

Course: Computers in Education (8620)

Semester: Spring, 2021

ASSIGNMENT No. 1

Q.1 Differentiate among the various types of Software.

Typically, there are two major classifications of software, namely System Software and Application Software.

1. System Software

A system software aids the user and the hardware to function and interact with each other. Basically, it is a software to manage computer hardware behavior so as to provide basic functionalities that are required by the user. In simple words, we can say that system software is an intermediary or a middle layer between the user and the hardware. These computer software sanction a platform or environment for the other software to work in. This is the reason why system software is very important in managing the entire computer system. When you first turn on the computer, it is the system software that gets initialized and gets loaded in the memory of the system. The system software runs in the background and is not used by the end-users. This is the reason why system software is also known as 'low-level software'.

Some common system software examples are:

- Operating System: It is the most prominent example of System Software. It is a collection of software that handles resources and provides general services for the other applications that run over them. Although each Operating System is different, most of them provide a Graphical User Interface through which a user can manage the files and folders and perform other tasks. Every device, whether a desktop, laptop or mobile phone requires an operating system to provide the basic functionality to it. As an OS essentially determines how a user interacts with the system, therefore many users prefer to use one specific OS for their device. There are various types of operating system such as real-time, embedded, distributed, multiuser, single-user, internet, mobile, and many more. It is important to consider the hardware specifications before choosing an operating system. Some examples of Operating systems given below:

- - Android
 - CentOS
 - iOS
 - Linux
 - Mac OS
 - MS Windows
 - Ubuntu
 - Unix

- Device Drivers: It is a type of software that controls particular hardware which is attached to the system. Hardware devices that need a driver to connect to a system include displays, sound cards, printers, mice

and hard disks. Further, there are two types of device drivers: Kernel Device Drivers and User Device Driver. Some examples of device drivers are:

- - BIOS Driver
 - Display Drivers
 - Motherboard Drivers
 - Printer Drivers
 - ROM Drivers
 - Sound card Driver
 - USB Drivers
 - USB Drivers
 - VGA Drivers
 - VGA Drivers
 - Virtual Device Drivers
- Firmware: Firmware is the permanent software that is embedded into a read-only memory. It is a set of instructions permanently stored on a hardware device. It provides essential information regarding how the device interacts with other hardware. Firmware can be considered as ‘semi-permanent’ as it remains permanent unless it is updated using a firmware updater. Some examples of firmware are:
 - BIOS
 - Computer Peripherals
 - Consumer Applications
 - Embedded Systems
 - UEFI
- Programming Language Translators: These are mediator programs on which software programs rely to translate high-level language code to simpler machine-level code. Besides simplifying the code, the translators also do the following :
 - Assign data storage
 - Enlist source code as well as program details
 - Offer diagnostic reports
 - Rectify system errors during the runtime
 - Examples of Programming Language Translators are Interpreter, Compiler and Assemblers.
- Utility: Utility software is designed to aid in analyzing, optimizing, configuring and maintaining a computer system. It supports the computer infrastructure. This software focuses on how an OS functions and then accordingly it decides its trajectory to smoothen the functioning of the system. Softwares like

antiviruses, disk cleanup & management tools, compression tools, defragmenters, etc are all utility tools.

Some examples of utility tools are:

- - Avast Antivirus
 - Directory Opus
 - McAfee Antivirus
 - Piriform CCleaner
 - Razer Cortex
 - Windows File Explorer
 - WinRAR
 - WinZip

2. Application Software

Application Software, also known as end-user programs or productivity programs are software that helps the user in completing tasks such as doing online research, jotting down notes, setting an alarm, designing graphics, keeping an account log, doing calculations or even playing games. They lie above the system software. Unlike system software, they are used by the end-user and are specific in their functionality or tasks and do the job that they are designed to do. For example, a browser is an application designed specifically for browsing the internet or MS Powerpoint is an application used specifically for making presentations. Application Software or simply apps can also be referred to as non-essential software as their requirement is highly subjective and their absence does not affect the functioning of the system. All the apps that we see on our mobile phones are also examples of Application Software. There is certain software that is exclusively made for app development like Meteor and Flutter. These are examples of Application software too.

