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# EE Student Workstation Lab Status Report December, 1988

Michael E. Hussey  
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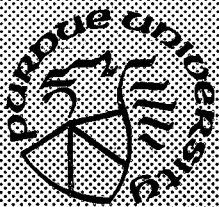
John C. Lindenlaub  
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# **EE Student Workstation Lab\* Status Report December, 1988**

**Michael E. Hussey  
John C. Lindenlaub**

**TR-EE 89-8  
January, 1989**

**School of Electrical Engineering  
Purdue University  
West Lafayette, Indiana 47907**

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**\* Supported in part by a grant from the Westinghouse Educational Foundation**

# **EE Student Workstation Lab\***

## **Status Report December, 1988**

by  
Michael Hussey  
Student Intern

and

Professor J. C. Lindenlaub  
Faculty Sponsor

School of Electrical Engineering  
Purdue University  
West Lafayette, Indiana 47907

January, 1989

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## Abstract

The Maclab project in the Spring of 1988 demonstrated that providing a Macintosh workstation environment to some sections of EE 267 (Digital Logic Design Laboratory) was both useful and feasible on a small scale. The goals of the EE Student Workstation project this past Summer and Fall were:

- A. To provide all sections of EE 267 (approximately 200 students) with a Macintosh workstation environment for the simulation of digital logic circuits and for the preparation of reports.
- B. To provide a useful Macintosh workstation environment to other Electrical Engineering students.
- C. To transfer responsibility for operational aspects of the Macintosh Workstation facilities to the Engineering Computer Network (ECN).

The opening of the new Materials Science and Electrical Engineering (MSEE) building in August 1988 provided space to establish the EE Student Workstation Laboratory. The facility occupies two rooms (186 and 190) within the terminal room complex of the MSEE building. The lab is equipped with 40 Macintosh Plus personal computers networked together via AppleTalk and bridged to the Engineering Computer Network (ECN). A Macintosh II with two 40 Megabyte hard drives is used as an applications server. Application serving can also be handled by one of ECN's Sun Server Machines. Using Aups (Apple-Unix file serving) software, students can access and store Macintosh files on their regular ECN UNIX accounts. Each room is equipped with a dot matrix and a laser printer for hard copy output. An "instructor's machine" is equipped with an LCD display and overhead projector so that large screen class demonstrations can be given.

The goal of expanding use of Macintosh student workstations to all EE267 students was successful. In addition, software purchases were made to make the facility a useful and productive environment for other EE students. Significant progress has been made in integrating this type of facility into normal ECN operations.

This report describes the operation and status of the EE Student Workstation Labs as of the end of the 1988 Fall semester. Recommendations based upon the experience gained during the semester are made.

## I. Introduction

The Maclab project in the Spring of 1988 demonstrated that providing a Macintosh workstation environment to some sections of EE 267 (Digital Logic Design Laboratory) was both useful and feasible on a small scale. The goals of the EE Student Workstation project this past Summer and Fall were:

- A. To provide all sections of EE 267 (approximately 200 students) with a Macintosh workstation environment for the simulation of digital logic circuits and for the preparation of reports.
- B. To provide a useful Macintosh workstation environment to other Electrical Engineering students.
- C. To transfer responsibility for operational aspects of the Macintosh Workstation facilities to the Engineering Computer Network (ECN).

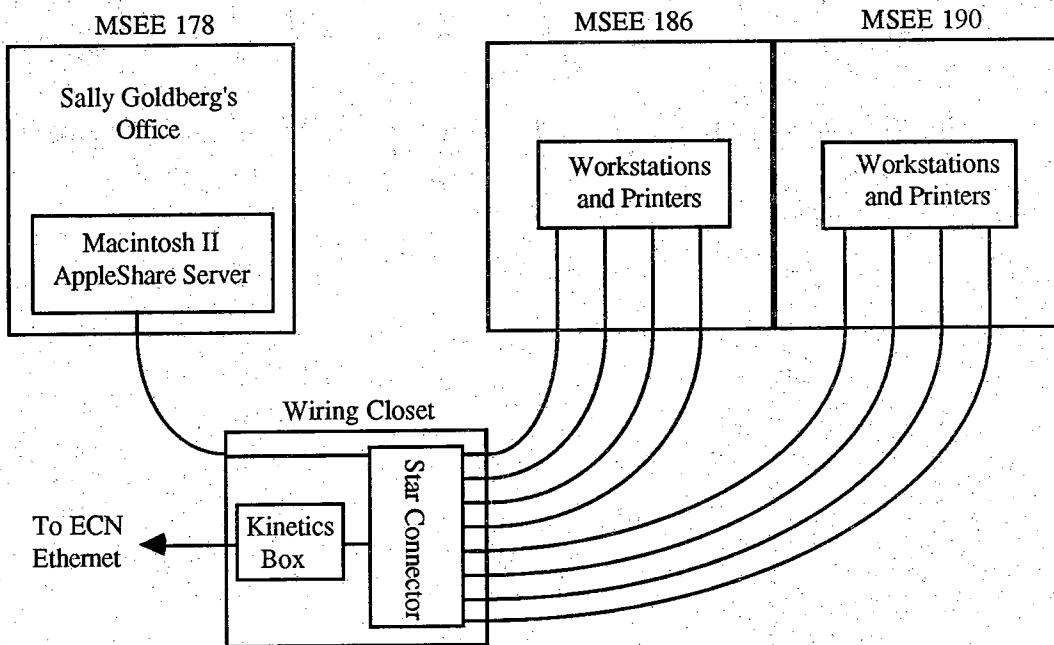
In order to attain these goals, the Maclab network needed to be significantly expanded. The physical expansion involved approximately doubling the network size to a total of forty Macintosh Plus computers, two LaserWriters and two Imagewriter II's. The wiring change was handled by ECN and will not be directly addressed in this report.

The number of users jumped from around forty to well over two hundred. Around one megabyte of software as well as some personal disk space had to be given to each of these users. The two available file servers were a Macintosh II with two 40 megabyte hard drives, and a Unix based machine. Unfortunately, the Macintosh II had less than half of the needed disk space and initial trials during the Maclab project had showed that with a similar network configuration, a Unix machine running Aufs (Apple Unix File Server) was too slow to be used as a server. A method needed to be found to get around this lack of disk space.

