

## Problem Set 4: Hardware, Software, and the Internet

*due Wednesday, 8 November 2006, by 5:30 P.M. ET*

This problem set requires Internet access and a trip to a computer store. You must submit this problem set via upload to the dropbox on the course's website. Though you may certainly take printouts of this problem set's "Shopping List" and "Invoice" with you to the store, please type your answers for submission.

### **The Journey Reloaded. (20 points.)**

1. For Problem Set 3, you described what happens when you visit your mom's blog. Suppose that, right after you've installed a brand new wireless router to share your broadband signal with everybody in the household, you settle down in front of your computer to check out your mom's latest updates and see how she spent her day (without you). But you are unable to get to her site!

Describe in a few paragraphs what might have gone awry from the time you hit "Enter" after inputting `mom.com` into your browser to the moment at which the error message "You tried to access the address `http://mom.com/`, which is currently unavailable" appears on your screen. Be sure to incorporate (intelligently), at least, each the following terms into your answer: browser, DHCP, DNS, domain, firewall, IP address, Internet, ISP, port, router, server, and TCP/IP. Please underline the first instance of each of these terms in your response.

### **Taking a Vacation on Your Computer. (10 points each.)**

Alright, Google Earth is just so cool we might as well let you garner some points for using it. Surf on over to `http://earth.google.com/download-earth.html` and download Google Earth Version 4 (the free version) to your computer's desktop. (Alternatively, you may download it to a PC in one of 53 Church Street's labs.) Then, go ahead and install the software by double-clicking its icon. Once installed, run it! Once the software automatically logs into Google's servers, your screen should fill with imagery of your home planet (assuming you're from Earth). We trust you'll kill the next hour or so playing around. (Be sure to try out the software's layers!) But when you're ready to pay attention again, we've got some questions for ya.

Beyond being fun, these questions are intended to be an opportunity for you to teach yourself how to use a program that you may not have used before. Moreover, they're meant to reveal that well-written software doesn't need a user's manual and that users shouldn't need to be trained to use software. Not sure how to do something, figure it out! Truth be told, if it's too hard to figure out, it's the software's fault, not yours.

2. Make a new folder under “My Places” called “2”. Then, in almost any manner you wish,\* find each of the following locations. For each location, zoom to whatever altitude looks best and placemark the location, naming it appropriately. If the placemark doesn’t end up in your “2” folder, be sure to drag it there manually.
  - i. Harvard’s Science Center
  - ii. Il Colosseo (*i.e.*, the Colosseum in Rome)
  - iii. El Zoo de Buenos Aires (*i.e.*, the zoo in Buenos Aires)
  - iv. Middle Earth (okay, the country where Peter Jackson filmed *The Lord of the Rings*)
  - v. The Hollywood Sign in California

Save your “2” folder as a file called 2.kmz for submission.

3. Make a new folder under “My Places” called “3”. Then, find three locations of interest to you (not including any locations already required by this problem set and not including any locations already placemarked in Google Earth’s “Sightseeing” folder). For each location, zoom to whatever altitude looks best and placemark the location, naming it appropriately. If it is not a well-known location (*e.g.*, if it’s the house in which you were born), also describe the location in your placemark.

Save your “3” folder as a file called 3.kmz for submission.

### **There’s No Place Like HomeRF. (20 points.)**

4. With our lectures on the Internet now under your belt, it’s time to apply your recently acquired knowledge of LANs and WLANs to your (dream) home.

Suppose that you have, minimally, two desktops and a laptop that you want to network together within the confines of your home. Moreover, you want both of those computers to share your cable or DSL modem’s uplink to the Internet as well as your personal laser printer. And you don’t want to be tied down with that laptop—you want it to connect wirelessly to this little network of yours.

Exactly how could you go about implementing this general design? In the form of a diagram, supplemented by a few paragraphs of descriptive text, spell out directions for building such a network. Specifically, explain exactly what hardware this venture requires, what type of cabling you need, how you should go about connecting everything together, and so forth. Be sure to label each of your diagram’s network interfaces with a unique MAC (*i.e.*, Ethernet) address and an appropriate, unique IP address. (By “appropriate,” we mean that your choices

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\* You’re welcome to use, *e.g.*, Google itself to search for addresses or more general guidance as to where in the world these locations are. But you may not search for or utilize placemarks that other people have made for these particular locations.

of IP addresses should make sense.) Also note the bandwidths of your various components as well as the technologies (802.11b, 802.11b/g, 802.11g, *etc.*) underlying your design.

The more technical your discussion, the more impressed we will be! In short, your diagram and text should provide a newbie (remember when you were one?) with sufficient direction for buying hardware for and setting up a home network.

Finally, in one, additional paragraph, justify your decisions. *Why* did you choose this and that technology? Was it because of speed? Cost? Simplicity? Couldn't recall your other options?

### E-1 Goes Shopping! (30 points.)

5. Guess what.

Now that you know all about hardware and software, we are giving you two thousand <sup>virtual</sup> dollars to spend at a local computer store!

Well, actually, your job for this problem is to “spend” up to \$2,000 in “virtual” dollars to “purchase” some hardware and software from a local computer store. We trust that this experience will bring you newfound confidence, if not excitement, in fairly technical atmospheres. (Read: we bet you know more than your salesperson.)

