

The Logo Newsletter for Teachers

T H E N A T I O N A L
LOGO
E X C H A N G E

Volume 4 Number 4

FORWARD 100!

December 1985 Page 1

Come to the LogoShow!

by Doris Schroeder

"Hello! Welcome to the LogoShow!"

"My name is Julie, and this is Michael. We will tell you the story of *The Gingerbread Man*."

A title page flashes off the computer screen and you are treated to a Logo drawing showing the little old woman's view of the gingerbread man in the center of a pan. As the story unfolds, two fourth grade students retell the familiar tale to a rapt audience.

At the appropriate moments, Julie presses the <RETURN> key, and new Logo illustrations appear: the gingerbread man running further and further down a road, the gingerbread man riding the crest of the waves on the fox's back, the gingerbread man's head just above the water, and in the final scene, only the blue waves.

Michael concludes, "... and before they got to the end of the river, the fox ate up the gingerbread man. And that is what should happen to all gingerbread men."

A look around the gym shows equally inventive Logo storytelling.

How It All Began

In previous years, the fourth grades at Montclair-Kimberley Academy, a private K-4 elementary school in Montclair, NJ, presented traditional-style class plays. This year, however, Kristina Urband and I got an inspiration that our fourth graders might be interested in something different ... The LogoShow! Although our students had already worked with Logo a number of weeks, the results of these few moments of inspiration were more Logo lessons, and many, many hours of hard work.

Each pair of students selected a fairy tale to retell and illustrate with Logo. They designed their pictures on paper, then created them with Logo on the screen. They wrote the stories and sketched storyboards in "dummy" books, sharing the narration, revising, and editing as needed. They rehearsed at the computers, receiving assistance from their teachers and peers. And, for the finishing touches, they dressed up as characters from their tales and presented their stories to the rest of the school at the LogoShow!

Sixteen Apple computers with color monitors were arranged, two to a table, around the gym. The school's

two hundred students and many parent-visitors were divided into eight groups and assigned a starting position. After both stories at a table were completed, a student raised a turtle sign. When eight turtle signs were held high, a few notes from the xylophone signaled everyone to rotate one position clockwise to hear the next two stories. The assembly proceeded in this fashion until all sixteen stories had been presented to each group. It was a phenomenal exercise in coordination and planning, and quite a success! And our students were the most excited of all!

It was also a phenomenal exercise in coordinated learning. In addition to all the Logo and language arts activities that were highlighted, one girl adapted the Hall and Oates song, "Out of Touch," to go with the show.

In nineteen years of primary school teaching, I thought the LogoShow was the most spectacular and exciting learning project I have ever carried out. It gave everyone a chance to get involved. I heartily recommend it for others!

(Ed. Note: This would be an outstanding Logo class project for National Library Week in April. Doris is interested in corresponding with any NLX readers who want more details about the LogoShow. Write to Doris

LogoShow continued

Schroeder, Montclair-Kimberley Academy, 201 Valley Road, Montclair, NJ 07042. Please enclose a stamped self-addressed envelope.)

Doris Schroeder taught fourth grade at Montclair-Kimberley Academy in Montclair, NJ, at the time of the LogoShow. She is presently teaching seventh grade reading and writing, and chairing the Academy's middle school computer department.

Out of Space

A Logo adaptation of
Hall and Oates' "Out of Touch"

by Margo Hirsch, fourth grade
Reproduced with permission

I look down at the keys
And then I press Control C.
Then it said, "OUT OF SPACE."
I wanted to play that turtle game RACE.
I looked up at the TV screen,
Took out the disk, shut off the machine.
It's no use. Why does it happen to me?

Chorus

You're OUT OF SPACE.
RECYCLE NODES.
But I still love to use Apple Logo.
RECYCLE NODES.
But I still love to use Apple Logo.
Oh-oh-oh, Lo-oh-go, Lo-oh-go.

Put Apple Logo in the disk drive
To get that computer to come alive.
It's booting up and it's ready to go.
Type S and T so the turtle will show.
It shows the turtle standing in place.
I'll type a procedure to make a face.
FORWARD 50 RIGHT 90 PENDOWN

Chorus

Chorus (at the end of the LogoShow)

We're OUT OF TIME.
It's time to go.
But we hope you've enjoyed our LogoShow!
We're OUT OF TIME.
It's time to go.
But we hope you've enjoyed our LogoShow.
Oh-oh-oh, Lo-oh-go, Lo-oh-go.

