

1. (8) Assume a friend owns a small company and wants to computerize his order entry process. He does some research regarding what software to purchase and decides on a product called the ABC Order Entry system. He goes to a local computer store and purchases the software.

After installing the software, he discovers that it does not have sufficient capacity to store information on all of his company's inventory items. Since the software won't work for his business, he returns it to the computer store and asks for a refund. The salesperson informs him that store policy prevents her from refunding the money.

He argues that the implied warranty of fitness for a particular purpose forces the store to refund his money. Is he right? Explain.

2. (8) How is a company's ability to downsize (in regard to their information technology) impacted by the form (source code or object code) of their applications software?
3. (8) Do some machine language instructions take longer to execute than others? Explain.  
How does your answer relate to a processor's MIPS rating?
4. (10) A company called Amazon.com Books sells books over the Internet. The following information is taken from their web page.

If it's in print, it's in stock.

Earth's biggest river surges with ten times the volume of the next mightiest river. And, in keeping with its namesake, Amazon.com Books offers over one million titles, more than five times as many titles as you'll find at even the largest Barnes & Noble, Borders, or other chain superstores. The good and the bad, the hard-to-find and the easy-to-find -- our goal is to carry every book in print, all available for immediate delivery.

30% off bestsellers.  
10% off hardcovers.  
10% off paperbacks.  
Every day.

Unlike traditional bookstores, we don't have to warehouse our books in expensive retail real estate, and our operations are largely automated. So, we're able to offer consistently low prices.

Apply the concepts of efficiency and effectiveness to this company. Be specific using Amazon.com Books—don't just write down the generic definitions of the two terms.

5. (8) Assume you are interested in purchasing a device to backup your computer's 2 GB internal hard disk. You go to one computer store and they recommend that you purchase a CD-R drive. You go to a second store and they recommend that you purchase a DAT tape system.

Which recommendation makes the most sense? Explain.

6. (8) On the advertisement for secondary storage devices passed out and discussed in class, a 2.6 GB magno-optical disk drive cost \$1,999 (with 2.6 GB cartridges selling for \$85 each). In addition, a 3.2 GB internal (magnetic) hard drive cost \$479. Provide an argument to justify the cost of the magno-optical drive.
7. (8) Consider the following argument: "There are two basic types of compression techniques in use today—lossy and lossless. Of the two techniques, lossy technology generally produces smaller compressed files. If a file can be compressed before it is sent via telecommunications to another computer, and then expanded after transmission, the transmission time can be reduced. Therefore, lossy compression should always be used in data transmission because it produces the smallest files and would result in the least transmission time."

Do you agree with this argument? Explain.

8. (8) Assume that you own a computer that has a modem rated at 28.8 Kbps (thousand bits per second). You want to download a file that is 864,000 bytes in length (as stored on a disk). Assuming that asynchronous transmission mode is used and that there is no data compression, how long will it take to download this file? Show your work and present your answer in seconds.
9. (8) Using the Netscape browser and the Internet, explain what is meant by the term client-server. Do not just write down a generic definition—instead, demonstrate an understanding of the definition by applying it to the browser and the Internet.
10. (10) Assume that you work for a small company that manufactures furniture. Your main customer is a large retail furniture outlet named Leaveits. Your boss (the company president) calls you into her office and shows you a letter from Leaveits. In their letter, they state that all suppliers (like you) must begin using EDI technology within six months. Your boss asks you to explain what this means.

How would you respond to her?

11. (8) Assume that a computer's performance is constrained by its inability to get data from its hard disk. Also assume that *all* other components (RAM, bus, etc.) have been eliminated as part of the problem.

Now assume that you replace the disk with a new disk that has an access time that is twice as fast as the original one. However, performance does not improve. Provide an explanation for this behavior.

12. (8) Why do you need a modem on your home computer to connect to the Internet and you do not need a modem if you connect to the Internet from a computer lab on campus?

1. He is wrong. The circumstances are not appropriate for invoking the implied warranty of fitness for a particular purpose. For this warranty to apply, the buyer must have relied on the expertise and recommendation of the seller. This is not the case here.

2. Downsizing involves moving applications to smaller machines, e.g., moving a payroll application from a mainframe to a minicomputer. Since the processors in the two computers are most likely different, they use different machine languages.

If the applications are in object (machine language) code, then they will not work on the new processor. However, if the applications are in source code form, then they can be recompiled into the machine language of the smaller machine.

3. Yes, some machine language instructions take longer to execute than others. That is, some require more microcode instructions than others.

MIPS measures the number of instructions (not microcode) executed per second. When you see a MIPS rating, the logical question to ask is “which instructions are being measured?” If the ones that execute fast are being measured, then the MIPS number will be larger than if the slow instructions are being measured.

4. A correct answer to this question should demonstrate an understanding of the terms efficiency and effectiveness. An argument for efficiency might relate to the savings associated with the lack of expensive real estate for a retail store. They are able to sell books (output) with less overhead (input) as a result of this.

An argument for effectiveness could relate to their large stock (“if it’s in print, it’s in stock”). Customers can go to one location (from any computer) and order any book (usually at a discount).

5. The CD-R has a high fixed cost (at today’s prices). In addition, it is a write-once technology. This means that you would need over three disks for each backup and they could never be reused. This would be expensive.

On the other hand, a single DAT tape cartridge could hold the contents of the entire hard drive and the cartridges could be reused if desired. The overall cost would be lower.

DAT appears to be the best choice in this case.

6. The magno-optical system has removable cartridges. These cartridges allow for media portability and also make it possible to get more storage at a relatively low marginal cost. In addition, magno-optical technology is more reliable than magnetic technology.

7. Everything about the argument is correct except the suggestion to always use lossy compression. This type of compression loses bits—that’s where the name of the technique comes from. If you are sending data (ANSI codes for example), then lost bits destroy the information. Lossy techniques are only useful with images and perhaps sound. They are never appropriate for binary or ANSI data.

8. It will take 300 seconds.  $864,000 \text{ bytes} \times 10 \text{ bits/byte} = 8,640,000 \text{ bits}$ .  $8,640,000 \text{ bits} \div 28,800 \text{ bits/second} = 300 \text{ seconds}$ .

9. Client-server architectures split the processing tasks of an activity between several machines—the clients and a server. The Netscape browser (located on the client machine) receives HTML commands from the server and formats the pages seen by the user. Images are sent in a compressed format from the server and the client browser decompresses them for display. This “sharing” of tasks minimizes the data transmission traffic on the network.
10. EDI (electronic data interchange) is a standard that defines how businesses can electronically exchange common business documents. You need to tell your boss that the company needs to modify their information systems to be able to accept and generate electronic transactions according to the standard. Your boss needs to get more detailed information on exactly what documents (purchase orders, billing confirmations, etc.) Leaveits plans to use with the EDI system and then assess how this will impact her company.
11. Your applications apparently do not randomly access data on the disk very often. Instead, your applications are probably transmitting large volumes of data to/from the disk for each access. The disk’s transfer rate is most likely the bottleneck.
12. You need a modem at home because you are using your telephone. The current underlying technology for the telephone system is an analog technology designed for voice (not data) transmission. Since computers communicate using a binary digital system, the modem is needed to convert the data transmission signals from digital to analog (modulation) and vice versa (demodulation).

The computers in the labs on campus are connected to a campus-wide digital network—not the telephone system. Since the network is digital, no conversion between signal types is necessary.