There are various types of application software:

- Word Processors: These applications for documentation. Along with that it also helps in storing, formatting and printing of these documents. Some examples of word processors are:
 - - Abiword
 - Apple iWork- Pages
 - Corel WordPerfect
 - Google Docs
 - MS Word
- Database Software: This software is used to create and manage a database. It is also known as the Database Management System or DBMS. They help with the organization of data. Some examples of DBMS are:

- - Clipper
 - dBase
 - FileMaker
 - FoxPro
 - MS Access
 - MySQL
- Multimedia Software: It is the software that is able to play, create or record images, audio or video files. They are used for video editing, animation, graphics, and image editing, Some examples of Multimedia Software are:
 - - Adobe Photoshop
 - Inkscape
 - Media Monkey
 - Picasa
 - VLC Media Player
 - Windows Media Player
 - Windows Movie Maker
- Education and Reference Software: These types of software are specifically designed to facilitate learning on a particular subject. There are various kinds of tutorial software that fall under this category. They are also termed as academic software. Some examples are:
 - - Delta Drawing
 - GCompris
 - Jumpstart titles
 - KidPix
 - MindPlay
 - Tux Paint
- Graphics Software: As the name suggests, Graphics Software has been devised to work with graphics as it helps the user to edit or make changes in visual data or images. It comprises of picture editors and illustration software. Some examples are:
 - - Adobe Photoshop
 - Autodesk Maya

- Blender
- Carrara
- CorelDRAW
- GIMP
- Modo
- PaintShop Pro
- Web Browsers: These applications are used to browse the internet. They help the user in locating and retrieving data across the web. Some examples of web browsers are:
 - - Google Chrome
 - Internet Explorer
 - Microsoft Edge
 - Mozilla Firefox
 - Opera
 - Safari
 - UC Browser

Other than these, all the software that serves a specific purpose fall under the category of Application Software. However, there exists one more classification of the software. The software can also be classified based on their availability and sharability.

Q. 2 Explain ways to access the Internet?

There are three ingredients needed to access the Internet from a laptop or desktop computer: (1) an ISP, (2) a modem and (3) a Web browser.

The Internet Service Provider (ISP)

Access to the Internet is through an Internet service provider (ISP), which can be a large company such as Comcast or AT&T, or any of hundreds of smaller ISPs throughout the country. You are offered unlimited access for a fixed rate per month.

The Modem

Depending on the kind of service you have, you will need a unit of hardware called a "modem" for connection. Today, cable and telephone companies provide service to most people in the U.S., and the modem converts their signals to the Internet packets your computer requires.

Rural areas may have only satellite service or dial-up telephone access, the latter as much as 100 times slower than cable. Older computers had built-in dial-up telephone ports.

Browsing the Web

A Windows PC comes with the Edge Web browser, while the Mac comes with Safari. Windows and Mac users

quite often choose a different browser such as Firefox (www.mozilla.org) or Chrome (www.google.com/chrome), which offer additional features and are very popular.

The first time you hook up to a new ISP, you may need their assistance to configure the dial-up or networking software in your computer. After that, all you do is launch the browser to "surf the Web."

Sending Email

Although email can be sent and received using your Web browser with a service such as Gmail or Yahoo! Mail, your computer may come with a dedicated email program that is already installed. For example, the Mac comes with Mail, while Windows has renamed its free program many times: Outlook Express, Windows Mail, Windows Live Mail and Mail. Configuring your locally installed email program may require some assistance.

Switching ISPs

If you only browse the Web, there is little lost in starting with one ISP and switching to another. However, if your email is provided by your ISP, switching your email address later on is not like moving your family to a new town. The U.S. Postal Service will forward your letters for a while, but if you close your account with an ISP, they generally do not forward email. That is the singular advantage of using a third-party email service such as Gmail or Yahoo! Mail and not the email provided by your ISP. Another option is to register your own domain name and use an ISP that supports third-party names.

An important factor in the rapid rise of Internet access speed has been advances in MOSFET (MOS transistor) technology.^[8] The MOSFET, originally invented by Mohamed Atalla and Dawon Kahng in 1959,^{[9][10][11]} is the building block of the Internet telecommunications networks.^{[12][13]} The laser, originally demonstrated by Charles H. Townes and Arthur Leonard Schawlow in 1960, was adopted for MOS light wave systems around 1980, which led to exponential growth of Internet bandwidth. Continuous MOSFET scaling has since led to online bandwidth doubling every 18 months (Edholm's law, which is related to Moore's law), with the bandwidths of online communication networks rising from bits per second to terabits per second.^[8]

Broadband Internet access, often shortened to just broadband, is simply defined as "Internet access that is always on, and faster than the traditional dial-up access"^{[14][15]} and so covers a wide range of technologies. The core of these broadband Internet technologies are complementary MOS (CMOS) digital circuits,^{[16][17]} the speed capabilities of which were extended with innovative design techniques.^[17] Broadband connections are typically made using a computer's built in Ethernet networking capabilities, or by using a NIC expansion card.