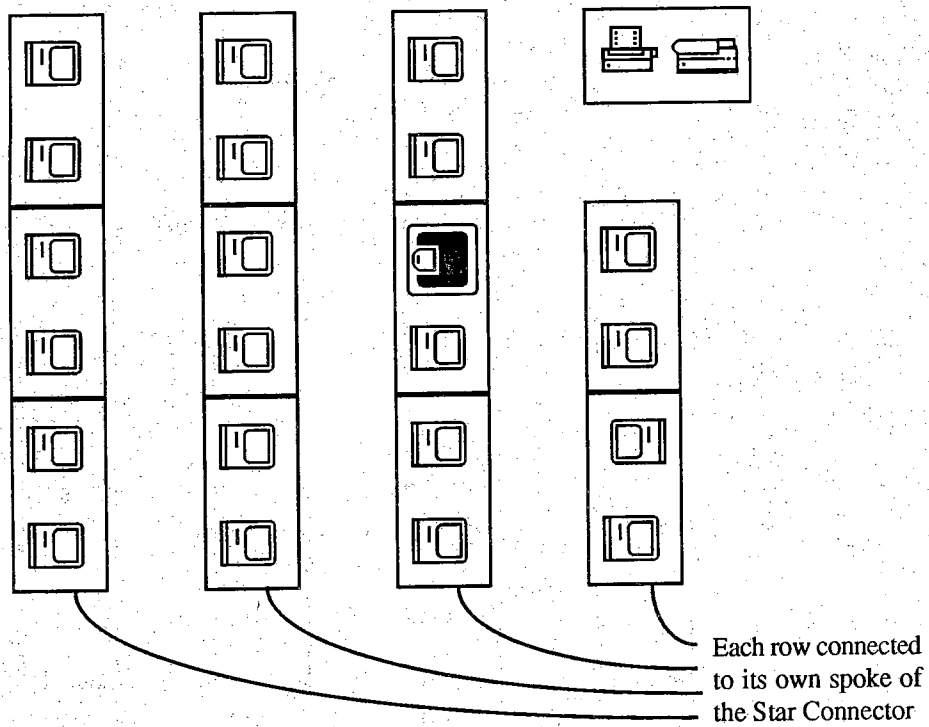
Other more minor problems also needed to be solved. Each Macintosh computer needed a startup floppy disk in order to keep it running. Unfortunately, floppy disks were limited to 800K, while megabytes of fonts, desk accessories, and system files existed which could potentially be useful to the user. The LaserWriters, which are not inexpensive to operate, were available for virtually unlimited printing by EE students and by others. Finally, we wanted to have an efficient way of making changes if we later had upgrades in either software or hardware.

## II. Description of the EE Student Workstation Lab

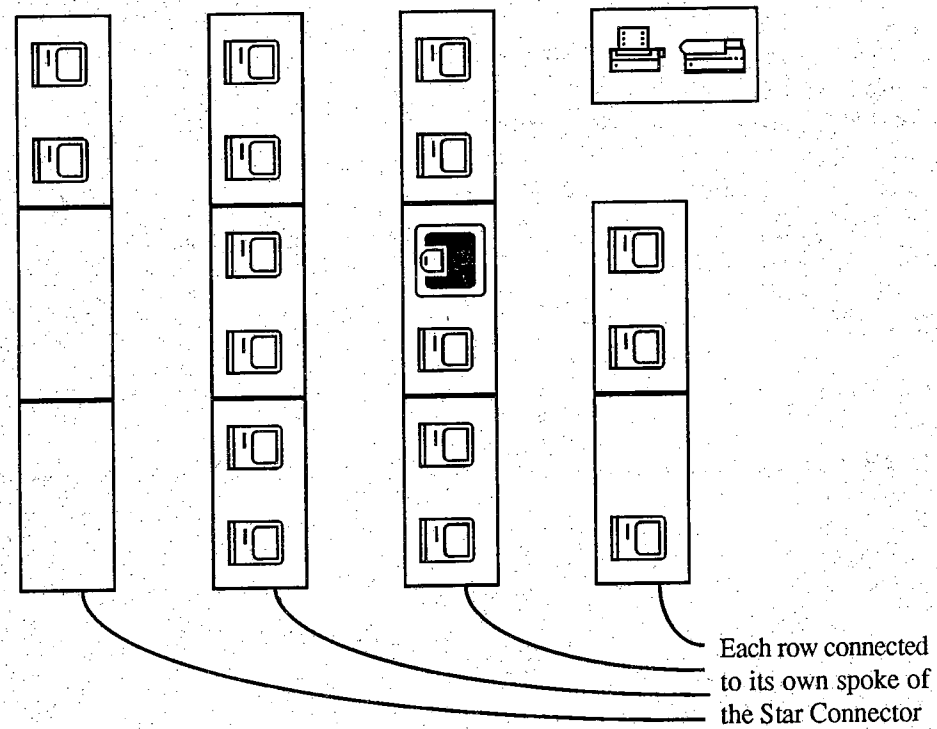
The network layout of the EE Student Workstation Lab is shown in Figure 1, 2 and 3.



**Figure 1.** The General Layout of the EE Student Workstation Lab



**Figure 2.** Arrangement of MSEE 190



**Figure 3.** Arrangement of MSEE 186



The instructor's workstation in MSEE 190 is interfaced to an LCD display which, when used in conjunction with an overhead projector, provides a large screen display capability for demonstration purposes.

Due to the lack of file serving hardware and to the large number of users, some sort of method needed to be developed for handling many users and for minimizing the required disk space. For this purpose, Application Calling was created. Basically, this method works by giving every user a copy of a small file which launches or "calls" the real application. The real applications are then hidden from the user so that they cannot be easily copied. To understand how this works in detail, please refer to the document "Application Calling."\*

The file serving for the EE Student Workstation Lab was done by implementing Application Calling on a Macintosh II running AppleShare 1.1. Two 40 megabyte hard drives were then mounted as read-only volumes, *Resource I* and *Resource II*. The students, via Application Calling, ran their applications from *Resource I* and *II*. They kept their personal files on floppy disks or on Unix based machines running Aufs (Apple Unix File Serving).

Startup disks were made available for check out which would automatically mount the two *Resource* volumes. Accompanying one of these disks was a short document describing how to use the EE Student Workstation Lab and how to set up an account on a Unix based machine so that it could be used by the Macintoshes. A copy of this document is contained in Appendix A.

