

## Children and the Turtle Down on the Farm

by Linda Razzano

Our turtle has been living on a farm. It has visited the cows, pigs, sheep, and horses daily, as it has maneuvered through corrals and along the farm roads. It has become the busiest and most gregarious member of our farm community.

My class of kindergarten and first grade children began to use the floor turtle in October, after having had some initial experiences using the screen turtle. They used an INSTANT program for the floor turtle that was basically the same as the INSTANT program they had used with the screen turtle, with the addition of WINK and HORN commands.

The floor turtle we've been using is the Tasman Turtle, which is larger than the original Terrapin Turtle. This larger size necessitated setting aside a good deal of floor space adjacent to the computer station which could be devoted to the turtle's environment.

The children's first use of the floor turtle was simply directing it to move to a specific object and back again. They then used building blocks to construct curved and angled channels through which they drove the turtle.

Since we had been involved in a farm life unit, a natural extension of both their turtle-driving projects and their farm studies seemed to be designing a farm environment for the turtle. Once again, the children used the building blocks and constructed corrals, fences, and barns; they also equipped the farm with our rubber animals.

Next, we introduced the turtle to the farm. It was great fun to get the turtle to wink at the pigs, and then to toot the horn while passing by the cows! The floor turtle was always operated by a pair of children: one at the terminal, and one keeping the turtle's "tail" from tangling. More excitement was exhibited for this activity than for anything else we'd done this year.

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## Cherokee Indian Symbols Come Alive With LOGO Sprites

by Pat Reilly

Recently, my second grade class at Punahou School, in Honolulu, HI, studied the importance of symbols in the Cherokee belief system. The Cherokees attached much significance to the four cardinal directions: north, south, east, and west; the colors of red, black, white and blue (or purple); animal life, particularly bird life; and the sacred numbers four and seven.

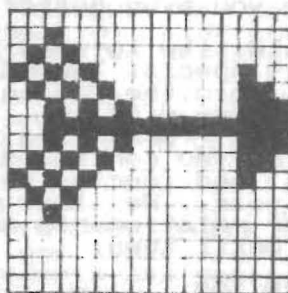
My children used TI LOGO to design some of these symbols as sprites and integrated their knowledge of the Cherokee Indians with their computer skills.

Here is the procedure the children followed:

1. Design an Indian symbol of your choice on a paper makeshape grid (16 x 16).
2. Get a makeshape number from the teacher.
3. Transfer the design to a shape on the computer using the MAKE-SHAPE command and the shape number from the teacher. (Arrow keys are used to designate the darkened squares.)
4. Use the design as a sprite, with a TELL and CARRY command. Set an interesting color, heading, speed, or location. It is now an Indian sprite!
5. SAVE your Indian sprite on a classroom diskette.

Here are some examples of the symbols, and some of the messages the students assembled.

red arrow: protection and life  
by Jessica Diamond



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Editor.....Tom Lough

## BACK 9

So much has happened in the last nine months! It is fun to pause for a moment to review the highlights. The shortcomings are there, too, naturally. But, as we compiled the index (see page 12) for the first year of the NLX, we experienced a feeling that something significant may have been accomplished, some needs served, some minds stirred.

Often, if we look back to where we have been, it gives us a better idea of where we are going. Of course, it is not constructive to dwell upon the past; it is worthwhile to learn from it. In particular, we want to learn ways to improve the service of the NLX.

However, when one looks back, it is sometimes difficult to see everything which is important. Distance and time can cause distortion of the things one is trying to discern.

That is why we ask for your help at this time. We feel that your points of view are important sources of useful information.

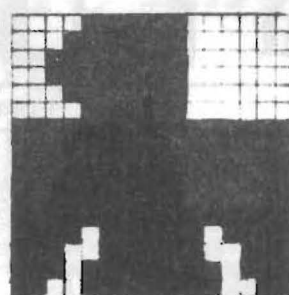
Would you please take a moment to think back about the NLX issues you have received? Then write us with any ideas or suggestions you could offer for improvement. This will help us to serve you even better.

We would like to send to each of you a very special THANKS. You have chosen to join the NLX in the first year and to grow with us. You are a special person for having taken that risk. We wish you continued success, excitement, and curiosity in your next LOGO year. We look forward to renewing our relationship with you in September. Until then,

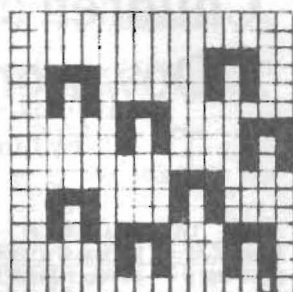
FORWARD 100!

*Tom*

## Cherokee Symbols continued



white eagle:  
peace and happiness  
Klari Asato



deer tracks:  
plenty of game  
by Angel Vardas

The children enjoyed recalling one another's Indian sprites, combining them in subprocedures, and writing coded messages to each other. They also discovered the value of the PO (print out) TI LOGO primitive, which enabled them to change temporarily the attributes of their friends' sprites.

