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Examination of an attempt to train high school dropouts in computer literacy to fill entry level positions in private industry and provide motivation to take full advantage of this new technology

Dale Nook

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AN EXAMINATION OF AN ATTEMPT TO TRAIN HIGH SCHOOL
DROPOUTS IN COMPUTER LITERACY TO FILL ENTRY
LEVEL POSITIONS IN PRIVATE INDUSTRY AND
PROVIDE MOTIVATION TO TAKE FULL
ADVANTAGE OF THIS NEW TECHNOLOGY

by

Dale Nook

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APPROVAL SHEET

This thesis has been approved by the following committee:

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Abstract

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Dale W. Nook

Technological change has impacted almost all of society, particularly the economic and educational sectors. High technology, of which computer technology is a fundamental component, has both destroyed and created jobs at a pace never before seen. The ability to understand and use computers is becoming essential to obtain and keep more and more different types of jobs.

The thesis project was an attempt to address the problem of an increasingly polarized society fueled by the technological revolution. The purpose of this study was to document whether all members of society are sharing in the benefits of high technology, or will we create a world characterized by haves and have nots? The way this was accomplished was to study the impact the information revolution is having on society. Once this survey was completed, an instrument was designed to motivate people to become better educated in order to improve their standing in a technology-oriented economy.

Abstract (continued)

This was done in conjunction with a core group of consul-
tants who represent all phases of the computer industry.
Relying upon their vast knowledge and expertise, a computer
literacy program was developed.

This thesis documented the effects the information revo-
lution is having on society. Then, it goes on to elaborate
upon the development of the computer literacy program and its
significance for the disadvantaged participants that it
served.

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CHAPTER ONE

Project/Research Report Proposal

<u>Purpose of the Project</u>

This project's purpose was to provide instruction in computer literacy so certain segments of our disadvantaged populace could attain entry level positions in the job market and/or become inspired to continue with further training in this increasingly important area. Since computers only do exactly what they are told, they function as well as those giving the instructions. For this reason, it is paramount that any training for high school dropouts include enhancement of their basic skills. Therefore, any program offering hands-on computer experience to be successful in making this popula-tion job ready must be augmented by Basic Skill development.

A high school diploma or General Equivalency Diploma (G.E.D.) certificate is almost becoming a universal minimum requirement for employment. This is especially true in a tight job market. Attempts at vocational training must address this important issue.

The concept of employability development is also an important consideration. This project had emphasized various facets. Sources such as the <u>Encyclopedia of Careers</u> and <u>Occupational Outlook Handbook</u> provided detailed job descrip-tions offering knowledge of the world of work. Career counseling and employability development was obtained as

in-kind services at the Young Women's Christian Associa-
tion.

The project was implemented through volunteer resources;
because funding was not obtained, the program did not operate
on a large scale. Various members of the educational and
professional components of the computer industry offered
their services as volunteer consultants. In conjunction
with them, the writer designed the program and created
the necessary curriculum. This source was also a means
for training services and job development.

Since the investigator is an active member of Multi-
cultural Community High School, an alternative providing
Basic Skill/G.E.D. preparation to Milwaukee's dropouts,
he integrated computer training with or adjunct to current
ongoing educational processes. To this end, he selected
students with good English and Math skills and exposed them
to hands-on computer experience. Since the computer is only
a tool, this process was viewed as interactive. Hence their
basic skills were enhanced by practical application. As
Multicultural is essentially a non-funded and non-profit
organization all basic skill and computer instruction was
provided by volunteers. Additional students were recruited
from Journey House, a community-based organization provid-
ing similar services in the same area.

If funding had been secured, the project would have
been larger and supported by the following staff. A full-

time coordinator would have been responsible for administration, job development, and counseling. A half-time secretary would have been provided for the coordinator's use. In addition, the services of a full-time basic skill and full-time computer instructor would have rounded out the program.

Two testing instruments evaluated project participants. Consultants devised a measurement of computer literacy and G.E.D. test scores reflected the level of basic skill attainment. This criteria provided the proper information for job placement or showed if continuing education was warranted. In either case, the students were tracked and support services provided when necessary.

Statement of Problem

High School dropouts without any marketable skills face a future characterized by high unemployment and under-employment. The following schema summarizes 1981 unemployment statistics for persons 16 to 24 years not enrolled in school as compiled by the Monthly Labor Review, September, 1982.

Table 1.1

1981 Unemployment Statistics for Persons
16 to 24 Not Enrolled in School

School Completed	Percentage Unemployment Rate
High School	
Less than 4 years	26.9
16 to 19 years	32.9
20 to 24 years	23.6
4 years only	13.8
College	
1 to 3 years	8.6
4 years or more	5.3

[1]

The length of time spent in school also has a marked
effect on future employment potential. A report released
by the U.S. Department of Labor takes an in-depth look at
March, 1982 unemployment statistics. In a study covering
persons 25 and over with the national unemployment rate at
7.6% one sees the following results.

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[1] Anne McDougall Young, "Special Labor Force Reports -
Summaries," Monthly Labor Review, Sept. 1982, p. 40.

Table 1.2

Unemployment Statistics per Educational Background
25 Years or Older (March, 1982)
Overall Unemployment - 7.6%

Level of Education	Percentage Unemployment Rate
Less than 8 years of school	13.2
1 to 3 years of high school	12.1
High school diploma	8.5
1 to 3 years of college	6.2
4 or more years of college	3.0

[2]

It is evident that certain segments of society are affected more by the current economic dilemma than others. In addition, those who experience difficulty finding employment in younger years face persistent problems in the future. The solution for them lies in the ability to get back in school, attain G.E.D. certification, or learn a marketable trade.

In an article adapted from their forthcoming book, Second Thoughts on Work, Sar Levitan, an economist, and Clifford Johnson, his assistant, discuss the microprocessor.

Today, futurists are discussing the onset of a sweeping technological revolution, one which

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[2] U.S. Department of Labor, Bureau of Labor Statistics Report, Sept. 1982, n.p.

would rival or surpass the Industrial Revolution
of the 19th century in importance. This envisioned
social order has been given many names - "post-
industrial," "technetronic," or "information"
society. At the center of this flurry of interest
in technological change is the microprocessor.
While computerized automation has been theoreti-
cally feasible for more than a decade, large and
expensive computer systems could produce cost
savings only in the most massive industrial
settings, and automated machinery could not be
easily adapted to serve various production func-
tions. Now, with the development of the micro-
processor, these obstacles have been overcome and
the potential uses of computerized machinery at
the workplace have dramatically increased.[3]

Addressing a gathering of the World's Futurists Society,

Lynne Stitt, a Colorado consultant, states; "the future is

between the knows and the know-nots, rather than between the

haves and the have-nots." According to Ann Lewin, Director

of Capital Children's Museum, "For me, it's not so much an

issue of sex, as it is equality - no matter. By the year

2000 we're going to find computers in every facet of our

lives. Those who will be winners will be those who are able

to access (computer) information."[4]

Not only is it important for dropouts to return to

school or obtain G.E.D. certification, any practical vocational

training should reflect an everchanging workplace. Would it

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[3] Sar A. Levitan and Clifford M. Johnson, "The Future of
Work: Does it Belong to Us or to the Robots," Monthly Labor
Review, Sept. 1982, p. 10.

[4] "Girls Falling Behind in Computer Skills," The
Milwaukee Journal, 3 Oct. 1982, p. 10, cols. 2-3.

be prudent to train welders when progress dictates those
jobs will soon become robotized? Since most high school
dropouts have limited exposure at best to computers, it
is crucial that this technology become demystified for
them.

Chapter 2 of the report documented the relevance the
program has for future job trends. In addition, it elabo-
rated on the importance of individualized and computer-
assisted instruction for the disadvantaged. Finally, it
compared and contrasted the project with others designed
to reach this target population.

Project Title, Location and Duration

The title of the Project is "An Examination of An
Attempt to Train High School Dropouts in Computer Literacy
to Fill Entry Level Positions in Private Industry and Pro-
vide Motivation to Take Full Advantage of This New
Technology." Through the auspices of an alternative high
school hands-on computer instruction was provided in Data
Entry, Word Processing, Basic Accounting and Fundamental
Programming.

The Milwaukee Christian Center, located at 2137 West
Greenfield, Milwaukee, Wisconsin, was the host facility for
all project training and instructional activities. The
Christian Center is located in what is commonly referred to
as Milwaukee's Inner City South. On October 25, 1974, the

U.S. Department of Commerce, Economic Development Administration designated this area for Special Federal Assistance because of its high unemployment and persistent economic distress. Excerpts from a Metropolitan Milwaukee Survey done in 1981-82 summarize the demographic characteristics of the city's near southside. (Table on following page.)

The project ran from September, 1982 until July, 1983. In September, the structure of the study was formulated. The design of the program and curriculum was devised between September and December. Instruction began in January and continued until July. Finally, from March until July all qualified students were placed in jobs or tentatively admitted to area colleges when possible.

Participants

The Milwaukee Christian Center sponsored computer training program had a well developed network of volunteer support services. Funding was not obtained, and the project could not serve many participants or employ a full-time staff in addition or adjunct to this core group.

Paul Hardiman is a professional programmer with fifteen years of experience in his field. Mr. Hardiman currently works in the area of artificial intelligence and decision support systems. His past background includes technical programming on large IBM main frames and programming micro-computers, especially the Apple II. In terms of support, he

Table 1.3

Demographic Characteristics City's Near Southside

Income (Total Family Before Taxes)	Percentage Total Households (29,000)
Under $5,000	13
$5,000 - $9,999	16
$10,000 - $14,999	16
$15,000 - $19,999	14
$20,000 - $24,999	17
$25,000 - $34,999	20
$35,000 - $49,999	4
$50,000 and Over	-

Education (Head of Household)	Percentage Total Households (29,000)
Grade school or less	16
1-3 years high school	22
Graduated high school	41
1-3 years college	15
Graduated college	6

[5]

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[5] "Metro Milwaukee Shopping Centers and Demographics by Economic Areas," (Milwaukee: The Journal Company, 1982), n.p.

has donated an Apple II computer to the Christian Center for
training services. He acted as a consultant in program
design and curriculum. Mr. Hardiman also provided volunteer
training services.

Kathleen Barry is an Editorial Research Assistant of
Computer-Assisted Instruction for Raintree Publishers. She
is completing an educational degree at the University of
Wisconsin-Milwaukee which in part focuses on microcomputers
and computer-based instruction. She acted as a consultant
to program design and curriculum. Ms. Barry and Mr. Hardiman
had helped devise a testing instrument to determine the level
of computer literacy program participants acquire. Finally,
Ms. Barry provided her training services as additional
support.

Joe Krzyzanowski is a certified teacher presently
completing a masters degree in reading instruction at
Cardinal Stritch College. He has worked in alternative
schools for the last ten years. Recently, he was responsible
for monitoring a state-funded computer-assisted instruction
project using Plato Systems developed by Control Data
Institute. His responsibilities included Basic Skill/G.E.D.
preparation at the Milwaukee Christian Center. He helped in
program development and curriculum design. Mr. Krzyzanowski
also provided computer training services.

The reviewer's area of concern addressed coordination
and administration of the project. In lieu of funding and

full-time staff, he was also responsible for job development
and training services. In conjunction with the core group,
he designed the program and developed curriculum.

Nancy Detwiler, Director of all Word Processing Training
for Honeywell Information Systems in Milwaukee, offered her
services as a consultant to develop a training curriculum
that prepared participants to enter the word processing/data
processing job market.

Jeff Jagmin has extensive experience marketing computers
and course development for The Byte Shop. He provided
assistance in program design and curriculum.

James McMahon is the Data Processing Internship Super-
visor at Washington High School, Milwaukee's computer
speciality school. He supported the Computer Literacy project
and relying upon his knowledge and expertise provided advice
on job development. Mr. McMahon also contributed to the
program design and curriculum development.

Jackie Wille is a certified teacher currently studying
for a masters degree in special education at the University
of Wisconsin-Milwaukee. She has been a Multicultural
coordinator for a number of years. To better serve her
students she has researched and devised an employability
curriculum. She volunteered her materials and expertise in
designing a similar program for Christian Center participants.

Ron Meier is an adjunct admissions counselor at the
University of Wisconsin-Milwaukee. He has had extensive

experience working with the disadvantaged student at Milwaukee Public School's Demmer Center. Mr. Meier offered to assist students in applying for admission to the University of Wisconsin-Milwaukee. For participants whose G.E.D. scores do not meet minimum requirements he referred them to the Department of Educational Opportunity for admission and support services.

Depending on the ultimate size of the program, it intended to serve from ten to fifty members of Milwaukee's southside disadvantaged population. The target group is low income unemployed or underemployed persons seventeen years or older without a high school education. Because of the nature of the training and traditional sexual stereotyping, the program anticipated serving a majority of women students. Finally, there is a large Hispanic population on Milwaukee's southside and this somewhat reflected itself in the program's participation.

Developmental Objective 1

By December 1982, an evaluation of the job market and a survey of detailed descriptions of entry level positions in computer-related functions was completed. This provided the basis for program development.

Implementation Activities - The researcher investigated the topic thoroughly by utilizing printed materials and interviews.

a. Literary sources such as <u>The Occupational Outlook</u> <u>Handbook</u> and <u>Encyclopedia of Careers</u> provided pertinent information.

b. Interviews with professionals in the computer industry added additional information.

c. A survey was conducted of those engaged in the teaching or training-related activities of computer-related functions.

<u>Evidence of Completion</u> - The objective was met when needs were pinpointed and a program could be developed to address those areas.

Developmental Objective 2

As the educational goals became clear for the program, a basic design and curriculum was developed by the end of December 1982.

<u>Implementation Activities</u> - To prepare for the formation of the training program, the following steps were taken.

a. Working with consultants in the technical, educational and practicing sectors of the computer industry, the course was designed.

b. The necessary materials were identified and developed.

<u>Evidence of Completion</u> - The objective was met when all the software was obtained, the curriculum materials developed, and testing measurements designed.

Developmental Objective 3

By January, the target population was identified and recruitment began through informal networks.

Implementation Activities - With a missionary perspective, disadvantaged participants were recruited.

a. The target population was determined to be the educationally disadvantaged.

b. Students with an interest and the proper basic skills were located.

c. The program also served disadvantaged adults, who were essentially displaced workers and displaced homemakers.

Evidence of Completion - A referral network for participants that proves operational.

Developmental Objective 4

Between January and July, instruction was provided in computer literacy and applications.

Implementation Activities - Provided training in computer literacy and applications.

a. Volunteers were recruited and trained.

b. Three series of computer literacy classes were given.

c. Two advanced programming classes were provided.

d. Hands-on instruction in keyboarding, word processing and accounting were given.

e. Employability development orientation was obtained at the YWCA.

Evidence of Completion - The objective would have been met if all training had been completed.

Evaluation Objective 1

Develop a proposal for a computer literacy course designed for twenty-four students for submission to various government agencies and to other foundations.

Implementation Activities

1. Create a basic format for training activities.

2. Develop each segment of the potential program.

3. Submit basic design to agencies for approval.

Evidence of Completion

This objective was considered completed when funding was secured for continuation of the program.

Evaluation Objective 2

Monitor results of a pilot computer literacy program by counting advanced work and positive terminations

Implementation Activities

1. Test students in BASIC programming through Step by Step lessons.

2. Expose students unable to acquire programming skills to clerical applications on the computer.

3. Use testing instrument to measure student's clerical skills when training is completed.

4. Evaluate student potential through use of G.E.D. test score.

5. Monitor positive terminations for various participants

Evidence of Completion

Provide students the background in programming to go on to higher education or training in clerical applications.

Limitations of Project Findings

The program was not able to successfully secure the appropriate levels of funding to provide all segments of the training. Because of this, the researcher had to rely on only one computer for hands-on experience and volunteers for instructors. In addition, this one computer was stolen before the fifteen students could complete their clerical applications exposure, although the students pursuing programming experience were able to complete their Step by Step lessons. The limitation of equipment also meant that a smaller test population would be served. Time constraints were also an important factor as the program was not fully developed for implementation until January. Adverse economic conditions also played a factor in the ability of participants to secure employment.

Budget

The project had at its disposal free use of facilities
and one donated Apple II microcomputer. Multicultural High
School and Journey House resources provided Basic Skill/
G.E.D. preparation and all necessary curriculum materials.
Through the auspices of the Milwaukee Public School System,
various software programs were made available for the
project's use. The reviewer along with volunteer support
services provided training.

If funding would have been obtained, the program proposed
twenty-four training slots. The budget for this type of pro-
gram was projected to be $57,000. Of this, $40,000 was to
provide staff salaries and fringe benefits. The remaining
$17,000 was to cover cost of materials and supplies for train-
ing, administration and support services. Proposals for this
type of program were submitted to Comprehensive Employment
and Training Act (CETA), Community Development Agency, and
Job Training Partnership Act (JTPA).

Timeline

A graphic representation of the timeline is provided
on Page 18.

Summary of Project/Research Report

Chapter One of the report defined the project and
discussed how it was implemented. In addition, it elaborated
on the problems of the target population and described the

Graph 1

Timeline

Steps	Months							
	Sept-Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1. Design of study.	*							
2. Determine necessary training. Schedule interviews with proper authorities.	*———*							
3. Creation of curriculum consulting with UW-M computer group and other resources.	*———*							
4. Implement pilot program. Notification of personnel at site.			*———*					
5. Monitor results of program. Administer various testing instruments to students.			*——————————————*					
6. Place students in entry level positions at various companies or positive termination to more training.								*
7. Scoring and analysis.			*—————————————*					
8. Track students after they are placed in various positive terminations.								*

participants who acted as delivery agents. It also developed objectives and showed the means to evaluate how successful the program became.

Chapter Two of the report elaborated on the historical relevance the program has for job trends. The philosophical, psychological, and social implications of computer literacy for the disadvantaged were discussed at length. Finally, the report investigated other programs designed for the same target population and compared and contrasted them to this project.

Chapter Three provides a brief but complete overview of the purpose, participants, implementation activity, and evaluation design of the project. Additionally, all suppositions have been evaluated and any implications discussed. In conclusion, it offers recommendations for use of the project or future study, as seems appropriate.

The Appendix provides a successful proposal submitted to the Milwaukee Associates in Urban Development (MAUD) for continuation of this project.

There is also a letter from St. Alphonsus Church donating $985 to the project for more computer equipment. The testing instrument to be used for the clerical students is also included along with various materials developed for different segments of the project.

CHAPTER TWO

<u>Introduction</u>

       Mankind is at the beginning of a new histori-
cal age - the Information Age.
       Some experts believe that society will under-
go more change by the year 2000 than it did during
the first 200 years of the industrial revolution.
The next 18 years are expected to bring change at
a speed and scale never before seen.
       The Information Age is being ushered in by a
revolution in the way we store, transmit, manipu-
late and use information. And almost every aspect
of culture and our perceptions of ourselves and
the world are likely to be affected.[6]

       <u>Time</u> magazine gushes about the "whiz kids" of
the "computer revolution." Pop sociologist Alvin
Toffler hits us with future shocks and third waves.
California's Jerry Brown wants to augment the three
R's with the three C's - "computing, calculating,
and communications through technology."
       For more than a quarter of a century, the
rhetorical trumpets of business, government,
journalism, and bargain-basement sociology have
all been heralding a computer revolution in
America. For almost as long, they have promised
a technological revolution in the schools, one
that would change the nature of learning and the
organization of education. For Toffler and <u>Time</u>,
and even for those with a more tempered enthusiasm
for the so-called computer age, computer literacy
will make science fiction a reality not only in
education but in work as well.[7]

The purpose of this project/research report is to

investigate the importance of computer literacy for all

members of our society. A particular emphasis will be

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    [6] Jerry Fass, "Computer Revolution Will Cause Social
Change," <u>The Milwaukee Sentinel</u>, 20, Dec. 1982, p. 1,
cols. 1-2.

    [7] Ross Corson, "Computer Revolution," <u>The Progressive</u>.
Sept. 1982, p. 32.

placed on the needs of those who are most likely to be disadvantaged by technology, those who are already economically and educationally disadvantaged.

Sensing the need for a formal study, the Office of Technology Assessment prepared a report on Informational Technology which it presented to Congress in the Fall of 1982. The report titled Informational Technology and Its Impact on American Education is a summary of the affects the information revolution is having on our society. The report emphasizes computer literacy as computers are the fundamental component of the "technetronic" era. This study, along with booklets prepared by the Association for Educational Data Systems and International Council for Computers in Education, represents the authorities on computer literacy presented in the project/research report. In addition, an evaluation of all current CETA training projects involving informational technology will be presented.

The information revolution is having a pervasive affect on all aspects of our society. As change is occurring so rapidly, the researcher used current newspapers and periodicals as the best source to represent public opinion and sentiment.

The project/research report will document the educational needs of our new age. It will emphasize the importance of making informational technology available for all members of our society. Finally, it will describe the

sweeping changes now occurring and the implications for our society.

Historical

> The history and evolution of computer tech-
> nology represent examples of not only human inge-
> nuity and inventiveness in a single area, but also
> the abilities of people to traverse the boundaries
> between many fields. Progress in computer tech-
> nology is representative of progress in electronics,
> communications, control systems, psychology, peda-
> gogy, mathematics, engineering, and many other
> areas.[8]

The information revolution anticipated for so long has finally arrived through the advent of new technology that is not only relatively inexpensive but extremely efficient as well. A glance through history will unfold just as to how many divergent forces have come together to foster the coming of the information age.