The *Resource I* volume contained four folders at the topmost layer: *rap*, *libraries*, *user info*, and *software*. The *rap* folder was invisible and held copies of the real applications (please refer to "Application Calling" for a complete description of the use of *rap*.) The *libraries* folder contained circuit and graphic libraries needed by some of the available applications. A few documents which explained how to use the Lab were kept in the *user info* folder. System folders and the "calling" files for the applications were saved in the *software* folder. The *Resource II* volume only contained a *rap* folder and was not used by the students.

Some of the most important folders on *Resource I* are shown in Figure 4.

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\* Michael Hussey and John Lindenlaub, "Application Calling," Technical Report, School of Electrical Engineering, Purdue University, November, 1988.

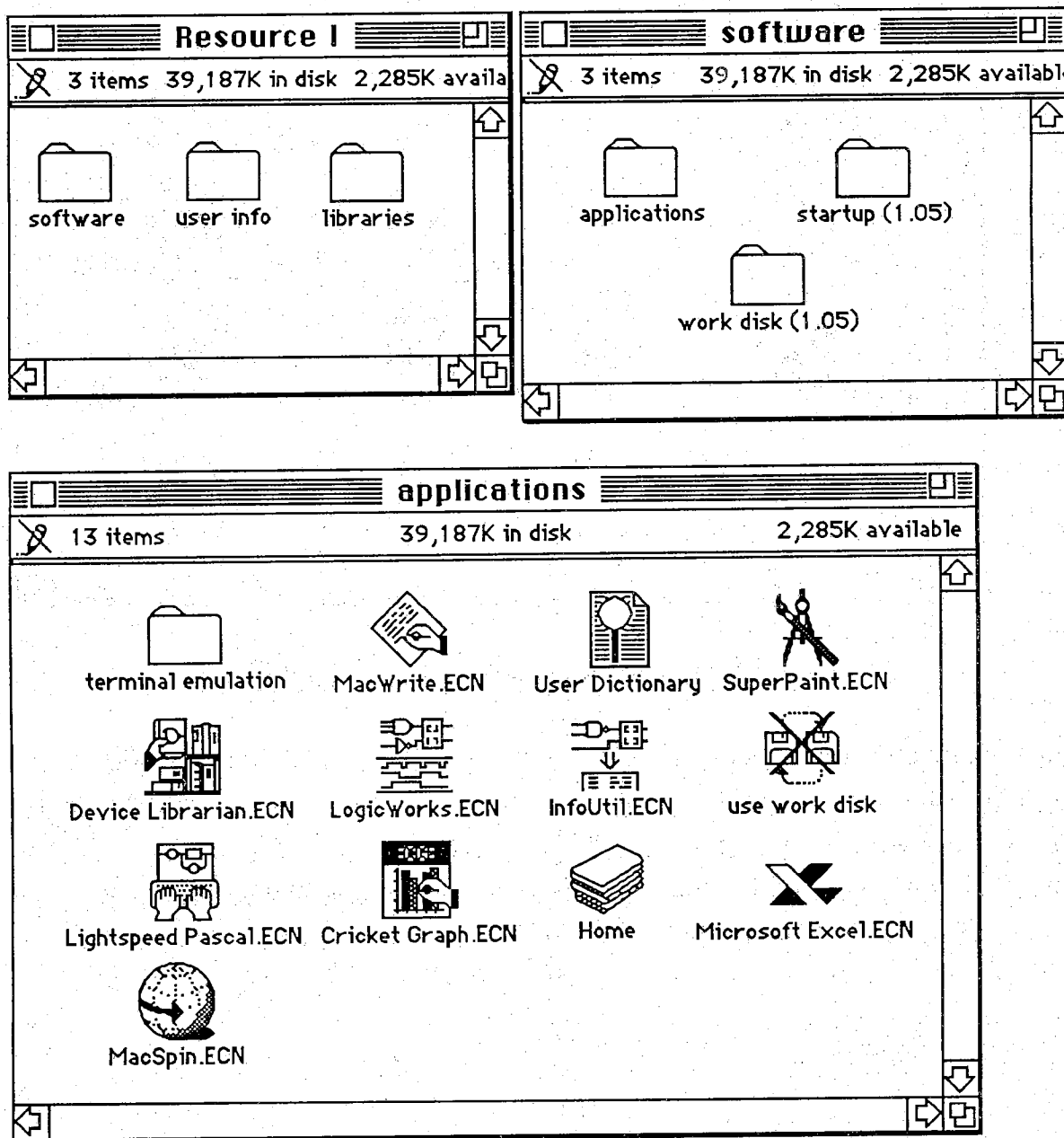


Figure 4. The Important Folders on *Resource I*

Some of the "calling" files in the application folder were created in a manner slightly different than was discussed in "Application Calling". Please refer to appendix B for a complete description of the "calling" files used during the 1988 Fall semester.

There were four users created at the beginning of the semester: *root*, *student*, *ee 267 ta*, and *ee 263 ta*. Each user was made a member of the only group, *users*.

The user *root* owned everything except for the *user info* and *libraries* folders, which were owned by the user *ee 267 ta*. This assignment was made so that TA's could make changes to these folders. Although the user *student* did not own any folders, it could read everything because it was a member of *users*. The user *ee 263 ta* was only included so that work for the course EE 263 could be done if desired. No changes were made to the users and groups during the course of the semester.

All folders on the EE Student Workstation Lab were readable by the group, *users*. This was necessary to allow the server to be backed up without shutting it down (please see the section under Backups.)

### III. Software Selection and Purchases

During the Spring 1988 tryout period software was selected to support the use of the Macintosh workstations for EE 267 (Logic Design Lab) and EE 263 (Introduction to Computing in Electrical Engineering). This software included:

#### EE263

LightSpeed Pascal 1.11 - Pascal editor, interpreter, compiler

#### EE267

LogicWorks (and utilities) - a logic circuit simulation program

MacWrite - word processor

SuperPaint - graphics program

Picture Base Retriever - allowed us to build libraries of symbols, tables, Karnaugh maps etc. which students could access with the PB Retriever desk accessory.

Forty to forty four copies (one for each machine) of each of these programs were purchased or licensed. LogicWorks, SuperPaint and PB Retriever were obtained under a site license arrangement. Multiple copies of LightSpeed Pascal and MacWrite were purchased for the network.