TELL 1 CARRY :TURKEY SETCOLOR :WHITE  
SETHEADING :SOUTH SETSPEED 7 gives a white eagle moving south, meaning peace and happiness.

TELL 2 CARRY :TURKEY SETCOLOR :BLACK  
SETHEADING :WEST SETSPEED 4 creates a black turkey moving west, meaning death.

TELL 3 CARRY :WOODPECKER SETCOLOR :RED  
SETHEADING :EAST SETSPEED 7 will give a red woodpecker moving east, to denote success in battle.

TELL 4 CARRY :JAY SETCOLOR :BLUE  
SETHEADING :NORTH SETSPEED 4 sets up a blue jay flying north, meaning trouble and defeat.

Creating these Indian symbols as LOGO sprites allowed the children to integrate their knowledge of the Cherokee belief system with their knowledge of the LOGO language. Thus, they were able to make yesterday's symbols come alive using today's technology.

(Ed. note: Dover Publications, 180 Varick St., NYC, NY 10014, has a number of inexpensive books showing many Indian designs and symbols. One such excellent ideabook is *Authentic Indian Designs* by Maria Naylor, Dover # 23170-4, \$3.95 + .75 postage, 219 pages. A listing of 40 other related books is included. There are plenty of LOGO ideas here!!)

Pat Reilly teaches a self-contained second grade at Punahou School in Honolulu, Hawaii. She has taught also at schools in Tennessee and Georgia.

# TIPPS

for

## TEACHERS

by Steve Tipps

### LOGO for All

Turtle graphics, printing, list processing, and arithmetic functions offer possibilities for many tasks to give computers. Few examples of LOGO are available, however. Anyone can go to a bookstore and find dozens of books containing hundreds of BASIC programs; LOGO programs are less available.

Glen Bull and I have been encouraging students and teachers to undertake computing projects using LOGO to expand the repertoire of LOGO applications. We have found that, beyond using the beginning commands, adopting and pursuing a project is the best way to learn LOGO. The demands of the project force growth with the language. Over the past two years, students in our classes have created many tasks for themselves which demanded new skills and understandings.

One of the difficult things about creating "educational" programs with LOGO is the mind set which we bring to the enterprise. Creating drill and practice programs with LOGO is relatively simple; creating highly interactive and creative environments is demanding.

We started asking people to design "microworlds" but that label seemed to intimidate them; we dropped the label, but not the idea of using LOGO to create exciting ways of exploring ideas other than through the traditional tutorial questions and answers. Other students used LOGO for the development of teacher utilities. These examples might stimulate you to define your own projects.

#### BALANCE

Mary King, a principal and member of the coordinating committee for the LOGO project in Albemarle County, VA, made a balancing exploration. The turtle draws a seesaw balance with different weights on the ends. The seesaw tilts to show which side is heavier. The child has control over the position of the fulcrum and the weight placed on one end to balance the given weight on the other end. Each attempt to balance causes the seesaw to be redrawn to show the results.

Trial and error is used at first to determine the relationships needed for balance, but, as children progress, they will need and find use for the formula which describes the length times weight situation. Mary's program is not intended to replace actual scales and weighing; instead, it extends those real situations and probably focuses directly on the relevant variables.

#### SKETCHING

A number of students have worked on making LOGO sketch boards. These efforts have ranged from single-key LOGO adaptations for very young children and handicapped youngsters, paddle controlled sketching pads and race tracks, and menus of shapes which can be drawn.

Sue Montgomery used her sketching program as a basis for children to create stories. As the sketch unfolded, she would stop and let the children compose a sentence using REQUEST. At the end, the child could print out the creative product and add their own version of the picture. Bernie Chesshir made a program which explores drawing in perspective.

I have worked on a single key LOGO version for 3 and 4 year olds at the UVA Child Development Center. To begin, I programmed combined distance and direction moves which are automatic responses to touching keys on the keyboard. Glen Bull chided me for combining the two types of moves into one action. We will find out how the children play with the computer to see if that was a bad choice. We also debated about whether we should have the children touch <RETURN> or make the keys automatic. I chose the latter. Those of you who have been through this please share your perceptions and experiences.

Of course, the questions of pre-programming LOGO is a main concern. Do you destroy the value of LOGO by reducing the child's fundamental control of processes? These projects invariably produced good learning for the programmer. When the products are used within the LOGO philosophy as examples which children can use, expand or adapt, I have fewer qualms. If they replace the exploration and understanding of LOGO, I think we have gone astray.

#### PIGGY BANK

Sally Gilmer created a piggy bank into which children could drop coins. The coins (TI LOGO sprites) fell into the piggy bank, beeped, and a total of all the coins flashed on the screen. She was working with learning disabled students and wanted to have a world in which they could play with addition ideas without being overburdened with calculations. The sum was responsive to the decision of the child about the kind of coin added.

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## TIPPS for TEACHERS continued

### PLANETS

Mary Ann Kivistik was working on a science unit on space. Her goal was to demonstrate how many times each planet revolved about the sun in one earth year. Text book pictures cannot show this idea; the pictures are static while the idea is dynamic. As she worked, she found more things that she would like to show with the computer. Her project will take a long time to complete, but she and the children are enjoying the development process.