However, some guidelines are in order!

By trip's end, your “shopping cart” must “contain” the following items.

- i. One desktop computer, complete with OS, display, keyboard, mouse, optical drive (of some sort), and NIC.
- ii. One laptop computer, complete with OS, optical drive (of some sort), and NIC.
- iii. One printer and printer cable.
- iv. All requisite hardware for networking these two computers and sharing an Internet connection (be it dialup, broadband, or DSL).
- v. One game (that's supported by your desktop computer's graphics card).

In short, you need to buy yourself everything necessary for a two-computer LAN!

Note that you *must* visit a computer store for this problem. You may *not* do your “shopping” on the Web or through a catalogue. Stores that sell computer hardware and software include BestBuy, Circuit City, CompUSA, Micro Center, OfficeDepot, OfficeMax, and Staples. The locations of these stores can be found in your local yellow pages. However, you need not restrict your “shopping” to these stores; you may visit any store that sells computer hardware and software.

Take advantage of your chosen store's sales staff. Ask the staff any and all questions. Treat this problem as an opportunity to practice shopping for that new computer whose purchase you've been postponing and postponing and postponing. However, we suggest that you not inform the sales staff that your funds are virtual. :-)

You may *not* "spend" more than \$2,000 in "virtual" dollars. (But you *may* pretend that you're exempt from taxes for this question.) "Spending" even a penny more than \$2,000 will result in point deductions for this question. In restricting you to "shop" on a budget for these two computers, we hope that you learn how to balance computing needs with financial means. This budget should compel you think carefully about your "purchase" decisions. (For instance, "Do I really need 1 GB of RAM? Because if I only get 512 MB of RAM, I can save some money and buy a bigger display.")

To be clear, this question does *not* require that you buy anything. It simply requires that you pretend that you have \$2,000 with which to "purchase" the prescribed items. You are expected to go to a computer store to *find out* exactly what you *could buy* with \$2,000, thereafter reporting your findings to us.

At the end of this problem set, you will find a "shopping list" and an "invoice." Tear those pages out of this packet, complete the blank fields on each, and submit the completed pages as your answer to this problem.

### **Explaining Your "Purchases." (10 points.)**

6. In two or more paragraphs, tell us what sort of decisions you had to make while "shopping." What was your thought process? Did you find yourself strapped by the \$2,000 budget, or were those funds more than enough for your purchases? Did you have to make any compromises? That is, did you have to forego "buying" one item in order to "afford" another? Was your chosen store's sales staff helpful? Did they teach you anything or did you feel that you knew more than they did?

In short, explain your "purchases." Justify the dollars that you "spent," using the rhetorical questions above as possible points of departure for your explanation.

### **Extra Credit. (5 points.)**

7. In the past few years online communities have become very popular. Most mentioned in the media are MySpace and Facebook. However, discussion boards, games, chatrooms, online and dating sites are all types of online communities. Using your newly acquired search skills, find a type of online community and explore what it is like. List the name and URL of the site, the category in which you might put it (you can even make up your own!), and your impression of it. Note to whom it seems to be targeted, perhaps how long it has been around, and the type of impact it might have.

## “Shopping List”

Be sure to fill in each of the blanks below in order to maximize your score for this problem.

Store Questions	Your Answers
Name of store:	
Location of store:	
Phone number of store:	
Name of salesperson who helped you (if any):	

Desktop Questions	Your Answers
Brand of desktop computer:	
Operating system:	
Speed of CPU (in Hz):	
Type of CPU (Pentium 4, PowerPC G4, <i>etc.</i> ):	
Capacity of HDD:	
Speed of HDD (in RPM):	
Type of optical drive:	
Speed of optical drive:	
Amount of RAM:	
Type of RAM (SDRAM, RDRAM, <i>etc.</i> ):	
Amount of L2 cache:	
Type of sound card (built-in, SoundBlaster, <i>etc.</i> ):	
Type of graphics card (built-in, GeForce4, <i>etc.</i> ):	
Amount of video RAM:	
Make and model of display:	
Size of display:	
Other features:	

Laptop Questions	Your Answers
Brand of laptop computer:	
Operating system:	
Speed of CPU (in Hz):	
Type of CPU (Pentium 4, PowerPC G4, <i>etc.</i> ):	
Capacity of HDD:	
Type of optical drive:	
Speed of optical drive:	
Amount of RAM:	
Size of display:	
Other features:	

Printer Questions	Your Answers
Make and model of printer:	
Speed of printer (in ppm):	

LAN Questions	Your Answers
Cables:	
Other LAN equipment:	

Game Questions	Your Answers
Name of game:	
Type of game:	

## “Invoice”

In the table below, list the cost of each of your “purchases.”

For example, if you “bought” a display for \$300, write “display” under the **Item(s)** column and “\$300” immediately to the right in the **Cost** column. If you “bought” multiple items for one price, enumerate each of the items. That is, if you “bought” a laptop that *came with* a 2.0-GHz Pentium 4, a 250GB HDD, 512 MB of RAM, a floppy drive, 512 KB of level-2 cache, and an 8x DVD-RW drive, list *all of those items* together in the **Item(s)** column, with their total cost immediately to the right in the **Cost** column.

In short, we want to know *exactly* what you “spent” on what.

Item(s)	Cost
<b>Total Cost:</b>	