Name (print): ____________________________________________________________

• Instructions:
  – Keep your eyes on your own paper and 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.
  – This exam is closed notes, closed books, and no calculator.
  – Turn all mobile devices off and put them away now. You cannot have them on your desk.
  – Write neatly and clearly indicate your answers. What I cannot read, I will assume to be incorrect.
  – Stop writing when told to do so at the end of the exam. I will take 5 points off your exam if I have to tell you multiple times.
  – Academic misconduct will not be tolerated. Suspected academic misconduct will be immediately referred to the Emory Honor Council. Penalties for misconduct will be a zero on this exam, an F grade in the course, and/or other disciplinary action that may be applied by the Emory Honor Council.

• Time: This exam has 8 questions on 9 pages including the title page. Please check to make sure all pages are included. You will have 75 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 and policies outlined above.

Signature: ____________________________________________________________

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total</th>
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<tbody>
<tr>
<td>Points:</td>
<td>8</td>
<td>12</td>
<td>7</td>
<td>7</td>
<td>10</td>
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</table>
1. (8 points) **DON’T KNOW MUCH ABOUT HISTORY.**
Match the people on the right with their contribution to Computer Science on the left. Write a letter from the right hand column in a blank next to the person left hand column. You will **not** use all the options in the right hand column.

| j | Ada Lovelace | (a) Inventor who worked on automated machines including the digesting duck and automated looms. |
| g | Charles Babbage | (b) Coined the term “bug” and developed the first compiler |
| b | Grace Hopper | (c) Invented the transistor. |
| f | J.C.R. Licklider | (d) Built the first mechanical calculator. |
| i | Alan Turing | (e) Invented the mouse. |
| a | Jacques de Vaucanson | (f) Originated the idea of storing programs along with data in computer memory. |
| e | Douglas Englebart | (g) Invented the Difference and Analytical Engines |
| l | Tim Berners-Lee | (i) “Father” of theoretical computer science who worked as a cryptographer during World War II. |
| | | (j) Wrote the first program to calculate Bernoulli numbers on the analytical engine. |
| | | (k) Originated the idea of a network of computers which would allow people worldwide to share and access information |
| | | (l) Developed the World Wide Web |
2. (12 points) SHORT ANSWER
   (a) Give an example of operating system software.
       (a) Linux, Windows, Mac OSX
   (b) Give an example of applications software.
       (b) FF, web browsers, etc
   (c) Give an example of a computer input device.
       (c) mouse, keyboard, microphone
   (d) Give an example of a computer output device
       (d) monitor, speakers/sound card, printer
   (e) Give an example of nonvolatile memory or storage.
       (e) hard/USB drive, ROM, DVD/CD
   (f) 4096 bits is equal to how many bytes?
       (f) 512
   (g) 4096 bits is equal to how many kilobytes?
       (g) .5
   (h) How many different things can we represent using 5 bits?
       (h) 32
   (i) What is the term for the interconnecting wires which connect parts computer and carry electrical signals?
       (i) bus
   (j) List one HTML element which does not follow the standard opening and closing tag pattern we discussed in class.
       (j) img, input, br, hr
   (k) The technical term for putting two string (such as “Hello” and “world”) together and making a new, joined string (such as “Helloworld!”) is known as what?
       (k) concatenation
   (l) What programming language have we used when building webpages in this class?
       (l) Javascript
3. Short Essays

(a) (2 points) Explain the significance of the Jacquard Loom in the history of computing.

**Solution:**
It was “programmable”. You could program it to weave a pattern of cloth using punched cards. This lead to the idea of general purpose machines having multiple functions/capabilities via programming by humans.

(b) (2 points) Explain the difference between the Internet and the Web.

**Solution:** The internet is hardware while the web is software. The internet is the network of interconnected computers such as routers or servers. The software running on them is the web and includes a number of different protocols governing the transmission of data and information as well as software for receiving/transmitting, “decoding”, and rendering the information.

(c) (3 points) The Internet is a distributed network. Explain what this term means. List at least two advantages of a distributed network over a centralized network structure?

**Solution:** page 48-49 in textbook
4. (7 points) ERRORS, ERRORS, EVERYWHERE
The following webpage contains both HTML and Javascript errors. Clearly identify the errors and how you would correct them. Note: As discussed in class, where the lines are broken is not an error for this exam.

Solution: missing closing </html>
missing quotes around style for ol element
extraneous comma after height for img element
no <> around img element
capitalization of Document... wrong
missing ) after input getElement call
missing closing </li>
5. (10 points) **What A Tangled Web**

Describe how the Internet and World Wide Web work using **all** of the terms below. To receive full credit, your answer must demonstrate the relationships between these terms in the context of the functionality of the Internet and WWW rather than simply defining them.

