

Software Use in the Math Department

The Math department uses computers in a number of its courses, both in the core and in the upper division. In the core courses there are four main software packages which are used: Maple, Mathematica, MATLAB, and ODE Toolkit.

Maple is a large program, primarily designed to perform various symbolic mathematical manipulations, including algebraic manipulations, differentiation of functions, integration of functions, and the solution of various types of equations. Additionally, Maple allows the user to graph curves and surfaces in a variety of formats, and is therefore quite useful as a visualization tool. The graphing capabilities and the symbol manipulations are taught to various degrees in the Calculus courses (Math 3, 4, and 5). Maple is available on virtually every computer on campus (HMC has a site license for this program) and for the purposes of calculus is used primarily in the Macintosh and PC labs.

Mathematica is another large, powerful symbolic manipulation program that is available in the PC labs. Much like Maple in its scope, it is the preferred computer algebra system for many users. Maple and Mathematica complement each other: some problems are handled better by Maple and others by Mathematica. Both packages support sophisticated graphics and can interact with external programs.

Another package which the math department relies on is MATLAB. Whereas Maple and Mathematica's main strength is symbolic manipulation, MATLAB's primary strength is numerical computation. It is both efficient and robust in executing various matrix and vector operations and has excellent graphics capabilities. Because MATLAB is also a programming environment, and can be called from programs written in FORTRAN or C, it is a powerful research tool heavily used in academics and industry. This being the case, MATLAB is used by a number of linear algebra instructors and is a mainstay in the scientific computing course (Math 164). It has also been used by a number of Math Clinic teams as the principal programming environment for their projects. MATLAB is available in the PC lab and in the Mathematical Computing Lab in Olin.

The fourth major piece of mathematical software used in the core is ODE Toolkit, which was developed at HMC and is used for instruction in Ordinary Differential Equations (Math 82). Under the leadership of Bob Borrelli and Courtney Coleman, Harvey Mudd College has become nationally known for the use of computers in ODE instruction. The ODE lab is supported by several DEC workstations. Students also use a variety of PC software to do their computing assignments, *(continued on page 6)*

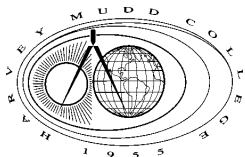


WWW4 IS HERE!

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Occasional Downtime is composed on a Apple Power Macintosh 6100/66 using Aldus PageMaker 5.0 and Microsoft Excel 4.0. The primary typefaces used are Times and Optima. We wish to thank Sally Rich Arroyo of the HMC Office of College Relations for all her help.



This semester Academic Computing has added a new World Wide Web server to the list of servers it maintains. Until last semester AC maintained three Web servers for the HMC community. The first, *www.hmc.edu*, is the main HMC Web server. The second server, *www2.hmc.edu*, is installed on the main VMS system *thuban* and is used primarily by faculty and staff to create their home pages. Students use the third server, *www3.hmc.edu*, to create their home pages. It is installed on the main UNIX system *osiris*.

The new Web server is called *www4.hmc.edu*. It is a Macintosh-based Web server using a commercial server software package called WebStar. It is installed on a Power Macintosh 7100 computer. The impetus for providing a new Web server came from several different directions. The first reason is to support faculty course development. WWW2 and WWW3 have been very effective for faculty, staff and students who wanted to create their own home pages. However, it has been difficult for faculty members to develop larger Web resources for their courses that required forms or clickable images. In general, processing forms, clickable images and other kinds of more advanced Web resources on a VMS or UNIX server usually requires the use of custom programs, which would involve a good deal of knowledge of UNIX or VMS programming. In contrast, a large selection of inexpensive and user-friendly tools which require little or no programming knowledge are available on the Macintosh platform and server software. This made the Macintosh a good choice for development work, especially since there

was already a faculty member (Hal Van Ryswyk) who had used this software extensively.

The second reason for setting up the new server was to provide a testbed for the Mellon Web seminar, a new cross-colleges seminar for faculty on how to create effective Web resources for their courses and research.

At the moment there are two main development tools available on *www4.hmc.edu*. The first, and most heavily used, is NetForms. NetForms is used to handle the data from HTML forms on a Web page. It can either create new Web pages based on data submitted in a form or create a tab-delimited text file which can then be input into a database or spreadsheet. Faculty members have already used this tool in a variety of ways, from creating online quizzes to using forms for their students to submit experimental data.

The second tool currently available is NetCloak, which can be used for many different purposes. For example, it can be used to create dynamic pages that change every time they are accessed. It can also be used to create customized pages which display different information depending on the IP address of the person accessing the page or to password-protect certain Web pages. These are only a few examples of what NetCloak can do.