From The Editor

by Tom Lough

"Sorry. We cannot approve this course for recertification. Logo isn't appropriate for use in the high school."

Because Logo is powerful enough that it can be configured for use with young children, it is often misconstrued as a computer language only for lower grades. After all, most of the Logo introduction in Papert's *Mindstorms* was directed toward use with primary and elementary children. The fact that an entire chapter is devoted to Logo and the teaching of physics is often overlooked.

As a result, a number of administrators (and experienced Logo teachers) can lose sight of the fact that this artificial intelligence language is powerful and sophisticated enough to be used at all levels of the educational spectrum. This mindset is not to the advantage of our students.

Statements such as the hypothetical quote above do little to encourage the development of Logo applications in the upper grades. And the problem may be getting worse.

Elementary teachers might be tempted to consider the "no Logo in the high schools" situation as something which belongs to their secondary counterparts, and choose not to become involved. If this happens, then the value of the Logo learning in the elementary grades can legitimately be called into question. What is it worth if no one from the lower grades is interested in the follow through at the higher levels?

It would be as bad, however, if elementary teachers give the impression that they feel Logo "belongs" only in the lower grades. In many cases, where administrators might be considering supporting experimental Logo projects in the high school curriculum, the gears of their minds could become locked up by thoughtless remarks made by well-meaning elementary teachers extolling the virtues of Logo for their grade levels with no regard for Logo applications at higher levels.

Perhaps if we all become more sensitive to the full potential of Logo and more interested in the big picture of Logo applications throughout the K-12 (and beyond) curriculum, our students would be in a position to take advantage of the power Logo offers throughout the entire grade sequence.

If we do not, high school students who learned what Logo can do while in elementary school might begin asking some rather uncomfortable questions ... While that may not be bad in itself (... and a child shall lead them ...), wouldn't it be better if Logo were already understood, respected, and "approved" by the administrators involved?

What do you think about it?
What can we do about it?
FD 100!



Tipps for Teachers

by Steve Tipps

Geologoboards

Working with geoboards is a favorite student activity. It is easy and fun to make shapes, designs, and symbols using varicolored rubber bands stretched between the nails or pegs. In the process, students learn about angles, lengths, and patterns with a dash of creativity. Geoboards can also be drawn with Logo. The learning with Logo Geoboards extends understanding co-ordinate names for placement of lines and objects on the screen.

Turtle Zip

As a beginning activity, children zip the turtle about the screen using the SETX, SETY, and SETXY or SETPOS commands. Interesting or chaotic patterns result from a series of commands.

```
SETX 50 SETY -50    or    SETX 50 SETY -50
SETXY 100 100      SETPOS [100 100]
SETXY 40 (-40)     SETPOS LIST 40 -40
SETXY 50 50        SETPOS LIST 50 50
```

A sequence of commands using the coordinate commands might be used to draw a ship, a house, or a bird. The pattern might be a geometric design. In the process of turtle zipping, students learn that the turtle can be moved directly to any spot on the screen. Students also become familiar with the range of numbers used for movement, and the syntax of the commands - especially the places which require parentheses when the second input is negative. The LCS versions of Logo demand that the co-ordinates be in the form of a list. This can be done in two ways. The coordinates must be placed in list brackets, or the command LIST can be used for the same effect.

However, typing in the numbers each time is rather laborious. A better method of telling the turtle exactly where to go is needed. With enough experience on procedures, students should have an intuition that the same task could be done more economically with procedures. Making tools is an important process to be learned in computing. Procedure making is an experience in making tools.

A Line, B Line

The first tool creates the grid of points on the Logo Geoboard. The physical geoboard may have been labeled with letters or numbers to locate points on the grid. On a 5 X 5 grid, the points might be labeled A1, A2, A3, A4, A5, B1, B2, etc., or by AA, AB, AC, AD, AE, BA, BB, etc. If labels are not already on the geoboard, you can use tape and markers to make them.

