Indiana University
Multi-campus Modular
Computing Curriculum

Introduction to Computing

Module # 2: Communication and the World Wide Web

Goals

- Students will be able to separate media exaggerations about the Internet from the current realities
- Students will become familiar with the general background of network communication as it applies to the Internet
- Students will be familiar with the important features of browser applications
- Students will practice using search engines, directory searches, and other skills to find information on the WWW

Prerequisite Skills

- Comfort with the keyboard and mouse
- Experience with the STAIR process

1 The Changing Role of Computers

The popular conception of how computers are used can be misleading. We still tend to think of computers as powerful calculators, skilled at mathematical processes. Indeed, the earliest computers were used almost exclusively for mathematical computation. The term computer, as defined before World War II, referred to a person who undertook complex mathematical calculations. The early computing machines were immediately pressed into such mathematically intensive roles as calculating artillery firing tables and code breaking. Even now, computing is often taught as part of a math curriculum in early grades, and we think of computers as large machines with flashing lights and cryptic output. Computers are still being used for calculation. They are better than ever at doing this type of work, but computers employed in this way are used principally at Universities and large corporations. Most computers today sit on the desks or in the homes of individuals. Although “regular people” have some calculating needs, most of us rarely have to generate an artillery firing table. The main use of computers has shifted from calculation to communication. Most of the applications we run on computers are designed to help us communicate more clearly with other humans. Even those programs which still have a heavy calculating ability (such as spreadsheets) are frequently used to turn the results of the calculations into charts or graphs that are more easily understood by humans. Even when we use a computer to calculate, our real goal is frequently communication.

Since the advent of written language, tools have been used to enhance and control human communication. The invention of the printing press made communication via the written word practical. The telephone, television and radio have had the same kinds of effects on visual and auditory communication. Modern office tools such as voice mail, pagers, and FAX machines have done much to change communication, but the bulk of business communication has still been paper documents. As you may be aware, the advent of the Internet has the potential to change the way we communicate in some fundamental ways. We cannot watch the news without hearing a story about the Internet. In one story we hear enthusiastic praise of the technology that will change everything for the better, and in the next story we hear about the abundance of smut, filth, crime, and other dangers being forced upon us. We need to understand what the Internet is and what it is not. It is a very real part of our present and future. The Internet will not go away any time soon. The effects it may have on us are profound. Our level of understanding of this phenomenon will decide whether the Internet controls our actions or we use it as a powerful tool to advance our personal ideals.

2 The Evolution of Computer Communication

The history of computing as a communications medium illustrates how the use of computers has evolved. The early days of computing foretold the development of huge, multi-purpose machines. In 1943, Thomas Watson, then the chairman of IBM, is reported to have said: “In the whole world there is a market for maybe five computers.” Today, the average family car on the road has eleven microprocessors. (Some have many more!)

2.1 Mainframes

In Watson’s day, his statement was not at all controversial. Computers of the time were mammoth machines. They were expensive to build and maintain, and were extremely difficult to program. These computers evolved into a type of computer called mainframes. A mainframe computer was a massive computer that could be used by many users simultaneously. Each user had her own monitor and keyboard, but there was only one main computer “brain”. The processor quickly jumped from individual to individual. Each person had the impression she had the computer to herself. This illusion broke down when a large number of people were using the system or somebody was running an especially demanding process. An important advantage of this scheme was the use of the computer as a communication medium. Since a large number of people were sharing the same computer at the same time, it was not too difficult to use the computer to talk to others in the system.

2.2 The Personal Computer and the LAN

The development of the microprocessor in the 1970's initiated the personal computer. Now a computer that was nearly as powerful as the earlier mainframes was small enough, cheap enough, and reliable enough to be on many people's desks and in their homes. Each computer could do the work in its own processor, so there was little need for mainframes in many situations.Mainframes continued to be used, (and they are still very much with us) but the popular image of a computer changed to the individual machine on each person's desk.

