SYST10199 - Web Programming

Web Design Review

Agenda

- Review HTML, CSS
- Review Request/Response Cycle
- An Overview of Web Technologies
- Setup Tasks
- How to Publish your Web Site
- Password Protect Assignments
- Exercises

Integrated Development Environment (IDE)

- To write code in any programming language you need an Integrated Development Environment (IDE)
  - They simplify the tasks of writing, debugging and testing the code.
- For this course we are going to use VS Code as IDE.
- You should have it already installed from the previous semester.
- If you got a new laptop or need to reinstall it, you can download it from Visual Studio Code website.

Web Technologies

- The key components of web technologies among other things include:
  1. HTML (HyperText Markup Language)
  2. CSS (Cascading Style Sheets)
  3. JavaScript
  4. Web Browsers
  5. Web Servers
  6. Databases
  7. Server-Side Languages

1. HTML (HyperText Markup Language)

- It is the foundational language used to create and structure content on the web.
- It provides the basic building blocks for web pages.
- An HTML document is structured with a series of elements, each defined by tags.
  - Tags are the building blocks of HTML.
  - They are enclosed in angle brackets (<>).
  - Most tags come in pairs: an opening tag and a closing tag (e.g., and).
  - Some tags are empty tags (e.g., <img>, <hr>, <br>, etc..).
- A full list of html tags can be found at HTML Element Reference

HTML Attributes

- Tags may contain attributes, which provide additional information about HTML elements and are included in the opening tag.
  - Common attributes include id, class, style, and title.
- HTML also contains semantics, which are HTML elements that clearly describe their meaning in a human and machine-readable way.
  - For example: <header>, <footer>, <article>, and <section>.
- Using semantic elements improves accessibility and Search Engine Optimization (CEO).

2. CSS (Cascading Style Sheets)

- CSS, or Cascading Style Sheets, is a stylesheet language used to control the presentation and layout of HTML documents.
- It allows developers to apply styles to web pages, enhancing their visual appeal and improving user experience.
- CSS is composed of selectors and declaration blocks.

```
selector {
  property: value;
}
```

- Selectors are used to target HTML elements to apply styles and can be:
  - Element Selector: Targets all instances of a specific HTML element
  - Class Selector: Targets elements with a specific class, prefixed by a dot (.).
  - ID Selector: Targets a unique element with a specific ID, prefixed by a hash (#).
  - Attribute Selector: Targets elements based on their attributes.

Box Model and Positioning

- The CSS box model describes the rectangular boxes generated for elements, consisting of:
  - Content: The actual content of the box (text, images).
  - Padding: Space between the content and the border.
  - Border: A line surrounding the padding (if any).
  - Margin: Space outside the border, separating the element from others.
- CSS provides several positioning methods to control the placement of elements:
  - Static: Default positioning; elements are placed in the normal document flow.
  - Relative: Positioned relative to its normal position.
  - Absolute: Positioned relative to the nearest positioned ancestor.
  - Fixed: Positioned relative to the viewport, remaining in place during scrolling.
  - Sticky: A hybrid of relative and fixed positioning.

3. JavaScript

- JavaScript is a programming language that enables interactive and dynamic features on web pages.
- It is an essential component of web development, allowing developers to manipulate web content in real-time.
- JavaScript can interact with the Document Object Model (DOM) to dynamically change the content and structure of web pages.
- It can also respond to user interactions through events, such as clicks, key presses, and mouse movements.
- We are going to learn JavaScript to develop interactive websites (client side) and later Node.js for server-side programming.

4. Web Browsers

- Browsers are software applications to view content on the World Wide Web.
- They interpret HTML, CSS, and JavaScript.
- A web browser is a client-side application that requests web pages from servers and renders them for users to view and interact with.
- Request and Response:
  - The browser sends an HTTP request to the web server hosting the requested page.
  - The server responds with the requested content, typically in HTML format.
- Rendering Engine:
  - The browser's rendering engine processes the HTML, CSS, and JavaScript to display the web page.
- Document Object Model (DOM):
  - The browser creates a DOM representation of the web page, allowing JavaScript to manipulate the content dynamically.

5. Web Servers

- Web servers are crucial components of the internet infrastructure, responsible for hosting websites and serving web content to users.
- A web server is a software and hardware system that stores, processes, and delivers web content to clients (typically web browsers) over the internet using the HyperText Transfer Protocol (HTTP)
- Web servers perform many different functions such as:
  - Hosting Websites: Storing and serving website files to users.
  - Handling Requests: Processing incoming requests and returning the appropriate responses.
  - Logging: Keeping records of requests and server activity for monitoring and troubleshooting.
  - Security: Implementing measures such as SSL/TLS for secure data transmission and firewalls to protect against unauthorized access.