Placing points on the screen may be done in several ways. If your version of Logo has a DOT com-

mand, it works in much the same way as SETXY or SETPOS. Simply call the DOT with two coordinates as input.

```
DOT [ 50 50 ]
```

or

```
DOT LIST 50 50
```

(Ed. note: In some Logo versions, a dot cannot be made until the pen is in a particular state, such as PD or PU.)

If you do not have the DOT command built into your Logo, you can write a DOT procedure.

```
TO DOT :X :Y
  PU
  SETXY :X :Y
  PD FD 1 BK 1 PU
  END
```

or

```
TO DOT :X :Y
  PU SETPOS LIST :X :Y
  PD FD 1 BK 1 PU
  END
```

Glen and Paula's October 1985 "Listful Thinking" column contains additional DOT procedures worth studying.

DOT can be used in the procedure for making the geoboard grid. A modular way to do this would be to setup each line of DOTs in a separate procedure.

| TO A.LINE | TO B.LINE | TO C.LINE |
|-----------|-----------|-----------|
| DOT 0 0 | DOT 20 0 | DOT 40 0 |
| DOT 0 20 | DOT 20 20 | DOT 40 20 |
| DOT 0 40 | DOT 20 40 | DOT 40 40 |
| DOT 0 60 | DOT 20 60 | DOT 40 60 |
| DOT 0 80 | DOT 20 80 | DOT 40 80 |
| END | END | END |

Tipps continued

Finally a grid is made with the lines of DOTs.

```

TO GRID5X5
A.LINE
B.LINE
C.LINE
D.LINE
E.LINE
END

```

In the primary grades, you may choose to write the GRID5X5 procedure for the children to use as a tool. In the intermediate grades, you can show the students how to make one line and they will finish the grid. The modular nature of the grid makes it easy to enlarge. In junior or senior high, you might use this set of procedures as the crude solution and challenge students to use a list of points to improve it. See "Listful Thinking" in the November 1985 NLX for a list processing method used to make star maps.

The basic strategy is adaptable to grids of all sizes and shapes. By changing the coordinates used and the number and distance between them, the grid can be as detailed or as simple as desired. The 5X5 grid uses only positive numbers, but larger grids may force students into the other quadrants of the screen.

Beyond a 5X5 grid, keeping up with the point names is difficult. You may find that a labeling scheme is needed on the screen. The top text line of the SPLIT-SCREEN is handy for the horizontal labels, but you need graphics procedures or the NLX alphabet for vertical labels. Commodore and IBM Logo allow you to stamp letters on the turtle screen, which is very helpful.

Dot to Dot

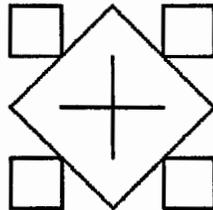
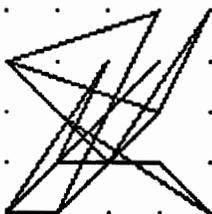
With the grid in place, the turtle is ready to zip from point to point by name. Each point on the 25 point grid can be written as a positional procedure. Here are two points for GRID5X5.

```

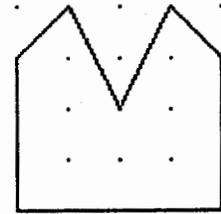
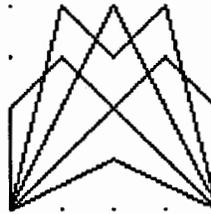
TOA1          or      TOA1
SETXY 0 0     SETPOS LIST 0 0
END           END

TOB1          or      TOB1
SETXY 2 0     SETPOS LIST 2 0
END           END

```



With all the zip procedures written, students are ready for creative designs. Experimentation with the tools yields different geoboard designs.



At first, the students just type in the zip procedures. They will begin to plan their designs. Working out the sequences of positions is a good off computer activity. Next come pen colors with PENUP and PENDOWN to make more complex designs. Some designs need more space and points, demanding bigger and better grids.

