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. You are to uphold the honor and integrity bestowed upon you by Emory University. Penalties for misconduct will be a zero on this exam, an F grade in the course, and/or other disciplinary action.

- **TIME:** This exam has 9 questions on 8 pages including the title page. Please check to make sure all pages are included. You will have 50 minutes to complete this exam.

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*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: _____________________________________________

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<td>Points:</td>
<td>10</td>
<td>10</td>
<td>16</td>
<td>12</td>
<td>12</td>
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Score: ___________________________
1. Multiple Choice. Circle the correct answer for each question.

(a) (2 points) ____________, who wrote a program to calculate Bernoulli numbers on the Difference Engine, is widely considered to be the first programmer.
   A. Joseph Jacquard
   B. Alan Turing
   C. Grace Hopper
   D. Charles Babbage
   E. Ada Lovelace

(b) (2 points) Which of the following is NOT an example of an operating system?
   A. Windows
   B. Mac OS X
   C. Linux
   D. Firefox
   E. Unix

(c) (2 points) A ____________ language, such as Python or Java, uses program statements to construct a program.
   A. assembly
   B. high-level programming
   C. machine
   D. binary
   E. natural

(d) (2 points) ____________ (or Software as Service) is a computing paradigm where services and software are delivered online and can be accessed from any computer connected to the internet.
   A. Grid computing
   B. Cloud computing
   C. Large scale computing
   D. Distributed computing
   E. Client-server computing

(e) (2 points) Nonvolatile memory is memory which is:
   A. erased when a computer is powered down.
   B. Random Access Memory (RAM).
   C. not erased when a computer is powered down.
   D. part of the CPU.
   E. used only in small, portable computing devices.
(f) (2 points) Modern computers are “digital.” This means that:

A. they store all data in binary format.
B. they must be programmed in natural languages.
C. they must be powered on at all times.
D. their data must be human readable.
E. they must contain memory.

(g) (2 points) _________ 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

(h) (2 points) The _________ is responsible for mapping IP addresses to unique URLs such as www.google.com.

A. IP Address Lookup System
B. Internet Relay Protocol
C. Internet Protocol System
D. Domain Name System
E. Hypertext Transfer Protocol

(i) (2 points) HTML is:

A. a compiled language.
B. software which displays web pages.
C. code which is not executed 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.

(j) (2 points) A _________ ethical framework stresses “social utility” which is often understood as “happiness.”

A. Professional
B. Deontological
C. Duty-based
D. Utilitarian
E. Virtue
2. (16 points) **Unix Commands.** Match the commands on the right with the description of the command on the left. Write a letter from the right hand column in a blank next to a command in the left hand column. You will **not** use all the command descriptions in the right hand column.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
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<tbody>
<tr>
<td>cd</td>
<td>(a) command which lists files in the current directory in the long format which includes dates and permissions</td>
</tr>
<tr>
<td>rm</td>
<td>(b) command which moves the user up one level in the current directory structure</td>
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<tr>
<td>cd ..</td>
<td>(c) command which allows files to be deleted</td>
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<tr>
<td>cd ..</td>
<td>(d) command which allows files to be renamed or moved to a different location in the directory hierarchy</td>
</tr>
<tr>
<td>top</td>
<td>(e) command which gives information about what processes are currently running on a computer</td>
</tr>
<tr>
<td>grep</td>
<td>(f) command which causes a user to move to their home directory</td>
</tr>
<tr>
<td>ls -l</td>
<td>(g) command which allows you to read a text file in an easily scrollable manner</td>
</tr>
<tr>
<td>cp</td>
<td>(h) command which allows a user to duplicate/copy files or directories</td>
</tr>
<tr>
<td>mv</td>
<td>(i) command which can be used to modify permissions on a particular file or directory.</td>
</tr>
<tr>
<td></td>
<td>(j) command which can be used to search through the contents of a text file for a specific word or phrase.</td>
</tr>
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</table>

**Solution:** (in order:) f, c, b, e, j, a, h, d
3. **Short Answer.** Give a brief (2-3 sentence) answer to the following questions.

