

Please answer the following questions in the space provided. Question point values are shown in parentheses.

1. (14) The following is an excerpt from an article titled “What’s Hot About Java” published in CIO magazine.

Java promises to make it easier and faster for software developers to write new programs because they won't have to be concerned with cross-platform incompatibilities. And since Java software is intended to reside on a server and be downloaded to a client machine as it is needed, updates are supposed to be easy. Rather than having desktop specialists install upgrades on every PC throughout the organization, every time the program is executed the network will do it automatically.

- a. Why will developers not “... have to be concerned with cross-platform incompatibilities”?
 - b. It is stated that “...every time the program is executed the network will do it [install upgrades] automatically”. Does the success of such an approach depend on the kind of network, e.g. a LAN, an Intranet, or the Internet? Explain.
2. (20) The following excerpt is taken from “The Fast Lane” published in the April 1, 1998 issue of CIO WebBusiness Magazine.

Forget that romantic image of a lone biker on a smooth ribbon of blacktop. Harley-Davidson dealer Russ Hampton can tell you it's no fun to go it alone. At least not when it comes to your dealership management system. Hampton's Warwick, R.I.-based dealership runs many business transactions from point-of-sale terminals to payables on software that cannot talk to Harley-Davidson Inc.'s Milwaukee headquarters. The software does a fine job of keeping Hampton's Ocean State Harley-Davidson Inc. rumbling along. He sold 270 hogs in the 1997 model year, and with the king of the road in hot demand, he has presold nearly all his stock through mid-1999. But with his data chained up in his own LAN, Hampton says doing business with the motor company was hardly easy riding. Getting an answer to a simple question about a Fat Boy's part recall history, for example, meant leaving a voice mail message in Milwaukee that could take days to be answered. Getting credited for an Electra Glide warranty repair could take a month or more after filling out and mailing in an old-fashioned paper form. “We were beginning to feel like a red-headed stepchild,” Hampton says, his voice softened by a Tennessee twang.

Now, thanks to Harley-Davidson's recent Web initiative, Hampton is feeling less like an outsider. The \$1.5 billion motorcycle company has developed a system called h-dnet.com that lets dealers like Hampton file warranty claims, check recall status and submit financial statements. Soon it will also

be used to order parts and accessories. All of these hard-core transactions, previously available only to dealers who used client/server systems that could talk to Harley-Davidson headquarters, can now be done via a Web browser. Dealers can also search for "soft" data--anything from exploded-view engine diagrams to executive press releases--and they can request to have technical service documents faxed to them from their h-dnet connection. Hampton says he's happier now; his routine warranty claims are processed within 48 hours, and he rarely has to make that call to Milwaukee. Harley-Davidson folks say they're happier, too. Welding Web technology onto the company's back-end systems has been a relatively inexpensive way to deliver a 24 hour, 7 days a week application to dealers whose computers cruise beyond Harley-Davidson's control.

Discuss the Information System issues/technology that we have covered so far this quarter that are highlighted in this excerpt. Address issues such as LANs and WANs, proprietary and TCP/IP networks, extranets and the Internet, and efficiency and effectiveness.

3. A company headquartered in Seattle has many stores located in cities around the United States. This company is in the process of replacing its existing payroll system with a new, more flexible system. One of the issues they need to deal with is the fact that the payroll tax laws are different from state to state. In addition, the states, as well as the federal government, change their tax laws frequently.

Although the company has a very capable information systems staff, they decide to acquire the software from a software firm. Their main reason for this decision is they can get the software now, whereas if they develop it internally, it will take 18-24 months.

Should the firm acquire the source code or the object code from the software firm (assuming that both options are available)? What specific issues in this situation make their choice more significant? What happens if they make the wrong choice?

4. (15) The law firm of Ready, Willing, and Able specializes in antitrust litigation. The large number of documents that are obtained during the evidence discovery process that take place prior to a trial characterizes litigations such as these.

The firm estimates that a typical case will average 250,000 pages of documents.

- a. Compute the total amount of storage needed to store images of 250,000 pages of information assuming each page is 8 inches wide and 10 inches high, that the scanning density is 100 dpi (dots per inch), 16 colors are desired (16 colors require 4 bits), and no compression is used. Provide your answer in bytes.
- b. If compression were to be used, would a lossy or lossless approach make the most sense? Explain.

- c. The firm wants to keep the computer images in a safe place potentially for many years (in case of appeals, etc.). Given the requirement of safe, long-term storage, what type of storage (magnetic or optical, fixed or removable media) would make the most sense?
 - d. Many of the documents are memorandums and it is very useful for example to create indexes to the documents that allow the attorneys to find all documents sent by person X or received by person Y. Given this requirement, would OCR technology have any value here? Explain.
 - e. Assume that the system has been created and is very useful for the firm as they use it in their office to prepare for a case. Also assume that the case is about to go to trial and the attorneys propose using the system in the courtroom to get fast access to documents while testimony is being given. The firm (located in Seattle where the computer system and document storage is also located) proposes setting up a network so that the attorneys can get fast access to the system from the trial, which is taking place in San Francisco. Would you have any words of caution for them? Explain.
5. (18) Consider the following excerpt from an article titled “Beyond Client/Server” in the March 1, 1997 issue of CIO:

In the classic client/server model, developers have to concern themselves with separate pieces of application software at the client and the server (and often at several points in between). In the Web-based world, however, the client displays whatever is sent to it over the network. To change what the user sees, one need simply change the HTML on the Web page file located on the server; in the eyes of the user, a new application is loaded each time he or she logs in.