During the '88 Fall semester some additional general purpose software was purchased for the EE Workstation Laboratory. This was funded thru an instructional development grant from Purdue's Dean of the Schools of Engineering. The additional software included:

10 cpy Excel 1.5 - spread sheet program

10 cpy Cricket Graph - data graphing/presentation package

25 cpy Expressionist 2.0 - mathematical equation processor

40 cpy HyperDA - a desk accessory for browsing thru HyperCard stacks

The HyperDA desk accessory will allow us to provide on line help and tutorial stacks for student use.

Selection, purchase, installation and maintenance of software for a network of personal workstations is not a trivial task and should not be minimized.

## **IV Use of Facilities**

During the '88 Fall semester EE Workstation Labs were open M-F from 7:00 am to 11:00 pm and on weekends when ECN consultants were on duty. The MSEE 186/190 facilities were designated for use by students taking EE courses requiring use of the workstations (EE 267), and other EE students and staff. It was stated that the facilities were not intended to serve the general university community. This proved to be reasonably satisfactory except for the fact that many non-EE people used the facility and there was no good way to control this situation.

Copies of the signs, notices, etc. that were used to inform people about use of the facilities are contained in Appendix C.

Included in the recommendations section of this report are comments relative to use of the EE Workstation facilities.

## V Operational Details

Operational details pertaining to student startup disks, use of a work disk, printing, training materials, server backups, memory upgrades and maintenance history are contained in this section.

### V-A. Startup Disk

The startup disk was like a "key" to the EE Student Workstation Lab because it automatically mounted *Resource I* and *Resource II*. It also contained essential information for the operating system such as fonts, desk accessories, and printer drivers. Since every student using the lab needed this disk, it was very important that it had all of the necessary information on it. Since the amount of space available on a floppy is limited, not everything could be kept on there.

To get around this space problem, two ideas were investigated. The first was to startup the Macintosh with a disk which had a basic system folder and then to switch launch to a startup folder that resided on the server. The main advantage to this scheme would be that the size of the startup folder would be limited only by the disk space on the server. Unfortunately, the Finder would not allow a startup folder to reside on a server. The second idea was to use a program which dynamically copied fonts and desk accessories from a file server to a workstation. This would allow the students to have many more fonts and desk accessories than could fit on a floppy disk. The program that was reviewed for this job, DA/Font Juggler, required that each copy of itself have a unique registration number. This was deemed to be too much of an administrative headache for the benefits that it offered.

Unable to find a way to get around the memory limitation of a floppy disk, it was decided to make a careful selection from the available system files, fonts, and desk accessories. Please refer Appendix D for a complete description of this startup disk.

A copy of the most recent version of the startup folder was kept on the server (See Figure 4). This permitted new users to obtain a copy of the latest disk, as well as to give old users a chance to update theirs.

## V-B. Work Disk

It was originally planned that each student would only use one floppy as a startup disk, while saving his/her personal files on a Unix based machine. At the beginning of the semester however, these machines appeared on the AppleTalk network with enough irregularity to annoy many users. In addition to this unreliability, file access time was slower from these servers than it was from floppies.

The work disk concept was developed in response to these problems. A work disk differed from the startup disk in two ways: the system file was smaller and it could not startup the Macintosh. A student was required to start up the Macintosh with his/her startup disk and then to switch launch to the work disk. Although this added a little complexity to getting the Macintosh going, the benefit was that a student could now, due to a smaller system file, save personal files on the work disk floppy. The Unix servers were then only used to store backup copies so that they did not need to be accessed so often.

The smaller system file was obtained by using the Installer application which comes with the system software package to install the 'Minimum Mac Plus' script. The proper fonts and desk accessories were then added using Font/DA Mover. One of the methods used for switching from one floppy startup folder to another, was double clicking on the Finder's icon while simultaneously holding down on the Option and Command keys. Since this is a rather awkward procedure, a small application was written which, when launched, would change the startup disk to the disk on which the application resided. This application utilized the fact that the later versions of the Finder automatically try to make the startup disk be the one on which the application being launched resides. Therefore, the Pascal code for this application was simply:

```
program ChangeStartup;
```

```
begin
```

```
end.
```

Details of the work disk configuration are given in Appendix E.

## **V-C. Printing**

Two LaserWriters and two ImageWriter II's were connected directly to the AppleTalk network (Figures 2 and 3) and all of the students were instructed on how to select them on the Chooser. This arrangement did not put any limits on the number of pages a student could print nor did it prevent any unauthorized user from using the printers.

Because the printers did not have built-in spooling capabilities, the students had to take turns obtaining output. An Aufs (Apple Unix File Server) spooler was temporarily tested, but proved to be too slow. Since this test was done on an ECN machine which had heavy loads, it is possible that such a spooler would be effective if a faster machine was used.

## **V-D. Documentation and Training Materials**

Along with the LogicWorks site licence agreement we were given permission to reproduce the LogicWorks manual. Robert Hawley, an EE Student Intern, wrote a manual illustrating how to use SuperPaint in conjunction with PB Retriever. A brief introduction to the use of MacWrite was also written. During the '88 Spring trial semester each student was provided a copy of these manuals. During the Fall semester we did not give each student a copy of the manuals. Instead, copies were left on the tables in the workstation lab and replaced if they were stolen or worn out. This worked very well.

Copies of the manuals that came with the hardware/software were turned over to Marian Hensler of ECN. She is responsible for documentation and training materials. She maintains archive and checkout copies and, when available in sufficient quantities, has placed copies of the manuals in the Potter Engineering Library. This has worked out reasonably well although it is probably true that the average student is unaware of where documentation is available.



## V-E. Server Backup

An account named *maclab* was set up on ECN's ampere machine for the sole purpose of backing up the EE Student Workstation Lab's server (the Macintosh II machine in Room 178). Because the server was completely readable by the user *root*, it could be backed up from any Macintosh connected to the network. The following steps describe the backup procedure:

1. The *maclab* account on Ampere is opened using the **Chooser**.
2. The entire contents of the *maclab* account are erased. (This is done by dragging all folders into the trash and then selecting **Empty Trash**.)
3. The *rap* folder on *Resource I* is made visible. (See Application Calling document to see how to make the rap folder visible.) The entire *Resource I* volume is then dragged to the *maclab* account.
4. The same thing is done to *Resource II*.
5. The two *rap* folders are made invisible again.

Note: This is a very slow process, so it is recommended that the backup for each *Resource* volume is done from a separate Macintosh.