To draw the grid designs more than once, students need to capture their designs in procedures. The idea of point procedures being tools is reinforced by writing other procedures using them. After drawing an arrow point by experimenting with positions, the arrow point is handier to redraw with a procedure.

```

TO ARROW.POINT
A1 E5
A2 B3 C4 E5
C3 A2 E5
B1 C2 D3 E5
C3 B1 E5
END

```



Decorated Grids

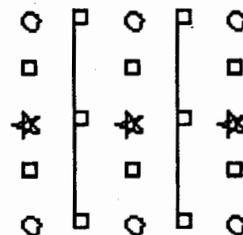
The positional, or zip, procedures move the turtle to each point on the grid. However, drawings on the grid are not limited to straight lines. Small squares, circles and triangles can be added to the grid tools.

```

TO SQUARE
REPEAT 4 [FD 5 RT 90]
END

TO CIRCLE
REPEAT 15 [FD 1.4 RT 24]
END

```



These shapes are then added to the sequence of position procedures for decorated grids.

Tipps continued

Never Boring Geoboards

The geoboards are not a substitute for the time children spend with rubber bands and pegs. The sensorimotor learning with geoboards is just as essential as playing turtle is to their thinking process. Geogoboard are simply another way of expressing ideas about lines, shapes, positions, and colors and a new way of creating.

However, the geoboard and the coordinate geometry which underlies it are very different in nature from turling and the intrinsic geometry which underlies it. Intrinsic geometry is based upon knowledge of where the turtle is here and now, not in relationship to other points. Some teachers may feel that coordinate geometry is superior because it is what is "taught" in schools. Intrinsic geometry is not inferior at all and has many strengths in describing events from an egocentric perspective. Logo has both geometric systems and opportunities to express ideas about each of them.

Steve Tipps is the West Professor of Education at Midwestern State University in Wichita Falls, TX. He conducts Logo workshops for school systems throughout the United States, and is a popular conference speaker.

Logo Teacher Feature

by
Rebecca Poplin

Featuring: Peter Rawitsch

As the holidays approach, many of us reflect on the most wonderful gifts (tangible or intangible) we have given or received. When we receive a special gift, with a childlike thrill, we want to share that gift with others. No gift could be more wonderful and intriguing to a user of Logo than that of new tools for thinking and creating. Peter Rawitsch, a first grade teacher in Glenmont, New York, has some delightful new tools that he has either created, found, or otherwise scrounged about for the money to purchase. Perhaps you would like to share them with others as Peter does.

Peter has discovered a fascinating construction kit, called *Capsela*® (Play-Jour, Inc., 200 Fifth Avenue, Room 1024, New York, NY 10010), which actually has gears inside clear plastic spheres. The spheres can be connected to each other with joining pieces to create land and water toys limited only by the imagination. Some of the spheres have speed reduction mechanisms. Wheels, propellers, and windmills can become a part of the construction. Talk about modularity!

Peter persuaded the PTA in his school to buy *Capsela* for his classroom. At first he used only the non-motorized pieces in his Microworld Center for off-computer activities. He was also careful not to put out pictures of construction projects so the children's creativity would not be limited. Even without motors, the constructions were dynamic and stimulated fascination with how one movement affects another.

Some *Capsela* models have "computer control" (via a microprocessor) and an infrared link. Peter is hoping to create an interface between Logo and the *Capsela* constructions during the year.

Peter has been interested in robots for quite a while. He uses the Big Trak, CompuRobot, and a Terrapin robot. His students predict the commands needed to move the robots and use the turtle to test hypotheses. Peter has written a grant for a Valiant Robot Turtle (available from Harvard Associates, 260 Beacon Street, Somerville, MA 02143, (617) 492-0660) for the teacher center in his area. Some of Peter's students are conducting a study to replicate animal movements with the robots.

Learning Logo

Peter Rawitsch's strong background in Early Childhood Education and the arts and his desire to develop the creativity of his students led him to Logo, though he does not have a strong interest in computers *per se*. He realized from studying a first draft of Terrapin Logo that the language puts the user in control of the computer. Peter taught himself to use Logo with the manual and without reading *Mindstorms*.

After attending a workshop on Logo in which the presenter claimed that Logo was not a good tool for group projects, Peter realized that teachers could benefit from his classroom experience by using Logo as an interdisciplinary tool, and developing both individual and group projects.

As Peter increased his work with other teachers, he began conducting inservice workshops and developing curricula, through which he has shared his experience and philosophy.

Rawitsch's Rules

One of Peter's gifts to teachers is what he calls *Rawitsch's Four Laws of Logo*.