Although there are a number of sources from which the origin of computing may be derived, automatic computing began in 1812 with Charles P. Babbage. The technology of his era was not advanced enough to make his analytical engine totally successful, but it is able to add, subtract, multiply and divide.

So the wait for the needed technology begins and pro-gression in the computer process parallels the rate at which innovations arise.

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[8] Sylvia Charp, et al., Layman's Guide to the Use of Computers in Education, (Washington: Association for Educa-tional Data Systems, 1982), p. 2.

The first major innovation was Herman Hollarith's
system of punched cards. This process was so effective at
speeding up the handling of data that the 1890 census was
completed in one-third the time of the 1880's. Hollarith's
company later becomes absorbed by IBM. The age of the
modern computer was begun.

In the 1930's a young engineer named Konrad Zuse, using
the German equivalent of an erector set for parts, builds a
simple computer. Its descendants later are used to calcu-
late wing designs for the German aircraft industry during
World War II. As throughout the course of history, drastic
times call for heroic efforts. Putting into practice some
of the ideas of Alan Turing, the British build a computer
called Colossus 1, which helps to break German military
codes.

The war effort also spawns the first fully electronic
computer. But Electronic Numerical Integrator and Calcula-
tor (ENIAC) was completed too late to be of any help. This
device also proves to possess many severe technical problems.

ENIAC and its successor, UNIVAC, are examples of First
Generation Computers. They are characterized by the use
of vacuum tubes and never overcome their maintenance and
reliability handicaps.

The development of high level programming languages,
along with the advent of the transistor, fosters the growth

of Second Generation Computers. They were able to achieve
increased efficiency, speed, and reliability.

Rapid technological advances continue in both hardware
and software. Timeshared computing and interactive BASIC
can allow for personalization in computing. The discovery
of the process to manufacture integrated circuits onto
silicon chips marks the birth of Third Generation Computers.
Thus, minicomputers become an everyday tool for hundreds of
thousands of people.

The era of personal computing began with the introduc-
tion of microcomputers in the late 1970's. By 1983, compu-
ters with telecommunications capacity are marketed for as
low as $79. These innovations have made personal computing
available for all. Computer manufacturers could conceivably
produce a microcomputer for every home, office, and student
desk. In addition, each separated unit could be connected
to larger computers through our telephone or cable television
systems. Not only is this possible, but it is quite likely
to occur in the next ten to twenty years.

> If cars had improved as much as computers
> during the last 20 years, a Rolls-Royce would cost
> $1, get 10 million miles per gallon and have a
> 200,000-horsepower engine, enough power for an
> aircraft carrier.[9]

With the coming of the long awaited technological break-
throughs, the information age arrives in the 1980's. Its

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[9] Jerry Fass, "Computer Chip Cuts Into Costs," The
Milwaukee Sentinel, 23, Dec. 1982, p. 1, col. 1.

effects are already so pronounced that _Time_ Magazine deems

1982's Man of the Year, the Computer. As transformations

begin to take place, it is certain education will play a

fundamental role.

> A number of the early computers were built at
> university campuses and were immediately used for
> both research and instruction. But first genera-
> tion computers were relatively expensive, so their
> use in education was limited.
> The 1960's saw a rapid proliferation of compu-
> ters in education, especially in colleges and
> universities. Hundreds of computer science and
> data processing degree programs were started.
> Computers were easy enough to use so that college
> undergraduates could take a few computer courses
> and emerge from college with well paying jobs as
> computer programmers or system analysts.[10]

In the late 1960's the concept of Computer-Assisted

Instruction (CAI) becomes very popular. Many viewed it as

the educational wave of the future. Its initial promise did

not materialize at that point for many reasons. First, the

available hardware was very expensive and this made it

difficult to obtain equipment. The software was very limited

in scope and quality. In addition, except in rare instances,

resources were not fully developed for educational purposes.

Success then depended upon large expenditures of money which

often was not available especially for an unproven concept.

There was also some question as to whether CAI could provide

a viable alternative or just suffice as an adjunct to normal

educational processes.

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[10] David Moursund, _Precollege Computer Literacy: A
Personal Computing Approach_, (Eugene: University of Oregon,
1981), p. 2.

Computer-assisted learning (CAL), the use of computers as an aide to learning, can be divided into two major parts. In one part, frequently called computer-assisted instruction (CAI), the computer acts upon the student. Whether the mode is drill and practice, tutorial or simulation, the computer has the knowledge and it is the student who is to acquire the knowledge.

A second form of CAL puts the student in charge - the student acts upon a computer as an aid to learning. Learning environments created using a LOGO language-based computer system provide a good example. After a few minutes of instruction, even an elementary school student can learn enough LOGO programming to begin encountering interesting and challenging geometry problems. Immediately the emphasis then switches from learning LOGO to problem solving in the domain of geometry.

The basic issues involve what students should learn about computers and the ways they should learn about or use them. When a computer acts upon a student in a computer-assisted learning mode, the student need not learn much about computers. But when a student acts upon a computer, developing programs and solving a variety of problems, more knowledge of computers is required - on the part of both the student and the teacher.[11]

In one sense the general population can acquire enough skill to use computers as application. This reflects a future characterized by a myriad of jobs de-skilled through technology. On the other hand, can the computer phenomenon provide the means for people to become dynamic and creative? Many feel indeed the shape of the future will include a technological elite supported by an army of increasingly semi-skilled workers.

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[11] Moursund, pp. 5-6.

Sociological

The prevailing medium of communication throughout history has profoundly affected each society. This phenomenon has even prompted scholars such as Marshall McCluhan to purport that indeed the "medium is the message." Inventions such as writing, the printing press, and television have dramatically changed and shaped culture over time.

Contemporary society is beginning to undergo profound technological and social change brought about by the improvements in the manner in which we are able to communicate. This is not only impacting individuals, but also how they may relate to institutions and to one another.

> Experts predict that most of our social institutions - schools, monetary and banking systems, corporations, postal systems and even governments - will be drastically changed in a few decades.
> And, they say, the Information Age - sometimes called the post-industrial age - may never end, because information is an infinite resource.
> In a way, the information revolution is just an explosively rapid phase of man's continuing effort to throw off the burden of work.
> During the industrial revolution, machine power replaced human and animal muscle. The essence of the information revolution is that machine intelligence will supplant most mental work by humans.
> The main engine of the information revolution is the computer. Experts believe it is a "fundamental" technology - like the wheel.
> Until recently, computers were big and were for big jobs. Now, miniaturization has made them small enough to fit anywhere. Just as the wheel and its cousins (gears, bearings, etc.) are found

in most machines, computers will be put in almost everything we build.[12]

It is this diversity of applications for microprocessor technology which distinguishes it from less significant innovations, and which has led futurists to predict a societal transformation "comparable with the agricultural revolution that began about 10,000 years ago, and with the industrial revolution."[13]

These improvements in the quantitative and qualitative aspects of information handling will profoundly affect individuals and organizations that communicate and use information in some of the following ways:

First, it will create a need for mass literacy in order for people to fully participate in economic, political and social activities. Any definition of this new literacy must include the ability to communicate through information technologies.

The question of participation also arises. The printing press in no small way fostered the development of mankind. Communication technologies might provide a new means by which organizations could mode social thought and cultural mores.

Technological change can also effect the decision-making processes in a society. New patterns of decision making may

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[12] Fass, "Computer Revolution Will Cause Social Change," p. 1, cols. 2-4.

[13] Herman Kahn, William Brown, and Leon Martel, The Next 200 Years, (New York: Morrow, 1976), p. 8.

affect relationships between organizations and between
organizations and their clients and employees.

Recently there has been a trend toward centralization
in our society. However, access to low-cost computers and
data communications provide people with unlimited ability to
communicate freely. The "Global Village" coined by Marshall
McCluhan becomes a reality.

One of the more interesting facets may be the effects on
intellectual processes. Some people feel informational
technology may provide a new form of consciousness which
will offer novel means to deal with our complex and difficult
problems.[14]

> In 1982 a cascade of computers beeped and
> blipped their way into American office, the
> American school, the American home. The "informa-
> tion revolution" that futurists have long predicted
> has arrived, bringing with it the promise of
> dramatic changes in the way people live and work,
> perhaps even in the way they think. America will
> never be the same.[15]

One of the most profound effects may be on the tradi-
tional concepts of work. Answering a _Time_ Yankelovich poll,
73% of the people felt the computer revolution would enable
more people to work at home. Though only 31% said that they
would prefer to do this themselves. Sociologist Robert

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[14] U.S. Cong., House, Senate, Office of Technology
Assessment, _Informational Technology and Its Impact on
American Eduction_, Hearing, 97th Cong., Nov. 1982
(Washington, D.C.: GPO, 1983), pp. 17-18.

[15] Otto Friedrich, Reported by Michael Moritz, et al.,
"The Computer Moves In," _Time_, 3 Jan. 1983, p. 14.

Schrank states, "The workplace performs the function of community." Can people function well without the people factor; that is just how important is the stimulation of personal contact? One way to address this concern is to get employees out of the house but not all the way downtown. Experiments such as Continental Illinois Bank's suburban "satellite work station," prove the versatility of tele-commuting. This process promises an infinite array of creative and innovative options for the future.[16]

High technology will also undoubtedly have an effect on de-skilling jobs now and in the future. Not only are robots becoming more prevalent in manufacturing, computers are making most clerical jobs less demanding. Many are concerned that this will allow employers to pay lower wages to fewer and lower skilled workers.

An advanced information age will also place a premium on skills oriented toward the creation of new knowledge and the design of new technologies. The important factor to remember is that there will be constant change. In fact, lifelong retraining is expected to become the norm for many people.

> If education is to meet the challenge of
> the next decade it must create a computer-literate
> community and institutionalize the use of these
> new intellectual tools. Education will have

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[16] Friedrich, p. 21.

achieved this goal only when computers and infor-
mation technology are no longer viewed as an
educational luxury for the small elite, but as
a necessary tool for all.[17]

This important concern brings us to the question of who

should be literate in our society. In addition, it will be

important to define the scope of literacy. It would seem

that skills in the use of information technology will not

only be of value but a necessity as well. Finally, educa-

tion should focus on learning how to learn rather than on

learning facts if lifelong retraining becomes a reality.[18]

> Futurists predict that two new social classes
> will arise: the information rich and the informa-
> tion poor. Those who can use and afford computers
> will have access to information and will prosper.
> Others will be at a severe disadvantage.[19]

There is grave concern that our society will become

increasingly stratified. One thought is a technological elite

is developing that will be for the most part upper class white

and male.

One reason is that people economically or educationally

disadvantaged now are likely to become even more so in a

technologically orientated society. Native intelligence,

street smarts, and muscles are not going to be skills sought

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[17] Robert W. Hamilton, Lyndall R. Hutcherson, Position
Paper On Computer Literacy, (Austin: Texas Association for
Educational Data Systems, Mar. 1982), p. 5.

[18] Informational Technology, p. 8.

[19] Jerry Fass, "Computers Generate New Work Modes,"
The Milwaukee Sentinel, 21 Dec. 1982, p. 1, col. 4.

after by employers, indeed, skills such as computer literacy are in the ascendency.

Even the disadvantaged students who remain in school might face difficulties. A survey by Market Data Retrieval Inc. found that 80% of the country's 2,000 largest and richest public high schools have at least one microcomputer, while 60% of the 2,000 poorest have none.[20]

Feminists, among others, are concerned that women's traditional math anxiety and early tracking will put them at a grave disadvantage. Most video arcades are crowded with males and the less aggressive females are often pushed off the microcomputers in schools fortunate enough to have computer labs. There is no reason for this to have to happen and it is important to understand the implications of early computer exposure for both women and the economically and educationally disadvantaged.

> So the revolution has begun, and as usually happens with revolutions, nobody can agree on where it is going or how it will end. Nils Nilsson, director of the Artificial Intelligence Center at SRI International, believes the personal computer, like television, can "greatly increase the forces of both good and evil." Marvin Minsky, another of M.I.T.'s computer experts, believes the key significance of the personal computer is not the establishment of an intellectual ruling class, as some fear, but rather a kind of democratization of the new technology. Says he: "The desktop

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[20] Philip Faflick, Reported by Bruce van Voorst/New York and Roger Witherspoon/Atlanta, "Peering into the Poverty Gap," Time, 15 Nov. 1982, p. 69.

revolution has brought the tools that only
professionals have had into the hands of the
public. God knows what will happen now."
    Perhaps the revolution will fulfill itself
only when people no longer see anything unusual
in the brave New World, when they see their
computer not as a fearsome challenger to their
intelligence but as a useful linkup of some every-
day gadgets: the calculator, the TV and the type-
writer. Or as Osborne's Adam Osborn puts it:
"The future lies in designing and selling computers
that people don't realize are computers at all."
    Sherry Turkle, a sociologist now finishing a
book titled The Intimate Machine: Social and Cultural
Studies of Computers and People, sees the prospect
of change in terms of perceptions and feelings.
Says she: "Children define what's special about
people by contrasting them with their nearest
neighbors, which have always been the animals.
People are special because they know how to
think. Now children who work with computers see
the computer as their nearest neighbor, so they
see that people are special because they feel.
This may become much more central to the way
people think about themselves. We may be moving
toward a re-evaluation of what makes us human."[21]

The near future poses a kaleidoscope of predictions or

visions. There is no doubt that the information revolution

will dramatically change our lives. It only remains to be

seen just how rapidly and where the impact will unfold.

Economical

Until a few decades ago the information industry, the

industry concerned directly with the producing and selling

of information, was relatively small in economic terms.

It is now becoming a major component of the U.S. economy.

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[21] Friedrich, p. 24.

Not only has it established its own identity apart from the traditional sectors, if defined broadly it accounts for over 60 percent of the economic activity of the U.S. To offer further evidence of this transition, in 1950 the employment of U.S. workers in information jobs actually surpassed that of workers in the industrial sector. In this decade, information workers will outnumber workers in all the other sectors combined.

According to a Position Paper on computer literacy, "Within a very few years, it will be necessary to be able to use the capabilities and output of computers effectively in order to get and hold most jobs."[22]

> An increase in job skill requirements could take place in three ways: 1) industrial growth and sectoral shifts in the economy could create more jobs demanding higher skill levels; 2) the availability of a more highly trained labor pool could encourage employers to raise their performance expectations, even if the basic job classifications remain the same; and 3) rapidly changing job requirements could place a premium on employees' flexibility and on their ability to be retrained in new skills.
> Justifiably or not, education is, generally speaking, a major factor in the competition for jobs, and those lacking the requisite educational level are less employable. Unemployment rates by education level are shown in Table 2.1. Two conclusions are suggested by the data.
> Education is an important selection criterion for employers.
> More sensitive to fluctuations in overall employment rates than their more skilled counterparts, less educated workers are more likely to lose their jobs when unemployment rises, and less likely to get them back when it drops.[23]

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[22] Hamilton, p. 1.

[23] Informational Technology, pp. 27-28.

In fact OTA has found that, "The growing use of information technology throughout society is creating major new demands for education and training in the United States and is increasing the potential economic and social penalty for not responding to those demands."[24]

Table 2.1

Unemployment Rates by Sex and
Number of Years of Education Completed

	1970	1979
Males		
High School, 1-3 years	4.8	8.3
High School, 4 years	3.4	5.5
College, 1-3 years	3.8	4.2
College, 4 years or more	1.2	1.8
Females		
High School, 1-3 years	6.6	10.4
High School, 4 years	4.6	6.0
College, 1-3 years	4.0	4.3
College, 4 years or more	2.0	3.0

[25]

[24] Informational Technology, p. 4.

[25] E. F. Denison, Accounting for Slower Economic Growth, (Washington, D.C.: Brookings Institution, 1979), n.p.

Many of the major effects of the information revolution will be felt in the clerical and related fields. The U.S. Department of Labor makes the following projections.

> According to the U.S. Bureau of Labor Statistics, clerical occupations (bank tellers, bookkeepers, cashiers, secretaries, and typists) will be the largest and fastest-growing group of white collar jobs during the 1980's. There will be 4.8 million new jobs created in this area by 1990. New developments in computers will have a profound effect on these classifications.[26]

> The current shortage of entry level office employees across the country continues to grow. Business must have the typists, bookkeepers, receptionists, office machine operators, and others necessary to operate the offices of the country. A projected need exists for 16.6 million new and replacement entry-level clerical workers during the 1978 through 1990 period. This number is the largest growth projected for any job cluster.[27]

> The Department of Labor reports that, out of 300 work classifications, more jobs are opening up in the secretarial field than in any other. New positions are being created at the rate of 440,000 per year in public and private sectors. About 20 percent of these new jobs are going unfilled because of lack of qualified candidates. Statistics show that secretarial needs may exceed the supply by as much as 250,000 by 1985.[28]

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[26] Dorothy Lee Brown, "The Use of Computers in the Accounting Program," Trends in Business Education, (Sacramento: California State Department of Education, 1981), p. 20.

[27] Merle Wood, "California Business Education and the Youth Initiative," Trends in Business Education, (Sacramento: California State Department of Edcuation, 1981), p. 31.

[28] Janet Hunt, "Industry and Education: The Team of the Eighties," Trends in Business Education, (Sacramento: California State Department of Education, 1981), p. 9.

> Locally, the Wisconsin Job Service has pre-
> dicted that by 1985, there will be 39,530 secre-
> tarial positions in the four-county metropolitan
> area, an increase of approximately 6,600 jobs over
> the past 11 years.[29]

The computerization of America is moving at breakneck

speed. There are more than one million systems operating,

a sevenfold increase from only six years ago. Last year

alone, one million computers or data terminals were added

to the four million already in use. These numbers are

expected to swell by 25% each year for at least another

decade.

The microprocessor supported by increasingly sophisti-

cated software is capable of an infinite variety of applica-

tions. Management information systems have become a way of

life in many large offices. Since this new technology does

not require knowledge of specialized computer languages,

its growing use will raise productivity among clerical

workers. In addition, instead of merely easing routine

tasks, the very means by which information is transcribed

and made available will change.

As Table 2.2 compiled by Data Resources Inc. clearly

shows, most new jobs in high tech may not be technical. In

fact a survey of the industry in the Boston and Worcester

area, one of the regions rivaling the silicon valley, shows

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[29] Helen Pauly, "Secretaries Still Fighting Stereotype,"
The Milwaukee Journal, 17, Oct. 1982, p. 2, col. 1.

that 80 percent of entry level jobs did not require college
training.

Table 2.2

Most New Jobs in High Tech
Will Not Be Technical

Occupation	Growth 1980-93 Number of Jobs	Percent
Operatives	226,183	22
Managers & Clerical Workers	149,650	22
Engineers	110,930	40
Craft & Related Workers	96,121	21
Engineering & Science Technicians	70,693	37
Professionals, except Managers & Clericals	33,305	22

[30]

There does exist a growing demand for professionals
trained specifically in computer skills. According to a
Bureau of Labor Statistics study 685,000 new jobs and 250,000
replacement positions will evolve in the next decade. These
estimates concern themselves with the traditional computer
fields, but in reality the information revolution is spawning
many other types of related jobs. The need for information
specialists, management personnel, and industrial engineers

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[30] "America Rushes to High Tech For Growth," Business
Week, 28, Mar. 1983, p. 87.

will cause employers to compete for this same group of
professionals, thus making these future estimates very con-
servative. Even without considering these other areas,
by 1990 the BLS predicts a demand of 2,140,000 specialists.
Table 2.3 offers a summation of these statistics.

Table 2.3

Requirements for Computer Specialists
(Data in Thousands)

Occupation	1980	Projected 1990
Systems Analysts	243	400
Programers	341	500
Equipment Operators	522	850
Data Entry Technicians	266	230
Service Technicians	83	160
Total	1,455	2,140

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A Wall Street Journal article states there were only
50,000 college graduates available to fill 115,000 computer-
related jobs last year. It goes on to reiterate that
present resources are severely strained and more facilities
are desperately needed.[32]

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[31] Informational Technology, p. 32.

[32] Carolyn Phillips, "Campus Glitch," The Wall Street
Journal, 14 Jan. 1983, p. 12, col. 5.

This severe manpower crisis has prompted OTA to project that colleges may have to lower admission standards for computer science majors and to require extensive remedial programs at the undergraduate level. It also feels as the number of people of traditional college age will be growing more slowly it may consist of an increasing proportion of educationally disadvantaged students.[33]

> The production of entry-level computer science and engineering graduates will need to be sustained during a period when the number of people of traditional college age will be growing more slowly and may consist of an increasing proportion of educationally disadvantaged students.[34]

> "We have a real manpower crisis in our industry," points out Donald J. Reifer, president of Software Management Consultants. Despite the fact that there are now 300,000 programmers working in this country and another 300,000 who work part-time on software, the demand for highly skilled people to write software is 40% greater than the supply, says Robert Curtice, an analyst for Arthur D. Little Inc.[35]

Even if advances in programming languages decrease the need for entry level programmers, there will exist an increasing demand for engineers to design state of the art hardware. Applications programmers will still be needed to write compilers for one system to interface with another. Finally, systems analysts will become increasingly important

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[33] Informational Technology, p. 33.

[34] Informational Technology, p. 33.

[35] "Missing Computer Software," Business Week, 1 Sept. 1980, p. 49.

as more and more sophisticated technology is used in an
infinite variety of applications.

Throughout history, technological change has impacted
society. The information revolution threatens to surmount
even the tremendous upheavals of the agricultural or indus-
trial revolution. In the past, people replaced old jobs
with new modes of work. Some experts tell us that within
two decades computers will be so advanced there may not be
enough work to go around. Those making estimates predict
that at least 60% of the workers in developing nations will
lose their jobs or need complete retraining by the year 2000.
It is safe to assume in the near future most people will
not be able to keep one job for life. The importance of
learning how to learn and constant re-education cannot be
stressed enough.

