Week 14

Bring laptop with abilty to remote connect to best-linux.cs.wisc.edu to class

Final Exam

- **Friday, May 10th, 5:05 pm to 7:05 pm**
  - **Lecture 001: Room 1125 of Biochemistry Building**
  - **Lecture 002: Room B10 of Ingraham Hall**
  - **Lecture 004: Room B102 of Van Vleck Building**
- **UW ID required**
- **Makeup exam emails sent**
- **See posted exam information (exam topics and latest "news") https://pages.cs.wisc.edu/~deppeler/cs400/exams**
- **TA availability as regularly scheduled through Thursday 5/2**

Verify that your scores are correctly entered on Canvas.
Send email to instructor if there is an inconsistency.

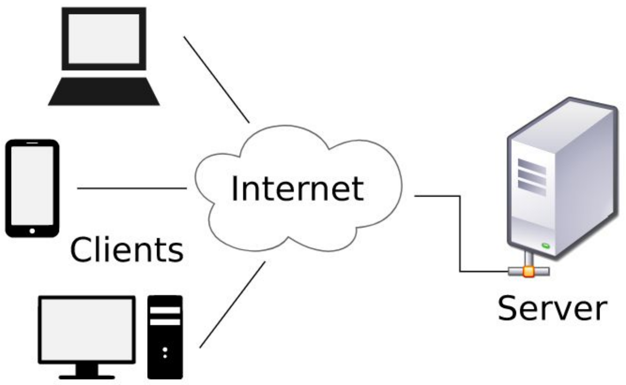
Complete p6 before 10pm on Friday. Lowest program score will be dropped.

Team Project:
(A-Team 100pts) Milestone #3: due before 10pm Thursday 5/2
Follow submission instructions to create executable.jar and food.zip.
Submit team.zip (it contains source, screenshots, and executable.jar file)
See Milestone #3 rubric (linked in separate document from milestone #3)

Read: Module 14 topics

THIS WEEK:

- HTML5/CSS/JS
  - Basic HTML elements
  - HTML5 Semantic web
- Responsive Web Design (RWD)
- HTML/JS Forms
- Chrome Developer Tools
- Web Frameworks
- JavaScript



- Course Evaluations https://aefis.wisc.edu
- Exam Review:
  - Complete last quiz
  - Post questions (that are not on the quiz) that we can answer and review in class

git clone http://github.com/cs400-deppeler/html-css-js-demo.git

HTML

Web link

- Hyper Text mark up language
- content is wrapped in tages
- Web browser interprets and displays html files