Programming does not have to be done in the closet. When you are working on a project, children will give you valuable reactions and suggestions. For this project, sprites would be a perfect way of showing simultaneous movement of the planets.

### FRACTIONS WORLD

Fractions are one of the most difficult ideas in elementary mathematics. Without going into a treatise on proportional thinking, I'd really like to see some work on using the computer to involve children with ratios. Programming in LOGO and scaling a drawing to one number is one way to go about this.

Jan Tuck had a wonderful car drawn using different circle parts. When she began to change parts, she discovered that all the proportions went wackeroo! In working out the correct relationships, she discovered much about ratio and geometry in a real - experimental way rather than by a rote - book way. At the end of the project, she wanted to know more about geometry and fractions.

Polly Wake has taken a different approach to fractions by displaying fractional parts of squares of differing sizes. The turtle draws squares split in half, fourths, and thirds, and colors in certain parts of the square. Many commercial programs are available which ask questions about fractional parts; in Polly's approach, children are telling the computer what kind of fractions to display, add, and subtract.

A good project on fractions needs to be done with attribute or concept formation ideas. A fractional part is displayed with the word YES or NO given. After three or four examples, the student can accept or reject a drawing as belonging. Although this edges toward drill and practice format, the content is not low level, but aimed at attribute abstraction and conceptual thinking.

### OTHERS

Many other worthwhile projects are also underway. Transitional subject areas can provide exciting ways of using LOGO to explore ideas. (See page 74 of Tom Lough's article in April's Electronic Learning, for example.) Such uses of the computer should not overwhelm the legitimate LOGO problem solving, but can provide a way of using LOGO as a tool. Students and teachers can turn the projects into cooperative classroom efforts.

Students might not be able to understand every part of the program structure immediately, but the modular nature of LOGO lends itself to dividing the task up and combining everyone's parts into the final program.

### UTILITIES

Teacher utilities are programs which teachers can use to do their jobs better. They are not strictly instructional, but can have instructional application. One example which Glen has demonstrated for several groups is the grade calculator. Rather than using the hand calculator for compiling grades, a simple program in LOGO asks the teacher to input the grades and it provides percentages and final average. Another teacher utility designed by Pete Davidson randomly picks students for classroom jobs.

Steve Taylor programmed LOGO to store the word lists of individual students. Each child keeps a list of words; these can represent individual spelling lists or creative writing words or vocabulary words. The word bank idea has many applications. Barb Thomas provides enrichment spelling for some of her students. She can enter extra spelling words for children to work on beyond the regular list. Both ideas point to the potential of the computer for individualizing instruction other than percentages of right and wrong.

Two students from Computer Science have been working on Senior Theses with LOGO this year. Linda Kaiser and a colleague chose to work on data base management systems in LOGO. They had much programming experience and have consulted with Keith Hammon and Terry Schwartz in Albemarle County to write student record systems. Data structures in LOGO have not received much attention in the literature. We hope that the prototype systems which are being designed will prepare us for new implementations of LOGO with more memory and features. (Ed. note: see March NLX, LOGO in the News)

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# MICROWORLDS

by Glen Bull

## Teaching Grammar to a Computer II

In last month's column, one method for teaching the computer to form plurals was outlined. The method consisted of the following approach:

```
To Form a Plural-
If the last letter in a word
is S, X, or Z, add ES to the
end of the word;
Otherwise, add S to the end
of the word.
End
```

This English description can be translated into LOGO in the following way:

```
TO PLURAL :ITEM
TEST MEMBER? LAST :ITEM [S X Z]
IFTRUE OUTPUT WORD :ITEM "ES
OUTPUT WORD :ITEM "S
END
```

In the past month, one fourth grade teacher has experimented with this approach in spelling class. Older children who understand list-processing instructions could write the LOGO procedures themselves. However, although these fourth graders are familiar with turtle graphics and some LOGO print instructions, they are not actually capable of writing the pluralization procedures.

### AUTOMATIC CODE GENERATION

This problem was easily circumvented by use of a Text-to-LOGO Conversion unit, a powerful device which translates a procedure from English into LOGO. This capability enabled the class to describe a spelling procedure in English and evaluate the effectiveness of the procedure on a computer.

The class was already familiar with the mechanism of a procedure because of their own work with LOGO. Use of a Text-to-LOGO Conversion unit quickly became an accustomed component of the program development process, just as use of a compiler and linking loader are part of the development cycle in other systems. This Text-to-LOGO Conversion unit (you guessed it: the teacher!!) used Heuristic Evaluation Rules and proved to be more accurate and flexible than military program generation systems costing millions of dollars more!

In other words, the process of describing a procedure is just as important as the actual process of coding it in LOGO. That, at least, was the theory. In practice the class not only participated in the description of common pluralization rules, they also enthusiastically searched out arcane exceptions until it became necessary to declare a moratorium!