6. Databases

- Databases are structured collections of data that allow for efficient storage, retrieval, and management of information.
- They play a crucial role in web applications, enabling developers to store user data, manage content, and perform complex queries.
- A database is an organized collection of data that can be easily accessed, managed, and updated.
- Databases are typically managed by Database Management Systems (DBMS), which provide tools for data manipulation and administration.
- Databases can be relational databases or NoSQL databases.
  - Relational databases use structured query language (SQL) to manage data organized in tables with rows and columns.
  - NoSQL Databases are designed for unstructured or semi-structured data, allowing for flexible data models.

7. Server-Side Languages

- Server-side languages are programming languages used to create the back-end of web applications.
- Server-side languages are executed on the web server, allowing developers to create dynamic web pages and applications that can interact with databases, handle user authentication, and perform complex business logic.
- Common server-side languages include PHP, Python, Ruby, Java, Node.js (JavaScript), and C#.
- In this course we are going to use Node.js as a server-side web programming language.

Web Programming

Setup Tasks

Understanding Basic Terms & Concepts

- Directory
  - A directory or "folder" is a named collection of files
- FTP
  - FTP stands for File Transfer Protocol.
  - It is the protocol used to transfer (upload, download) files to and from a server.
- FTP Client
  - A program on your computer that helps you to manage FTP connections.
- public_html
  - Web servers have a public_html directory where all web public content is stored.
  - Anything inside public_html or any of its sub-directories is publicly accessible via a URL.

Understanding Basic Terms & Concepts

- cPanel
  - Is the software on the server that allows you to manage your web space.
  - You have been assigned a limited amount of space on a web server where you can publish your web pages and web applications.
  - You can use cPanel to upload and download files and change the settings for your space on the server.
  - You will also use cPanel to manage your databases.
- Local
  - Local refers to a "local server" or "local connection" meaning your own machine.
- Remote
  - It's the opposite of local.
  - A remote server is a server in another room, another building, or even another city or country.

Installations and Setup

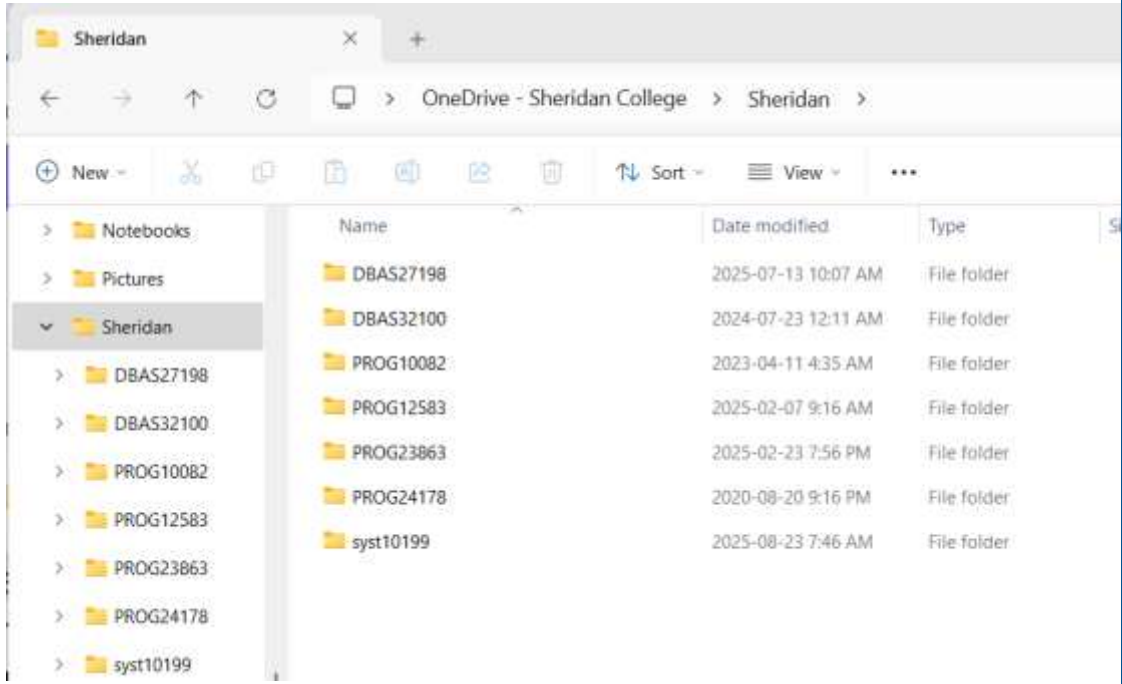
- To do the homework, assignments, and exercises for this course, you will need to set up your work environment, which includes:
  - Installing Software
  - Setting Up Your Workspace
  - Setting Up Your Web Space
  - Password Protect Assignments