W3schools.com

Start paragraph tag `<p>Place a paragraph's text content here.</p>` End tag

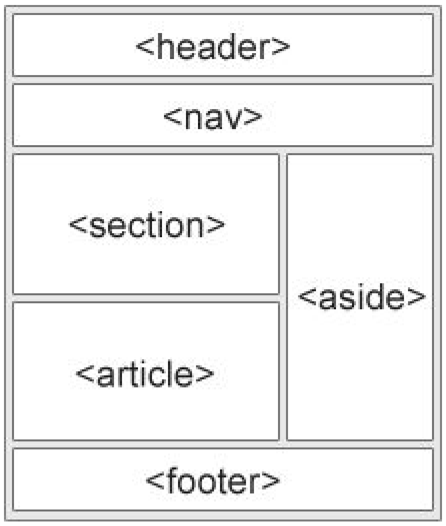
text that is wrapped in <p> tag

Basic HTML Elements

```
<!DOCTYPE html>
<html lang="en-US">

  <head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
  ✔ <title>Exams</title> in title bar
    <link rel="stylesheet" href="styles.css">   external stylesheet
    <script src="myscript.js">
  </head>                             external java script code

  <body>
    <header><h1>Exam Information</h1></header>

    <!-- display course calendar -->
    <img src = "spring_exam_calendar.png"           picture
         alt = "March and May calendars with 3/15 and 5/11 shaded" />
                         longdesc = "file.txt"               always include
    <table>
      <tr><th>Midterm</th><td>5-7 PM</td><td>October 25th</td></tr>
      <tr><th>Final</th><td>7:45AM – 9:45AM</td><td>Dec 15th</td></tr>
    </table>

    <h2>Topics</h2>
    <ul>   unordered list                        use an ordered list to get # , a-e, I - II
      <li><b>Java 8</b>: functional interfaces, lambda expressions</li>
      <li><b>Java FX</b>: Label, Button, BorderPane, Scene, Stage</li>
    </ul>

    <dl>              dictionary list
       <dt>Term</dt> <dd>definition</dd>
    </dl>   dictionary term      dictionary defintions

    <footer>
      <p><a href="home.html">Home Page</a> <br>
      Report broken links and accessibility problems to: deppeler
    </footer>

  </body>
</html>
```

HTML5 Semantic Web

Tag	**Description**
<div>	used to manage a section or block of tags as a unit
<span>	used to manage a portion of a text tag as a unit
<article>	Defines an article
<aside>	Defines content aside from the page content
<details>	Defines additional details that the user can view or hide
<figcaption>	Defines a caption for a <figure> element
<figure>	Specifies self-contained content, like: illustrations, diagrams, photos, code listings, etc.
<footer>	Defines a footer for a document or section
<header>	Specifies a header for a document or section
<main>	Specifies the main content of a document
<mark>	Defines marked/highlighted text
<nav>	Defines navigation links
<section>	Defines a section in a document
<summary>	Defines a visible heading for a <details> element
<time>	Defines a date/time



nav bar

CSS

a list of rules

promotes consistent formatting access all pages in website

define style in-line, at top of doc in <head>, or in external doc.

```
body {
    font-family: Verdana,sans-serif;
    font-size: 0.9em;
}

header, footer {
    padding: 10px;
    color: white;
    background-color: black;
}

section {
    margin: 5px;
    padding: 10px;
    background-color: lightgrey;
}

article {
    margin: 5px;
    padding: 10px;
    background-color: white;
}

nav ul {
    padding: 0;
}

nav ul li {
    display: inline;
    margin: 5px;
}
```

apply external doc ×

apply top of doc ×

apply in-line ✓

<span color = "orange">text </span>

Try It!

Create your own web page on the CS web server and view it from the World Wide Web

1. Remote connect to best-linux.cs.wisc.edu
2. `cd ~/public/html`
3. `mkdir demo`
4. `cd demo`
5. `vi home_page.html`
6. type i to enter ***insert*** mode in vi editor
7. type in the following HTML

```
<!DOCTYPE html>
<html>
<head><title>About Me</title></head>
<body>
  <header><h1>About Me</h1></header>
  <p>write something about yourself
  fact or fiction is fine – but not too personal for the W3</p>
  <img src="myphoto.png" alt="no photo yet" width="100" height="50" />
  <footer>Created on 12/3/2018</footer>
</body>
</html>
```

8. add any or all of the following
    a. h2, list, table
    b. create a css page
    c. link the css page to your web page
9. save your file
    a. typing ESC to exit insert mode
    b. type **:w** to write your file to disk; or type **ZZ** to **save file and exit vi editor**
10. view your web page from the Internet (your web browser)
    http://pages.cs.wisc.edu/~cslogin/demo/home_page.html