## V-F. Memory Upgrades

The Macintosh Plus personal computers used in the EE Student Workstation labs are shipped with 1 MByte of RAM. This is sufficient for most applications but falls short if one attempts to open more than one application under Apple's Multifinder mode of operation. Since students are frequently required to copy data from one application to another student productivity can be increased considerably by increasing the workstation RAM memory from 1 MByte to 2.5 MByte.

Due to back ordering and delayed shipments the memory upgrades ordered with the Mac Plus machines did not arrive in time to be used during the 1988 Fall semester. The memory arrived near the end of the semester. PUCG Macintosh maintenance staff installed the memory upgrades on 12/19/88.

## **V-G. Maintenance Procedures and History**

At the present time the only way to get "official" maintenance of Apple Computer Company products is thru PUCG. In order to guarantee working equipment in the workstation labs a few of the machines were held back so that if a student machine failed a good machine could be quickly brought in. A Mac Plus in Sally Goldberg's office served as the main backup unit. EE267 staff were told to notify Sally as soon as a machine failed. She would then swap with the machine in her office and send the bad machine to PUCG for repair. Another Mac Plus resides in Prof. Lindenlaub's office. It is used to test software, network response, etc. with a "student environment" machine and also serves as a readily accessible second backup in case another of the student machines fail.

A summary of maintenance changes accumulated during the '88 Fall semester has been prepared by Sally Goldberg and is contained in Appendix F.

## VI. Evaluation, Conclusions and Recommendations

Evaluation of the success of the EE Student Workstation Lab operation was accomplished by a combination of faculty and staff observations and comments, informal reactions from ECN staff, and a questionnaire filled out by students enrolled in EE267. (A summary of student responses is contained in Appendix G.) One can conclude that the goal of scaling up the operation of using Macintosh computers by EE 267 students from an experimental group of 22 students to full operation with 11 sections and 220 students was successful. Furthermore, significant progress was made in integrating facilities such as MSEE 186/190 into ECN's "normal" operations.

Work remains to be done and the following recommendations are made:

- "clean up" the Mac II server disks, update server software to AppleShare 2.0.
- try using a Sun Server machine for application serving.

- set up some sort of spooling and accounting procedure to prevent unauthorized use of laser printers.

- optimize AppleTalk - Ethernet bridging by rearranging Ethernet branches, using a Kenetics FastPath 4 instead of a FastPath 3, putting the workstation labs on a separate AppleTalk zone.

- limit access to the facilities, especially find a mechanism to keep non-EE students out.

- get better control on use of Laser printers.

- explore use of Timbukto software for instructor demonstrations and remote access to Mac II server operation.

- see if ECN can assume maintenance responsibilities.

- use available network monitoring software to get a better handle on network bottlenecks and seek ways to improve speed of network response.

- explore use of HyperCard as a mechanism for providing on-line help and tutoring.

## VII. Acknowledgements

Many people have contributed to the establishment and success of the EE Workstation Lab project. Instructional development grants from AT&T, Westinghouse, and the Dean of the Schools of Engineering have provided the resources for developing the concepts and a portion of the equipment and software used in the lab. R. J. Schwartz, Head of the EE School, allocated funds for a major portion of the equipment. EE Student Interns Robert Hawley and Sandra Tretter assisted in setting up the experimental network used in the Spring of 1988. Teaching assistants Douglas Welk (Spring '88) and Carla Zoltowski (Fall '88) and the EE 267 instructional staff all helped to integrate the use of the student workstations into the EE267 course. Numerous members of the ECN staff, especially Dwight McKay, Mike Moya, Sally Goldberg, have assisted in the integration of the workstation lab with other ECN network and facilities support activities. The authors gratefully acknowledge these many contributions.

## **Appendix A. Handout Materials**

The following pages contain copies of the general EE Student Workstation Lab handouts used during the Fall semester 1988.

# An Introduction to Using the EE Student Workstation Lab

The EE Student Workstation Lab consists of Macintosh Plus computers. That is only the beginning, however, because each of the Macintoshes are connected to a huge AppleTalk network. This network is in turn connected to printers, other computers, and even other networks.

In order to begin to explore using the Macintosh, you need to get a startup disk. This disk is always necessary to keep the Macintosh "running," so you should make your own copy of it right away.

## To Make a Copy of the Startup Disk:

- 1) If you are not familiar with the Macintosh, run the Tour Disk before doing anything else. This can be obtained from the TA, or the consultant if you're not in class.
- 2) Buy a blank 3 1/2 inch double-sided, double-density disk from a local store. Obtain a startup disk from a TA or a consultant.
- 3) Turn on a Macintosh. Insert the startup disk and wait until three icons appear at the right of the desktop. The top-most icon is the startup disk, and the other two icons are the **Resource I** and **Resource II** volumes.
- 4) Drag the startup disk icon into the trash. This doesn't erase anything; it just ejects the disk. Insert your blank disk. You will get a message asking if you want to initialize it. Use the mouse to click **two-sided**. You will then be asked to name your disk something. Name it something decent. When it's finished initializing, you should have four disk icons on the desktop.
- 5) Open the **Resource I** volume. Open the **software** folder. Now drag the **startup (?)** folder to your freshly initialized disk. (The number in parentheses is the version number.) When that is done, your disk is now your startup disk.
- 6) From the **Special** menu, select **Restart**. Insert your startup disk back in after you hear a beep. When the desktop appears you should have three disk icons at the right.
- 7) Return the borrowed startup disk.

Now that you have started up with your own startup disk, you can begin to investigate how the EE Student Workstation Lab is set up. **Resource I** and **Resource II** are volumes that are located on the network from which you can only copy files and applications from. Files and applications of yours must be stored on some other disk. Your startup disk is far too small for that, so it will only be used to keep the Macintosh "running." Your files and applications will be stored in your ECN account. Before you can do this, however, your account must first be set up so that the Macintosh can use it as if it were a Macintosh disk.

