THE JOHN E. ANDERSON GRADUATE
SCHOOL OF MANAGEMENT AT UCLA

Eighth Annual UCLA Survey of Business School Computer Usage

September 1991

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Executive Summary

The 1991 Eighth Annual UCLA Survey of Business School Computer Usage extends the focus of the previous surveys, providing a comprehensive overview of the business school computing, communication, and information environment. This year, 166 schools completed the twelve page questionnaire regarding hardware, software, and resource commitments. The sample is demographically very similar to samples from the previous surveys.

Findings

Over the past six years, the samples of participating business schools have shown a slight increase in the computer operating budget as a percentage of the total school operating budget, from about 3% in 1985 to just over 4% in 1991 (Section 3.1). This increase supported the growth in information technology in the schools, most notably in the number of microcomputers as well as in the number of computer support staff. The average number of microcomputers per school has increased from 80 per school in 1985 to 215 per school in 1991 (Section 4.2). Similarly, the average student to computer staff ratios have improved from approximately 418 students supported by a single computer staff member in 1985 to 341 in 1991 (Section 3.2)

However, due to the continuing constraints on the schools' sources of funds and thus on their budgets, the schools are increasingly looking directly to the students as a source of funds. In the past two years alone, the number of schools charging computer-related fees has increased 55% at the undergraduate level and 42% at the MBA level (Section 3.1).

The impressive increases in the average number of microcomputers at the schools has resulted in a broad diversity of different models requiring support. Five years ago most schools supported only one or two different microcomputer models. Today, most schools support over eight different models, creating a continual broadening of support requirements as newer models are introduced but older systems are retained (Section 4.2.1).

Another impressive shift in the data over the past five years has been in the networks which allow connectivity between the microcomputers. The thrust of schools in 1985 was to acquire microcomputer systems, and accordingly, only 14% of the schools had more than two-thirds of their systems networked. While the average number of microcomputer systems in 1991 has increased threefold since 1985, the number of schools with more than two-thirds of their microcomputer systems networked has increased fourfold (Section 5.1). This increase in connectivity allows the implementation of various network-dependent applications, with electronic mail (e-mail) leading the way. This year's data indicates that for those schools with the capacity for e-mail (i.e., extensive connectivity), over one third of the faculty and staff, one quarter of the MBAs, and one sixth of the undergraduate students are regular users, using a mail system at least three times per week (Section 5.3).

Corresponding to the diversity in microcomputer models has come a diversity in operating systems. Although DOS is the ubiquitous operating system for IBM and IBM-compatible microcomputers, two-thirds of the schools reported an average 16% of their systems use Windows to provide a graphic user interface. Fifteen percent of the schools also reported using OS/2 and 15% UNIX on some of their microcomputers (Section 4.2.2).

Ninety-eight percent of the schools participating in this year's survey reported a sufficient number of microcomputers to meet faculty and student needs most of the time (Section 4.2.3). The data indicated that the schools have invested more heavily in desktop microcomputer systems (35,200) rather than laptops (3300) or workstations (350). Apparently,

for student computer lab or faculty office environments, desktop systems are more appropriate. Workstation acquisition appears linked to specialized applications, while laptop ownership seems more appropriate for individual purchase. Over the past two years, the estimated level of student microcomputer ownership has remained approximately the same, about 23% at the undergraduate level and 43% at the MBA level (Section 4.2.4).

Over the past six years, just over one-third of the participating schools operated their own mini/mainframe systems (Section 2). During this period, the average number of mini/mainframe systems per school ranged from a low of 1.1 in 1984, increasing each year to a high of 2.0 in 1989, and declining for the second year in a row to 1.7 this year (Section 4.1). There was a decrease in the number of schools reporting expected future purchases of mini/mainframe systems (Section 4.1) and a decrease in the use of mini/mainframes for required instructional use (Section 7.2).

The most impressive area of consolidation within the business schools in this year's data was in the area of software resources. Although the business schools are supporting a greater variety of applications than before, the diversity of different software packages within these application categories is being reduced. The average decrease in the number of different microcomputer software packages was 45% for instructional use and 35% for research use. The average decrease in the number of different mini/mainframe software packages was 61% for instructional use and 51% for research use (Section 6).

This year's survey also shows another consolidation, a decrease in computer-related requirements for graduation, three percent for the undergraduates and six percent for the MBAs. At the MBA level, though, there is a somewhat offsetting three percent increase in computer-related expectations. However, the overall indication was a lessening in the formal requirements for graduation (Section 7.2).

Open issues

Business schools have made a significant investment in developing information technological infrastructures. This investment includes mini/mainframes, microcomputers, workstations, laptops and notebooks, network equipment and systems, support staff, software, maintenance, space allocations and modifications, the refocusing of time and energy, together with the personal time and efforts on the part of the faculty, staff, students and vendors. Business schools are part of an electronic era where MTV, video arcades, VCRs, FAX machines, and microcomputers have dramatically influenced views and perspectives, not only of the students, but the views of all in the society. Acquiring information technology at an incredible pace has been a phenomena of our time and the business schools are caught up in this passion as well, as is documented in Figure 3, Section 4.

A fundamental question which may be asked, therefore, is what has been the return on this investment in the microcomputerization of the business schools. The costs can be estimated but the definition and measurement of the benefits is difficult as there are multiple unquantifiable factors. Foremost, schools must address the issue of purpose: why are they doing this? Ostensively they are trying to prepare their students to enter the commercial world where a similar massive introduction of information technology has occurred. Additionally, they are trying to improve the learning, teaching, and research processes. Technology has provided substantial individual productivity gains and, to a large extent, eliminated the drudgery of some tasks. But, how can the degree to which it has improved the learning/teaching process, research, and the preparedness of their graduates be determined?

While pondering this ROI issue, business schools must be concerned with how they will continue to support their investments. Financial challenges are facing universities and this is reflected in the allocations to the business schools. It is somewhat surprising that as a strategy to offset equipment costs there has been no major increase in the percentage of schools requiring or strongly recommending microcomputer ownership by students over the past six years, even though the cost of these systems has decreased over the same period. Several explanations are possible. Legally, many public schools cannot require ownership as it would then be equivalent to a fee or cost which can only be implemented by the governing board of the university. Some schools are concerned about the impact on their total funds available for financial aid. Others may be hesitant as required ownership implies that the systems will be used extensively throughout the instructional program. Finally, some schools may simply be waiting until an appropriate match is found between the economics, technology, and instructional requirements.

Based on the assumption that it is important for students to learn with and about information technology, the issue of the differences between the schools needs to be addressed. This discrepancy manifests in terms of dollar allocations, staff support, and amount of equipment available. The approach in these surveys has been to divide the schools into quartiles based on the computer operating dollar allocation per student. Two comparisons are then possible -- within and between the quartiles. For dollar allocations and staff support there has been little change over the past six years within the quartiles. Schools in the same quartile have spent about the same amount per student annually, allowing schools in these quartiles to progress at about the same rate in the development of their technological infrastructures. For microcomputer density, however, the second, third and fourth quartiles have made enormous progress in approaching the level of the first quartile schools. Yet without the financial and staff support available to the first quartile schools, the responsibility for full utilization of this equipment shifts to the faculty and students to achieve on their own.

The discrepancy between the quartiles continues to be momentous. The top quartile schools have consistently spent about five times the second quartile, ten times the third, and 30 times the fourth. The long term impact of these expenditure differences which continue to separate the business school quartiles must be considered.

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1. Introduction

The goal of this, the Eighth Annual UCLA Survey of Business School Computer Usage, is the same as that of the previous surveys — to monitor the changing nature of the business school computing environment. The purpose over the past eight years has remained the same — to provide deans and other policy makers with information that may assist with computer allocation decisions and program plans. The reader is cautioned that this survey reflects what the schools report they are doing and is not an endorsement of what they should be doing.

The First, Second, Fourth, and Sixth Surveys gathered information on the hardware, software, and other computer resources of the schools, while the Third Survey addressed issues of concern to the deans. The Fifth, focused on business school computerization in terms of process, recognizing that the introduction and use of technology is ongoing and that the schools may not only be approaching computerization differently, but also at different rates. Last year's survey, the Seventh, detailed the operating budgets and computer-related services to provide the costs of computer-related services.[1]

This survey, the Eighth, returns to the specific focus of hardware, software, and other computer resources, allowing an update on these specifics of the business school computer environment. However, more emphasis has been given to instructional support resources with expanded discussions regarding entrance and graduation requirements and expectations, the impact of information technology on the curriculum, and classroom electronic equipment.

For several categories of the data (budget expenditures, staff support, and student and faculty microcomputer densities), the data is divided into quartiles to give a more detailed picture of the distribution across the schools. For each quartile, the median value for the variable is reported rather than the mean, to avoid the skewing problems that occur when there are extremely high or low values in the distribution. The sample size ("N" value) varies across many of the tables and figures in this report because of missing data.

Additionally, throughout this report, where appropriate and available, comparable data from the Second (1985), Fourth (1987), Fifth (1988), Sixth (1989), and Seventh (1990) Surveys are also included. These surveys do not comprise an exact longitudinal study, as the same schools are not being followed over a period of time. Rather, the survey samples comprise the accredited business schools which wish to add their data. The accuracy of comparisons between years are therefore a function of a changing sample. However, given the overall consistency of the sample and its structure as described in the next section, the identification of some general trends seems appropriate.

This report is divided into eight sections: Introduction, Profile of Surveyed Schools, Support Resources, Hardware Resources, Communications Resources, Software Resources, Instructional Support Resources, and Data Resources. Three appendices detail the demographics, mini/mainframe and microcomputer systems, and computer labs by school.

1 The Second, Fourth, Fifth, and Sixth Surveys have been published in the *Communications of the ACM*, Volume 29, No 1 (1986), Volume 31, No 7 (1988), Volume 32, No 1 (1989), and Volume 33, No 5 (1990). The Seventh has been scheduled for publication in *CACM*, December, 1991.

2. Profile of Surveyed Schools

The population for the Eighth Survey once again consisted of the schools currently accredited by the American Assembly of Collegiate Schools of Business (AACSB) and ten Canadian business schools which had participated in previous surveys. Of the 276 schools available for participation, 166 completed the 12 page questionnaire, a 60% response rate. The questionnaires were completed primarily by computer center directors (31%), faculty members (24%), and assistant deans (14%).

The schools that participated in this survey are identified in the appendices. In comparison with the Sixth Survey, (which also focused on hardware, software, and other computer resources), the sample of this Eighth Survey was about the same size. One hundred twenty-one (74%) of the 163 business schools in the Sixth Survey also provided data for the Eighth Survey.[2]

Table 1 displays general demographic information about the 166 schools in this year's sample together with data from previous survey samples. For most of the categories given in Table 1, the data has been consistent over the last seven years. For example, for 1985, 1987, 1988, 1989, and 1991, participation by type of school, public versus private, has remained approximately two-thirds public and one-third private. The level of programs, reflected in the type of degrees offered, has also stayed about the same. Student enrollments and mini/mainframe facilities available at the participating schools, however, continue to fluctuate slightly across the time period.

Table 1
Demographics of Participating Schools
(percent of schools)

	First 1984 N=35	Second 1985 N=125	Fourth 1987 N=128	Fifth 1988 N=175	Sixth 1989 N=163	Seventh 1990 N=145	Eighth 1991 N=166
Type of school Public	49%	69%	67%	68%	68%	70%	68%
Private	51	31	33	32	32	30	32
Degrees offered							
Undergraduate only		2	2	2	3	3	5
Undergraduate & graduate	66	86	85	88	89	86	86
Graduate only	34	12	13	10	7	9	7
No data					1	2	2
Student enrollment (FTE)							
Less than 1000 students	37	22	25	24	22	23	22
Between 1000 and 2000	23	22	27	21	26	28	29
Between 2000 and 3000	20	26	24	23	20	20	20
More than 3000 students	20	30	24	32	31	27	27
No data					1	2	2
Mini/mainframe facilities							
Both school & university	54	27	29	34	31	27	27
School only	6	4	7	6	6	10	8
University only	40	64	60	56	59	58	60
No data		5	4	4	4	5	5

Appendix 1 presents general demographic information, including type of school, student enrollments, faculty counts, budgets and staff ratios, and computer fee charges by school for the 1991 sample.

2 The complete SAS files of the Second, Fourth, Fifth, Sixth, Seventh, and Eighth raw data are available to interested researchers. Please contact the Information Systems Research Program, Anderson Graduate School of Management, University of California, Los Angeles, CA 90024-1481, or ghyatt@agsm.ucla.edu.

3. Support Resources

Successful implementation of information technology requires hardware, software, support staff, financial support, maintenance, communication links, and instructional support resources. This section examines the financial and staff resources of the business schools supporting the computerization effort.

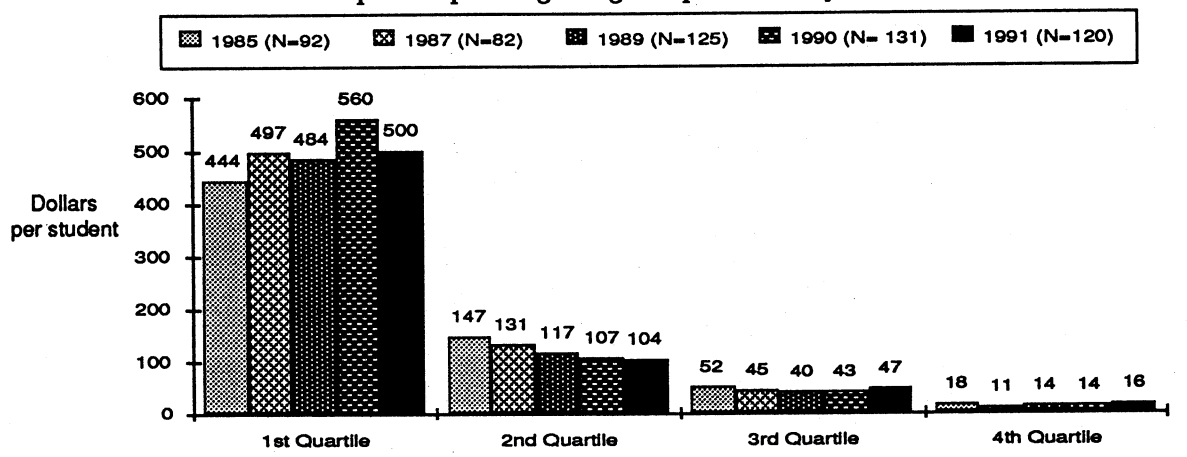
3.1 Budgets

Two budget items continue to be tracked in the surveys: the total annual business school operating budget and the total annual business school computer operating budget. The computer operating budget includes staff salaries, benefits and support, equipment maintenance and services, software and data acquisition and licenses, supplies, operating overhead, and computer recharge funds. It does not include major capital expenditures where list value is greater than $2000 and depreciation is 3 years or more (e.g., microcomputer purchases), lease payments, and faculty salaries. One hundred twenty-three (74%) of the schools reported their total school budget, 122 (74%) reported their computer operations budget, and 109 (66%) reported both. Several schools noted some changes in the inclusions or exclusions. Some of the schools not answering this question indicated that the data was confidential, not available at this time, unknown, or controlled by the university and not the business school.

For the 123 schools providing data, the total annual business school operating budgets ranged from $60,000 to $140,000,000, with a median of $3,500,000. The total annual business school computer operating budgets for the 122 schools providing data ranged from $6,000 to $5,800,000 with a median of $78,000. For the 109 business schools providing data for both budgets, on average, the computer operating budget was 4.2% of the total school budget, up from 3.8% in the Sixth Survey (1989), 3.3% in the Fourth Survey (1987), and 3.0% in the Second Survey (1985). This year's sample continues the trend of a slight increase in the overall financial commitment to computer support seen in the previous years.

To provide another basis of comparison of the budget data across the business schools, the annual computing operating budget was converted into a per student statistic by dividing the reported computer operating budget by the total student full-time equivalent (FTE). For the 120 schools providing both the computer operating budget and the student enrollment data, the median quartile expenditures per student were $500, $104, $47, and $16, respectively, as shown in Figure 1. The largest change in dollar per student support is seen in the first quartile, where support decreased an average of $60 per student, from $560 in the 1990 data to $500 for this 1991 data. Average support per student remained within four dollars for the other three quartiles.

Figure 1
Median Computer Operating Budget Expenditure by Quartiles



The business schools also provided details regarding computer usage charges and fee structures. Table 2 summarizes this information, comparing it with data from the 1989 survey. For the 150 business schools with undergraduate programs as well as the 154 with MBA programs, the number of schools with student computer usage charges increased. Specifically, over the past two years, the percentage of undergraduate schools requiring a computer usage charge has increased from 29% to 45%. The number of MBA schools requiring a computer usage charge has similarly increased from 31% to 44%. The charge breakouts summarized in Table 2 are quite similar for the undergraduate and the MBA programs, with the exception of slightly higher charges per year for the MBA programs. Charges other than those specifically listed in the table included per course charges for certain majors, one time mandatory charges, and differential charges by residence (state/non-state), by student status (part-time/full-time), by system used (PC, MAC, mini/mainframe), and by service (full or selective, e.g., e-mail only).

Table 2
Computer Usage Charges at Business Schools
(percent of schools)

	Undergraduate		MBA	
	1989 N = 149	1991 N = 150	1989 N = 157	1991 N = 154
Computer charges	29%	45%	31%	44%
No computer charges	71	55	69	56
Charges per course	10%	16%	8%	12%
	Range: $1-50	Range: $6-50	Range: $1-50	Range: $6-50
	Median: $15	Median: $20	Median: $15	Median: $20
Charges per semester or quarter	5%	9%	5%	9%
	Range: $15-165	Range: $4-65	Range: $15-165	Range: $4-65
	Median: $25	Median: $30	Median: $25	Median: $30
Charges per year	7%	10%	10%	8%
	Range: $10-300	Range: $11-250	Range: $10-345	Range: $16-350
	Median: $60	Median: $70	Median: $90	Median: $75
Charge for output (most schools indicated for laser output only)	10%	11%	11%	11%
	Range: $.04-.50	Range: $.05-.30	Range: $.04-.50	Range: $.05-.30
	Median: $.14	Median: $.18	Median: $.15	Median: $.20

3.2 Computing Support Staff

A major portion of a business school's computing operating budget is allocated to its staff support salaries. Data from last year (1990) indicated that the 131 schools which provided data allocated an average of 52% of their computer operating budget to staff salaries.

One hundred thirty-five (81%) of the business schools in this survey indicated that they had their own computing support staff, autonomous from other campus facilities and supported out of the business school computer operating budget. The total number of staff ranged from .25 to 50.5 FTE. Technical, hardware and network staff ranged from .1 to 17 FTE, academic user support staff from .2 to 24 FTE, administrative user support staff from .2 to 15.33 FTE, and computer facilities management staff from .1 to 13 FTE.

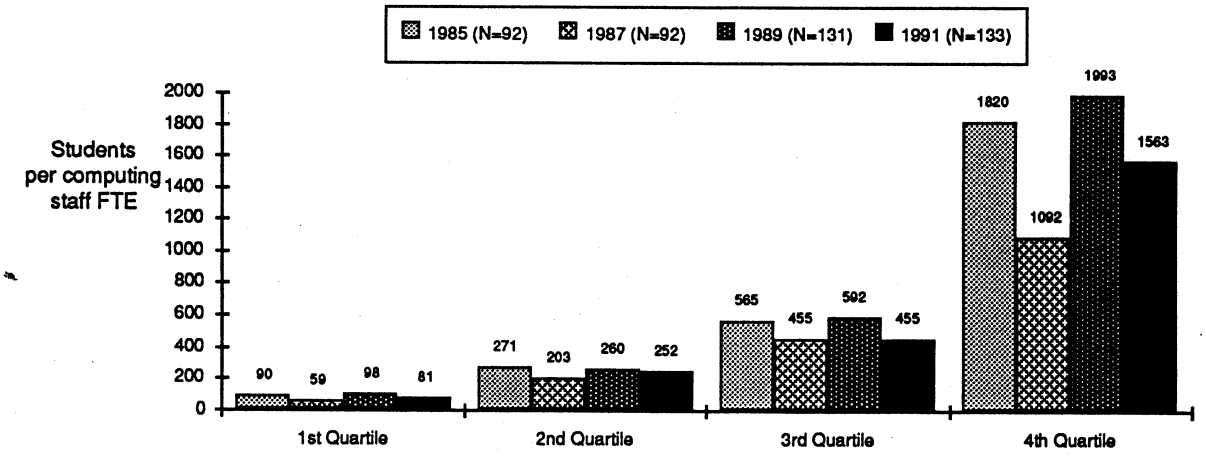
Table 3 details the business schools' staff FTE allocations among the four categories: technical (hardware and network), academic user support, administrative user support, and computer facilities management. Based on quartile medians, schools in all quartiles appear to employ approximately twice as many academic user support personnel as technical staff. Administrative user support levels are about the same as the computing service management levels. These staff allocations have remained the same as previously reported in the 1989 survey.

Table 3
Median Computing Staff Support Categories by Quartiles
N=135

FTE Allocations	Quartile 1st	2nd	3rd	4th
Technical support	5	2	1	0.5
Academic user support	10	4.5	2.5	1
Administrative user support	4	1.5	0.8	0.4
Management	3	1.5	1	0.5
Total staff FTE	22	9.5	5.3	2.4

The ratio of student FTE to total staff FTE was calculated to provide further comparison of the computing support staff across the business schools. Figure 2 displays this ratio by quartile for the 133 schools providing both the staff and student enrollment data, the median ratios for each quartile being 81, 252, 455, and 1563, respectively, with a sample median of 341. All of the quartiles showed improvements in staff support from the 1989 data. However, looking at the data over the full-time period between 1985 and 1991, the level of staff support within each quartile has remained relatively flat. On the other hand, there is a wide disparity between the quartiles.

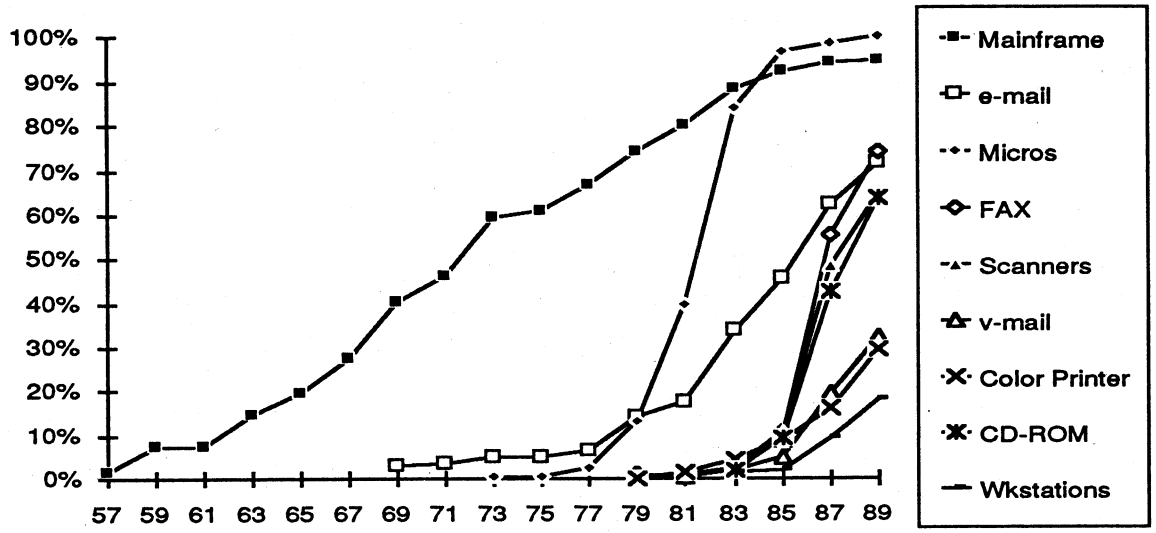
Figure 2
Median Staff Support of Computing by Quartiles



4. Hardware Resources

Information technologies are entering our business schools at an ever increasing rate. Figure 3 shows the responses of this year's sample to the question "What year did these information technologies become generally available within your school?" The graph shows that mini/mainframe systems have entered the schools at a fairly uniform rate over the past thirty years. Electronic mail (e-mail) also shows a rather slow rate of introduction, following its implementation on the early mini/mainframe systems. However, it is only now beginning to become commonly used with the connectivity provided through networked microcomputers. Microcomputers, on the other hand, achieved a dominant position in six short years, followed very quickly by other information technologies: FAX, scanners, voice-mail, color printers, CD-ROM, and workstations. Overall, the absorption rate of the new technologies into the business school environment is increasing.

Figure 3
Introduction of Information Technologies
(percent of schools with technology)



Thus, the options for computer hardware resources in the business schools continue to expand. Furthermore, there is a blurring of distinctions between hardware categories. It is increasingly difficult to differentiate between some minicomputers and some workstations, to clearly identify that point where workstations end and microcomputers begin. Within this context, this year's survey questionnaire categorized the microcomputer systems by type of processor and differentiated between the minicomputer and the workstation based on whether the system was primarily designed for use by a single user (workstation) or multiple simultaneous users (minicomputer). This section examines the business schools' hardware resources, providing details on mini/mainframes, microcomputers, laptops, workstations, and computer labs.

4.1 Mini/Mainframe Computer Systems

One hundred fifty-eight (95%) of the business schools indicated that their users had access to mini/mainframe systems. Thirteen of these schools indicated that they used only their own mini/mainframe systems, 45 schools accessed both their own and university-wide systems, and the remaining 100 schools relied exclusively on access to the university-wide systems. Appendix 2 provides detailed information on the make and models of mini/mainframe availability as reported by each school.

The 58 business schools (35%) which maintained their own mini/mainframe systems listed 95 separate computers. Although 14 different vendors were represented, only five had systems supported by at least three or more of the schools. Table 4 displays the make, model, and number of these mini/mainframes. Digital Equipment Corporation had the largest number, 36 (38%) of the total 95. The AT&T 3Bxs, the VAX 11/8xxxs, and the IBM 43xxs shared the position of most installed system with 9 systems each. Table 4 shows a decrease in number for many of the models but at the same time an increase in diversity of models for several of the vendors. Viewing the data from an average number of systems per school, the steady increase shown between 1984 and 1989 appears to be reversing with the average number of systems per school decreasing over the past two years. Furthermore, only 16 (10%) of the business schools indicated plans for acquiring a new mini/mainframe system, (usually within a one year time frame), down from the 1989 data which showed 27 (17%) schools with plans for acquiring a new system.

Table 4
Business School Mini/Mainframe Systems Installed by Model
(number of systems)

Make (at least three systems)		1984 N=33	1985 N=39	1987 N=46	1988 N=70	1989 N=61	1990 N=54	1991 N=58
AT&T	3Bx			3	14	15	10	9
Data General								
	MV xxx			2	4	3	4	3
Digital	VAX 11/7xx	7	10	17	23	18	15	5
	VAX 3xxx							6
	VAX 4xxx							4
	VAX 6xxx						5	6
	VAX 8xxx			4	7	8	7	9
	MicroVAX			5	11	16	7	6
Hewlett-Packard								
	HP3000s	6	8	11	12	12	5	5
	HP9000s							4
IBM	43xx	2	9	13	16	17	12	9
	S36,38		1	3	6	7	6	5
	9370						3	5
	AS400							6
Others (1 or 2 each)		20	27	19	29	23	23	13
Total		**37**	**59**	**80**	**127**	**122**	**100**	**95**
Average per school		1.1	1.5	1.7	1.8	2.0	1.9	1.7

Data provided by 55 of the business schools which maintained their own mini/mainframes indicated several distinct patterns of usage, as shown in Table 5. Thirty-four (37%) of these mini/mainframes were used only for a single purpose, either for coursework (12 schools), for research (12 schools), or for administrative activities (10 schools). Since 1989, the number of systems dedicated solely to instruction has decreased by 35% while the number used only for administrative activities has increased by 37%. Twenty-eight (30%) of these larger systems were shared in all three categories of use, and the remaining 30 (33%) were used for dual purposes, the most popular being the combination of course and research usage.