### MORE USES FOR LAST AND BUTLAST

Previous versions of a procedure for plural formation tested for words ending in S, X, and Z. In order to test for words ending in SH and CH, it is necessary to create a module for extracting the last two letters of a word. This type of procedure may be given to a class just as the procedure for MEMBER? may be supplied for versions of LOGO in which it is not a primitive.

(Ed. note: The procedure MEMBER? was supplied in the April NLX and appears below for new readers.)

```
TO MEMBER? :ITEM :LIST
IF :LIST = [] OUTPUT "FALSE
IF :ITEM = FIRST :LIST OUTPUT "TRUE
OUTPUT MEMBER? :ITEM BUTFIRST :LIST
END
```

The strategy consists of:

1. extracting the last letter of the word.
2. extracting the next-to-last letter of the word.
3. using WORD to combine the two letters.

The following procedure is one way to implement this strategy:

```
TO LAST.TWO.LETTERS :ITEM
MAKE "LETTER1 LAST :ITEM
MAKE "LETTER2 LAST BUTLAST :ITEM
OUTPUT WORD :LETTER2 :LETTER1
END
```

When this procedure is used, it produces results such as:

```
PRINT LAST.TWO.LETTERS "JONATHAN
AN
```

This procedure, in turn, can be incorporated into a revised and updated version of PLURAL which accounts for all five cases described in most elementary texts on English.

```
TO PLURAL :ITEM
TEST MEMBER? LAST :ITEM [S X Z]
IFTRUE OUTPUT WORD :ITEM "ES
TEST MEMBER? LAST.TWO.LETTERS :ITEM [SH CH]
IFTRUE OUTPUT WORD :ITEM "ES
OUTPUT WORD :ITEM "S
END
```

This will give the following results:

```
PRINT PLURAL "BOY
BOYS
PRINT PLURAL "GRASS
GRASSES
PRINT PLURAL "WATCH
WATCHES
```

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## MICROWORLDS continued

Of course, a number of other exceptions such as oxen and mice remain. A very intelligent computer might be programmed with a knowledge of Latin, Old English, the linguistic history of English evolution, and a number of other factors to identify these exceptions. In the distant future, such a computer might exist. There are already languages such as LISP (a grandparent of LOGO) which can give a computer a general knowledge of the world, enabling it to deduce specific characteristics.

In the interim, it is necessary to enter a list of exceptions at the beginning of our LOGO procedure:

```
TO PLURAL :ITEM
  IF :ITEM = "OX OUTPUT "OXEN
  IF :ITEM = "MOUSE OUTPUT "MICE
  TEST MEMBER? LAST :ITEM [S X Z]
  IFTRUE OUTPUT WORD :ITEM "ES
  TEST MEMBER? LAST.TWO.LETTERS :ITEM [SH CH]
  IFTRUE OUTPUT WORD :ITEM "ES
  OUTPUT WORD :ITEM "S
END
```

### RULES FOR EMPLOYING ARTICLES

The skills developed in plural formation can be used to attack syntactic rules. For example, many elementary texts on English devote a section to the use of articles. The article AN is placed before words which begin with vowels, while A is used before all other nouns. This process could be described in English in the following way:

To Article -  
-If a word begins with a vowel, use AN;  
-Otherwise, use A.  
-End

The LOGO counterpart of this rule is shown below:

```
TO ARTICLE :ITEM
  TEST MEMBER? FIRST :ITEM [A E I O U]
  IFTRUE OUTPUT SENTENCE "AN :ITEM
  OUTPUT SENTENCE "A :ITEM
END
```

This procedure works tolerably well for many cases, but not for all instances:

```
PRINT ARTICLE "APPLE
AN APPLE
PRINT ARTICLE "PEAR
A PEAR
PRINT ARTICLE "APPLES
AN APPLES
```

The rule does not operate properly, however, in the case of plural nouns. For example, "THE BOYS" would be preferable to "A BOYS". Recognition of a plural noun is the inverse of the process of forming a

plural. One useful initial assumption is that a noun ending in S is plural. Later, a separate PLURAL? procedure could be created. The revision of the English description of the use of articles could read:

To Article -  
-If a word ends in S, assume it is plural and use THE;  
-If a non-plural word begins with a vowel, use AN;  
-Otherwise, use A.  
-End

This English procedure might be written in LOGO in the following way:

```
TO ARTICLE :ITEM
  TEST LAST :ITEM = "S
  IFTRUE OUTPUT SENTENCE "THE :ITEM
  TEST MEMBER? FIRST :ITEM [A I O U]
  IFTRUE OUTPUT SENTENCE "AN :ITEM
  OUTPUT SENTENCE "A :ITEM
END
```

This modification will permit the following output:

```
PRINT ARTICLE "BOYS
THE BOYS
```

The procedure for employing articles can be embedded in longer phrases:

```
PRINT ( SENTENCE [I SAW] ARTICLE "BOYS [BATTING THE BALL.] )
I SAW THE BOYS BATTING THE BALL.
```

### USING LOGO TO IDENTIFY LIMITATIONS OF COMPUTERS

There are also cases in which THE is used before a noun to indicate emphasis, as in THE BALL above. The phrase THE BALL suggests that there is a particular ball in mind, whereas A BALL refers to any ball at all.

