Name (print): ________________________________

- **INTEGRITY:** By taking this exam, you pledge that this is your work and you have neither given nor received inappropriate help during the taking of this exam in compliance with the Honor Code of Emory University. Do NOT sign nor take this exam if you do not agree with the honor code.

- **INSTRUCTIONS:**
  - Keep your eyes on your own paper.
  - Do your best to prevent anyone else from seeing your work.
  - Do NOT communicate with anyone other than the professor/proctor for ANY reason in ANY language in ANY manner.
  - Do not use notes, books, calculators, etc during the exam.
  - Turn all mobile devices off and put them away now. You cannot have them on your desk.
  - Write neatly and clearly. What I cannot read, I will assume to be incorrect.
  - Academic misconduct will not be tolerated. The penalty for violating any of the above policies or other misconduct will be a zero on this exam. Other disciplinary action as deemed appropriate by the Emory Honor Council may also be applied.

- **TIME:** This exam has 10 questions on 12 pages including the title page. Please check to make sure all pages are included. You will have 50 minutes to complete this exam.

---

*I commit to uphold the ideals of honor and integrity by refusing to betray the trust bestowed upon me as a member of the Emory community. I have also read and understand the requirements outlined above.*

Signature: ________________________________

---

<table>
<thead>
<tr>
<th>Page</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>11</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>20</td>
<td>5</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>14</td>
<td>11</td>
<td>10</td>
<td>12</td>
<td>100</td>
</tr>
</tbody>
</table>

Score: ________________________________
1. **Fill in the Blank.** Write the correct answer to each question in the blank provided.

(a) (2 points) Who wrote a program to calculate Bernoulli numbers on the Difference Engine and is widely considered to be the first programmer?

(b) (2 points) 48 bits are equal to how many bytes?

(c) (2 points) What is responsible for mapping IP addresses to unique URLs such as www.google.com?

(d) (2 points) What is the name of the component that Shockley, Bardeen, and Brattain (engineers working at Bell Labs) invented which replaced vacuum tubes in early electric computers with smaller, cheaper, more energy-efficient, and more reliable solid state circuits?

(e) (2 points) How many different things can we represent using 4 bits?

(f) (2 points) Who was the Navy Rear Admiral who was responsible for developing the first compiler and the term “bug” which is used today to indicate an error in computer hardware or software.

(g) (2 points) According to Moore’s Law, how long does it take for the number of transistors on a computer chip to double?

(h) (2 points) What was the name of the precursor of the Internet which was originally developed as a way for university, defense contractors and military bases to communicate about research projects?

(i) (2 points) What symbol ends a Javascript statement?

(j) (2 points) Name one high-level programming language.

(a) **Ada Lovelace (or Ada Byron)**

(b) **6**

(c) **DNS, Domain Name Sys/Serv**

(d) **transistor**

(e) **16**

(f) **Grace Hopper**

(g) **12-18 months**

(h) **ARPAnet**

(i) **semicolon ;**

(j) **COBOL, FORTRAN, Java, C++, JavaScript, etc.**
2. **Multiple Choice.** Circle the correct answer for each question.

(a) (1 point) In order to remove the ability to use the internet from Egypt, the Egyptian government did not simply “unplug” the computers which made up the internet in Egypt. How do we know this?

A. The Telecommunications Regulatory Agency, the governmental organization which regulated Internet Service Providers in Egypt, released an official statement saying they did not.

B. Only social networking sites such as Twitter or Facebook were down during the outage.

C. **Internet traffic originating from or traveling to Europe and the Middle East was not affected.**

D. Computers inside Egypt were still reachable using an IP address instead of a URL.

E. Satellite internet service and dial-up service continued to function using Internet Service Providers (ISPs) inside of Egypt.

(b) (1 point) Which of the following quantities is largest?

A. 1 GB

B. 1 TB

C. 1 MB

D. 1 KB

E. 1 Mb

(c) (1 point) When you visit http://www.emory.edu/, which protocol is not involved?

A. IP

B. HTTP

C. TCP

D. FTP

(d) (1 point) ___________ are specialized computers which determine how to route information from one computer to another.