Table 5
Business School Mini/Mainframe Systems Usage Patterns
N=55 business schools
(using 92 mini/mainframes)

Usage Categories		Course		Research		Administration
12	used only for	x				
12	used only for			x		
10	used only for					x
28	used for all	x	and	x	and	x
23	used for	x	and	x		
3	used for	x			and	x
4	used for			x	and	x

4.2. Microcomputers

The most significant area of growth within the business school computer environment in recent years has been in the introduction of microcomputers. One hundred sixty-four (99%) of the schools in this Eighth Survey (1991) provided microcomputer data. The total number of microcomputers reported by these business schools was 35,228, ranging from 16 to 830 per school, with quartile medians of 353, 243, 141, and 71 microcomputers per school for the first through fourth quartiles, respectively. There was an average of 215 microcomputers per school. Appendix 2 presents the microcomputer information detailed by school.

4.2.1 Models and Market Penetration

One hundred sixty-four schools reported owning a total of 35,228 microcomputers. Table 6 details the microcomputer models for which at least 300 systems were reported. The average number of systems per school continues to grow, but at a much slower rate, 7% over the past year, in contrast to 18% and 23% between 1987-1988 and 1988-1989 respectively. The IBM PC/XTs, PS2/25s and the IBM PC/ATs, PS2/30s, 50s, and 60s remain dominant, representing 33% of the microcomputer systems. The Macintosh Pluses, SEs, and Classics follow with 8% of the systems, together with the 386 clones. All of the other models are 7% or under.

Table 6
Business School Microcomputers by Model
(number of systems)

Model (>300 systems)	1985 N=119		1987 N=128		1988 N=175		1989 N=161		1990 N=143		1991 N=164	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
IBM PC/XT, PS2/25	5120	54	7509	45	10149	37	9286	30	7204	25	6543	19
IBM PC/AT, PS2/30,50,60	259	3	1194	7	2110	8	1827	6	1506	5	4916	14
Macintosh Plus, SE, Classic	457	5	925	5	1893	7	2165	7	2456	9	2747	8
Clones 386									615	2	2650	8
IBM PS2/70,80					1305	5	2393	8	3678	13	2545	7
Clones 286							1055	3	1597	6	2303	6
Clones 8086							2714	9	2666	9	2070	6
Zenith 150	411	4	1791	11	3274	12	3923	13	1276	4	1484	4
HP Vectra 286	40	0	349	2	538	2	1194	4	715	3	1328	4
Macintosh IICI											977	3
HP Vectra 386							632	2	315	1	886	3
Macintosh II							444	2	1011	4	868	2
Zenith 386											760	2
Unisys	544	6	593	4	765	3	881	3	848	3	731	2
Zenith 286									2037	7	722	2
AT&T 6300											678	2
Macintosh SE/30											665	2
AT&T 286					1172	4	1043	3	489	2	550	1
Others	2725	28	4364	26	6004	22	3183	10	2345	7	1805	5
Total	9556	100%	16725	100%	27210	100%	30740	100%	28758	100%	35228	100%
Average systems per school	80		131		155		191		201		215	
Average percent growth			64%		18%		23%		5%		7%	

The top nine models in Table 6 account for 76% of the total 35,228 microcomputers. Table 7 distributes these models among the faculty, student, administrative, and computer staff user groups. Seventy-seven percent of these systems are about evenly divided between the faculty and students.

Table 7
Microcomputer Distribution by User Groups
(nine major models)

Model	Number Schools	Total Systems	Student	Faculty	Admin	Computer Staff
IBM PC/XT, PS2/25	133	6543	40%	35%	22%	3%
IBM PC/AT, PS2/30,50,60	122	4916	36	34	23	4
Macintosh Plus, SE, Classic	110	2747	35	39	21	5
Clones 386	102	2650	36	46	14	4
IBM PS2/70, 80	104	2545	40	38	14	8
Clones 286	94	2303	30	42	25	3
Clones 8086	64	2070	41	41	17	1
Zenith 150	45	1484	48	37	14	1
Vectra 286	31	1328	53	24	20	3
Average			40	37	19	4

Table 8 displays the variety of microcomputer models reported by the schools owning four or more of the same systems. Overall, at least 28 different microcomputer vendors and 55 different microcomputer models were reported. Within Table 8, the vendor models based on similar microprocessors were grouped together. Thus, 74% of the schools reported having four or more IBM PC/XTs or PS2/25s, 60% IBM PC/ATs, PS2/30, 50 or 60s, 51% Macintosh Pluses, SEs or Classics, and 45% IBM PS2/70 or 80s. In Table 8, data has been retained for all identifiable models over the past six years so that the pattern of emerging and declining microcomputer systems can be observed.

Table 8
Business School Microcomputers
(percent of schools with model)

Model (at least 4 systems)	1985 N=119	1987 N=128	1988 N=175	1989 N=161	1990 N=143	1991 N=164
IBM PC/XT, PS2/25	82%	86%	86%	86%	85%	74%
IBM PC/AT, PS2/30,50,60	5	35	35	34	33	60
Macintosh Plus, SE, Classic	13	26	29	35	48	51
Clones 386				8	23	47
IBM PS2/70, 80			31	49	58	45
Clones 286				17	32	43
Clones 8086				35	39	32
Macintosh IICI						27
Macintosh II				17	30	25
Macintosh SE/30						24
Zenith 150					27	24
Zenith 286	10	30	42	29	32	21
Zenith 386						20
HP Vectra 286	3	9	11	13	13	16
HP Vectra 386				7	8	14
AT&T 6300					6	13
AT&T 286		6	14	12	8	7
Unisys	4	8	7	6	7	7
AT&T 386				3	6	6
Clone 486						4
IBM PS2/90, 95						1
Macintosh IIFX						1
DEC Rainbow	13	6	6	6	4	
Apple II series	16	10	7	5	4	
Leading Edge				4	4	
NCR				2	3	
HP 150s	4	10	7	6		
Tandy	10	2	4	2		
Other	19	31	35	33	21	24

In general, the number of leading vendors has remained about the same. However, the diversity of separate models supported by the business schools has continued to increase. Table 9 documents this change. For example, in 1987, 76% of the responding schools were supporting one to three different microcomputer models. In 1989, the schools supporting one to three different microcomputer models had dropped to 18%, and then further to 13% in 1990, and to only 2% in 1991. Ninety-eight percent of the schools are now supporting at least four models. Twenty-five percent of the schools reported supporting between 11 and 18 different models, with these models extending across two or three generations of microprocessor chips. For example, a single vendor school may have IBM PCs with 8086 chips, PC/ATs with 80286 chips and PS/2s with 80386 or 80486 chips.

Table 9
Different Microcomputer Models Supported by School
(percent of schools)

Number of different microcomputer models	1987 N=128	1989 N=161	1990 N=143	1991 N=164
1	17%	1%		
2	35	6	4%	1%
3	24	11	9	1
4	12	15	8	10
5	7	18	10	15
6	3	14	15	8
7		10	14	11
8		7	12	12
9		8	12	9
10	1	5	7	9
11-14		4	6	21
15-18			1	4

4.2.2 Microcomputer Operating Systems

One hundred forty-nine schools estimated that an average of 88% of their IBM or IBM-compatible microcomputers were using MS DOS, with the percentages ranging from 3% to 100%. One hundred eight schools estimated that an average of 16% of their IBM or IBM-compatible computers were using MS DOS with Windows, with the percentages ranging from 0.5% to 98%. Similarly, 24 schools indicated using OS/2, 5% on average, with the percentages ranging from 0.5% to 35%, and 23 schools indicated using UNIX, 5% on average, with the percentages ranging from 0.5% to 40%.

Twenty schools indicated that they had a plan or a goal of achieving 100% Windows or another graphical user interface within an average of 18 months (ranging from 5 to 36 months). Fifty-three schools indicated a plan or a goal of achieving an average of a 45% (ranging from 4% to 95%) windows-type environment within an average of 13 months (ranging from 3 to 36 months). Seventy-five schools indicated that they had not yet addressed this issue. Fifteen schools commented that the implementation decision is still under evaluation or will be when the budget permits, that they have an intensive Macintosh environment, that their plans were either for students or faculty exclusively, or that they were not in favor of the window environment.

4.2.3 Microcomputer Densities

Two ratios were calculated to provide further understanding of the penetration of microcomputers into the business school computer environment. The first ratio, student-per-microcomputer, was calculated by dividing the total student FTE by the number of the school's microcomputers available for student use. This density measure thus reflects the number of students

who share access to a single microcomputer. For example, a student microcomputer density of 28 is interpreted as 28 students sharing access to a single microcomputer system. The second ratio, faculty-per-microcomputer, was calculated by dividing the faculty FTE by the number of the school's microcomputers available exclusively for faculty use. As these ratios do not take into consideration any microcomputer systems that might be owned privately by the students or the faculty, the actual number of students or faculty who share access to microcomputer systems is probably lower (i.e., better) than reported.

Of the 154 schools who provided the necessary data, the median student-per-micro density by quartile is 10, 20, 29, and 62, respectively, as shown in Figure 4. Of the 159 business schools providing the necessary data, the median faculty-per-micro densities are 0.8, 1.0, 1.3, and 2.2, as shown in Figure 5. These figures again reflect the continuing, but slowing, growth of microcomputers into the business school computer environment. Furthermore, the data shows a continuing decline in the disparity between the quartiles. For example, the ratios between student microcomputer density quartiles in 1985 were 1:5:8:16, while in 1991 they were 1:2:3:6.

Figure 4
Student Microcomputer Density by Quartiles

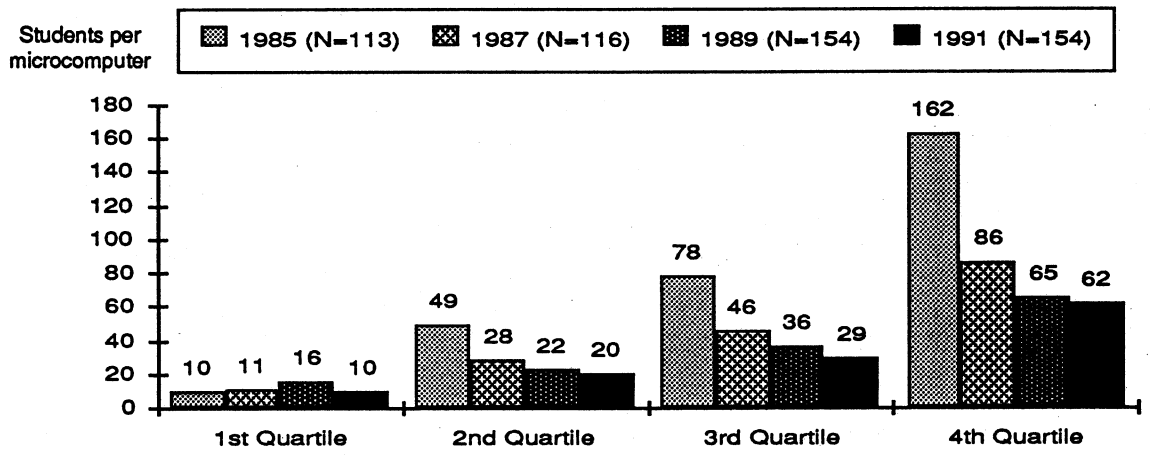
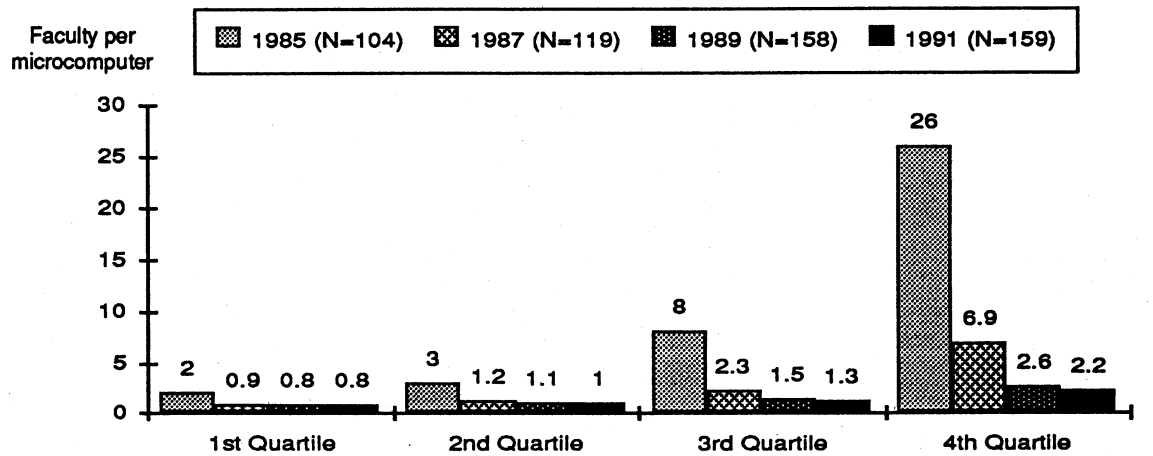


Figure 5
Faculty Microcomputer Density by Quartiles



Another measure of the penetration of microcomputers into the business school environment is the general perception of the sufficiency of the microcomputers to meet the schools' current demands, excluding exam times and at the end of the term. Table 10 presents the sufficiency responses, together with the microcomputer densities for each group. Considering faculty access to microcomputers, the data indicates that a faculty-to-micro density of 1.4 or less provides the faculty with a "never any waiting" access, while a density of 1.6 provides an "occasional waiting" access. For the students, the data suggests that a density of 34 or less achieves a "never any waiting" access, while a density of above 40 and less than 70 provides an "occasional waiting" access. Densities over 100 suggest there is "always a wait". The data tends to indicate that the MBAs are more tolerant of the higher microcomputer densities than the undergraduates. However, as discussed in the next section, it is estimated that a higher percentage of MBAs own their own microcomputers and thus may not be as dependent on the school-provided systems as are the undergraduates.

Reference to Figures 4 and 5 show that the microcomputer densities may be considered sufficient for all except the fourth quartile for both the students and the faculty. This sufficiency view adds support for the general slowing in growth of microcomputers at the schools. Overall, in about 98% of the business schools providing data, there seems to be sufficient microcomputers for both the faculty and the students so that there is never "always a wait" for microcomputer access.

Table 10
Microcomputer Sufficiency by User Group
(percent of schools)

	Faculty N=143		Undergraduate N=134		MBA N=139	
Microcomputer access	**%**	**density**	**%**	**density**	**%**	**density**
Never any waiting	80	1.4	15	24	19	34
Occasional waiting	20	1.6	84	43	79	63
Always a wait			1	134	2	107

4.2.4 Acquisition and Estimated Ownership

One-hundred forty-two of the schools offering undergraduate programs and 144 of the business schools offering graduate programs provided data regarding their student microcomputer purchase requirements for the 1990-91 academic year. Eighty-five percent of these undergraduate schools and 80% of these MBA program schools indicated that their students were not required to purchase a microcomputer. Thirteen and eighteen percent of these undergraduate and MBA programs, respectively, responded that purchase was recommended but not required. The remaining two percent for each group indicated that purchase was required for some students (e.g., quantitative-oriented freshmen or executive MBAs).

One hundred thirty-one undergraduate schools and 129 MBA schools provided estimates of the percentages of their students owning microcomputers. Table 11 gives these estimated percentages. For both the undergraduate and MBA ownership estimates, this year's and last year's data are about the same. Weighted averaging suggests that about 23% of the undergraduates and 43% of the MBAs own microcomputers.

Table 11
Estimated Student Microcomputer Ownership
(percent of schools)

Student Ownership	Undergraduate 1990 N=111	Undergraduate 1991 N=131	MBA 1990 N=116	MBA 1991 N=129
Less than 1/3	83%	82%	46%	41%
1/3 to 2/3	15	16	38	40
More than 2/3	2	2	16	19

4.2.5 Maintenance

One hundred sixty (96%) of the business schools provided information regarding maintenance of their school-owned microcomputers. Fourteen (9%) of these schools responded that they had no definite policy regarding maintenance. Ninety-eight (61%) of the schools responded that they used their own staff for maintenance, 88 (55%) contracted with outside vendors, and 48 (30%) contracted with university services. Twelve (8%) of the schools provided other responses to the maintenance question, indicating that maintenance was provided by a combination of in-house and contractors as required, often without formal contract arrangements and on a time and materials basis.

With regard to maintenance and support of faculty-owned microcomputers, 58 of the total 150 responding schools (39%) indicated that their business school provided the maintenance.

4.3 Laptop and Portable Systems

For several years, laptops and portable microcomputer systems have been considered the new area of potential growth and expansion. The popular press is indicating that laptops and the new lightweight notebook systems are the fastest growing segment in the computer market today. However, the data presented in Table 12 is showing a different picture with respect to business schools. This may reflect the fact that the schools are creating computer lab environments where desktop systems are more appropriate. Laptop systems may be appropriate for individual rather than business school ownership.

The percentage of schools that have laptops has been increasing annually. The average laptop systems per school has fluctuated between 1987 and 1991. This fluctuation is due to the overwhelming dominance in the number of Hewlett-Packard systems and the variation in the number of these systems reported each year. Although the data was collected by model, in Table 12 the models were aggregated by vendor due to the growing number of different models available. Hewlett-Packard dominates with 49% of the systems, followed by Zenith with 19%, Compaq with 9%, Toshiba with 7%, and IBM with 6%. Table 12 demonstrates the "staying power" of older technology, specifically the Hewlett-Packard laptops which are no longer manufactured but still provide functional benefits.

Table 13 presents another view, providing information on the portable systems installed by the schools by vendor. Zenith systems were reported by 59% of the schools, Compaq by 37%, Toshiba by 28%, and IBM by 27%. Although Hewlett-Packard laptops are given as the absolute leader in number of systems, they are concentrated in only 8% of the schools.

Table 12
Laptop and Portable Systems by Vendor
(number of systems)

Vendor	1987 N=82 n	%	1988 N=135 n	%	1989 N=135 n	%	1990 N=122 n	%	1991 N=143 n	%
Hewlett-Packard	1076	66	990	43	3226	69	436	21	1602	49
Zenith	77	5	291	13	502	11	567	28	637	19
Compaq	151	9	338	15	315	7	297	14	292	9
Toshiba	13	1	149	6	153	3	279	14	227	7
IBM	226	14	447	19	236	5	159	8	218	6
Tandy	7	>1	11	>1	113	2	113	5	126	4
Apple							14	1	29	1
Data General							28	1	29	1
NEC	28	2	25	1	29	<1	20	1	20	1
Other	49	3	77	3	126	3	136	7	104	3
Total	**1627**	**100%**	**2328**	**100%**	**4700**	**100%**	**2049**	**100**	**3284**	**100**
Average systems per school	19.8		17.2		34.8		16.8		23.0	
% schools with laptops	64		77		83		85		86	

Table 13
Laptop and Portable Systems
(percent of schools)

Vendor	1987 N=82	1988 N=135	1989 N=135	1991 N=143
Zenith	23%	43%	47%	59%
Compaq	23	39	28	37
Toshiba		16	17	28
IBM Convertible	27	33	26	27
Hewlett-Packard	11	15	14	8
Apple				8
Tandy		4	3	6
NEC	2	5	6	5
Data General				2
Other	16	14		16

4.4 High Performance 32-bit Graphic Workstations

Another area of potential growth has been the 32-bit high performance graphic workstations, the systems between the microcomputers and the mini/mainframes. However, with the emergence of the high performance microcomputers (e.g., IBM PS/2 Model 90 or Apple Macintosh IIFX), the distinction between these workstations and microcomputers is becoming fuzzy.

Table 14 presents the workstations by vendor. The two most popular workstations reported in this year's data were the Sun with 124 (35%) of the total 355 workstations, followed by the Digital with 115 (32%). As with the laptops, the average number of workstations shows fluctuation over the years.

Table 14
High Performance 32-bit Graphic Workstations by Vendor
(number of systems)

Vendor	1988 N=31		1989 N=33		1990 N=49		1991 N=48	
	n	%	n	%	n	%	n	%
Sun	50	34%	73	23%	105	46%	124	35%
Digital	16	11	153	49	43	19	115	32
IBM	59	41	33	10	33	15	38	11
NeXT			3	1	3	1	37	10
HP/Apollo	13	9	21	7	2	1	24	7
Xerox	4	3	30	9	33	15	9	3
TI	3	2	3	1	6	3	6	2
Other					2	1	2	1
Total	**145**	**100%**	**316**	**100%**	**227**	**100%**	**355**	**100%**
Average systems per school	4.7		9.6		4.6		7.4	
% schools with workstations	18%		20%		34%		29%	

Table 15 indicates that the Sun and Digital workstations, the leaders in ownership numbers, are also dispersed throughout 58% and 48% of the schools respectively, followed by the IBM workstations, reported by 33% of the schools.

Table 15
High Performance 32-bit Graphic Workstations
(percent of schools)

Vendor	1988 N=31	1989 N=33	1990 N=49	1991 N=48
Sun	42%	39%	39%	58%
Digital	19	36	31	48
IBM	26	30	27	33
NeXT		9	6	17
HP/Apollo	10	9	4	13
TI	10	9	10	10
Xerox	3	9	6	2
Other			2	4

4.5. Computer Labs

Data on computer labs was provided by 159 (96%) of the business schools. Five hundred twenty-seven separate computer labs were identified, accounting for 13,782 microcomputers, 39% of the total 35,228 microcomputers reported in this year's survey. On average, there were 3.3 computers labs per school, with 26.2 microcomputers in each lab. Appendix 3 details the computer labs for the 468 labs which reported having four or more microcomputer systems.

Table 16 summarizes the computer lab data and compares it with the data from 1989. The major difference is in the area of communications, with this year's data showing a 46% increase in the number of labs which have been networked and a 28% increase in the number linked to a host. Another difference is in the number of laser printers per lab, which has increased from just under one to about one and a half. The final difference is in consultant availability. There has been an increase in the percent of computer labs with consultants available more that two thirds of the time, and a decrease in those with consultants available less than one third of the time.

Table 16
Business School Computer Labs

	1989 N = 157	1991 N = 159
Number of labs	490	527
Average per school	3.1	3.3
Range	1-12	1 - 10
Total lab micros	12,450	13,782
% of total micros reported	40%	39%
Average micros per lab	25.4	26.2
Range	1-84	10 - 100
Communications		
Average labs networked	48%	70%
Average labs linked to host	41%	54%
Output devices		
Average dot matrix printers per lab	8.9	9.1
Range	(.33-43)	(.2-48)
Average laser printers per lab	.98	1.58
Range	(.14-4)	(.2-11)
Average plotters per lab	.7	.62
Range	(.17-2)	(.16-3)
Usage		
Regular classroom instruction	49%	48%
User group dedication (number of labs)	477	509
Students or students/staff only	75%	73%
Faculty or faculty/staff only	11%	10%
All users	14%	17%
Consultant availability (number of labs)	432	474
less than 1/3 time	31%	24%
1/3 to 2/3 time	10%	11%
greater than 2/3 time	59%	65%

5. Communications Resources

Information technology connectivity is facilitated through the communication resources, which include both the hardware and software as well as the cabling, conduits, phone lines, and switches. About the same percentage of business schools provided local area network data this year as for 1989, 80%, compared to 66% for 1987 and 39% for 1985. This increase corresponds to the impressive growth in the number of microcomputers with network connectivity.

5.1 Microcomputer Communications

Network data provided by 131 of the business schools for 28,915 microcomputers (82% of the total 35,228 reported by the schools in this year's survey) showed that only 8,282 (29%) of the microcomputers were stand alone, not linked to any other computer systems. The remaining 71% were linked: 5,940 (20%) to a host only, 4,352 (15%) to other microcomputers, and 10,341 (36%) to both a host and other microcomputers. Figure 6 displays this data. This aggregate form shows the major change in the amount of microcomputer networking over the past six years. Sixty percent of the 131 schools reported that more than two-thirds of their microcomputers were networked, almost twice the percentage reported in the 1989 survey. The "none" category may be somewhat misleading though, as the 35 schools which did not provide data were not added into that category and it is likely that many of them did not provide any connectivity between their micros.

Figure 6
Microcomputers with Communications Connectivity

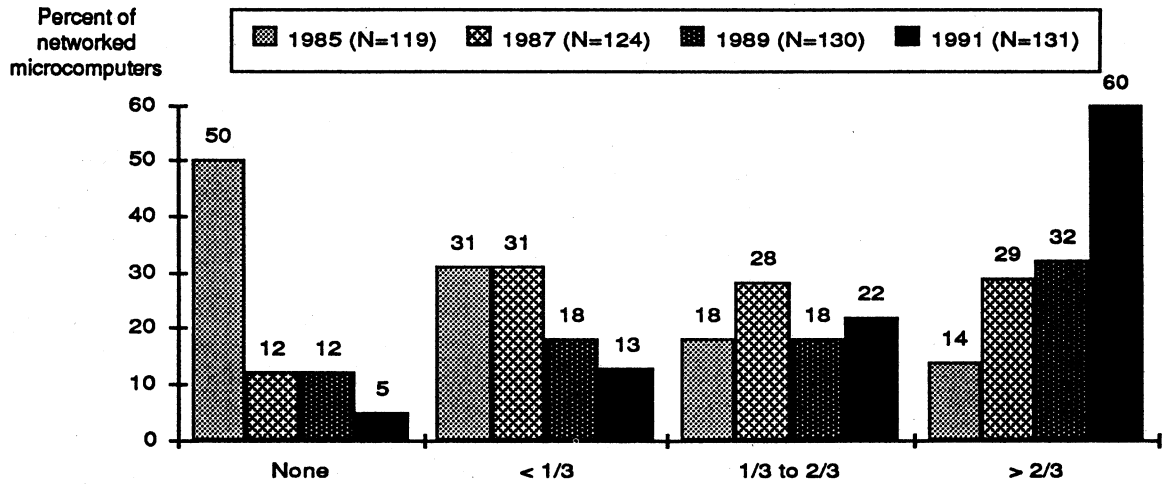
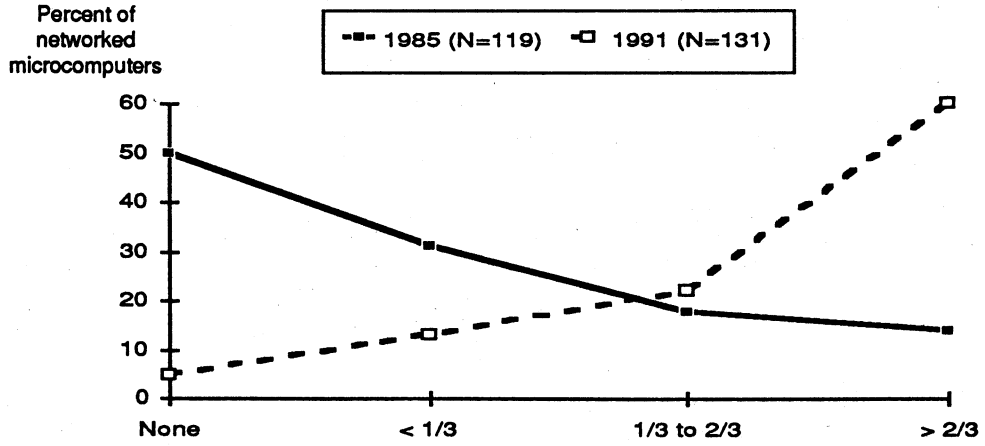


Figure 7 extracts the 1985 and the 1991 data to present another view of the impressive increase in microcomputer connectivity, showing the complete reversal within six years in the percent of schools with most of their systems allowing communication through networks.