There is an enormous chasm between the first part of the rule for THE and this second part. Stated in English, we have:

1. Use THE with all plural nouns.
2. Use THE with both plural and singular nouns to indicate emphasis.

The first part is fairly easy to implement. The second part requires a considerable knowledge of linguistics, the world, and the relationship between the two. Creation of a LOGO procedure which differentiates emphasized and unemphasized nouns, perhaps through evaluation of surrounding text, would not be a realistic task.

The exercises in use of LOGO to describe grammar rules can be used to introduce computers in an English class. They also may be used to demonstrate that certain types of tasks may not be readily amenable to solution by computer. I believe that, for many, knowledge of the limits of computers may ultimately prove as important as knowledge of their capabilities.

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## MICROWORLDS continued

### OBTAINING ADDITIONAL INPUTS

One means of determining when a noun should be emphasized is to ask the person using the computer:

```
TO ARTICLE :ITEM
TEST LAST :ITEM = "S
IFTRUE OUTPUT SENTENCE "THE :ITEM
PRINT ( SENTENCE [DO YOU WANT TO EMPHASIZE] :ITEM [?] )
TEST MEMBER? REQUEST [(Y) (YES) (SURE)]
IFTRUE OUTPUT SENTENCE "THE :ITEM
TEST MEMBER? FIRST :ITEM (A E I O U)
IFTRUE OUTPUT SENTENCE "AN :ITEM
OUTPUT SENTENCE "A :ITEM
END
```

This procedure asks whether a word should be emphasized. A sample output might resemble the following:

```
PRINT ARTICLE "APPLE
DO YOU WANT TO EMPHASIZE APPLE?
NO
AN APPLE
```

```
PRINT ARTICLE "TURTLE
DO YOU WANT TO EMPHASIZE TURTLE?
YES
THE TURTLE
```

Let your imagination go. I'm sure you can think of many improvements and extensions of these ideas. Keep us posted on what you do!

### TURTLE EMPHASIS a preliminary report

As indicated above, I want to emphasize TURTLE because we have just had our first encounter with THE Tasman Turtle, as described in the March issue of the NLX. It is a well constructed two-wheeled plexiglass hemisphere, connected to the computer through an umbilical cord of ribbon cable which carries both power and control instructions.

Our version is configured to interface with an Apple computer, and can be operated through both MII and LCSII LOGO and BASIC. With LOGO, the usual turtle commands are simply preceded by a T:

TFD 100 TRT 90 etc ...

I set up the Tasman at home initially - I couldn't wait until I got to the office! It took about five minutes to unpack and connect the turtle. It worked the first time it was turned on, exactly as described in the manual, without difficulty.

It was easy to control the turtle from the computer keyboard. Soon, it blinked both its eyes (green lights on the front), honked its horn and rolled around the floor.

One observation I made right away was that the connecting cable was shorter than I had expected. This limits the exploration of mazes of books and other objects placed on the floor.

A touch sensor encircles the turtle, enabling it to tell when it contacts an object in front, back, or on the sides. It took just a few moments to program the turtle so that it responded to a touch on any side by retreating, blinking its eyes all the while. In the absence of any touches, the turtle was instructed to make short random movements from time to time. (It seemed almost alive!)

A floor turtle offers tremendous possibilities for both a teacher and a class. There are also uncounted possibilities for the introduction of children to the control of real-world objects through a computer. I also have fantasies about an introduction to LOGO conducted by the turtle on the first day of class. My belief is that every school system's instructional computing program should also include a robot turtle.

I have enjoyed meeting you through this column. In the September issue, I will share some more details on the many uses for a floor turtle in the classroom.

Glen Bull is a professor at the University of Virginia, and teaches LOGO courses at both the graduate and undergraduate level.

## LOGO Congress Announced

The Asociacion Amigos de LOGO is helping to sponsor the First International LOGO Congress. It will convene in Buenos Aires, Argentina, September 16 - 18, 1983. Seymour Papert will be there, according to Horacio Reggini, conference chairman.

Check with your school systems now to see if they would help with your expenses. This would be an opportunity for exceptional professional growth!

The National LOGO Exchange is putting together a group tour to take care of transportation and lodging for those desiring to attend the conference. Departure points on both the east and the west coast are planned.

If you would like information on the tour, please send your name, summer address and telephone number to NLX LOGO Congress Tour, PO Box 5341, Charlottesville, VA 22905. We will keep you posted as the trip develops.

## Turtle on the Farm continued

In addition to the children's enthusiasm, I saw significant growth in their competencies during their work with the floor turtle. Many children made tremendous strides in their understanding of directionality. Many also became much more accurate in estimating and anticipating outcomes. And for some children, recognizing letters and finding them on the keyboard was an enormous achievement.