A. DNS servers

B. **Routers**

C. Web servers

D. IP address servers

E. Email servers

(e) (1 point) Modern computers are “digital.” This means that:

A. they must be programmed in natural languages.

B. **they store and process all data as binary digits.**

C. they must be powered on at all times.

D. their data must be human readable.

E. they must contain memory.
(f) (1 point) HTML is:
A. a high-level programming language.
B. software which displays web pages.
C. code which is not rendered and is intended to provide maintainers and developers with information about a webpage.
D. text which is displayed on a webpage.
E. simple instructions which tell a web browser how to display a web page.

(g) (1 point) In a programming language, a statement has what function?
A. It specifies a particular action for the computer to carry out.
B. It specifies event handlers to allow interactions with users.
C. It controls whether a webpage is static or dynamic.
D. It sets HTML attributes when events occur.
E. It gives the user additional instructions for debugging an error.

(h) (1 point) Many computers today take advantage of parallel processing. This means that:
A. computers are capable of running many different high-level languages.
B. computers have multiple processors which allows them to execute tasks much faster than a single processor computer.
C. computers have large banks of memory which can be accessed at the same time.
D. computers can be connected to many websites at the same time via parallel networking components.
E. computers can have multiple, smaller hard drives which cumulatively allows them greater total storage.

(i) (1 point) An event handler is an HTML attribute that specifies
A. how the HTML element is to react to syntactic errors in the HTML.
B. how the HTML element can be uniquely identified in the context of the webpage or document.
C. how the HTML element can be reused multiple times on the same webpage.
D. how the HTML element is to react to certain events generated by the user.
E. how the HTML element can be styled and made to look different via the use of things such as borders, font characteristics, etc.
3. Multiple Answer. Circle ALL of the correct answers for each question. There will be at least one correct answer for each question, but there may be more.

(a) (2 points) Which of the following CANNOT be used to space elements in an HTML page?
   A. `<space>`
   B. `<p>`
   C. `<br>`
   D. `<body space="10px">`
   E. `&nbsp;`

(b) (2 points) Which of the following are examples of operating system software?
   A. Adobe Photoshop
   B. Windows
   C. Mac OS X
   D. iTunes
   E. Linux
   F. Firefox

(c) (2 points) Which of the following was/were NOT one of the original 4 nodes of the network which later became the Internet.
   A. Dobbins Air Force Base
   B. University of California Los Angeles (UCLA)
   C. Stanford Research Institute (SRI)
   D. Xerox Parc
   E. University of California Santa Barbara (UCSB)
   F. University of Utah
   G. Massachusetts Institute of Technology (MIT)
   H. The Pentagon

(d) (2 points) Which of the following is/are reason(s) to comment your webpage?
   A. To control the automatic spacing of the webpage.
   B. To place notes to yourself or future maintainers of the webpage.
   C. To change the style of our webpage using CSS.
   D. To maintain crucial bits of information about the webpage such as when it was last modified, the developers name, and copyright information.
   E. To control how different browsers render the webpage.
   F. To make the webpage dynamic.
   G. To make the webpage static.
4. **Overheard on the Emory Street.** As you listen to your fellow students talk, you overhear some conversations about computers. For each of the overheard statements below, decide whether or not the person knows what they’re talking about. If they don’t, briefly (2-3 sentences, maximum) explain what is wrong with their statement.

(a) (4 points) “The Internet and the World Wide Web are the same thing.”

**Solution:** Don’t know what they’re talking about. The internet is a network of interconnected computers (HW). The WWW is the software which runs on those computers and enables easy transfer and browsing of the information stored on the computers.

(b) (4 points) “I just bought a new computer with a dual-core hard drive!”

**Solution:** Don’t know what they’re talking about. Hard drives are computer memory and are disks for storing information. CPUs are the processors and there are often multiple CPUs on a computer chip.

(c) (4 points) “I just wrote an awesome program in HTML and CSS!”

**Solution:** Don’t know what they’re talking about. HTML and CSS are not programming languages. They are markup languages which serve to style/format the content contained in them.

