CLUB_____
BIRTHDATE_____
YEARS IN PROJECT___
YEARS IN 4-H___

4-H 1079B

4-H COMPUTER PROJECT III:
Using Computers in 4-H Projects

Florida Cooperative Extension Service
Institute of Food and Agricultural Sciences
University of Florida, Gainesville
John T. Woeste, Dean for Extension

The 4-H program is for all young people ages 8 through 18. Members can choose from a wide range of educational activities and have fun while learning. Contact your county 4-H Extension agent to learn how you can participate in the many projects and activities for young people.

This manual is the product of a project that was supported by a special needs grant from the Extension Service, USDA, Washington, D.C. This revision, following a pilot test by 12 states, has been prepared by University of Kentucky Extension Agricultural Engineer George A. Duncan with the help of University of Kentucky Computer Project Committee members Dennis Goodman, Richard Maurer, Patricia P. Schrader and George Turner. The pilot test draft was prepared by Lee Hays, George A. Duncan and George Turner, with artwork by Ron Hutt, from the original materials prepared by George Duncan, George Turner, Linda Bach, Steve Duncan, Sandy Holland, Bernie Bourbeau, Richard Maurer, David Miles, Jerald Rose and Kathy Wyatt.

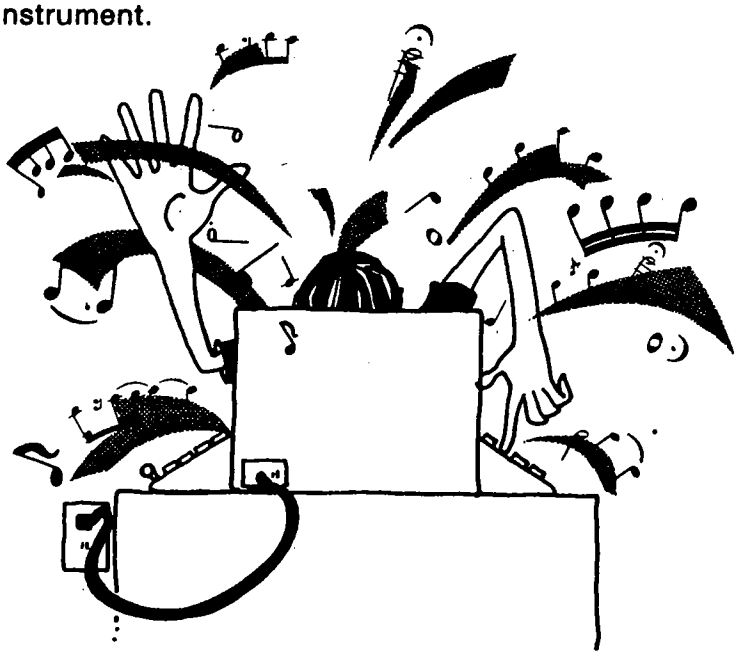
4-H Computer Project III:
Using Computers in 4-H Projects

Introduction

In 4-H Computer Project I, you learned about some of the components of small computers, how to load a program from a cassette tape or diskette, and how to run and respond to a program. In 4-H Computer Project II, you learned about programming and how commands direct the computer to do useful things.

This more advanced project will challenge you to use microcomputer programs in various 4-H activities, perhaps even developing your own programs to use. The project requires access to a microcomputer to fully develop and apply programs. This project also provides some guidelines on reviewing and selecting a microcomputer for your present or future needs.

If your 4-H group does not have a microcomputer available, try to find a friend (or a school or business) who has a microcomputer on which you can practice. Learning to use or to program a computer is just like learning to play a piano; you must sit down at a keyboard to really master the instrument.



What You Will Learn in This Project

- Helpful pointers on microcomputer hardware and software
- Ways to use microcomputers in 4-H projects
- Potential benefits of microcomputers
- How to plan and develop your own programs
- How flowcharts can help you plan and organize a computer program

What You Will Do in This Project

- Review computer terms and commands.
- Use available programs for various activities.
- Plan a program.
- Develop your own program.
- Give a demonstration about the computer or a program.
- Keep a record of your 4-H computer project.

A Review of What You Have Learned

Let's review what you learned in the first two computer projects. You must have a good understanding of the information in these two project booklets before you can learn more about computers. To help you review, write a brief sentence about the following components of a microcomputer and what each does.