1. **Logo is not easy.** It requires thinking, and thinking requires a lot of effort.
2. **Logo is not important.** The language itself is not important; what a child can *do* with it is important.
3. **Logo is not safe.** It is unpredictable. The best-laid teacher plans may go awry. A creative teacher must remain open to all kinds of opportunities and be ready to maximize the opportunities when they occur.
4. **Logo is not for everyone.** Many teachers cannot handle things that are not important and not safe. For those teachers, a different tool may be more appro-

Feature continued

appropriate. Some teachers get hung up in commands and miss the real objects of Logo. If we are going to use Logo, we need to agree that thinking skills and problem solving strategies are important.

Peter is quite interested in giving and receiving ideas about curriculum, robots, and other tools you may have found useful in your classroom. If you would like to communicate further with Peter Rawitsch, he would like to hear from you.

Peter Rawitsch
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Guilderland Center, NY 12085
(518)861-6637

If you know of creative teachers who are actively involved with using Logo and have special gifts to share through this column, please contact Rebecca Poplin, 2421 Fain Street, Wichita Falls, TX 76308.

Rebecca Poplin uses Logo to teach computing and mathematics at a junior high school in Wichita Falls, TX.

NLXionary A Lectionary of Selected Logo Readings

with Commentary and Opinion
by Griff Wigley

"The Many Worlds of Logo," Part one of a three-part series on Logo, *Educational Computing* segment EC301, PBS weekly videotaped program, produced by Kentucky Educational Television (KET) in association with the EPIE Institute of New York.

> *Educational Computing* is a weekly half-hour TV series in magazine format for parents and educators. The programs typically cover educational software evaluations, comments from experts in the field of educational computing, and updates on computer news and technologies. Although this program is not a "reading," I feel it is worthy of comment.

> In this segment, Fred D'Ignazio reports on the variety of ways educators around the world are using Logo to address different educational needs and content areas. He finishes with a short interview of Papert.

> This is a nice overview of Logo's possibilities, especially for readers of the NLX, as opposed to a typical viewing audience who might need a simpler introduction to Logo and its philosophy. Some of the more unusual applications of Logo spotlighted were the treating of autistic children, creating weather graphics, teaching English as a second language to Japanese students, and using it as a mechanical design tool.

> The fact that many of those interviewed are university people involved in research left me with a mixed reaction. It confirms the "no ceiling" attribute of Logo as postulated by Papert, and, in that sense, excites and stimulates. It also confirms some feelings of inadequacy in that it appears to take considerable teaching talent and content area knowledge to help students go very far beyond Logo's introductory stages.

> Yet, that might be part of Logo's appeal for many of us - like the "diamonds are not dispersed on every street corner" philosophy of pursuing interests. Whatever the case, readers are encouraged to watch this series, particularly the next two segments, "Logo Under Fire," and "The Future of Logo."

(Ed. note: "The Many Worlds of Logo" (EC 302) is scheduled for rebroadcast on November 28 and 29. "Logo Under Fire" (EC 304) follows on December 26 and 27, and "The Future of Logo" (ED 308) on January 9 and 10. Local broadcast dates and times vary by as much as a week. Consult your local PBS station for more details, or call KET at (800) 354-9067.)

"Remembering the Path to Excellence," by Stanley Pogrow, *Phi Delta Kappan*, October, 1985.

> Four educators are asked to view education since 1985 from the fantasized vantage point of the year 2005. Pogrow's article is one of the four viewpoints, taking advantage of "hindsight."

> He speaks of the fizzle of microcomputers during the mid to late eighties as occurring because educators knew little about the learning process and the operation of schools, focusing instead on computer literacy, one computer in every classroom, Logo, and equal access to computers. Among other things, he says educators learned "that Logo didn't have any real effect on learning (though many children came to believe that Indians shot turtles at cowboys) ... With the wisdom of hindsight, it seems silly that substantial numbers of educators came to believe that kids could be made smarter spontaneously by moving a turtle around the screen."

> Pogrow maintains that the formula of infusing innovations into every classroom and subject according to a scope and sequence, regardless of whether or not teachers had mastered simpler teaching techniques, was an "ingrained bias of the time ..."

> His article goes on to cite exceptions to the above, and explains that the resolution of the problem came in the form of using interactive technologies to automate the routine teaching and learning of facts, "making it possible to concentrate more funding on specialists and master teachers, while providing a greater diversity of learning opportunities."