Figure 7
Microcomputers with Communications Connectivity: 1985 and 1991



5.2 Local Area Networks

One hundred fifty-three (92%) of the schools provided information regarding their network environment protocols/topologies, the standard technological formats used on their local area networks for data transmission. Protocols are the "hand shake" rules between computers which allow the passing of data. Table 17 summarizes the responses and shows that Ethernet, Appletalk, and Token Ring were the most common. The other protocols/topologies were identified by less than 20% of the schools. Of the 154 business schools reporting LAN protocols, 52 (34%) listed only one protocol, 52 (34%) listed two different protocols, 32 (21%) listed three, and 17 (11%) listed four or more. Schools with multiple protocols may or may not have bridged them together.

One hundred forty-five (87%) of the schools provided information regarding their network environment file sharing software, the local area network software that facilitates data transmission between the host and/or interconnected microcomputers. Table 18 summarizes the responses and shows that the Novell Netware, 286 and 386, together with Appleshare were the most common. The other protocols were identified by less than 20% of the schools. Of the 145 business schools reporting LAN file sharing software, 59 (41%) listed only one, 49 (34%) listed two, and 37 (25%) listed three or more. Unlike the multiple protocols which can co-exist, schools using more than one file sharing software have them each on a separate network.

With regard to the microcomputers being connected to a host mini/mainframe, 65 schools indicated using a data switch, port selector, or PABX. Twelve schools indicated using Micom, seven schools AT&T, six schools Gandolf, five schools each DecServer, IBM, and Rolm. Fourteen other switching devices were reported once or twice each.

Table 17
Local Area Network Protocols/Topologies
(percent of schools)
N=166

Protocol/Topologies	%
Ethernet	67
Appletalk	49
Token ring	27
PC LAN/PC Network	18
DecNet	17
Arcnet	15
SNA	7
Starlan	5
TCP/IP	4
Other	6

Table 18
Local Area Network File Sharing Software
(percent of schools)
N=166

File Sharing Software	%
Novell Netware 286	44
Appleshare	41
Novell Netware 386	34
NFS (network file system)	11
TOPS	10
OS/2 file server	7
Starlan	7
MS Lan Manager	6
Other	16

5.3 Electronic Mail and Conferencing Systems

One hundred fourteen (69%) of the schools provided information about their electronic mail and conferencing systems. Approximately 55 different systems were listed. Of those, only five were given by six or more schools: WP Office (by 23 schools), Dec VAX Mail (22), IBM Profs (14), :cc Mail (9), and VMS mail (6). All of the other e-mail systems were identified by three or fewer schools. Eleven schools specifically mentioned using internally developed systems, although this number may be larger as some of the systems given may have been developed internally but not identified as such.

One hundred twenty-six schools estimated that on average, about 38% of their faculty members were regular electronic mail users, using the mail system at least three times a week. One hundred fourteen schools estimated that just over 44% of their staff were regular electronic mail users. Similarly, 60 schools estimated that about 26% of their MBAs were regular users and 59 schools estimated that just over 17% of their undergraduates were regular users.

6. Software Resources

Twenty-two different categories of software packages used by the participating business schools were identified both by computer system implementation (mini/mainframe and microcomputer) as well as by usage (instruction and research). Table 19 summarizes the software usage as reported by the schools for each of these categories. Sorted by number of schools reporting microcomputer software packages, this table emphasizes the variety of packages in each category. For example, the first line in Table 19 shows that for word processing, 58 business schools listed software packages for mini/mainframes and 163 schools listed software packages for microcomputers. Within the mini/mainframe category, 6 packages were identified as used for instruction and 14 for research. Within the microcomputer category, 17 different packages were identified for instructional usage, whereas 31 were listed as being used for research.

Table 19
Summary of Computer Software Usage
(ordered by number of schools reporting microcomputer software usage)
N = 163

	Mini/mainframes			Microcomputers		
		# of Packages			# of Packages	
	# Schools	Instruction	Research	# Schools	Instruction	Research
Word Processing	58	6	14	163	17	31
Graphics/Presentation	106	5	5	158	24	28
Spreadsheets	8	3	4	158	8	8
Communications	128	14	18	154	25	29
Database Mgmt Sys	84	13	13	153	18	18
Statistical	148	7	14	151	29	23
Desktop Pub	34	2	4	128	7	10
Prog Languages	118	12	10	125	12	12
Modeling/Opt	84	4	11	124	14	12
AI/Expert Sys	29	6	7	105	20	23
Simulation	52	8	6	81	11	8
Dev Tools	6	3	2	80	11	7
Business Games	22	10	1	78	34	7
Virus	3	3	3	63	18	20
Utilities	0	0	0	61	6	5
Multimedia / Hypermedia	0	0	0	28	9	8
Project Mgmt	1	0	1	24	8	7
GDSS	4	3	2	19	13	9
Instructional Programs	5	3	0	18	10	4
Bibliographic	9	6	7	17	9	9
Integrated Packages	1	1	1	16	3	6
Text Analysis	4	1	2	16	3	8
Others	0	0	0	2	3	3

When compared to the data from 1989, the overall number of schools providing data was approximately the same (156 for 1989 and 163 for 1991). However, the schools reported using more categories of software than in previous years. Almost without exception, the number of software packages in each category decreased. For example, in the graphics/presentation software category, the number of schools reporting mini/mainframe usage increased from 35 to 106, with a decrease in the number of software packages from 13 to 5 for instruction and from 19 to 5 for research. Similarly, for microcomputer usage, the number of schools using graphics/ presentation software increased from 97 to 158 and the number of different software packages decreased from 60 to 24 for instruction and from 56 to 28 for research. The average decrease in the number of different software packages for mini/mainframe instruction was 61% (for the 13

categories reported in 1989) and for mini/mainframe research 51%. The single exception was the number of statistical packages for research which increased from 11 to 14. Similarly, the average decrease in number of different software packages for microcomputer instruction was 45% and for research 35%, with the exception of the number of word processing packages for research which increased from 29% to 31%. The data is showing strong evidence of a consolidation in the software industry, for both the mini/mainframes and the microcomputers.

6.1 Software Details by Application Category

In the subsections which follow are tables which detail the software application categories. It should be noted that among these tables, the number of schools differs since some schools did not report software for that category. The count listed next to the software package reflects the number of times that package was reported by five or more schools. "Other" reflects the total number of schools reporting software packages not listed by name (thus being listed by less than five schools). The different packages at the bottom of each column in the tables gives the total number of different software packages reported by the schools.

Artificial Intelligence, Expert Systems

This software application area is summarized in Table 20 and indicates that more software packages are specified for microcomputers than for mini/mainframe systems. The number of schools reporting artificial intelligence (AI) and expert systems software increased 52% over the number reported in the 1989 survey. LISP was the only package identified by five or more schools for the mini/mainframes. Prolog, Exsys, Guru, LISP, and VP-Expert were most commonly listed for microcomputers. VP-Expert remained especially strong for instructional use.

Table 20
Artificial Intelligence, Expert System Software
(N = number of schools reporting software package)

Mini/mainframes (N=29)				Microcomputer (N=105)			
Instruction		Research		Instruction		Research	
LISP	15	LISP	14	VP-Expert	53	Prolog	31
Other	9	Other	10	Prolog	24	VP-Expert	28
				Exsys	22	LISP	24
				Guru	13	Exsys	16
				Other	27	Guru	14
						Other	25
Different Packages	6		7		20		23

Bibliographic Software

Bibliographic search software is a new application category, collected for the first time in this survey. Nine schools reported using mini/mainframe software with four of them using LUIS. Seventeen schools listed bibliographic software for microcomputers. The most commonly used packages were ProCite listed by six schools and EndNote listed by four schools.

Business Games

As in the previous surveys, this type of application software remains stronger for instructional usage than for research, reflecting the integration of computers through the business games into the curriculum. The business games microcomputer instructional category showed the largest number of different packages, 34. However, only Markstrat, mentioned by 39 schools, and Marketing Game mentioned by 22 schools met the criteria of being identified by five or more schools. Compared to the 1989 data, the number of different packages declined by an average of 64% for mini/mainframes and 53% for microcomputers.

Communications

Communications software is among the top six most widely used applications as ordered in Table 19. Table 21 shows this very high response rate among the schools in both computer environments with 128 (79%) of the schools identifying mini/mainframe usage and 154 (95%) identifying microcomputer usage. KERMIT is the most commonly used communications package, followed by Procomm. Although there are still a large number of different packages listed for microcomputers, the total decreased from the 1989 data by an average of 28%. The total number of different packages listed for mini/mainframes decreased by an average of 34%.

Table 21
Communications Software
(N = number of schools reporting software package)

Mini/mainframes (N=128)				Microcomputer (N=154)			
Instruction		Research		Instruction		Research	
KERMIT	107	KERMIT	108	KERMIT	112	KERMIT	117
Procomm	31	Procomm	33	Procomm	64	Procomm	77
YTERM	8	YTERM	9	YTERM	12	Crosstalk	25
TCP/IP	6	TCP/IP	5	TCP/IP	7	YTERM	12
Other	14	Other	18	FTP/TELNET	5	FTP/TELNET	6
				Other	21	TCP/IP	5
						Other	26
Different Packages	14		18		25		29

Database Management Systems

Database management systems software is also one of the leading microcomputer applications identified in Table 19. The number of schools reporting database software has remained just about the same as for 1989. As shown in Table 22, about twice as many schools reported using this software on microcomputers than on mini/mainframe. dBase was the most dominant microcomputer package. For the mini/mainframe systems, SQL, Oracle, and INGRES were the most common. Although the different number of mini/mainframe software packages decreased by an average of 60% from the 1989 data, the number of microcomputer packages decreased by an average of only 29%.

Desktop Publishing

As may be seen in Table 23, desktop publishing is primarily a microcomputer application, with almost four times as many schools responding with software listings for the microcomputers as for the mini/mainframes. The most popular package for the microcomputers remained PageMaker, again followed by Ventura, and TeX.

Table 22
Database Management System Software
(N = number of schools reporting software package)

Mini/mainframes (N=84)				Microcomputer (N=153)			
Instruction		Research		Instruction		Research	
SQL	31	SQL	26	dBase	124	dBase	106
Oracle	20	Oracle	19	R:BASE	54	Paradox	48
INGRES	14	INGRES	15	Oracle	25	R:BASE	42
Informix	6	Focus	10	Paradox	23	Oracle	26
RDB	6	RDB	5	Focus	12	Focus	13
Other	17	Other	8	Foxbase	6	INGRES	11
				INGRES	6	Other	16
				Other	15		
Different Packages	13		13		18		18

Table 23
Desktop Publishing Software
(N = number of schools reporting software package)

Mini/mainframes (N=34)				Microcomputer (N=128)			
Instruction		Research		Instruction		Research	
TeX	10	TeX	33	PageMaker	69	PageMaker	76
Other	1	Other	3	Ventura	19	Ventura	35
				TeX	14	TeX	31
				Ready Set Go	7	WordPerfect	5
				Other	6	Other	6
Different Packages	2		4		7		10

Development Tools

Development or Computer Assisted Software Engineering (CASE) tools are an important part of the instructional environment for system analysis and design courses. Eleven different microcomputer-based CASE tools were being used for instruction by 80 schools. Excelerator remained as the primary software package, listed by 70 (88%) of the schools, with the other packages listed only once or twice.

Graphics and Presentation Software

Graphics application software, detailed in Table 24, identifies eleven different packages for microcomputers with Lotus and Harvard Graphics remaining the most common. For the mini/ mainframes, SPSS and SAS Graph are reportedly used with about equal frequency. The number of schools using mini/mainframe software increased an average of 200%, from 35 in the 1989 survey to 106 currently, while the microcomputer usage schools increased by an average of 63%.

Group Decision Support Systems

Group decision support system software is another new category, collected for the first time in this survey. There was considerable latitude in the responses as a school may use a package designed for one purpose in innovative ways, thus extending the application beyond its

Table 24
Graphics and Presentation Software
(N = number of schools reporting software package)

Mini/mainframes (N=106)				Microcomputer (N=158)			
Instruction		Research		Instruction		Research	
SPSS	52	SPSS	77	Lotus	117	Harvard	110
SAS Graph	49	SAS Graph	76	Harvard	92	Lotus	109
Other	3	Telegraf	5	MacDraw	49	SAS Graph	54
		Other	2	MacPaint	34	MacDraw	45
				FreeLance	20	Freelance	34
				Storyboard	18	Chart	12
				HP Gallery	14	HP Gallery	11
				PowerPoint	9	DrawPerfect	9
				Chart-Master	8	PowerPoint	5
				QuattroPro	6	QuattroPro	5
				DrawPerfect	6	Other	25
				Other	22		
Different Packages	5		5		24		28

original intended purpose. For example, some schools listed business game packages in this category. Four schools reported using three different mini/mainframe software packages. Nineteen schools reported using microcomputer software, with Vision Quest and University of Arizona Group Systems being reported by five and three schools respectively.

Instructional Support Software

Instructional support software is also a new category, collected for the first time in this survey. For both computer environments, the schools reported developing their own programs in-house using spreadsheet and database management software, although SAS Gradebook was mentioned by several schools and was used by both mini/mainframes and microcomputers.

Integrated Packages

Integrated packages combine spreadsheet, word processing, database, graphics and communication capabilities under a common interface. The only software package reported by more than five schools was MS Works, mentioned by eight schools under the microcomputer instructional category. Even though integrated packages were once perceived as a potential replacement for the various separate application packages, this has not happened. Although there was a 13% decrease in the number of schools listing this application between 1987 and 1989, the number of schools responding in this category stayed just about the same in this year's survey as in 1989.

Modeling and Optimization

Previously, modeling and optimization applications showed about the same amount of usage in both of the computer environments. Now, however, as presented in Table 25, more schools indicated microcomputer usage. LINDO and IFPS continue to be very popular for this application for both the mini/mainframe and microcomputer systems, although use of Storm greatly increased in the microcomputer instructional environment.

Additionally, the number of different programs in the mini/mainframe environment has decreased from 1989 by an average of 72% and in the microcomputer environment by an average of 61%.

Table 25
Modeling and Optimization Software
(N = number of schools reporting software package)

Mini/mainframes (N=84)				Microcomputer (N=124)			
Instruction		Research		Instruction		Research	
LINDO	51	LINDO	51	LINDO	73	LINDO	54
IFPS	36	IFPS	29	Storm	46	IFPS	25
Other	2	Other	11	IFPS	38	What's Best!	12
				QSB	31	Other	11
				What's Best!	10		
				Other	12		
Different Packages	4		11		14		12

Multimedia and Hypermedia

Information on the use of multimedia and hypermedia was collected for the first time in this survey. Applicable only in the microcomputer environment, twenty-eight schools reported nine separate programs. Among the more common packages, Hypercard was reported by eleven schools and Toolbook by six.

Programming Languages

Programming languages (at one time the only software available) now share the domain, being listed eighth in Table 19. Details of programming language usage, presented in Table 26, have remained about the same since 1989, except for the number of different packages which have once again decreased an average of 39% for the mini/mainframes and 29% for the microcomputers.

Table 26
Programming Language Software
(N = number of schools reporting software package)

Mini/mainframes (N=118)				Microcomputer (N=125)			
Instruction		Research		Instruction		Research	
COBOL	67	FORTRAN	79	BASIC	68	FORTRAN	65
BASIC	40	C	42	Pascal	39	BASIC	60
Pascal	39	Pascal	41	COBOL	37	C	59
FORTRAN	36	BASIC	36	C	36	Pascal	48
C	30	COBOL	36	FORTRAN	29	Prolog	25
PL/1	8	PL/1	15	Prolog	15	LISP	23
Other	7	Other	6	Other	7	COBOL	23
						Other	9
Different Packages	12		10		12		12

Project Management

Project management software is another of the software applications dominated by the microcomputer environment. Twenty-four schools indicated microcomputer project management software usage. For instructional usage, MS Project was mentioned by seven schools and SuperProject by five. None of the other different packages were listed by more than five schools.

Simulation

The simulation category has shown a shift from being primarily a mini/mainframe application in 1987, to being used about equally in both computer environments in 1989, to currently being used more in the microcomputer environment. The software packages presented in Table 27 have remained the same with the exception of two packages, Siman and Sim Factory, which are also now being used by five or more schools. The number of different mini/mainframe packages has remained about the same, although the number of different microcomputer packages has decreased an average of 44%.

Table 27
Simulation Software
(N = number of schools reporting software package)

Mini/mainframes (N=52)				Microcomputer (N=81)			
Instruction		Research		Instruction		Research	
GPSS	21	GPSS	22	SLAM	26	SLAM	26
SLAM	13	SLAM	18	GPSS	24	GPSS	19
Simscript	11	Simscript	15	STELLA	19	STELLA	18
Other	5	Other	4	Simscript	10	Simscript	11
				Siman	7	Siman	5
				Sim Factory	6	Other	3
				Other	7		
Different Packages	8		6		11		8

Spreadsheet Packages

Spreadsheet software shares second place with graphics/presentation software surpassed only by word processing as shown in Table 19. In Table 28, 158 schools are using only 8 different microcomputer spreadsheet packages, an average decrease of 53% from the 1989 data. Lotus 1-2-3 continues to dominate, being specified by about 91% of the schools. All of the other microcomputer software packages listed have remained the same with the exception of QuattroPro which has made a strong entry, being included for the first time this year. In the mini/mainframe category, 20/20 was the only package to meet the criteria of being identified by more than five schools for inclusion in the table.

Table 28
Spreadsheet Software
(N = number of schools reporting software package)

Mini/mainframes (N=8)				Microcomputer (N=158)			
Instruction		Research		Instruction		Research	
20/20	4	20/20	4	Lotus 1-2-3	143	Lotus 1-2-3	138
Other	2	Other	3	Excel	70	Excel	86
				QuattroPro	36	QuattroPro	38
				VP-Planner	27	VP-Planner	18
				SuperCalc	10	SuperCalc	16
				Other	3	Other	6
Different Packages	3		4		8		8

Statistical Packages

Previously the dominant environment for statistical software was the mini/mainframe. This year's data shows that statistical software is being used more equally in both computer environments. Table 29 shows that the major mini/mainframe packages have been successfully adapted to the microcomputer environment, with SAS, SPSS, and Minitab being the most common packages in all categories. With regard to the number of different packages indicated by the schools, use on mini/mainframes remained about the same as in 1989, but the number of different microcomputer packages decreased by an average of 24%.

Table 29
Statistical Software
(N = number of schools reporting software package)

Mini/mainframes (N=148)				Microcomputer (N=151)			
Instruction		Research		Instruction		Research	
SAS	93	SAS	127	Minitab	67	SAS	97
SPSS	86	SPSS	125	SPSS	61	SPSS	85
Minitab	65	Minitab	52	SAS	59	Minitab	56
BMPD	13	LISREL	40	SYSTAT	42	RATS	51
Other	4	BMPD	30	TSP	22	Gauss	40
		TSP	23	RATS	19	TSP	33
		Other	8	StatGraphics	16	Systat	16
				Microstat	10	StatGraphics	15
				Mystat	5	Other	17
				Other	24		
Different Packages	7		14		29		23

Text Analysis Software

Text analysis software is another new category, collected for the first time in this survey. As shown in Table 19, four schools reported using two different mini/mainframe software packages and sixteen schools reported using eight different microcomputer packages. The most popular microcomputer package was Grammatik, being listed by six different schools.

Utility Software

Utility software is also a new application category, collected for the first time in this survey. Sixty-one schools listed use of this microcomputer software. Only two packages were listed by five or more schools, Norton Utilities (43 schools) and PC Tools (16 schools).

Virus Protection Software

Virus protection software is yet another new application category. Sixty-three schools primarily listed microcomputer applications, with three packages identified by five or more schools: McAffee Viruscan by 14 schools, SAM by eight, and FProt by six. For a new category, a considerable number of different packages, 17, was listed other than these three, but none met the criteria of being reported by five or more schools.

Word Processing

Word processing is again the single most prevalent microcomputer software application. As shown in Table 30, 163 business schools listed 31 different microcomputer word processing packages. WordPerfect has again remained the dominant package, reported by over 93% of the schools. Although the number of different mini/mainframe packages decreased by an average of 45% from 1989 and the number of packages used in the microcomputer instructional environment decreased by 39%, the number used in the microcomputer research environment increased by two packages.

Table 30
Word Processing Software
(N = number of schools reporting software package)

Mini/mainframes (N=58)				Microcomputer (N=163)			
Instruction		Research		Instruction		Research	
Other	8	Script	10	WordPerfect	141	WordPerfect	152
		TeX	29	MS Word	69	MS Word	94
		XEDIT	28	MacWrite	35	WordStar	63
		Other	16	WordStar	24	TeX	42
				PC-Write	11	PFS Write	19
				DisplayWrite	9	PC-Write	18
				PFS: Write	9	DisplayWrite	17
				MultiMate	8	MultiMate	17
				Other	11	MacWrite	6
						Other	30
Different Packages	6		14		16		31

6.2 Software Standards

One hundred forty-six (88%) of the schools provided information regarding the issue of software standards. Fifty-four percent of these schools indicated that they did not have a software standard. The remaining 46% of the schools provided definitive statements as to what differentiated "standard" from "non-standard" software, indicating the various orientations as to what the term "standard" meant.

Twenty-nine schools interpreted "standard" in terms of what software was supported by the computer staff. Included in this interpretation of "standard" was automatic upgrading when new versions became available. Nineteen schools listed specific packages by name as the "standard" for the most common applications (word processing, spreadsheets, and database management systems). The next most common definition (given by ten schools) was very pragmatic: "standard" was defined as those software packages most common in the real world business environment. Additionally, some schools in this group suggested that market share leadership determined the definition of "standard". Seven schools indicated that "standard" software was the software that the policy committee determined would be supported. The other schools listed additional interpretations: software which would run on the local area network, software for which the school had site licenses, or complete versions of the software versus abbreviated student versions.

It is clear that when the word "standard" is used with regard to software, there are a multitude of interpretations of what is meant. Therefore, whenever discussing software and standards, it is probably helpful to clarify which definition of "standard" is being used.

7. Instructional Support Resources

This section covering instructional support resources includes computer entrance and graduation requirements/expectations, penetration of computers into the curriculum as indicated by hands-on computer use in the core courses, sources of courseware, classroom electronic equipment, and computer-related training for various computer user groups.

7.1 Entrance Requirements/Expectations

Of the 150 business schools offering undergraduate business programs, 105 (70%) indicated that there were no computer literacy entrance requirements for their students. Thirty-three (22%) of the business schools had requirements, a seven percent increase over the 1989 survey data. The requirements were usually a passing grade in an introductory computer course or passing a computer literacy exam in which knowledge of basic applications and/or programming was demonstrated.

For the 154 schools with MBA programs, 89 (62%) stated that there were no computer literacy entrance requirements. Fifty-five (38%) of the graduate business schools specified requirements, a nine percent increase over the 1989 data. These requirements included prerequisite courses in computer concepts, MIS, or applications (9 schools), general computer literacy (word processing, spreadsheets and database management systems), or familiarity and experience (12 schools). Eight of the graduate schools stated that they required computer proficiency hands-on exams, using microcomputer applications software. Several others mentioned microcomputer and/or mini/mainframe workshops.

7.2 Graduation Requirements/Expectations

Table 31 summarizes the computer requirements and/or expectations upon graduation from business school for both the undergraduate and the MBA programs, comparing the 1991 data with that of 1989. The presentation of this year's data differs slightly in that the 1989 "required" category has been separated into "required" and "required for some" categories for 1991.

As shown in Table 31 the order of importance of the requirements as suggested by the percentage rankings remains the same for both the undergraduate and the MBA programs. Furthermore, a larger percent of the undergraduate programs than MBA programs specify requirements.

To enable a more thorough understanding of the change in requirements and expectations, average percent changes were calculated. For this calculation, the "required" and "required for some" categories for 1991 were added together. Overall, for the undergraduate programs there was a three percent decrease in graduation requirements and a negligible change in graduation expectations. For the MBA programs there was a six percent decrease in graduation requirements, but a corresponding three percent increase in graduation expectations.

The data continues to show the emphasis on microcomputer systems over mini/ mainframes in the business school environment. The largest single graduation requirement decrease for both the undergraduates and the MBAs was in mini/mainframe use, 16% and 17% respectively. Other major shifts were with respect to MBA microcomputer and spreadsheet usage. Required use of each of these decreased by 11% while expectations increased by 5%. "Other" requirements given by some of the business schools included use of a graphics package, an accounting system, a statistical package, and an expert system shell.

Table 31
Computer Requirements and Expectations Upon Graduation
(percent of schools)

	Undergraduate					MBA				
	1989 N=149		1991 N=150			1989 N=157		1991 N=154		
Requirements/Expectations	Required	Expected	Required	Required for some	Expected	Required	Expected	Required	Required for some	Expected
Computer/Info Sys course	91%	3%	82%	5%	5%	75%	10%	67%	3%	13%
Microcomputer use	83	12	77	3	13	76	17	62	2	23
Spreadsheet use	81	14	75	4	15	72	21	60	1	25
Word Processing use	71	20	63	2	25	51	37	47	1	37
Database use	58	19	52	11	19	41	29	36	5	32
Mini/mainframe use	50	25	27	7	19	38	30	20	1	31
Programming language	41	16	23	15	11	19	15	10	5	17
Online database retrieval	18	25	13	7	22	17	29	15	3	29
Computer literacy exam	11	10	9	1	11	12	11	9		18

7.3 Penetration into the Curriculum

As a measure of penetration of computers into the curriculum, the business schools indicated whether hands-on use of computing was required in their undergraduate and graduate core courses, using the course descriptions as given by AACSB. The schools responded whether required computer use occurred in none, some, or all of the core course sections. Figure 8 summarizes the responses for the undergraduate core courses and Figure 9 for the graduate core courses. For the undergraduate programs, over 70% of the schools indicated required computer usage for seven of the core courses; the MBA programs required usage for only six core courses. When Figures 8 and 9 are compared, in general, computer usage is required more at the undergraduate level than at the graduate level.

To see the aggregation of required computer usage across the curriculum, the data for Figures 8 and 9 was compared with that from 1985, 1987, and 1989, as shown in Table 32. The net change for each academic core area between the 1989 and the 1991 data was calculated, and then averaged into an undergraduate and graduate total for each of the years. Table 32 shows very little change in required computer usage for both business programs this year, compared to a 5% increase for the undergraduate programs and 6.6% increase for the graduate programs for 1987 to 1989. As is seen in the table, increases occurred in Information Systems, Management Science, and Organizational Behavior at the undergraduate level. However these increases were offset by the large decrease in required computer usage in the Marketing core classes. A decrease was also seen in required usage in the Marketing core classes at the graduate level.