HARDWARE _____

_____

SOFTWARE _____

_____

VIDEO DISPLAY _____

_____

KEYBOARD _____

_____

RAM MEMORY _____

_____

DISKETTE _____

_____

PRINTER _____

_____

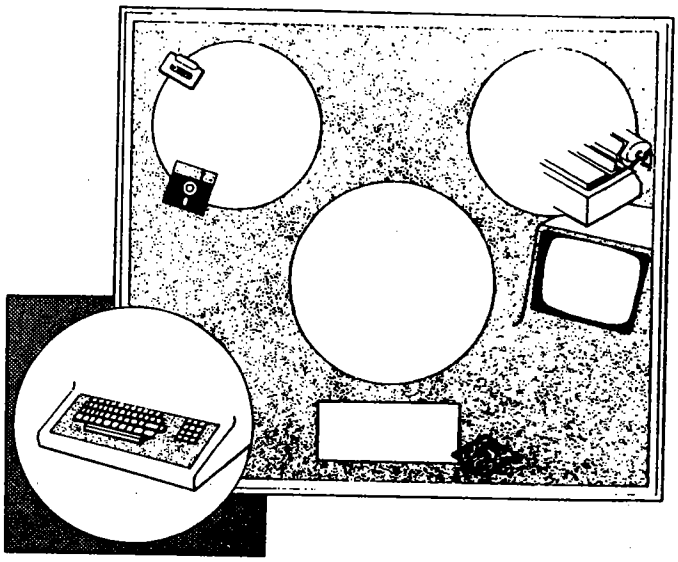
CPU stands for

C _____

P _____

U _____

Looking at the components of the computer represented below, draw the arrows to indicate the flow of information.



The keyboard is the means by which you "communicate" to the computer. Briefly explain what each of the following important keys does.

CLEAR _____

_____

BREAK _____

_____

ENTER or RETURN _____

_____

SHIFT _____

_____

SPACE BAR _____

_____

* _____

_____

\+ _____

_____

\- _____

_____

/ _____

_____

O _____

_____

Ø _____

_____

You have already learned how to type certain words on the keyboard and then enter them in the computer to make it do certain things for you. These are called _____ words. Briefly explain what the following words cause the computer to do.

PRINT _____

_____

TAB _____

_____

RUN _____

_____

CLS _____

_____

HOME _____

_____

LIST _____

_____

INPUT _____

_____

GOTO _____

_____

READ _____

_____

What is the "**prompt**" symbol and what does it mean?

_____

_____

What is the "**cursor**" symbol and what does it mean?

_____

_____

Choosing A Microcomputer

More and more people are buying computers every day, and there are many types from which to choose. New models are becoming available nearly every month—a trend which may continue for several years. You may wonder which microcomputer is the best to use in your 4-H project or other home, school or personal use. If a microcomputer is already available, you are ready to begin—provided it has the software support and features you will need. However, many 4-H'ers will be interested in buying their own microcomputer someday, maybe soon, or in helping others select equipment. To learn more about microcomputers, you should

review books in the library, obtain issues of current magazines, visit local computer stores, and talk with teachers, leaders, and friends about the equipment they use. The following brief pointers on microcomputer hardware features will help you better understand which equipment might best suit your needs.

Portability: Quite powerful microcomputers from pocket or book size units up to tabletop sizes are available. Factors to consider include the size, weight, whether the microcomputer is one unit or has components with cables, and the cost.

Memory capacity (RAM): A memory of at least 16K is essential for beginning programs; 48K, 64K and 128K are now widely available and preferred since these capacities allow you to develop and use larger programs.

Keyboard: Most all keyboards have the keys arranged like a typewriter and have raised keys. However, some economical units have "membrane" type key switches that require pressure on an exact spot. These are not as easy and fast to use as regular keys. An extra set of keys in a separate group (numeric keypad) is helpful for data entry.

Video display: Video displays range from a 25-30 character one-line LCD display on a pocket-size microcomputer to the 12- to 13-inch monochrome or color monitors. If you plan long-time use and viewing, the video display would be more desirable. These displays feature line lengths of 32 to 80 characters and 16 to 24 lines (80 by 24 is the industry standard for professional computers). If you want compactness and easy portability, the multi-line LCD character displays may be more appropriate.

Color or monochrome video: Monochrome means a one-color display. These are available as black and white, green or amber. Opinions differ as to which is easiest to see and less tiring on the eyes. Size is probably more important for viewing ease. The color video output of many microcomputers allows the use of color monitors for extra opportunities and challenges in producing color video displays.

Graphics: High resolution graphics enable fine detail for symbols, illustrations, and other creations. Good graphics features are available on both monochrome and color microcomputers, but a proper video monitor is necessary to display the graphics.

Musical tones: Several octaves of simple musical tones are available in some microcomputers for those who want to develop musically related programs or tunes.

Cassettes or diskettes: A cassette recorder and tapes are economical but slow and limited in data access and versatility. The floppy disks and disk drives are much faster and offer many conveniences and advantages at a reasonable cost. Any microcomputer intended for serious use should have the capability of adding disk drives.