Installing Software

- HTML/CSS/JavaScript Editor
  - For this course, we will focus on VS Code (Visual Studio Code), although you are free to use something else.
  - You **may not use** a WYSIWYG editor (such as DreamWeaver, HubSpot, CoffeeCup, Editor.js, TinyMCE, etc.) for any assignments/evaluations in this course.
  - You should have VS Code already installed as you have used it in other courses
  - If you need to install it, you can download Visual Studio Code for your platform.
- FTP Client
  - An FTP (File Transfer Protocol) Client allows you to upload and download files to/from a server.
  - There are several free FTP Clients available; FileZilla is one of them and it is easy to use.
  - Install FileZilla (the client version) if you don't have it installed.

Setting Up Your Workspace

- You will be storing the files that make up your web pages locally
- If you have not done so already, you should set up a folder/directory on your system for this semester courses.
- Inside the folder/directory you created for this course, add an "assignments".
- Create additional sub-directories for each week (/week01, /week02, etc.)

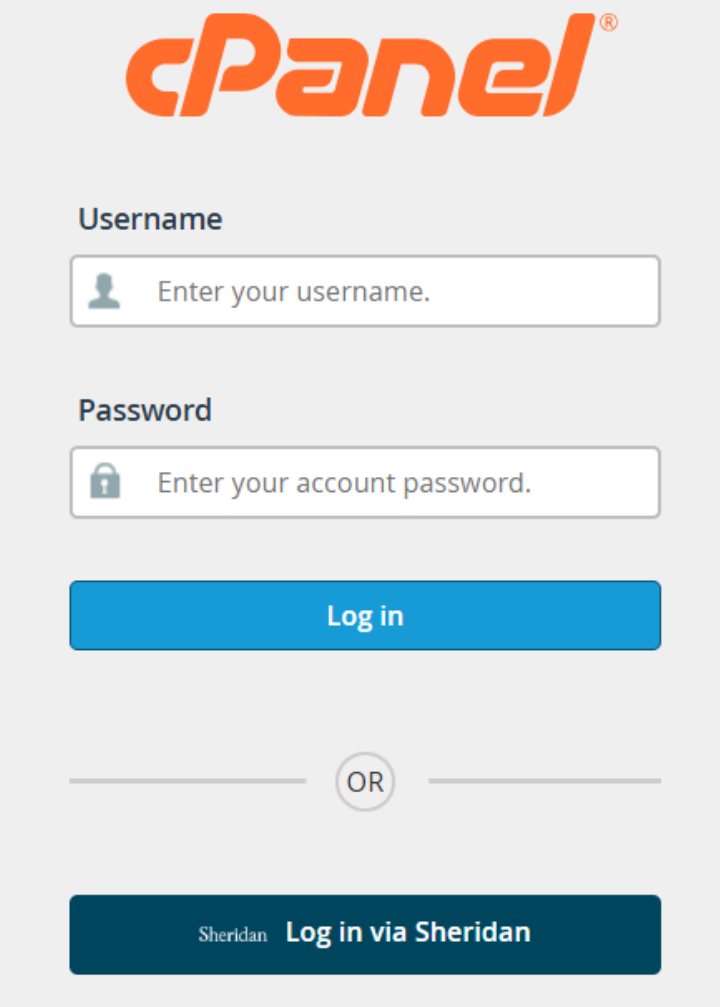


Setting Up Your Web Space

- Once you set up your web space, the contents of your "syst10199" directory will be mirrored or cloned on the server
- This will make it easy to publish your work on the server.
- All assignments and exercises must be published on the dev.fast web server.
- The dev.fast web server uses a server software called cPanel.
- The following is the summary of your Sheridan credentials:

```
Email: login@sheridancollege.ca
UPN: login@shernet.sheridancollege.ca
Username (Login name): the first 8 characters of your email/UPN
```

The cPanel



- To set up your web space account, simply go to dev.fast cPanel (https://cpanel.dev.fast.sheridanc.on.ca) and click on the "Log In Via Sheridan" button at the bottom.
- Then sign in using your Sheridan username (not the UPN or email address)
- The first time you sign in during a new term, your account is automatically created.