It is difficult to predict how rapidly change will
occur, as there exists many economic governors which can
slow the adoption of automated technologies. Public opinion
and sentiment can also play a significant role. These
factors will not, in and of themselves, mitigate the impend-
ing revolution; but indeed could very well help determine
how rapidly it progresses.

CETA Training Programs

This section offers a summation of all Milwaukee County
CETA programs utilizing computer technology in some form.
As the target population, goals, and time constraints are

similar this format is best reflective of the action thesis project. The information revolution is such a new and dynamic phenomenon educational facilities are experiencing difficulty reacting to it. All the programs studied are new this year and directly result from a response to the many changes now occurring. For this reason, no evaluation can be offered in terms of performance. The researcher will describe each proposed program as presented to him in interviews or materials obtained from the representative coordinators.

Two of the programs studied are very similar in nature. New Concepts Self Development Center and the Council for the Spanish Speaking offer secretarial skills training. The curriculum is structured in three distinct phases. Phase I concentrates on developing basic skills. Phase II focuses on clerical skills and G.E.D. preparation when required. And finally, in each program, Phase III teaches word processing. The objectives for each participant directly relate to their skill level upon entering the program. In this manner only a few complete all phases of the curriculum.[36]

International Telephone and Telegraph (I.T.T.) has developed a secretarial program that focuses just on clerical skills and word processing. In addition, there is a special emphasis on the legal and medical clerk areas.

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[36] Personal Interviews with Matty Smith on April 26, 1983 and Lenor Garrett on May 4, 1983.

This program requires typing ability and well developed basic skills for entry. Its purpose is to just concentrate on clerical training.[37]

Hoping to address a broader area, Interfaith has created a micro-computer programming course. What they have done was sub-contract five courses from the Milwaukee Area Technical College Computer Science Department. Mike Shanovich, the program coordinator, just had a vague idea about how his curriculum would help participants. He mentioned future employment possibilities such as computer vendor, bookkeeper, or office manager. The researcher received the impression that Mike felt computers were a good idea and any training useful.[38]

Opportunities Industrialization Center (OIC) offers participants training in computer sciences. The goal is to train students in the use of the Report Program Generator programming language. They feel there is a market for software specialists at small businesses in the area utilizing mini-computers. But the question arises as to whether companies would feel four months training adequate for a full fledged programmer.[39]

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[37] Telephone Interview with Barbara Gunn, Midwest Regional Administrator, International Telephone and Telegraph, April 20, 1983.

[38] Personal Interview with Mike Shanovitch, April 26, 1983.

[39] Personal Interview with Neil Helgreen, April 26, 1983.

Finally, the Milwaukee Metropolitan Association of Commerce provides On-the-Job Training Contracts. Through this program, one participant went to work for an area advertising firm. She presently works for this company in full-time unassisted employment. Her duties in the accounting department include operating a cathode ray tube (CRT) terminal.[40]

When evaluating the CETA programs, the researcher concludes that the clerical skills training courses are well designed and have a good prognosis for success. Their only failing toward planning for the future is the choice of dedicated word processing systems for training. Trends forecast more and more utilization of integrated software packages by companies. Clerks will be expected to do accounting and data base input in addition to word processing. Sensing this need, the Council for the Spanish Speaking is considering updating their IBM word processing machine with integrated software.

The researcher feels Interfaith and OIC are on the right track but have not planned well. OIC is attempting to address a need in the labor market, but its goals may be too ambitious. Interfaith has not really made a thorough evaluation of the job market, although the training will benefit participants.

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[40] "Our Programs Are Working," _Milwaukee Commerce_, Apr. 1983, p. 2.

The Milwaukee Metropolitan Association of Commerce
program is very well developed. In fact it is CETA's
intention to precipitate whenever possible the participa-
tion of area business in their programs. OJT is really
an example of future trends.

Other Training Programs

Two programs from opposite ends of the country have
been developed in order to address the same problem; that
is the importance of bringing computer awareness and exposure
to disadvantaged members of our society. Neither program
attempts to be the complete educational experience in and
of itself, but instead focuses on providing the background,
motivation, and experience for participants to go on to
entry level positions or more training.

Playing to Win Inc. is a non-profit organization
dedicated exclusively to promoting computer use for the
education of minorities, inmates of correctional institutions,
juvenile delinquents, and other disadvantaged people. After
its founder, Toni Stone, successfully implemented projects
at Fortune Society (an organization working with ex-offenders)
and Spofford Juvenile Center (a correctional facility),
Playing to Win Inc. was established in East Harlem.

Essentially this program conveys a realistic attitude
about what computers can do for students, and then provides
the background and experience to become more involved with
them.

Evergreen Valley College in San Jose, California has developed a ten-week computer and electronics course designed to help displaced workers and displaced homemakers make informed career decisions. While the course's intention is to familiarize students with the field and to lead them toward more training, some students gain enough experience from the program to get entry level jobs in the industry.

Because of the lack of the necessary resources, the thesis project resembled both Play To Win Inc. and Evergreen Valley's programs. If CETA or JTPA funding had been obtained, it intended to provide in depth clerical skills, computer skills, and basic skill development. Instead the computer literacy program focused on computer exposure and awareness and provided lead ins to area colleges or other programs. In addition, some training was provided in BASIC programming, keyboarding, word processing, and accounting.

Another objective was to identify for students, companies offering in-house training and development. Apple Corporation, for instance, provides extensive educational opportunities to their employees. One local example would be Mount Sinai Hospital's medical technologists training provided to their new employees.

Psychological

In order to learn to use informational technology effectively an autodidactic process is mandated. The

importance of hands-on experience cannot be emphasized
enough. This raises important considerations when one
addresses the needs of disadvantaged students, who are
often times lost in the traditional education format.
According to Bob Baker, a California Business educator:

> The computer is an excellent tool for indi-
> vidualized instruction. Since disadvantaged
> students often need this kind of instruction, it
> logically follows that the computer will be use-
> ful for them.
>   Tutoring and drill in basic skills given by
> the computer provide an excellent method of train-
> ing disadvantaged students. The one-to-one
> instruction given by the computer reinforces
> student progress with immediate feedback to
> student responses. Students who often feel
> threatened or intimidated by traditional teach-
> ing methods many times feel comfortable working
> with computer-assisted instruction(CAI).[41]

Although many participants have been inhibited from
partaking in traditional educational programs because
they felt self conscious or such programs were too expen-
sive, time consuming, or inconvenient; information tech-
nologies offer an infinite array of alternatives in
education. These new modes adapt themselves particularly
well to individualized instruction. Some examples might
include Basic Skills instruction in home-based study, or
remedial college classes. In fact many companies have
incorporated job training at the work station itself through

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[41] Bob Baker, "Implementing CAI for Disadvantaged Busi-
ness Education Students," Trends in Business Education,
(Sacramento: California State Department of Education, 1981),
pp. 22-23.

particular applications of computers. Perhaps one last
model could be that of a neighborhood-based drop-in learning
center providing a supportive environment to fragile students.

When resources are available computer-assisted learning
(CAL) can be an effective tool for educating disadvantaged
young people.

> The School District of Philadelphia uses
> tutorial instruction to help meet the needs of
> inner-city youth. The major thrust is to help
> students improve their basic skills through pro-
> grams that enable each student to work at his
> or her own rate, providing self-direction for
> learning, fostering the development of thought
> processes, and encouraging motivation for learn-
> ing. Through the use of individualized tutorial
> computer lessons, students begin at their level
> of understanding. Material that is not mastered
> is presented again in a different manner as often
> or with as much variation as needed to produce
> sufficient comprehension. A reading program helps
> the teacher develop and monitor an individualized
> course of study, building as much on the child's
> competencies as on defects. Because the student
> is continuously and actively involved, receiving
> immediate feedback on responses, he/she becomes
> an active partner in the learning process and is
> aware of progress as it occurs. A mathematics
> tutorial program presents students with highly
> individualized exercises that reinforce and review
> material, enabling them to proceed at their own
> rate.[42]

Very often CAL fosters within students a sense of con-
trol. This concept is extremely important for many of the
disadvantaged as they experience helplessness or lack of
control in many areas of their lives. With a feeling of
accomplishment, the computer can become a tool for exploring

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[42] Charp, p. 13.

an infinite array of avenues to learning previously
denied.

The most ambitious undertaking to date in the use of
CAL has been Plato. This computer-based educational system
was developed through public and private assistance and is
now under the control of Control Data Corporation.

In 1981, 6,000 Plato terminals provided on-line access
to a multitude of subject areas made available by the system.
In addition, this material has been adapted for use on the
Control Data 110, which can be hooked up on-line or used
independently making Plato curriculum readily available to
all.

This sytem provides training in almost every conceivable
subject area. In fact, a company or agency can have Plato
materials written or adapted to their particular needs.
Control Data Corporation has developed programs relating
to the inner city, low achieving students and prison inmates.
Some years ago, Multicultural Community High School, the
sponsoring group for the thesis project, was able to
participate in a basic skill development program facilitated
by Plato.

Despite its enormous success at developing the Plato
system, it has not become a profit maker for Control Data
Corporation. In fact, it is very expensive to use and is
now suffering from competition by the new low cost micro-
computers and their software. Nevertheless, it was a

tremendous undertaking that helped foster the acceptance

of CAL.

An important factor when viewing the psychological

affects of the information revolution on society at large

is that of ignorance.

>The standard home computer is sold only to
>somebody who wants one, but the same machine can
>seem menacing when it appears in an office.
>Secretaries are often suspicious of new equipment,
>particularly if it appears to threaten their jobs,
>and so are executives. Some senior officials
>resist using a keyboard on the ground that such
>work is demeaning. Two executives in a large
>firm reportedly refuse to read any computer print-
>out until their secretaries have retyped it into
>the form of a standard memo. "The biggest problem
>in introducing computers into an office is manage-
>ment itself," says Ted Stout of National Systems
>Inc., an office design firm in Atlanta. "They
>don't understand it, and they are scared to death
>of it."
>But there is an opposite fear that drives
>anxious executives toward the machines: they
>worry that younger and more sophisticated rivals
>will push ahead of them. "All you have to do,"
>says Alexander Horniman, an industrial psycholo-
>gist at the University of Virginia's Darden School
>of Business, "is walk down the hall and see
>people using the computer and imagine they have
>access to all sorts of information you don't."
>Argues Harold Todd, executive vice president at
>First Atlanta Bank: "Managers who do not have
>the ability to use a terminal within three to
>five years may become organizationally dysfunc-
>tional." That is to say, useless.[43]

Computers may also contribute to new forms of stress.

The _Technology Review_ states since computers can monitor

workers far more closely than human supervisors, the

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[43] Friedrich, p. 18.

resulting stress (from being monitored by computers) .
represents a qualitatively new kind of work place problem.[44]

It is apparent that public attitudes will be an impor-
tant force limiting the expansion of computer technology.
Robots are met with fear and suspicion at the factory by the
workers they threaten to replace. In the same manner,
clerical workers are not entirely sure informational technology
will ease their burden and provide greater opportunity for
them. Finally, would one really want to listen to a
sophisticated music synthesizer produce flawless Bach or is
the aura of the local symphony orchestra more appealing?

Higher level programming languages are constantly
developed attempting to make computers user friendly. Will
their success insure that computers are demystified and
become a tool for everyone? This is one means to address
the fear and suspicion change can sometimes foster.

Political

The United States has traditionally treated education
as a public good. Public goods are defined as services or
goods whose benefits are available to everyone and from
which no one can be excluded. There are few pure public
goods such as national defense, but an abundance of impure
public goods exists. These services such as education com-
bine aspects of both public and private goods. If decisions

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[44] Fass, "Computer Revolution Will Cause Social Change,"
p. 1, col. 3.

about something as important as education are personal
choices made in the market place, society could be very
adversely affected. The government must assume responsi-
bility in order that education be efficiently produced and
equitably distributed.[45]

Through time, most educational decisions have been made
in the political arena. In addition, if these activities
were not financed by the government, they were in some way
supported by it. This view of education reflects the belief
Americans have in the importance education plays in socializ-
ing its members. To insure that this becomes a reality,
they have established a broad spectrum of educational
institutions which are supported and regulated by the govern-
ment.

According to one educator though the government is
failing to meet or successfully address the dilemma new
technology has placed on our existing facilities.

> But Mr. Gillespie at the University of
> Washington questions whether colleges and univer-
> sities, even with industry help and the factor of
> time, will effectively absorb changes the computer
> is bringing to education, without some sort of
> national agenda. "The computer affects the founda-
> tions of American education in a way that means
> we should reexamine how we provide that educa-
> tion," Mr. Gillespie says. "We're floundering
> right now because there's a need for the federal
> government to provide resources and information

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[45] Informational Technology, pp. 68-69.

policies. That lack of direction on a national level has us standing at the edge of a cliff."[46]

But Congress is well aware of the crisis and is beginning to respond.

Not since Sputnik and the space race in the 1950's has Congress been as concerned about revitalizing U.S. technology. Since last January over 200 separate high tech bills have been introduced. They range from the "High Technology Morrill Act," which would use monies from oil leases to support education, to the "Apple Bill," which would give computer companies special tax credits for donating computers to schools. Even the Reagan administration has backed down from an earlier stance and supports more educational funding.

Indeed the Federal Government has traditionally supported higher education. Recently this involvement has been increasing. In the late 1960's funds were provided to assure that all qualified students would have access to higher education. In the Fiscal Year 1978-79 approximately $14 billion was spent to achieve this goal. Today, nearly 40 percent of all students receive Federal aid, and 75 percent of scientific research is federally funded. The Civil Rights Act of 1964, the National Education Act of 1965, and the Educational Amendments of 1972 give license for government intervention in academic affairs. The Federal Government views higher

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[46] Phillips, p. 12.

education as a vital national resource to which all Americans should have equal access.[47]

When focusing directly on informational technologies, the following options exist for federal action. Congress could decide to adopt a policy of direct intervention. This would involve tax incentives for donation of equipment to schools, a program to subsidize software development, or directly funding technology acquisition.

Another direction could entail adopting a general education policy, which would support research and development and eliminate unintended regulatory barriers. A concrete example is the importance of providing copywrite protection so companies are more willing to spend money in developing new technologies.[48]

The information revolution also raises other important political issues for society as a whole. Relationships with all our institutions are becoming increasingly complex. The inability to successfully communicate in all arenas will severely hamper people's ability to prosper.

There are also many grave security issues. Are other countries preparing their students better as many studies show? How successfully do foreign powers make use of espionage to steal our scientific and technological information? Although defense officials have traditionally been

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[47] Informational Technology, p. 79.

[48] Informational Technology, pp. 11-12.

concerned with military information, this more general leakage of knowledge could supply countries with differing ideologies the ability to achieve economic or military goals that are in contrast to our own.

Philosophical

Since informational technology is so powerful and its effects on society very pervasive, it holds the potential for great good or evil. One of the most obvious concerns is the possibility of creating a society similar to the one described by George Orwell in 1984. Indeed, with so much data available and not enough safeguards, privacy is hard to maintain.

The information age will also bring new vices. How many of our television-saturated children are now becoming video arcade junkies? There is also a question of giving children the tools, but not the maturity to use them properly. The recent fever raised by Milwaukee 414's, a group of young computer users who broke into government-restricted data bases, attest to the potential dangers inherent in computer misuse.

Computers will also be used by management to control workers. It remains to be seen how effective they will be and if this phenomenon can avoid serious dehumanizing affects.

These issues lead James Martin to the following remarks:

> There's a constant fear of technology getting
> out of control. It's rather like W. W. Jacob's
> The Monkey's Paw - where you make a wish, have it
> granted, and then the unfortunate byproducts of
> that wish will come true too!
>
> That's true of technology also. People,
> politicians, industrialists, great engineers are
> making wishes about what we'd like to build and
> we're acquiring the capability to make those
> wishes come true. If we're not careful, the mere
> fact that the wish comes true might have all sorts
> of undesirable consequences.
>
> The computer itself has ENORMOUS POSITIVE
> BENEFITS for all mankind and it's only just
> started! But, the computer can also lead to the
> abuse of people - treating them as numbers instead
> of human beings, keeping too much information on
> individuals resulting in an invasion of privacy,
> making mistakes, making incredible weapons systems,
> or making bureaucratic insanities possible.
>
> There are all sorts of possibly dangerous
> byproducts of computer technology, but this is true
> with any technology. Some are more obvious, such
> as nuclear energy. I think it's very important
> for people in creating new technologies to think
> out the long range consequences and to anticipate
> the possible side effects.
>
> Then it's very important TO COMMUNICATE this
> to the public for a better understanding of tech-
> nology. Scientists are never going to think of
> every implication, so it's really necessary to
> get the issues understood by sociologists,
> historians, politicians. In short, anyone who
> communicates with the mass public.[49]

These are some of the more far-reaching issues affect-

ing our society and should be considered very carefully by

everyone.

Many studies predict we are going to suffer severe

massive automation-induced unemployment. This will be only

a temporary problem, as change will produce new avenues of

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[49] "An Interview with James Martin," The Future, n.d.,
p. 1.

employment. These new jobs though are going to require a more sophisticated workforce. In fact, lifelong retraining is expected to become the norm for many people. This could lead us to a society further characterized by the "haves and the have nots."

Considerable evidence exists that most young people exposed to computers are white and middle class. One reason is the suburban tax base allows for better equipped schools. Well-off, aware, and motivated parents are buying home computers and exposing their children to them. In addition, they are sending them to private computer schools and camps.

One train of thought purports that an increasingly stratified society is not the fault of the computer per se, but indeed how society might use this technology. The position of this thesis is that the computer would be a powerful means to help empower the economically and educationally disadvantaged members of our society and every effort should be brought forth to insure this happens.

Summary

The Information Revolution has had a pronounced affect on the manner in which we live, think, learn and work. Additionally, the information sector is already a major component of our economy and will be the source of most jobs in the future. In order for people to have a participatory role in our new society, literacy in high

technologies will be mandated. There is a great deal of concern that those disadvantaged now are destined to become more so in a technetronic era.

Since the "information" society will require lifelong retraining, any education must stress learning how to learn. The ability to be computer literate may very much determine whether one joins the technological elite or the army of semi-skilled support workers. In any case, some form of computer literacy will be required for most jobs. Those who are not able to obtain this training will be at a severe disadvantage.

Computer-assisted instruction (CAI) lends itself particularly well to the educational needs of disadvantaged students. In addition to providing immediate feedback, it can be adapted to many alternative modes of education. Programs utilizing PLATO systems attest to proven success with this population.

The target population for this research project is those most likely to be disadvantaged by technology, those who are already economically or educationally disadvantaged. Since many of these people are poorly motivated, any program, to be successful, must adopt a missionary attitude.

The purpose of this project was to develop a CETA formated training program in microprocessing for high school dropouts. Since CETA, JTPA, or CDA funding was not obtained, the project evolved somewhat differently. The actual program

offered participants computer literacy, career orientation, and some practical applications. The final goal was lead-ins to other programs or entry level jobs.

Chapter Three will emphasize the importance of reacting to the information revolution by creating new educational programs that are able to reach everyone in our society. It will also detail the direction the researcher's work has taken to address this need and offers recommendations for future goals and objectives.

CHAPTER THREE

Historical Review of Project

Technological change has impacted almost all of society, particularly the economic and educational sectors. High technology, of which computer technology is a fundamental component, has both destroyed and created jobs at a pace never before seen. The ability to understand and use computers is becoming essential to obtain and keep more and more different types of jobs.

People who, because of economic or educational problems, are unaware of this situation, or are unable to improve their position relative to it, are likely to become permanently disadvantaged.

The project was undertaken to design an instrument to motivate people to become better educated in order to improve their standing in a technology-oriented economy. This included providing the proper background to go on for more education at various higher level institutions. For other students, who for reasons of ability and self motivation were not interested in this objective, the program provided computer exposure and experience in application of various software programs. The goal of this portion of the project was to give them enough computer skills to obtain entry-level positions.

The target population for this program were those who
were most likely to be disadvantaged by technology - those
who were already economically or educationally disadvantaged.
This entailed a missionary attitude for the program, since
many people in the target population were poorly motivated
for reasons related to their overall situation. Although
initially the program's target population was to be rela-
tively young high school dropouts, the recent economic
dilemma has created a new class of disadvantaged. In order
to help the displaced worker and/or the displaced homemaker,
the program enlarged its participants to include this
segment of the disadvantaged. In addition, the program
allowed the general public to participate, especially
Milwaukee Christian Center staff.

All training for the project took place at the Mil-
waukee Christian Center, 2137 West Greenfield Avenue. This
is a community-based organization funded by United Way
offering a variety of services to residents in low income
neighborhoods on Milwaukee's near southside.

Multicultural Community High School which is a non-
profit alternative school, provides educational services to
the thesis project target population at various centers
throughout the city and surrounding suburbs. One center was
located at the Milwaukee Christian Center and this served as
the sponsoring agency for the program. All proposals that
were submitted to various foundations and government agencies

were sponsored by Multicultural through the auspices of the Milwaukee Christian Center.

It is important to note that the Milwaukee Christian Center's presence in the community is an integral factor in any successful attempt to provide training such as computer literacy to people who are generally unaware of the tremendous changes occurring in society. In addition, the on-going educational opportunities offered by Multicultural provide the proper lead-in for students to become involved in the project that had been developed. An article in The Milwaukee Journal detailed Multicultural's growth as an organization. One of the most interesting facts brought out by the article was that the average age of the students had changed over the years. Especially in difficult economic times, more and more older students were feeling the necessity to go back and get more education and training in order to obtain gainful employment or better sense of self. This coincided with the attempt of the researcher to offer the program to displaced homemakers and displaced workers.