This change brought about some interesting side effects. Individuals were empowered by having their own machine, but the communications capabilities of the mainframes were lost. The "paperless office" has long been touted as a potential benefit of computing, but anyone who works in an office knows better: Computers started generating more paperwork than ever, because it was so easy to do so. Paper remained the transfer medium of choice, although trading disks became an option. The solution to this predicament was the Local Area Network (LAN). This innovation was a combination of programs and hardware designed to connect a series of personal computers so they could communicate electronically. Once a LAN was set up in an office, it became much easier to send documents across the LAN to other computers on the network. People still had the power of individual computers, and now they had regained some of the communications abilities of the mainframe days.

LAN's, however, had some problems of their own. It became much easier to communicate electronically within an organization tied together with a LAN, but that organization became an "information island". Transferring information beyond the LAN involved the same old problems of transfer to paper or disk. Connectivity created a larger problem. As we shall see, different types of computers have different ways of storing information. In the mid-1980's, there were as many as 10 different types of computers popular within the home market. None of these machines could speak directly with each other. As the market settled down, there became far fewer popular operating systems, but the problem still persisted. If you create a document on a Macintosh at work, your IBM at home will not recognize it without some special modifications. There was not a uniform way to describe and transfer information across computing platforms.

2.3 The Internet and Its Major Ancestors

Solutions to the problems of cross-platform computing are just now starting to be developed. We think of these problems as being relatively new, but research about how computers communicate has been ongoing for many years. The development of the Internet actually has a much longer history than most people realize. It has been around nearly as long as computers, although it has caught popular attention only within the last two years. The Internet actually got its start in the heart of the Cold War, during the 1960's. Much of the research in computing was funded by the US military. In particular, the military was interested in a communications network that could tie together the various geographical locations that would be involved in the control and launching of nuclear missiles. There was an important tactical consideration: If an intermediate station was blown up by the bad guys, the communication still needed to get there through alternative means. A protocol was developed that took messages, broke them into packets, and sent each packet separately to its destination. If the way was blocked, the packets could find an alternate route. When they got to the destination, the packets would automatically re-join. This ingenious strategy, known as TCP/IP (Transfer Control Protocol/Internet Protocol) became the foundation of today's Internet. The entire network which used TCP/IP to tie together the military computers was first referred to as ARPANET (Advanced Research Projects Agency Network).

Eventually the military emphasis of the ARPANET was modified to include scientific and educational capabilities. Control of the ARPANET was absorbed by the National Science Foundation (NSF), so the name of the network was changed to NSFNET. It is interesting to note that commerce was strictly forbidden on the NSFNET. This explains resistance among long-time Internet users to some of the current commercial utilization of today's Internet.

The term "Internet" came into popular use in the 1992 U.S. presidential campaign. The charter of the NSFNET was substantially changed to encourage personal and commercial use of the Internet. The NSFNET (which is a US institution) joined with other large networks to form the Internet as we currently know it. A consortium of private entities known as the Internet Network Information Center (InterNIC) actually has what little control there is of the Internet. The Internet is global in scope, so other parts of the backbone are owned by various entities. It is not owned or controlled by anybody, although there is an international coalition known as the Internet Architecture Board (IAB) that helps to establish mutually agreed standards for Internet protocols.

Notice that the history of computers as communication tools is very much a history of problems and solutions. The evolution of the Internet is a collective effort of millions of people trying to solve problems with methodologies similar to the STAIR technique we have been studying.

3 Description of the Internet

The popular press is entranced with the novelty and potential of the Internet. Those stories about the Internet that have the biggest news potential are not always the ones that best describe the Internet. It would be easy to believe some things about the Internet that are not true:

3.1 What the Internet is NOT

It is not a centrally owned or organized institution. There is no "Dept. of the Internet" or "Internet Inc.". Although the NSF and InterNIC do have some limited organizational authority, the Internet is largely unorganized and uncontrolled.

It is not a single entity. The Internet is an evolving collection of hardware elements, programs, protocols, and agreements. It cannot be easily classified as a type of program or a set of hardware components.

It is not a "Den of Iniquity" There is certainly pornography, recipes for bombs, and subversive material available on the Internet. It is easy to over-rate the prevalence of these materials. The Internet is a reflection of society. There is as much seamy material on the Net as there is in the society it reflects. There is conversely as much wholesome, good material (whatever that is) as there is in society. Most of the time, the bad stuff is pretty clearly marked as such. Innovations in software applications and proposed changes to protocols have the potential to limit inadvertent exposure to any type of material you don't want yourself or your children to see. Legislative efforts by themselves have little chance of impacting the prevalence of such materials. You will find as you explore the Internet that perhaps 80of what you see is harmless and meaningless. You will find a small percentage that is very worthwhile, and an even smaller percentage that could be interpreted as offensive. You are very unlikely to find the offensive materials if you are not deliberately looking for them.

