LOCATING INTERNET RESOURCES

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The Internet has opened up new ways to share ideas and deliver education. This paper is an abbreviated and updated version of the brief guide to Internet services presented in Orlando. It gives a quick overview, some hints for getting started and a few suggestions for keeping up with the explosion of information available on the net.

OVERVIEW

Today we are seeing the third generation of Internet functions and services. The first generation of tools was e-mail, telnet, and ftp (file transfer protocol). E-mail is used for mail-like communications, telnet is used for remote logins and ftp is used to transfer files with a remote computer. The problem of finding files located somewhere on the vast network was overcome by two graduate students at McGill University who developed a server called Archie. The Archie servers available today are still excellent for searching all ftp servers.

The Internet tools above work well, but require users to know a few basic unix commands. A simpler menu driven interface became necessary to allow more people to take advantage of the Internet. This gave rise to the second generation of Internet development associated with the special type of server, called gopher, developed at the University of Minnesota. Gopher servers and an associated program, called Veronica, to search gopher servers are now widely accessible.

Gopher is easy to use, but text-based. The third generation of Internet tools was initiated by the development of the World Wide Web (WWW or Web for short) by the European Laboratory for Particle Physics at CERN in Geneva. The Web is an internet service that allows a user to call up additional documents, images, and audio from links embedded in text. A major advancement, developed by the National Center for Supercomputing Applications (NCSA) at the University of Illinois, was the creation of the program Mosaic, a graphical interface to the web and other internet services like gopher, WAIS and ftp. Various other browsers - the most popular of which is Netscape - are now available and tools for searching the Web have been developed. While all internet users can access Gopher, currently, a small percent can access the web. But access is increasing at a phenomenal rate. By the time this paper appears, web traffic will probably exceed that of gopher. And if MSN is included as part of Windows 95, access to the web will be ubiquitous.

Hints for using e-mail lists, gopher, and the WWW are provided below. Particular attention is paid to tools and resources of interest to mathematical educators.

E-MAIL LISTS

A simple way to keep abreast of an area of interest is to subscribe to a list dealing with that topic. To join an e-mail group, frequently called discussion forums or interest groups, requires nothing more than being able to send and receive e-mail. E-mail lists are maintained by a server called a **listserv** (also **listproc**, **majordomo**, or **mailbase**) at an internet node. To subscribe to a list send a special type message to the list address. For example, suppose I wish to subscribe to the discussion group, NCTM-L, that deals with mathematics education. I would send to **listproc@sci-ed.fit.edu** the mail message whose text is

subscribe nctm-l Steve Comer.

After you successfully subscribe to a list the first message you receive from the list will be basic information about the list including instructions about how to leave the list or temporarily suspend it. **It is important to save this message for reference.** Below we will mention how to find what lists are available and where to subscribe.

GOPHER

One of the most popular ways to access the internet is by using a gopher client. Many colleges have switched to this interface as its default menu for local information. If gopher is available on your system, entering "gopher" brings up the local menu. Below is the menu I obtain .

```
Internet Gopher Information Client v2.0.16

                Home Gopher server: gopher.citadel.edu

--> 1. About Citadel Gopher/
    2. The Citadel/
    3. South Carolina - SCIway/
    4. Internet/
    5. Other Gophers/
    6. Libraries/
    7. Electronic Publications/
    8. K-12 Education/
    9. Multimedia/
    10. Reference Shelf/
    11. The Good Stuff/
    12. What's New on Citadel Gopher  (last updated 31-Oct-1994)

Press ? for Help, q to Quit                          Page: 1/1
```

To use gopher, move up and down the menu using the arrow keys. Select an indicated item by pressing the enter key or, alternately, entering the number of the item.

If you have an internet connection, but not a gopher client you may login to a public gopher client. For example, the command

telnet consultant.micro.umn.edu

will connect you to the home gopher at the University of Minnesota. Once you have used gopher awhile you will want to use shortcuts indicated below for getting to specific information without working through a hierarchy of menus.

Entering an Address

Suppose I wish to use the Mathematics Archives at the University of Tennessee mentioned in the October 1994 MAA Focus and know the address is archives.math.utk.edu with port 70. On my VMS system I would enter

gopher archives.math.utk.edu.

(On some systems the port number must also be added to the address.)

Bookmarks

If you find an interesting directory or file on a server that you like or want to go to quickly, you can create a "bookmark" that will allow you to easily jump to the marked item. Basically the bookmark file allows you to create your own personal gopher menu. To add an item to a bookmark file, press the **a** key (for "add") while the curser is pointing to the item. This brings up a menu which allows a name to be provided (if the default is not suitable). Bookmarks are placed in a special file called **gopherrc.** which may be edited to rearrange or add entries if so desired. To "view" your bookmarks at any time press the **v** key. To delete a bookmark press the **d** key while the curser points to it.