The researcher was responsible for program development, coordination, and some training for the project. In order to accomplish all these duties, he relied extensively on a core group of volunteers who were specialists in many areas of the professional and educational components of the computer industry. The researcher had acted as a resource person for Multicultural for nine years. His background as

an instructor, fund raiser, and administrator proved bene-
ficial in developing and implementing the program.

For program development, the researcher worked closely
with James McMahon, Jeff Jagmin, Kathleen Barry, Paul Hardi-
man, Matt Brzeski, Fred Obbenberger, and Robin Phillips.

James McMahon, the Data Processing Internship Supervisor
at Washington High School, recommended various software such
as the accounting and keyboarding programs. In addition, he
provided his general expertise toward program development.

Jeff Jagmin, who is responsible for development of
educational programming at the Byte Shop, acted as a consul-
tant in program length, feasibility and materials.

Kathleen Barry, Editorial Research Assistant of Computer-
Assisted Instruction for Raintree Publishers, recommended
various software programs for the project. Of these, Step
by Step was chosen to teach BASIC programming. She also
assisted in designing the format for the classes and helped
with training activities.

Paul Hardiman, professional programmer with fifteen
years experience, developed initial computer literacy classes
and designed and taught the advanced programming classes.

Matt Brzeski, a programmer with Allen Bradley, taught
along with the researcher, the beginning computer literacy
classes. In addition to adding to Paul Hardiman's and the
researcher's curriculum, he was able to demonstrate various

applications for microcomputers. Among the many things were
use of a modem, word processing, and Visicalc.

Fred Obbenberger, McGraw Hill-Gregg's Southeastern
Wisconsin sales representative, played an active role in
formulating the basic design and curriculum for a broad
based microprocessing training program. This format was
submitted to JTPA for approval.

Robin Phillips, a Business Education teacher at Brook-
field Central High School, acted as a consultant to develop-
ing the clerical training portion of the program. She
utilized materials developed by McGraw Hill-Gregg to teach
accounting principles at her high school, the same materials
that were to be used in the CETA or JTPA format of clerical
skills training programs that the project hoped to facilitate
if the funding would have been obtained. This curriculum
is designed for programmed learning. In this manner, it
could have been adapted, with Robin's help, for students
returning to complete their clerical skills portion of the
thesis project. The particular reason this course was
chosen was the fact that it allowed for individualized
instruction. Therefore, students could progress at their
own speed studying various applications on the microcomputer
and reinforcing their clerical background with individualized
instruction in accounting principles.

Judy Hansen, who was also a Business Education teacher
at Waukesha County Technical Institute, acted as a consultant

to the clerical portion of the project as she was familiar with the same materials.

In order to familiarize students with operation of a microcomputer, a number of volunteers acted as tutors. Ralph Kurowski, a retired engineer, assisted the program in this manner. In addition, he began writing software programs that would review basic skills for the students. Two displaced workers, who had some computer background, in addition to taking our classes helped the program as tutors. Carter Case, who has a degree in engineering and has taught at Laubach Literacy Center, assisted as a volunteer tutor. Dan Fehrer, a computer hobbyist, was able to instruct students on how to operate the microcomputer.

In order to demonstrate word processing applications, Sandra Hunter, a professional secretary utilizing integrated software in her place of employment, was available to instruct students in the use of Apple's Word Handler II (a sophisticated word processing program for microcomputers that has many of the features of a dedicated word processing machine). In addition, she developed course materials relating to this topic. Finally, Wendy Elliott, Director of the YWCA's Career Counselling Center, developed an employability skills course for use by the participants. If JTPA funds would have been obtained, a staff person would have been added to her career counselling center with sole responsibility for the project's students.

The project served forty participants. The students
roughly divided equally among three categories - high school
dropouts, displaced workers and homemakers, and the general
public. The high school dropouts were referred to the
program through Multicultural High School and Journey House,
an organization offering similar training to area high school
dropouts in G.E.D. preparation. The displaced workers and
displaced homemakers were generally referred to the program
through the Milwaukee Christian Center's informal channels.
Often times, they were friends and relatives of Multicultural
students. Members of the general public who took part in
the program were mostly Multicultural and Milwaukee Christian
Center staff.

In the Fall of 1982, the researcher made a thorough
evaluation of the job market and detailed descriptions of
entry-level positions in the computer field. Foremost, he
discovered the impact that the microcomputer is having on
society and the importance of exposing everyone to its
many uses. The biggest change occurring in data processing
had to do with the impact of the silicon chip. No longer
was keypunch considered the norm, indeed data entry by CRT
terminals was becoming more pronounced. This information
provided the basis for focusing on microcomputers in
program development.

As the researcher began to realize the significance of
exposing people to basic computer literacy, he developed the

project to focus on providing training in fundamental pro-
gramming and applications on microcomputers. In order to
accomplish this, working with the technical, educational,
and practicing sectors of the computer industry, the basic
course was designed. This involved developing the curriculum
materials and identifying, locating, and obtaining funds for
the necessary software packages to do applications on the
computer.

In November, the essential elements of the program were
developed sufficiently to apply for CETA funding. When this
attempt was not successful, various foundations were approached
with the hope of obtaining more equipment. Apple and Tandy
Corporations educational foundations were two such avenues
that proved unsuccessful. Locally, letters were sent to
foundations with the goal of obtaining more computers. This
attempt was finally successful in late summer, when a grant
was obtained for $985.

In January, with the help of his core group of volunteers,
the materials were ready for the researcher to begin the pilot
program. In addition, through Milwaukee Public School
System Title 2 funding, all the software packages were
obtained. Realizing the necessity for more volunteers, a
Milwaukee Journal "Volunteers Wanted" ad provided the program
with the services of Robin Phillips, Dan Fehrer, Carter Case,
and Sandra Hunter. Matt Brzeski was recruited through a
message on a computer bulletin board explaining the project

and asking for help. Also, by January, the targeted
populations were identified and recruitment began through
the Milwaukee Christian Center and Multicultural informal
networks. This involved referrals from Multicultural's
southeast center and Journey House. In addition, the general
public was also invited to partake of the classes. This
meant identifying and contacting displaced workers and home-
makers. This also entailed training of organizational staff
and some members of the general public at large. Between
January and June, instruction was provided at the Milwaukee
Christian Center in computer literacy and its applications.
Three seris of beginning computer literacy classes were
given, two advanced programming classes were also provided,
and computer lab sessions focused on BASIC programming,
keyboarding, word processing, and accounting. Before all
the clerical training could be completed, the computer
utilized for these purposes was stolen. All training was
stopped because by the time the insurance company made
funds for restitution available and the computer arrived
from Apple Company, it was to be the end of August.

Participants who identified their objective as more
training were able to complete their Step by Step lessons
and the advanced programming classes. For students who
chose to take the clerical training option of the project,
time constraints of having only one computer and then

having that computer stolen made it impossible to complete
that segment of the project in the proposed time frame. If
this training would have been completed, classes in employ-
ability development were arraigned to be provided for at
the YWCA's Career Counselling Center. These classes were
to be adapted from their basic program to fit the particular
needs of our population.

By the beginning of summer, all segments of the program
were fully developed. Congress, in its attempt to react to
the adverse economic conditions and changes brought about by
the information revolution, made money available for retrain-
ing by restructuring the old CETA act into JTPA and through
JOBS bill funding. In early summer, through the auspices
of the Milwaukee Christian Center, JOBS bill money was
requested through the process set forth by the Community
Development Agency. This attempt also proved unsuccessful;
therefore, in late summer another proposal was put to the
private industrial council for JTPA funding. Again, the
Milwaukee Christian Center was unsuccessful in their
attempts.

Through the sponsorship of Multicultural, in July,
the researcher was able to obtain funding for a full time
VISTA volunteer position. In addition, he also was able to
obtain the necessary funds for more computer equipment to
expand this program to the Salvation Army, 1645 North 25
Street, in Fall of 1983. The researcher will also continue

the project started at the Milwaukee Christian Center, again relying on the help of his core group of volunteers. He anticipates that the students will be able to complete their clerical skills training in microprocessing at the Milwaukee Christian Center this year as a replacement computer is now available. When students complete their training, they will be able to take advantage of the employability development program at the YWCA. As a result of his work, the researcher has been in close contact with the program directors at the Salvation Army and Children's Outing Association, working as a consultant to develop computer literacy programs at Multicultural centers within their agencies. The YWCA has also approached the researcher about similar assistance. The La Farge Lifelong Learning Institute and University of Wisconsin-Extension have contacted the researcher about the possibility of teaching computer literacy classes there. At a recent job interview for Alverno College, among other things, responsibilities for developing programming for their Telesis Institute were mentioned to the researcher during his attempt at securing employment.

The Milwaukee Christian Center's intention is to continue its attempts at attaining funding. Late Fall of 1983, saw the researcher continuing his attempt to secure monies for retraining of displaced workers vis a vis the Governor's Employment & Training Office.

Development of Computer Literacy Program

The intention of the researcher was to develop a micro-processing training program to be submitted to various government agencies and foundations to secure funding. In order to achieve this goal, extensive research was done in the area of education and application of computers.

Relying upon the expertise of many volunteers and valuable consulting information obtained from computer vendors and curriculum sales representatives, the researcher was able to develop the basic format for a computer literacy program. The intention of this project was to offer participants, not only computer awareness, but also go further and develop literacy capabilities.

Using the limited resources available in terms of capital equipment and the abundant resource of volunteers, a pilot program was implemented at the Milwaukee Christian Center, the agency which also sponsored various proposals submitted to agencies through the Milwaukee area offices.

Evaluation Objective 1:

Develop a Proposal for Submission to
Various Government Agencies and to Other Foundations

Working with Jeff Jagmin, James McMahon, Kathy Barry, and the other consultants, a basic format for training activities was developed in fall. This included the essential design of the program, especially things like time frames and areas of study to be covered.

At this time, a proposal was submitted to CETA which
described a microprocessing training program which utilized
computers to not only teach applications but to be used to
review basic skills. This attempt was not successful and
in lieu of a program of this sort, arrangements were made to
develop a pilot project to be run at the Milwaukee Christian
Center.

The program at the Milwaukee Christian Center was
designed to provide participants computer awareness, and
as much as possible, to give them hands-on experience on
the computer itself. As there was only one computer available
for the project's use, exposure was somewhat limited. When
students worked during computer lab sessions, they utilized
various software programs recommended by the numerous
consultants to the project. Each program was chosen for a
particular reason. Typing Tutor familiarized participants
with the keyboard. Step by Step taught students BASIC pro-
gramming. Word Handler II and Accounting materials were
also available for students to enhance their clerical
abilities.

In addition to the computer lab sessions, two different
classes were available to students. In a basic computer
literacy course developed by Paul Hardiman, computer aware-
ness was emphasized.

Matt Brzeski and the researcher were also able to add
to this segment of the program. A copy of the outline for

this class and other materials developed for it are included in the Appendix.

Paul Hardiman wrote descriptions of various terminology and principles pertinent to the computer phenomenon. Matt Brzeski contributed numerous articles that explored the topics covered in the course. Among many things were the use of modems, Visicalc, computers in education., and computer careers. Sandy Hunter also contributed materials written on word processing principles which were also utilized in this beginning orientation. In addition, the researcher developed job trends and further offered information on career orientation.

At the conclusion of this computer literacy course, certificates were awarded. It was the intention to also have provided students the necessary information to determine how they would best become involved in the forthcoming technological revolution. For students who showed the aptitude and desire to continue in programming, Paul Hardiman developed an advanced concepts course. Although this class focused primarily on BASIC, it was designed to provide students an overall understanding of all programming princi-ples. The ultimate goal was to provide a foundation in order for students to go on for more training either to intensify their understanding BASIC at large or other programming languages. A copy of this course is included in the Appendix.

Many students felt they would be more comfortable as
just users of computers. For these students, there were
various software programs available to enhance their clerical
skills. The researcher also provided counseling to them as
to where they could obtain additional training and to this
end, some students chose to enroll in CETA training programs.
The Milwaukee Christian Center feels there is a definite
need for an indepth microprocessing training program,
especially for the disadvantaged people on the near southside.
It was their intention to continue their efforts to obtain
the appropriate levels of funding to provide this necessary
service.

Through the auspices of the Milwaukee Christian Center
and Multicultural Community High School, the researcher was
successful in only two attempts at raising additional funds.
A proposal submitted for a VISTA volunteer was approved in
July. In addition, in August the researcher was able to
obtain a grant of $985 to purchase more computer equipment.
These attempts will be continued and close attention will be
paid to any Congressional reactions to the restructuring of
the nation's workforce that is resulting in temporary massive
unemployment.

Evaluation Objective 2:

Monitor Results of a Pilot Computer Literacy Program

Each student was exposed to Step by Step programming lessons on the computer. Their ability to assimilate this material determined whether they would go on to advanced programming classes or clerical skills training. In all, seventeen participants went on to the advanced programming classes, fifteen members of the program chose the clerical skills training option and the remaining eight participants did not go on for any more training. If the clerical training would have been completed, a testing instrument was devised to determine typing speed, word processing skills, and general accounting and computer knowledge. This information would have been helpful in job placement. When applicable, G.E.D. test scores would provide additional criteria in evaluating participants. This is especially important for those who want to go to college. It also is a gauge of the grammar and English ability of the clerical students. Table 3.1 offers descriptive data on participants.

The final evaluation was to see how successfully the program placed people in additional training programs or entry-level jobs.

Table 3.1

Descriptive Data on Project's
Forty Participants

Sex				Male	Female
				9	31
Age			18-25	26-55	56+
			15	22	3
Education	1-3 Years of High School	High School Diploma	General Equivalency Diploma		Some College or College Diploma
	6	15	11		8
Future Plans	Homemaker or Retired	Work	Vocational Training Programs		College
	6	27	3		4

Conclusions

The first evaluation objective was to develop a proposal to submit to various government agencies and other foundations. In order to do this, the researcher had to first identify where the need exists for training programs of this sort. Realizing that there is tremendous upheavals occurring in data processing due to the information revolution, the researcher interviewed educators responsible for developing new programs that are responding to these changes. At Washington High School, the Business Education Department is creating a word processing program utilizing Wang Systems. At MATC's West Allis Campus, they are currently developing a one year microprocessing course which emphasizes the use of microcomputers.

Upon consulting with numerous computer specialists and curriculum representatives, the researcher was able to identify what type of training would be necessary in a more technologically orientated society. It was on this basis that various proposals were formulated for submission to Milwaukee area governmental agencies.

Although for the most part his attempts were not successful, the proper foundation has been developed in order to continue this quest in the future and hopefully at some point, obtain sufficient levels of funding to fully develop this course.

If the resources are obtained, all segments of the program are fully developed. This includes essentially all the curriculum materials that would be needed. Relationships have been established with numerous community-based organizations which are excited about participating in this type of programming. In order to address areas that are not generic to a microprocessing training course, but are important to any successful retraining program, the proper linkages have been established with agencies such as the YWCA and area colleges.

The second evaluation objective was to determine how students progressed in the training program. Step by Step lessons in BASIC were provided to all students. Twenty-one out of forty participants successfully completed the majority of these ten lessons, which included self-tests at the conclusion of each segment. Table 3.2 summarizes this portion of the program. Seventeen of this number went on to the advanced programming option of the project. Fifteen members of the program, who for the most part had difficulty with this material or were not interested in pursuing programming further, chose the clerical option. The remaining eight participants did not go on for any more training.

If all clerical training had been completed, a testing instrument was designed to monitor skill attainment. This was to be used as criteria in helping determine proper job placement. A copy of this is included in the Appendix.

For students completing either segment of the program, G.E.D.
test scores also provided important criteria in determin-
ing proper placement for students. This is one measure that
is looked at when determining college entrance requirements
and also would suffice to give a profile of the English
skills of potential clerical employees.

Table 3.2

Progress of Students Who Took
Step by Step Lessons in BASIC

Lessons Completed	Participants
5-10	12
10	9

Upon completion of the program, the following placements
occurred for participants. These outcomes will be presented
by group. There were fifteen high school dropouts in the
program. During the training period, two became pregnant
and joined one other student as full-time homemakers. Two
participants went on to area colleges for more training.
One decided to pursue additional clerical training at the
Counsel for the Spanish Speaking's CETA program and another
went on to Cosmetology School. Two students got jobs in
offices and will come back to finish their training and
improve their clerical skills. Another two have gotten low

level paying jobs in child care and at McDonald's. Four are
still out of work and have indicated a willingness to complete
the program this year. Table 3.3 summarizes terminations for
high school dropouts.

Table 3.3

Outcomes for High School Dropouts

Positive or Negative Terminations	Participants
Homemakers	3
College	2
Vocational Training	2
Employment	4
Unemployed	4

The project thesis program was able to help, in some
way, the majority of these students. For those going on to
college, it provided the proper background in computer
science for them to go on for more training. Those deciding
to develop clerical skills were hampered by the fact that
there was only one computer for hands-on experience. As
the program will continue, one of its goals is to obtain
more equipment. Another way to solve this problem is by
having the students stay in the program longer until they

finish all the exercises and develop expertise in micro-processing.

In all there were eleven displaced workers and home-makers in the program. In computer-related areas, partici-pants obtained jobs as a data entry clerk, computer vendor, and VISTA volunteer. One student became a new car sales person and another got called back to work as a steamfitter. Two went on to get low level jobs at a Milwaukee Public School lunch program and the Milwaukee County Stadium. Two decided it was best to remain full-time housewives for the time being. A laid-off factory worker is now manufacturing build-ing materials. Finally, a student enrolled in Interfaith CETA training program hoping to get more experience with microcomputers. Table 3.4 shows terminations for displaced workers and homemakers.

Table 3.4

Outcomes for Displaced Workers & Homemakers

Positive or Negative Terminations	Participants
Homemakers	2
Employment	8
Vocational Training	1

The program generally benefited all of the students,
even if they decided that computer careers may not be for
them. Those who had an interest in the computer-related
fields have begun to develop careers through entry-level
positions. As all these students are in mid-life, many of
them did not feel they wanted to invest the time in more
training, but were glad they were able to find out about the
computer phenomenon and how it affects their daily lives.
Those most interested in computer careers seemed to be the
male students. Generally, the female participants did not
feel that at this time they wanted to develop a new career
if it involved a substantial investment in more training.

Fourteen members of the general public took the classes
with the anticipation of becoming more computer literate.
They were all employed at the time and their job status did
not change as a result of the project. For the most part,
they wanted to learn about computers and become better users
of them.

Implications

A recent Milwaukee Journal article titled, "The Computer
Advantage" by staff reporter Margaret Thale reiterated the
following conclusions. Many educators feel computers will
be the dividing line between the haves and the have nots.
Also, there is much confusion on the best way to utilize them.
One issue is that in wealthy schools, students who have had

previous exposure to computers are writing sophisticated
programs and doing problem solving, as compared to dis-
advantaged students who generally use computers for simple
drill and practice exercises. There is much concern that
this will lead to an increasing polarization of society.
One problem that may lead to this is the lack of planning
by school administrators. There is also much concern that
schools are not encouraging women to pursue careers in the
technical and scientific areas. Ms. Thale also feels any
computer literacy attempt should include career applications
ethics, social impact, and problem solving skills.[50]

The thesis project was an attempt to address all the
issues brought forth in the Milwaukee Journal article.
Most important was the concern with bringing computer literacy
to disadvantaged portions of our population in order to avoid
the movement towards an increasingly stratified society.
Beyond that, the project attempted to convey a realistic
attitude about computers to its participants. It also
addressed all the concerns Ms. Thale alluded to in her
article of what a computer literacy program should emphasize
in its basic design.

The computer literacy classes focused on developing
an awareness of career applications and some training. The

[50] Margaret Thale, "The Computer Advantage," The Milwaukee
Journal, 16, Oct. 1983, p. 1, cols. 3-4.

social impact and issues such as ethics were also discussed
at length in these classes. For people taking the pro-
gramming portion of the training, skills at learning how to
learn or problem solving are to be the focus of this curricu-
lum. Realizing that broad programming concepts were conveyed
in the initial design, the focus has changed to entail more
problem solving slant to this option of the program. The
program did not have any problems with sexual stereotyping
as the two students who have gone on to college to develop
technical or scientific training are both female. Every
effort was made to avoid limiting choices based upon such
things as race, sex, or age.

All societal institutions are going to have to respond
to the information revolution. Foremost will be the need to
address the concerns for education. The microcomputer
promises to be an extremely versatile tool with which to
address the complexity of this problem. In all the proposals
that were written and intrinsic to the pilot computer literacy
program was the emphasis on the very adaptability of the
microcomputer to answer various educational problems.

Recommendations

Initially, the thesis project was to be an intensive
program developing microprocessing skills for high school
dropouts to become clerical workers utilizing new technology.
Because funding was not obtained, the resources were not
available to develop this type of project. To best utilize

the abundant services of volunteers along with the limitation of one computer, the program was designed as one that would provide more information and background in a classroom type setting and as much hands-on experience as the resources allowed. This was done instead of a program that would focus particularly upon just training on the computer per se. The researcher felt that such a program though was indeed necessary and in late Fall 1983 another attempt was made to submit for funding to the Governor's Employment & Training Office. It is recommended that further attempts for funding be made based on the results of the current project.