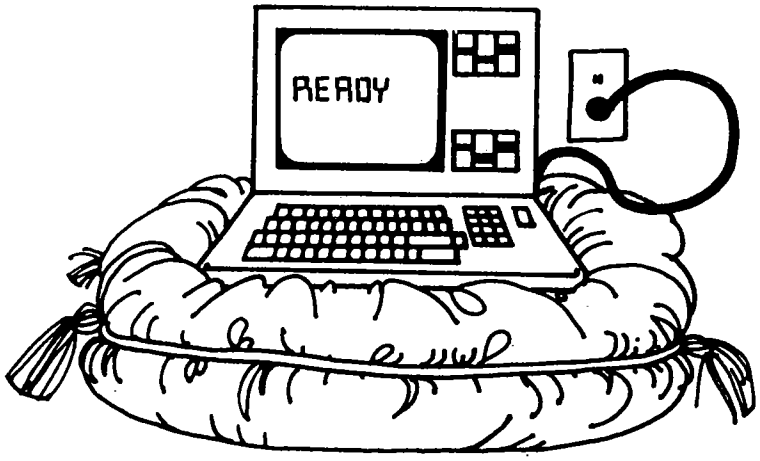
Printer: An economical printer is a desirable accessory to provide printed copies of the results of the microcomputer's output. Many capable and economical dot matrix printers are available using single sheet or continuous form paper.

RS232C Serial Interface: This component allows a microcomputer to "communicate" with other microcomputers or with larger computers over the telephone lines or similar networks. A MODEM is also needed to connect the RS232C device to the telephone circuit.

What Software Is Available?

Thousands of software programs are available for the popular brands of microcomputers. This software ranges from the arcade type games to very useful home, business and educational programs. Several 4-H related programs have been developed and are available free from your 4-H Extension agent or leader. Many other programs are available from microcomputer user groups, friends, schools, computer stores or catalog sources. Some programs are free. Others may cost a few dollars or several hundred dollars depending on the scope and complexity. Much commercial software is "copyrighted" which means it is not legal to make copies to distribute or share with others. Proper selection and use of software

will greatly influence the usefulness and benefits of a microcomputer.



Software can be divided into two categories: 1) general purpose and 2) specific applications. General purpose commercial software allows several applications to be made from each program. For example,

- *Word processing software* may be used for letters, documents or reports, etc. It includes features such as page length, margin, editing, etc.
- *Mailing list software* may be used to print labels, automatically insert addresses in letters, sort by name, city, state, zip, or other coded data.
- *File management software* enables the entering of many records on personnel, products, equipment, etc., and accessing, sorting, or printing any single record or groups of records in a matter of seconds.
- *Financial and accounting software* provides numerous options of financial applications such as budgets, balance sheets, payroll, general ledger, accounts receivable, accounts payable, etc.
- *Electronic spreadsheets* provide a grid-like structure for entering, tabulating, projecting, and printing extensive numerical data with titles, summaries and other notations.

Software for specific applications includes programs for home energy analysis, diet and nutritional analysis, irrigation scheduling, crop drying and system design, crop and animal performance records, chemical applications, building designs and estimated costs, etc.

Should You Use Available Software or Develop Your Own?

Both, depending on your needs and the resources available! Ignoring the availability and use of existing software is poor judgment and careless oversight. However, some software may have a cost that you, your agents, leaders, teachers, or friends cannot afford, so you will have to rely on the free or affordable sources. The real challenges and satisfaction of using microcomputers come about when you develop your own useful programs.

The remainder of this project will guide you in learning to use available software and in developing your own new programs for your 4-H, home, farm, ranch, or school needs.

Using Existing 4-H Software

Several programs have been developed for use with some of the popular microcomputers as part of this 4-H computer project. These are available from your 4-H agent or leader. If the microcomputer available to you will not use these versions, then you might undertake modifying and adapting the BASIC language of the program to work on your microcomputer. This assumes you have learned programming in BASIC well enough to do the conversion. If not, perhaps you can review Project II, read other programming books and/or get help from a friend, teacher, or leader.

Here's how you can use some of the programs.

Program: *FUELCOST*

Benefits:

1. Determine annual fuel costs of your family vehicles.
2. Compare fuel efficiency and savings of several vehicles.
3. Learn how to economize on automobile fuel costs.

Requirements:

1. The *FUELCOST* program
2. A microcomputer to run this program
3. The following data for each car:
   a. average miles driven daily
   b. average miles per gallon of fuel
   c. cost of fuel per gallon

Procedures:

1. Obtain the above data for one or more cars.
2. Prepare the *FUELCOST* program for operation on the microcomputer.
3. Enter the above data when requested by the program.
4. Write down the annual fuel costs for the vehicles.

vehicle model: _____

_____

annual fuel costs: _____

_____

5. Show the results to the owners of the vehicles and suggest ways to economize with tune-ups, fewer trips, carpooling, combined errands, etc.
6. Remember that fuel costs alone are only part of a car's total annual costs. The car operating costs program (*CARCOST*) gives a more complete analysis of a car's annual cost.
7. Write a summary of your experiences with this program.