Most broadband services provide a continuous "always on" connection; there is no dial-in process required, and it does not interfere with voice use of phone lines.^[18] Broadband provides improved access to Internet services such as:

- Faster world wide web browsing
- Faster downloading of documents, photographs, videos, and other large files
- Telephony, radio, television, and videoconferencing
- Virtual private networks and remote system administration

- Online gaming, especially massively multiplayer online role-playing games which are interaction-intensive

In the 1990s, the National Information Infrastructure initiative in the U.S. made broadband Internet access a public policy issue.^[19] In 2000, most Internet access to homes was provided using dial-up, while many businesses and schools were using broadband connections. In 2000 there were just under 150 million dial-up subscriptions in the 34 OECD countries^[20] and fewer than 20 million broadband subscriptions. By 2005, broadband had grown and dial-up had declined so that the number of subscriptions were roughly equal at 130 million each. In 2010, in the OECD countries, over 90% of the Internet access subscriptions used broadband, broadband had grown to more than 300 million subscriptions, and dial-up subscriptions had declined to fewer than 30 million.^[21]

The broadband technologies in widest use are ADSL and cable Internet access. Newer technologies include VDSL and optical fibre extended closer to the subscriber in both telephone and cable plants. Fibre-optic communication, while only recently being used in premises and to the curb schemes, has played a crucial role in enabling broadband Internet access by making transmission of information at very high data rates over longer distances much more cost-effective than copper wire technology.

In areas not served by ADSL or cable, some community organizations and local governments are installing Wi-Fi networks. Wireless, satellite and microwave Internet are often used in rural, undeveloped, or other hard to serve areas where wired Internet is not readily available.

Q. 3 Identify the widely used products and explain the key features of different software applications.

Application software is a type of computer program that performs a specific personal, educational, and business function. Each program is designed to assist the user with a particular process, which may be related to productivity, creativity, and/or communication.

Application software programs are created to facilitate a variety of functions, including but not limited to:

- managing information
- manipulating data
- constructing visuals
- coordinating resources
- calculating figures

The most common application software programs are used by millions every day and include:

- Microsoft suite of products (Office, Excel, Word, PowerPoint, Outlook, etc.)
- Internet browsers like Firefox, Safari, and Chrome
- Mobile pieces of software such as Pandora (for music appreciation), Skype (for real-time online communication), and Slack (for team collaboration)

Business application software is a subset of the application software. These programs are built to facilitate certain business functions, improving the accuracy, efficiency, and effectiveness of operations. Business application software programs achieve measurable objectives such as saving work time and enhancing

productivity. Below are some popular examples of business applications that are commonly used by organizations:

Enterprise Resource Planning

A type of business software used by companies – usually via a bundle of integrated applications – to solicit, review, store, manipulate, and analyze data derived from a variety of business operations

Customer Relationship Management

Used by companies – usually via a bundle of integrated applications – to solicit, review, store, and analyze customer data, and also to manage customer interaction and facilitate the sales process and relevant partner relationships.

Database

An electronic arsenal of data that a user builds in order to later access, review, and update particular pieces of information in a rapid and coherent manner.

Application software is an end-user program typically divided into two classes; applications software and systems software. Systems software provides an operating system and utilities that enable applications software such as database programs, spreadsheets, web browsers, and more to run.

An application platform provides services to an application, and is comprised of the set of tools an application relies on to run. Virtually every application relies on other software to run, from database management software to the cloud. This group of software together is what we call an application platform. An application platform should support an application in every style, from single-user applications on a device to thousand-user applications in the cloud. Application platforms typically include the following services: an operating system, execution services (such as libraries for running software), data services, cloud services and development tools.

Application Software

Single end-user program

Database programs, spreadsheets, web browsers, etc.

Application Platform

Group of software and services an application relies on to run

Group of services to support use of database programs, spreadsheets, web browsers, etc.

Quick Base is an application platform that empowers builders to create their best application software solutions. Through our low-code rapid application development software, we provide the tools needed to enact change and improve efficiency. We are driven by the belief that those who are most impacted by application software are those that should head the development thereof because they have the clearest sense of what is needed and how they will be best served.