It is further recommended that educational institutions recognize the need for training in computer literacy for students with a wide variety of backgrounds. In fact many educational institutions are just beginning to react to the changes brought about by the information revolution. The Business Education Department at Washington High School has acquired the Wang Word Processing System. This is an example of the need of most schools to go out and update their equiment and re-design their courses to reflect the changing workplace and market. Milwaukee Area Technical College (MATC) has, this August, begun a one-year microcomputer specialist program. This course focuses on machine operation and is very similar to the program that the researcher would have developed had he obtained the necessary resources. Chapter Two documents the need for this type of

program as the way in which information is processed, trans-
mitted, and handled is changing rapidly, and there will be a
tremendous opportunity for clerical workers who are familiar
with the new technology. The researcher submitted proposals
for this type of program to Comprehensive Educational Training
Act (CETA), Job Training Partnership Act (JTPA), and Community
Development Agency (CDA). These efforts were not successful,
but will be continued in the future.

The actual thesis pilot project resembled programs such
as Play To Win, Inc. and Evergreen Valley College's Computer
and Electronics Course. In the Milwaukee area, a new program
called the Private Sector Electro-Mechanical Skills Develop-
ment Center has been developed to provide a background in
computers and electronics for students and lead-ins to
other programs.

In order to begin to address the problem of an increas-
ingly polarized society, it is tremendously important for
community institutions to outreach to the disadvantaged
members of society and provide them the necessary knowledge
and support to become more involved with informational
technology. This is to be done with an emphasis on empower-
ing skills to function in an increasingly complicated world.
It is also important that this is planned well, so any people
becoming involved will not just obtain semi-skilled jobs, but
would use new informational technologies to obtain greater
control over their lives.

To ensure that this happens, the researcher recommends that various community institutions develop computer literacy outreach programs. The YWCA has planned just such an attempt to bring the computer phenomenon to young minority women. The researcher not only applauds this attempt, but will act as a consultant in its development.

It is further recommended that other community organizations involve themselves in this type of programming. To this end, the researcher has been in contact with the La Farge Lifelong Learning Institute, University of Wisconsin Extension, Children's Outing Association and Alverno College

The institutions mentioned along with various associations are some of the vehicles to use to reach the public. Realizing this significance, the researcher has been strengthing the work of the non-profit computer network, an association dedicated to the sharing of resources and knowledge among community-based organizations. It is recommended that this viable and relevant organization continue its efforts at bringing computer literacy to all members of society.

Summary

The thesis project was an attempt to address the problem of an increasingly polarized society fueled by the technological revolution. The purpose of this program was to ensure that all members of society share in the benefits of the tremendous progress made by utilization of high tech.

The way this was done was to study the impact the information revolution is having on society. Once this material was obtained, a means was devised to convey a realistic attitude about new technology to any participants in our project. By working with consultants from the many professional components of the industry, the objectives were obtained. Relying on their expertise and vast knowledge, a program was developed to convey information about computer careers and general computer literacy. In addition, the training was provided to encourage students to continue on at higher educational institutions or other programs. The project also attempted to provide for those students, who for various reasons were unable to handle a more sophisticated application of computers, the ability to operate successfully different software utilized in a number of clerical occupations.

Definition of Terms

Apple Computer	One of the first microcomputers developed and marketed. This is one reason there is more software available for this micro than any of the others.
Association for Educational Data Systems	An organization formed to promote the use of computers in education.
Autodidactic	Refers to the art of self instruction.
Basic Accounting	Fundamental knowledge of microcomputers to do simple bookkeeping.
Basic Skills	Remedial education in reading, writing, and arithmetic.
CAI	Computer-Assisted Instruction. The use of computers in teaching, which may involve drill and practice, tutorial or problem solving.
C.E.T.A.	Abbreviation for the Federal Government's Comprehensive Employment and Training Act.
Community Development Agency	An agency of city government responsible for funding of numerous civic projects.
Data Entry	The process of transferring information to computer memory.
Department of Educational Opportunity	A program at the University of Wisconsin-Milwaukee providing support services to disadvantaged students including counselling and tutoring.
Disadvantaged	Individuals or groups who have low status in a particular society for reasons of race, sex, ethnicity, economics, language, geographic location, environment, education, disabilities, etc.

Definition of Terms (continued)

Displaced Homemaker
An individual who has not been in the workplace for a period of time, but has worked as a housewife during this period.

Displaced Worker
Someone temporarily out of the workforce mainly due to cyclical changes in the economy or automation induced unemployment.

Employability Development
Program providing participants with prosocial skills, self knowledge, and work knowledge.

Fundamental Programming
A working knowledge of BASIC, the most common computer language.

G.E.D. Certification
A testing program that provides accreditation in lieu of a high school diploma.

Global Village
The ability of modern technologies to foster interpersonal communication.

Information Technology
The means in which knowledge is stored and transmitted.

Interactive
Processes that are complimentary to one another.

International Council for Computers in Education
An organization dedicated to the improved instructional use of computers.

Job Development
Contacts made with employers in order to have access to job openings for placement of participants.

JTPA
Job Training Partnership Act. Replaces CETA as the Federal Government's new vehicle for jobs training.

Definition of Terms (continued)

Microprocessor	An electronic circuit chip that can perform arithmetic and logical operations on data. The microprocessor is the brains of a microcomputer.
Milwaukee Christian Center	A community-based organization sponsored by United Fund which offers an infinite array of social services.
Multicultural High School	An eleven year old non-profit alternative high school serving Milwaukee's dropouts at six locations.
Non-profit Computer Group	An association formed to facilitate the sharing of knowledge and expertise among community-based organizations.
Office of Technology Assessment	An analytical arm of Congress which is responsible for informing legislative policy makers of technological change.
Private Sector Electro-Mechanical Skills Development Center	A program developed with private sector donations fostering the introduction of computers to inner city youths.
Robotized	The replacement of human labor by computers that are re-programmable and multifunctional.
Word Processing	A system that performs storage, manipulation and processing of text.

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APPLICANT ORGANIZATION Multicultural Community High School

NAME OF PROJECT WHICH VISTA WILL BE CARRYING OUT

Computer Literacy Program

DESCRIBE THE PROBLEM THAT THIS PROJECT WILL ADDRESS. INCLUDE A DESCRIPTION OF THE TARGET POPULATION OR GROUP THAT WILL BE ASSISTED, THE MAJOR CAUSES OF THE PROBLEM AND NECESSARY DATA TO SUPPORT THE PROBLEM STATEMENT.

Lynne Stitt, a Colorado consultant, states, "The future is between the knows and the know nots, rather than between the haves and the have nots." Whether you call our new age the "post industrial," "technetronic," or "information" society, one thing is certain, computers will play the paramount role. Multicultural Community High School's goal is to help insure that all members of our society reap the benefits of the sweeping technological computer revolution.

The fundamental objective of the community computer program is to offer computer exposure, education, and training through a neighborhood based organization to people otherwise denied this opportunity. In this manner first the computer will be demystified for all participants. After an initial orientation various career paths will be explored and some training in practical applications provided. We feel our format allows us the flexibility to serve the greatest amount of people in the most efficient manner.

Multicultural Community High School has traditionally provided for Milwaukee's hard core dropout population. In addition to increasing our services to this group, we feel our program will be of value to other populations in low income neighborhoods. Thus, our project is designed to help accomplish this goal.

This project intends to focus on Milwaukee's inner city, central city and near west areas. Almost 40% of the households in these neighborhoods have an average annual income of less than $10,000. In addition between 31% and 40% of the heads of family have not completed high school. Our intention is to focus on their educational needs in hope that this would eventually aid them economically.

DESCRIBE YOUR ORGANIZATION'S PREVIOUS SUCCESSES WITH THIS OR SIMILAR PROBLEMS. INCLUDE INFORMATION ON YOUR GROUP'S ACCOMPLISHMENTS AND HOW LONG VISTAS HAVE BEEN USED BY YOUR ORGANIZATION.

For the past eleven years, Multicultural has succeeded in reaching between 400 and 500 young people each year - people who were not being reached by any other educational program. We use non-professional teachers and, in large

Application for VISTA Volunteer
Multicultural Community High School
Page 2

part, a "homemade" curriculum of math and grammar work sheets. We structure
our program around the skills required for the GED exam. We know how to reach
an out-of-school population and we never have to "recruit" students. They
find us on their own. We know how to provide a quality education using
very few funds. Multi has had VISTAs since 1973 (intermittently). From
1973 to 1976, our VISTAs were instrumental in creating new Multicultural
learning centers (finding space, materials, etc.) and in staffing these
centers (finding volunteers).

Another VISTA was primarily engaged in advocacy with the Milwaukee Public
Schools and was a significant force in MPS' decision to open a middle school
"outpost" to attract non-attending students assigned to Kosciuszko and
Walker Middle Schools.

Currently we have a VISTA working on an adult literacy program developing
study groups in various people's homes in the community.

SECTION III. VISTA PROJECT WORK PLAN

Problem No. _____

GOALS AND OBJECTIVES	PLANNED PERIOD OF WORK AND ACCOMPLISHMENTS	ACTUAL PROJECT ACCOMPLISHMENT *(This column to be completed only when submitting ACTION Project Progress Report.)*
GOAL I Implementation of a computer literacy program offering exposure, education, and training through neighbor-hood based organizations to people otherwise denied this opportunity - high school dropouts, displaced home-makers, displaced workers, members of low income neigh-borhoods, neighborhood organization staff.		
Objective 1 Arrange for a computer training program at the Salvation Army, 1645 North 5 Street. Begin initial negotiations stipulating responsibility.	1 - 2	
Objective 2 Develop a curriculum for the program - knowledge of com-puters, awareness of career potentialities, vocational training in computer related functions, background and motivation to go on to more training. This is to be done in conjunction with a core group of consultants who are experts in all phases of the computer industry and will carry on after the VISTA leaves.	2 - 3	
Objective 3 Recruit volunteer instruc-tors for the project - provide necessary orienta-tion, train on-site personnel. This is to be done in conjunction with a core group of consultants	2 - 3	

SECTION III. VISTA PROJECT WORK PLAN

Problem No. _____

GOALS AND OBJECTIVES	PLANNED PERIOD OF WORK AND ACCOMPLISHMENTS	ACTUAL PROJECT ACCOMPLISHMENT *(This column to be completed only when submitting ACTION Project Progress Report)*
ho are experts in all nases of the computer iduustry and will carry on fter the VISTA leaves. bjective 4 btain the necessary equip-ent - funding sources, nation of computer time by rivate conce:ns, utilize he existing apple com uter r transporting it to train-ig site. Have volunteers ie their equipment as aching aide. Hands-on perience at UW-M or public hools.	2 - 3	
AL II ovide an educational perience to 60 partici-nts characterized by the orementioned target pulation. bjective 1 people will attend a ries of evening classes. iese classes will explore iowledge of the computer self, computers in educa-on, computer application i graphics, computer appli-tion in data communication cial implications of mputer phenomenon.	4 - 12	
bjective 2 ter the proper background utills motivation and entiries career choices, unseling on where to tain more training will be fered.	4 - 12	

SECTION III. VISTA PROJECT WORK PLAN

Problem No. _____

GOALS AND OBJECTIVES	PLANNED PERIOD OF WORK AND ACCOMPLISHMENTS	ACTUAL PROJECT ACCOMPLISHMENT. *(This column to be completed only when submitting ACTION Project Progress Report.)*
Objective 3 Provide instruction in computer related functions in order for 12 partici- pants to locate jobs in entry level positions.	4-12	
Objective 4 Staff project with an instructor for evening classes to be given every six weeks to 12 partici- pants. In addition four tutors to provide assistance during hands- on training.	4-12	

LETTER OF AGREEMENT

Multicultural Community High School _____ agrees to
the following obligations as component in good standing of M.A.U.D., Ltd.

1. Compliance with ACTION Guidelines and Regulations.

2. Payment of regular monthly dues for office support.

3. Selection of an appropriate on-site supervisor who will:

   a) regularly attend scheduled committee, general and
      board meetings.
   b) provide the volunteers with adequate job supervision
      and support.
   c) provide the volunteers with at least one weekly
      meeting to discuss volunteers' work, program, etc.
   d) inform the proper MAUD supervisor in a timely
      fashion of a volunteers' work or health problems.

4. Inform the proper MAUD Supervisor, in writing, of any change
   in on-site supervisor.

5. Payment of adequate "on the job" transportation costs to
   volunteers.

6. Preparation of proposals, job description, quarterly reports
   and volunteer evaluations in a timely fashion as requested
   by MAUD Supervisors.

7. Recognize that MAUD staff is the liaison between components,
   volunteers and the ACTION office.

8. Designation of program beneficiaries to serve on MAUD
   committees and Board.

9. Provide or assist volunteers in procuring necessary resources
   for assigned tasks.

10. Assistance in the development of Career Development of Plans
    for low-income locally recruited volunteers.

Signature of Organization Chair _____

On-Site Supervisor _____

Date _February 11, 1983_____

VISTA VOLUNTEER WORK PLAN

NSTRUCTIONS: To be completed by Sponsor for each individual Volunteer assignment or assignments performed by a group of Volunteers.

1) SPONSOR NAME: M.A.U.D., Ltd. 2600 W. Wells St., Milwaukee, WI *LOCATION: (city, state)* 53233 *2) GEOGRAPHIC AREA(S) OF VOLUNTEER ASSIGNMENT:* Greater Milwaukee Area *3) CATEGORY & NUMBER OF VOLUNTEERS* *ocally Recruited (* X *) Nationally Recruited ( )*	*FOR ACTION USE ONLY* *PROJECT #_____ VOL. REQ. #_____* *TRAINING CLASS #_____* *TRAINING DATE _____* *C.O.I. _____* *GENERIC TAC _____* *SKILL CODE. PREFERRED ( ) ALTERNATE ( )*

4) Brief description of sponsoring organization and VISTA project:

Multicultural Community High School is a network of six neighborhood learning centers reaching 400 to 500 young people, ages 14 to 18 each year. The computer literacy program will focus on bringing exposure, education, and training to this population and others in low income neighborhoods.

5) Volunteer Assignment Description:

The VISTA will locate a site in a low income neighborhood where the training can be offered. When the needs of the population in the particular area are assessed the VISTA will design the curriculum of the program. Additional duties will include obtaining the necessary equipment through various funding sources. After recruiting and training of volunteers the VISTA will oversee the educational program.

6) Special placement information (e.g., Climate, Living Conditions, Transportation):

The VISTA should understand that the training of participants is to be done by volunteers and the VISTA's duties involve coordination.

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7) Preferred Volunteer Skills/Qualifications (include acceptable alternative skills):

VISTA must have a commitment to working with people in non-hierarchical,
egalitarian ways.
VISTA should have some community organizing experience.
VISTA should have good verbal communication skills.
VISTA should have some experience in managing materials and personnel and/or
a willingness to assume a responsible/self-directing role.

Sponsor Should Indicate Its Capacity To Accommodate Handicapped Persons:

We see no large barriers to the effectiveness of a handicapped person. Much
of the work of coordination will involve use of a phone. If a neighborhood
facility could be chosen with easy access this will also ease any major
difficulties.

Additional Comments, Information, Background:

CHURCH OF ST. ALPHONSUS

5960 W. Loomis Road   :::   Greendale, Wisconsin 53129

August 15, 1983

Mr. Dale Nook
613 East Oklahoma Avenue
Milwaukee, Wisconsin 53207

Dear Dale:

Our Parish Council has approved your request for the Computer
Literacy Program in the amount of $985.00. Thank you for
coming to our meeting to discuss your program plans.

God be with you in your work.

                    Sincerely,

                    David H. Walker

                    David H. Walker
                    Chairperson, Outreach Committee

Enclosure

NAME: _____   DATE: _____

Circle one of the following choices for each numbered statement below.

    SA   If you strongly agree with the statement.
    A   If you agree with the statement.
    U   If you are uncertain about the statement.
    D   If you disagree with the statement.
    SD   If you strongly disagree with the statement.

SA   A   U   D   SD   I enjoy working in a group.

SA   A   U   D   SD   I enjoy working alone.

SA   A   U   D   SD   Learning is easy for me.

SA   A   U   D   SD   I think computers could be helpful as a means to learn.

SA   A   U   D   SD   I am somewhat fearful of computers.

List several ways that computers are used in everyday life.

_____

_____

_____

_____

List several ways that computers are used in business and industry.

_____

_____

_____

_____

According to some sources how many jobs will be computer or computer-related by 1990.

             a. 50%
             b. 75%
             c. 90%
             d. 60%

Word processing is:

        a. Finding definitions
        b. Editing a text
        c. Typing
        d. Writing a manuscript

What is the difference between calculators, computers, and electronic games?

_____

_____

_____

Signify whether these terms are software or hardware with an "S" or "H."

Monitor	S	H
Keyboard	S	H
Disk	S	H
Memory	S	H
Tapes	S	H
Paddle	S	H

A computer program is:

a. A television show about computers.
b. A person who runs computers.
c. A method of learning about computers
d. A list of commands.

Computers draw by:

a. Connecting dots
b. Drawing lines
c. With a special pencil
d. Lapping circles

State what will happen if instructions are not properly stated in the precise language for that computer.

a. It will stop
b. It will type "no, dummy"
c. It will type "syntax error"
d. It will go tilt

Which of these are an example of computer language. Identify with a capital "L"

Fortran   _____

Machine   _____

English   _____

Robotics   _____

When referring to computers the term BASIC means.

a. A computer language
b. A fundamental task
c. Something very simple or small
d. A video game

Unless a mistake has been made a two-column account form should always

a. Be prepared accurately and neatly
b. List just the assets of a business
c. Balance left side with the right side
d. List a firm's financial ratios

Which of these following terms are assets. Identify with a capital "A."

Cash   _____

Inventory   _____

Stock   _____

Mortgage   _____

Accounts Payable   _____

Land   _____

Accounts Receivable   _____

Equipment   _____

In Accounting, a credit is

a. Something you owe someone
b. Something someone owes you
c. A measure of work completed.
d. The balance of a debt

INTRODUCTION TO COMPUTERS

PART 0: OVERVIEW

In this series of meetings, we'd like you to get comfortable with computers and achieve some understanding of how they work, how they can be useful, and how they will probably affect your life in many ways. This is somewhat loosely known as "computer literacy".

Each week will include some hands-on exercises on Multicultural's APPLE][microcomputer system. Please take part in these. It is important that you actually use the computer. This is the only way you'll get comfortable and productive with it (like riding a bike or playing the piano).

Above all, please ask questions. Someone here either has the answer or can get it for you. Our purpose is to share our knowledge with you as much as possible. If there is some topic you'd like us to talk about, or spend more time on, just let us know.

Tentative Schedule:

   Week 1:   Some basic terms; Operating the Apple][

   Week 2:   Some more basic terms; Computers and Education

   Week 3:   Computer Graphics; Doing Something Useful

   Week 4:   Data Communications; Word Processing.

   Week 5:   Catchup; Anything by popular demand; Wrapup

INTRODUCTION TO COMPUTERS

PART 1: BASIC COMPUTER TERMS

COMPUTER: a data processing device which has significant computational power. A computer manipulates data in its memory, has the ability to store and carry out instructions, and communicates with its environment in a variety of ways.

MICROCOMPUTER: a small computer built around a microprocessor chip. The difference between microcomputers and large computers is the same as that between a Toyota pickup and a Mack truck.

HARDWARE: the physical components of a computer, such as its electronic chips, cables, cabinet, circuit boards, keyboard, etc.

MICROPROCESSOR: the electronic circuit chip that can perform arithmetic and logical operations on data. The microprocessor is the 'brains' of a small computer. Microprocessors are usually known by a number given them by their manufacturer. Examples are the 6502 (used in Apple, Atari), 9900 (used in TI), Z80 (used in many systems), 8088 (used in the IBM personal computer), 6809 (used in Radio Shack's color computer). Of course, every company thinks its microprocessor is best, but don't pay much attention to this. What really counts is the software.

SOFTWARE: the instructions and related data which enable a computer to perform useful work.

FIRMWARE: software which is permanently built into hardware, usually in the form of memory chips.

DATA: the representation of information in a form usable by a computer. For example, a bank account or a business letter are information. They must be changed into data in order to be stored in a computer's memory or to be manipulated by a program.

PROGRAM: a sequence of instructions which the computer follows in order to perform a task. PROGRAM and SOFTWARE are pretty much the same thing. Programs are really just another type of data to the computer. On the other hand, if data representing a checking account is put where the computer expects a program to be, the results are very unpredictable.

MEMORY: storage of various kinds which the computer uses to remember data. Memory can be viewed as collections of boxes of various sizes into which the computer puts data, and out of which the computer can retrieve data. These boxes have the useful feature that when the computer retrieves data from them, the data remains in the boxes and can be used again and again. (Don't take this 'box' idea too seriously.)

    Units of memory:

    BIT: an electronic switch, also called a flip-flop, which can be in one of two states (on/off, high/low voltage, positive/negative current, north/south magnetism). Bits are given the arithmetic values 0 or 1, which form the basis of all computer logic and

arithmetic. All programs and data in the computer are made up of strings of thousands (millions ...) of ones and zeroes.

BYTE: .the smallest unit of memory whose data a computer can move from one box to another. A byte consists (usually) of 8 bits. A byte usually corresponds to a single character of information, such as the letters 'A' to 'Z', the digits '0' to '9', and so on.

K: a unit of 1024 bytes of memory. For example, many small computers are described as having '16K' of memory. This means that it can store 16 x 1024 (16,384) bytes of data. You can usually think of a K as a round 1000.