### To Set Up Your ECN Account So That It Can Be Used By the Macintosh:

- 1) Startup the Macintosh with your startup disk if you haven't already.
- 2) Open the **Resource I** volume. Open the **software** folder. Open the **applications** folder. Open the **terminal emulation** folder. You will see several programs that will allow you to log onto the ECN machine of your choice. If you don't see the machine that you have an account on, please consult the appendix.
- 3) Double click on the program that will log you onto the ECN machine with your account. If the Macintosh gives you an error when you try to run the program--either something about the file being open or the application not being found--don't worry: the Macintosh is as confused as you are. These errors are common when trying to run programs when the network is busy. Keep trying and soon you will be able to run it.
- 4) When you get the prompt to log in, type your ECN login and password.
- 5) Type the following line exactly as you see it and then press return:

```
/usr/ecn/cap/macinit
```


Note that this command creates a file called `afpvols` and a directory called `.macintosh` in your home directory. Changing these can render your Macintosh files unusable!

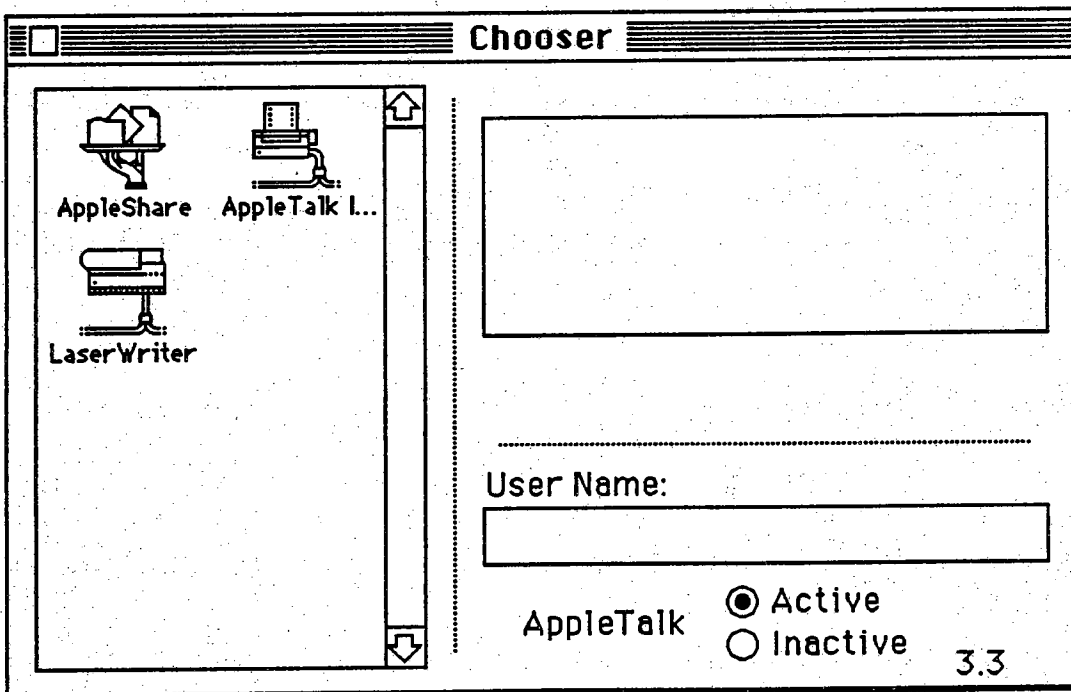
- 6) Press and hold the **Option** key (lower left) and then press **d** to log out. (The **Option** key is the same as the **CNTRL** key on many other terminals.)
- 7) Select **Quit** from the **File** menu. Now you are done setting up your account. If you have another account on ECN that you would like to use with the Macintosh, simply repeat the above steps, otherwise you should never have to preform them again!

Information that you'll need throughout the semester will be stored on the **Resource I** and **Resource II** volumes. Various kinds of documentation, the most recent version of the startup disk, and other things are all stored on these volumes. The **Resource I** volume is divided up into three folders: **software**, **user info**, and **libraries**. The **libraries** folder contains information used by programs which you will soon become familiar with. The other two folders' contents are self explanatory. The **Resource II** volume currently does not have any interesting information on it, but it may in the future.

Copies of applications and all of your files will be saved in your ECN account. You need to make your account appear as an icon on the desktop in order to start copying.

To Make Your ECN Account Show Up as an Icon on the Desktop:

- 1) Startup the Macintosh with your startup disk if you haven't already. Be sure your ECN Account has been set up with /usr/ecn/cap/macinit before proceeding!
- 2) Use the Apple Menu (  ) and select **Chooser**. You'll get a screen that looks like this:



- 3) Click inside the User Name box. Type In your ECN login if it is not already there. Then click on the AppleShare icon.



- 4) A list of ECN machines appear in the window at the right. Find the machine that your account is on and then double click on it. (You may have to use the scroll bar to find it.) As an example, assume your account is on the **ei** machine. You would use the scroll bar to find **EI Aufs** and then double click on it. If you accidentally double clicked on the wrong machine, simply click on the **Cancel** button and try again.
- 5) You are then asked to enter your password. Type in your password and press **Return**. (Be sure the Caps Lock button is not down if your password is in lower case letters.)
- 6) You are then asked what volumes you want to use. Just press **Return**.
- 7) Close the **Chooser** window and you should see a new icon on the desktop. That is your ECN account as seen by the Macintosh.

The first things that you want to put into your ECN account are copies of the applications. You might as well copy all of the available applications right now, because you never know when you might need them later.

#### To Make Your Own Copies of All of the Applications:

- 1) Startup the Macintosh with your startup disk if you haven't already. Use the Chooser to bring up your ECN account icon if you haven't already.
- 2) Open the **Resource I** volume. Open the **software** folder. Open the **applications** folder.
- 3) Select **Select All** from the **Edit** menu. Place the mouse pointer over one of the applications. Press and hold the mouse button, and then drag them to your ECN account's icon.
- 4) All of them will be copied into your account.

August 17, 1988  
mh

## Appendix

This appendix need only be read by those people wanting to set up their ECN accounts on machines not available in the **terminal emulation** folder.

### Setting up ECN Accounts On Unavailable Machines:

- 1) Startup the Macintosh with your startup disk if you haven't already.
- 2) Open the **Resource I** volume. Open the **software** folder. Open the **applications** folder. Open the **terminal emulation** folder.
- 3) Double click on any one of the programs there. If the Macintosh gives you an error when you try to run the program--either something about the file being open or the application not being found--don't worry: the Macintosh is as confused as you are. These errors are common when trying to run programs when the network is busy. Keep trying and soon you will be able to run it.
- 4) When you get the prompt to log in, select **Close Connection** from the **File** menu. Press **Return** when asked if you are sure that you want to close the connection.
- 5) Select **Open Connection** from the **File** menu. A menu will appear with `ei.ecn.purdue.edu` highlighted next to the words **Session name**. Change `ei.ecn.purdue.edu` to the full machine name that you want to log onto and then press **Return**. For example, say you wanted to log onto ampere. The session name should then be `ampere.ecn.purdue.edu`.
- 6) Follow steps 4 through 7 under the section titled:

To Set Up Your ECN Account So That It Can Be Used By the Macintosh

## Using Your Work Disk

The following steps describe how to use your work disk without having to continuously switch between it and your startup disk. These first three steps only need to be done *once*.