Another tool which will soon be available is Butler SQL and its companion, Tango. Butler SQL is a powerful relational database which can be queried using SQL (Structured Query Language), the standard

language for accessing data in relational databases. Tango is an easy-to-use tool for creating Web interfaces to relational databases. One of the first projects Academic Computing will attempt with Butler SQL and Tango will be to move the Help Desk from FileMaker Pro to Butler SQL. We will then use Tango to create a Web interface to the Help Desk which will allow users to submit problems and check on the status of problems in the database.

WWW4 has been set up so that faculty who want to create Web pages on it can use their home directories on *Kato* rather than having to obtain a special account and password on the server itself. This reduces both the effort required by Academic Computing to administer the server and the number of accounts and passwords users must remember. The server's directories and files are stored on Academic Computing's file server, *Kato*, in the directory `Kato.Home/Web/`. Each department has a subdirectory there for storing their Web documents. A directory has also been created for the Web Seminar. For security reasons, each directory is set up so that faculty only have access to the documents in their department's directory. The main advantage to this system is that the faculty have the freedom to create and edit their pages using either a Windows or Macintosh editor or word processor and have full access to all of their documents. At the same time, their documents are safe from being accidentally deleted or modified.

Several faculty have already used www4.hmc.edu to create course-related Web pages. If you would like to see examples of what they have done please see the server homepage at <http://www4.hmc.edu/>. More detailed information on how to use the server to develop course materials can also be found at this page. If you have any questions regarding the use of our new server please contact Elizabeth Hodas by e-mail at Elizabeth_Hodas@hmc.edu or by phone at x7-4583. ☺

Editor's Notes

As you may have noticed, February's issue of *Occasional Downtime* is a little late. The winter break and our move to our newly renovated offices, combined with a busy workshop schedule early in the semester put *Occasional Downtime* a little behind its normal publication schedule.

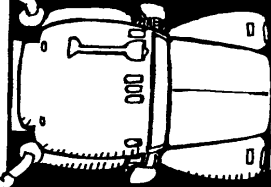
This issue marks the beginning of a new publication year for *Occasional Downtime*. We continue our series on the use of computers and software in the various departments at HMC with an article focusing on the Math Department by Profs. Mike Moody and Dave Bosley. The second part of Josh Hodas' article on Data Encryption will appear in the April issue of *Occasional Downtime*. Instead, we have articles on Academic Computing's new office space and computer labs, as well as a special article on our new Macintosh Web server, www4.hmc.edu.

We hope you enjoy this issue of *Occasional Downtime*. As always, if you have an idea for an article you would like to contribute, please let us know by sending e-mail to downtime@hmc.edu.

—Elizabeth Hodas

Occasional Downtime is published bimonthly by the Academic Computing Department at Harvey Mudd College. It is also available in plain text format on the HMC Gopher Server and in a variety of formats on the HMC Web Server. Comments and questions can be directed to downtime@hmc.edu.

ACADEMIC COMPUTING ON THE MOVE!



Our new offices...

The Department of Academic Computing is in the process of moving to its newly renovated offices in the basement of Parsons. The renovation was completed early this semester and was funded by a \$450,000 grant from the Keck Foundation. This grant provided for the renovation of the offices and labs and for some of the new computer equipment for the labs.

The new office space consists of a main lobby area with a central circular demonstration area, a small kitchen area, offices for all of the Academic Computing staff, and a machine room. The demonstration area will eventually house several computers and will be used to demonstrate new computer hardware and software.

All of the server computers maintained by Academic Computing, which until now have resided in various staff offices or closets, will be moved into the machine room. The main file server, *Kato*, was moved early in the semester; *osiris*, *thuban* and the others should move shortly. Some of the staff have already moved to their new offices and the rest, including Matt Masterson and the audio-visual office, will move over the course of the semester.

Academic Computing held a small “house warming” party on February 6th to celebrate moving to its new offices. If you were not able to come, we hope you will stop by to visit us in our new quarters soon. 🐶

Our new labs...

Academic Computing’s newly renovated space in the basement of Parsons includes three new computer labs. The new PC lab has 24 Pentium computers and has been designed to be used both as a computer lab and as an electronic classroom. Classroom facilities include a whiteboard at the front of the room, a screen, and a video projector which is hooked up to the instructor’s Pentium. All of the machines in this lab have been equipped with 100 Mbit ethernet cards which provide extremely fast network access.

There are currently two courses being taught in the electronic classroom. Josh Hodas is teaching CS-50, Structured Programming. This course is typically taught as a lecture course but this semester

Prof. Hodas is experimenting with teaching it as a computer lab course. In the course he uses Netscape to access lectures that he has prepared on the Web. He also uses Telnet to login to *osiris* and run demonstration C++ programs. Students then use Telnet to login to *osiris* and solve programming problems during the class. Nancy Hamlett and Steve Adolph are teaching Biol-52, Introduction to Biology, in the new classroom as well. The students in Biol-52 are using Netscape to access the many biological resources on the Web. This includes everything from using the Web as a research tool to displaying movies of protein motion.