MEG: a unit of 1024 K. That is, a meg is 1024 x 1024 bytes, or 1,048,576 bytes. You can usually think of a meg as a round million.

WORD: usually the largest unit of memory whose data a computer can move from one box to another. In most small computers a word is 2 bytes. In larger computers a word can be 4, 6, or 8 bytes.

INTEGER: a whole number; that is, one which has no fraction or decimal part. In most small computers integers can only range from -32767 to +32767. This is because an integer is allowed to use only 2 bytes of memory.

REAL: a number which can have a fraction or decimal part. For example, a dollar amount such as $49.63 is stored by the computer as a real number. Real numbers are also known as FLOATING POINT numbers. In a computer's memory a real number usually takes up 4 bytes.

STRING: a sequence of characters. For example, the name 'John Q. Doe' and the address '1575 Main Street' are strings. A string usually takes up as many bytes of memory as it has characters.

Types of memory:

Internal memory: memory which is built into the computer, usually in the form of electronic chips. Small computers can have from 16K to 768K of internal memory.

ROM: read only memory. The computer can retrieve data from this type of memory, but cannot store new data into it. FIRMWARE is usually in the form of ROM chips.

RAM: memory from which the computer can retrieve data and into which it can also store new data.

External memory: memory which must be attached in some way to the computer and which can be detached and moved to another computer.

CARTRIDGE: removable ROM memory. Many computer games are distributed as cartridges which plug into microcomputers or video games (which are really microcomputers).

CASSETTE: memory in the form of cassette tapes. The computer records data on the tapes in a magnetic form similar to musical cassettes.

FLOPPY DISK: a flat, circular, flexible form of storage. The computer records data on disks in pretty much the same magnetic form as it does on cassettes. However, disks are faster and more reliable than cassettes, and can store more data. A typical 5-1/4 inch floppy can store from 90K up to 512K of data. An 8 inch floppy can store from 256K up to 1 meg of data. Floppy disks are also known as DISKETTES.

HARD DISK: an inflexible disk which is sealed in an enclosure. Hard disks are otherwise pretty much the same as floppies, but they are faster and more reliable, and can store much more data. A hard disk can store from 5 meg up to 20 meg of data.

FILE: the usual name for a collection of data about one kind of thing (like accounts payable) stored on a disk.

COMPUTER LANGUAGE: a language with which a human being can communicate with a computer. Because computers have always been, and remain, more stupid than humans by several magnitudes, it has been necessary for humans to talk down to them. This situation is similar to the way we must talk to infants and small children (GOO-GOO, DA-DA, MA-MA, ICKY-POO, etc.) differently than we talk to other adults. So remember when dealing with computers that it is usually the computer's fault, not yours, if things go badly, and keep your patience. Also remember that most computers simply cannot tolerate spelling mistakes or simple grammar errors that humans handle as a matter of course.

Note: This situation is improving rapidly. However, our APPLE][system is still pretty primitive. Please bear with it.

The names of some common computer languages are BASIC, FORTRAN, COBOL, LISP, Pascal, Forth, C, and ADA. There are literally hundreds of uncommon computer languages.

BASIC: the most common computer language provided with small computers. It has a limited vocabularly and is most appropriate for numerical problems. Unfortunately, each type of computer comes with its own dialect of BASIC. All of these versions are similar, but they are all different in various respects.

MACHINE LANGUAGE: a low-level language which a computer can understand directly. Machine language is unintelligible to most humans.

BASIC INTERPRETER: a program, often provided as FIRMWARE in ROM,

which interprets the BASIC language into machine language instructions which the computer can understand directly.

PROGRAMMING: the process of making a computer solve a real-world problem. It consists of several steps:

1. Understand the real-world problem.

2. Understand how to solve the problem in a normal human way.

3. Figure out how the computer can be used to solve the problem. Can the computer do it faster or better? Maybe the computer is unnecessary. Maybe the problem can't be solved without a computer.

4. Design instructions to solve the problem.

5. Translate the instructions into a computer language so the computer will know how to solve the problem.

6. Let the computer have a go at it. If it doesn't work, go back to step 1 (or wherever else the programmer made a mistake) and repeat until it does work.

I/O: input/output. These are the various ways by which a computer communicates with its environment.

Keyboard: a device similar to a typewriter's keys on which you can type commands and data for the computer. Unfortunately, every computer comes with its own special keyboard, and no two manufacturers can agree on the same way to lay out the keys. Some small computers have a keyboard built into them, like the Apple. Others have detachable keyboards. Still others have no keyboard at all, and require a terminal for communication.

Terminal: a typewriter-like device on which the user types his input. A terminal has a display screen, or a printer, or both, which the computer uses to show its output.

Printer: used for hardcopy (paper) output.

CRT: cathode ray tube. A television-like terminal on which the computer can show information to the user. Most CRTs are black-and-white only and do not have the ability to do graphics. Most CRTs also have a built-in keyboard. Some small computers have a CRT built right into them.

Video monitor: another television-like display device. Monitors come in both black-and-white and color versions. Some small computers have a monitor built right into them.

TV: an actual television set which the computer can use to display information.

PART I: BASIC COMPUTER TERMS

RF modulator: a device that converts the video output signal from a computer to the antenna level input of a home television set. RF modulators are not required if the computer is attached directly to a video monitor, but necessary if a home TV is being used.

Telephone Network: common carrier communications systems accessible by telephone. With special hardware costing from $150 to $400 and special software, small computers can communicate with other computers anywhere the phone system extends.

Voice: synthesized human voice output and human voice input. Good quality, but not perfect, voice output is now affordable ($200 - 500) on home and office microcomputers. Voice input, however, is still in the development stages. Many problems still remain to be overcome in the areas of vocabulary capability and wide spectrum voice recognition before voice input will be cost-effective.

DATABASE: a comprehensive collection of data about some field of interest (for example, books in a library), organized in such a way as to make intelligent retrieval of the information easy. Computer databases are usually very large files stored on disks.

GRAPHICS: the ability of a computer to divide the display screen of a monitor or CRT or TV into a matrix of dots. The computer can turn each of these dots on or off individually, often in several colors besides black and white. This allows the computer to draw pictures and graphs on the screen. Most small computers can show dots in from 4 to 16 colors, and in several different intensities.

RESOLUTION: the number of dots into which the computer can divide the screen. The higher the number of dots, the finer the pictures the computer can draw. Most small computers range from a resolution of about 40 horizontal by 40 vertical to about 600 horizontal by 300 vertical.

ROBOT: a programmable, multifunctional manipulator designed to move materials, parts, tools, and/or specialized devices through variable motions for the performance of a variety of tasks.

PICK-AND-PLACE ROBOT: a simple robot with limited ranges of motion and control, usually capable of point-to-point moves.

INTELLIGENT ROBOT: a servo-controlled robot which is capable of making sophisticated decisions and choices through its sensing (voice, light, touch) and control systems.

All contemporary robots are controlled by computers and/or have small computers built right into them. Heathkit now sells a robot kit for $1500 that has a built in computer, voice output, a gripping arm, and sensors for light, sound, and touch.

ARTIFICIAL INTELLIGENCE (AI): a field which blends computer science,

engineering, psychology, mathematics, and philosophy. In general, it
has two aspects:

> 1. Making computers more useful by giving them the ability to do
> jobs which we've always considered to require human intelligence
> (whatever that is).

> 2 Using the computer as a research model to discover more about
> human.intelligence, learning, and the nature of knowledge.

> AI researchers have had a strong working interest in computers
> and robotics since AI got started.

PART 2: OPERATING THE APPLE]C

I.   Handling Diskettes

The computer records data magnetically on the surface of the
diskette. While diskettes are reliable and durable in normal
usage, the data on them can be destroyed easily by various forms
of abuse. So, here are a few rules:

1.   Don't fold or bend a diskette.

2.   Don't write on a diskette label with ball point pen or
pencil. Instead, use a felt tip pen and press lightly.

3.   Don't place or store diskettes near any source of radio
frequency radiation (radio, television set, tape recorder,
speaker).

4.   Don't force a diskette into or out of the disk drive.

5.   Don't touch the shiny exposed surface of the diskette.

6.   Keep diskettes in their envelopes when not in use.

II. Putting Diskettes into the Disk Drives.

1.   There is a small red light on the front of each disk drive.
When this light is ON, the drive is either reading from or
writing to the diskette.

Never open or close the disk drive door, or insert or remove
diskettes, when the red light is ON !

2.   Always insert diskettes with the labeled side UP, and the
oval cutout pointing INTO the drive.

III. Starting Up the Apple.

1.   Make sure the Apple and the video monitor are plugged in.

2.   Find the diskette labeled "DOS 3.3 SYSTEM MASTER". Insert
this diskette into the drive labeled "1". Be sure the disk drive
door is closed.

3.   Turn on the video monitor. It has a small red light which
indicates it is turned on.

4.   Turn on the Apple with the switch on the fan box.

5.   The Apple should "beep" and display "APPLE]C" at the top of
the video monitor screen.

6.   Firmware in the Apple's ROM will load more software into its
RAM. These are the programs which actually control the computer.

7. After the control programs (known as the Disk Operating System [DOS] and the APPLESOFT Basic Interpreter) have been loaded from the diskette into RAM, you will be given the choice of using the Step-by-Step instruction programs, or running other programs. Just follow the instructions displayed on the video monitor.

IV. Running Programs.

1. Files.

The computer stores data on diskettes in files, which are simply collections of related data. Some files contain programs; others contain data used by the programs, such as the text of a letter or some business accounting records.

Each file on a diskette has a unique name. In order to run a program, you must know its name.

2. To find out what programs are on a diskette, type:

CATALOG

The computer will list the names of the files on the diskette. If the screen fills up, it will wait until you press some key on the keyboard before continuing.

3. To use the other disk drive, insert a diskette and type:

CATALOG D2

You will get a listing of the contents of the diskette in drive 2. All commands will now use drive 2. To return to drive 1, type:

CATALOG D1

The computer will always use the drive which was last specified. You can flip back and forth all you want.

4. To run a Basic program (Basic programs have an A or an I in front of their names when you do a CATALOG), type:

RUN XXXXXXX

where XXXXXXX is the name of a program. If the program has a B in front of its name, type:

BRUN XXXXXXX

If a name in the catalog has a T in front of it, it is a data file and not a program; you can't run it.

5. To run programs on the other disk drive, just type:

RUN XXXXXXX.D1 or RUN XXXXXXX.D2

The same holds for BRUNning programs.

V. How to Tell What in H***'s Going On.

1. The Prompt Character.

When the computer is waiting for you to input something, it will display the prompt character. For Integer Basic, this is >. For Applesoft Basic, it's].

Note: Different programs will use different prompt keys, such as :, ?, or !. The instructions for the program should explain this.

2. The Cursor.

The cursor is the blinking white box which originally follows the prompt character. When you press a key on the keyboard, the computer will display it on the screen where the cursor is, and move the cursor to the right, or to the next line.

3. Integer Basic vs. Applesoft Basic.

The APPLE][comes with two flavors of the Basic language. Integer Basic is the simpler of the two, and only allows integer numbers (no fractions or decimals). Applesoft is much more powerful, and allows fractional and decimal numbers. You can tell which one is currently in control by the cursor, as described just above.

4. The RETURN key.

As you type a command on the keyboard, the computer will display it on the screen, but will do nothing with it. In order to tell the computer to actually process your command, you must press the RETURN key. The RETURN key is a way of telling the computer that you are done typing.

5. The RESET key.

The RESET key is like an electric cattle prod, and you should use it only when the computer is behaving very badly. If you use it carelessly, you might lose the work you were doing, or damage a diskette file.

PART 3: COMPUTERS AND EDUCATION

In this part we'll explore some of the ways computers can be used in education at all levels. There will be several programs for demonstration and hands-on practice.

In this part we'll also get started with the Step-by-Step computer aided instruction course in the BASIC programming language.

PART 4: GETTING THE COMPUTER TO DO SOMETHING USEFUL

This is an exerise in which we'll use the computer as an "electronic filing cabinet". In fact, we'll use a program called FILE CABINET. This program was written in the BASIC language by computer hobbyists (not professionals !). We'll see how easy it is to use the Apple][to store and manipulate information.

Here's our project:

> We've decided to set up a little dog breeding business on the side. We want to keep track of the following information about each of our dogs:
>
>> It's name;
>>
>> Its breed;
>>
>> How many ounces of dog cereal it needs each day.
>
> We want to get an alphabetical (by name) listing of our dogs which shows the total amount of dog food they need daily.

This project will illustrate how to describe information to the computer, how computer data entry works, and how to get a computer report.

PART 5: COMPUTER GRAPHICS

In this part we'll explain computer graphics and some if its uses in engineering, manufacturing, business, games, and music.

INTRODUCTION TO COMPUTERS

PART 6: DATA COMMUNICATIONS

I. Terms

MODEM: a modem is a device which converts the digital signals from a computer or terminal into analog signals which can be moved through the telephone network, and from analog back to digital. A modem allows a terminal or computer to hook into the telephone networks.

NETWORK: an organization of computers, terminals, and other data processing devices (called NODES) which are connected by communication links. Intelligent nodes, usually computers or computer-based terminals, have knowledge of the network structure and can participate in controlling the network.

BPS (Bits Per Second): the rate of speed at which data can be sent over a communications link. The usual speed for home computers is 300 bps, which is the same as 30 characters per second. Other common rates are 1200, 2400, 9600, and 19200 bps. (BPS is sometimes incorrectly referred to as the BAUD rate.)

HALF DUPLEX: data can flow in only one direction at a time.

FULL DUPLEX: data can flow in both directions at a time.

II. Uses of Data Communications

A. Online applications for government, business, industry, and education.

        Examples: Banking and Airline Reservations

B. Conferencing Systems and Electronic Mail.

        Examples: ARPAnet

C. Databases, commercial and educational.

        Examples: Legal, Agricultural (Agristar), Medical, Business (Dow Jones)

D. Home Banking.

E. Computerized Bulletin Board Systems (BBS).

        - General Purpose

        - Special Purpose

                Computer Languages

                Particular brands of computers

                Computer Music

Space Travel

Sex

Amateur Radio

Games

- Community or social orientation

Peace-net

CommuniTree

- Program exchanges

PART 7: WORD PROCESSING

Development of word processing:

    1.   Text Editors

    2.   Text Formatters

    3.   Word Processing Programs

        - combine functions of editors and formatters.

    4.   Office Automation

        - combine word processing, electronic mail, conferencing, calender management, other typical office functions.

    5.   Hands-on demonstration of word processing

General Information on Word Processing

The purpose of a word processor is to eliminate retyping of
cuments, letters, proposals, or any other printed material from
office or an individual. Even when typing your own letters
u may find a need to change a few words, clean up a sentence,
delete something you decided not to say. This is where a word
ocessor comes in handy. In addition to making changes, a word
ocessor is good for getting work done faster because editting
e work is easier than before. Copying paragraphs from one page
another, deleting sentences from the middle of a page,
tomatic centering of text and other features can all be done
th a few simple keystrokes.

You personally could use a word processor for job resumes,
nding a letter or many to a company you are unhappy with, send
tchen recipes to friends and a copy for yourself, or just
mple reminders to yourself to get those household chores done.

For students, word processing can be used for term papers,
ference notes, and book reports. You can put your thoughts
to a rough draft and then come back and finish it up without
ving to retype the entire report. Using a hunt and peck system
typing or just two fingers would be still faster than writing
t the entire report and rewriting it by hand. Teachers say
ey prefer typed reports versus handwritten reports and a word
ocessor can help.

There will be a difference in computers and the way they
erate, but knowing the basic features of one computer will give
u a head start on using other equipment. The main purpose of
ving you training on the Apple is to get you acquainted with
at you can do with a word processor. It is necessary that you
arn some of the terms used when talking about word processing
that you understand the instructions from your boss or the
lesman trying to sell you a word processor. Each different
rd processor uses some basic features, what you will have to
arn are the keys that operate the machine. When you learn to
e a different machine, all you will have to learn will be the
w keys to do the job, you will already know how to do word
ocessing. You can then ask intelligent questions on how to use
e machine once you have learned some terms and had some
perience with the word processing program.

No matter what system you operate there is no program that
ll correct bad grammar or make sense out of an incomplete
ought. You must already know the basic language skills to
sely use a word processor. Any employer will expect the
perator" to point out any sentences that don't make sense and
rrect bad grammar. Until you have learned the basic language
ills of grammar, spelling, and punctuation, getting a job as a
rd processor operator will very hard to do.

One other important idea when using a word processor is to
ep a good dictionary handy! If you are beginning a new job
ere will be many terms that will be unfamiliar to you. If you
e typing a job resume, make sure all the spelling is correct.
resume with obvious spelling mistakes will lessen your chances
 getting the job.

Having a resume ready when you go for a job will eliminate a
t of writing and guesswork when you are asked to fill out an
plication. Many employers will now attach your resume to the
ck of the application. On your resume you can be sure to have
y information ready ahead of time. This will save time at the
terview and show the employer you are prepared. A word
ocessor can produce a neat and effective resume for your job
terview.

Main Features of Word Processing

:leting Text - removing a word, sentence, or paragraph from the
ixt.

ive/Copy Text - taking words from one place and moving or
ipying it to another place in the document.

earch/Replace Text - exchanging one word for another
itomatically.

oportional Spacing - making the right side and the left side of
e letter look even when printed out.

tomatic Centering - type in a title or heading and have it
ntered on the page with one keystroke.

rm Letters - using a document with blank spaces in it to be
lled in later. May be sent to many people by filling in the
ank spaces with names, addresses, or other information.

sert Text - adding new words or sentences to a document that
s already been typed.

Common Word Processing Terms

ckup Copy – second copy of a document in case the original
cument is lost.

ffer – space used to hold words or lines that you wish to move
 copy to another place in the document.

TRL' key – stands for 'control' key. Used with other keys to
rform special functions.

rsor – mark to show where you are in the text.

skette – magnetic record used to store letters and reports.

cument – a form of work on the word processor.

it – making changes to a document because of spelling mistakes,
ugh drafts, or other corrections.

ase File – Wipe out stored text to start over, or delete a
tter from the diskette.

SC' key – 'escape' key. Used for special functions, such as
king the place of a shift key.

rmat – the settings of the margins, the number of lines on the
ge, the width of the lines, etc.

dex (catalog) – listing of the stored documents on the
skette.

formation lines – lines on the screen, usually at the bottom,
at show the number of lines typed, space remaining, or general
formation.

stification – to have the text line up with the left or right
de of the page.

ystroke – one keystroke would be to hit one letter on the
yboard.

rge text – to combine two lines, paragraphs, or letters into
e.

de – another word for the function or operation you are doing,
ch as the editing mode, insert mode, etc.

tion – special feature you can use.

ge break – the end of text on a page even though it is not the
ysical end of the page.

gged edge – to have the right side of the page look uneven

:cause you did not use proportional spacing.

placement string - words to replace other selected words, such
; correcting a name that you have typed in various places.

ETURN' key - the key most often used to enter your text into
e machine.

rolling - moving the cursor around the document.

urce text - original document or letter.

bbing - to skip left and right on the line.

rget string - the words you wish to replace or change with
her words.

xt - words, lines, paragraphs, or letters that you type into
e machine.

breakable space - used when you do not wish two or more words
 separated on different lines when printed, such as
. Lincoln'. Names are never typed on two different lines.

rd wrap - moving a word to the next line when there is not
ough room to type it on the first line.

These are the BASIC topics we should be familiar with after
completing STEP BY STEP #1:

PRINT
PRINT with commas and semicolons
Order of arithmetic
NEW
RUN
LIST
DEL
END
STOP
Variables: Real, Integer (X%), String (X$)
LET (assignment)
INPUT
GOTO
IF...THEN
REM
Functions: INT(X), ABS(X), RND(X), SQR(X)
HOME
TAB(X)
VTAB n
HTAB n
READ...DATA
RESTORE
FOR...NEXT and STEP
Nested loops
Arrays
DIM

Cover any questions or misunderstandings about these topics.

SESSION 1, PART 2: COMPUTERS AND NUMBERS

I.   Integers

      - Integers are whole numbers from -32767 to +32767.

      - In Applesoft, a variable is specified to be an integer
        by ending its name with a per cent sign.
        Examples: A%, I%, COUNT%

      - In Applesoft, integer arithmetic uses up less memory
        than real arithmetic. So, use integer variables
        whenever its appropriate, especially when you use
        large arrays of numbers.

II.   Real Numbers

      A.   Scientific Notation

      B.   Precision: the number of decimal places you want.

            - Applesoft's precision is 38

      C.   Accuracy: the number of significant digits you want.

            - Applesoft's accuracy is 9

      D.   Problems with real arithmetic

            1.   When is zero zero ?

                  Moral: when checking real numbers for zero, check
                  that the numbers are within a range which is too
                  small to be useful. For example:

                  Instead of   IF A = 0 THEN ...
                  do this   IF (A < .0001) AND (A > -.0001) THEN ...

            2.   Accumulated rounding errors

                  Moral: postpone rounding until all calculations have
                  been completed; then round the final result.

      E.   Solution: use true binary coded decimal arithmetic

            - A hardware feature on some computers;
              a software feature on others.

            - Not provided with Applesoft

            - A feature of most "business" BASICs

2

SESSION 1, PART 3: INTRODUCTION TO PROGRAMMING

I.   Software Engineering

   A.   Computer programs should be built in the same way that
        machines and buildings are built.

   B.   Programs should be designed before they are built.

   C.   You should be confident that a program will work
        properly before you start coding it.

   D.   Complex programs should be designed in small units,
        called modules.

        - Each module should do only one thing, or at most a
        sequence of very closely related things.