The different types of application software include the following:

Application Software Type	Examples
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Word processing software	MS Word, WordPad and Notepad
Database software	Oracle, MS Access etc
Spreadsheet software	Apple Numbers, Microsoft Excel
Multimedia software	Real Player, Media Player
Presentation Software	Microsoft Power Point, Keynotes
Enterprise Software	Customer relationship management system

Q. 4 Enlist different modes of CAI. How it helpful in teaching learning.

Computer-Assisted Language Learning (CALL) has received considerable attention during the current decade from academics and researchers in campus-based institutions. They have discussed developments in hardware, new software products, and the advantages and disadvantages as reported in recent experiments which integrated CALL into more traditional language learning environments, mainly at the post-secondary level. A review of the literature reveals that during the 1980s more than 20 books and hundreds of articles have been published in this field. CALL has found a place in the teaching of many second languages, be they romance, germanic, slavic, oriental, or even classical. A survey of Canadian universities which was conducted in 1985/1986, for example, found that one institution in three used computers for teaching one or more of 12 second languages and almost all the universities that did not were interested in doing so (Craven & Sinyor, 1987). This shows a marked increase when compared to the results of Olsen's earlier survey of four-year American colleges (Olsen, 1980).

The situation, however, is very different insofar as the use of or experimentation with CALL in distance education is concerned. One is hard pressed to find a reference to the application of computers in learning languages at a distance, and articles on the topic are practically non-existent. Even Zetterstein (1986), who dedicates a chapter to distance learning in his book *New Technologies in Language Learning*, primarily enumerates applications in distance education which are not concerned with language teaching. One must conclude, therefore, either that computer-applied learning has not had an impact on the methodology used to teach languages at a distance or that academics have not had an opportunity to report on their work in this area.¹ If the Canadian situation is any indication, the former is more likely to be true, since it was reported at the Oslo ICDE conference that CALL had not yet made its entry into distance education in Canada (Karpiak, 1988). Support for the general applicability of this conclusion is provided by a recent questionnaire distributed by the FernUniversität of the Federal Republic of Germany, which, even though it seeks to determine the skills and the methodology used internationally in language teaching at a distance, makes only one passing reference to

computers (one can respond "by computer" to a question which asks how students communicate with the institution).

Computer-Assisted Instruction and Distance Education

The reluctance to introduce CALL into distance education is more easily understood when one recognizes that distance education in general has made little use of computer technology as a facilitator of the learning process. What is true of CALL and the teaching of languages at a distance is also true of Computer-Assisted Instruction (CAI) and distance education in general.

Researchers in the 1980s continue to refer to the future of CAI and distance education (Kaufman, 1986; Bates, 1986); they find little to report about the present and past. (The British Open University, or BOU, which has used Computer Aided Learning [CAL] in many science, mathematics, and technology courses, is somewhat of an exception.) In fact, Laaser (1988) suggests that the two most significant ventures by distance education institutions into the field of CAI (the STEB-Project at the FernUniversität and the CYCLOPS project at the BOU) proved to be expensive add-ons which failed to live up to expectations.

Distance educators refer to three distinct applications of computers to the home-study environment. Since these will form the framework for examining possible applications of CAI to distance education, it is important that they be understood. These applications are Computer Managed Instruction, Computer Aided Learning, and Computer Conferencing. (For a more detailed discussion of computers in distance education, see Bates, 1986; Lampikoski, 1984; and O'Shea, 1984.)

Computer Managed Instruction (CMI)

CMI focuses on the computer as a management tool which facilitates the administration of the learning process. It can enable (to name but a few features) the electronic counselling of students, on-line registration, institutional (registrarial) record keeping, tracking of student progress through a particular course, exam generation, testing, data banking, and so on.

In this regard, the needs of the institution involved in distance education are very similar to those of the campus-based organization. They may be more complex in cases where continuous year-round enrollment has to be accommodated, and it is true that the distance which separates the learner from the institution undoubtedly complicates all relationships and interaction between the learner and the administrative processes of the institution, but the functions are for the most part characteristic of both campus- and distance-based institutions. However, there is at least one particular use of CMI in distance education. Using the computerized printing process commonly known as desk-top publishing, courses can be produced much faster than was traditionally the case, and packages can be updated regularly.