I keep a notebook with brief notes of each child's struggles and triumphs. Almost without exception, the children made considerable progress in using the computer by the time we retired the turtle from the farm. I also saw a transfer of these skills to their work with the screen turtle. Their projects became much more precise.

A highlight of the turtle on the farm project was the completion of a class story book. After each child had a turn controlling the turtle's activities, she/he illustrated and wrote or dictated a story about the turtle's adventures. We compiled these stories into a book that has been read over and over again.

A floor turtle's environment need not be limited to a farm. Many other curriculum units lend themselves well to the turtle's exploration. Our turtle has subsequently led us into a study of mapping, and has journeyed through the solar system. The turtle has become a facilitator for learning in subject areas as well as a facilitator for LOGO learning.

I have found great value in integrating the turtle beyond math and into the areas of social studies, science, and language arts. The computer has become not a separate and distinct curriculum, but an integral part of my classroom program. And the floor turtle has been our major inspiration. It is an excellent aid for use with young children because it sparks their imagination and provides endless opportunities for enriching all aspects of their learning.

Linda Razzano teaches a K+1 combined class at Hanscom Primary School in Bedford, MA. She also acts as a LOGO consultant for neighboring schools.

## PROBLEMS AND HOPES

The projects which students have undertaken have revealed some persistent problems with current versions of LOGO. The first problem is that of workspace memory. Projects of any complexity run into difficulties of using and trading files on disk. I have several projects which fill workspace two and three times. The subsequent file manipulation causes the programmer problems which should not be necessary.

Mysterious bugs which bomb some versions of LOGO when memory is nearly full and at other unexplained times are problems which need to be addressed. Speed is another (though less obvious) problem. Extensive work with lists can be slower than desired. In looking FORWARD 100 to fuller implementations, we hope that developers take into consideration people who want to do semi-serious programming with LOGO. If LOGO is to become a full purpose language for everyone, some of these deficiencies must be remedied. That is one hope.

Another hope is that you, dear readers, have a good summer and continue to grow with LOGO. If your school is wise, they will allow you to have access to LOGO this summer, and perhaps attend one of the many LOGO summer activities mentioned in the NLXTRAS. Balance skill development with application to your own projects. The projects described this month may stimulate your own project ideas.

Glen and I will be working with LOGO this summer. We will offer one, two, and three credit hour courses at the University of Virginia. These are intensive experiences with LOGO. We always learn so much from the students because they constantly challenge us with questions, problems, and new ideas. The courses begin in late July. If you are interested in more information, you can write to me at the School of Education, 405 Emmet Street, Charlottesville, VA 22903 or in care of The National LOGO Exchange, Box 5341, Charlottesville, VA 22905.

Our last hope is to complete a LOGO book for you by August. The writing of the book meets Papert's ideas of learning by making mistakes. We have a laboratory manual which students have been debugging for two years. We hope that our experience will be a valuable addition for all who are interested in LOGO.

Steve Tipps is a professor at the University of Virginia, and conducts LOGO workshops for teachers throughout the eastern United States.



# Teach Your Turtle to Draw Hex Signs

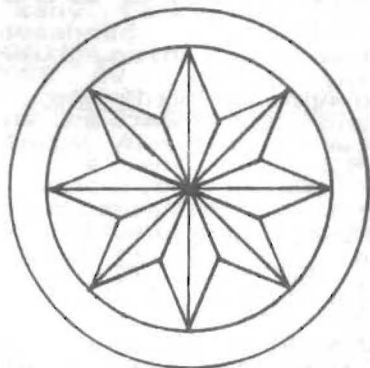
by Elizabeth Pearce

For my project in a computer course taught by Steve Tipps and Glen Bull at the University of Virginia, I developed a unit on Pennsylvania Dutch Hex Signs.

The intent of the project was to demonstrate mastery of programming skills in LOGO, including basic turtle commands, REPEAT statements, and the use of procedures and variables. But, in attempting to do that, I gained much more.

I chose to reproduce the hex signs because they are based on geometric shapes which I have always found appealing. I selected actual examples of the original Pennsylvania Dutch art form, and used a master procedure comprised of smaller subprocedures to draw each sign.

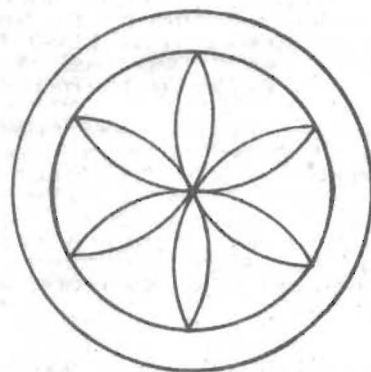
Each hex design is drawn from the center outwards. I designed my procedures so that they stop at certain places and ask for color and size selections. Variable values are computed, and that part of the design is then drawn.



I had to spend an unexpected amount of time in designing the subprocedures and defining appropriate values for the variables. But, when a design was completed, I felt a great feeling of satisfaction as the turtle moved through each subprocedure, pausing at the right places for size and color information! When I showed them to my friends, they got so excited, they broke into spontaneous applause!

