SENG 401: Lab 1

Web Programming

Client-Side Programming: HTML, CSS, JavaScript, jQuery

Winter 2019

1. Client-Side Programming: HTML

The major focus of this course is Architecture. In order to practice architecture we focus on web service architectures, so a complete understanding of **HTML** as the basic language of web is required. HTML is the standard markup language for creating web pages and web applications; HTML describes the structure of a web page semantically and originally utilizing cues for the appearance of the document (Ref: Wikipedia).

HTML **elements** are the building blocks of HTML pages. An HTML element is an individual component of an HTML document or web page. HTML is composed of a tree of HTML **nodes**. Each node can have HTML **attributes** specified. Nodes can also have **content**, including other nodes and text. Many HTML nodes represent semantics, or meaning. For example, the *"title"* node represents the title of the document (Ref: Wikipedia).

HTML is a markup language and can be read easily by human. The structure of the language is based on components such as tags, attributes, values and content:

```
<tag attribute="value">
      Content
</tag>
```

Skills in HTML can be gained by practice. For this part of lab, visit the "W3SCHOOLS" website and start practicing HTML. W3SCHOOLS gives you a platform to practice and learn many basic web programming skills. For the beginning, start with HTML at: http://www.w3schools.com/html/default.asp.

You are required to cover at least the following topics from W3SCHOOLS website: **HTML5 Tutorial**, **HTML Forms**, and **HTML5** (from the left menu).

You can always create an HTML file easily using a text editor (such as: NotePad, **NotePad++**, Atom, …), save it as *.html and run it using a web browser (such as: Google Chrome, FireFox, Internet Explorer, …).

Questions 1:

After you finished the HTML tutorial, answer the following questions:

1. What does HTML stand for?
2. What are the two major nodes of an HTML file (inside <html> </html> node)?

3. What are the steps of HTML growth (Version and Year)?
4. How many headings does HTML support?
5. What are HTML text formatting elements and how they affect a piece of text?
6. How do you comment a line in HTML?
7. What are the main ways to define a color in HTML? (provide examples)
8. Write a piece of code for a link that opens the following site in a **new tab**: www.w3schools.com ?
9. What are the tags for ordered list and unordered list?
10. What is the use of **class** attribute? What is the difference between class and id?
11. What is Responsive Web Design?
12. What is a URL?
13. What are the main Form->Input Types in HTML?
14. What is the difference between "GET" and "POST" in HTML forms? Which one is suitable for sending sensitive data?

2. Client-Side Programming: CSS

CSS is a style sheet language used for describing the presentation of a document written in a markup language. CSS is designed primarily to enable the separation of document content from document presentation, including aspects such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple HTML pages to share formatting by specifying the relevant CSS in a separate *.css file, and reduce complexity and repetition in the structural content (Ref: Wikipedia).

In order to learn CSS, again refer to W3SCHOOLS website at: http://www.w3schools.com/css/default.asp and cover at least the following topic: **CSS Tutorial** (from the left menu)**.**

Questions 2:

After you finished the CSS tutorial, answer the following questions:

1. What does CSS stand for?
2. What are the three ways of inserting a style sheet?
3. What is the syntax to link to an external style sheet?

Task 1:

Design a website for your final project, containing the following components (Use a text editor to write codes. Save HTML files with **html** extension and CSS files with **css** extension):

1. **Title** of the page should be the name of the course.
2. A series of **images** from free image sharing sites. (at least 2 images). You will later replace them with relevant images to your project.
3. A **Heading** of the course name.
4. Define 2 **sections**:
    a. About us: a **paragraph** about each of your team members (containing name and student id) with a photo.
    b. Contact Info: a **form** so the visitor can fill the following input areas and submit it to you: title, phone, email address, date, website, and message.
    c. Map: insert the world **map** (provided for you on D2L) in your homepage and put a **circle** with a hyperlink on City of Calgary (approximate coordinates 114W51N). Show the map as an image of 720*360 on your page. Do the transformations (translation and mirror; rotation is not required) yourself to

put the circle on the correct location. The link should lead to: http://www.calgary.ca/ .

3. Client-Side Programming: JavaScript

First of all JavaScript has nothing to do with Java. It is a client-side web programming language developed by Netscape to create dynamic websites.