Clearly, there is (and ought to be) little controversy about introducing CMI into the operational structures of distance education institutions. Decisions must be based on practical questions, most importantly cost-effectiveness and cost-efficiency. A word of warning, however, is in order: all institutions operate within fixed budgets, and it is imperative that the advantages of investing in this area be weighed against cuts of

restricted growth in others, for the decision to invest in one area automatically means failure to support or expand another. This is true not only of software decisions but also of hardware acquisitions, which, even though they may be presented as "donations" from established companies, nevertheless require considerable operating funds on an annual basis.

Computer conferencing is the name given to an electronic network which enables individuals to communicate via computers in delayed asynchronic time either as a group, or between two individuals, or with a database. (For a detailed analysis of educational applications of computer conferencing, consult Kaye, 1987; and McCreary & Van Duren, 1987.)

In its simplest form, electronic mail (e-mail) has been used by distance educators to allow for speedy and effective two-way communication between an instructor and a student or between two students (Scriven, 1988), thereby facilitating the clarification of course-related problems, discussion between students, and communication in general. Kaye (1987) also reports on the use of e-mail between course manager and course tutors in order to permit rapid communication concerning difficulties encountered when offering a new BOU course.

Other academics (Harasim, 1986; Paulsen & Rekkedal, 1988) have reported on the use of computer conferencing as an integral teaching component of a distance education course. In these instances, the course tutors conduct electronic tutorials for students who have been assigned to them. At the British Open University, Kaye is experimenting with this model in the BOU's Introduction to Technology course. Bates (1986) finds this kind of communication most profitable, since it reassigns the primary importance of two-way communication to the teaching process. Gledhill and Dudley (1988) found that students who had difficulty participating in a real-time seminar felt more at ease in the electronic computer conference mode. Of equal significance are the many references in the literature to the fact that computer conferencing allows students to feel part of a group, the absence of which is considered by many educators to be a significant shortcoming of individualized home-study learning.

Since computer conferencing is considered a means to an end, a tool for communication rather than a piece of courseware, it suffers little from the problems associated with CAL. Costs are incurred, both in establishing the network and in supporting communication charges, but these need not, and indeed must not, be significant add-ons. One means of preventing additional operating costs may be for computer conferencing to be used as a replacement for other support systems such as telephone or in-person tutorials. The minimal requirements for hardware have led many institutions either to expect students to equip themselves or to arrange for inexpensive leasing. Insofar as communication charges are concerned, these are far from prohibitive and should be covered, according to institutional policy, either by the student or the teaching establishment.

Whereas we have described the present situation of CAL applications to second language teaching at a distance as practically non-existent, we believe not only that many of the advantages have been missed, but also that new developments have made and will continue to make it difficult to ignore CALL as a tool for aiding the language

learner at a distance. In expounding the benefits that computers can bring to the tele-teaching of second languages, however, it will become evident that the case for second language learning at a distance maybe quite different from the general directions elaborated upon in the previous section: for teaching languages at a distance, CAL may prove to be a much more important tool than computer conferencing.

Testing applications (cited above), which examined the possible general uses of CMI in a distance education setting, merit particular attention from educators who are engaged in second language teaching at a distance. Currently discussion is limited to summative evaluation, since formative testing ought rightfully to be classified as a CALL rather than a CMI activity.

Given the availability of adequate hardware, computer-assisted tests can be devised to evaluate skills in listening and understanding, reading and understanding, writing, and even speaking. There are of course limits to the functions that a computer and its peripherally controlled equipment can perform, but the combination of a microcomputer (text presentation, multiple choice, true/false, clozing, parsing) and a randomly controlled audio device does enable significant summative testing to occur. To date, however, references to computerized testing applications in second language instruction at a distance have been limited, as in Zetterstein's (1986) case, to computerized marking of student answer sheets. Pusack (1984) and Wyatt (1984) have, however, drawn attention to actual and possible applications of the kind that we are envisaging here in more traditional learning environments.

In summative evaluation, the emphasis is of necessity placed on assessing a student's knowledge rather than on facilitating further knowledge acquisition. It follows that testing of this kind can occur either prior to a student's enrolling in a particular course or during the enrollment period. In the first case, the assessment can serve either as a diagnostic/placement test or as a challenge examination. The one seeks to determine the level or course which it is appropriate for a student to enrol in; the other, in institutions whose academic regulations permit this, tests the student's prior knowledge and decides whether or not, on the basis of previously acquired knowledge, a student can be given credit for a particular course without enrolling in it. On the other hand, summative evaluation within a course primarily tests to determine how much of the material and how many of the concepts presented in a course have been understood and mastered by a student. Both these kinds of summative testing provide particular problems for language instruction at a distance, problems which computer applications can help to resolve.