It is not crawling with eight-year-old children controlling nuclear bombs. The image of a young child with impressive computer skills is very popular, and has some basis in fact. However, there are NOT hackers behind every web site. There are very few people capable of breaking into your computer and stealing your information. Very few of the people with the skill to misuse this technology have the motivation to do so. There are people out there that misuse technology, but the danger is not nearly as pervasive as the movies would have you believe. We will discuss later a few precautions you can take to minimize your security risk.

The Internet is not a hive of viruses waiting to attack your computer. Some people are afraid to use the Internet because they are certain to contract a virus the minute that they get on line. Viruses are a real threat, but again they are very much over-emphasized. Just being connected cannot cause your computer to catch a virus. We will teach you some principles of "safe computing" that will help you minimize the risk when you do the kinds of activities that can put you at risk. It would be extremely difficult to catch a virus from today's exercise.

The Internet is not just for pimple-faced teenagers with propeller beanies. In its earlier days, the Internet was a formidable place. A person had to be relatively proficient with computers before attempting to utilize the Internet. With the advent of the World Wide Web, which is now the most used user interface for the Internet, and new browser software, the Internet is friendly enough for nearly everyone. Using the Internet can be much easier than using a word processing program.

3.2 What the Internet IS

A vast repository of information Anyone with a little skill can add to the pool of information on the Internet. Many people with widely differing interests have added information to the Web. The wealth of subject matter available on the Web is due to the thousands of people who post information for themselves, organizations they belong to, or their employers. For example, information has been posted on just about every hobby imaginable. This freedom also means there is absolutely no editing on the Web, except that which is self imposed by Web authors. There is absolutely no reason to believe that something is true just because it is posted on the Web.

Relatively universal It doesn't matter much what type of computer you are using, once it is hooked up to the Internet. You can read documents that were written on any type of computer, provided they were written according to some type of established Internet protocol. Computer scientists refer to this concept as platform independence.

Dynamic The content of the Internet changes many times a second. Millions of people are adding and deleting information from their own personal part of the Internet at any given time.

4 The Problem

Knowing that this vast resource is available, how do we take advantage of it? Specifically, how can we find the information we want? What kinds of problems are best solved using the world wide web?

There are many types of communication available through the Internet. The world wide web in particular, is good at serving information. Look to the web when you want some kind of information that you think somebody has placed somewhere on the web. A more advanced user can also use the web as a publishing resource, to help place information into the public domain. In this class we are interested mainly in the first usage, searching for existing information.

5 The Tools

There are a number of tools available for our use. The term "tool" takes on at least two distinct meanings in the Internet context. First of all, the specific protocol we are using could be considered a tool. Also, within a web browsing program, we will have a number of commands available for our use. Each of these could be considered a tool as well.

5.1 The World Wide Web As A Tool

There are many formats for storing, retrieving, and transferring information on the Internet. These formats are called protocols. Each of the major protocols could be considered a tool. Today we are only interested in one such protocol, the World Wide Web. The World Wide Web is also known as the Web, WWW, or w3. It is different from many of the other protocols (we will learn about them later) in some very profound ways:

It uses a model based on pages. Each page can contain multimedia. (Multimedia is words and pictures; even music and video clips!)

It is designed to encourage hypertext. (Certain words or pictures are highlighted. Clicking on them with a mouse takes you to a new page of information about that word or picture)

It is designed to allow exploration without the user having to worry about exactly which computer he is accessing. It is just as easy to access a page on a computer in Japan as it is to access one on the computer next door. You might not even know you are getting information from Japan!

It is very easy to use. Web browser programs are generally less complex to learn than word processors and other major applications. The web itself is designed to be easy to use.

It is also very easy to create pages. Nearly anyone with an Internet account can learn to create simple pages in a couple of hours, and there is no practical limit to what kind of information can be on a page. (This explains why the Internet is growing so fast, and is so difficult to regulate.)