- 1) Startup the Macintosh with your startup disk.
- 2) After the desktop appears, drag the icon of your startup disk into the trash can. Insert your work disk. Initialize it if you haven't already.
- 3) Open the **Resource I** volume. Open the **software** folder. Copy the **work disk (?)** folder to your work disk.

The folder that you just copied to your work disk will keep the Macintosh running without it continuously asking for you to insert your startup disk. You must tell the Macintosh that you have this folder on your work disk. The following steps do just that and they need to be performed every time you come into the lab.

- 1) (Skip this step and the next one if you just completed the above three.) Startup the Macintosh with your startup disk.
- 2) After the desktop appears, drag the icon of your startup disk into the trash can. Insert your work disk.
- 3) Open your work disk. Open the **work disk (?)** folder.
- 4) *While holding down both the Option key and the Command key*, double click on the icon called **Finder**.
- 5) After a few seconds the desktop will reappear and your work disk icon will be at the top-right corner. You're all set to begin work and you won't need your startup disk until the next time you come to the lab.

## Appendix B. Calling Files Used in First Semester

The following is a list of applications which have been used with Application Calling in the EE Student Workstation Lab at Purdue University as of December 1988.

<u>Name</u>	<u>Comments</u>
MacWrite 4.6	"Calling file does not automatically open an untitled document. File Type = 'CALL'
MacWrite 5.0	"Calling file does not automatically open an untitled document. File Type = 'CALL'
SuperPaint 1.0 "Application	Used method described in Appendix II of Calling"
SuperPaint 1.1 "Application	Used method described in Appendix II of Calling"
LightSpeed Pascal 1.0 "Application	Used method described in Appendix II of Calling"
Microsoft Excel 1.5	File Type = 'CALL'
LogicWorks 1.34	File Type = 'CALL'
InfoUtil 1.01	Needed to correct a bug in this version's icon information. File Type = 'CALL'
InfoUtil 2.0	File Type = 'CALL'
Device Librarian 1.32	File Type = 'CALL'
MacSpin 2.0	File Type = 'CALL'
Expressionist 2.0	File Type = 'CALL'
MathType 1.53	The real application needed to be saved in a folder with read/write privileges, because the application writes to itself. File Type = 'CALL'
Cricket Graph 1.2	

## **Appendix C. Access Notices**

The following pages contain copies of notices posted during the 1988 Fall semester regarding access to the EE Student Workstation Labs.

## Schedule of Operation

The EE Undergraduate Workstation Laboratories, MSEE Rooms 186 and 190, are open for student and staff use as follows:

Weeks when classes are in session -

Mon. thru Fri. - 7:00 am to 11:00 pm

Sat. and Sun. - when ECE consultants are on duty  
(typically 8:30 am to 11:00 pm)

Academic vacation periods and between semesters -

Mon. thru Fri. - 7:00 am to 11:00 pm

Sat., Sun. and University holidays - closed

Please cooperate and leave promptly when asked by those university employees responsible for locking the rooms.

## Priority of Usage

Top priority for using these facilities is granted to students enrolled in EE courses which require use of the Undergraduate Student Workstations. You may be asked to show your current fee schedule as proof of enrollment during peak usage times. Second priority goes to all other EE students and staff. These facilities are not intended to serve the general university community. Please cooperate with those who have a higher priority than you.

This Room is Reserved for EE 267 labs  
 during the Fall 1988 semester  
 as shown below

	M	T	W	Th	F
7:30 AM	/	/	/	/	/
8:30 AM					
9:30 AM	/	/	/	/	/
10:30 AM					
11:30 AM				/	/
12:30 PM				/	/
1:30 PM				/	/
2:30 PM	/	/	/	/	/
3:30 PM					
4:30 PM	/	/	/	/	/

## Appendix D. Startup Folder (1.04)

This folder was created by running the Installer program on the 6.0 System Tools disk and installing the 'MacPlus' and 'AppleShare' scripts. The folder was then altered using the DA/Font Mover application. This folder excludes several features common to many MacPlus startup disks in order to have a maximum amount of available disk space. They are:

- No Control Panel (i.e., cannot adjust clock, mouse, beeper, etc.)
- No Find File
- No Startup Screen
- No background printing (i.e., no Print Monitor)

### Folder Description

Complete Folder Size: 725K

Left Available on Disk: 60K

System	Size: 376K	Version: 6.0
AppleShare	Size: 37K	Version: 1.1
(creates a 1K AppleShare Preps file)		
Backgrounder	Size: 5K	Version: 1.2
DA Handler	Size: 6K	Version: 6.0
Key Layout	Size: 5K	Version: 2.3
Finder	Size: 107K	Version: 6.1
MultiFinder	Size: 49K	Version: 6.0
LaserWriter	Size: 64K	Version: 5.2
LaserWriter Prep	Size: 28K	Version: 5.2
AppleTalk ImageWriter	Size: 28K	Version: 2.7
RegisterName	Size: 2K	Version: 5



## System File Breakdown

Size: 376K

Version: 6.0

### Fonts: 81.9K

### Comment

Chicago 12

required

Courier 10

required

Courier 12

required

Geneva 9

need 9 through 24 for ImageWriter II

Geneva 10

Geneva 12

Geneva 14

Geneva 18

Geneva 24

Helvetica 9

smaller print difficult to read without 9 and 10

Helvetica 10

Helvetica 12

Monaco 9

required

Monaco 12

required

Symbol 9

used by equation editors

Symbol 12

used by equation editors

Symbol 18

used by equation editors

Times 9

used by LogicWorks

Times 10

and looks good with equation editors

Times 12

### Desk Accessories: 88.4K

Calculator

3257

Chooser

14960

HyperDA

48799

Key Caps

2718

PB Retriever

14435

Scrapbook

3689 (makes its own file)

