Homework #8 on Chapter 7 (12 points total)
Due: Friday, November 9th, in class

1. If a web page is loaded in two different browsers, in what ways will the html files differ? Justify your response. 1 point

2. Discuss the purposes of HTML, CSS and JavaScript, giving the meaning of acronyms when necessary. 2 points

3. Explain why an Internet user would see a 404 error message. 1 point

4. Determine the total time it takes to transmit an uncompressed grayscale image (with 8 bits/pixel) from a screen with a resolution of 1,024 × 768 pixels using each of the following media. Assume 1 Kbps = 1024bps, etc. 2 points
   a. A 56 Kbps modem (dial up) 2 points
   b. A 1.5 Mbps DSL line (an older DSL line)
   c. A 100 Mbps Ethernet link (Fast Ethernet)
   d. A 10 Gbps Ethernet link (10-gigabit Ethernet)

5. In the figure below, assume each box is considered a node (not including thing1 and thing2). Suppose B is sending a packet to A. How many nodes in the network will look at the message and ask “is this for me?” if thing1 and thing2 are … 1 point
   a. bridges?
   b. repeaters?

6. For the figure in problem 5, suppose C is sending a packet to A. How many nodes in the network will receive the message if thing1 and thing2 are … 1 point
   a. bridges?
   b. repeaters?
7. Given the following diagram, where the numbers represent the time delays across a link:

2 points
a. How many simple paths (those that do not repeat a node, i.e., a loop) are there from node A to G?

b. What is the shortest path from node A to node G? What is the overall delay?

c. If node E fails, does that change the shortest path? If so, what is the new shortest path?

8. Here is a simple heuristic (approximation algorithm) for routing a message from node A to node B in a reasonable amount of time. The algorithm assumes that every node in the network has at least two outgoing links.

Assume A has n outgoing links, n ≥ 2, with delays to the nodes on the other end of a₁, a₂, … aₙ. Select the link with the shortest delay and send the message on that line. If the message arrives at node B, you are done. Otherwise, repeat this process until the message does arrive at its intended destination, but do not send the message directly back to the node from where it just came. That is, if the message was sent from A to C, then C should not return the message to A. In this case, choose the second-lowest delay value for the outgoing line.

Will this heuristic always deliver the message from node A to node B? If not, explain why by providing an example network where this heuristic does not work. 2 points