It is designed to share information independent of the type of computer being used to view the page. If you create a page on a Macintosh, you can read it with a UNIX machine or a Windows machine, and it will be pretty much the same.

5.2 Browsers Are Also Tools

The software programs used to view web pages are referred to as web browsers, or simply browsers. There are a number of popular browser programs. They all have various features that make navigating the WWW easier:

Location Box - This is some way of specifying the address of the page you want to visit. If you know the address (often called a URL for Uniform Resource Locator) you can type it into the location box, and the browser will go directly to that location.

Navigation Buttons - Like most modern software, browsers often have command buttons near the top of the screen that help you move around. We will discuss some of the features you might access through these buttons below.

Menus - Like most modern programs, most browsers have a menu structure that allows you to find all the commands you may need to move through the web.

On-Line Help - Usually there is a help button or help option in the menus that takes you to an on-line help facility. This feature may help you figure out problems when they occur.

5.3 Commands Within Browsers Are Tools

In addition to the features listed above, most browsers will have some form of a few basic commands. They can almost always be accessed by the browser's menu structure. You may also find a button on the toolbar that does a specific command. Toolbars contain buttons which have pictures on them; when they are clicked with the mouse a certain task is performed. Many commands have specific key combinations attached to them. Generally, beginners don't worry about these shortcut keys. As you get more comfortable with any type of program, you will find yourself ready to learn shortcuts such as key combinations. Don't worry about memorizing commands now. You can always check the on-line help for assistance in how to do something. The important thing is that you recognize what these tools are, and think about them when you are searching for a specific tool to do a web navigating job. Once you know WHAT you want to do and what tool you are using to do it, figuring out exactly how to do it is not a terribly difficult exercise. We deliberately will not give you specific command names or key combinations, because they will vary from browser to browser. Below is a list of commonly found commands on Internet browsers.

Previous page - This is often shown by an arrow pointing left. When you want to back up one page, (which will happen frequently) activate this command.

Home page - This is frequently depicted as button with a picture of a house. The home page is the page your browser starts up with. In universities, businesses, or other public settings, it is frequently a special page designed for the specific university or corporation that owns the computers you are using. If you are ever confused, or you come to a browser somebody else has been using, pressing the home page button should get you to a page you should recognize. As you get more experience with your browser, you can set up a browser so that the home page is any page you specify, even one you have created yourself!

Search - There is usually some type of command that takes you to a series of search engines. These are special pages that allow you to type in a word or phrase, then press a button. The program will return a list of sites (often thousands of them!) that contain the word you are looking for. There are many search engines available. Experienced Internet users have passionate arguments about which one is best. It really is a matter of personal preference. Try a few out, and see which ones you prefer. Some search engines are faster than others, some have more detailed databases, some have easier interfaces. Most experienced Internet users choose one or two of their favorites and use a bookmark (see below) to return to them.

Directory - You will often see a button or command that allows you to do a directory search. This takes you to another series of pages that allow you to browse parts of the Internet. These pages are edited lists of links, organized by content. (Yahoo is by far the most influential, although there are many others) The advantage of a directory search over a search engine is that if you know the type of information you are looking for, you can browse through a set of topics until you find the one you want, then have a list of potential pages to visit. The advantages of this approach are organization and editing: Somebody has gone out and checked the content of these pages. They are likely to contain the kind of information you are looking for, and it is relatively easy to find pages on any topic that the directory engine covers. There are some disadvantages. There may be very good pages that the list editor didn't know about or did not add to the list. The lists are never as up-to-date as the search engines. Finally, such lists often include advertising targeted specifically to the subject matter you are looking up. If you search for vacations, for example, you are very likely to see advertising for travel agencies on the pages you peruse, even before you start dealing with the actual pages that contain real content.

History - Often you will find yourself taking advantage of the easy links between pages and discover you have strayed far from your original intention. Most browsers automatically keep track of the places you have been. There will be some kind of command that lets you look at this history list and return to one of your previous pages.

Bookmarks - When you find a place you like, you might want to return there directly. Most browsers have bookmark capabilities. This means you can add a 'bookmark' to a page, and then when you want to return to the page, consult a 'check bookmarks' command to see a list of the pages you have bookmarked. This feature works well on your own computer, but it is often disabled on public computers.