Considering Table 32 from a long term perspective, several patterns of integration into the curriculum seem to have occurred. These patterns are somewhat different for the undergraduate and MBA courses. The most common pattern is a gradual introduction as seen in Business Policy, Information Systems, and Statistics at both the undergraduate and MBA levels, and as seen in Accounting, Economics, Management Science, and Organizational Behavior at the undergraduate level. In contrast, Production/Operations Management at both levels shows a rather flat pattern over the years with little change.

Figure 8
Required Computer Use in Undergraduate Core Courses

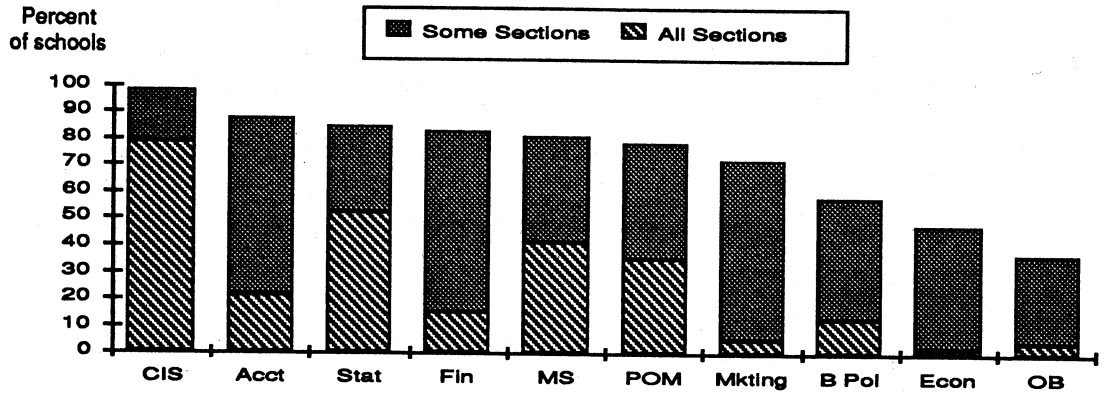


Figure 9
Required Computer Use in Graduate Core Courses

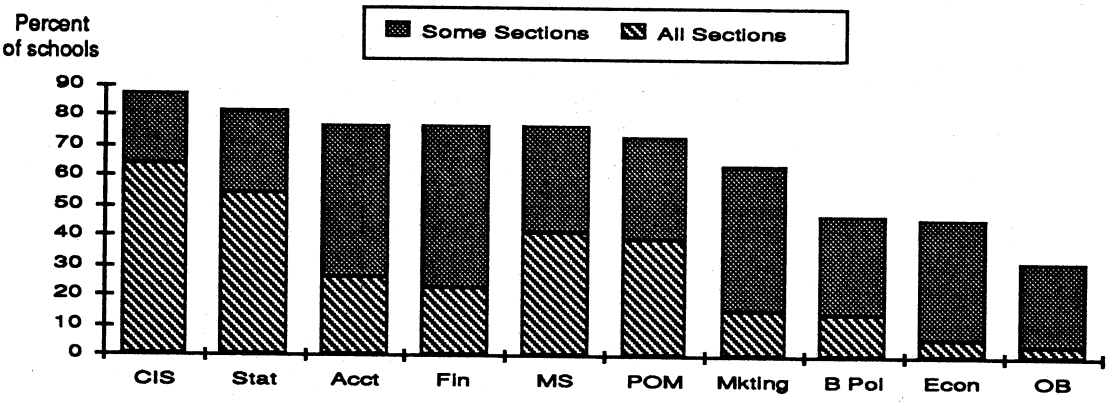


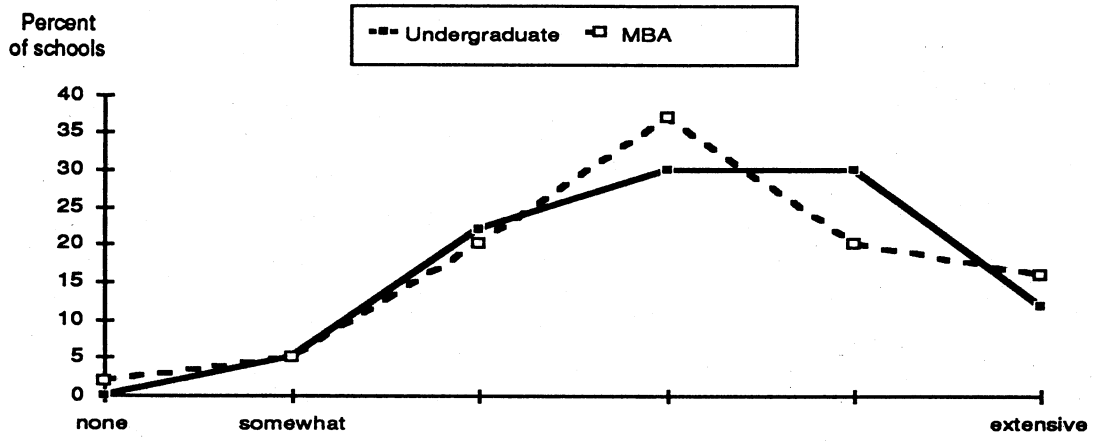
Table 32
Change in Required Computer Usage in Core Courses
(percent of schools)

	Undergraduate					Graduate				
Core Courses	**1985**	**1987**	**1989**	Change	**1991**	**1985**	**1987**	**1989**	Change	**1991**
Accounting	62%	84%	86%	2%	88%	55%	70%	80%	-3%	77%
Business Policy	42	47	58	-	58	32	44	47	-	47
Economics	29	37	49	-1	48	32	31	47	-1	46
Finance	64	81	83	-	83	76	75	80	-3	77
Info Systems	87	94	93	5	98	78	78	83	4	87
Mgt Science	52	69	74	7	81	77	74	77	-	77
Marketing	82	81	82	-9	73	55	58	70	-6	64
Org Behavior	20	26	32	5	37	21	22	31	1	32
Prod/Operations	78	74	77	2	79	71	75	70	3	73
Statistics	76	81	86	-1	85	69	72	80	2	82
Average	59.5%	67.4%	72%	1%	73%	56.6%	59.9%	66.5%	-.3%	66.2%

7.4 Impact on the Curriculum

This year the schools were asked a very direct bottom-line question, "To what degree has computer technology affected the curriculum at your business school?" The response to this question was on a zero to five scale, with zero being "none," one anchoring the "somewhat" responses and five anchoring the "extensively." One hundred forty-one (94%) of the undergraduate program schools and 147 (96%) of the MBA program schools responded. These responses are shown in Figure 10.

Figure 10
Impact of Computer Technology on the Curriculum



As shown in Figure 10, the bottom line answer suggested by the data is quite similar for both the undergraduates and the MBA schools. An average of 26% of both the undergraduate and MBA schools were perceiving the impact of computer technology on the curriculum more as "somewhat." On the other hand, 43% of the undergraduate schools and 36% of the MBA schools reported the impact more as "extensive." Overall, it appears that the collective efforts towards the computerization of the business school environment has positively impacted the curriculum even though this impact may not as yet be considered "extensive."

7.5 Sources of Courseware

For core courses for which a school indicated that there was at least some required computer use, the source of the courseware was requested. The sources mentioned included courseware that was developed internally, acquired with the textbook, acquired from commercial sources, or acquired from another university. Many schools indicated multiple sources for a particular course, and some listed commercial packages such as Lotus 1-2-3 as the courseware. Tables 33 and 34 summarize this data separately for the undergraduate and graduate core courses. The "N" values in these tables are the number of schools which indicated at least some required computer use with each line showing the percentage of schools in each cell based on that "N."

Both tables indicate that commercial software packages remain the dominant source of courseware. When compared to data from the earlier surveys, the averages have declined almost to their 1987 levels, down 9% at the undergraduate level and 11% graduate level. The internally developed courseware showed especially large decreases since 1989, 26% for the undergraduate level and 39% for the graduate level. In contrast, the major increases seen in 1989 for the amount of courseware acquired with textbooks (about 20% for both levels) remained. Acquisitions from other university percentages remained about the same as the 1987 and the 1989 data.

Table 33
Sources of Undergraduate Courseware
(percent of schools)

Undergraduate Core Class	N	Internal	Textbooks	Commercial	Other University
Accounting	132	24%	61%	71%	3%
Business Policy	87	10	51	57	5
Economics	72	24	42	68	6
Finance	125	24	46	78	6
Information Systems	147	28	48	81	8
Management Science	122	18	55	68	7
Marketing	109	11	50	63	7
Organizational Behavior	56	18	40	57	7
Production/ Operations	119	15	48	66	4
Statistics	127	15	36	81	4
Average		19	48	69	6

Table 34
Sources of Graduate Courseware
(percent of schools)

Graduate Core Class	N	Internal	Textbooks	Commercial	Other University
Accounting	118	20%	42%	72%	4%
Business Policy	73	12	36	70	4
Economics	71	18	37	70	7
Finance	118	26	36	75	5
Information Systems	134	20	32	78	7
Management Science	119	18	40	69	5
Marketing	99	13	37	66	6
Organizational Behavior	49	20	35	53	6
Production/ Operations	113	18	39	70	5
Statistics	127	17	32	79	4
Average		18	37	70	5

7.6 Classroom Electronic Equipment

Of the 156 schools reporting their use of interactive computer output display technology, 108 (69%) of the schools had permanently installed equipment. Seventy-five of these schools estimated the percentage of all of their classrooms that were permanently equipped; 55 (73%) of the schools reported permanent equipment in less than 25% of their classrooms, 10 (13%) in 25% to 50% of their classrooms, and 10 (13%) in more than 50% of their classrooms.

A heavy dependency was again seen on mobile units which could be wheeled between classrooms. One hundred fifty-one (94%) of the schools reported using mobile units, with 38 schools reporting one mobile unit, 45 schools two, 24 schools three, 12 schools four, and 17 schools five or more. Ninety-eight schools responded that these units were picked up and returned by the faculty and 51 schools responded that these units were delivered to the classroom by staff or teaching assistants. Several of the schools mentioned that the units were assigned to a faculty member.

For both the permanently equipped classrooms and the mobile units, the video projectors that were specifically identified ten or more times by the schools included Sony (53), Electrohome (19), Barco (18), and NEC (12). The video monitors that were specifically identified five or more times included Sony (10), Zenith (6), NEC (5), and Panasonic (5). Datashow was the most often specified LCD device used with the overhead projectors with 119 in 72 schools, followed by Sharp (60), Infocus (14), nView (14), PC Viewer (13), and Magnabyte (11). None of the other overhead projectors were identified by ten or more schools.

One hundred fifty-nine (96%) of the schools responded to the question regarding the general sufficiency of classrooms equipped with display devices. Over 16% of these schools indicated that they never had any scheduling problems. Fifty-nine percent indicated that they had occasional problems with scheduling. The remaining 25% indicated that they usually or always had scheduling problems.

There were many problems other than scheduling with the electronic classroom equipment. The most common, given by seventeen schools was in the set-up of the equipment, including unauthorized software configurations changes, the integrity and dependability of the equipment, cabling problems, the time required to set up and take down the systems, and the lack of available support staff. Another common problem, also given by seventeen schools was lack of training for the faculty on the use of the equipment. This included conflicts in the time required for preparation of the basic instructional materials and a questioning by the faculty of the equipment's effectiveness. Ten schools specifically mentioned the inadequacy of the optical system, problems with the focusing and achieving of a high enough resolution at a reasonable price. Eight schools mentioned the security of the system, together with seemingly constant maintenance problems due to the fragility of the systems and the multitude of different users. Seven schools pointed out problems with cumbersome physical environments, such as wrong-sized classrooms (either too large or too small), lighting, uneven floors, poor cart design, and elevators, all of which resulted in delivery and set-up problems. Other problems given by several schools included compatibility and equipment standards, inadequate storage and RAM, lack of a "smart system" to facilitate faculty and student interaction, and missing or damaged software.

The lack of appropriate equipment combined with the difficulties associated with the equipment currently available are seen as obstacles in integrating information technology into the curriculum.

7.7 Training

Figure 11 displays types of computer-related training for students for 1985, 1987, 1989 and 1991. In this table the relative position of the kinds of training has been consistent.

The respondents were also asked to identify the effectiveness of the different types of computer-related training programs provided to their students, faculty, and staff using a zero to five scale. The response to this question was on a zero to five scale, with zero being "none," one indicating "inadequate," three indicating "adequate for most users," and five indicating "exceptionally effective in meeting user needs."

Table 35 displays the data relating to the seven different training approaches by user group. Classroom instruction was shown to be the dominant form of training for students, followed by handouts/documentation, and university-provided workshops. University-provided workshops (followed by documentation) was the primary approach used for both faculty and staff. The table also shows that training as part of classroom instruction was

considered to be the most effective type of training for the undergraduates, that workshops prior to the beginning of classes was the most effective for the MBAs, and individual training was the most effective for both faculty and staff. CAI/video training was considered to be the least effective for the students, as well as for the faculty and for the staff.

Figure 11
Types of Computer-related Training for Students
(percent of schools)

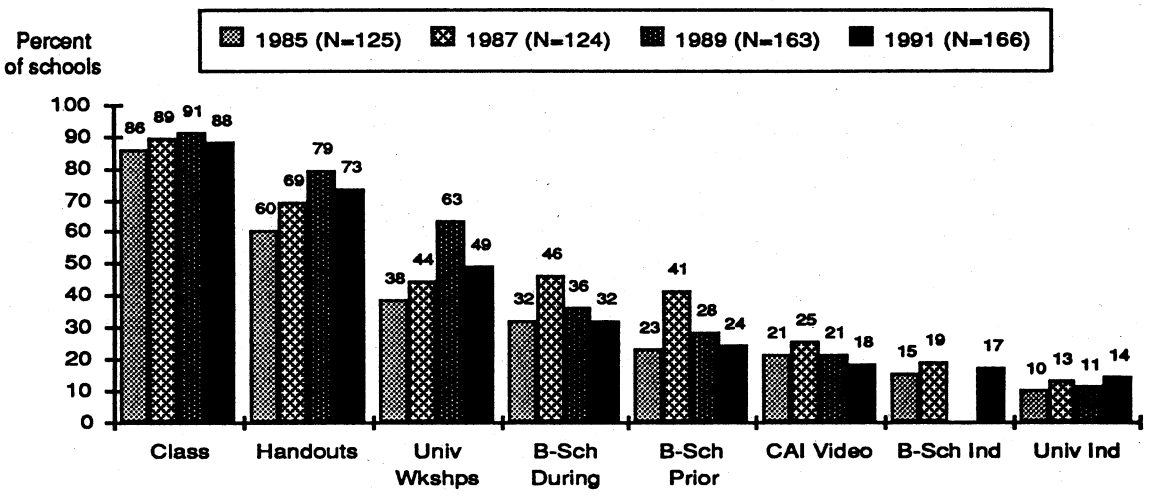


Table 35
Effectiveness of Computer-Related Training By User Group
(percent of schools)

Type of Training	Undergrad N=150		MBA N=154		Faculty N=166		Staff N=166	
As part of classroom instruction	91%	3.1*	85%	2.9*	19%	2.6*	16%	2.6*
University-provided workshops	51	2.3	47	2.2	78	2.5	83	2.5
University provided one-on-one training	15	2.0	14	2.2	31	2.6	33	2.6
Business school workshops (prior to the beginning of classes)	13	2.3	36	3.0	16	2.4	19	2.4
Business school workshops (during the academic year)	29	2.8	35	2.9	37	2.5	39	2.7
Business school individual training	15	2.7	18	2.5	47	3.1	46	3.1
Handouts, workbooks, and other documentation	72	2.8	74	2.8	71	2.7	71	2.7
CAI, video training	17	1.9	18	2.1	17	1.8	20	2.0

* Average effectiveness, scaled 1 = inadequate
3 = adequate for most users
5 = exceptionally effective in meeting user needs

8. Data Resources

Information regarding the databases available for research and instruction in at least 10% of the 166 business schools are summarized in Table 36. The table is ordered by percent of availability.

Compustat again remains the most widely used database and is available in 106 (64%) of the schools. Thirty-six (22%) of the schools reported storing the Compustat database online, 70 (36%) of the schools used tape storage, and 42 (25%) of the schools reported having Compustat available on CD-ROM. Some schools indicated that Compustat was available on all three storage media. Terminal dial-up access for Compustat was the most common access method reported by 50 (30%) of the schools, with faculty the primary users. On average, Compustat users were reported to be given "some support" by the schools. Only eight (5%) of the schools indicated an access charge for using the database.

Although data usage changes by the ten data sources for the user groups, averaging across all the databases, the faculty were shown to be the primary users (28%), followed by the MBA students (15%), and the Ph.D. students (13%). The library catalog data resource showed the highest level of support at 3.4.

Table 36
Databases Available for Research and Instruction
N=166
(ordered by availability)
(percent of schools)

Availability		Database	Storage Format			Access Method			Primary Users			Level of Support for Users	Access Charge	Funding Available
1989	1991		on-line	tape	CD-ROM	stand-alone	terminal dialup	via network	Faculty	Ph.D.	MBA	1=users on own 5=extensive support		
74%	64%	Compustat	22%	36%	25%	22%	30%	25%	64%	31%	24%	3.1 (1.3)	5%	11%
63	55	CRSP	22	41	1	4	30	25	54	27	13	3.0 (1.4)	6	9
37	48	Library catalog	46		2	4	25	32	42	20	30	3.4 (1.2)	2	1
26	30	Dow Jones	26	2	1	5	25	4	25	10	19	2.8 (1.3)	8	9
17	30	ABI Inform	9	1	25	21	6	8	22	8	19	3.3 (1.3)	4	5
21	28	Compact Disclosure	6	1	25	22	2	4	16	9	17	3.0 (1.4)	1	4
24	22	Citibase	13	9	2	5	8	13	20	10	8	2.9 (1.3)	1	1
17	21	Lexis	20	1	1	1	18	2	18	5	7	2.4 (1.3)	9	7
	14	Nexis	13	1			12	1	11	5	6	3.2 (1.6)	5	3
13	13	Value Line	7	6	1	3	6	5	11	4	7	2.9 (1.5)	2	2

EIGHTH ANNUAL UCLA SURVEY: 1991
GENERAL SCHOOL DATA

INSTITUTION	TYPE	UGRAD (FTE)	MBA (FTE)	PHD (FTE)	XMBA (FTE)	NON-D (FTE)	FAC (FTE)	COMP OP BUDGET	COMP BDGT/ STUDENT($)	COMP/TOT BUDGET(%)	STUD/COMP STAFF	COMPUTER FEE
U OF ALABAMA	PUB	4269	196	126	101	.	.	234724	50	2.7	361	YES
U OF ALASKA, FAIRBANKS	PUB	600	60	.	.	.	34	206224	312	7.1	220	YES
U OF ARIZONA	PUB	4935	350	125	.	7	137	840000	155	6.7	229	
ARIZONA ST U	PUB	8850	794	145	.	.	190	.	.	.	2797	
U OF ARKANSAS, FAYETTEVILLE	PUB	3222	171	74	.	42	104	60000	17	.	7017	YES
BABSON COLLEGE	PRIV	1584	689	.	.	67	125	1783000	762	3.2	65	
BALL ST U	PUB	3800	173	.	.	.	110	52683	13	0.8	.	
BAYLOR U	PRIV	3076	163	.	.	.	127	800000	247	5.9	405	YES
BENTLEY COLLEGE	PRIV	5569	1871	.	.	.	391	5000000	672	7.2	.	
BOISE ST U	PUB	2947	215	.	.	.	62	60000	19	1.2	791	YES
BOSTON COLLEGE	PRIV	550	105	.	.	.	83	.	.	.	.	
BOSTON U	PRIV	1700	912	39	.	63	157	309273	114	3.2	194	YES
BRADLEY U	PRIV	874	188	.	.	.	52	.	.	.	4248	
BRIGHAM YOUNG U	PRIV	4000	600	.	.	.	115	.	.	.	438	
U OF CALIF, BERKELEY (HAAS)	PUB	530	457	93	.	.	76	174275	161	3.9	144	
U OF CALIF, IRVINE	PUB	.	233	53	126	.	42	339800	825	4.2	52	
U OF CALIF, LA (ANDERSON)	PUB	.	900	150	60	38	110	990000	863	5.5	67	YES
CAL POLY ST U, SLO	PUB	1900	150	.	.	.	65	.	.	.	820	YES
CAL ST U, CHICO	PUB	.	.	.	.	.	75	50000	.	.	.	YES
CAL ST U, FULLERTON	PUB	6512	276	.	.	.	168	87500	13	.	799	
CAL ST U, LOS ANGELES	PUB	5115	458	.	.	.	143	94700	17	0.9	1858	
CAL ST U, NORTHRIDGE	PUB	3914	110	.	.	.	147	188698	47	1.6	894	
CAL ST U, FRESNO	PUB	3498	340	.	.	.	111	40000	10	5.1	384	
CANISIUS COLLEGE	PRIV	1242	212	.	.	.	59	.	.	.	.	YES
CARNEGIE MELLON U	PRIV	339	513	73	.	27	99	800000	840	.	79	
CASE WESTERN U (WEATHERHEAD)	PRIV	162	686	81	86	23	85	266053	256	1.6	83	

CENTRAL MICHIGAN U	PUB	3435	284	.	.	.	97	88632	24	.	372	
CHARLESTON COLLEGE	PUB	800	.	.	.	.	30	.	.	.	.	YES
U OF CINCINNATI	PUB	2450	227	64	.	63	95	200000	71	2.9	312	
CLARK U	PRIV	80	200	.	.	.	20	21500	77	0.6	102	
CLEMSON U	PUB	1600	150	50	.	18	150	.	.	.	727	
CLEVELAND ST U (NANCE)	PUB	2200	635	50	.	.	127	.	.	.	412	
U OF COLORADO, BOULDER	PUB	2430	416	77	.	.	80	.	.	.	254	YES
COLORADO ST U	PUB	1220	253	.	.	5	89	50000	34	1.8	336	YES
CORNELL U (JOHNSON)	PRIV	.	454	27	.	19	44	700000	1400	5.0	33	
CREIGHTON U	PRIV	800	110	.	.	.	60	.	.	.	455	YES
DARTMOUTH COLLEGE (TUCK)	PRIV	.	330	.	.	32	35	170000	470	1.5	52	
U OF DAYTON	PRIV	1600	560	.	.	.	60	100000	46	1.6	309	
U OF DELAWARE	PRIV	550	200	.	.	.	120	.	.	.	375	
U OF DETROIT, MERCY	PRIV	591	740	.	.	.	54	127000	95	4.7	133	
DRAKE U	PRIV	1025	245	.	.	3	44	6000	5	5.4	.	
DUKE U (FUQUA)	PRIV	.	755	39	.	139	72	.	.	.	72	
EAST CAROLINA U	PUB	841	243	.	.	.	70	190000	175	.	120	YES
EAST TEXAS U	PUB	788	130	.	.	.	30	23000	25	15.3	612	YES
E WASHINGTON U	PUB	870	55	.	.	.	48	.	.	.	.	
EMORY U	PRIV	300	243	.	91	11	47	350000	543	5.0	88	YES
U OF FLORIDA	PUB	2341	442	116	.	.	117	221578	76	1.8	290	
FLORIDA ATLANTIC U	PUB	1400	650	23	22	.	110	.	.	.	.	
FLORIDA INTL U	PUB	1954	496	46	.	.	109	20000	8	2.8	1426	
FLORIDA ST U	PUB	5500	250	125	.	.	108	200000	34	2.0	452	
FORDHAM U	PRIV	800	1800	.	.	.	100	.	.	.	433	
GEORGE WASHINGTON U	PRIV	1397	1956	163	.	.	145	250000	71	2.0	879	YES
GEORGETOWN U	PRIV	1110	240	.	.	4	68	156000	115	2.7	104	YES
U OF GEORGIA	PUB	4140	156	122	.	.	127	.	.	.	295	YES
GEORGIA TECH	PUB	1600	150	12	.	.	50	.	.	.	587	
GONZAGA U	PRIV	546	92	.	.	.	46	115000	180	6.1	71	YES

HARVARD U	PRIV	.	1596	111	.	674	206	5800000	2436	4.1	47	
HOFSTRA U	PRIV	3178	407	.	.	.	110	1000000	279	12.5	.	
U OF HOUSTON, UNIV PARK	PUB	3300	1300	100	80	23	95	210000	44	3.5	534	YES
U OF ILLINOIS, CHICAGO	PUB	2762	569	37	.	.	73	.	.	.	.	
U OF ILLINOIS, URBANA	PUB	3500	576	231	.	.	173	600000	139	.	131	YES
ILLINOIS ST U	PUB	3837	271	.	.	.	.	153000	37	2.2	.	YES
INDIANA U, BLOOMINGTON	PUB	2400	600	100	50	108	140	.	.	.	233	YES
INDIANA-PURDUE U, FORT WAYNE	PUB	283	171	.	.	.	37	13000	29	0.6	252	YES
U OF IOWA	PUB	1300	454	100	55	12	114	.	.	.	320	YES
JAMES MADISON U	PUB	3171	162	.	.	.	102	50000	15	15.7	3333	YES
JOHN CARROLL U	PRIV	558	205	.	.	.	42	60000	79	1.0	.	
U OF KANSAS	PUB	937	455	45	.	8	57	32000	22	.	964	
KANSAS ST U	PUB	2628	160	.	.	.	52	82144	29	2.5	1394	
LOUISIANA ST U	PUB	.	226	103	.	13	.	.	.	.	16	
U OF LOUISVILLE	PUB	1497	331	.	.	63	104	115000	61	1.6	.	
LOYOLA U, CHICAGO	PRIV	1700	350	.	.	.	85	.	.	.	.	
LOYOLA U, NEW ORLEANS	PRIV	1025	295	.	.	.	42	16000	12	0.6	.	
U OF MAINE	PUB	1021	107	.	.	.	25	12075	11	0.7	4512	YES
U OF MARYLAND	PUB	1800	700	100	.	3	105	275000	106	3.9	325	
MIT (SLOAN)	PRIV	300	650	100	100	105	120	727000	579	2.9	157	YES
MIAMI U (OHIO)	PUB	4452	163	.	.	.	167	.	.	.	769	
U OF MICHIGAN, ANN ARBOR	PUB	588	1850	106	.	198	169	535000	195	1.1	102	YES
U OF MINNESOTA (CARLSON)	PUB	1386	2268	153	.	.	112	.	.	.	635	YES
U OF MISSOURI, KANSAS CITY	PUB	458	439	9	.	44	47	33000	33	1.2	.	YES
U OF MISSOURI, ST LOUIS	PUB	2400	240	.	.	13	60	.	.	.	10610	YES
MONTANA ST U	PUB	1440	10	.	.	.	28	50000	34	4.5	.	YES
U OF MONTEVALLO	PUB	425	.	.	.	.	15	20000	47	2.2	106	
U OF NEBRASKA, OMAHA	PUB	3360	510	.	.	.	90	100000	26	2.9	2580	
U OF NEVADA, RENO	PUB	1600	300	.	.	.	55	55000	29	.	760	YES
U OF NEW MEXICO (ANDERSON)	PUB	950	323	.	.	.	64	80000	63	2.0	300	