## Appendix E. Work Disk 1.05

This folder was created by running the Installer program on the 6.0.2 System Tools disk and installing the 'MacPlus' and 'AppleShare' scripts. The folder was then altered using the DA/Font Mover application. This folder excludes several features common to many MacPlus startup disks in order to have a maximum amount of available disk space. They are:

- No Control Panel (i.e., cannot adjust clock, mouse, beeper, etc.)
- No Find File
- No Startup Screen
- No background printing (i.e., no Print Monitor)

### Folder Description

Complete Folder Size: 596K  
Left Available on Disk: 592K

<u>File</u>	<u>Size</u>	<u>Version</u>
System	298K	6.0.2
AppleShare (creates a 1K AppleShare Preps file)	44K	6.0.2
Key Layout	6K	6.0.2
Finder	106K	6.0.2
LaserWriter	64K	6.0
LaserWriter Prep	28K	6.0
AppleTalk ImageWriter	44K	6.0

## System File Breakdown

Size: 302.8K

Version: 6.0.2

### Fonts: 81.9K

<u>Size</u>	<u>Comment</u>
Chicago 12	3534 required
Courier 10	4886 required
Courier 12	5234 required
Geneva 9	2776 need 9 through 12 for ImageWriter II
Geneva 10	2824
Geneva 12	2916
Geneva 14	3750
Geneva 18	5046
Geneva 24	7750
Helvetica 9	10478 smaller print difficult to read without
Helvetica 10	10206 9 and 10
Helvetica 12	10766
Monaco 9	2626 required
Monaco 12	2622 required
Symbol 9	3670 used by equation editors
Symbol 12	4174 used by equation editors
Symbol 18	6676 used by equation editors
Times 9	6936 used by LogicWorks
Times 10	6662 and looks good with equation editors
Times 12	7072

### Desk Accessories: 87.6K

	<u>Size</u>
Calculator	3257
Chooser	14668
HyperDA	48799
Key Caps	2718
PB Retriever	14444
Scrapbook	3689 (makes its own file)

## Appendix F. Summary of 1988 Fall Semester Maintenance Charges

### EE Workstation Lab Expenses for Fall 1988

Date	Item	Cost
09/15/88	labor	30.00
09/15/88	mac mouse (3)	237.00
09/15/88	markup	27.26
10/05/88	800K disk drive	100.00
10/05/88	MAC Plat. P.S.	88.00
10/05/88	labor	82.50
10/05/88	markup	21.62
10/07/88	800K disk drive	100.00
10/07/88	labor	60.00
10/07/88	markup	11.50
10/14/88	800K disk drive	100.00
10/14/88	labor	60.00
10/14/88	markup	11.50
11/01/88	800K disk drive	86.00
11/01/88	labor	75.00
11/01/88	markup	9.89
11/03/88	parts markup	15.07
11/04/88	apple mouse (2)	128.00
11/04/88	lock keyswitch	3.00
11/07/88	floppy drive	14.00
11/07/88	markup	1.61
11/14/88	labor	45.00
11/14/88	markup	10.12
11/14/88	power supply	88.00
11/16/88	800K disk drive	100.00
11/16/88	labor	45.00
11/16/88	markup	11.50
11/29/88	labor	45.00
12/13/88	800K disk drive	100.00
12/13/88	labor	255.00
12/13/88	parts markup	11.50

## Appendix G. Summary of EE Undergraduate Workstation Lab Survey

Towards the end of the 1988 Fall semester students in the EE 267 Laboratory course were asked to respond to a questionnaire regarding the EE Student Workstation Laboratory. Three open ended questions were asked followed by several specific questions. The results of the survey are summarized below. (Readers interested in seeing a compiled list of actual student responses to the open ended questions should contact Professor Lindenlaub.)

### Summary of EE Undergraduate Workstation Lab Survey

Question 1. What I like best is:

144 responses

Responses related to simulation capability		70 (47%)
Responses related to facilities		67 (45%)
Macintosh computers		
general	25	
user interface	12	
report generation	4	
graphic capability	1	
Laser printers	15	
General facilities	10	
Responses related to 7400 hardware		2 (1%)
Miscellaneous responses		10 (7%)

Question 2. My biggest frustration is:

177 responses

Responses related to availability		72 (41%)
Too few machines	49	
Hours of availability	12	
Competing with non-267 students	11	
Responses related to Macintosh limitations		29 (16%)
Speed of machines	19	
Moving between applications	5	
Floppy disk limitations	5	
Responses related to printing		5 (3%)
Responses related to networking		15 (8%)
Responses related to course requirements		35 (20%)
Work load	15	
type of work	9	
schedule, due dates, etc.	11	
Responses related to 7400 hardware		3 (2%)
Miscellaneous responses		18 (10%)

Question 3. In my opinion, the single most important change or improvement that needs to be made is:

160 responses

Responses pertaining to more machines	51 (32%)
Restrict access to EE's only	22 (13%)
24 hour operation	16 (10%)
Responses pertaining to printers	5 (3%)
Improve network response	18 (28%)
Use of Macs for reports	10 (6%)
Improve workstation configuration	10 (6%)
Workload/scheduling	11 (6%)
Miscellaneous	21 (13%)

Question 4. The three Macintosh application programs I use most are

97% use LogicWorks

94% use MacWrite

70% use SuperPaint

20% use MacPaint

Other programs used include Aldus Freehand, MacDraw, Fullwrite Professional, Hypercard, Infoutil, Microsoft Works, Pagemaker, Microsoft Word

Question 5. List type of projects you use the Macintoshes for

81% listed EE267 lab

5% listed circuit simulation

5% listed other lab reports

3% listed personal

3% listed EE266 lab

1% listed EE207 lab

1% listed circuit diagrams

1% listed homework

Question 6. The average number of hours worked per week in one of the EE undergraduate workstations

27% spent 6 hours

16% spent 10 hours

16% spent 7 hours

13% spent 5 hours

9% spent 8 hours

9% spent 4 hours

3% spent 9 hours

3% spent 3 hours

1% spent 12 hours

1% spent 13 hours

1% spent 15 hours

### Question 7. Student classification

52% are 5th semester  
36% are 3rd semester  
8% are 4th semester  
2% are 7th semester  
1% are 6th semester  
1% are 2nd semester

### Major

53% are EE  
28% are CEE  
17% are CS  
2% are IDE