It appears that the author of the article feels that the “Web-based” approach is better than “classic client/server” model. Provide an argument that the Web-based approach *as described in the excerpt* is actually inferior the classic client/server model. In your argument, indicate the potential problems with the Web-based approach and how the classic client/server model overcomes those problems.

6. (18) You are in the process of acquiring an accounting package for your small firm. You have already established your requirements and are now trying to decide how to acquire the software. You have narrowed your choices to either licensing an existing accounting package or having the software written by your internal information systems staff.

Discuss the advantages and disadvantages of each alternative.

Answer key

1. a. Java runs under the control of what is called a “virtual machine”. Java source code is not translated into the machine language of a specific CPU. Instead, it is translated into “byte code”, a language for a hypothetical machine. The Java Virtual Machine acts as this hypothetical machine and understands and interprets the byte code. Therefore, any computer (or browser) that includes the Java virtual machine can execute a Java program.

b. This approach places large demands on the network. Under this model, every time a Java program is executed, it must be send to the client machine. While this will insure that the client gets the most current version, it also means that slow network transmission rates will reduce the effectiveness of the approach. Both a LAN and an Intranet may be able to provide sufficient transmission capability but the Internet could present a problem.
2. Hampton’s original system is a proprietary LAN used to support their operations. It seems that this system was very effective for what it was originally designed for (“The software does a fine job of keeping Hampton’s Ocean State Harley-Davidson Inc. rumbling along”). However, the system could not interface with Harley-Davidson’s proprietary client/server system and thus overall, the both systems were ineffective.

When Harley-Davidson installed their Intranet-based system (h-dnet.com), the need for proprietary systems was replaced with TCP/IP-based technology and browsers. This provided all dealers with a more effective solution that not only gave them access to traditional transaction processing, but also access to a variety of “soft” data. It can also be argued that the new system improved efficiency for Harley-Davidson (“a relatively inexpensive way to deliver a 24 hour, 7 days a week application to dealers”).

3. If possible, they should acquire the software in source-code form. The software will likely have to be changed frequently because of the different and changing tax laws in the various states as well as the Federal tax code. These changes can only be made to the source code – it is not possible to change the object code in this way. If they make the wrong choice (they obtain the object code when the source code is available), then they are highly depending on the software firm who supplies the object code (because the software firm has the source code). This dependency may be very costly. They may not be able to get changes made in a timely manner and in the worst case, not be able to get the changes made at all.

4. a. For one page:

8 in x 10 in = 80 square inches
100 dpi x 100 dpi = 10,000 dots (pixels) per square inch
80 square inches x 10,000 pixels/inch = 800,000 pixels per page

4 bits/pixel (for color) x 800,000 pixels = 3,200,000 bits
3,200,000 bits / 8 bits/byte = 400,000 bytes/page

For all documents:

400,000 bytes/page x 250,000 pages = 100,000,000,000 bytes

- b. It is likely that lossy compression would be the best choice. The quality of the images would be reduced slightly but they would likely still be very readable. Since the compressed files would be smaller with lossy that lossless, this seems to be a good choice.

c. The media should be removable so that it can easily (and at low cost) be stored in a safe location. Optical storage should be used since optical storage is inherently more reliable than magnetic storage.

d. Optical Character Recognition (OCR) could be very useful in this context because as the documents were scanned, OCR could be used to convert the name of the sender and receiver into computer-readable form. This could then be used to create the indexes.

e. This could be a problem. The proposal is suggesting that a system that is running on a LAN be moved to a WAN. Since WAN technologies are generally slower than LAN technologies, and since the images are large (likely true even with compression), the result could be very poor performance. Fast access to documents while testimony is being taken could be difficult.

5. As described in the excerpt, the client is responsible for the presentation part of the application. In the classical client/server model, the tasks of presentation, application processing, as well as data management can reside on either the client, the server, or split across both. That is, there is more flexibility in terms of placing the tasks at the appropriate machine. This can reduce network traffic and improve overall responsiveness.

6. Advantages of purchasing (and disadvantages of in-house development):

- Potentially lower cost
- Faster access to the working solution
- High (at least tested and known) quality
- Does not consume in-house expertise

Disadvantages of purchasing (and advantages of in-house development):

- Feature may not meet requirements which can result in need to modifying the package, living with the problems, or modifying the way the company operates
- High dependence on the software vendor to make changes and support package