASP
- However, third-party developers have created many more

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The Common Language Runtime (CLR)

- the engine that executes all .NET programs
- provides automatic services for these applications, such as:
  - security checking
  - memory management
  - Optimization
- More info: https://docs.microsoft.com/en-us/dotnet/standard/clr

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The .NET Framework class library

- The class library holds prebuilt functionality that you can simply add to your applications
- e.g. reading an XML file to sending an e-mail message.
- These features are sometimes organized into technology sets, such as ADO.NET (the technology for creating database applications)
- Windows Presentation Foundation (WPF, the technology for creating desktop user interfaces).

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Advantages of using the class library

- Any .NET language can use library's features
- by interacting with the right objects. This helps encourage consistency among different .NET languages and
- removes the need to install numerous components on your computer or web server.
- parts of the class library are targeted directly at web development.
- Some classes aren't specific to web or Windows development.
- E.g. base set of classes that define common variable types and
- Database-type classes for data access, for example, database transactions and concurrency, ensuring multiple, simultaneous users can request the same web page at once.

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ASP.NET

- This is the engine that hosts the web applications created with .NET technology,
- It supports most features found with the .NET Framework class library.
- It also includes a set of web-specific services, which include things like:
  - secure authentication
  - data storage

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Visual Studio

- Powerful development tool
- Allows for rapid development of sophisticated applications
- contains a rich set of productive tools and debugging features.
- We can access the complete .NET Framework through VS
- Available on MacOS (kind of…)

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Advantages of using visual studio

- Page design implemented through drag-and-drop using an integrated web form designer
- HTML system-generated, less emphasis on hand scripting
- VS automatically reports errors before applications run
- Potential problems are highlighted and solutions proposed,
- As well as traditional debugging (checking contents of variables e.g.), web apps can be debugged via built-in web server
- Intelligent code completion for recognized objects and automatically lists e.g. function parameters: Intellisense

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Summary

- Web applications are web sites with business logic
- Incorporate client and server-side script
- Usually connected to database
- They generate dynamic web pages
- ASP.NET vs ASP.NET Core
- Visual Studio

Next…

- Allocate groups / pairs
- Start thinking about your project ideas
- Start reading up on Razor Pages for Unit 2