Printing, Saving and Other Ways to Get Files

Suppose you've found an interesting file and want to obtain either a printed copy or an electronic version. Depending on the version of Gopher, commands are located either at the bottom of the gopher screen or in the "help" box (press "**?**"). Usually, "**p**" will print the document to your local printer, "**s**" allows the file

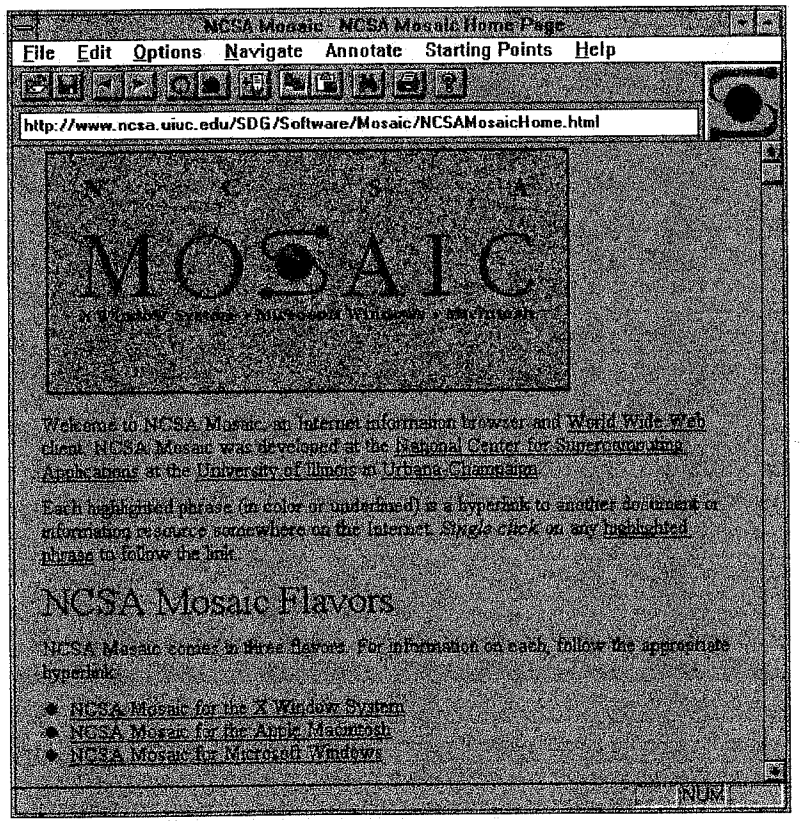
to be saved on your system, and "**m**" allows the document to be mailed to an internet address. If the file to be retrieved is a program or a binary file, it may be more difficult to obtain a copy of the file. Depending on the client and host a binary file that is saved locally using the gopher "**s**" option may not work. Before WWW it was my experience that **ftp** was more reliable; now I use the web. When you identify a document of interest it is valuable to find out where it is located. With the curser pointing to a Gopher menu item press the "=" (equal) key to bring up a screen giving the item's **URL** (Uniform Resource Locator). The = key is very useful and may be used at any time to find out where you are in gopher space.

VERONICA

Veronica is a tool that allows a user to search for directory and/or document titles located on Gopher servers worldwide. It is an "Archie" for Gopher. To use Veronica select the menu item **Other Gopher and Information Servers/** and then **Search titles in Gopherspace using veronica/** from the main Gopher menu at the University of Minnesota. This brings up a menu which gives a choice of several Veronica servers. Selecting one brings up a query form. When a pair (or any multiple) of words are entered, the query treats the words as if they are connected by the conjunction "and". The word order does not matter. Check the entry "How to Compose Veronica Queries" for information on using Boolean operations, wildcards, etc. Veronica produces a list of entries that satisfies the condition. Try to specify a query as "tight" as possible. Some veronica servers will inform you that there are more matches than, say 200 matches, and you should try again. These restrictions can be overridden by using a "-mN" option which allows N matches to be delivered. A final note. With increasing use of Veronica it is becoming more and more difficult to connect. Be patient.

WORLD WIDE WEB

The ability to transfer graphics and sound using the WWW is revolutionizing the use of the internet. An example of a home page is the NSCA Mosaic Home Page displayed below.



Each web document has its own unique name known as an URL or Uniform Resource Locator. For example, the URL for the NCSA home page is

http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/NCSAMosaicHome.html.

The **http** to the left of the colon stands for HyperText Transfer Protocol as opposed to another protocol such as gopher or telnet. The next part, **www.ncsa.uiuc.edu**, is the internet address of the server, and the right hand side, **NCSAMosaicHome.html**, is the name of the HTML document. Between the "/" and the document name is the path to the document. HTML or HyperText Markup Language is the language used to write web documents. For a more extensive discussion of the Web see the August 1994 MAA Focus. WARNING: URLs are case sensitive.

As with a gopher server there are several ways to navigate through the web. Clicking on a "hotspot" in a document retrieves the linked document. There is an analogue to gopher bookmarks in Mosaic, called "HotLists". Clicking on the Navigate option at the top of the Mosaic screen pulls down a menu which allows the current document to be added to the HotList or the HotList to be viewed. The pull-down menu under the File option at the top of the Mosaic screen allows a user to open a new URL. The same menu allows a user to print the current document, save it to a file or view the html source document.