Program: *CARCOST*

Benefits:

1. Determine overall annual car operating costs.
2. Compare costs and savings of different models of cars.
3. Plan for future car purchases that provide the most economical operating costs.

Requirements:

1. The *CARCOST* program
2. A microcomputer to run this program
3. The following data for each car:
   a. size category of the car; for example, standard 8-cylinder, intermediate 6-cylinder, compact 6- or 4-cylinder, sub-compact 4-cylinder
   b. annual insurance costs
   c. annual license registration fee
   d. average miles driven per day
   e. average miles per gallon of fuel
   f. cost of fuel per gallon

Procedures:

1. Obtain the above data for the cars.
2. Prepare the *CARCOST* program for operation on the microcomputer.
3. Enter the data when requested by the program.
4. Write the following results:

car model: _____

_____

miles driven: _____

_____

annual costs: _____

_____

cost/mile: _____

_____

which car is more economical:

_____

_____

7. Compare the cost of trading a car for a more economical model and how long it will take for the savings in operating costs to offset the cost of trading.
8. Give a demonstration to your 4-H group, school class, community club, or other group on the results of this car cost analysis.
9. Write a summary of your experiences with the car cost program.

Program: *GARDEN*

Benefits:

1. Have the most productive and efficient garden for the number of people in your family in the space available.
2. Determine the estimated cost of seeds and plants required.
3. Determine the estimated value of products grown.
4. Review or learn ways to serve, freeze, can, or otherwise preserve the harvested vegetables for home use. (Refer to other 4-H projects or check with your Extension agent.)

Requirements:

1. The *GARDEN* program
2. A microcomputer to run the program
3. Selection of any of 36 listed vegetables
4. A data input form, if you use the program at an exhibit, to accommodate large numbers of people more conveniently

Procedures

1. Prepare the *GARDEN* program for operation. (Note: some data in the program on planting and harvesting dates may have to be modified for your region of the U.S.)
2. Enter the number of people the garden will produce for.
3. Select the vegetables to be grown.
4. Display or print the results.
5. Write the following results:
   number of people to produce for _____
   square feet of area required _____
   approximate cost of seeds and plants _____
   approximate value of products to be grown _____
   returns of your garden _____ cents/sq. ft.
6. Make other vegetable selections and compare the area, costs, and yield.
7. Help friends and neighbors plan their garden.
8. Organize and conduct garden projects for the summer.
9. Give a demonstration on how to plan a good garden and use the vegetables produced.
10. Write a summary about your experiences with the *GARDEN* program.

Using Commercial Software

Numerous programs to perform useful tasks are available for most all microcomputers. They may be purchased from computer stores, catalogs and magazines. The general-purpose software described in a previous section is widely used in offices, by businesses, farmers, ranchers, teachers and even in homes. The top quality software has been developed and tested by professional programmers and capable users over many months or years. It should be error-free, easy to use and supported with good instructional manuals. The cost varies depending on the capabilities and market competition.

The following activities will guide you to learn more about such software, its availability in your community, how it is being used and ways you might use it for 4-H projects.

Program: *Word Processing Software*

Benefits:

1. Prepare letters, reports, documents, etc.
2. Make changes, corrections, additions, deletions, etc., readily and easily.
3. Format page margins, lengths, etc.
4. Print one or several copies.
5. Save the final version on diskette for future uses.

Requirements:

1. A microcomputer and printer
2. The word processing software and the instruction manual for its use
3. Assistance in the proper use of the equipment and the software
4. A brief letter, report, announcement or minutes of club meeting, etc., which you wish to type and have several copies produced

Procedures:

1. Locate a person or business who has the equipment and software needed.
2. Read the instruction manual to learn proper use of the software.
3. Ask the person presently using the equipment for guidance in its proper use.
4. Prepare the software for use and type your letter, report, etc.
5. Check the typed information on the video display for accuracy.
6. Save (store) a copy on a diskette for future uses.
7. Print a hard copy and double-check for correctness, margins, etc.
8. If you find errors or changes, make the corrections, save the corrected version, and reprint one or more copies as needed.
9. Write results of your activity here:

a. Whose equipment did you use?

_____

_____

b. What was the name of the commercial software?

_____

_____

c. What letter, report, etc. did you prepare?

_____

_____

d. Did you learn to make corrections?

_____

_____

e. What were some of the corrections you had to make?

_____

_____

f. How many copies did you make?

_____

9. Describe some advantages and disadvantages of the software you used.

_____

_____

_____

_____

10. What are some other uses of word processing software?

_____

_____

11. Write a school report, news article or give a demonstration on the capabilities of word processing software and how it can be used.