It is important for us all to realize that projects such as this not only demonstrate the graphic capabilities of the LOGO language, but, more importantly, suggest a means in which the growing computer skills and interests of our students could be combined with other content areas.

These hex sign projects could be used as an independent or group project for students as a followup to a study of ethnic groups or regional areas of the United States, for example. Use of the computer as a medium for such sharing must be included in today's lesson plans.



Students might become interested in making up their own hex signs, or studying the meaning of the various components. But, such a project need not be limited to hex signs.

Early American quilt designs might be reproduced (Ed. note: see LOGO Quilting Party, NLX, December 1982). American Indian artifacts and art designs could also be studied and drawn, as shown by Pat Reilly in her article in this issue. Various architectural styles could be displayed. Map making has a universal appeal for students. Patterns in cloud formations could be illustrated.

Finding outlets for such illustrative graphics is not difficult when suggested in a manner in which students are encouraged to share their knowledge and accomplishments. Certainly, the effect of the excitement caused by a well-done project makes it all worthwhile!

I cannot wait until I have a class of my own once more, so that I can help my students develop their own LOGO projects parallel to the subjects we will be studying. And, if I have a "rainy day," I can always show them my hex signs!

**References:**  
Folk Motifs of Pennsylvania, Frances Cichten, Hastings House, 1954.  
The Pennsylvania Dutch and Their Furniture, John G. Shea, Van Nostrand Reinhold Company, 1980.  
Hexology: The History and the Meaning of the Hex Symbols, Jacob and Jane Zook, privately published by the authors, 1962.

Elizabeth Pearce, a graduate student at the University of Virginia, taught primary grades in Glastonbury, CT. She is majoring in Reading Education.

## MECC's LOGO Book Announced

The long-awaited Apple LOGO in the Classroom by Marcia Horn and others, is ready for distribution. The book contains ten modules that enable LOGO teachers to help their students progress from LOGO fundamentals to using LOGO as a problem solving and creative thinking tool.

Teacher notes and reproducible worksheets with student activities are provided in the 217-page volume. Topics range from turtle graphics through list operations. Activities progress from familiarization to practice to self-directed, and help prepare students to explore with LOGO on their own.

The importance of student LOGO journals is discussed at the very beginning of the book. A sample is provided as a guide.

Although the book was written for use with LCSi (Apple) LOGO, most skills and activities will transfer readily to other LOGO versions. The price for Minnesotans is \$16, and for others \$32. Send your order to Marcia Horn, MECC, 2520 Broadway Drive, St. Paul, MN 55113.

## LCSI to Release Apple LOGO Tool Kit

A disk packed full of useful utilities will be released shortly by LCSi to support its Apple LOGO. It will include procedures for printing and saving pictures, editing text, making music, low-resolution graphics use, debugging tools (STEP and TRACE) and instructions on making your own primitives.

A LOGO 6502 assembler and the commands to control the Tasman and Terrapin floor turtles are also in the package. This is what many of you advanced LOGO programmers have been waiting for.

If your students have "taken you to the LOGO limit," here is something to whet appetites. These utilities will allow extension into many areas not previously accessible.

Plans are being made to release this package through the Apple dealers. So, stay in touch with your local representative for further information. Or, write Michael Tempel at LCSi, 220 Fifth Avenue, New York, NY 10001.

## TELL :SELF PENDOWN

Summer is on the way! For many of us, it promises a change from the past nine months... an opportunity to rest, relax, read, travel, try some different kind of work.

Why not plan to use some of your summer time to reflect on your LOGO work? Further, why not write a short article for the NLX? It would be the perfect time to do so.

If you have enjoyed reading about the LOGO ideas of others, you know the importance of sharing. And, when teachers share, the children benefit. So, come on! Plan to spend a little time in the PENDOWN mode!

Articles should be about 500 words long, and include your LOGO ideas and activities, and a brief evaluation of the responses of your students. If you made use of any handy references, include information on how NLX readers could obtain them.

Send your completed article to Editor, The National LOGO Exchange, PO Box 5341, Charlottesville, VA 22905. You cannot imagine the rewards which will come your way!

## New LOGO Books

Reston Publishing, 11480 Sunset Hills Road, Reston, VA 22090, has announced Apple LOGO Primer, by Gary Bitter and Nancy Watson, and 1,2,3, My Computer and Me, by Donna Beardon of the YPLA.

Turtle Enterprises North, 11515 Kathy Drive, Spokane, WA 99218, has published LOGO: A Problem Solving Approach, by Joan Davis and Joan Schenker.

McGraw-Hill's books by Dan Watt, Learning with LOGO and Learning with Apple LOGO, most likely will be out by the time you read this.

Rumors have it that Harold Nelson (Technical Editor for Microcomputing magazine and author of "LOGO: Not Just for Kids," Microcomputing, March 1982) is writing a book on advanced LOGO projects which is to be published by Addison Wesley.