Alongside HTML and CSS, JavaScript is one of the three core technologies of World Wide Web content production; the majority of websites employ it, and all modern Web browsers support it without the need for plug-ins (Ref: Wikipedia).

W3SCHOOLS is a great source to learn JavaScript. Follow the link at: http://www.w3schools.com/js/default.asp and cover at least **JS Tutorial**, **JS Objects**, **JS Functions**, and **JS HTML DOM** topics (all from the left menu).

Questions 3:

After you completed the mentioned topics in JavaScript, answer the following questions:

1. List arithmetic operations in JavaScript and their description.
2. List assignment operators in JavaScript and their description.
3. List comparison operators in JavaScript and their description.
4. List logical operators in JavaScript and their description.
5. List all the data types in JavaScript.
6. List conditional statements in JavaScript.
7. List loop statements in JavaScript.
8. What is the output of "typeof" function in JavaScript?
9. List HTML keyboard events and mouse events that JavaScript can handle.
10. What are the different ways of inserting JavaScript code in your HTML?
11. What is the difference between an Array and an Object?
12. What does JSON stand for?
13. What is the syntax to convert JSON text to JavaScript Object?
14. Create an Object in JavaScript with the following attributes and methods:
    a. Name: Calgary
    b. Latitude: 51.0486
    c. Longitude: - 114.0708
    d. Population: 1,096,833
    e. Area: 825.29 SqKM

f. Density: Population/Area

Task 2:

Make your website dynamic, by adding the following features (Use a text editor to write codes. Save JavaScript files with **js** extension. Make sure to write the appropriate code to introduce your JavaScript file to your HTML file):

1. When the mouse is **over** any components of your website that component should be highlighted, or its color should be changed. (try using both JavaScript and CSS (:hover) independently)
2. Create an empty "div" on top of your page so when the mouse **hovers** on any "section" the name of the section appears in the "div" as a "heading".
3. On the previous Task you added City of Calgary on a map. Beside the map create an empty "div" so when the mouse is over City of Calgary its information pops up in the div and when the mouse is out it disappears.
4. Create another object for City of Edmonton with the following data and make your map dynamic enough to realize if the mouse is over Calgary or Edmonton and show corresponding data.
    a. Name: Edmonton
    b. Latitude: 53.5444
    c. Longitude: - 113.4909
    d. Population: 960,015
    e. Area: 684.37 SqKM
    f. Density: Population/Area

4. Client-Side Programming: jQuery

jQuery is a cross-platform JavaScript library designed to simplify the client-side scripting of HTML. jQuery is the most popular JavaScript library in use today, with installation on 65% of the top 10 million highest-trafficked sites on the Web. jQuery is free, open-source software licensed under the MIT License (Ref: Wikipedia).

jQuery's syntax is designed to make it easier to navigate a document, select DOM elements, create animations, handle events, and develop Ajax applications. jQuery also provides capabilities for developers to create plug-ins on top of the JavaScript library. This enables developers to create abstractions for low-level interaction and animation, advanced effects and high-level, theme-able widgets. The modular approach to the jQuery library allows the creation of powerful dynamic web pages and Web applications (Ref: Wikipedia).

From W3SCHOOLS website (http://www.w3schools.com/jquery/default.asp) cover the following topics on jQuery: **jQuery Tutorial**, **jQuery Effects** and **jQuery HTML**.

Task 3:

Make a second copy of your website and apply the same dynamics of Task 2 to the new copy, this time with jQuery.

Ready to get started?

You have just started Web programming. There are thousands of JavaScript and CSS libraries that can help you create professional websites.

Try:

- Bootstrap
- D3.js
- Leaflet.js
- …

What/When/Who to submit?

There are 3 sets of Questions. Answer them thoroughly in a document. You need this document to review for your midterm and final exam. You don't have to submit it to your TA.

There are 3 sets of Tasks: Task 1 (7 items), Task 2 (4 items) and Task 3 (4 items). Each task is worth 2 points.

Total points of this lab is 30.

You have 2 weeks to accomplish the requirements of this lab. Present the output of the tasks to your TA by the beginning of the next new lab (in 2 weeks).