There are various indexes available for searching the web for information. The first was the WWW Worm (or WWWW) developed at the University of Colorado. To try it, use the URL

http://www.cs.colorado.edu/home/mcbryan/WWWW.html

This document contains several good examples which can be modified to allow a search of the type desired. Other useful search tools include *Lycos* (**http://lycos.cs.cmu.edu/**), the *WebCrawler* (**http://webcrawler.cs.washington.edu/WebCrawler/WebQuery.html**) and the infamous *Yahoo Index* (**http://www.yahoo.com/**).

New browsers are being customized for mathematical and scientific applications. *Mathbrowser,* by MathSoft (**http://www.mathsoft.com/**) allows users to interactively change values in formulas to perform their own what-if analysis and *HotJava* (**http://java.sun.com/**) from Sun Microsystems allows embedded spreadsheet modification, animation, and 3-dimensional models that can be rotated with a mouse.

LOCATING INFORMATION

In this section we give some hints for finding e-mail addresses, listserv addresses, new internet features and mention some collections of resources.

E-mail Lists

Many gopher servers have Whitepages or Phonebooks (Pbs). For example, from the University of Wisconsin-Milwaukee gopher, **alpha1.csd.uwm.edu**, select **Finding People on the Internet**. To find the e-mail address of someone who is a member of the American Mathematical Society the **Combined Membership List** at **e-math.ams.org** is useful.

Listserv Addresses

The University of Michigan library contains a Clearinghouse of Listserv lists. Access as **gopher una.hh.lib.umich.edu**. Then select **Clearinghouse of Subject-Oriented Internet Resource Guides**. For a web index of Listservs **http://www.tile.net/tile/listserv/index.html.**

New Features

A weekly Scout Report is published by General Atomics to help internet users keep up with new information sources. It can be obtained by WWW (**http://www.internic.net/infoguide.html**), from Gopher

(**is.internic.net/11/infoguide/scout-report**), or by sending an e-mail message to **majordomo@is.internic.net** with the text **subscribe scout-report** in the body. A popular list for someone who cannot wait for the weekly scout report is **net-happenings.** To subscribe, send an e-mail message to **majordomo@is.internic.net** with the message body reading

subscribe net-happenings <your name>.

Net-happenings can be viewed from the web (**http://www.mid.net/net/**) or using gopher (gopher to **gopher.mid.net**, choose **MIDnet's Catalog of Information Resources/**, then **Net-Happenings Listserve Archive/**).

Gopher Resource Collections

The following are three popular collections of resources:

Gopher Jewels: gopher cwis.usc.edu/Other gopher_and_information resources/ Gopher Jewels.

Yanoff List: gopher alpha1.csd.uwm.edu/Remote Information Services/Special Internet Connections.

New (and Old) User's Guide to the Net: http://ug.cs.dal.ca:3400/franklin.html.

USEFUL STARTING PLACES

The following is a list of gopher and/or web servers which provide starting places for locating information useful to mathematics. Additional resources can be found through my home page (**http://comers.mathcs.citadel.edu/**). Warning: (which should have been given on the first page) files are occasionally moved from one location to another so addresses and links may change. Also, some machines have limits on the number of simultaneous users.

American Mathematical Society (gopher e-math.ams.org)
Chance Project (gopher chance.dartmouth.edu/The Classroom/Classroom Tools/ The CHANCE Database or http://www.geom.umn.edu/docs/snell/chance/welcome.html)
The Geometry Center (http://www.geom.umn.edu)
Geometry Forum (gopher forum.swarthmore.edu or http://forum.swarthmore.edu)
Mathematical Association of America (gopher math.maa.org)
Mathematics Archives (gopher archives.math.utk.edu or http://archives.math.utk.edu)
Mathematics Virtual Library (http://euclid.math.fsu.edu/Science/math.html)
List of Mathematics Servers (http://www.math.psu.edu/OtherMath.html)

REFERENCES

1. *Classroom Connect.* Wentworth Worldwide Media. (Contact **editor@wentworth.com.**) This is an internet newsletter for educators K-12.
2. Comer, Douglas. *The Internet Book.* Prentice Hall, 1995
3. *Communications of the ACM*, Vol. 37, No. 8, August 1994. Special issue on Internet Technology.
4. Dickey, Ed. "Mining the Internet for Mathematical Gems: What's Available for Teachers of Mathematics on the Information Highway". Third Carolinas Mathematics Conference. Charlotte, NC. October 7, 1994.
5. *Internet World*, Mecklermedia Corporation. (Contact **info@mecklermedia.com.**) This magazine is devoted to use of the internet.
6. Krol, Ed. *The Whole Internet User's Guide and Catalog.* O'Reilly & Associates. 1992. The classic introduction.
7. "Making the Internet Connection" *PC Magazine* (October 11, 1994). The cover story. Check also **http://www.ziff.com/~pcmag** for the *PC Magazine* home page.
8. "Networks in Focus" *MAA FOCUS.* (February 1993, June 1993, December 1993, February 1994, August 1994, and October 1994) A series of excellent articles on the use of networks.