Example html files available at: https://pages.cs.wisc.edu/~deppeler/cs400/html

git clone https://github.com/cs400-deppeler/html-css-js-demo.git

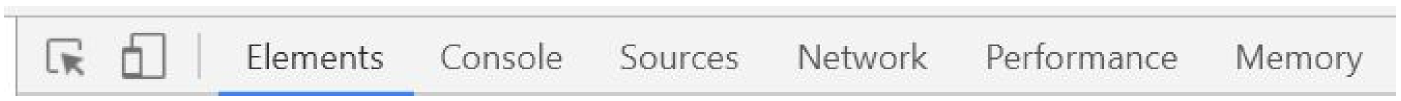
Chrome Developer Tools

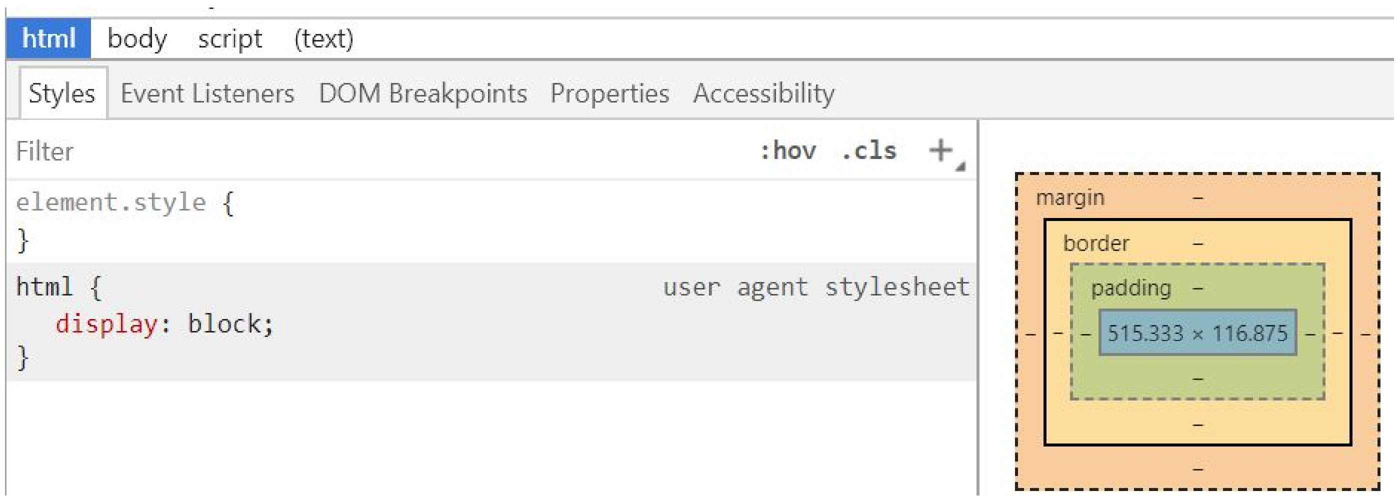
https://developers.google.com/web/tools/chrome-devtools/

1. click Customize and control Google Chrome icon
2. mouse over More tools
3. click Developer Tools

Developer tools allow you to:
- view and change page styles
- debug JavaScript
- view console message
- analyze performance

choose device





```
element.style {
}
html {                                    user agent stylesheet
   display: block;
}
```

Web Forms

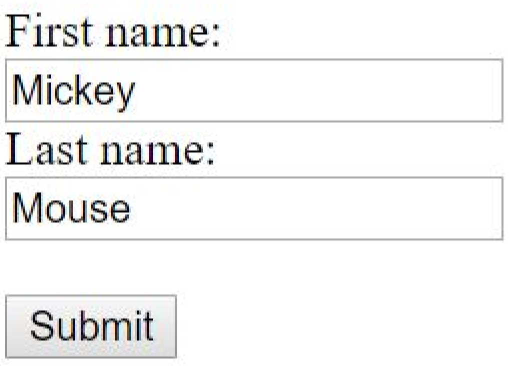
use a form to get and process user input
action attribute tells what to do

script get post where to post results

start

```
<form action="/action_page.php" method="get" target="_self">
  First name:<br><input type="text" name="firstname" value="Mickey"><br>
  Last name:<br> <input type="text" name="lastname" value="Mouse"><br><br>
  <input type="submit" value="Submit">
</form>
```

end


First name:
Mickey
Last name:
Mouse

Submit Methods

Notes on GET method: (from w3c)

- Appends form-data into the URL in name/value pairs
- The length of a URL is limited (about 3000 characters)
- Never use GET to send sensitive data! (will be visible in the URL)
- Useful for form submissions where a user want to bookmark the result
- GET is better for non-secure data, like query strings in Google

Notes on POST method:

- POST has no size limitations, and can be used to send large amounts of data.
- Form submissions with POST cannot be bookmarked
- Use POST if the form data contains sensitive or personal information.
- POST does not display info in address

https://www.w3schools.com/html/tryit.asp?filename=tryhtml_form_submit_id
https://www.w3schools.com/php/default.asp // php tutorial