(d) (4 points) “I just bought some more primary memory for my computer! This RAM is going to make my computer run applications faster!”

**Solution:** Knows what they’re talking about.
5. (4 points) Briefly explain what a *client-server architecture* is.

**Solution:** Servers make the internet possible. They serve up information. Ex: email servers, web servers, etc. Clients are machines which receive that information.

Let’s take www.google.com as an example. When you are sitting at your computer, you’re sitting at a “client” machine. You type in google.com. A request for the information contained on google.com is routed through DNS and to google’s server(s). Google’s server will find the page you requested and send it back to your computer (the client).

Other examples include email servers, software servers (google docs), and storage servers.

6. (4 points) Mechanical calculators, such as those designed by Pascal and Leibniz, were first developed in the 1600s. However, they were not widely used in businesses and laboratories until the 1800s. Why was this the case?

**Solution:** Manufacturing tolerances.

7. (6 points) List 3 examples of input devices found on computers. List 3 examples of output devices.

**Solution:**

Input: mice, track pads, keyboards, joysticks, microphones, scanners

Output: monitors, printers, speakers
8. Consider the following code in a webpage:

```html
<p id="text" style="color:blue"> This is my text!</p>
<p id="dir"> Some more text!</p>
<input type="button" value="Click Me!"
onclick="document.getElementById('text').innerHTML='Hello, CS110';">
```

(a) (2 points) What HTML element(s) are represented?

**Solution:** 2 paragraphs `<p>` and a button `<input>`

(b) (2 points) What attribute(s) does the first element have?

**Solution:** id and style

(c) (2 points) What event(s) does this code handle?

**Solution:** when the button is clicked; onclick

(d) (2 points) What attribute(s) does the event handler modify?

**Solution:** innerHTML; the text inside the first paragraph element

(e) (3 points) Describe in your own words how a user could interact with this webpage.

**Solution:** When a button is clicked, the text in the first paragraph element will change from “This is my text” to “Hello, CS110”.
9. (10 points) ERRORS ERRORS EVERYWHERE.
Identify the errors in the following HTML document and correct them.

```html
<html>
<head>
<title> My Awesome Webpage!</title>
</head>

<body>

<!-- This is my webpage -->

<p> A couple of lines of text will go here. This is another line of text on my webpage. I am writing lots of text. </p>

<img src="demo.jpg alt="Text description of image">

<!-- This is a 2x2 table -->
<table>
  <tr><td>Data 1</td><td>Data 2</td></tr>
  <tr><td>Data 3</td><td>Data 4</td></tr>
</table>

<!-- This is a list -->
<ul>
  <li>List item 1</li>
  <li>List item 2</li>
  <li>List item 3</li>
</ul>

</body>
</html>
```
Solution: No closing tag for the `<html>` element
Title tag closed outside of tag in which it was begun
Incorrect comment tag. Should be `<!--`
Missing quotation mark at the end of `demo.jpg`
Table row `<tr>` and table data `<td>` tags are reversed.
10. (12 points) I'M A LITTLE BROWSER.

Pretend you are a web browser. Render the following HTML page. Assume the only two files on the webserver are the two below (exam.html and style.css); no other files exist on the webserver. Note that you may use the next page for your full drawing.

```html
<html>
<head>
    <title>Exam Page</title>
    <link rel="stylesheet" type="text/css" href="style.css" />
</head>
<body>
    <!-- <h1> This is a webpage about my trip to China</h1> -->
    <p> I took a really awesome vacation. Here's a picture of me in China. </p>
    <img src="greatwall.jpg" alt="The Great Wall">
    <p class="important"> I don't have any other good pictures! </p>
    Here's how much I spent. <br>
    <ol style="list-style-type:upper-alpha;">
        <li> Airfare: $1200 </li>
        <li> Hotel: $1400 </li>
    </ol>
</body>
</html>
```

File 1: exam.html

File 2: style.css
I took a really awesome vacation. Here’s a picture of me in China.

The Great Wall

Here’s how much I spent.

- Before $1200
- Hotel $600