Other courses, such as Prof. Alex Rudolph’s Astro-62 class, have used the

electronic classroom for individual classes, and AC has been holding many of its workshops there as well. If you are interested in reserving the electronic classroom for a class please contact Elizabeth Hodas at x7-4583 or by e-mail at Elizabeth_Hodas@hmc.edu.

The second new lab is the Macintosh lab which contains a mix of Macintosh IICI, Power Macintosh 6100/66 and Power Macintosh 7200 computers. The Power Macintosh 7200 computers have been equipped with 100 Mbit ethernet cards. This lab is not currently set up for use as a classroom since it does not have a screen or video projector, but as demand increases it can easily be converted for use as an electronic classroom. In the meantime an LCD panel can be used in this lab so if you are interested in using it as a classroom please contact Matt Masterson at x7-3498 or by e-mail at Matt_Masterson@hmc.edu.

The third lab contains a mix of Pentium and Macintosh computers. All three labs have laser printers, but this lab will also contain a color printer for use by the HMC community, including students.

The Keck Foundation grant also included funds for the creation of a new lab called the Faculty Resource Development lab. The lab has not yet been finished, but is intended to be used by faculty for curriculum design and other projects, including projects with students. The HMC Computing Committee will be considering what kinds of activities the facility should support (e.g., audio digitizing? video digitizing? CD-ROM creation? multimedia authoring?). If you have suggestions, contact Richard Parker, x1-8613. The room should be ready in time for any summer projects. ☺

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SOME ELECTRONIC JOURNALS ON THE WEB

- ▼ *Electronic Journal of Differential Equations:*
<http://ejde.math.swt.edu/>
- ▼ *Electronic Journal of Combinatorics:*
<http://ejc.math.gatech.edu:8080/Journal/journalhome.html>
- ▼ *American Journal of Mathematics:*
http://muse.jhu.edu/journals/american_journal_of_mathematics/index.html
- ▼ *The Astrophysical Journal:*
<http://www.aas.org/ApJ/>
- ▼ *Physical Review Letters Online:*
(A password is required to access this journal. It can be found at: <http://voxlibris.claremont.edu/ejournals.html>)
http://www.ref.oclc.org:2000/html/ejo_pswd.htm
- ▼ *Journal of Biological Chemistry:*
<http://www-jbc.stanford.edu/jbc/>
- ▼ *The Institute*, a news supplement to IEEE Spectrum:
<http://www.ieee.org/ti.html>
- ▼ *Reviews in American History:*
http://muse.jhu.edu/journals/reviews_in_american_history
- ▼ *Academe This Week*, a complimentary service of The Chronicle of Higher Education:
<http://chronicle.merit.edu/>
- ▼ *TidBITS*, a newsletter about the computer industry and the Macintosh:
<http://www.dartmouth.edu/pages/TidBITS/TidBITS.html>
- ▼ Indexes of other electronic journals:
[gopher://ar1.cni.org:70/11/scomm/edir](http://ar1.cni.org:70/11/scomm/edir)
<http://www.edoc.com/ejournal/>

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including MDEP, MacMath, Phaser and Differential Systems. Professors Borrelli, Coleman and Moody are currently managing a large multimedia software development project sponsored by the NSF and by the publisher John Wiley & Sons. A consortium of several schools, including HMC, Cornell University, and Rensselaer Polytechnic Institute, are producing an extensive collection of interactive ODE "modules" on CD-ROM which will emphasize mathematical modeling and applications of differential equations to a wide variety of areas. The package (which is called MODE for Multimedia ODE) will have a state-of-the-art numerical ODE solver and advanced graphical capabilities, and so will be a powerful tool that students can use in many different courses.

For all upper division math courses, the Mathematical Computing Lab is available. The lab consists of nine Hewlett-Packard UNIX workstations and is used for clinic projects as well as by several courses. In particular, the course in scientific computing examines several types of mathematical problems, which arise from modeling physical situations in the sciences and engineering. The resulting models are then solved using tools such as MATLAB and the FORTRAN library CMLIB.