   (a) (4 points) Explain the difference between a command line interface (CLI) and a graphical user interface (GUI).

   **Solution:** They offer different ways of interacting with the computer. In a CLI, the user types text commands to interact with the computer. In a GUI, the user interacts via graphical elements such as icons, windows, menus, etc.

   (b) (4 points) Why was the Jacquard Loom considered an important predecessor of the modern computer?

   **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.

   (c) (4 points) Explain Moore’s Law. What is one negative consequence of Moore’s Law?

   **Solution:** Moore’s Law states that the number of transistors on a chip roughly doubles every 18 months. This means that the speed of devices also doubles roughly every 18 months or that you can buy a machine with twice the capabilities 18 months later. This means that devices become obsolete very quickly which generates tremendous amounts of e-waste as people upgrade to the new, faster electronics.
4. (6 points) Describe three ways that digital technologies changed the practice of collecting and storing personal information.

**Solution:** Cyber-technology has increased the AMOUNT of personal information that can be gathered, increased the SPEED at which it can be transmitted, and lengthened the DURATION of time the information can be retained and increased the KIND of information that can be acquired and exchanged.

Before cyber-technology:
Amount - Physical space limited it
Speed - physical transport/access/searching
Duration - physical records are typically expunged to save space (more forgiving)
Kind - Every transaction, website visit, even keystroke can be saved now.

5. (6 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. (8 points) List two pros and two cons why a professional organization might have a code of ethics.

**Solution:** Praise:
- Even if flawed, still worth pursuing.
- Inspire, Guide, Educate, discipline
- Sensitize members to ethical issues.
- Inform public about the nature of the profession.
- Enhance the profession in the eyes of the public.

Criticisms of Professional Codes:
- Too general/vague
- Have no Teeth (so what if you get kicked out of the ACM?)
- Incomplete
- How to resolve conflicts? Some directives don’t say...
- Inconsistent directives?
- Confusions between Micro-Ethical issues (personal relationships, yourself) and Macro-Ethical issues (apply to society in general).
- Self-serving for the profession.

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7. (10 points) What role did technology problems play in the downfall of Value America as described in the book, *dot.bomb*. Give at least two specific examples.

**Solution:** A haphazard technology infrastructure prevented them from growing sales/revenue and keeping/retaining customers.

Examples include:
- Software which “lost” customer orders
- Slow (upwards of 5 minute) page loads which resulted in many customers abandoning the site
- Having to reboot all web-servers every morning to ensure the servers did not bog down or crash
- Difficulty transitioning to more professional pieces of software such as Oracle and SAP for order tracking/management.
- Software which was designed without ability to compute crucial accounting statistics such as number of units sold, revenue, etc.
- Software which was not flexible enough to accommodate different types of promotions and eventually allowed huge numbers of users to apply a 50% off coupon multiple times.
- Software and website were overly complicated and no one but original designers could fix/maintain/enhance.
8. (10 points) Define data-mining and explain how it might represent a threat to individual privacy in today’s digital world.

**Solution:** Data-mining is the extracting of implicit patterns from data (not just online or “internet” data). Note that it’s not just searching the data for keywords or figures. It presents a threat to privacy, particularly when the data or patterns are aggregated. Patterns of which you are unaware and which may or may not be applicable to the subject can be used in making decisions about important matters.

9. (12 points) List and briefly explain three reasons why you might want to build websites utilizing CSS and HTML rather than HTML alone.

**Solution:** Separate content from presentation - Allows you to have files with content and minimal HTML code and files with more complicated CSS code. Useful if writers need to be able to update frequently, etc.

Reduce duplication/clutter in your pages - One style sheet can be applied to many webpages. Don’t have to duplicate HTML code across all webpages.

Flexible in spacing/appearance - CSS gives more options in appearance (spacing, colors, layout, etc).

Unify theme/appearance easily - This is really a subset of some answers above, but I also gave credit for it.