> Except for his sarcastic remarks about Logo, this is a very worthwhile and interesting article. His philosophy is quite similar to that of Marc Tucker, Director of the Carnegie Commission's Information Technology project. The US economy will be threatened unless schools begin graduating students who are able to work

NLXionary continued

in small cooperative groups turning innovative ideas into value-added products.

>I interviewed Pogrow while he conducted a workshop on his Higher Order Thinking Skills (HOTS) project, which is briefly described in the article. He acknowledged purposely using some inflammatory language as an antidote to Logo as religion. But, beyond that, the problems he has with Logo are more related to the structure of our current learning environments than with Logo itself.

>Logo is difficult for most teachers to relate to the traditional curriculum, he believes. It is not only difficult for students to generalize from Logo's problem solving approach to other areas, but even to have the opportunity for creating and then solving meaningful problems is rare.

>Lastly, Pogrow believes that Papert has underestimated the unwillingness of both teachers and students to deal with ambiguity. Problems and questions which are not open ended still rule the land. Although he doesn't believe in maintaining the status quo, he finds he can be more effective by combining good discussion and questioning techniques with software that is more transparent than Logo. (By transparent, he means requiring less effort to learn to operate the actual software, thereby allowing more effort to be spent on the learning process in the content area.)

>I don't have a particular problem with any of this. Many people have been geared up to expect the world of Logo, and have met with inevitable disappointment. If more teachers introduced their students to turtle graphics with the goal of having students acquire a deeper understanding and *feeling* for certain mathematical and geometrical properties and concepts, I suspect Pogrow would be less condemning.

Griff Wigley is a co-owner of Family Computing, Inc., a facilitator in the Faribault (MN) Public Schools, and a school board member of Prairie Creek Community School.

Logo Disserts: Dissertations Dealing with Logo

by Barbara Elias

Are there differences in the problem solving activities of gifted children and normal children who learn Logo? This question was examined in an exploratory study which involved sixteen children of ages 9 through 11. Differences were examined in the bugs and the debugging strategies of both groups. In addition, procedural nets (diagrams) were constructed from the projects they developed and examined for structure and level of complexity.

The children who participated in the study attended a public elementary school. Gifted children were selected using the school's identification procedure, Renzulli, Reis, and Smith's *Revolving Door Identification Model for the Gifted and Talented*. An average group of the same age and sex was matched with the gifted group. None of the children had previous computer experience. An equal number of girls and boys was in each group.

Children worked in pairs with two researchers twice per week for ten weeks. After basic Logo concepts were developed, children were encouraged to explore and to "teach" the computer as they worked on individual projects. They were encouraged to sketch their projects first and discuss plans before beginning on the keyboard. As bugs were encountered, children were asked to describe the problems. Suggestions were provided for working through the debugging.

Data sources included dribble files, pencil drawings and notes, tape recordings, and teacher logs. A classification system protocol analysis was used to classify the problem solving activities. In such a system, activities are structurally sequenced into episodes and represented as procedural nets (diagrams). The system provided information on programming style, procedures, revisions, and bugs.

The researcher cautions that the results should be considered inconclusive because of the small number of children. The results obtained, however, indicate that differences were observed in the two groups. Gifted children developed more complex projects, used deeper hierarchical structures in projects, and wrote more procedures. Both groups had about the same number of bugs and no differences were noted in debugging style. Differences were noted in the frequency of bugs and in debugging actions. Children in the gifted group did more debugging after procedure writing, in contrast to the average children, who debugged more before procedures were written. Many individual differences were observed in the teams of each group.

Classroom teachers may find a problem solving model of the novice programmers in this study helpful for their own classroom observations.

>>>Maniatis, E. G. (1983) *An Analysis of the Differences in Problem Solving of Gifted and Non-Gifted Children Using the Logo Programming Language*. (Unpublished masters thesis, McGill University, Montreal, June 1983.)

(Ed. note: Each month, Barbara Elias highlights a dissertation or thesis dealing with Logo. She is accepting copies of recent research results for the NLX Dissertation and Thesis Repository. Reports may be mailed to her in care of NLX, PO Box 5341, Charlottesville, VA 22903.)