<table>
<thead>
<tr>
<th>HTTP (HyperText Transfer Protocol)</th>
<th>packets (or packet switching)</th>
<th>web server</th>
</tr>
</thead>
<tbody>
<tr>
<td>URL (Uniform Resource Locator)</td>
<td>HTML (HyperText Markup Language)</td>
<td>web browser</td>
</tr>
<tr>
<td>DNS (Domain Name System)</td>
<td>IP (Internet Protocol) addresses</td>
<td>web page</td>
</tr>
<tr>
<td>routers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Solution:** A user generates a request for a **webpage** by typing a **URL** like `http://www.mycompany.com` into their **web browser**. The “http” part of the URL indicates the protocols/rules which govern the format of transferred data. HTTP indicates that the information being transferred is a webpage which uses hypertext and **HTML**. Since the URL is in a human readable format like “www.mycompany.com”, it must be translated to a unique **IP address**. This translation from human-readable URL to numerical IP address is accomplished by utilizing **DNS** (Domain Name Server) computers. This unique IP address allows the request to be routed to the **web server** via specialized computers called **routers**. The web server for mycompany receives the request and sends the data back to the requesting computer. If the data transferred is sufficiently large, the data is broken up into **packets** or smaller chunks of data for more efficient transfer.
6. (8 points) I'M A LITTLE BROWSER

Pretend you are a web browser. Render (that is, draw) the webpage that would result from the following HTML code.

```html
<html> <head> <title>A New Webpage</title> </head> <body> 
<!-- <p> In order to introduce myself</p> --> 
<h1> Introduction </h1> 
<p> Hello! These <br> are things I like </p> 
<ul style="list-style-type:square"> 
<li>Raindrops and roses </li> 
<li>Whiskers on kittens </li> 
<ol style="list-style-type:lower-alpha"> 
<li>Especially kittens with black whiskers </li> 
<li>Or pink whiskers </li> 
</ol> 
</ul> </body> </html>
```

Solution:

**Introduction**

Hello! These are things I like

- Raindrops and roses
- Whiskers on kittens
  - Especially kittens with black whiskers
  - Or pink whiskers
7. CROSSING THE BORDER
In HTML, we can surround an image with a border by adding a border attribute to the `img` HTML element. For example adding the attribute `border=1` will add a border 1 pixel thick around the image. Assigning a higher number yields a thicker border. The following 3 questions concern adding borders to images.

(a) (2 points) Write the appropriate HTML code which would make an image element from the file `image.jpg` and give it a 4 pixel border.

Solution:
```
<img src="image.jpg" alt="some text" border=4>
```

(b) (4 points) Write the appropriate HTML and Javascript code which changes the border from 4 pixels to 6 pixels which the user moves their mouse over the image.

Solution:
```
<img src="image.jpg" alt="text" border=4 onmouseover="this.border=6;">`
```

(c) (5 points) Write the appropriate HTML and Javascript which would add a button and image to your page. This button should change the image’s border from 4 pixels to 6 pixels which it is clicked. It should then pop up an alert window with the message “Crossin’ the Border” displayed in it.

Solution:
```
<img src="image.jpg" alt="text" border=4 id="pic">
<input type="button" value="click me" onclick="document.getElementById('pic').border=6; alert('Crossin\' the border!');">`
```

8. (12 points) **Test Twists Text**

In class, we discussed and demonstrated how you can control text in an area of a webpage via HTML elements and Javascript. Write HTML and Javascript code which would satisfy the below description: *Note, you do not need to write HTML code to generate the entire webpage; only the elements which generate the behavior below are required.*

You want to generate some dynamic text on a webpage. When a user moves their mouse over an image from the file `img1.jpg`, the text area should read, “You touched image 1.” When the user moves their mouse over a second, different image from the file `img2.jpg`, the text area should read, “You touched image 2.” When the user moves their mouse off of either image (i.e. the user’s mouse isn’t on either image, but is on some other part of the webpage), the text area should read, “Touching neither image.”

**Solution:**

```html
<img src="img1.jpg" alt="text"
    onmouseover="document.getElementById('output').innerHTML='You touched image 1';"
    onmouseout="document.getElementById('output').innerHTML='Touching neither image';">

<img src="img2.jpg" alt="text"
    onmouseover="document.getElementById('output').innerHTML='You touched image 2';"
    onmouseout="document.getElementById('output').innerHTML='Touching neither image';">

<div id="output">Touching neither image</div>
```