U OF NEW ORLEANS	PUB	3546	429	35	.	.	91	48000	12	0.9	802	
NEW YORK U (STERN)	PRIV	2788	1707	88	172	.	206	.	.	.	106	
NICHOLLS ST U	PUB	800	98	.	.	.	47	70812	79	3.2	599	
U OF NC, CHARLOTTE	PUB	2323	268	.	.	.	88	.	.	.	.	YES
U OF NORTH FLORIDA	PUB	1500	200	.	.	.	55	.	.	.	.	
NORTHEAST LOUISIANA U	PUB	1700	.	.	.	.	54	40000	24	.	1700	
NORTHEASTERN U	PRIV	.	.	.	.	.	.	.	.	.	0	
NORTHERN ARIZONA U	PUB	900	54	.	.	30	69	20000	20	0.6	.	YES
NORTHERN ILLINOIS U	PUB	4700	985	37	52	36	135	427170	74	5.6	.	YES
U OF NOTRE DAME	PRIV	1526	407	.	80	15	92	80000	39	0.9	1014	
OAKLAND U, MICHIGAN	PUB	1395	168	.	.	.	57	145371	93	3.4	447	YES
OHIO ST U	PUB	3050	707	200	.	66	148	750000	186	3.1	199	
U OF OKLAHOMA	PUB	2004	116	42	.	10	85	86000	40	1.5	434	YES
OKLAHOMA ST U	PUB	3326	310	108	.	.	94	50000	13	0.5	1248	YES
U OF OREGON	PUB	2120	180	48	40	7	60	.	.	.	342	YES
OREGON ST U	PUB	2654	180	.	.	.	62	75000	26	2.3	405	YES
U OF THE PACIFIC	PRIV	511	.	.	.	4	26	11000	21	13.7	258	
U OF PENN (WHARTON)	PRIV	3000	1700	275	180	160	195	2500000	470	2.5	134	YES
PENN ST U	PUB	6959	325	119	.	77	154	200000	27	1.2	1069	YES
PORTLAND ST U	PUB	2000	500	20	.	.	50	50000	20	1.2	1008	YES
PURDUE U (KRANNERT)	PUB	2391	317	120	45	10	104	420000	146	3.9	214	
U OF RHODE ISLAND	PUB	1350	320	.	40	.	63	8950	5	4.7	3420	
U OF RICHMOND (ROBINS)	PRIV	363	278	.	.	.	54	.	.	.	.	
U OF ROCHESTER (SIMON)	PRIV	175	654	58	170	1	58	512000	484	4.1	118	
RUTGERS ST U OF NJ	PUB	700	1581	100	80	.	80	150000	61	2.1	1231	
SAN JOSE ST U	PUB	4438	226	.	.	.	150	386000	83	0.4	518	YES
SHIPPENSBURG U	PUB	1450	.	.	.	2	51	.	.	.	.	
U OF SAN FRANCISCO (MCLAREN)	PRIV	900	450	.	.	15	50	10000	7	0.2	2730	
U OF SOUTH CAROLINA	PUB	2568	1009	141	.	.	147	.	.	.	113	
U OF SOUTH FLORIDA	PUB	965	213	35	65	14	137	250000	193	2.3	129	

U OF SOUTHERN CALIF	PRIV	3530	1445	65	166	.	190	835400	160	.	336	YES
SOUTHERN ILLINOIS U, CARBONDALE	PUB	2329	131	52	.	.	59	40000	16	0.9	3349	YES
SOUTHERN ILLINOIS U	PUB	1225	695	.	.	13	79	125000	65	3.6	121	
SOUTHERN METHODIST U	PRIV	780	608	.	.	60	63	310000	214	3.4	290	YES
STANFORD U	PRIV	.	661	84	41	122	95	1800000	1982	7.2	44	YES
SUFFOLK U	PRIV	952	446	.	115	2	65	666000	440	6.3	433	YES
SYRACUSE U	PRIV	1679	438	54	.	16	87	.	.	.	2187	
TEMPLE U	PUB	3805	758	186	.	.	211	320000	67	2.1	950	YES
TENNESEE TECH U	PUB	.	.	.	.	.	.	81000	.	10.7	.	
U OF TEXAS, ARLINGTON	PUB	5370	920	101	396	44	142	167300	24	15.4	581	YES
U OF TEXAS, AUSTIN	PUB	8265	1387	195	.	.	213	650000	66	3.1	340	YES
TEXAS A&M U	PUB	5900	600	100	.	17	147	.	.	.	6617	YES
TEXAS CHRISTIAN U	PRIV	1026	213	.	.	.	46	102510	83	10.2	275	
TEXAS TECH U	PUB	4385	450	76	.	.	98	185000	38	2.1	756	YES
TULANE U	PRIV	343	440	8	107	.	54	360000	401	2.5	239	
U OF UTAH	PUB	850	250	50	52	14	60	195000	160	3.5	81	
UTAH ST U	PUB	1986	288	.	.	30	53	175000	76	6.0	461	YES
VALDOSTA ST COLLEGE	PUB	800	.	.	.	.	35	.	.	.	94	
VANDERBILT U (OWEN)	PRIV	.	364	15	98	10	44	753990	1548	10.3	244	YES
U OF VERMONT	PUB	810	30	.	.	.	30	31162	37	.	1120	
VILLANOVA U	PRIV	1900	250	.	.	3763	90	.	.	.	5913	
U OF VIRGINIA (DARDEN)	PUB	.	471	5	.	71	60	420000	768	2.5	61	
U OF VIRGINIA (MCINTIRE)	PUB	666	79	.	.	21	65	250000	326	5.0	36	
VIRGINIA TECH INST (PAMPLIN)	PUB	3075	286	72	.	28	113	765000	221	8.2	2769	
WAKE FOREST U (BUS & ACCNT)	PRIV	.	.	.	.	.	22	.	.	.	0	
WAKE FOREST U (BABCOCK)	PRIV	.	320	.	.	.	26	145000	453	.	160	
U OF WASHINGTON, SEATTLE	PUB	1441	400	86	82	48	124	400000	194	.	242	
WASHINGTON U, ST LOUIS (OLIN)	PRIV	556	589	24	110	.	64	388734	304	2.8	128	
WASHINGTON AND LEE U	PRIV	80	.	.	.	.	11	.	.	.	40	
WAYNE ST U	PUB	1480	2285	.	.	.	83	300000	80	3.7	538	YES

WEST GEORGIA COLLEGE	PUB	1300	65	.	.	.	43	20500	15	0.8	.	
WEST VIRGINIA U	PUB	1107	132	20	.	.	67	110000	87	2.3	315	
WESTERN CAROLINA U	PUB	1135	120	.	.	.	45	76000	61	2.9	418	
WESTERN ILLINOIS U	PUB	1672	199	.	.	.	75	.	.	.	.	YES
WESTERN MICHIGAN U	PUB	6490	650	.	.	.	95	120000	17	1.6	1020	YES
WESTERN WASHINGTON U	PUB	715	51	.	.	.	48	77987	102	3.1	511	
WINTHROP COL	PUB	1250	240	.	.	.	56	77000	52	2.3	88	YES
U OF WISCONSIN, EAU CLAIRE	PUB	2500	.	.	.	.	66	.	.	.	.	
U OF WISCONSIN, LA CROSSE	PUB	1900	70	.	.	.	48	.	.	.	.	
U OF WISCONSIN, MADISON	PUB	1309	655	88	.	137	100	478300	219	3.7	208	
U OF WISCONSIN, OSHKOSH	PUB	2450	500	.	.	.	50	30000	10	0.9	3933	
U OF WYOMING	PUB	1275	61	27	.	.	62	20691	15	.	.	
YALE U	PRIV	.	425	20	.	8	52	.	.	.	65	YES
U OF ALBERTA	PUB	1660	189	40	.	.	118	461000	244	4.8	472	
U BRITISH COLUMBIA	PUB	1500	400	70	.	7	110	200000	101	2.5	494	
U OF CALGARY	PUB	1000	350	2	.	8	87	1500000	1103	.	227	
DALHOUSIE U	PUB	790	230	.	.	.	45	75000	74	2.9	.	YES
MCGILL U	PRIV	1600	450	35	.	.	105	172000	82	2.7	321	YES
MCMASTER U	PUB	1458	324	14	.	2	60	175000	97	3.2	599	
U OF WESTERN ONTARIO	PUB	320	520	30	.	63	66	500000	536	4.5	139	YES

EIGHTH ANNUAL UCLA SURVEY: 1991
HARDWARE RESOURCES

INSTITUTION	MAINFRAME MODEL(S), YR(S)	#	MICROCOMPUTERS (N>3)	TOTAL MICROS	STUDS/ MICRO	FAC/ MICRO
	* B-SCHOOL ACCESS ONLY					
U OF ALABAMA	IBM 3091	5	APPLE MAC, PLUS, SE, CLASSIC	396	40	0
		112	IBM PC/XT, PS2/25			
		27	IBM PC/AT, PS2/30, 50, 60			
		20	IBM PS2/70, 80			
		24	ZENITH Z150			
		10	ZENITH Z286			
		10	ZENITH Z386			
		14	8086 CLONES			
		27	80286 CLONES			
		145	80386 CLONES			
U OF ALASKA, FAIRBANKS	* IBM 9370 (90)	22	APPLE MAC, PLUS, SE, CLASSIC	89	15	0.9
	* UNISYS (88) A4 MAINFRAME	6	APPLE MACINTOSH IICI, CX, SI			
	VAX (80)	14	HP VECTRA 386			
	* UNISYS U5000 (89)	18	UNISYS			
		23	80286 CLONES			
U OF ARIZONA	* VAX 8600 (84)	6	APPLE MAC, PLUS, SE, CLASSIC	443	26	0.8
	* VAX 780 (86)	19	APPLE MACINTOSH SE/30			
	* VAX 3100 (90)	158	AT & T 286			
	IBM 3090-30 (90)	4	HP VECTRA 286			
	RVAX	65	IBM PC/XT, PS2/25			
	CONVEX	83	IBM PC/AT, PS2/30, 50, 60			
		8	IBM PS2/70, 80			
		6	ZENITH Z150			
		6	ZENITH Z286			
		12	ZENITH Z386			
		13	8086 CLONES			
		39	80286 CLONES			
		14	80386 CLONES			
ARIZONA ST U	IBM 3090 1	24	APPLE MAC, PLUS, SE, CLASSIC	438	52	0.9
	DEC VAX 8600	20	APPLE MACINTOSH II			
	CRAY X-MP	10	HP VECTRA 286			
	IBM 3081-K	10	HP VECTRA 386			
		230	IBM PC/XT, PS2/25			
		50	IBM PC/AT, PS2/30, 50, 60			
		7	IBM PS2/70, 80			
		20	ZENITH Z286			
		50	ZENITH Z386			
		5	80286 CLONES			
		12	80386 CLONES			
U OF ARKANSAS, FAYETTEVILLE	IBM 4381 R-14	20	IBM PC/XT, PS2/25	206	24	2.2
		87	IBM PC/AT, PS2/30, 50, 60			
		17	IBM PS2/70, 80			
		15	8086 CLONES			
		23	80286 CLONES			
		40	80386 CLONES			

BABSON COLLEGE	DEC VAX 6410 (80) DEC VAX 8530 (84)	35 4 137 12 37 163 101	APPLE MAC, PLUS, SE, CLASSIC HP VECTRA 386 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 8086 CLONES 80286 CLONES 80386 CLONES	495	18	1.1
BALL ST U	IBM 370.3083 DEC VAX 11/780, 4 DEC VAX 11/8650 * DEC MICROVAX II (87)	12 10 32 52 71 4 84 8 5 11 6 4	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH II AT & T 6300 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 ZENITH Z150 ZENITH Z286 ZENITH Z386 8086 CLONES COMPAQ CPT W/DOS	306	29	1.1
BAYLOR U	IBM 4361-L5 (86) * IBM 4381-P22 (88) * IBM 5362-P MINI (87)	11 18 4 103 54 105	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80	299	23	1.3
BENTLEY COLLEGE	VAX 6410 (89,90) PRIME 9955III (85) PRIME 950 (84)	36 185 21 10 40 4	APPLE MAC, PLUS, SE, CLASSIC HP VECTRA 286 IBM PC/XT, PS2/25 8086 CLONES 80286 CLONES 80386 CLONES	305	66	4.1
BOISE ST U	IBM 3090 (91) HP 3000 (90)	5 70 46 4 6	HP VECTRA 386 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 ZENITH Z286 80286 CLONES	145	51	1
BOSTON COLLEGE	IBM 3090 (85) VAX CLUSTER, 4 (81,86)	365 36 140 115	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH II APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25	656	4	0.2
BOSTON U	* ENCORE MULTIMAX 120 * SANYO ICON 4000 IBM 3090 IBM 3090	99 4 28 182	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH II IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60	317	26	1.2
BRADLEY U	CDC 930 (89) VAX 780	85 6 5	AT & T 6300 AT & T 386 IBM PC/XT, PS2/25	98	23	1.2

BRIGHAM YOUNG U	VAX 8600 (88)	35	APPLE MAC, PLUS, SE, CLASSIC	333	29	1
		5	APPLE MACINTOSH II			
		11	AT & T 286			
		5	IBM PC/AT, PS2/30, 50, 60			
		22	IBM PS2/70, 80			
		255	80386 CLONES			
U OF CALIF, BERKELEY (HAAS)	IBM 3090	23	APPLE MAC, PLUS, SE, CLASSIC	206	8	1.7
	DEC VAX 6420	25	APPLE MACINTOSH SE/30			
	DEC VAX 8650	24	HP VECTRA 286			
	CRAY XM/14	33	IBM PC/XT, PS2/25			
		75	IBM PC/AT, PS2/30, 50, 60			
		22	IBM PS2/70, 80			
U OF CALIF, IRVINE	CONVEX C240	26	APPLE MACINTOSH II	184	5	0.8
	DEC VAX 6310	76	HP VECTRA 286			
	DEC VAX 8350	42	HP VECTRA 386			
	BALANCE SEQUENT 21000	11	IBM PC/XT, PS2/25			
	IBM 9375	21	80386 CLONES			
	* HP3000 MICROXE					
	IBM 4381					
U OF CALIF, LA (ANDERSON)	IBM 3090 (85)	9	APPLE MAC, PLUS, SE, CLASSIC	389	8	0.8
	* HP 9000/850 (88)	44	APPLE MACINTOSH IICI, CX, SI			
		96	HP VECTRA 286			
		56	HP VECTRA 386			
		29	IBM PC/XT, PS2/25			
		146	IBM PC/AT, PS2/30, 50, 60			
		9	IBM PS2/70, 80			
CAL POLY ST U, SLO	IBM 4300	12	APPLE MAC, PLUS, SE, CLASSIC	159	30	1
	IBM 3090	72	HP VECTRA 286			
	* HP 3000	27	HP VECTRA 386			
		9	IBM PC/XT, PS2/25			
		13	8086 CLONES			
		22	BRAND NOT GIVEN			
CAL ST U, CHICO	IBM 4381	9	APPLE MAC, PLUS, SE, CLASSIC	167	0	1.3
	IBM 3090	37	AT & T 6300			
	CDC 830	56	HP VECTRA 286			
	VAX 6310	56	8086 CLONES			
	PRIME 9755	5	80386 CLONES			
CAL ST U, FULLERTON	DEC VAX 8550	23	APPLE MAC, PLUS, SE, CLASSIC	318	40	1.4
		32	APPLE MACINTOSH SE/30			
		6	APPLE MACINTOSH II			
		58	IBM PC/XT, PS2/25			
		22	IBM PC/AT, PS2/30, 50, 60			
		6	IBM PS2/70, 80			
		141	8086 CLONES			
		20	80286 CLONES			
CAL ST U, LOS ANGELES	IBM 4381	98	AT & T 6300	189	46	3.1
	SUN 41280, 3	18	IBM PC/AT, PS2/30, 50, 60			
	IBM 9370	8	80286 CLONES			
		61	80386 CLONES			

CAL ST U, NORTHRIDGE	IBM 4381 (91) VAX 8550 (8.) AT&T 3B15 (88) CYBER 960	4 5 88 122 4 23	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 IBM PC/XT, PS2/25 80286 CLONES 80386 CLONES BIG XT CLONE	248	42	1.2
CAL ST U, FRESNO	DEC VAX 11/785 (87) PRIME 9755 (86) CDC CYBER 830 (86) IBM 4381 (89) IBM 9370 (90)	4 235 7 70 9	APPLE MAC, PLUS, SE, CLASSIC IBM PC/AT, PS2/30, 50, 60 UNISYS 8086 CLONES 80386 CLONES	329	21	0.9
CANISIUS COLLEGE	DEC VAX 4000 (90) DEC VAX 4000 (91) DEC 5000 (90)	6 8 64 11 4 6 9 15	APPLE MACINTOSH IICI, CX, SI HP VECTRA 286 HP VECTRA 386 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 ZENITH Z150 ZENITH Z286	126	23	1.3
CARNEGIE MELLON U	IBM 3083 (84) VAX 6420 * SUN 330 SPARCSTATION * SUN SPARCSTATION 1 * DIGITAL VAXSTATION 3100 M	23 35 39 106 57 86 4 10 5	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH II APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 80286 CLONES 80386 CLONES 80486 CLONES	367	6	1.1
CASE WESTERN U (WEATHERHEAD)	IBM 4381 (87)	6 12 14 8 6 173 14	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25 8086 CLONES 80286 CLONES 80386 CLONES	243	13	1.1
CENTRAL MICHIGAN U	IBM 3090 * IBM 36 (MINI)	8 128 26 8 48	AT & T 286 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 EPSON	218	28	1.8
CHARLESTON COLLEGE	DEC VAX (89)	12 4 51	IBM PC/XT, PS2/25 ZENITH Z386 8086 CLONES	69	22	0.9
U OF CINCINNATI	AMDAHL 5580,470 (80,84) VAX 785 (85) VAX 750 (87) * AT&T 3B2 (87) * MICROVAX II (87)	10 25 50 8 45	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25 ZENITH Z386 80386 CLONES	143	31	2.2

CLARK U	DEC VAX 8530 (86) DEC VAX 6310 (88) DEC VAX 11/750 (85)	14 16	IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60	32	28	1.8
CLEMSON U	* IBM 9370 (88) * IBM AS/400 (90) HITACHI 3090 (90)	10 46 5 61 20 37 5	APPLE MACINTOSH SE/30 APPLE MACINTOSH II APPLE MACINTOSH IICI, CX, SI IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 80286 CLONES 80386 CLONES	190	303	0.9
CLEVELAND ST U (NANCE)	IBM 3081 (86) VAX 750, 2 (84,86) VAX 730, 2 (83,85) IBM 3090	23 33 57 170 67	IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 8086 CLONES 80386 CLONES	353	12	1.3
U OF COLORADO, BOULDER	CDC 720 DEC VAX 11/750, 2 DEC VAX 11/780 DEC VAX 11/785	4 124 12 36	APPLE MAC, PLUS, SE, CLASSIC IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80	180	37	1
COLORADO ST U	RS6000-IBM * HP 9000 380 * HP 9000 400S * 3B2 500 IBM 3084	4 8 18 47 73 56 5 40	APPLE MACINTOSH SE/30 APPLE MACINTOSH IICI, CX, SI AT & T 286 HP VECTRA 286 HP VECTRA 386 8086 CLONES 80286 CLONES 80386 CLONES	257	9	1.3
CORNELL U (JOHNSON)	* VAX 785, 8530 * MICROVAX II IBM 4381 IBM 3090 * HP 9000 835	57 17 12 13 17 21 24	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH II HP VECTRA 286 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 8086 CLONES	164	10	0.7
CREIGHTON U	UNIVAC 1100/70	15 10 61	AT & T 6300 UNISYS 80386 CLONES	89	19	1.5
DARTMOUTH COLLEGE (TUCK)	DIGITAL VAX CLUSTER HONEYWELL DPS IBM 4281	91 10 6 6 14 4 64	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 APPLE MACINTOSH II APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80	196	5	0.7

U OF DAYTON	VAX 4000 MODEL 300 (90) * NCR TOWER 6x0 (85)	53 8086 CLONES 13 80286 CLONES 14 80386 CLONES 41 NCR PC-6	123	42	1.3
U OF DELAWARE		25 APPLE MACINTOSH IICI, CX, SI 80 IBM PC/AT, PS2/30, 50, 60 8 IBM PS2/70, 80 21 ZENITH Z386	134	13	2.4
U OF DETROIT, MERCY	B6800 A3K PDP 11/84	33 APPLE MAC, PLUS, SE, CLASSIC 21 APPLE MACINTOSH II 6 AT & T 286 44 IBM PC/XT, PS2/25 10 IBM PC/AT, PS2/30, 50, 60 5 80286 CLONES 35 80386 CLONES	155	10	3.9
DRAKE U	DEC VAX 8650 (86) DEC VAX 8650 (89)	78 APPLE MAC, PLUS, SE, CLASSIC 20 IBM PC/AT, PS2/30, 50, 60	111	32	0.7
DUKE U (FUQUA)	* IBM 4381 (89) MODEL R23	5 APPLE MACINTOSH IICI, CX, SI 81 AT & T 6300 71 IBM PC/XT, PS2/25 17 IBM PC/AT, PS2/30, 50, 60 16 IBM PS2/70, 80 101 UNISYS 5 80286 CLONES 27 80386 CLONES 5 NCR	334	7	0.8
EAST CAROLINA U	SPERRY 1100, 2 IBM 4381, 2 AT&T 32B DEC VAX, 2 * AS/400	9 APPLE MAC, PLUS, SE, CLASSIC 18 APPLE MACINTOSH II 17 APPLE MACINTOSH IICI, CX, SI 8 IBM PC/XT, PS2/25 28 IBM PC/AT, PS2/30, 50, 60 38 IBM PS2/70, 80 6 ZENITH Z150 12 IBM PS2/55	140	15	1.3
EAST TEXAS U	IBM 93/70, 2	47 IBM PC/XT, PS2/25 12 8086 CLONES 17 80286 CLONES 7 80386 CLONES	83	24	1.1
E WASHINGTON U	VAX 6410	21 IBM PC/XT, PS2/25 31 ZENITH Z150	52	18	0
EMORY U	* VAX 4300 (90) IBM 3090 VAX 8550	38 APPLE MAC, PLUS, SE, CLASSIC 24 APPLE MACINTOSH IICI, CX, SI 84 80386 CLONES	149	16	1.1

U OF FLORIDA	IBM 3090J (90) * IBM SYS 36 (88)	5 82 79 23 24	APPLE MAC, PLUS, SE, CLASSIC IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 80386 CLONES	224	67	0.8
FLORIDA ATLANTIC U	DEC VAX 6320 (89) IBM 38/400 (84,89)	7 20	APPLE MAC, PLUS, SE, CLASSIC 80286 CLONES	35	84	12.2
FLORIDA INTL U	DEC VAX 8800 (86)	37 4 30 11 10	IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 ZENITH Z150 ZENITH Z286 80286 CLONES	98	83	1.9
FLORIDA ST U	IBM 4381 (89) CDC CYBER 850 (80) DEC VAX 6210 (89) IBM 3090 (90) CRAY Y/MP (88)	51 59 30 74 6 4	IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 ZENITH Z150 80286 CLONES 80386 CLONES	229	62	1.4
FORDHAM U	* IBM 9370-60 (87) DEC VAX 11-785 (85)	10 65 14	AT & T 6300 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80	99	186	1.9
GEORGE WASHINGTON U	IBM 370	4 7 33 68 7 8 12	APPLE MACINTOSH SE/30 APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 ZENITH Z286 80286 CLONES	142	135	2.1
GEORGETOWN U	IBM IBM IBM VAX VAX	16 63 17 13 68	APPLE MACINTOSH II IBM PC/XT, PS2/25 8086 CLONES 80286 CLONES 80386 CLONES	181	13	1.2
U OF GEORGIA	* IBM 4381 * AT&T 3B2/300 * SUN 4/2805 IBM 3090 (87) CDC CYBERS, 4 AND DEC VAX	7 75 9 104	APPLE MACINTOSH SE/30 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80	199	25	0
GEORGIA TECH	CYBER 990/880 IBM 4381 HYDRA	130 6 15	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25	152	22	0.8

GONZAGA U	VAX 6410 * MICROVAX SERIES II	33 24 17	HP VECTRA 286 IBM PC/AT, PS2/30, 50, 60 80386 CLONES	77	16	1.4
HARVARD U	* IBM 4381 (84) * DEC SYSTEM 1095 (79) * DEC VAX 8530 (87) * AUTO ZEBRA 5820 (87) * DEC VAX 6410 (89)	206 4 163 370	APPLE MACINTOSH II IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80	748	7	5.2
HOFSTRA U	IBM 4381 (87) VAX 8530 (88) VAX 6410 (90)	4 12 4 99 9 4 9 25	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 ZENITH Z150 ZENITH Z286 ZENITH Z386	169	39	1.8
U OF HOUSTON, UNIV PARK	AS 9000 HONEYWELL DEC VAX (88)	19 6 98 5 25 83 45 16 26	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 8086 CLONES 80286 CLONES 80386 CLONES COMPAQ DESKPRO	328	28	1
U OF ILLINOIS, CHICAGO	IBM 3090/300J (89)	30 130 14 10 21 5	AT & T 6300 AT & T 286 IBM PC/AT, PS2/30, 50, 60 80286 CLONES 80386 CLONES AT&T 3B2	210	32	0.8
U OF ILLINOIS, URBANA	IBM CONVEX * IBM SYS S/36 CRAY	4 4 379 85	APPLE MAC, PLUS, SE, CLASSIC HP VECTRA 386 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80	474	32	1
ILLINOIS ST U		142 38 32 41 4 13	IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 ZENITH Z150 ZENITH Z286 ZENITH Z386 80386 CLONES	270	27	0
INDIANA U, BLOOMINGTON	IBM 3090-120 VAX 11/780 VAX 11/800 VAX 11/900 VAX 9000	4 130 5 125 25 225 10 50 42	APPLE MACINTOSH II HP VECTRA 286 HP VECTRA 386 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 80386 CLONES NCR PC6'S NCR 386SX/486	623	14	0.7

INDIANA-PURDUE U, FORT WAYNE	VAX 11/780 IBM 4381	6 34 6	IBM PC/XT, PS2/25 ZENITH Z150 ZENITH Z286	52	0	0.9
U OF IOWA	IBM 3090 DEC ENCORE * IBM AS400	26 12 9 67 37 78 18 5 42 7 7 4	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 APPLE MACINTOSH IICI, CX, SI HP VECTRA 286 HP VECTRA 386 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 8086 CLONES 80286 CLONES 80386 CLONES 80486 CLONES	313	13	1.1
JAMES MADISON	DEC VAX 4000 (91) DEC VAX 4000 (91)	13 25 82 40 5 30	APPLE MACINTOSH SE/30 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 8086 CLONES 80286 CLONES 80386 CLONES	195	52	0.9
JOHN CARROLL U	DEC VAX 8300 DEC VAX 8530 DEC VAX 6000-420	15 4 54 18	IBM PC/XT, PS2/25 ZENITH Z150 8086 CLONES 80286 CLONES	93	16	1.2
U OF KANSAS	DEC VAX 8650 IBM 3081 KS	8 12 37 5 6 54 4	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 AT & T 6300 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 ZENITH Z150 ZENITH Z386	136	24	0.9
KANSAS ST U	IBM 3084 IBM 4381-1 MVS/SP (83)	23 96 5 6	IBM PC/XT, PS2/25 ZENITH Z150 ZENITH Z286 ZENITH Z386	136	38	1.1
LOUISIANA ST U	IBM 370 MODEL 3090-600E IBM 370 MODEL 3084QX6	39 166 8 43 25 11	IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 ZENITH Z150 ZENITH Z286 ZENITH Z386	296	3	0
U OF LOUISVILLE	IBM 3090 (90) VAX CLUSTER (90)	4 5 61 165	APPLE MACINTOSH II IBM PC/XT, PS2/25 IBM PS2/90, 95 ITT	245	19	1.1