JavaScript

scripting language interpreted by the web browser

allows dynamic content

syntax similar to java

Reference

Strings

```
"JavaScript".length
.toUpperCase()
.toLowerCase()
.trim()
```

Numbers

```
var x = 1 + 0.5;
x = 1 + 1/2;
x += 3.14 * 2 + (-7 -3);
```

Booleans

```
var lightOn = true;
lightOn = false;
```

Operators

```
+ - * / ( ) =   ==    >=   >   <    <=   !-
```

Variables

```
var x = 3 ;
var y = x + 3 ;
x = 5 ;
```

what is the value of y? 6

Conditionals

```
if ( x > y ) {

} else {

}
```

Arrays

```
var a = [ 10, [ "hello", "good-bye" ], d ]

var e = a[0]; // a[-1]
a[ 2 ] = new String(3)+ +;

a.length
a.concat(b)
a.pop()
a.push()
a.reverse();
```

dictionary

curly braces

key: value pairs

Objects

contain other objects

3 objects

```
var s1 = { name: "Deb", pets: [ "Bo", "Kiwi" ], course: "cs400" };
s1.pets[0]     // "Bo"
s1["pets"][1]  // "Kiwi"


s1["greeting"] = "hi"
```

Console

use to display information to the console window (instead of browser page)

```
console.log( s1.pets[0] );
```

display information

Click Me Button

```
<button id="click" onclick="clickMe()">Click Me</button><br>
<label id="tally"> </label>
<p id="count"> </p>
<script lang="JavaScrip">
  var n = 0;
  function clickMe() {
    n += 1;
    var button = document.getElementById("click");
    var tally = document.getElementById("tally");
    var count = document.getElementById("count");
    if ( button.innerHTML == "Click Me" ) {
      button.innerHTML = "Don't Click Me";
      tally.innerHTML += "1" ; <!-- up arrow "&uarr;"; -->
    } else {
      button.innerHTML = "Click Me";
      tally.innerHTML += "0" ; <!-- down arrow "&darr;"; -->
    }
    count.innerHTML = "" + n;
  }
</script>
```

Log Button

```
<button id="clear" onclick="clearLog()">Clear Log</button><br>
<input type="text" id="msg" onchange="log(this.value);" /><br>
<p id="log"></p>

<script>
  var logString = "";

  // add date -> msg to the logString
  function log(msg) {
    if (msg=="") return;
    var date = new Date();
    var logmsg = date.getMonth() + "/" + date.getDate() + "/"
               + date.getFullYear() + " -> " + msg;
    logString += logmsg + "<br>";
    document.getElementById("log").innerHTML = logString;
  }

  function clearLog() {
    logString = "";
    document.getElementById("log").innerHTML = logString;
  }
</script>
```

FYI ONLY

Web Frameworks

- Provide a library of styles and JavaScript that are standard and ready to use
- Can download the frameworks or link to the required files online

https://www.w3schools.com/bootstrap/default.asp
http://jquerymobile.com/

Responsive Web Design (RWD)

- Download (and install or extract) style sheets
- Include meta tags to read CSS information from those style sheets (don't edit these)
- Create your own customized stylesheets
- Include links to your style sheets (that override the provided styles as desired)

Popular CSS Style Packages

- Pure: https://unpkg.com/purecss@1.0.0/build/pure-min.css
- Bootstrap: https://getbootstrap.com/
- jQuery Mobile: http://jquerymobile.com/