Finally, the department also makes heavy use of LaTeX. LaTeX is a type-setting program which is very popular in the field of mathematics because it has a very large library of mathematical symbols and because the quality of the typesetting is excellent. In the mathematical community, learning some form of TeX is becoming essential. This semester, students in Math 131 (Math Analysis) are all required to submit their homework write-ups in LaTeX. A current installation of LaTeX is available on the computers in the Mathematical Computing Lab. 🐉

by Michael Moody and David Bosley

SAVING E-MAIL MESSAGES TO A FILE

Saving an e-mail message to a file so that you can later edit it in a word processor is a very common task. It's pretty easy to do no matter what e-mail program you use. If you use VMS Mail on the administrative VMS system (*hmcadm*) or on the VMS cluster (*thuban*, *linus*, *cbrown*, etc.) then all you need to do is first read the message you want to save (in order to make it the current message) and then type the following at the e-mail prompt:
EXTRACT /NOHEADER FILE.TXT

If you'd like to save several messages to the same file, then begin by following the instructions above for the first message, then read the second message and type the command:
EXTRACT /NOHEADER /APPEND FILE.TXT

To save a mail message to a file in pine first select it with the arrow keys and then type *e* for *export* (the *save* command is used to save a message to another mail folder). Pine then asks for a filename and saves the file to your home directory. In elm first select the message and then type *s* or *>* to save the message, and when prompted for *Save file to:*, just type in a filename. Elm will ask you if you want to create a new file with that name (or if you want to append to an existing file if that filename already exists). Type *y* for yes or *n* for no.

To do the same in Eudora on a PC or Macintosh, select the message you want to save by single-clicking on it in the mailbox window (or select several messages by clicking and dragging) and then select *Save As* from the *File* menu. A file dialog box will come up asking you to select a file name and directory to save the file to. When you've typed a file name and selected the directory you want, click *OK*. You can even tell Eudora what kind of text or word processor format you would like it to save the file as. Select *Settings* from the *Special* menu (*Options* from the *Tools* menu on the PC) and select the *Attachments* icon. Click the button next

Tricks & Tips

to the option "TEXT files belong to:" and select the word processor or text editor program you want (such as BBEdit or Microsoft Word).

FINDING RECORDS IN FILEMAKER PRO

In FileMaker Pro you can use the Find mode to find specific records, to isolate groups of records in your database, and to find records that contain errors (such as duplicate records or records with empty fields). To perform a find first choose the layout you want to use to find records. Then choose *Find* from the *Select* menu. FileMaker Pro will bring up a blank form. At this point you can click in any field and enter a search term. Then click the *Find* button.

For more advanced finds you can enter a combinations of search terms using the operators from the *Symbols* pop-up list. You can either type the operators or select them from the pop-up list. For example if you had a field for recording the year you could search for records from before 1996 by typing *<1996*. To find all records between 1992 and 1994 use the range operator by entering *1992...1994* in the year field.

You can use the exact match operator (*=*) to find records that match a search word exactly. This is useful because normally entering a search term will find all records with words that start with that search term. For example, searching for the last name "Smith" will find "Smith," "Smithson," "Smithly," etc. So to find only those records with "Smith" you would type *=Smith*. You can also use the exact match operator to find records with empty fields by typing just the *=* operator in the field. Try experimenting with some of the other operators. 🐾

& Tricks

QUESTIONS *and* ANSWERS

Q: I tried to read my e-mail using Eudora this morning and I got an error message saying that my password is incorrect. I never use my password with Eudora anyway so what's wrong?

A: When Eudora retrieves your mail from *thuban* (or some other POPmail server) it must, for security reasons, know your account password. While we do not recommend using this feature, Eudora has an option to save your password after the first time you retrieve mail so that it doesn't have to ask for it each time.

If for some reason you change your *thuban* password, then the password stored in Eudora will be out of date. To solve this problem you must tell Eudora what your new *thuban* password is. To do this select Forget Password from the Special menu. Then select Check Mail from the File menu and type in your new password when you are prompted for it.

One reason your *thuban* password might have changed is that *thuban* has very strict security procedures. *Thuban* requires periodic password changes. If you login to *thuban* interactively using Telnet or by dialing-in from home with a modem, *thuban* will force you to change your password if it has expired.

Q: Why does my e-mail keep disappearing? I am using pine as my e-mail program on *osiris*. Oh yeah, I also use Netscape 2.0.

A: The new version of Netscape includes a mail program which is similar to Eudora. You have probably configured

Netscape to retrieve mail without realizing it. If you have misconfigured this feature, then Netscape will be retrieving mail from your mail server every couple of minutes and removing the messages from the server. Then, when you use pine to try to read mail, it finds an empty mailbox.

Q: I have computer accounts on both *osiris* and *muddcs*. I only want to receive e-mail on *muddcs*. How do I forward my e-mail from *osiris* to *muddcs*?

A: To forward your mail create a file called `.forward` in your home directory on *osiris* with a single line containing your forwarding address and nothing more. For example, to forward your mail to your account on *muddcs* you would type the following line in the `.forward` file on *osiris*:

```
login_name@muddcs.cs.hmc.edu
```

Be very careful not to create a forwarding loop. In other words don't create a `.forward` file both on *osiris* and *muddcs*. If you do, your mail will bounce back and forth between *muddcs* and *osiris* and will eventually be lost for good. 🐾