Barbara Elias is an assistant professor in the Education Department of Virginia State University in Petersburg, VA, and a doctoral candidate at the University of VA.

Listful Thinking

by Glen Bull and Paula Cochran

Instant Tools

Logo was designed to give users easy access to the power of a computer. As Papert has pointed out, the fact that children can use certain parts of Logo so easily has led to the mistaken impression that it is a children's language. Logo is also used in advanced applications such as college physics courses, and there is nothing inherently childish about the language. Nevertheless, many of us are particularly interested in the use of Logo with young children. In this column we will introduce a Logo tool called DO, which we hope will enable you and your students (even the young ones) to DO some exciting projects this month.

Troubles with Turtles

There are many ways to introduce Logo to young children. The difficulty of ensuring that it becomes empowering for them is a recurring topic in teacher training courses and in the Logo literature. Problems frequently reported by teachers include:

- (1) the commands require too much typing for a young child
- (2) the use of large, double-digit numbers does not match the child's developmental level

A form of Logo which is often called "Instant Logo" is one of the more popular solutions to these problems. In most Instant Logo programs (sometimes called "Easy Logo" or "Single-Key Logo"), the child only has to press a single key to make something happen on the screen. For example, the child might press F, immediately causing the turtle to move forward 10 steps.

Writing a short Instant program is not overly difficult, and, in fact, is a common exercise in a number of Logo texts. Usually these programs work by checking a single key against a list of possible commands. For example, if the child presses R, the program checks to see if the key pressed is F, B, etc., until it reaches R. Then it turns the turtle right 30 degrees. (Terrapin and Commodore Logo users omit the brackets in the procedure.)

```
TO INSTANT.CHECKLIST
MAKE "COMMAND RC
IF :COMMAND = "F [ FD 10 ]
IF :COMMAND = "B [ BK 10 ]
IF :COMMAND = "R [ RT 30 ]
IF :COMMAND = "L [ LT 30 ]
IF :COMMAND = "Q [ STOP ]
INSTANT.CHECKLIST
END
```

This traditional kind of INSTANT program has the virtue of simplicity. It's easy to see how the program works, and if you want to extend the program, you just keep adding more IF statements.

From a programming standpoint, this kind of structure is a common one, found not just in Logo, but in many other languages as well. One disadvantage of this structure is that, as you add more and more IF statements, the program takes longer and longer to check the list of possible commands.

It is possible to write a more elegant INSTANT.

```
TO INSTANT
DO RC
INSTANT
END
```

This Instant relies on a short procedure which will DO a command. In this case, each command must be defined as a one-letter procedure. Here is an example.

```
TO F
FD 50
END
```

DO is a short Logo procedure. It first checks to see if a procedure is defined. If the procedure is defined, DO runs the procedure. There are several possible uses for a tool like DO. This month we have chosen to concentrate on Instant applications. (See the end of the column for Terrapin and Commodore versions of the same procedure. If you use Apple Logo II and are typing in as you read, be sure to include the Q procedure below to stop your Instant.)

```
TO DO :COMMAND
IF NOT DEFINEDP :COMMAND [ STOP ]
RUN (LIST :COMMAND)
END
```

The DO command takes advantage of a sophisticated feature in Logo. The language treats data and programs in the same way. This lets us run a command directly, without searching through a look-up table of the kind used in INSTANT.CHECKLIST.

Another advantage of the new version of Instant is that it is easy for a teacher (or older students) to add new

Listful Thinking continued

commands. All that is necessary is to define new single key procedures. For example,

```
TO R
RT 30
END
```

This can be continued indefinitely, or at least until the alphabet is exhausted.

The Issue of Instant

One of the most highly touted characteristics of Logo is that it permits playful exploration of numbers. However, in traditional versions of Instant Logo, the child does not have an opportunity to input a number at all. This is just one of the limitations which has led critics to note that most versions of Instant take the power of Logo out of the child's hands (Papert, 1984; Tipps, 1983). This is true in many cases. Fortunately, an Instant Logo doesn't have to be so limited.

The version of INSTANT that uses the DO command can encourage construction of an Instant program which accommodates the child, but does not prevent access to Logo's capabilities. Our experience with looking at ways in which Logo can complement a pre-academic or early academic curriculum have lead us to require certain features in Instant programs we use.