        - Each module should know only as much about the whole
        program as it absolutely needs to do its job. Ideally,
        a module knows nothing about the whole program.

        - When modules communicate with each other, they
        should exchange as little information as absolutely
        necessary to get their jobs done.

        - If a module seems too complex, difficult to
        understand, or error-prone, then break it down into
        simpler modules.

   E.   Don't re-invent the wheel!

        - If there is a program or module that already does
        something that you can use, use that code; don't write
        new code.

        - Build a "software toolkit" that you and other people
        can use to build programs.

   F.   Design a program or module to work correctly. Code it
        and get it to work first. Then, and only then, worry
        about efficiency. A well-written program can always
        be made more efficient. A poorly written one, no
        matter how efficient, may never work properly.

   G.   Don't try to write the whole program at once, and then
        try testing it all at once. Write as much as you need
        to get one useful unit of work done. Test out that
        much until it works. Then write the next unit of work
        and test that out. And so on, until the whole program
        is done.

II. BASIC

    A.   Computer programming is not merely knowing how to "speak" a particular computer language.

    B.   Computer programming is:

        1.   Understanding a problem that needs to be solved.

        2.   Understanding how to solve the problem, whether by computer or some other means.

        3.   Figuring out how to solve the problem with a computer.

        4.   Designing a "machine" or "structure" or "system" to solve the problem.

        5.   Implementing the solution to the problem in an appropriate computer language.

        6.   Verifying that the solution works properly and consistently.

    C.   Very important: Don't think in computer language in steps 1 thru 4. Think in simple, straightforward English. Use computer language only in step 5.

    D.   BASIC is only one of many computer languages. Once you learn BASIC, it will become easier to learn a second one. After that, it will be easier to learn even more.

    E.   Learning how to understand, analyze, and solve a problem is far more difficult than learning a computer language. It is also more important!

4

```
EM   DEMONSTRATE ROUNDING
EM   USING HALF ADJUSTMENT
REM   ** MAIN PROGRAM **
GOSUB 1000
GOSUB 2000
IF QT = 1 THEN  GOTO 5000
GOSUB 3000
GOSUB 4000
GOTO 300
REM   ** INITIALIZATION **
HOME
QT = 0: REM  TIME-TO-QUIT FLAG
RETURN
REM   ** GET A NUMBER FROM THE USER **
PRINT "ENTER ANY NUMBER,"
INPUT "  OR JUST ZERO TO QUIT:";N
IF N = 0 THEN QT = 1
RETURN
REM   ** ROUND N TO 2 DECIMAL PLACES **
R =  ABS (N) * 100
R = R + .5
R =  INT (R)
R = (R / 100) *  SGN (N)
RETURN
REM   ** PRINT OUT THE ROUNDED NUMBER **
PRINT "NUMBER TO 2 PLACES IS ";R
PRINT
RETURN
REM   ** END THE PROGRAM **
PRINT "** THAT'S ALL **"
END
```

```
 ANY NUMBER,
JUST ZERO TO QUIT:503.70809
R TO 2 PLACES IS 503.71

 ANY NUMBER,
JUST ZERO TO QUIT:-55.0735
R TO 2 PLACES IS -55.07

 ANY NUMBER,
JUST ZERO TO QUIT:-55.0753
R TO 2 PLACES IS -55.08

 ANY NUMBER,
JUST ZERO TO QUIT:.804082
R TO 2 PLACES IS .8

 ANY NUMBER,
JUST ZERO TO QUIT:4032.66666
R TO 2 PLACES IS 4032.67

 ANY NUMBER,
```

5

ANY NUMBER,
JUST ZERO TO QUIT:.12345678
R TO 2 PLACES IS .12

ANY NUMBER,
JUST ZERO TO QUIT:.87654321
R TO 2 PLACES IS .88

ANY NUMBER,
JUST ZERO TO QUIT:0
AT'S ALL **

T "SCIENTIFIC NOTATION, PRECISION, AND ACCURACY"
TIFIC NOTATION, PRECISION, AND ACCURACY

T 391448676
8676

T 3914486760
48676E+09

T .000123456789
56789E-04

T .00011123456789
34568E-04

T 2/3
66667

T .123456789
56789

T 9.123456789
45679

T 1.405 - 1.0

T 10.405 - 1.0

T 100.405 -- 100.0
05

T 100.405 - 100.0
00001

T 100.405 - 100.0 - .405
15322E-09

```
ude "stdio.h"

()    /* Demonstrate rounding using half adjustment */

JITTIME = 0;
e N;
BUFFER[80];
n double atof();

  (QUITTIME == 0) {
intf("Enter any number,\n");
intf("  or just return to quit:");
ets(BUFFER, sizeof BUFFER, stdin);
  (BUFFER[0] == '\n') break;
= atof(BUFFER);
intf("Number to 2 places is ");
rintf(stdout, "%.2f%\n\n", N);

F("** That\'s All **\n");
```

```
 any number,
just return to quit:503.70809
- to 2 places is 503.71

 any number,
just return to quit:-55.0735
- to 2 places is -55.07

 any number,
just return to quit:-55.0753
- to 2 places is -55.08

 any number,
just return to quit:4032.66666
- to 2 places is 4032.67

 any number,
just return to quit:-385.5555555
- to 2 places is -385.56

 any number,
just return to quit:.87654321
- to 2 places is 0.88

 any number,
just return to quit:
at's All **
```

SESSION 2, PART 1: SUBROUTINES (GOTO, GOSUB, RETURN, POP).

A subroutine is an independent part of a program which performs one simple unit of work. It corresponds to the idea of program module which we talked about under software engineering.

Subroutines may be entered with a GOTO statement, but this does not work out well if the subroutine is used from many places in a program.

Subroutines should be entered with a GOSUB statement.

    * BASIC remembers where a GOSUB statement was used in a return stack.

    * The RETURN statement goes back to the statement after the last GOSUB that was used.

    * The POP statement removes a return pointer from the return stack, but does not cause BASIC to transfer control.

Errors with GOSUB:

    * More RETURNs than GOSUBs

    * More POPs than GOSUBs

    * More GOSUBs than Applesoft can handle (25)

    * GOSUB (or GOTO) to a non-existing line number.

Example: the rounding program from session 1.

    The main routine of this program is lines 200 - 700.

    This program has five subroutines:

    1. Initialization
    2. Getting a number from the user
    3. Rounding the number
    4. Printing out the number
    5. Ending the program

GOTO and GOSUB are transfer of control statements.

SESSION 2, PART 2: FLOWCHARTING

A flowchart is a sort of blueprint for a module, a program,
or a system of programs.

A flowchart is also a model of a program. It can be used to
find out if the design of a program is correct. By playing
computer and following through the flowchart, we can validate
the design.

It is much easier to correct a design by changing a flowchart,
then to correct a design by changing a real program.

Flowcharts are also an aid in understanding a program long after
it was written. Flowcharts are a form of documentation.

Flowcharts can be very simple or very fancy, as appropriate.

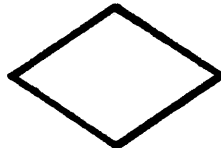Flowchart Symbols:

    Entry and Exit:

    General Processing:

    Test or Decision:

    Subroutine:
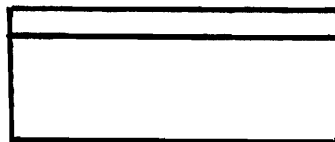
    Input/Output:
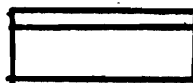
    On-page Connection:

    Off-page Connection:

MAIN PROGRAM

Subroutine:

Get a Number

```
        ┌──────────┐
        │  ENTRY   │        Line 2000
        └────┬─────┘
             │
     ┌───────┴───────┐
     │ PRINT PROMPT  │
     └───────┬───────┘
             │
     ┌───────┴───────┐
     │   INPUT N     │
     └───────┬───────┘
             │
           ◇ N=0 ◇           Yes
             ?
             │
             No

                            ┌──────────────┐  Time to
                            │     QT=1      │  Quit
                            └──────────────┘

        ┌──────────┐
        │  RETURN  │
        └──────────┘
```
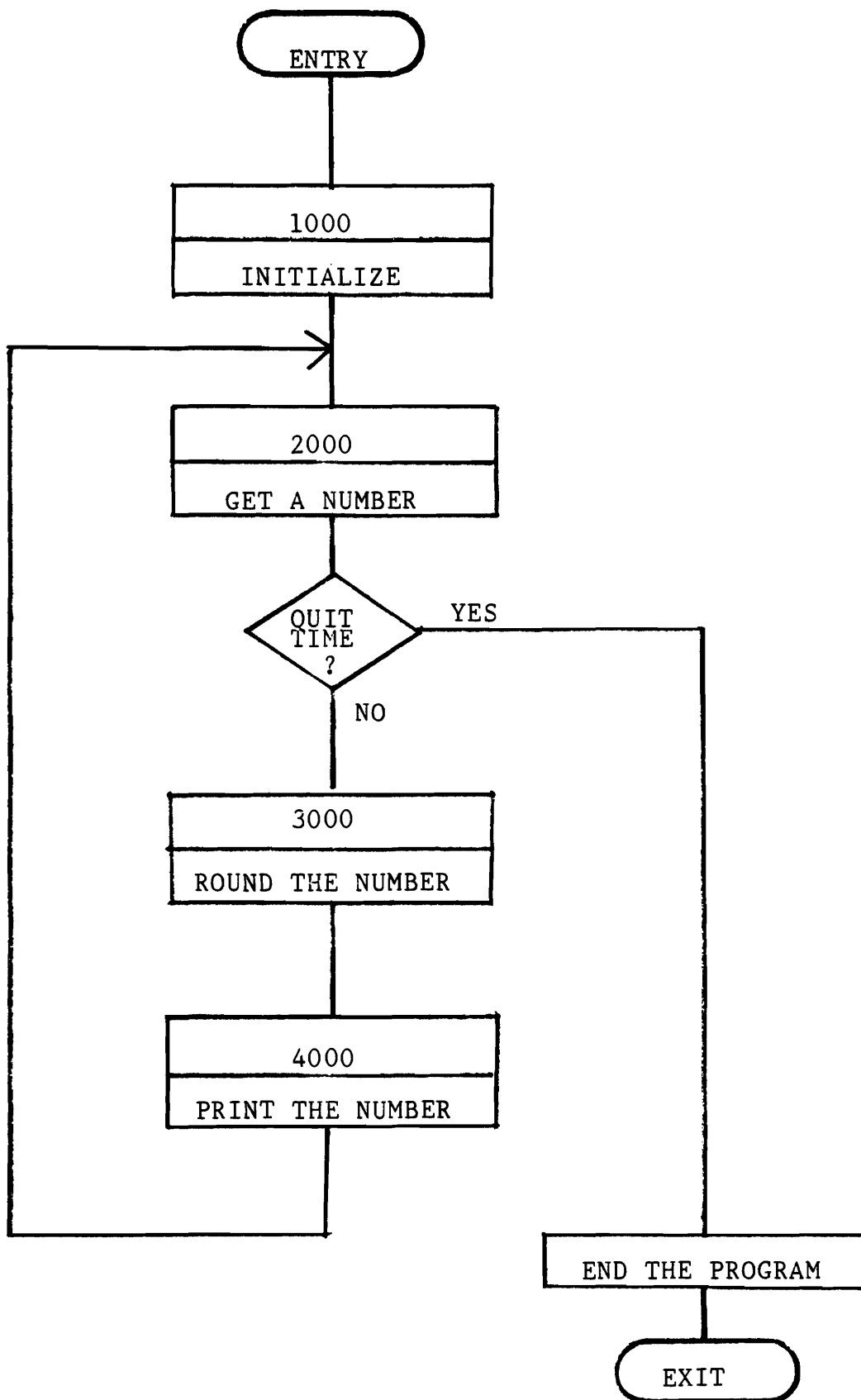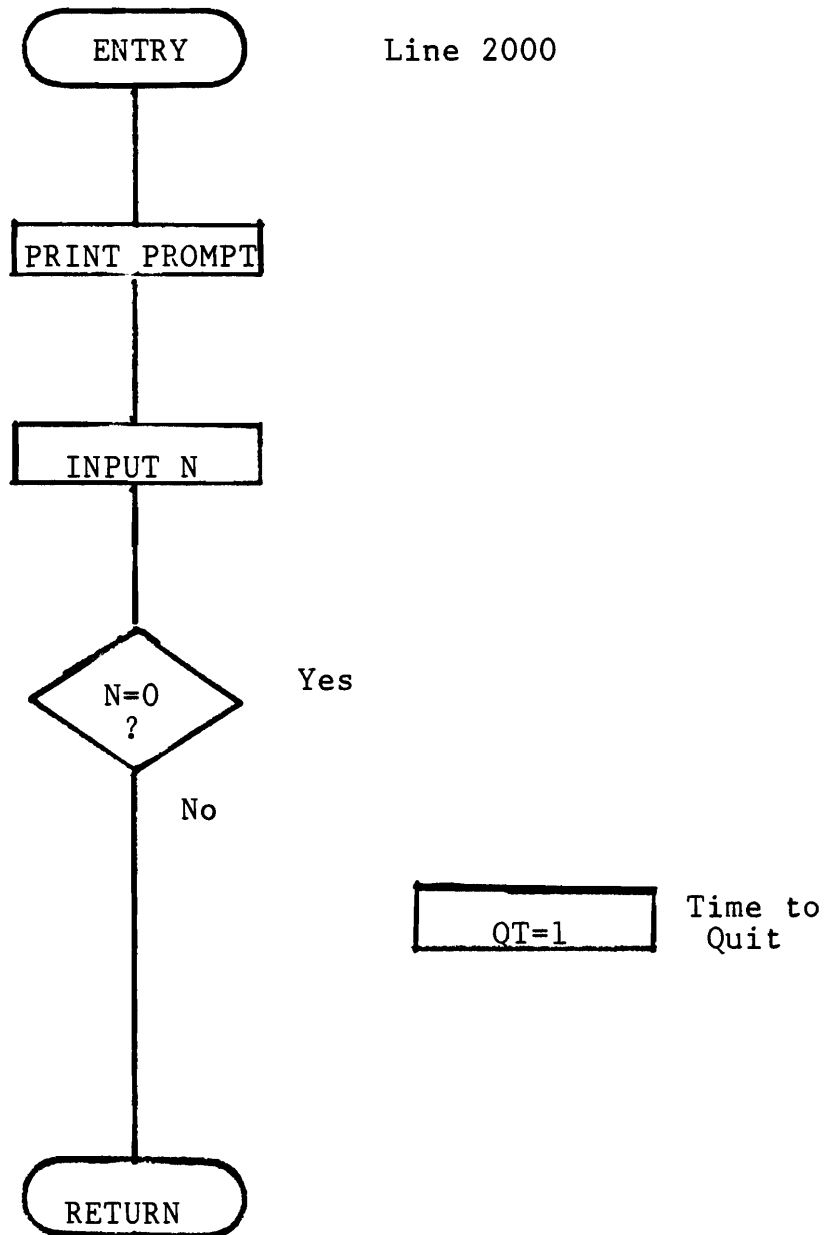
SESSION 3, PART 1: OPERATING SYSTEMS

An operating system is a program (or set of programs) which
stands between the user of a computer system and the
nitty-gritty details of the computer system.

Functions of an operating system:

    1.   Manages the hardware at the lowest levels of detail.

    2.   Manages system resources (memory and I/O devices).

    3.   Presents a "user-friendly" interface to the user.

Historical notes:

The first computer operating systems were designed to support
punched card, paper tape, and teletypewriter devices for user
I/O, rather than the video display devices which are now
standard.   This accounts for the predominance of 80-column video
terminals.   It also accounts for the use even today of certain
special keyboard characters:

    Carriage return (CR)
    Line feed (LF)
    Combined carriage return and line feed (CR/LF)

The Apple II Operating System:

    1.   The monitor program resident in ROM - contains programs
    to control graphics generation, text screen, keyboard,
    speaker, and cassette.

    2.   DOS (Disk Operating System) - consists of programs to
    control the disk drives and manage the storage of data on
    diskettes.

    3.   BASIC - allows the programmer access to the monitor and
    DOS through BASIC language commands.   .

SESSION 3, PART 2: FILES

A FILE is an organized collection of data, usually related to a
single application. Examples: a file of inventory data; a file
of student test scores.

A RECORD is a set of data items related to a single entity.
Examples: a bank account record; an employee record.

A FIELD is a single data item. For example, an employee record
might have these fields:

    1. name
    2. address
    3. social security number
    4. monthly salary or hourly wage
    5. birth date
    6. marital status
    7. department

Records in a file usually contain one or more fields called KEY
fields, which uniquely identify each record in the file. For
example, in an employee file, the employee's name or social
security number might be key fields.

Key fields are also used for sorting the records in a file in
some particular order. For example, the records in an employee
file might be sorted in ascending order by social security
number. Such fields are called SORT KEYs.

Files have traditionally been stored on magnetic tapes, disks,
and punched cards.

Some operating systems view all system resources as files,
including:

    printers
    terminals
    communications lines
    memory
    programs

SESSION 3. PART 3: DISK FILES ON THE APPLE II

A DISKETTE is a plastic disk covered with a layer of magnetic
material on which data may be recorded, in much the same manner
as sound is recorded on audio cassette tapes.

A diskette is divided into a number of concentric rings in which
the disk drive's read/write heads record data. Each ring is
called a TRACK.

Each track is divided into a number of SECTORs. A sector is the
amount of data which is read or written at one time by the disk
drive.

The Apple II divides a diskette into 35 tracks, each having 16
sectors of 256 bytes of data. This permits 143k bytes of data
to be stored on one diskette. However, since Apple's DOS uses
1 sector for a catalog and 3 sectors to store the DOS program
itself, only about 123k bytes are actually available.

Each diskette contains a CATALOG. This is simply a directory of
the files contained on the diskette. Each file on a diskette
has a unique name by which it is known in the catalog. An entry
in the catalog tells DOS what kind of file the name refers to,
where on the diskette the file is stored, and some facts about
the file. A catalog is very much like the card catalog in a
library.

A catalog has space enough to keep track of 105 files.

The DOS takes care of all the bookkeeping involved in storing
files on diskettes. A programmer doesn't need to worry about
any of these details.

Types of disk files:

        SEQUENTIAL: this type of file consists of fields of text
        characters. Each field is ended by a CR character to
        separate it from the following field.

        Sequential files can be processed only in sequence
        from start to end.

        Note: in some operating systems a group of text items
        terminated by a CR or LF or CR/LF is known as a LINE.
        This is a carryover from when lines of data were typed
        on a teletypewriter. The text items within a line are
        usually separated by spaces or commas.

RANDOM: this type of file consists of fixed-length records.
Each record consists of fields of text characters, each
field ending in a CR.

The records in a random file can be processed without
respect to order. Each record is identified simply by
its record number in the file, starting with zero.

KEYED: this type of file consists of records which can be
located by a KEY field. The contents of the key field are
used to look up an entry in an index. The index entry
points to the actual data record.

A telephone book is similar to a keyed file, since all
you need to find a person's phone number and address
is the person's name, which serves as a key.

For example, in an employee file, a person's social
security number could serve as a key.

Although Apple's DOS does not support keyed files,
several programs to do so are available from software
vendors.

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SESSION 4, PART 1: MISCELLANEOUS

Refer to the household INVENTORY demonstration program for examples.

1.   Accessing machine addresses from a BASIC program

      a.   PEEK(x)

      b.   POKE x,y

      c.   CALL x

2.   Error trapping

      a.   ONERR GOTO linenumber   (line 30 in demo)

      b.   Error trap subroutine   (lines 32200-32360 in demo)

      Note: if you want to trap any kind of error, you must trap
      all kinds of errors!

3.   Branching by variable

      a.   ON x GOTO   (line 5200 in demo)

      b.   ON x GOSUB

4.   Records in BASIC

      In some computer languages, the programmer can define
      records explicitly, for example:

```
Type INVENTORY_RECORD is record
   OWNER_ID        : integer;     \
   DATE_PURCHASED  : integer;      \
   PURCHASE_PRICE  : integer;       \   record's
   REPLACE_COST    : integer;       /   fields
   CATEGORY        : integer;      /
   DESCRIPTION     : string;      /
End record;
```

      In almost all versions of BASIC, this is not possible.
      Rather, the programmer must keep track of each field of a
      record in a separate variable.

      Refer to lines 1000-1280 in the demo program.

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Notes on the household INVENTORY demonstration program.

1.   This program uses random disk files. Each inventory item is
identified by its record number (from 1 to the size of the file).

Each record has 6 fields:

        Owner's id
        Date purchased (month and year combined in one integer)
        Purchase price (in whole dollars)
        Replacement cost (in whole dollars)
        Category of item
        Description

Record 0 is reserved to contain only the size of the file.

2.   The main part of the program is lines 5000-5300. All the
rest of the program is subroutines.

3.   This program communicates with the user through menus and
prompts.   The user doesn't need to remember any commands or
codes.

4.   Disk I/O subroutines are:

        Open disk file: lines 31400-31480

        Read disk record: lines 1000-1080

        Write disk record: lines 1200-1280

5.   Various constant information is set up in the initialization
routine (lines 31000-31300).

INTERPRETERS

Interpreters are programs which are able to follow instructions
written in some computer language, such as BASIC. An interpreter
works like this:

1. The programmer types his program from the keyboard.

2. As each line is typed in, the interpreter stores it in order
   of ascending line numbers, and translates reserved words
   into 1-byte tokens which can be recognized quickly when
   the program is later run.