cPanel Tools

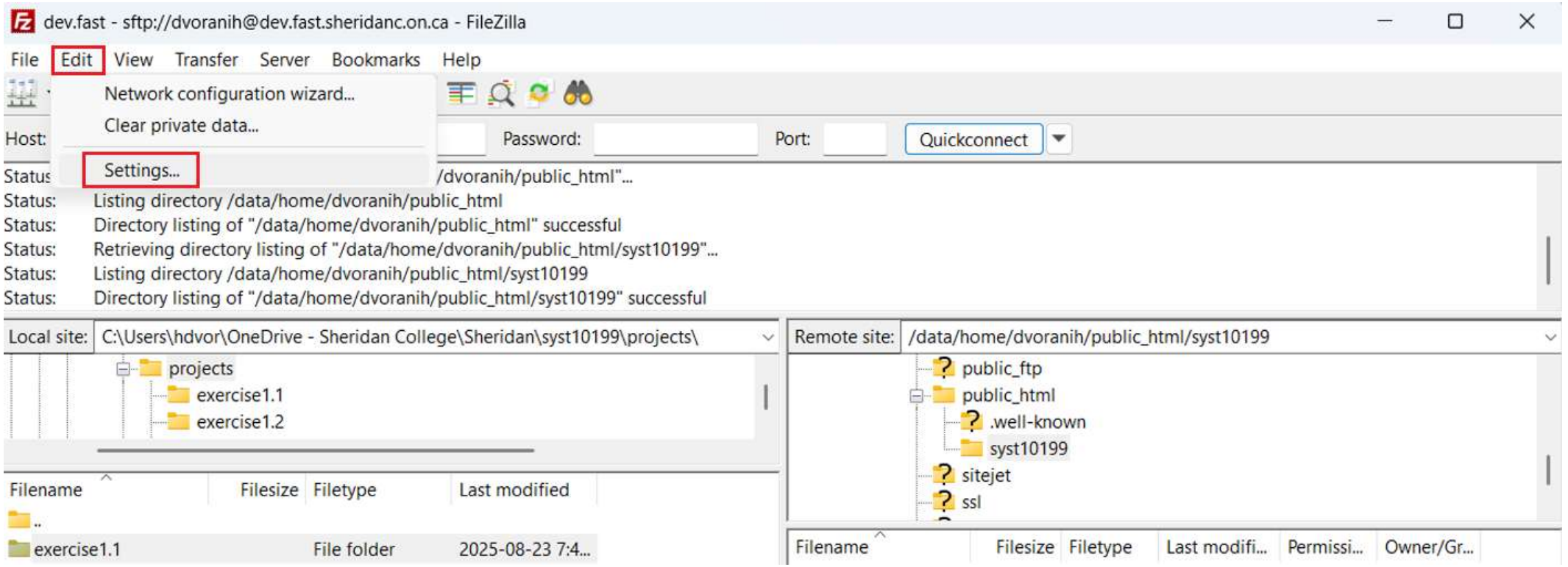
- The main cPanel page has many categories of tools.
  - Each of these categories is collapsible
- While using the tools, you can return to the main tools menu at any time by clicking the "Tools" link on the far-left side of the page.
- There are a few file settings that need to be changed
- Follow instructions on SLATE to change the File Settings.

Create the SSH Key

- Follow instructions on SLATE to create SSH Key
- Very important:
  - Follow instructions carefully
  - Make sure to create a very strong password or use "Password Generator" to create one for you
  - Make sure to write down or save somewhere the password; you will need it

Setting The Key With FileZilla

- After generating the SSH Key, you can use FileZilla to communicate between your local computer and dev.fast server.
- Follow instructions on SLATE to set the generated key with FileZilla.



Exercise 1.1 – Part A and B

- Follow instructions on Slate to create a simple web page in one of the folders in your local machine.

Publishing Your Website

- Publishing a web site means uploading it to a web server and making it available to the public.
- To publish a web site, you need:
  - A web site to publish (the files that make up your site, organized into directories).
  - A web server or space on someone else's web server.
  - An FTP client that allows you to connect to the web server so you can upload your files.
- We have already setup all the above components.
- Let's see how to publish a simple webpage.

Exercise 1.1 – Part C

- Follow instructions on Slate to publish the website.

Password Protect Assignments

- You will need to password-protect your assignments so that others can't copy them
  - Remember, if someone copies your work and gets caught with an academic integrity breach, you will also be penalized for making your work available to them.
- Follow instructions on Slate to password protect your assignment directory in your server.

Reference

- **Code Guide**
  - Link: Code Guide
  - Description: A comprehensive guide to best practices in coding, focusing on HTML, CSS, and JavaScript.
- **Fundamentals of Web Programming**
  - Link: Fundamentals of Web Programming
  - Description: An interactive textbook covering the essential concepts of web programming, including HTML, CSS, and JavaScript.