LOYOLA U, CHICAGO		11 AT & T 6300 43 IBM PC/XT, PS2/25 10 IBM PC/AT, PS2/30, 50, 60 10 ZENITH Z286 30 ZENITH Z386	104	62	1.2
LOYOLA U, NEW ORLEANS	VAX 11/750 IBM 4361 IBM 9375	12 APPLE MAC, PLUS, SE, CLASSIC 21 8086 CLONES	33	0	1.4
U OF MAINE	IBM 3090 * AT&T 3B2	17 APPLE MAC, PLUS, SE, CLASSIC 4 APPLE MACINTOSH IICI, CX, SI 39 IBM PC/XT, PS2/25 4 IBM PS2/70, 80	67	32	0.8
U OF MARYLAND	* VAX 750	10 APPLE MAC, PLUS, SE, CLASSIC 32 APPLE MACINTOSH II 20 IBM PC/XT, PS2/25 110 IBM PC/AT, PS2/30, 50, 60 24 IBM PS2/70, 80	196	33	1.2
MIT (SLOAN)	* IBM 4381 (89) * ATT 3B2 (88)	117 APPLE MAC, PLUS, SE, CLASSIC 5 APPLE MACINTOSH SE/30 37 APPLE MACINTOSH II 37 APPLE MACINTOSH IICI, CX, SI 55 AT & T 286 33 AT & T 386 70 IBM PC/XT, PS2/25 62 IBM PC/AT, PS2/30, 50, 60 37 IBM PS2/70, 80	453	21	0.5
MIAMI U (OHIO)	IBM 4381 MODEL 23 DIGITAL VAX 8250	14 APPLE MAC, PLUS, SE, CLASSIC 8 APPLE MACINTOSH IICI, CX, SI 90 IBM PC/XT, PS2/25 10 IBM PC/AT, PS2/30, 50, 60 51 IBM PS2/70, 80 64 8086 CLONES 34 80286 CLONES	276	71	0.9
U OF MICHIGAN, ANN ARBOR	IBM 3090-600E (MTS) AMDAHL 5860 DEC VAX (OCC USE)	86 APPLE MAC, PLUS, SE, CLASSIC 43 APPLE MACINTOSH SE/30 7 APPLE MACINTOSH II 26 APPLE MACINTOSH IICI, CX, SI 11 IBM PC/XT, PS2/25 4 IBM PC/AT, PS2/30, 50, 60 60 IBM PS2/70, 80 492 UNISYS 5 ZENITH Z286	742	13	0.8
U OF MINNESOTA (CARLSON)	CYBER * IBM 4341 CRAY 2 ENCORE VAX 8600	23 APPLE MAC, PLUS, SE, CLASSIC 10 APPLE MACINTOSH SE/30 8 APPLE MACINTOSH II 20 IBM PC/XT, PS2/25 35 IBM PC/AT, PS2/30, 50, 60 86 IBM PS2/70, 80 50 ZENITH Z286 40 8086 CLONES 6 80286 CLONES 32 80386 CLONES	313	63	0.6

U OF MISSOURI, KANSAS CITY	VAX 6000/460 (90) IBM 5520	7 IBM PC/XT, PS2/25 4 IBM PC/AT, PS2/30, 50, 60 40 8086 CLONES 17 IBM 5150 56 AT & T 6386 WGS	127	18	1.1
U OF MISSOURI, ST LOUIS	IBM 4381 (86) IBM 30XX (87) DEC VAX (86)	47 IBM PC/XT, PS2/25 24 IBM PS2/70, 80	72	221	1.2
MONTANA ST U	DEC VAX NETWORK UNIX	5 AT&T 8088	16	0	2.3
U OF MONTEVALLO	DEC 6410	10 APPLE MACINTOSH II 32 ZENITH Z286 11 80286 CLONES	55	9	1.9
U OF NEBRASKA, OMAHA	DEC 8650	12 APPLE MAC, PLUS, SE, CLASSIC 13 IBM PC/XT, PS2/25 61 ZENITH Z150 38 ZENITH Z286 9 ZENITH Z386 5 80386 CLONES	140	90	1.5
U OF NEVADA, RENO	SUN 3/280 (88) SUN 4/280 (91) CYBER 430 (85)	4 IBM PC/AT, PS2/30, 50, 60 10 IBM PS2/70, 80 5 IBM PS2/90, 95 45 ZENITH Z150 7 ZENITH Z386 33 8086 CLONES 6 80286 CLONES 11 80386 CLONES	128	35	1.3
U OF NEW MEXICO (ANDERSON)	* IBM AS-400 (90) IBM ES 9121/MODEL 320 DEC VAX 8650	5 APPLE MACINTOSH II 64 IBM PC/XT, PS2/25 9 IBM PC/AT, PS2/30, 50. 60 6 ZENITH Z150 5 80386 CLONES 7 DEC RAINBOW	100	28	1.8
U OF NEW ORLEANS	VAX 8600 CLUSTER (84) IBM 4381 (86)	55 IBM PS2/70, 80 44 ZENITH Z150 6 ZENITH Z386 5 80286 CLONES	113	149	1.3
NEW YORK U (STERN)	* VAX 8700 (85) * SUN 4/280 (88) * SUN 490 (89) * SUN 490 (90) * VAX 8550 (86) * VAX 780 (85)	14 APPLE MAC, PLUS, SE, CLASSIC 6 APPLE MACINTOSH SE/30 6 APPLE MACINTOSH IICI, CX, SI 157 HP VECTRA 386 97 IBM PC/XT, PS2/25 115 IBM PC/AT, PS2/30, 50, 60 11 IBM PS2/70, 80 195 ZENITH Z150 176 80386 CLONES 51 PANASONIC	830	19	0.6

NICHOLLS ST U	UNISYS A6 (87) * DEC MICROVAX 3900 (90)	106 4 6	ZENITH Z150 ZENITH Z286 ZENITH Z386	117	12	1.5
U OF NC, CHARLOTTE	IBM 4381 VAX 8530	10 42 48 25	APPLE MAC, PLUS, SE, CLASSIC IBM PC/XT, PS2/25 80386 CLONES IBM 8086	125	45	1.6
U OF NORTH FLORIDA		15 40 5 5	IBM PC/XT, PS2/25 ZENITH Z286 80286 CLONES 80386 CLONES	65	0	1.1
NORTHEAST LOUISIANA U	IBM 4381 VAX 6400	47 93	8086 CLONES 80286 CLONES	142	17	1.7
NORTHEASTERN U		11 9 22 104 28 14 5 4 14	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 AT & T 6300 IBM PC/XT, PS2/25 ZENITH Z150 ZENITH Z386 8086 CLONES 80286 CLONES 80386 CLONES	212	0	.
NORTHERN ARIZONA U	IBM 9370 (88) VAX (87)	5 17 59 10 90 66 4	APPLE MACINTOSH IICI, CX, SI IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 8086 CLONES 80286 CLONES 80386 CLONES	251	7	0.9
NORTHERN ILLINOIS U	* HP 3000 (88) * KAYPRO PC	24 44 114 98 6	HP VECTRA 286 HP VECTRA 386 IBM PC/XT, PS2/25 8086 CLONES 80286 CLONES	292	33	1.1
U OF NOTRE DAME	HP 3000 IBM 4381 CONVEX C1	30 30 70 52	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80	187	25	1.1
OAKLAND U, MICHIGAN	* DEC VAX 8350 (88) DEC VAX 632. (90) DEC VAX 6310 (90) DEC SYSTEM 5820	4 37 5 49 5 40	APPLE MAC, PLUS, SE, CLASSIC AT & T 6300 IBM PC/XT, PS2/25 UNISYS 80386 CLONES DEC VAXMATES	142	23	0.9

OHIO ST U	* PRIME 9955 * NCR TOWER 600 * BANYON SERVER	84 APPLE MAC, PLUS, SE, CLASSIC 5 APPLE MACINTOSH SE/30 7 APPLE MACINTOSH II 4 APPLE MACINTOSH IICI, CX, SI 64 IBM PC/XT, PS2/25 11 IBM PC/AT, PS2/30, 50, 60 6 IBM PS2/70, 80 4 UNISYS 7 ZENITH Z286 15 8086 CLONES 9 80286 CLONES 26 80386 CLONES 37 NCR PC6 65 NCR PC8	345	27	1.1
U OF OKLAHOMA	IBM 3081-K64 DEC VAX 11-780	11 APPLE MAC, PLUS, SE, CLASSIC 7 APPLE MACINTOSH SE/30 8 APPLE MACINTOSH IICI, CX, SI 69 IBM PC/XT, PS2/25 31 IBM PC/AT, PS2/30, 50, 60 30 IBM PS2/70, 80 8 ZENITH Z150	169	39	1.2
OKLAHOMA ST U	IBM 3090 DEC VAX 11/785	12 APPLE MAC, PLUS, SE, CLASSIC 185 IBM PC/XT, PS2/25	214	44	1
U OF OREGON	VAX 8850	24 APPLE MAC, PLUS, SE, CLASSIC 42 APPLE MACINTOSH SE/30 8 APPLE MACINTOSH IICI, CX, SI 55 HP VECTRA 286 11 HP VECTRA 386 11 IBM PC/XT, PS2/25 7 8086 CLONES	164	31	1
OREGON ST U	CYBER 1 IBM 4381 FPS/VAX	50 HP VECTRA 286 101 HP VECTRA 386 26 80286 CLONES 76 80486 CLONES	262	21	0.6
U OF THE PACIFIC	DEC VAX 11/785 (85)	26 IBM PC/XT, PS2/25 23 IBM PC/AT, PS2/30, 50, 60 5 8086 CLONES	58	0	0.5
U OF PENN (WHARTON)	* DEC VAX 6420 * DEC VAX 6410 * DEC VAX 8700 * DEC MICROVAX III * IBM 9370 AND 90	24 APPLE MAC, PLUS, SE, CLASSIC 20 APPLE MACINTOSH SE/30 18 APPLE MACINTOSH II 32 APPLE MACINTOSH IICI, CX, SI 9 AT & T 6300 93 AT & T 286 39 AT & T 386 111 HP VECTRA 286 28 HP VECTRA 386 68 IBM PC/XT, PS2/25 70 IBM PC/AT, PS2/30, 50, 60 16 IBM PS2/70, 80 19 UNISYS 114 80286 CLONES 54 80386 CLONES	721	93	0.9

PENN ST U	IBM 3090 600S (89) IBM 3090 * IBM AS400 (90)	7 36 6 57 8 18 44 123 17 4 8 12	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 APPLE MACINTOSH IICI, CX, SI AT & T 6300 HP VECTRA 286 HP VECTRA 386 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 8086 CLONES 80286 CLONES 80386 CLONES	349	47	1.5
PORTLAND ST U	IBM 4381	8 7 38 48 22 10 15	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 80286 CLONES 80386 CLONES 8088	155	29	1
PURDUE U (KRANNERT)	ETA-10 IBM 3090 (85) CYBER 205 (84) (90) VAX 8600 (89) SEQUENT SYMMETRY (89)	97 12 35 73 27 12 65 4 28 7	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH II APPLE MACINTOSH IICI, CX, SI HP VECTRA 286 HP VECTRA 386 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 NCR 486 HP 9000/319	362	16	0.9
U OF RHODE ISLAND	IBM 4381-3 PRIME 6350	26 11	80386 CLONES 80486 CLONES	42	0	1.9
U OF RICHMOND (ROBINS)	VAX 750 VAX 785	9 14 32	AT & T 6300 IBM PC/XT, PS2/25 8086 CLONES	56	27	2.6
U OF ROCHESTER (SIMON)	* IBM 4361 (85) * HP 3000 (82)	76 5 7 39 10 42 53 20 20 26 21 4	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 APPLE MACINTOSH II APPLE MACINTOSH IICI, CX, SI HP VECTRA 286 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 8086 CLONES 80286 CLONES 80386 CLONES 80486 CLONES	326	10	0.4
RUTGERS ST U OF NJ	AS-9000 VAX 8650 VAX 8550 PYRAMID 9810-TA	5 5 35 65 9 34 30	APPLE MAC, PLUS, SE, CLASSIC AT & T 386 IBM PC/XT, PS2/25 ZENITH Z150 ZENITH Z286 80386 CLONES MITSUBISHI 286	188	28	1.4

SAN JOSE ST U	IBM 3090 * HP 3000	15 APPLE MAC, PLUS, SE, CLASSIC 8 APPLE MACINTOSH II 40 APPLE MACINTOSH IICI, CX, SI 30 HP VECTRA 286 51 HP VECTRA 386 101 80286 CLONES 10 80386 CLONES	258	30	2.3
SHIPPENSBURG U	UNISYS VAX DECK	17 ZENITH Z150 35 ZENITH Z286 6 ZENITH Z386 4 80386 CLONES	63	52	2
U OF SAN FRANCISCO (MCLAREN)	DATA GENERAL VAX	22 APPLE MACINTOSH SE/30 8 APPLE MACINTOSH II 35 8086 CLONES 23 80386 CLONES	88	21	2.5
U OF SOUTH CAROLINA	* IBM 4381 P-14 (88) IBM 3081-D24,2 (83,84) DEC VAX 11-780 (84) * IBM SYS 36 FPS MT-64	73 APPLE MAC, PLUS, SE, CLASSIC 26 APPLE MACINTOSH SE/30 38 AT & T 386 109 IBM PC/XT, PS2/25 70 IBM PC/AT, PS2/30, 50, 60 4 IBM PS2/70, 80 6 UNISYS 45 ZENITH Z386 36 80386 CLONES	419	17	1.1
U OF SOUTH FLORIDA	IBM 3090	40 APPLE MAC, PLUS, SE, CLASSIC 6 APPLE MACINTOSH IICI, CX, SI 25 IBM PC/XT, PS2/25 15 IBM PC/AT, PS2/30, 50, 60 15 ZENITH Z150 30 80286 CLONES 27 80386 CLONES	164	15	2.4
U OF SOUTHERN CALIF	IBM 3090	29 APPLE MAC, PLUS, SE, CLASSIC 35 APPLE MACINTOSH SE/30 17 APPLE MACINTOSH II 7 APPLE MACINTOSH IICI, CX, SI 5 HP VECTRA 286 34 HP VECTRA 386 195 IBM PC/XT, PS2/25 19 IBM PC/AT, PS2/30, 50, 60 4 IBM PS2/70, 80 30 8086 CLONES 103 80286 CLONES 112 80386 CLONES 16 80486 CLONES 5 AST 286	615	28	1
SOUTHERN ILLINOIS U, CARBONDALE	IBM 3081 IBM 3090	98 IBM PC/XT, PS2/25 10 IBM PC/AT, PS2/30, 50, 60 15 8086 CLONES 5 80386 CLONES	130	114	0.9
SOUTHERN ILLINOIS U	IBM 4381 (86)	7 IBM PC/XT, PS2/25 8 IBM PC/AT, PS2/30, 50, 60 7 ZENITH Z286 10 ZENITH Z386	35	387	3.4

SOUTHERN METHODIST	IBM 3081 (84) * AT&T 3B15 (87) * AT&T 3B2 (86) IBM 3081 (89)	6 APPLE MAC, PLUS, SE, CLASSIC 20 AT & T 6300 36 AT & T 286 8 AT & T 386 30 IBM PC/XT, PS2/25 65 80286 CLONES 8 80386 CLONES	183	16	1.2
STANFORD U	* VAX 8550 (87) * VAX 3800 (88) * VAX 4000-300 (90 IBM 3091 (90)	132 APPLE MAC, PLUS, SE, CLASSIC 16 APPLE MACINTOSH SE/30 10 APPLE MACINTOSH II 63 APPLE MACINTOSH IICI, CX, SI 26 HP VECTRA 286 24 HP VECTRA 386 57 IBM PC/XT, PS2/25 46 IBM PC/AT, PS2/30, 50, 60 19 IBM PS2/70, 80 42 80286 CLONES	437	9	0.9
SUFFOLK U	PRIME 6350	9 APPLE MAC, PLUS, SE, CLASSIC 5 IBM PC/XT, PS2/25 61 8086 CLONES 29 80286 CLONES 17 80386 CLONES	125	27	1.5
SYRACUSE U	IBM 3090 DEC VAX 8600	8 APPLE MAC, PLUS, SE, CLASSIC 67 IBM PC/XT, PS2/25 36 IBM PC/AT, PS2/30, 50, 60 16 IBM PS2/70, 80 10 8086 CLONES 4 80386 CLONES	146	44	1.6
TEMPLE U	IBM 4381 * VAX	4 APPLE MACINTOSH SE/30 100 IBM PC/XT, PS2/25 230 IBM PC/AT, PS2/30, 50, 60 5 IBM PS2/70, 80 10 ZENITH Z150 5 ZENITH Z286	356	59	1.9
TENNESEE TECH U				0	0
U OF TEXAS, ARLINGTON	IBM 4341 IBM 4381 NOVELL LAN	4 APPLE MACINTOSH IICI, CX, SI 64 IBM PC/XT, PS2/25 63 80386 CLONES 5 OLIVETTI	137	66	5.1
U OF TEXAS, AUSTIN	VAX 11/780 IBM 8081 CRAY	111 APPLE MAC, PLUS, SE, CLASSIC 7 APPLE MACINTOSH II 22 APPLE MACINTOSH IICI, CX, SI 40 HP VECTRA 386 223 IBM PC/XT, PS2/25 108 IBM PC/AT, PS2/30, 50, 60 37 IBM PS2/70, 80 23 8086 CLONES 32 80286 CLONES 22 80386 CLONES	629	36	1.7

TEXAS A&M U	AMDAHL IBM 4361 (84) IBM 3090 CRAY Y-MP (89)	30 5 28 45 125 20 15 35	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH SE/30 APPLE MACINTOSH II HP VECTRA 286 IBM PC/XT, PS2/25 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80 ZENITH Z150	305	31	2.7
TEXAS CHRISTIAN U	IBM 4381 (82) IBM 9375 (85) VAX 6310 (89) VAX 4000 (90)	84 16 35	80286 CLONES 80386 CLONES 8088 XT CLONES	138	17	1.2
TEXAS TECH U	IBM 3081-KX VAX 8650 & 6510 * AT&T 3B2 * VAX 6000-310 * VAX 3100	15 5 10 19 17 10	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH II IBM PC/XT, PS2/25 80386 CLONES PACKARD BELL AT COMPUADD 286	79	351	2
TULANE U	IBM 3081 KX * AS/400	13 6 23 8 9 31 15 33	APPLE MAC, PLUS, SE, CLASSIC AT & T 6300 IBM PS2/70, 80 ZENITH Z150 ZENITH Z286 80286 CLONES 80386 CLONES ITT XTRA	141	14	2.2
U OF UTAH	IBM 3090 600S	5 6 25 28 55 40	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH II IBM PC/AT, PS2/30, 50, 60 80286 CLONES 80386 CLONES BRAND NOT GIVEN	162	18	1
UTAH ST U	VAX 8650 IBM 4341	40 14 8 69 118	IBM PS2/70, 80 UNISYS 80286 CLONES 80386 CLONES TELEVIDEO 1605	249	14	0.7
VALDOSTA ST COLLEGE		36 17 4	IBM PC/XT, PS2/25 ZENITH Z150 ZENITH Z286	61	25	1.7
VANDERBILT U (OWEN)	VAX 8800 IBM	34 5 40 12 19	APPLE MAC, PLUS, SE, CLASSIC APPLE MACINTOSH II AT & T 386 IBM PC/AT, PS2/30, 50, 60 IBM PS2/70, 80	116	12	0.9
U OF VERMONT	IBM 4381, 2 (85,87) 8650 (90) * DEC 780 (85) * DG MV10000 (85)	29 9 4	AT & T 6300 AT & T 386 IBM PS2/70, 80	50	56	1.2

VILLANOVA U	IBM 3090-120F (89) VAX 8210 (89) VAX 6310 (88)	9 IBM PC/XT, PS2/25 43 IBM PC/AT, PS2/30, 50, 60 31 ZENITH Z150 112 ZENITH Z286 14 ZENITH Z386	209	48	1.2
U OF VIRGINIA (DARDEN)	CDC CYBER 855 PRIME 750 IBM 3090 * VAX 4000 (90)	25 APPLE MAC, PLUS, SE, CLASSIC 7 APPLE MACINTOSH II 67 IBM PC/XT, PS2/25 21 IBM PC/AT, PS2/30, 50, 60 54 IBM PS2/70, 80 6 8086 CLONES 16 80286 CLONES	197	8	0.9
U OF VIRGINIA (MCINTIRE)	* IBM 9370 * ATT 3B2-1000 IBM 3090	10 AT & T 6300 17 AT & T 286 30 AT & T 386 30 IBM PC/AT, PS2/30, 50, 60 40 IBM PS2/70, 80 62 80286 CLONES	191	7	1
VIRGINIA TECH INST (PAMPLIN)	IBM 3090 (88) IBM 3084 (85) DEC VAX 8800 (90)	7 APPLE MACINTOSH IICI, CX, SI 133 IBM PC/XT, PS2/25 12 IBM PC/AT, PS2/30, 50, 60 30 ZENITH Z286 7 ZENITH Z386 16 80286 CLONES 10 80386 CLONES	225	56	0.7
WAKE FOREST U (BUS & ACCNT)	PRIME 4150 AT&T 3B15	31 IBM PC/XT, PS2/25 11 IBM PC/AT, PS2/30, 50, 60	45	0	3.7
WAKE FOREST U (BABCOCK)	PRIME 4150 (88)	5 APPLE MACINTOSH IICI, CX, SI 37 ZENITH Z150 30 ZENITH Z286 29 ZENITH Z386	117	6	0.8
U OF WASHINGTON, SEATTLE	DEC 5810 (HARDY) SEQUENT S81 (MILTON) IBM 3090 VAX 8820 VAX 8600	13 APPLE MAC, PLUS, SE, CLASSIC 37 APPLE MACINTOSH SE/30 18 APPLE MACINTOSH II 50 APPLE MACINTOSH IICI, CX, SI 44 HP VECTRA 286 38 IBM PC/XT, PS2/25 23 IBM PC/AT, PS2/30, 50, 60 17 IBM PS2/70, 80 4 8086 CLONES	252	19	1.6
WASHINGTON U, ST LOUIS (OLIN)	IBM 43XX, 4 * VAX 8810 (88) * VAX 6220 (88)	6 APPLE MACINTOSH II 32 IBM PC/XT, PS2/25 46 IBM PC/AT, PS2/30, 50, 60 6 IBM PS2/70, 80 16 80286 CLONES 21 80386 CLONES	130	20	1.3

WASHINGTON AND LEE U	PRIME 9955 (84)	8	APPLE MAC, PLUS, SE, CLASSIC	71	2	0.4
		34	IBM PC/AT, PS2/30, 50, 60			
		20	80286 CLONES			
		9	80386 CLONES			
WAYNE ST U	AMDAHL 470V/8	7	APPLE MAC, PLUS, SE, CLASSIC	260	27	0.9
	IBM 4381	34	APPLE MACINTOSH SE/30			
	IBM 3080GX	4	APPLE MACINTOSH IICI, CX, SI			
		26	IBM PC/XT, PS2/25			
		29	IBM PC/AT, PS2/30, 50, 60			
		84	ZENITH Z150			
		14	80286 CLONES			
		16	80386 CLONES			
		45	386 SX			
WEST GEORGIA COLLEGE	IBM 4341	51	IBM PC/XT, PS2/25	81	31	1.4
	IBM 4341	4	IBM PC/AT, PS2/30, 50, 60			
	SUN 4/220	7	ZENITH Z150			
	ATT 3B2	18	ZENITH Z286			
	IBM RS-6000					
	SUN 4/11000					
WEST VIRGINIA U	IBM 3090				0	0
	VAX CLUSTER					
WESTERN CAROLINA U	DIGITAL 8530 (87)	4	IBM PC/AT, PS2/30, 50, 60	83	22	3.2
	DIGITAL VAX 4000 (91)	22	ZENITH Z386			
		28	80286 CLONES			
		29	EPSON EQUITY III+			
WESTERN ILLINOIS U	IBM 4381, 2 (84,87)	35	IBM PC/XT, PS2/25	162	51	0.8
	DEC MICROVAX II (86)	4	IBM PS2/70, 80			
	CDC CYBER 180-830 (79)	63	ZENITH Z150			
		27	ZENITH Z286			
		25	ZENITH Z386			
		5	80286 CLONES			
WESTERN MICHIGAN U	* DUAL HOST VAX 4000-300 (9	20	APPLE MACINTOSH II	345	33	1.1
	VAX 6000 (91)	77	APPLE MACINTOSH IICI, CX, SI			
	VAX 8700 (85)	20	APPLE MACINTOSH IIFX			
	VAX 8650 (87)	20	ZENITH Z150			
		208	ZENITH Z386			
WESTERN WASHINGTON U	DEC VAX 11-780	11	AT & T 6300	135	12	0.7
	DEC VAX 11-780	12	IBM PC/XT, PS2/25			
	SEQUENT	84	ZENITH Z386			
		22	80286 CLONES			
WINTHROP COL	* DGMV 8000 II (84)	6	IBM PS2/70, 80	133	18	1.5
		125	8086 CLONES			
U OF WISCONSIN, EAU CLAIRE	VAX 6420	54	IBM PC/XT, PS2/25	196	33	0.6
		50	IBM PC/AT, PS2/30, 50, 60			
		10	UNISYS			
		25	ZENITH Z286			
		20	8086 CLONES			
		35	80286 CLONES			

U OF WISCONSIN, LA CROSSE	VAX 11/780	43	IBM PC/XT, PS2/25	100	82	0.9
		20	ZENITH Z386			
		33	8086 CLONES			
U OF WISCONSIN, MADISON	DEC VAX 6310	14	APPLE MAC, PLUS, SE, CLASSIC	269	23	0.8
	* DEC VAX 6410	16	APPLE MACINTOSH IICI, CX, SI			
		25	AT & T 6300			
		10	AT & T 286			
		65	AT & T 386			
		102	IBM PC/XT, PS2/25			
		25	IBM PC/AT, PS2/30, 50, 60			
U OF WISCONSIN, OSHKOSH	IBM 4380	30	IBM PC/XT, PS2/25	48	0	1.3
	VAX, 2	10	ZENITH Z386			
U OF WYOMING	DEC 11/785 (85)	13	IBM PC/XT, PS2/25	41	195	2.1
	IBM 3081 (86)	9	ZENITH Z386			
	VAX DEC 8800, 2 (87)	15	ZENITH 248			
YALE U	IBM 3090 (85)	21	APPLE MAC, PLUS, SE, CLASSIC	185	6	1.1
	AMDAHL V8	4	APPLE MACINTOSH SE/30			
	DEC VAX 8600 (86)	59	IBM PC/XT, PS2/25			
	* DEC VAX 750	59	IBM PC/AT, PS2/30, 50, 60			
	* CELEBRITY 1260 D	4	IBM PS2/70, 80			
		4	ZENITH Z286			
		5	ZENITH Z386			
		19	IBM 55SX			
U OF ALBERTA	AMDAHL 5870 (78) MTS	81	APPLE MAC, PLUS, SE, CLASSIC	249	21	1.1
	IBM 4381 (80) VM	5	APPLE MACINTOSH SE/30			
	IBM 3081 (K) MVS	25	APPLE MACINTOSH II			
		69	IBM PC/XT, PS2/25			
		8	IBM PC/AT, PS2/30, 50, 60			
		8	IBM PS2/70, 80			
		4	ZENITH Z150			
		10	ZENITH Z286			
		11	8086 CLONES			
		4	80286 CLONES			
		22	80386 CLONES			
U BRITISH COLUMBIA	* DATA GEN MV10000	6	APPLE MAC, PLUS, SE, CLASSIC	436	28	0.3
	UBC MAINFRAME	10	APPLE MACINTOSH IICI, CX, SI			
		6	IBM PC/XT, PS2/25			
		70	IBM PC/AT, PS2/30, 50, 60			
		5	IBM PS2/70, 80			
		10	ZENITH Z150			
		100	8086 CLONES			
		107	80286 CLONES			
		118	80386 CLONES			
U OF CALGARY	BULL DPS/870M	80	IBM PC/XT, PS2/25	292	10	1.1
	CDC CYBER 860	66	IBM PC/AT, PS2/30, 50, 60			
	IBM 3081	144	IBM PS2/70, 80			
	CDC CYBER 870					
	CDC CYBER 2?3					