3. When you type RUN, the interpreter looks at each line of
   the program in line number order. It examines each token
   and each other string of characters, and figures out what
   it is supposed to do with them. Then it carries out the
   instruction.

4. No matter how often a line may be executed, each time the
   interpreter examines that line it must go through the whole
   process of figuring out what it is supposed to do.

Interpreters are easy to use because errors can be corrected
quickly, simply by typing in a new program line. However,
the process of interpreting each line over and over takes a
lot of time, so that interpreted languages are rather slow.

COMPILERS

A compiler is a program which translates a file containing statements
in some computer language, such as BASIC, into a machine language file
which can then be executed directly by the computer. The compilation
process works like this:

1. The programmer types his program from the keyboard into
   another program called a text editor. The text editor
   saves this program into a disk file, known as the
   source program.

2. The programmer runs the compiler, which reads in the source
   program, examines the statements, and translates them into
   machine code. The compiler outputs a new file containing the
   machine code, which is known as the object file.

3. The programmer runs the linker, a program which reads in the
   object file, combines it with other object files which have
   been compiled separately, and outputs a new file containing
   the machine language program, which is known as an executable
   file.

4. You can now run the executable file.

Compiled programs run much faster (10 - 100 times) than interpreted
programs. However, it is more difficult to make corrections, since
the programmer must change the source program and repeat the compiler
and linker steps.

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```
EM    ***********************
EM    * HOUSEHOLD INVENTORY *
EM    *    DEMO FROGRAM      *
EM    ***********************
NERR   GOTO 32200
IOME
OSUB 31000: REM   INITIALIZE
OTO 5000
 REM   READ DATA RECORD
 PRINT D$;"READ ";FI$;",R";K%
 INFUT ID%,DF%,FF%,RC%,CG%,DD$
 PRINT D$
 RETURN
 REM   WRITE DATA RECORD
 PRINT D$;"WRITE ";FI$;",R";K%
 PRINT ID%
 PRINT DF%
 PRINT FF%
 PRINT RC%
 PRINT CG%
 PRINT DD$
 PRINT D$
 RETURN
 REM   SCREEN LIST ROUTINE
 VTAB 2: CALL  - 958
LC = 0
 IF LC = 7 THEN  RETURN
 GOSUB 1000
 IF ID% <  > 0 THEN  GOTO 1680
K% = K% + 1
 IF K% > FS% OR K% > ER% THEN  RETURN
 GOTO 1560
 GOSUB 4000
 PRINT : FRINT L1$: PRINT L2$
LC = LC + 1
K% = K% + 1
 IF K% > FS% OR K% > ER% THEN  RETURN
 GOTO 1560
 REM   FORMAT PRINT LINES
LA$ = "R#" +  STR$ (K%)
LB$ = " O=" +  STR$ (ID%)
W1% =  INT (DP% / 100)
W2% = DF% - (W1% * 100)
LC$ = " " +  STR$ (W1%) + "/" +  STR$ (W2%)
LD$ = " $" +  STR$ (FF%) + " $" +  STR$ (RC%)
LE$ = " C=" +  STR$ (CG%)
L1$ = LA$ + LB$ + LC$ + LD$ + LE$
L2$ = DD$
 RETURN
 REM   *****************
 REM   ** MAIN ROUTINE **
 HOME
Z% = 0
 PRINT EM$:EM$ = ""
 PRINT "AVAILABLE FUNCTIONS ARE"
 FOR I = 1 TO 9
 PRINT I; SFC( 2);FF$(I)
 NEXT I
 PRINT "WHAT FUNCTION ?"
 INFUT Z%
 ON Z% GOTO 11000,12000,13000,14000,15000,16000,17000,18000,6000
```

```
 REM  ** END MAIN ROUTINE **
 REM  **********************
 REM  ** TERMINATION **
 IF FO% <  > 1 THEN  GOTO 6100
 PRINT D$;"CLOSE ";FI$
 HOME
 END
 REM  FORMAT NEW FILE
 HOME : PRINT EM$:EM$ = ""
 PRINT "HOW MANY RECORDS DO YOU WANT ?"
 INPUT FS%
 IF (FS% > 0) AND (FS% < 1000) THEN  GOTO 11200
EM$ = "FILE SIZE INVALID"
 GOTO 11000
 GOSUB 31400: REM  OPEN FILE
 GOSUB 31800
ID% = 0:DF% = 0:FP% = 0:RC% = 0:CG% = 0:DD$ = "X"
 FOR K = 1 TO FS%
K% = K
 GOSUB 1200
 NEXT K
 GOTO 5000
 REM  COPY FILE
 HOME
 INPUT "HAS THE NEW FILE BEEN INITIALIZED - Y/N ";Z$
 IF  LEFT$ (Z$,1) = "Y" THEN  GOTO 12040
EM$ = "CANNOT COPY": GOTO 5000
 INPUT "ENTER NEW FILE NAME ";NF$
OF$ = FI$: REM  SAVE OLD FILE NAME
 GOSUB 31400: REM  OPEN OLD FILE
 GOSUB 31600: REM  GET FILE SIZE
FI$ = NF$
 GOSUB 35000
NSLOT% = XSLOT%:NDRIVE% = XDRIVE%
 GOSUB 31420: REM  OPEN NEW FILE
 FOR K = 1 TO FS%
K% = K
FI$ = OF$
 GOSUB 1000: REM  READ OLD FILE
FI$ = NF$
 GOSUB 1200: REM  WRITE NEW FILE
 NEXT K
 PRINT D$;"CLOSE ";FI$
XSLOT% = OSLOT%:XDRIVE% = ODRIVE%
FI$ = OF$: REM  SET OLD FILE
 GOTO 5000
 REM  ADD A RECORD
 HOME
 GOSUB 31400
 GOSUB 31600
 GOSUB 20000
 IF K% = 0 THEN  GOTO 5000
 GOSUB 1000
 IF ID% = 0 THEN  GOTO 13160
EM$ = "RECORD " +  STR$ (K%) + " ALREADY EXISTS"
 GOTO 13060
 GOSUB 20400
 GOSUB 20800
 INPUT "ENTER PURCHASE PRICE ";PP%
 INPUT "ENTER REPLACEMENT COST ";RC%
 GOSUB 22000
 INPUT "ENTER DESCRIPTION ";DD$
 GOSUB 1200
 GOTO 13060
```

```
 GOSUB 31400
 GOSUB 31600
 GOSUB 20000
 IF K% = 0 THEN  GOTO 5000
 GOSUB 1000 ;
 IF ID% < > 0 THEN  GOTO 14200
EM$ = "RECORD " + STR$ (K%) + " IS NULL - USE ADD"
 GOTO 14080
 GOSUB 26000
 Z$ = ""
 INPUT "CHANGE OWNER ID - Y/N";Z$
 IF  LEFT$ (Z$,1) < > "Y" THEN  GOTO 14240
 GOSUB 20400: GOSUB 26000
 Z$ = ""
 INPUT "CHANGE DATE OF PURCHASE - Y/N ";Z$
 IF  LEFT$ (Z$,1) < > "Y" THEN  GOTO 14300
 GOSUB 20800: GOSUB 26000
 Z$ = ""
 INPUT "CHANGE PURCHASE PRICE - Y/N ";Z$
 IF  LEFT$ (Z$,1) < > "Y" THEN  GOTO 14370
 INPUT "ENTER PURCHASE PRICE ";PP%
 GOSUB 26000
 Z$ = ""
 INPUT "CHANGE REPLACEMENT COST - Y/N ";Z$
 IF  LEFT$ (Z$,1) < > "Y" THEN  GOTO 14430
 INPUT "ENTER REPLACEMENT COST ";RC%
 GOSUB 26000
 Z$ = ""
 INPUT "CHANGE CATEGORY - Y/N ";Z$
 IF  LEFT$ (Z$,1) < > "Y" THEN  GOTO 14470
 GOSUB 22000: GOSUB 26000
 Z$ = ""
 INPUT "CHANGE DESCRIPTION - Y/N ";Z$
 IF  LEFT$ (Z$,1) < > "Y" THEN  GOTO 14540
 INPUT "ENTER DESCRIPTION ";DD$
 GOSUB 26000
 Z$ = ""
 INPUT "CONFIRM CHANGES - Y/N";Z$
 IF  LEFT$ (Z$,1) < > "Y" THEN  GOTO 14200
 GOSUB 1200
 GOTO 14080
 REM  DELETE A RECORD
 HOME
 GOSUB 31400
 GOSUB 31600
 GOSUB 20000
 IF K% = 0 THEN  GOTO 5000
 GOSUB 1000
 IF ID% < > 0 THEN  GOTO 15200
EM$ = "RECORD " + STR$ (K%) + " IS NULL"
 GOTO 15080
 GOSUB 26000
 Z$ = ""
 INPUT "CONFIRM DELETION - Y/N";Z$
 IF  LEFT$ (Z$,1) < > "Y" THEN  GOTO 15080
ID% = 0:DP% = 0:PP% = 0:RC% = 0:CG% = 0:DD$ = "X"
 GOSUB 1200
 GOTO 15080
 REM  DISPLAY A RECORD
 HOME
 GOSUB 31400
 GOSUB 31600
 GOSUB 20000
 IF K% = 0 THEN  GOTO 5000
```

```
 GOSUB 26000
 INPUT "PRESS RETURN FOR NEXT RECORD ";Z$
 GOTO 16080
EM$ = "RECORD " + STR$ (K%) + " IS NULL"
 GOTO 16080
 REM  LIST FILE ON THE SCREEN
 HOME : GOSUB 31400: GOSUB 31600
BR% = 0:ER% = 0
 INPUT "ENTER BEGINNING RECORD ";BR%
 IF BR% < 1 OR BR% > = FS% THEN  GOTO 17060
 INPUT "ENTER ENDING RECORD ";ER%
 IF ER% < = BR% THEN  GOTO 17100
 HOME
 PRINT "FILE CONTAINS ";FS%;" RECORDS"
K% = BR%
 GOSUB 1500
 VTAB 24
 INPUT "PRESS RETURN FOR NEXT PAGE ";Z$
 IF K% > FS% OR K% > ER% THEN  GOTO 5000
 GOTO 17200
 REM  LIST FILE ON PRINTER
 HOME : GOSUB 31400: GOSUB 31600
BR% = 0:ER% = 0:LP% = 0
 INPUT "ENTER BEGINNING RECORD ";BR%
 IF BR% < 1 OR BR% > = FS% THEN  GOTO 18060
 INPUT "ENTER ENDING RECORD ";ER%
 IF ER% < =;BR% THEN  GOTO 18100
 INPUT "ENTER LINES PER PAGE ";LP%
 IF LP% < 10 OR LP% > 60 THEN  GOTO 18160
LC = LP%: REM  INIT LINE COUNT
 PRINT "YOU CAN SUPPLY A HEADING "
 PRINT "UP TO 60 CHARACTERS."
 INPUT "ENTER HEADING ";HD$
 IF  LEN (HD$) > 60 THEN  GOTO 18220
 PRINT "BE SURE PRINTER IS AT TOP OF FORM."
 INPUT "READY THE PRINTER AND PRESS RETURN ";Z$
 PRINT D$;"PR#1"
K% = BR%
 IF LC < LP% - 1 THEN  GOTO 18600
 PRINT  CHR$ (12)
 PRINT " "
 PRINT " "
 PRINT "INVENTORY LIST"; SPC( 55);"PAGE ";PG%
Z% = (80 -  LEN (HD$)) / 2
 PRINT  SPC( Z%);HD$
 PRINT " "
LC = 5:PG% = PG% + 1
 IF K% > FS% OR K% > ER% THEN  GOTO 18800
 GOSUB 1000
 IF ID% = 0 THEN  GOTO 18670
 GOSUB 4000
Z% = 40 -  LEN (L2$)
 PRINT L2$; SPC( Z%);L1$
LC = LC + 1
K% = K% + 1
 GOTO 18340
 PRINT  CHR$ (12)
 PRINT D$;"PR#0"
 GOTO 6000
 REM  ACCEPT RECORD NUMBER
 HOME : PRINT EM$:EM$ = ""
 PRINT "ENTER RECORD NUMBER"
 INPUT "ZERO WILL END FUNCTION ";K%
 IF (K% > = 0) AND (K% < = FS%) THEN  GOTO 20100
EM$ = "INVALID RECORD NUMBER"
```

```
 RETURN
 REM  ACCEPT OWNER ID
 HOME
 PRINT EM$:EM$ = ""
 PRINT "VALID OWNER NAMES ARE"
 FOR I = 1 TO 3
 PRINT I; SPC( 2);OW$(I)
 NEXT I
 INPUT "ENTER OWNER CODE ";ID%
 IF (ID% > 0) AND (ID% <  = 3) THEN  GOTO 20600
EM$ = "INVALID OWNER CODE"
 GOTO 20400
 RETURN
 REM  ACCEPT DATE OF PURCHASE
 HOME : PRINT EM$:EM$ = ""
 PRINT "ENTER YEAR PURCHASED"
 PRINT "IN FORM YY"
 INPUT YY%
 IF (YY% = 0) THEN  GOTO 21400
 IF (YY% >  = 40) AND (YY% <  = 82) THEN  GOTO 21000
EM$ = "INVALID YEAR": GOTO 20800
 HOME : PRINT EM$:EM$ = ""
 PRINT "ENTER MONTH PURCHASED"
 INPUT MM%
 IF (MM% > 0) AND (MM% <  = 12) THEN  GOTO 21100
EM$ = "INVALID MONTH": GOTO 21000
DP% = (MM% * 100) + YY%
 RETURN
DP% = 0: REM  NOT PURCHASED
 RETURN
 REM  ACCEPT CATEGORY CODE
 HOME : PRINT EM$:EM$ = ""
 PRINT "CATEGORIES ARE"
 FOR I = 1 TO 5
 PRINT I; SPC( 2);CN$(I)
 NEXT I
 INPUT "ENTER CATEGORY CODE ";CG%
 IF (CG% > 0) AND (CG% <  = 5) THEN  GOTO 22200
EM$ = "INVALID CATEGORY CODE": GOTO 22000
 RETURN
 REM  DISPLAY A RECORD
 HOME
 PRINT "RECORD NUMBER ";K%
 PRINT "OWNER IS ";OW$(ID%)
MM% =  INT (DP% / 100)
YY% = DP% - (MM% * 100)
 PRINT "PURCHASED ";MM%;"/";YY%
 PRINT "PURCHASE PRICE WAS $";PP%
 PRINT "REPLACEMENT COST IS $";RC%
 PRINT "CATEGORY IS ";CN$(CG%)
 PRINT "*";DD$;"*"
 PRINT
 RETURN
 REM  INITIALIZATION
 DIM OW$(3),CN$(5),FF$(9)
 FOR I = 1 TO 3
 READ OW$(I): REM  OWNER'S NAMES
 NEXT I
 FOR I = 1 TO 5
 READ CN$(I): REM  CATEGORIES
 NEXT I
 FOR I = 1 TO 9
 READ FF$(I): REM  FUNCTIONS
 NEXT I
```

```
  GOSUB 35000
: OSLOT% = XSLOT%:ODRIVE% = XDRIVE%
 PG% = 1: REM   PAGE COUNTER
 FO% = 0: REM   FLAG FILE CLOSED
 EM$ = "": REM   SCREWUP MESSAGE
 D$ = "": REM   CTRL D FOR DOS
 RL% = 60: REM   RECORD LENGTH
 FS% = 0: REM   CLEAR FILE SIZE
  PRINT D$;"NOMON C,I,O"
  RETURN
  REM   FILE OPEN ROUTINE
  IF FO% = 1 THEN   GOTO 31440
  PRINT D$;"OPEN ";FI$;",L";RL%;",S";XSLOT%;",D";XDRIVE%
 FO% = 1: REM   FLAG FILE OPEN
 K% = 0: REM   SET 1ST RECORD KEY
  RETURN
  REM   READ FILE SIZE ROUTINE
  IF FS% <  > 0 THEN   RETURN
  PRINT D$;"READ ";FI$;",R";K%
  INPUT FS%
  PRINT D$
  RETURN
  REM   WRITE FILE SIZE ROUTINE
  PRINT D$;"WRITE ";FI$;",R";K%
  PRINT FS%
  PRINT D$
  RETURN
  REM   INITIAL VALUES
  DATA   "PAUL","FRED","JOINT"
  DATA   "FURNITURE","APPLIANCES","CLOTHING","TOOLS","OTHER"
  DATA   "FORMAT NEW FILE","COPY FILE","ADD A RECORD","CHANGE A RECORD
"
  DATA   "DELETE A RECORD","DISPLAY A RECORD","LIST FILE ON SCREEN"
  DATA   "LIST FILE ON PRINTER","END OF JOB"
  REM   ERROR TRAP ROUTINE
  IF  PEEK (222) = 255 THEN   GOTO 32320
  IF  PEEK (222) = 254 THEN   GOTO 32360
 Z =  PEEK (218) +  PEEK (219) * 256
  PRINT "ERROR CODE "; PEEK (222);" IN LINE ";Z
  STOP
 EM$ = "INPUT INTERRUPTED": GOTO 5000
  PRINT "RE-ENTER . . .": RESUME
  REM   SETUP DISK ADDRESSES
 XSLOT% = 6:XDRIVE% = 1: REM   DEFAULTS
  PRINT "DO YOU WANT TO CHANGE DISK ADDRESSES ?"
  INPUT "Y/N ";Z$
  IF  LEFT$ (Z$,1) = "N" THEN   RETURN
  INPUT "ENTER SLOT ";Z%
  IF Z% < 2 OR Z% > 7 THEN   GOTO 35050
 XSLOT% = Z%
  INPUT "ENTER DRIVE ";Z%
  IF Z% < 1 OR Z% > 2 THEN   GOTO 35080
 XDRIVE% = Z%
  RETURN
```
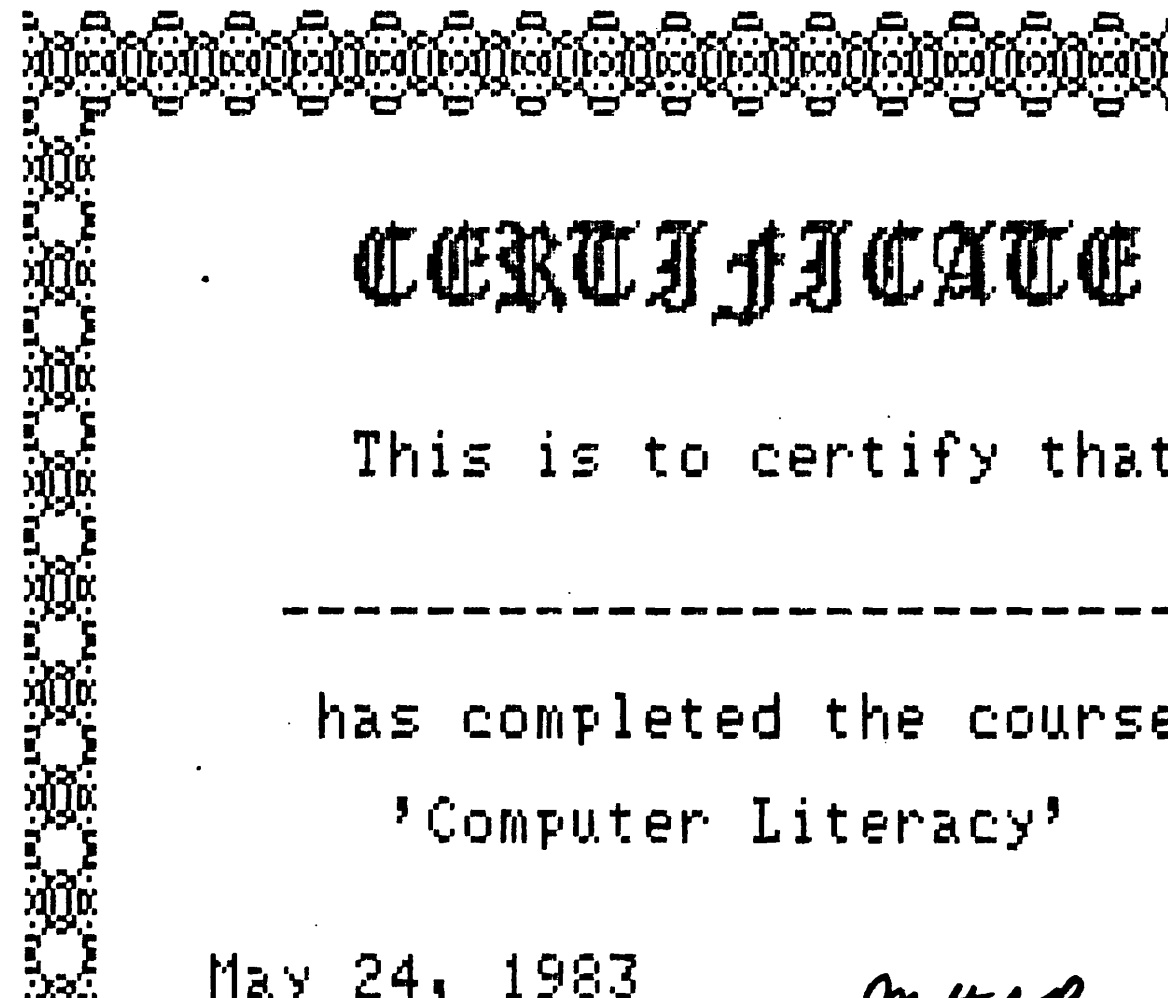
CERTIFICATE

This is to certify that

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has completed the course

'Computer Literacy'

May 24, 1983