Media Queries

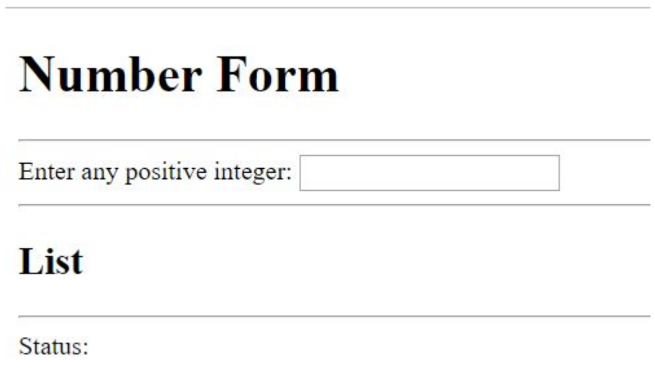
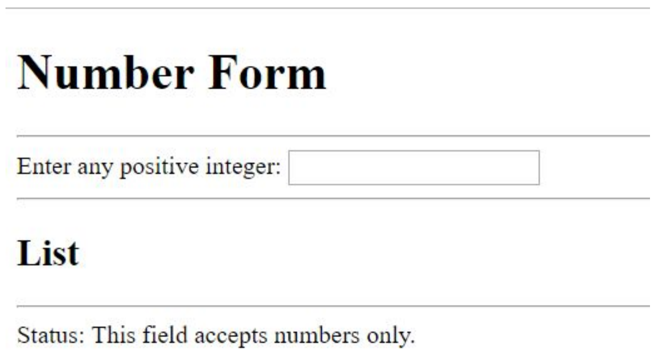
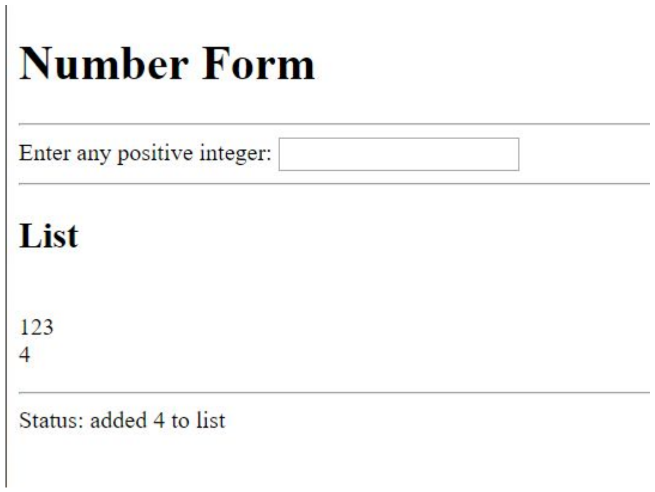
https://www.w3schools.com/css/css_rwd_mediaqueries.asp

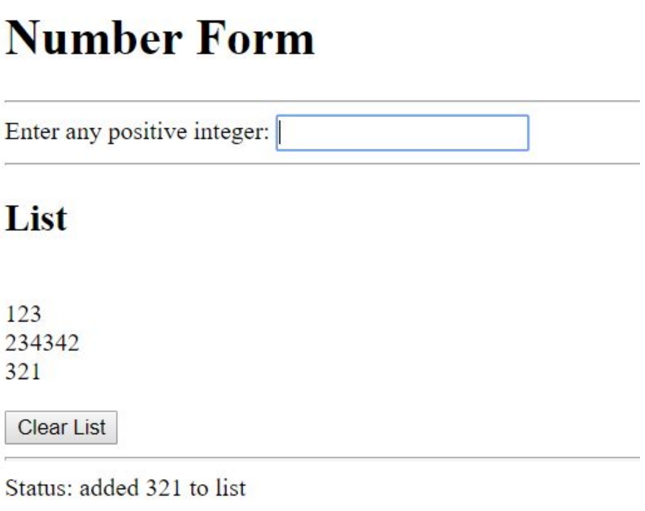
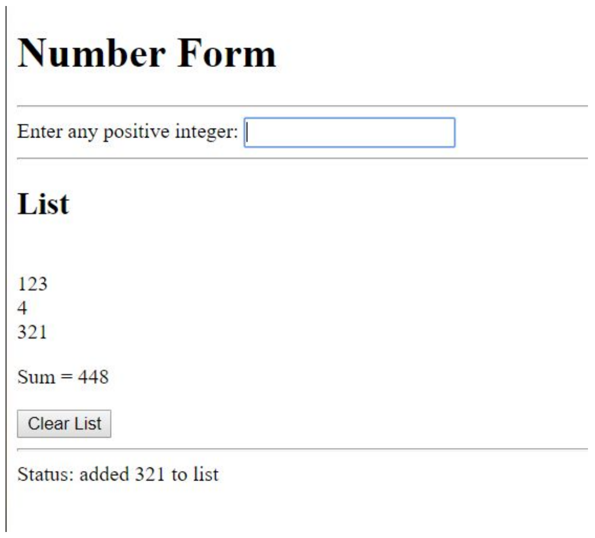
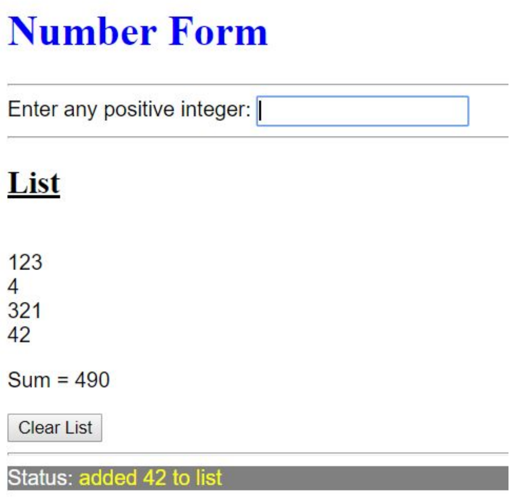
1. Create multiple sets of styles
2. Add code to query what type of device
3. Select the style set accordingly