6 Example - Finding Information on the World Wide Web

The STAIR method can be very useful when trying to locate information on the web. There is so much available, and it is so loosely organized, that you can easily become disoriented if you do not follow some kind of structured technique. Let's look at an example:

Dan and his brother get in an argument after viewing the Disney Movie "Beauty and the Beast." In particular, Dan insists that the line in the song "Kill the Beast" that starts "screw your courage to the sticking place" is a Shakespeare quote. His brother asks "Oh yeah, what play, act, and scene?" and leaves feeling triumphant. Dan decides to use his Internet skills to find whether the quote is listed in any Shakespeare plays, and if so, where the quote occurs.

He starts by firing up his web browser. Dan begins by clicking on the net directory button of his browser, since he knows he's going to have to search to find the reference. Dan likes Yahoo, and he thinks he remembers seeing a section on literature there, so he decides to click on the Yahoo symbol.

When the Yahoo screen comes up, there is no Shakespeare section, but he does see a section on Arts and Humanities. That sounds promising, so he clicks on the word 'Humanities.' He immediately sees the word 'Classics' and decides "Hey, Shakespeare is considered classic literature, isn't it?" He presses the button and finds a page full of references to Ancient Greek and Etruscan material. Fascinating, but not Shakespeare. He hits the 'back up' button to get back to the humanities page. He looks more closely at the topics available. "Oh," he says, "there's a literature link. Looks a bit more promising." He clicks on it.

Within the literature section, he sees a link for authors. He clicks on it, and sees a link for playwrights. This is looking promising indeed! As expected, there is a link to Shakespeare from here. He clicks it.

There are a number of interesting links here, including a 'Shakespearean Insult Generator.' He is very tempted to look up the Shakespearean insults so he can call his brother an appropriate name later, but he decides to press on. He knows that the page he is currently on will be stored in his history list, so he can always come back. He sees a link called indices, so he clicks on the link. There are two listed, and one is in German, so he decides to try the other one, titled 'Mr. William Shakespeare on the Internet.'

This is a beautiful page, put together by someone who obviously adores Shakespeare and technology. There are a number of interesting sites here that tempt Dan, but again he decides to persevere and concentrate on finding his text. One link that really catches his eye is called 'Search Engines' The accompanying text explains that the link leads to 'a collection of links to search engines along with a helpful article on how to use them.' He clicks here, and ends up at a page that has links to Yahoo, InfoSeek, and other web search programs. Essentially this would be starting over! (Ooops!) He doesn't worry, but backs up a page and tries again.

This time he sees a page called 'Shakespeare the Works.' On this page, he sees a link called 'MIT Shakespeare Home Page' It claims to have a Shakespeare search engine. Perfect! He clicks on this search engine link. He sees a page that allows him to type in any text in a search keywords box and select which work to search from. He chooses the "all the texts" option, and types in "screw your courage to the sticking place". Nothing happens until he presses the "submit" button, but when he does, he gets a page that says:

MACBETH

Act 1, Scene 7

But screw your courage to the sticking-place, [text]

Cool!! The phrase [text] appears to be a hyperlink, and he clicks it to see the context of the quote. It turns out that the phrase occurs near the end of Scene 7. Lady MacBeth says it as she is convincing MacBeth to kill Duncan.

Dan prints out this page, then checks the history list to find the "Shakespearean Insults" page. He takes the printout of the page with Lady MacBeth's quote on it to his brother and calls him a "mammering rude-growing mammet".

6.1 Some of the Places Dan Visited

The Shakespeare Search page: http://the-tech.mit.edu/Shakespeare/search.html

The Shakespearean Insult Generator: http://www.nova.edu/Inter-Links/cgi-bin/bard.pl

6.2 Notes on Dan's Adventure:

You may want to try to follow Dan's steps, but the Internet has changed since this document was written. It is possible that the same path does not exist anymore!