If determining a language student's entry level is difficult for traditional campus-based institutions, it is all the more so in the case of distance-based post-secondary operations where students are often older and have interrupted their studies at some point. Not only does one have to address the issue of the faux debutants, that is of the many students who claim to be real beginners when in fact they are not, but, more importantly, one is also obliged to ensure that returning students possess in practice (not just on paper) the prerequisite skills on which a course may be built. While some would argue that the locus of responsibility does not necessarily lie with the institution, it would be foolhardy to suggest that it rests entirely with the student. In campus-based institutions,

students have access to their peers and to faculty advisors when faced with decisions of this kind. Some students at a distance may be fortunate enough to have a student advisor or counsellor, but rarely will this individual be in a position to advise students adequately in this regard. Computer-assisted evaluation, on the the other hand, could serve as a primary, if not the sole, medium for determining whether or not a student possesses the required preparation for a specific second language course.

In fact, Wyatt (1984) has argued in favor of the development of computer-adaptive testing for placement tests, in part because these would be more humane and user friendly than non-computerized tests, since the former could branch students according to their level and thereby greatly reduce the number of questions which are beyond their competence. In a distance education setting, one can envisage developing one placement test which, by the appropriate use of branching, could recommend which of several courses a particular student would be adequately prepared for.

Computerizing challenge examinations and summative examinations within a course (normally final examinations) allows not only for the individualization of the testing material through data banking, but also for the testing in a removed location, of audio comprehension and speech generation. If this proves to be a time-consuming task in traditional learning environments, the distant educator is further hampered by the distance between the learner and the teacher. In this instance, different configurations of computer- controlled cassette recorders, providing audio comprehension or incorporating speech production via voice- activated recording capability, would prove to be a viable alternative to current practice.

Q. 5 Enlist and discuss the ways in which computer helps self-learning.

Ways in which faculty are using computers to assist in teaching and learning:

To replace writing on the chalkboard/white board/overhead:

- Instead of writing on the board, instructor or a student takes notes on the computer and projects this onto the screen so the whole class can see this. Purposes:
 - Enables the students to read what has been written more easily than instructor's handwriting.
 - This can then be saved as a record of class (summary of class discussion or group work) then e-mailed to the whole class or posted on the course web page.
 - Students can work in small groups and use laptop computers to take notes on their group's discussions (replacing the use of poster paper or handwritten overhead transparencies). When they share their group's findings with the whole class, they copy their work to disk and bring it up to the front of the class to project using the instructor's computer.

PowerPoint - to replace slides, pre-prepared overhead transparencies, and even video:

- Creating own presentations for class.
- Creating own presentations for class and uploading these to course web page.
- Using presentations that come on CD with textbook.

- Having students create PowerPoint presentations to give presentations in class and for presenting assignments
- Creating presentations but printing them out and creating overhead transparencies of the slides (where faculty member does not have access to a computer in the classroom or does not feel comfortable with giving PowerPoint presentation).

Course web pages:

(Either using TopClass course management system or faculty member creating own site using PageMill or other web-authoring software).

- Having a collection of pages for each course (a course site) that includes some or all of the following: syllabus, class schedule, assignments, links to readings, on-line class discussion, posting of student work, on-line testing.

Internet:

- Outside of class:
 - Required readings (having students read specific web pages as assignments). Especially useful: on-line journals (e.g. ISTE).
 - Student research (for sites on specific topics)
- In-class use:
 - Instructor integrating web sites into teaching of lesson (projecting sites on to the screen)
 - Having students use specific sites during class, either working in groups, using their laptops, or in computer lab, with one or two students per computer.
 - Having students integrate web sites into class presentations (so that as students present to the class, they project the web site onto the screen and use this as part of their presentations)

Online discussion forums:

Using TopClass, Web Crossing, or Tom Bacig's board.

- Students to continue class discussions outside of class
- Outside "speakers" can join in class discussions online.
- Using folders within the discussion forum, students can "meet" online to do group projects.
- Distance education classes can meet online.

Student created web pages:

- students creating on-line portfolios of their work
- class developed "clearinghouse" on particular tasks or topics
- as a means of students sharing their work with peers (for group assignments) or with the instructor.

Class e-mail alias:

- For instructor to provide updates and reminders to students.

- To e-mail students copies of work developed in class (e.g. instead of writing on the board, instructor or a student takes notes summarizing class discussion or group work, and then this is e-mailed to the whole class).