DALHOUSIE U	VAX 8800 (88) * VAX STATION 3100 (90) * DEC STATION 5000 (90) IBM 4381 (85)	5 APPLE MAC, PLUS, SE, CLASSIC 79 IBM PC/XT, PS2/25 4 80286 CLONES 16 80386 CLONES 32 8088	136	21	0.8
MCGILL U	IBM ES9000-320 IBM 4381-92E * DEC SERVER 3100	29 IBM PC/XT, PS2/25 8 IBM PS2/70, 80 52 8086 CLONES 31 80286 CLONES 71 80386 CLONES	198	27	1.5
MCMASTER U	IBM 4381 VAX 6420 VAX 11/780 IBM 4381	51 IBM PC/XT, PS2/25 6 IBM PC/AT, PS2/30, 50, 60 17 IBM PS2/70, 80 24 ZENITH Z150 20 8086 CLONES 39 80386 CLONES	161	21	1.1
U OF WESTERN ONTARIO	* IBM 4381 MOD 13 (85)	5 APPLE MAC, PLUS, SE, CLASSIC 20 HP VECTRA 286 108 IBM PC/AT, PS2/30, 50, 60	139	23	1

EIGHTH ANNUAL UCLA SURVEY: 1991
COMPUTER LABS

INSTITUTION	NUMBER MICROS	MICROCOMPUTERS	NET-WORK	HOST	#OUTPUT DEVICES P	L	PLT		PRIMARY USERS			CONSULT TIME	CLASS USE
U OF ALABAMA	22	NORTHGATE 386			6	0	0		U	G		>2/3	YES
	21	NORTHGATE 386	NET		5	1	0		U	G		>2/3	YES
	33	NORTHGATE 386			8	0	0		U	G		>2/3	
	20	MORTHGATE 386			6	0	0		U	G		>2/3	
	4	NORTHGATE 386	NET		2	1	0	F			S	>2/3	YES
U OF ALASKA, FAIRBANKS	15	UNISYS	NET	LINK	1	1	0		U	G		<1/3	YES
	26	14 HP VECTRA, 12 APPLE MAC	NET	LINK	4	2	0		U			>2/3	YES
	4	MAC, 286 CLONES	NET	LINK	0	4	0	F			S		YES
U OF ARIZONA	100	AT&T	NET	LINK	0	3	0		U			>2/3	YES
	16	IBM	NET	LINK	2	2	1	F		G	S	>2/3	YES
	20	APPLE	NET	LINK	0	1	0	F		G	S	>2/3	YES
	6	IBM , APPLE		LINK	1	3	0	F			S	<1/3	YES
	16	AT&T	NET		0	1	0	F			S	<1/3	YES
	28	IBM	NET	LINK	0	1	0	F			S	<1/3	YES
	32	IBM EVEREX	NET	LINK	0	2	1	F				<1/3	YES
ARIZONA ST U	120	IBM	NET		0	2	2		U	G		1/3-2/3	
	35	IBM	NET		0	1	1		U	G		<1/3	
	28	ZENITH	NET	LINK	0	1	1		U	G			YES
	15	APPLE/MAC	NET		0	1	0						
U OF ARKANSAS, FAYETTEVILLE	32	PS/2 MODEL 55 SX	NET	LINK	10	0	0		U			<1/3	YES
	40	386 CLONES	NET	LINK	40	0	0		U	G		<1/3	YES
	24	ZENITH/286			24	0	0		U	G	S	<1/3	YES
	30	IBM EGA AT	NET		30	1	1	F	U	G	S	<1/3	YES
BABSON COLLEGE	21	20 NEC 286, 1 HP VECTRA	NET	LINK	1	1	0		U	G		>2/3	YES
	35	IBM PC/COMPATIBLE		LINK	20	5	0		U	G		>2/3	YES
	20	MAC	NET	LINK	0	3	0		U	G		>2/3	YES
	25	EVEREX 386SX PC		LINK	20	0	0	F	U	G	S	>2/3	YES
	19	14 386SX, 5 MAC		LINK	14	2	0		U	G		1/3-2/3	YES
	9	EVEREX 386 SX		LINK	0	0	0	F	U	G	S	>2/3	YES
BALL ST U	30	ZENITH, MAC, IBM PC	NET	LINK	0	5	0		U	G		>2/3	YES
	47	IBM PC	NET	LINK	11	1	0		U	G		>2/3	YES
	16	IBM, ZENITH, MAC, NEXT		LINK	7	3	1	F		G	S	>2/3	YES
	42	IBM, AT&T ZENITH			14	1	0		U	G		>2/3	YES

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BAYLOR U	36	IBM PC - CGA MONITORS	NET	LINK	18	0	0		U	G			>2/3	YES
	25	IBM PS/2 MOD 55SX COLOR	NET	LINK	12	0	0		U	G			>2/3	YES
	27	IBM PS/2 MOD 50	NET	LINK	14	2	0		U	G			>2/3	YES
	7	IBM PS/2 MOD 70	NET	LINK	0	4	1		U	G	S		>2/3	YES
	18	APPLE MAC SE 30	NET		0	1	0		U	G	S		>2/3	YES
	25	PS/2 MOD 70	NET	LINK	12	0	0		U	G			>2/3	YES
BENTLEY COLLEGE	65	HP VECTRA CLASSICS		LINK	65	1	0		U	G			>2/3	YES
	16	HP PORTABLE VECTRA CS			16	0	0		U				>2/3	YES
	21	IBM PC XT & CLONE	NET		1	1	0		U	G			>2/3	YES
	25	MAC SE/CLASSIC	NET		0	2	0	F				<1/3		YES
	4	2 HP RS20 386, 2 MAC SE (20 + 30)	NET		0	2	0	F				<1/3		YES
	4	2 MAC II, 2 MAC SE.	NET		0	1	0		U	G			>2/3	YES
BOISE ST U	30		NET	LINK	8	1	1		U	G			>2/3	YES
	34		NET	LINK	8	0	0		U	G			>2/3	YES
BOSTON U	29	IBM PS/2 MOD 50Z	NET		15	0	0	F	U	G			>2/3	YES
	31	IBM PS2 MOD 50Z	NET		15	0	0	F	U	G			>2/3	YES
	19	IBM PC	NET		9	0	0	F	U	G			>2/3	YES
	26	1 MACII, 25 MAC SE		LINK	12	1	0	F	U	G			>2/3	YES
BRADLEY U	25	AT&T 6300	NET	LINK	22	0	0		U				>2/3	YES
	21	AT&T 6300	NET	LINK	1	0	0		U	G			>2/3	YES
BRIGHAM YOUNG U	110	80 IBM PC & PCII, MAC PLUS	NET		76	7	3		U	G			>2/3	YES
	40	IBM PC	NET		10	0	0		U	G			>2/3	YES
U OF CALIF, BERKELEY (HAAS)	20	HP VECTRA	NET		2	1	0		U	G			>2/3	YES
	30	APPLE	NET		2	1	0		U	G			>2/3	YES
	22	IBM PC/AT			12	0	0		U	G			>2/3	YES
U OF CALIF, IRVINE	20	HP VECTRA	NET	LINK	10	2	2			G			>2/3	YES
	32	HP QS/16 (80386 BASED)	NET	LINK	2	2	0			G			>2/3	YES
	20	MACINTOSH IIX	NET	LINK	2	1	0			G			>2/3	YES
U OF CALIF, LA (ANDERSON)	31	ATW/386 MOTHERBOARDS	NET	LINK	3	0	0	F		G	S			YES
	23	IBM PC/AT	NET	LINK	3	0	0	F		G	S			YES
	22	VECTRA 386 (10),PS/2 70 (6),MAC CX (6)	NET	LINK	4	0	0	F		G	S			YES
	24	HP VECTRA 386 (17),MAC IICX (7)	NET	LINK	0	8	1	F		G	S			YES
	8	VECTRA 386 (1),PS/2 60,70,80 (3),MAC IICX (4)	NET	LINK	3	1	3	F			S			YES
CAL POLY ST U, SLO	40	HP VECTRA (286)	NET	LINK	16	1	0		U	G			>2/3	YES
	20	HP VECTRA (286)	NET	LINK	8	0	0		U	G			>2/3	YES
	11	10 IBM, 1 CLONE			3	0	0		U	G			>2/3	YES
	4	2 MAC S1, 2 386/2S PC			0	2	0	F				<1/3		YES
CAL ST U, CHICO	93	45 HP VECTRA, 40 LEADING EDGE, 8 MAC			12	3	1		U				>2/3	YES
	5	3 HP VECTRA, 2 LEADING EDGE			0	0	0			G		<1/3		YES
CAL ST U, FULLERTON	24	PC CLONE	NET		6	0	0		U	G			>2/3	YES
	40	PC CLONE	NET		10	0	0		U	G		<1/3		YES
	16	PS/2 55SX	NET	LINK	4	0	0		U	G			>2/3	YES
	26	PS/2 50Z, MAC, HP TERMINAL, ZENITH, PC CLONE	NET		6	0	1		U	G				YES
	27	MAC	NET		5	1	0		U	G		<1/3		YES
	9	4 MAC, 2 PS/2, 1 ZENITH, 1 IBM PC, 1 CLONE 386	NET		2	3	0	F					>2/3	YES

CAL ST U, LOS ANGELES	65	38 AT&T 6300,16 IBM PC,5 APPLEII GS,6 MAC CLS/SE30	NET		29	0	0		U	G			>2/3	YES
	24	AT&T			25	0	0	F	U	G	S		<1/3	YES
	25	AT&T 6300	NET	LINK	25	0	0	F	U	G	S		<1/3	YES
	10	IBM PS/2 MOD 55SX, MOD 50; IBM PC			4	1	0	F	U	G	S		>2/3	YES
	23	AT&T 6386, AT&T 6386-E	NET	LINK	4	0	0	F	U	G			>2/3	YES
CAL ST U, NORTHRIDGE	35	IBM XT, CLONES	NET		33	2	0		U				>2/3	YES
	30	IBM XT, CLONES	NET		30	0	0		U				1/3-2/3	YES
	28	IBM XT, CLONES	NET		5	2	0		U				<1/3	YES
CAL ST U, FRESNO	20	IBM PS/2 MOD 50			0	5	0	F			S			YES
	20	IBM PS/2 MOD 50			0	0	0		U	G				YES
	20	IBM PS/2 MOD 50		LINK	0	0	0		U	G			1/3-2/3	YES
	8	IBM PS/2 MOD 50			0	0	0			G				YES
	30	IBM PS/2 MOD 50			15	0	0		U	G				YES
	30	IBM PS/2 MOD 50			15	0	0		U	G				YES
	25	IBM PS/2 MOD 50			15	0	0		U	G				YES
	20	IMB PS/2 MOD 50		LINK	10	0	0		U	G				YES
	20	IBM PS/2 MOD 50			10	0	0		U	G				YES
	20	IMB PS/2 MOD 50			10	0	0		U	G				YES
CARNEGIE MELLON U	4	MAC II, IBM RT,XT,XT-286	NET	LINK	0	2	1	F			S		<1/3	YES
	4	VAX WORKSTATION,IBM RT,PS/2-80,MACII	NET	LINK	2	2	0	F					<1/3	YES
	17	IBM PS/2-30, MAC	NET	LINK	14	2	0			G			1/3-2/3	YES
	30	MAC II	NET	LINK	0	2	0			G			1/3-2/3	YES
	21	IBM PS/2-30/XT,MAC	NET	LINK	20	0	0			G			1/3-2/3	YES
	20	IBM PS/2-80	NET		0	1	0	F					<1/3	YES
CASE WESTERN U (WEATHERHEAD)	56	40 IBM AT COMPT,13 MACII,MAC SE/30,3 SUN 4/20 SLC	NET		42	4	0	F	U	G	S		>2/3	YES
CENTRAL MICHIGAN U	24	IBM	NET	LINK	1	1	1		U				<1/3	YES
	32	IBM	NET	LINK	1	0	0		U				1/3-2/3	YES
	44	IBM		LINK	1	1	1	F	U	G			1/3-2/3	YES
	30	EPSON			1	1	0	F	U	G			>2/3	YES
CHARLESTON COLLEGE	37	CLONE	NET		1	0	0		U					YES
U OF CINCINNATI	20	IBM PC W/ INTEL 'INBOARD 386 CARDS	NET	LINK	3	0	0		U	G			>2/3	YES
	20	MEMOREX 386X	NET	LINK	3	0	0		U	G			>2/3	YES
	24	MEMOREX 386 SX	NET	LINK	3	1	0		U	G			>2/3	YES
	25	MACII, 10CI, 15SI	NET	LINK	3	1	0		U	G			>2/3	YES
CLARK U	10	IBM			5	0	0			G			1/3-2/3	YES
CLEMSON U	42	TANDY			42	0	0		U				>2/3	YES
	18	NCR			18	0	0		U				>2/3	YES
CLEVELAND ST U (NANCE)	90	ITT, IBM	NET		25	6	0		U	G			1/3-2/3	YES
	30	ITT	NET		8	0	0		U	G			<1/3	YES
	30	ITT			9	0	0		U	G			<1/3	YES
	20	ITT, IBM	NET		10	0	0			G			<1/3	YES
	10	IBM			4	0	0	F					<1/3	YES
	40	MEMOREX/TELEX	NET	LINK	8	6	0		U	G			1/3-2/3	YES

U OF COLORADO, BOULDER	39	PS/2 55 SX			0	0	0		U	G				YES
	20	PS/2 55 SX	NET	LINK	1	1	0		U	G			>2/3	YES
	20	PS/2 55 SX		LINK	10	0	0		U	G			>2/3	YES
COLORADO ST U	84	HP QS16S, MACIICX, AT&T6312, HP ES, HP ES12	NET	LINK	0	13	10		U	G			>2/3	YES
	38	NCR PC6, HP QS16S			38	0	0		U	G			>2/3	YES
	10	HP 386/25, HP QS/20	NET	LINK	10	2	2			G			<1/3	YES
	20	HP QS/20	NET		20	4	0		U	G			>2/3	YES
CORNELL U (JOHNSON)	18	MAC SE	NET	LINK	0	2	0			G			>2/3	YES
	14	IBM PS/2 50Z	NET	LINK	0	2	0			G			>2/3	YES
	8	HP VECTRA	NET	LINK	0	2	0			G			>2/3	YES
CREIGHTON U	44	ATT 6386 WGS	NET		2	1	0		U	G			>2/3	YES
DARTMOUTH COLLEGE (TUCK)	70	MAC, IBM	NET	LINK	20	5	0	F		G			>2/3	YES
U OF DAYTON	24	NCR PC-6, NCR 810, NCR 900	NET	LINK	11	1	0		U	G			>2/3	YES
	22	NCR PC-6, MAC IICX			11	0	0		U	G			>2/3	YES
	19	NCR PC-8, NCR 900, 386 UNITS UP TO BE PRUCHASED			3	0	0		U	G			>2/3	YES
U OF DELAWARE	60	20 ZENITH 386SX, 20 IBM MOD 30, 20 MACIICX	NET	LINK	0	4	1		U				>2/3	YES
U OF DETROIT, MERCY	50	IBM COMPATIBLE			20	6	0		U	G	S	1/3-2/3		YES
	24				12	2	0	F	U	G	S	1/3-2/3		YES
	26	MAC	NET	LINK	13	0	0	F	U	G	S	1/3-2/3		YES
	21	APPLE II	NET		10	0	0	F	U	G	S	1/3-2/3		YES
	6	UNIX	NET	LINK	0	1	0	F	U	G	S	1/3-2/3		YES
	4	IBM COMPATIBLE			1	1	0	F						
DRAKE U	20	MAC	NET	LINK	4	2	0	F	U	G			>2/3	YES
	20	IBM PS/2	NET	LINK	4	1	0	F	U	G			>2/3	YES
DUKE U (FUQUA)	42	AT&T 286 (6312)	NET		35	7	0			G		1/3-2/3		YES
	18	UNISYS 286 (B26)	NET		0	9	0			G				YES
	7	IBM, ZENITH, CLONES, 8088, 80286, 80386		LINK	5	2	0							YES
EAST CAROLINA U	63	APPLE, IBM, ZENITH	NET	LINK	48	1	0		U	G			>2/3	YES
EAST TEXAS U	19	1 PACKARD BELL AT, 18 IBM PC XT			18	1	0		U	G			>2/3	YES
	20	IBM PC XT	NET	LINK	15	0	0		U	G			>2/3	YES
E WASHINGTON U	52	HP, IBM, ZENITH	NET		21	1	1		U				>2/3	YES
EMORY U	40	MAC SE (9), MAC IISI (11), DECSTATION 316+ (20)	NET	LINK	2	4	0		U	G			>2/3	YES
U OF FLORIDA	28	IBM PC,PC/XT,PC/AT,IBM PS2/MOD 50,55SX,60, MAC+,SE	NET	LINK	9	1	0	F		G			>2/3	YES
FLORIDA ATLANTIC U	34	APPLE MACII, IBM, UNISYS, NEC			17	1	0		U				>2/3	YES
	9	HP, IBM, MAC	NET	LINK	3	3	0	F		G			>2/3	YES
	6	IBM, MAC			3	1	0	F		G			>2/3	YES

FLORIDA INTL U	23	ZENITH	NET		6	0	0	F	U	G			>2/3	YES
	20	10 ZENITH, 10 IBM	NET		6	1	0	F	U	G	S		>2/3	YES
FLORIDA ST U	27	15 IBM PC/XT, 12 IBM PS/2 55SX	NET	LINK	9	0	0		U	G			>2/3	YES
	49	ZENITH Z-150	NET	LINK	22	0	0		U				>2/3	YES
	17	IBM PC/XT	NET	LINK	4	0	0	F					<1/3	YES
FORDHAM U	14	IBM	NET	LINK	7	4	1	F		G			>2/3	YES
GEORGE WASHINGTON U	30	IBM PS/2 MOD 50	NET	LINK	0	2	0		U	G			>2/3	YES
	11	IBM PC/XT			2	1	0		U	G			>2/3	YES
GEORGETOWN U	43	WIN LABS (80386/25)	NET	LINK	0	3	0		U	G			>2/3	YES
	12	WIN LABS (80286/33)	NET	LINK	0	1	0		U	G			>2/3	YES
	30	20 IBM XT, 10 MAC	NET	LINK	12	4	1		U	G			>2/3	YES
	30	HP 80386SX	NET	LINK	10	2	0		U	G	S		>2/3	YES
	42	IBM XT			30	0	0		U	G			>2/3	YES
U OF GEORGIA	36	35 PS/2 MOD 55LS, 1 PS/2 MOD 55SX	NET	LINK	18	0	0		U	G			1/3-2/3	YES
	21	PS/2 MOD 55SX	NET	LINK	11	0	0		U	G				YES
	32	13 PS/2 MOD 55LS, 10 PS/2 MOD 55SX, 9 PC/XT	NET	LINK	0	0	0		U	G			>2/3	
	21	5 MAC SE/30, 16 PC/XT			1	0	0		U	G			>2/3	
	40	1 PS/2 MOD 50, 20 PC/XT, 19 PC	NET	LINK	4	0	0		U	G			>2/3	
	15	12 PS/2 MOD 55LS, 1 MAC SE/30,PS/2 MOD 80, PC/AT			1	3	1	F						
GONZAGA U	40	14 EVEREX TEMP 386/SX, 26 HP VECTRA 286/8MHZ		LINK	20	2	0		U	G			>2/3	YES
HARVARD U	16	IBM		LINK	16	0	0			G			>2/3	YES
HOFSTRA U	40	IBM PC/XT, ZENITH 150 286, 386SX	NET	LINK	8	0	0		U	G			>2/3	YES
	20	MAC	NET		1	1	0		U	G			>2/3	YES
	33	IBM PC/XT, PS2 MOD 25	NET	LINK	4	0	0		U	G			>2/3	YES
U OF HOUSTON, UNIV PARK	85	75 IBM PS/2 MOD 30, AT, NEC286; 10 MAC			16	0	0		U	G				YES
	40	ZENITH & NEC			4	0	0		U	G				YES
	22	NEC	NET		2	0	0							YES
	22	COMPAQ PORT II			4	0	0		U					
U OF ILLINOIS, CHICAGO	100	AT&T 6286			2	3	0		U	G			>2/3	YES
U OF ILLINOIS, URBANA	24	PS/2 30	NET		0	0	0		U	G			>2/3	YES
	42	PS/2 30	NET		0	0	0		U	G			>2/3	YES
	21	PC/AT	NET		0	0	0		U	G			>2/3	YES
	32	30 PC/AT, 2 PS/2 70	NET		0	0	0		U	G			>2/3	YES
	18	PS/2 70	NET		0	0	0	F					>2/3	YES
ILLINOIS ST U	31	IBM PC/XT			30	0	0		U	G			1/3-2/3	YES
	30	ZENITH 286			29	1	0		U	G			1/3-2/3	YES
	32	IBM PC/XT			31	0	0		U	G			1/3-2/3	YES
	10	IBM PS/2 55SX			10	0	0	F		G			1/3-2/3	YES
	47	IBM PC/XT, ZENITH 140/150, ZENITH 286 LP			45	1	0		U	G			>2/3	YES

INDIANA U, BLOOMINGTON	24	12 IBM PS/2, 12 IBM XT				4	3	0		G		<1/3		YES
	60	IBM XT	NET	LINK		0	4	0		U	G	>2/3		YES
	60	IBM XT	NET	LINK		0	4	0		U	G	>2/3		YES
	24	IBM MOD 70	NET	LINK		2	0	0		U	G	1/3-2/3		YES
	40	HP LABTOPS				0	0	0		U	G	<1/3		YES
	17	16 NCR 386 SX, 1 NCR 486	NET	LINK		0	0	0	F	U	G			YES
U OF IOWA	70	50 IBM XT, 5 NCR 286, 15 MAC	NET	LINK		6	3	0	F	U	G	>2/3		YES
	25	HP VECTRA	NET	LINK		1	0	0	F	U	G	S	>2/3	YES
	4	IBM PC, NCR 386, MAC	NET			1	0	0	F		G	S	<1/3	YES
JAMES MADISON U	20	IBM PS/2 MODEL 50	NET	LINK		5	0	0		U			>2/3	YES
	20	WIN-386	NET			3	0	1		U			>2/3	YES
	30	20 WIN (PC-AT CLONE) & 10 MACINTOSH	NET			8	1	1		U			>2/3	YES
JOHN CARROLL U	49	EPSON, IBM, HP, AGI	NET	LINK		12	1	0		U	G		>2/3	YES
U OF KANSAS	39	ZENITH & ATT & IBM				0	0	0		U	G		>2/3	YES
KANSAS ST U	67	60 ZENITH 157,159; 6 IBM PC; 1 ZENITH 286		LINK		17	1	1		U	G		>2/3	YES
LOUISIANA ST U	48		NET			6	0	0		U	G		>2/3	YES
	36					12	0	0		U			>2/3	YES
	24		NET			4	2	0	F		G		>2/3	YES
U OF LOUISVILLE	33	ITT	NET	LINK		4	0	0		U			>2/3	YES
	60	ITT/APPLE/MAC/IBM		LINK		12	0	0	F	U	G		>2/3	YES
	6	4 ITT, 2 PS-2 MOD 70		LINK		2	1	0	F			S	<1/3	YES
	5	4 ITT, 1 PS-2 MOD 70		LINK		2	1	0	F			S	<1/3	YES
	5	4 ITT, 1 PS-2 MOD 70		LINK		2	1	0	F			S	<1/3	YES
	28	22 ITT, 6 PS-2 MOD 55				6	0	0		U	G		>2/3	
LOYOLA U, CHICAGO	33	IBM XT	NET	LINK		16	2	0		U	G		<1/3	YES
	16	386 ZENITH	NET	LINK		0	8	0		U	G	S	<1/3	
LOYOLA U, NEW ORLEANS	47	MS DOS, MAC	NET			20	2	0		U	G		>2/3	YES
	5	MS DOS, MAC	NET			2	2	0	F			S		
U OF MAINE	20	IBM PC	NET	LINK		7	1	0		U	G		>2/3	YES
	16	APPLE MAC	NET	LINK		8	1	0		U	G		>2/3	YES
	19	AT&T 6386	NET	LINK		0	1	0		U	G		>2/3	YES
U OF MARYLAND	32	17 PS/2 30-386, 3 PS/2 50, 9 MACII, 3 AT, 2 XT	NET	LINK		2	2	0		U	G		>2/3	YES
	20	AT	NET	LINK		1	1	0		U	G		>2/3	YES
	7	5 MACII, 1 PS/2 50, 1AT	NET	LINK		1	1	0	F			S	1/3-2/3	YES
MIT (SLOAN)	14	MAC SE (6), ATT 6312 (8)	NET	LINK		2	0	0		U	G		<1/3	YES
	22	ATT 6386 (10), ATT 6312 (7), IBM AT (5)	NET	LINK		6	2	0		U	G		<1/3	YES
	24	MAC IISI, MAC IICI, CLASSICS	NET	LINK		4	2	0		U	G	S	<1/3	YES