https://www.w3schools.com/css/tryit.asp?filename=tryresponsive_mediaquery_breakpoints

- Design for smallest device first.
- Choose breaks in the content to be on their own "page" based on content.
- Identify where content hits a point where it could adapt to take advantage of a wider width.
- Write media queries' widths in ems, not pixels so layout will adapt to font size changes in addition to screen widths.
- To calculate the width in ems, divide the target width in pixels by default font size in pixels. For example: phone width of (320px) divided by 16px (the default font size) = (20em).
- Use min-width breakpoints that build on top of the mobile styles.
- The first breakpoint applies layout adjustments on top of the standard mobile styles so these can be fairly lightweight.
- Additional min-width breakpoints can be added for even wider screens that each build on the previous breakpoint styles.
- To override framework styles only for smaller screens, use a max-width breakpoint instead. This allows you to constrain your style overrides to only apply below a certain screen width. Above this width, all the normal styles will apply so this is good for certain types of overrides.

NumberForm example

1. create a number form page with an input field and a list paragraph and a status paragraph in the footer https://pages.cs.wisc.edu/~deppeler/cs400/html/listForm/NumberForm_1starterForm.html	 **Number Form** Enter any positive integer: **List** Status:
2. add javascript to ignore typed characters that are not positive integers, 0-9 Update status if any such characters are typed in the integer field. https://pages.cs.wisc.edu/~deppeler/cs400/html/listForm/NumberForm_2setStatus.html	 **Number Form** Enter any positive integer: **List** Status: This field accepts numbers only.
3. add positive integers to the list of values. It should clear the input field when it adds value to the list. https://pages.cs.wisc.edu/~deppeler/cs400/html/listForm/NumberForm_3addToList.html	 **Number Form** Enter any positive integer: **List** 123 4 Status: added 4 to list

4. add button and code to clear the list https://pages.cs.wisc.edu/~deppeler/cs400/html/listForm/NumberForm_4addClearForm..html	 **Number Form** Enter any positive integer: **List** 123 234342 321 Clear List Status: added 321 to list
5. add a sum label and code. Clear sum if list is cleared. https://pages.cs.wisc.edu/~deppeler/cs400/html/listForm/NumberForm_5addSum..html	 **Number Form** Enter any positive integer: **List** 123 4 321 Sum = 448 Clear List Status: added 321 to list
6. add document css styles in the head section of the document https://pages.cs.wisc.edu/~deppeler/cs400/html/listForm/NumberForm_6addStyles..html	 **Number Form** Enter any positive integer: **List** 123 4 321 42 Sum = 490 Clear List Status: added 42 to list