Dan did not necessarily choose the most efficient path. Another person went to the Altavista search engine (http://www.altavista.digital.com) and typed in the whole phrase. She got several links to versions of the play on the Internet. (She also found some links to a column for the love-lorn !?!?) She found the answer much more quickly than Dan did, but she didn't get to any other related resources like the insult generator. Which approach was best? It doesn't matter. The important thing is whether the problem got solved.

Notice the process. Dan reached a couple of dead ends, but he just backed up and tried again. With persistence, he found what he was looking for.

Dan showed a lot of restraint. It is easy to get sidetracked on the web. Dan had to remind himself a couple of times that he was there to solve a problem, and he needed to solve that problem first. It's a good idea to write down or bookmark any places you want to visit later. Try to have the discipline to solve your problem without getting sidetracked.

7 The STAIR Process and Searching the WWW

The STAIR method of problem solving is adapted easily to searching for things on the web.

Statement of problem: What are you trying to find?

Tools: Will you use a search engine or directory? Which one will you use? Each of the commands we discussed earlier in this chapter can be considered a tool as well. When you are stuck, which browser commands can you use to reorient yourself?

Algorithm: Although this will depend upon the tool, eventually it will come down to making an incrementally closer approximation to the eventual page. You may start by looking at a very general topic. Keep getting more and more specific, until you have a page that has the answer to your question.

Implementation: This step is simply trying your search. Just keep moving closer to your goal. If you find yourself getting further than you previously were (as Dan was a couple of times in the example above), simply back up a page or two and try again.

Refinement: The entire process is mainly a matter of refinement. It is very unlikely that you will find the answer to your question on the first link you access. You will need to make several attempts until you get the page you want or realize you have picked a completely inappropriate approach.

The same process could be applied to any kind of search that might occur using the web.

8 Laboratory Assignment

Your lab instructor will show you how to start the web browser software installed in your lab. You will go on an Internet treasure hunt. Use the stair method to answer the following questions. For each question below, write the answer to the question, and the URL of the site where you found the answer. URL (Uniform Resource Locator) is the address location of a particular Web page. On some Web browsers the URL may be found in a box at the top of the page which is labeled "Location".

1. What is your lab instructor's Email address?
2. Find a picture of a cow. What is your cow doing?
3. What is today's high temperature in Hong Kong?
4. Who has the best batting average on the Cincinnati Reds?
5. Who wrote a poem containing the phrase "yet know I how the heather looks;"

Note: Some questions will have multiple right answers. There are many ways to find each answer. Use the STAIR process to aid you in your search.

9 Vocabulary / Important Concepts

The Internet - A network of networks connecting computers worldwide.

Mainframe - A large, multi-user computer.

Processor - The central part of the computer that handles all the information manipulation.

Personal Computer (PC) - A computer based on integrated circuit technology designed for single person use.

Local Area Network (LAN) - A combination of hardware and software designed to allow many computers within a small area such as a building or campus to communicate with each other.

TCP/IP - Transfer Control Protocol / Internet Protocol - The underlying protocol of the Internet.

http - HyperText Transfer Protocol - The protocol that supports the world wide web. Like other Internet protocols, it is based on TCP/IP.

ARPANET - Advanced Research Projects Agency Network - One of the earliest ancestors of the Internet.

NSFNET - National Science Foundation Network - The name given to the combination of ARPANET and university research computers. Now sometimes referred to as the "NSF backbone".

InterNIC - Internet Network Information Center - An international coalition of Internet organizations that has what control there is of the Internet.

IAB - Internet Architecture Board - An organization that sets standards for the Internet.

Hacker - Originally used to describe a person extremely skilled at computing. The term is used generally to refer to people who use such skills in illegal or unethical manners (such as breaking into accounts that do not belong to them).

Virus - In the computing world, a virus is a program which has been designed to act much like a biological virus; it attacks files and makes copies of itself. The term has spread to refer to any number of programs which are designed to sneak into a victim's files and cause destruction.

Safe Computing - Simple precautions and programs you can use to protect yourself from computer viruses.

World Wide Web - (the web, w3, WWW) - A protocol that is extremely popular because of its ease of use and support for hypertext and multimedia.

Protocol - A standard for storing, reading, and transferring information on the Internet.

Hypertext - Text that has been specially prepared so that when a user clicks on certain words or phrases, she is taken directly to a new page. The world wide web is an excellent example of hypertext.