LOGO Computer Systems Inc. will release their Apple LOGO Training Manual shortly. Authored by Barbara Bowen of the Apple Education Foundation and Michael Tempel of LCSi, the book will be targeted at those who present inservice training and LOGO workshops with Apple LOGO. It is organized so that a presentation can be assembled easily from the components. If you give workshops on a regular basis to diverse groups, this volume could be extremely helpful!

# Save Your Apple LOGO Graphics

by Tom Lough

Since Apple LOGO (LCSI) cannot execute the DOS command BSAVE, there is no provision for saving graphic drawings on a disk. It is possible to do this, however, by "crashing" LOGO, loading BASIC into the computer without disturbing the graphics memory domain, and using the BSAVE command as in BASIC operations.

A convenient way to do this is to prepare a graphics storage disk in the following manner. Start up your Apple computer with BASIC and enter the program listing at the end of this article. Place a blank disk in the drive, and initialize it by entering INIT HELLO. (Note: When this is done, all information previously stored on the disk will be lost.)

Now, start up your LOGO system and draw something on the screen. When you are ready to save it on the file disk, perform the following steps:

1. Enter HIDE TURTLE.
2. Place your initialized graphics file disk in the drive.
3. Enter .PRINTER 6 to boot the BASIC program from the file disk. You will see a confirmation that your graphics drawing is still in memory.
4. When prompted by the program, enter the name of the picture which you want to save.
5. When disk activity stops, take the file disk out of the drive, insert the Apple LOGO disk, and press <return>.
6. Resume your LOGO activity.

Later, you can print the picture from the disk using any one of many graphics dump routines available.

The name under which the drawing is saved must be selected with care. If you choose a name which is already on the file disk, the picture on the disk will be lost. If you do not know whether the name you have chosen is on the disk or not, enter \* when prompted to see a catalog listing of all picture names in use on that particular disk.

Here is the program to use when initializing your graphics file disk:

```

10 REM APPLE LOGO GRAPHICS SAVE
20 REM COPYRIGHT 1983 TOM LOUGH
30 REM THE NATIONAL LOGO EXCHANGE
40 REM PERMISSION IS GIVEN TO COPY
50 REM FOR NON-PROFIT USE PROVIDED
60 REM CREDIT IS GIVEN TO THE NLX
70 REM ENJOY!
80 REM *****
90 REM INITIALIZE YOUR STORAGE DISK
100 REM WITH THIS APPLESOFT PROGRAM
110 REM *****
120 REM VERIFY YOUR GRAPHICS DRAWING
130 POKE -16297,0 : POKE -16304,0
140 FOR I = 1 TO 1500 : NEXT I

```

```

150 TEXT
160 HOME : VTAB (10)
170 D$ = CHR$ (10)
180 PRINT "TO SEE NAMES ALREADY IN"
190 PRINT "USE ON DISK, ENTER *"
200 PRINT "OTHERWISE, ENTER YOUR"
210 PRINT "DRAWING NAME."
220 GOTO 240
230 PRINT "ENTER YOUR DRAWING NAME."
240 PRINT : INPUT N$
250 IF ASC (N$) = 42 GOTO 500
260 PRINT D$ : "BSAVE " : N$ :
      " : A$2000, L$2000"
270 PRINT "DRAWING SAVED AS:"
280 PRINT N$
290 PRINT
300 PRINT "TO RESUME LOGO, INSERT"
310 PRINT "YOUR LOGO DISK, THEN"
320 PRINT "PRESS RETURN"
330 GET A$
340 PR#6
350 END
500 PRINT D$ : "CATALOG"
510 PRINT "PRESS ANY KEY"
520 GET A$
530 GOTO 230
540 END

```

## LOGO Notes

Griff and Robbie Wigley have compiled a LOGO Resource Manual which contains 63 citations for articles on LOGO in 16 magazines, and information about 11 LOGO books, 9 LOGO-related organizations, and 13 different versions of LOGO! It is updated on a continuing basis. To get your copy, send \$5 (plus .70 to cover postage) to Griff Wigley, Family Computing Inc., 918 College Street, Northfield, MN 55057. Minnesota residents add .30 for sales tax.

INSTRUCTOR magazine announces an invitation for computer using teachers to contribute tips and ideas to the expanded Bright Ideas section in each issue. This is another excellent opportunity to share your LOGO ideas with others. Compensation and a by-line are among the benefits included. Write to John Lent, INSTRUCTOR, 757 Third Avenue, New York, NY 10017 and ask for a copy of the editorial guidelines for a Bright Idea submission. Good luck!

The long-awaited newsletter of the Friends of LISP/LOGO & Kids (FOLLK) is off the presses! The first issue includes an article about FOLLK, a listing of LISP/LOGO utilities, a discussion of the role of the quote mark in LOGO operations, some interesting puzzles, and an announcement about a LOGO utilities disk which FOLLK will have available in the near future. FOLLK membership costs \$25 per year for adults, and \$15 for students and senior citizens. Write FOLLK, 254 Laguna Honda Blvd., San Francisco, CA 94116.



# The National LOGO Exchange

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