MIAMI U (OHIO)	25	IBM PC	NET		12	0	0		U	G		>2/3	YES
	22	NCR PC4	NET		0	0	0		U			>2/3	YES
	4	IBM PS2 55SX	NET		2	0	1			G		>2/3	YES
	7	3 MAC IICX, 1 MAC II, 3 MAC SE	NET		2	0	0	F	U	G		>2/3	YES
	22	IBM PS/2 70	NET		0	0	0	F	U	G		>2/3	YES
U OF MICHIGAN, ANN ARBOR	65	UNISYS PW500 (48),MAC SE (14), IBM XT (3)	NET	LINK	3	5	0		U	G		>2/3	YES
	50	UNISYS PW500 (30),MAC SE (20)	NET	LINK	3	4	0		U	G		>2/3	YES
	11	UNISYS PW500 (9),MAC SE (2)	NET	LINK	2	2	0			G		>2/3	YES
	7	UNISYS PW500 (5),MAC SE (2)	NET	LINK	5	2	0			G		<1/3	YES
	4	UNISYS PW500 (1),PW850 (1), MACIICI (1),MACSE30(1)		LINK	0	2	0	F				<1/3	YES
U OF MINNESOTA (CARLSON)	19	DELL, IBM, MAC	NET		0	3	0			G		>2/3	YES
	12	IBM			0	3	0			G		>2/3	YES
U OF MISSOURI, KANSAS CITY	23	17 AT&T 6386 WBS, 6 STANDARD (8086-2)			1	0	0		U	G		>2/3	YES
	24	AT&T 6386			1	0	0		U			>2/3	YES
U OF MISSOURI, ST LOUIS	12	IBM PS/2 70			0	11	0		U			<1/3	YES
MONTANA ST U	70	ZENITH 8086	NET	LINK	10	0	0		U			>2/3	YES
	20	ZENITH 80286	NET	LINK	5	0	1		U			>2/3	YES
	20	MAC			5	0	0		U				
U OF MONTEVALLO	29	4 APPLE IIE, 9 IBM PC & PC/XT, 16 ZENITH 200S			30	1	0		U		S	>2/3	YES
U OF NEBRASKA, OMAHA	40	ZENITH	NET	LINK	1	1	0	F	U	G	S	>2/3	YES
U OF NEVADA, RENO	22	ZENITH 8088 BASED	NET	LINK	2	0	0		U	G		>2/3	YES
	25	ZENITH 8088 BASED	NET	LINK	2	0	0		U	G		>2/3	YES
	10	PS/2 MOD 70			4	0	0	F		G		>2/3	YES
	20	ASCII TERMINALS: QUME, LIBERTY FREEDOM		LINK	5	0	0		U	G		>2/3	YES
	12	IBM 5291 TERMINALS LINKED TO AS/400		LINK	1	0	0		U			>2/3	YES
U OF NEW MEXICO (ANDERSON)	43	IBM XT			43	0	0		U	G		>2/3	YES
	12	IBM PS/2 55SX	NET	LINK	0	1	0	F	U	G		<1/3	YES
U OF NEW ORLEANS	50	ZENITH 100, 148, 158, 150, APPLE MAC.		LINK	29	0	0		U	G		>2/3	YES
NICHOLLS ST U	26	ZENITH 150+			6	0	0		U	G		<1/3	YES
	16	ZENITH 150+		LINK	6	0	0		U	G		<1/3	YES
	25	ZENITH 386 & 386SX	NET	LINK	6	2	0		U			1/3-2/3	YES
	20	ZENITH 150+			4	0	0		U			1/3-2/3	YES
U OF NC, CHARLOTTE	25	IBM PC			0	0	0		U			>2/3	YES
	33	ICS 386/SX	NET	LINK	0	0	0		U			>2/3	YES
NORTHEAST LOUISIANA U	26	IBM PC, TANDY 1200, 3000	NET	LINK	25	1	0		U	G		>2/3	YES
	36	TANDY 1200, 3000	NET	LINK	18	1	0		U	G		>2/3	YES
	30	TANDY 1200			25	0	0		U			1/3-2/3	
	27	NEXT	NET	LINK	0	2	0	F	U	G		<1/3	YES
	15	VT 220			0	0	0						

NORTHEASTERN U	50	AT&T 6300	NET	15	0	1		U	G		>2/3	YES
NORTHERN ARIZONA U	28	IBM PS/2 MOD 30		7	0	0		U			<1/3	YES
	20	XT CLONE		5	0	0		U			<1/3	YES
	20	16 IBM PS/2 MOD 50, 4 APPLE MAC SI	NET LINK	3	2	0		U			<1/3	YES
	7	AT CLONE	NET	0	2	1	F				<1/3	YES
	4	3 IBM PS/2 MOD 50, 1 IBM XT		0	2	1	F				<1/3	YES
	50	286 BASED CLONE	NET	9	0	0		U			>2/3	YES
NORTHERN ILLINOIS U	88	50 CORONA-HP 386SX, 4 TANDY 1000, 34 KAYPRO	NET	43	0	0		U	G		>2/3	YES
	22	HP VECTRA 286	NET LINK	10	2	1		U	G		>2/3	YES
	25	HP VECTRA 386SX	NET	0	2	0		U	G		>2/3	YES
U OF NOTRE DAME	80	IBM,MAC	NET LINK	0	8	0		U	G		>2/3	YES
OAKLAND U, MICHIGAN	32	DEC VAXMATES286, ATT 6300S 8086, UNISYS PW2 286		7	2	0		U	G		>2/3	YES
	18	16 ATT 6300S 8086, 1 UNISYS PW2 286, 1 IBM XT		7	0	0		U	G		<1/3	YES
OHIO ST U	30	NCR PC 810	NET LINK	1	0	0		U	G		>2/3	YES
	30	NCR PC6	NET LINK	1	0	0		U	G		>2/3	YES
	15	DTK 386	NET LINK	1	0	0		U	G		>2/3	YES
U OF OKLAHOMA	30	IBM PC/XT		15	0	0		U			>2/3	YES
	15	10 IBM PS/2 MOD 70; 5 APPLE MAC II & SE/30	NET	6	1	1	F	U	G		>2/3	YES
OKLAHOMA ST U	40	IBM PC		1	0	0		U			>2/3	YES
	45	IBM PC CLONE		1	0	0		U			>2/3	YES
U OF OREGON	16	MAC SE, SE30	NET LINK	3	0	0		U			>2/3	YES
	24	MAC SE30, IICI, IICX	NET LINK	3	1	0	F		G		>2/3	YES
	25	HP VECTRA 286, 386	NET LINK	4	1	0	F	U	G	S	>2/3	YES
OREGON ST U	55	HP VECTRA 286 (UNDERGRAD LAB)	NET	0	4	0		U			>2/3	YES
	10	AST; HP VECTRA 386 (BETA TEST LAB)	NET LINK	0	1	0		U		S	>2/3	YES
	22	HP VECTRA 386 (ACCOUNTING LAB)	NET LINK	0	3	0		U			>2/3	YES
	40	HP BECTRA 386 (MBA LAB)	NET LINK	0	4	0	F		G		>2/3	YES
	4	HP VECTRA 386 (MIS LAB)	NET LINK	5	1	0		U	G		>2/3	YES
U OF THE PACIFIC	21	IBM MOD 50-2 (PS-2)		2	1	0		U			>2/3	YES
U OF PENN (WHARTON)	8	HP VECTRA ES/12	NET LINK	4	0	0		U	G		<1/3	YES
	12	HP VECTRA ES/12	NET LINK	6	1	0		U	G		<1/3	YES
	40	HP VECTRA ES/12	NET LINK	24	0	0	F	U	G	S	<1/3	YES
	16	MACINTOSH SE/30	NET	8	0	0		U	G		<1/3	YES
	45	HP VECTRA QS/16S	NET LINK	21	2	1			G		<1/3	YES
	22	MACINTOSH SE/30	NET LINK	11	0	0		U			<1/3	YES

PENN ST U	20	IBM MOD30	NET	LINK	5	1	2		U	G			>2/3	YES
	20	IBM MOD 30	NET	LINK	5	1	2		U	G			>2/3	YES
	25	AT&T 6300S	NET	LINK	6	1	2		U	G			>2/3	YES
	19	IBM PC			13	2	2		U	G			>2/3	YES
	6	4 IBM PS2/70, 2 MAC SE/30			2	1	1	F			S		<1/3	YES
	20	IBM 6502	NET	LINK	2	0	0		U	G			>2/3	YES
	5	2 IBM PS2/70, 3 IBM PC/XT			1	1	0	F					<1/3	YES
	8	HP VECTRA 121	NET	LINK	8	1	10	F		G	S		>2/3	YES
	30	MAC SE/30	NET		3	2	0		U	G				YES
PORTLAND ST U	45	IBM PS/2 50			16	0	0		U	G			>2/3	YES
	24	IBM XT			8	0	0		U	G			>2/3	YES
	12	MAC SE, SE30	NET		0	1	0	F		G	S		>2/3	YES
PURDUE U (KRANNERT)	24	IBM AT	NET		0	2	1		U	G			>2/3	YES
	34	VECTRA	NET	LINK	0	3	0		U	G			>2/3	YES
	24	MAC	NET		0	2	0		U	G			>2/3	YES
	24	IBM PS/2	NET	LINK	0	3	1		U	G			>2/3	YES
	5	MACIICX	NET		0	2	0		U				>2/3	YES
	5	HP9000/319	NET	LINK	0	1	0		U	G			>2/3	YES
	15	NCR 486	NET		0	2	0		U	G			>2/3	YES
U OF RHODE ISLAND	32	20 IBM PC, 12 TEXTRONICS TREMS	NET	LINK	0	0	0		U	G			<1/3	YES
	16	IBM PC	NET		0	1	0		U	G			>2/3	YES
	24	IBM PS/2 30-386	NET		12	0	0		U	G			>2/3	YES
	8	IBM PS2/ 70	NET		0	0	0	F	U	G			<1/3	YES
U OF RICHMOND (ROBINS)	25	16 PC CLONE, 8 IBM PC, 1 AT&T 386 (HOST)			12	0	0		U	G	S			YES
U OF ROCHESTER (SIMON)	64	28 MAC, 36 PC & EQUIVALENT	NET	LINK	2	9	0			G			>2/3	YES
RUTGERS ST U OF NJ	26	IBM, ZENITH, AT&T, MITSUBISHI, APPLE	NET	LINK	10	1	1			G			>2/3	YES
	32	MITSUBISHI	NET	LINK	0	0	0	F		G			>2/3	YES
	5	MITSUBISHI, APPLE, GATEWAY 2000	NET	LINK	0	2	0	F					<1/3	YES
SAN JOSE ST U	47	TELEVIDEO AT COMPATIBLE	NET		6	0	0		U	G			1/3-2/3	YES
	45	HP VECTRA	NET	LINK	6	0	1		U	G			1/3-2/3	YES
	14	ELTECH & CLUB AMERICA AT COMPATIBLE		LINK	4	0	0		U	G			1/3-2/3	YES
	32	APPLE MAC	NET		4	1	0		U	G			1/3-2/3	YES
SHIPPENSBURG U	25	ZENITH			6	0	0	F	U				>2/3	YES
	8	ZENITH	NET	LINK	3	1	0	F	U				>2/3	YES
U OF SOUTH CAROLINA	72	30 AT&T, 18 IBM & 3179, 6 ZENITH, 12 MAC, 6 UNISYS	NET	LINK	34	3	1		U	G			>2/3	YES
	25	ZENITH	NET	LINK	10	0	0	F	U	G			>2/3	YES
	25	IBM PS-2/60	NET	LINK	25	0	0	F	U	G			1/3-2/3	YES
	40	MAC	NET	LINK	0	0	0						>2/3	YES
	12	8 MAC, 4 AT&T	NET	LINK	3	2	0	F		G			>2/3	YES
U OF SOUTH FLORIDA	27	IBM PC, 4 PS/2	NET		2	1	0		U	G			>2/3	YES
	18	ZENITH 158			2	0	0		U	G			>2/3	YES
	25	MAC SE	NET	LINK	2	1	0		U	G			>2/3	YES
	15	286 CLONES	NET		1	0	0	F	U	G			<1/3	YES

U OF SOUTHERN CALIF	71	APPLE, HP, CLONES	NET	LINK	35	5	1		U	G		>2/3	YES
	32	APPLE, ZENITH, HP, CLONES	NET		0	4	3		U	G	S	>2/3	YES
	49	IBM	NET	LINK	1	0	0		U	G	S	<1/3	YES
SOUTHERN ILLINOIS U, CARBONDALE	25	PC, PS2 MOD 30			12	0	0					>2/3	YES
SOUTHERN ILLINOIS U	35	ZENITH 140, 150			10	0	0		U			>2/3	YES
	12	ZENITH 150			4	0	0	F	U	G		>2/3	YES
	20	ZENITH 150			5	1	0	F	U	G	S	>2/3	YES
	24	ZENITH 150	NET		4	1	0	F	U	G	S	>2/3	YES
SOUTHERN METHODIST U	20	EVOSTAR 286, LIVESTAR 286	NET	LINK	1	0	6		U			>2/3	YES
	20	IBM	NET	LINK	1	0	0			G		>2/3	YES
	40	ATT 286, 386	NET	LINK	20	2	1	F	U	G		>2/3	YES
STANFORD U	85	HP,EPSON,IBM,APPLE	NET	LINK	27	15	0			G		>2/3	YES
	8	IBM,APPLE,HP	NET	LINK	3	4	0					<1/3	YES
	6	IBM,APPLF,HP	NET	LINK	0	3	1	F				>2/3	YES
SUFFOLK U	33	MAC CLASSIC, MAC+, IBM PC CLONE 8088,80286, 80386			4	1	0		U	G		>2/3	YES
	20	8 IBM CLONE 80386, 12 IBM CLONE 80286	NET		1	0	0		U	G		<1/3	YES
SYRACUSE U	22	IBM 55SX	NET	LINK	1	1	1		U	G		<1/3	YES
	20	IBM PC	NET	LINK	1	0	0		U	G			YES
TEMPLE U	30	IBM PS/2 MOD 30-286	NET	LINK	1	0	0		U	G		>2/3	YES
	40	IBM PS/2 MOD 30	NET	LINK	1	0	0		U	G		>2/3	YES
	10	IBM PS/2 MOD 30-286,(1 APPLE SE/30 W/ HP DESKJET)	NET	LINK	1	0	0		U	G		>2/3	YES
TENNESEE TECH U	47	21 IBM PS/2, 20 IBM PC, 6 DELL			23	0	1		U	G		>2/3	YES
	8	DIGITAL RAINBOWS			4	0	0		U	G		>2/3	YES
U OF TEXAS, ARLINGTON	15	ARCHE 386-SX	NET		1	2	1		U	G		>2/3	YES
	16	ARCHE 386-25	NET		0	1	0	F	U	G		>2/3	YES
	4	MAC SI	NET		0	0	0	F	U	G		>2/3	YES
	52	50 IBM XT, 2 GRID 386-SX	NET	LINK	0	0	1	F	U	G		<1/3	YES
	14	IBM XT			0	0	0		U	G		1/3-2/3	YES
U OF TEXAS, AUSTIN	11	MAC	NET	LINK	0	0	0						YES
	32	31 HP 386SX, 1 MAC	NET	LINK	0	2	0		U	G		>2/3	YES
	9	MAC	NET	LINK	0	1	0					>2/3	YES
	7	1 IBM PC/AT, 1 PB/PC, 5 HP 386SX	NET	LINK	0	0	0						
	5	IBM AT, CLUB 386SX, MACII, SUN SPARC			2	0	0						YES
	25	1 IBM PC, 23 MAC, 1 PB-PC	NET		6	2	0		U	G		>2/3	YES
	18	MAC	NET		5	0	0			G		>2/3	YES
	40	IBM PC			22	0	0		U	G		>2/3	YES
	58	57 IBM PC, 1 PB PC			26	1	0		U	G		>2/3	YES
	17	IBM AT	NET	LINK	0	0	0		U	G			YES
TEXAS A&M U	30	APPLE MAC SE	NET		0	1	0		U	G		<1/3	YES
	50	ZENITH			1	0	0		U			<1/3	YES
	50	IBM XT		LINK	1	0	0		U	G		<1/3	YES
	35	HP VECTRA	NET	LINK	0	1	0		U	G		<1/3	YES
	35	IBM XT		LINK	0	1	0			G		<1/3	YES

TEXAS CHRISTIAN U	33	TANDY 286	NET	LINK	16	0	0		U	G		>2/3	YES
	22	TANDY 8088, 80386SX			11	0	0		U	G		>2/3	YES
TEXAS TECH U	20	IBM, ZENITH			1	0	0		U	G		<1/3	YES
	34	ZENITH	NET	LINK	1	0	0		U	G		<1/3	YES
	30	24 ZENITH, 6 MAC	NET	LINK	1	0	0		U	G		<1/3	YES
TULANE U	38	MAC+, ITT XTRA, ZENITH159, IBM-PC, DELL 3176SX	NET		30	2	0		U	G		>2/3	YES
	17	IBM PS/2 MOD 70 25 MHZ	NET	LINK	0	3	0	F		G		>2/3	YES
U OF UTAH	68	IBM, VECTRA, AST, GRID	NET	LINK	2	0	1		U	G		>2/3	YES
UTAH ST U	40	TELEVIDEO 1605	NET	LINK	6	0	0	F	U	G		>2/3	YES
	20	80386 CLONES	NET	LINK	2	1	0		U	G		>2/3	YES
	30	IBM MODEL 70	NET	LINK	4	1	0	F	U	G		>2/3	YES
	30	15 TELEVIDEO 1605, 15 30836 CLONES	NET	LINK	2	0	0		U	G		>2/3	YES
	30	TELEVIDEO 1605	NET	LINK	2	0	0		U	G		>2/3	YES
	15	TELEVIDEO 1605			0	0	0						
VALDOSTA ST COLLEGE	18	11 IBM XT, 7 ZENITH 159			11	0	0	F	U			>2/3	YES
	20	19 IBM XT, 1 ZENITH 159		LINK	1	0	0	F	U			>2/3	YES
VANDERBILT U (OWEN)	39	15 MAC SE, 24 AT&T 6386	NET	LINK	13	3	1			G		>2/3	YES
	4	IBM PS2 MOD50, IBM PC (HARD DISK), 2 MAC II	NET	LINK	0	2	0	F				<1/3	YES
U OF VERMONT	10	2 AT&T 6300, 4 IBM PS/2, 1 AT&T 386SX, 3 ZENITH386	NET	LINK	1	1	0		U			<1/3	YES
VILLANOVA U	26	ZENITH 286 LP, 248-150 NETWORK SERVER	NET		8	0	0		U	G		>2/3	YES
	16	ZENITH 159	NET		5	0	0					1/3-2/3	YES
	20	ZENITH 286 LP COLOR MONITORS	NET		1	0	0	F	U	G			YES
	20	ZENITH 286 LP	NET		1	0	0	F	U	G			YES
	20	IBM PS2 25 286	NET		1	0	0	F	U	G			YES
	20	IBM PS2 25 286	NET		1	0	0	F	U	G			YES
	4	2 ZENITH 159, 2 ZENITH 306, DEC VT100	NET		0	2	0	F			S		YES
U OF VIRGINIA (DARDEN)	30	IBM PS/2 MOD 50, IBM PC, XT	NET	LINK	2	4	0			G		1/3-2/3	YES
	11	APPLE MAC, MACII	NET		1	1	0			G		1/3-2/3	YES
	10	WIN AT 286	NET	LINK	0	0	0	F		G			YES
U OF VIRGINIA (MCINTIRE)	36	AT&T 6386	NET	LINK	4	0	0		U	G		>2/3	YES
	35	IBM PS/2 MOD 30	NET	LINK	4	3	0		U	G		>2/3	YES
	35	80286 CLONES	NET	LINK	6	1	0		U	G		>2/3	YES
VIRGINIA TECH INST (PAMPLIN)	19	IBM PC		LINK	2	0	0		U			>2/3	YES
	21	13 ZENITH 248-84,7 ZENITH 248/12-40,ZENITH 158-43			5	0	0		U			>2/3	YES
	30	IBM, ZENITH 386, 248, AST PREMIUM, AT&T, MAC II			10	1	0	F	U	G		>2/3	YES
WAKE FOREST U (BUS & ACCNT)	25	IBM XT	NET	LINK	1	1	0		U			>2/3	YES
WAKE FOREST U (BABCOCK)	26	ZENITH/286 (50%), ZENITH/386 (50%)	NET		0	4	0			G		<1/3	YES
	10	ZENITH/286 (50%), ZENITH/386 (50%)	NET		0	1	0			G		<1/3	YES

U OF WASHINGTON, SEATTLE	38	HP VECTRA		LINK	19	0	0		U	G		>2/3	YES
	35	MAC IICX	NET	LINK	3	1	0		U	G		>2/3	YES
	35	MAC SE/30	NET	LINK	3	1	0		U	G		>2/3	YES
WASHINGTON U, ST LOUIS (OLIN)	35	IBM		LINK	30	2	2		U	G		>2/3	YES
	15	286 CLONES	NET		1	0	0	F	U	G		<1/3	YES
WASHINGTON AND LEE U	29	IBM PS/2 MOD50	NET	LINK	6	0	2		U			1/3-2/3	YES
	7	MAC CLASSIC	NET		2	0	0		U			<1/3	YES
WAYNE ST U	24	ZENITH 158	NET		0	0	0		U	G		>2/3	YES
	24	ZENITH 158			1	0	0		U	G		>2/3	YES
	22	IBM PS/2 MODEL 50, ZENITH, MACINTOSH SE/30			9	4	1		U	G		>2/3	YES
	21	IBM PS/2 MODEL 50			13	0	0		U	G		>2/3	YES
	25	MAC SE/30	NET		0	2	0		U			>2/3	YES
	10	386SX CLONES	NET	LINK	0	1	0		U			>2/3	YES
WEST GEORGIA COLLEGE	30	28 IBM PC, 2 IBM PC-AT	NET		4	0	0		U	G		>2/3	YES
	15	14 IBM PC, 1 IBM PC-AT	NET		4	0	0		U	G		>2/3	YES
WEST VIRGINIA U	30	IBM PS/2 MOD 50	NET		15	0	0		U	G		>2/3	YES
	30	IBM PS/2 MOD 50	NET		15	0	0						
WESTERN CAROLINA U	38	IBM PC/AT, ZENITH, EPSON EQUITY III+			10	0	0		U	G		>2/3	YES
	9	EPSON EQUITY III, ZENITH 286			10	0	0		U		S		YES
	10	ZENITH 386/20			6	1	0		U	G		>2/3	YES
WESTERN ILLINOIS U	13	ZENITH 150+	NET	LINK	3	0	0		U			>2/3	YES
	30	ZENITH 386 SX, IBM PC	NET	LINK	4	0	0		U			>2/3	YES
	60	ZENITH 150+	NET	LINK	10	1	0		U			>2/3	YES
	15	ZENITH 286, 386SX, 150+	NET	LINK	4	1	1		U			>2/3	YES
WESTERN MICHIGAN U	70	50 ZENITH MOD 1, 20 MAC II	NET	LINK	24	3	0		U	G		>2/3	YES
	70	ZENITH MOD 1	NET	LINK	3	1	0		U	G		>2/3	YES
	50	MAC II	NET	LINK	3	2	0		U	G		>2/3	YES
	5	MAC II SX		LINK	1	1	0	F	U	G	S	1/3-2/3	YES
WESTERN WASHINGTON U	52	ZENITH	NET		16	0	0		U	G		>2/3	YES
	4	ZENITH/DELL			1	1	1	F			S	<1/3	YES
WINTHROP COL	25	IBM PC COMPATIBLE	NET	LINK	1	0	0		U	G		1/3-2/3	YES
	27	IBM PC CMPATIBLE	NET	LINK	1	0	0		U	G		1/3-2/3	YES
	30	IBM PC COMPATIBLE	NET	LINK	1	0	0		U	G		1/3-2/3	YES
U OF WISCONSIN, EAU CLAIRE	25	IBM PC	NET		3	0	0		U	G		<1/3	YES
	30	PS/2	NET		3	0	0		U	G		<1/3	YES
	20	ZENITH 158	NET	LINK	1	0	0		U	G		1/3-2/3	YES
	30	ZENITH 158			0	1	0		U	G		<1/3	YES
U OF WISCONSIN, LA CROSSE	24	ZENITH 238	NET	LINK	3	1	0		U	G		1/3-2/3	YES
	24	ZENITH 8086	NET	LINK	3	1	0		U	G		1/3-2/3	YES

U OF WISCONSIN, MADISON	37	ATT 7386SX	NET		2	2	0		U	G		1/3-2/3	YES
	18	8 MAC SE, 8 MACII	NET	LINK	0	2	0		U	G		<1/3	YES
	4	MAC II, IBM PS/2 50, COMPAQ			0	2	0	F				<1/3	YES
	4	IBM PS/2 (50, 80), COMPAQ		LINK	0	1	0	F				<1/3	YES
	12	IBM PS/2 50	NET	LINK	2	1	0	F				<1/3	YES
	4	IBM AT	NET	LINK	1	1	0			G		<1/3	YES
U OF WISCONSIN, OSHKOSH	4	IBM PS/2 MOD 60,IBM PC/XT,MACII,ZENITH 386 SERVER	NET		2	9	1	F		G		<1/3	YES
	40	IBM PS/2 MOD 50, ZENITH 386, TERMINALS-VAX	NET	LINK	1900		0		U	G		1/3-2/3	YES
	20	ZENITH 386	NET		5	0	0		U	G		<1/3	YES
	60	ZENITH 386, MAC	NET	LINK	15	0	0		U			1/3-2/3	YES
	20	TERMINALS-VAX		LINK	1	0	0		U			<1/3	YES
U OF WYOMING	26	ZENITH 159			12	0	0		U	G		>2/3	YES
	37	ZENITH 159			5	0	0		U	G	S	1/3-2/3	YES
	7	ZENITH 248 80286		LINK	4	0	1	F	U	G		<1/3	YES
YALE U	15	IBM AT, 50, ZENITH 286	NET	LINK	8	1	1			G		<1/3	YES
	41	IBM 50, GGSX, 70, AT	NET	LINK	32	2	1			G		<1/3	YES
	24	IBM PC, AT, APPLE SE, SE/30, CLASSICS, IISI, CX	NET		3	1	1			G		<1/3	YES
U OF ALBERTA	28	IBM PC	NET	LINK	28	0	0		U	G			YES
	28	APPLE MAC	NET		14	0	0		U	G			YES
	11	IBM PC, APPLE MAC	NET		5	0	0	F		G		>2/3	YES
	5	IBM CLONE 386, IBM PC, ZENITH, APPLE MAC		LINK	3	0	0					>2/3	YES
	8	IBM PC, APPLE MAC	NET	LINK	0	3	1	F			S	>2/3	YES
U BRITISH COLUMBIA	65	5 P BELL XT, 55 IBM 286 MOD 30, 5 OTHERS	NET	LINK	10	2	0		U	G		>2/3	YES
	12	4 IBM 386, 6 OTHER 386, 2 P BELL 8086	NET	LINK	0	2	0					<1/3	YES
U OF CALGARY	56	IBM PC XT	NET		28	0	0		U	G		>2/3	YES
	40	IBM PC AT, XT/286	NET	LINK	0	1	0		U	G	S	>2/3	YES
	34	IBM PS/2 55	NET	LINK	0	1	0	F	U	G	S	<1/3	YES
DALHOUSIE U	48	IBM & CLONES	NET	LINK	15	1	1		U	G		>2/3	YES
MCGILL U	18	386 TYPE COMPATIBLE	NET	LINK	20	1	0		U	G		>2/3	YES
	18	286 TYPE COMPATIBLE	NET	LINK	8	1	0		U	G		>2/3	YES
	12	PC XT	NET	LINK	2	1	0		U			>2/3	YES
	6	3 386 COMPATIBLE, 3 286 COMPATIBLE	NET	LINK	2	1	0			G		1/3-2/3	YES
	23	8 PC XT, 15 386 BYPE	NET	LINK	4	1	0		U	G		1/3-2/3	YES
MCMASTER U	30	IBM PC XT	NET	LINK	0	0	0		U			>2/3	YES
	15	IBM PS/2 55SX	NET	LINK	0	0	0			G		<1/3	YES
	15	386 CLONE, IBM COMPATIBLE	NET	LINK	0	0	0			G		<1/3	YES
	24	12 IBM PC AT, 12 386 CLONE, IBM COMPATIBLE	NET	LINK	0	0	0		U			>2/3	YES
	5	IBM PC XT	NET	LINK	0	0	0			G		<1/3	YES
U OF WESTERN ONTARIO	20	IBM AT	NET		4	1	0		U	G		>2/3	YES
	20	HP ES	NET		4	1	2		U	G		>2/3	YES