Multimedia - The integration of text, graphics, and other elements which could include video, audio, or other types of media into one document. The world wide web supports limited multimedia.

Web Browser - A special program designed to help a user navigate the Internet. As of this writing, the most popular browsers were Netscape Navigator and Microsoft Internet Explorer. There are many others available.

URL - Uniform Resource Locator - The address location of a WWW document. The URL usually starts with http:// (specifying it is a document designed specifically for the world wide web), then contains the name of the machine that holds the document, then has the name of the document itself. URLs are usually entirely in lower case, and are always one word. The URL can often be typed directly into a location box to direct a browser quickly to a certain location on the web.

Search Engine - A special web page that connects the user to a computer with a database program containing many web pages. The user types in a list of words to search, and the program returns a list of links that contain the words.

Bookmark - In the world wide web, a bookmark is a location you have told your browser to "remember". There is usually some kind of command in the menu structure that allows you to easily return to files you have bookmarked.

History List - Most browsers keep a list of all the places you have recently visited. You can return to a place on your list by examining the list through a command on the menus, or via the forward and back buttons.

HyperLink - Any text in a hypertext document that is designated as a link to another document. In most web browsers, hyperlinks are underlined, and are usually a different color than other words on the screen.

10 Summary

Computers were originally thought of as calculating devices. Although they retain this ability, they are increasingly used as communication devices. The Internet is an outgrowth of this phenomenon. It consists of a number of protocols, or agreements for how information will be transferred. The most elemental protocol is TCP/IP. The most popular protocol in recent times is the World Wide Web. The web is navigated with special programs called browsers. A user can direct a browser to pages on the Internet in a number of ways. Searching for information on the Internet is an application of the STAIR process that can involve the use of special searching pages called search engines or directory pages. It is often necessary to start with a wide search topic and use successive approximations to get closer to the goal you seek.

11 Review Questions

Q. 1 Put the following developments in the proper chronological order:

- The personal computer
- The LAN
- The mainframe computer

(Answer on page 2-15.)

Q. 2 Put the following developments in the proper chronological order:

- The Internet
- ARPANET
- NSFNET

(Answer on page 2-15.)

Q. 3 What is the difference between hypertext and multimedia?

(Answer on page 2-15.)

Q. 4 Given the current nature of the World Wide Web, which kinds of information are you LEAST likely to find on the Internet?

(Answer on page 2-15.)

Q. 5 Given the current nature of the World Wide Web, which kinds of information are you MOST likely to find on the Internet?

(Answer on page 2-15.)

6. Think of a problem from another class. Try to find the answer using the World Wide Web as a resource.

7. Use the Web to obtain information on a hobby you enjoy. Search for your favorite sport, musical group, sports team, hobby, or some other field that interests you.

8. Use the web to locate a beginners' guide to the Internet. Add a bookmark to this site so you can return there whenever you wish.

9. Learn how to create your own home page. Look up HTML as a starting place.

Answers to Questions

1. - The mainframe computer
   - The personal computer
   - The LAN
2. - ARPANET
   - NSFNET
   - The Internet
3. Hypertext is defined as text that has links in it. When you activate a link, you are taken to a new page relating to that link.

   Multi-Media is defined as the combination of text with other elements such as sound, graphics, and video.

   Hypertext and multimedia can be combined. The WWW encourages this combination of these two features. Such a combination is referred to as 'hyper-media.'
4. There are still some under-represented areas on the Internet. The net is currently still the most populated by people with technical skills and a relatively high educational background. The people who are capable of building Web pages today tend to have technical interests. You might not find local issues at the level of your neighborhood yet. Certain issues and occupations have few advocates on the Web as yet. These might include any field not normally associated with technology.
5. Any topic that you can imagine probably has at least one page. Certain topics have IMMENSE volumes of information available on the Web. These topics are the ones that many people with Web development skills are interested in. Most Web authors are still in school, so you will find many pages about school issues (at every level from elementary to post - graduate.) The military and educational representation on the web is very strong, as you would guess by reading this chapter. People love to make pages about their hobbies. You will find a page about any hobby you can imagine. You can also find lots of information about pop culture. Most musical groups, movies, models, and TV shows have official and unofficial home pages.