Rule-of-Thumb Number 1

A written message on the screen should tell the child what is happening after each keypress. For example, when the child presses the letter F, we would like the word "FORWARD" to appear on the screen (the whole word, not the abbreviation). Since F is a procedure in the Instant we were working on above, it's a simple matter to edit it.

```
TO F
PRINT [FORWARD]
FD 10
END
```

Obviously, the developer of the Instant program has control over the screen message, which does not necessarily have to match the equivalent regular Logo command. Occasionally, for example, we have substituted the word WALK for FORWARD when working with cognitively delayed children (and yes, we have stickers all over the keyboard!).

Rule-of-Thumb Number 2

The child should have the opportunity to supply numeric inputs to procedures. How do we minimize typing and still provide a chance to explore with

numbers? Keep your eye on that F procedure.

If you are using Terrapin or Commodore Logo,
a. Use PRINT1 in place of TYPE.
b. Use REQUEST in place of READLIST in the INPUT.NUMBER procedure.
c. Omit brackets around [OP INPUT.NUMBER].

```
TO F
(TYPE [FORWARD] SPACE)
MAKE "NUMBER INPUT.NUMBER
FD :NUMBER
END
```

```
TO SPACE
OP CHAR 32
END
```

```
TO INPUT.NUMBER
MAKE "NUMBER READLIST
IF :NUMBER = [] [OP INPUT.NUMBER]
OP FIRST :NUMBER
END
```

This revised version of our F command allows the child to type in a number. It also prints out the full word FORWARD, automatically followed by a space. Since the child may want to type more than a single digit (such as 10), the program waits for a carriage return before executing the Instant command.

Rule-of-Thumb Number 3

An Instant program should provide error messages that are meaningful to a child. In regular Logo, if you type FORWARD and press RETURN without entering a number, Logo is apt to present an error message such as:

```
FORWARD NEEDS MORE INPUTS
or
LOGO DOESN'T LIKE [] AS INPUT TO FORWARD
```

Most adults will recognize that Logo is telling them that by pressing RETURN they entered an empty list as input (right?), but this error message isn't helpful for a five-year-old child. It also isn't helpful if the program crashes when the user makes a slight mistake. We anticipate that there are two types of errors a young user of Instant will make:

- (1) They will press RETURN without entering a number.
- (2) They will type a letter instead of a number.

Our INPUT.NUMBER procedure should check for both of these possibilities, and provide a suitable error message.

Listful Thinking continued

```

TO INPUT.NUMBER
MAKE "NUMBER READLIST
TEST EMPTY :NUMBER
IFTRUE [ PRINT [ PLEASE TYPE A NUMBER. ] ]
IFTRUE [ OP INPUT.NUMBER ]
TEST NUMBERP FIRST :NUMBER
IFFALSE [ PRINT SE :NUMBER [ IS NOT A NUMBER. ] ]
IFFALSE [ OP INPUT.NUMBER ]
OP FIRST :NUMBER
END

```

The Terrapin/Commodore version of this procedure is slightly different, and is shown below.

```

TO INPUT.NUMBER
MAKE "NUMBER REQUEST
TEST :NUMBER = [ ]
IFTRUE PRINT [ PLEASE TYPE A NUMBER. ]
IFTRUE OP INPUT.NUMBER
TEST NUMBER? FIRST :NUMBER
IFFALSE PRINT SE :NUMBER [ IS NOT A NUMBER. ]
IFFALSE OP INPUT.NUMBER
OP FIRST :NUMBER
END

```

The error message can be customized by the teacher. If "Please type a number" is not appropriate, it can be changed to any suitable message.

Rule-of-Thumb Number 4

An Instant program should encourage the use of numbers which are meaningful to the child. For a child who is just becoming familiar with small numbers, even the Instant described so far can be a bit frustrating. If she uses the numbers 1 to 10 as inputs, for example, not much is going to happen on the screen. In fact, small turns are frequently not visible at all in regular Logo (try it -- type RIGHT 2 and see what happens).

Dilemma: A preset number is extremely limiting, but use of the small numbers with which the child is familiar is unrewarding.

Solution: Make the small numbers visible, and thus more interesting. This involves multiplying the number typed by the child. We might decide that for every 1 step requested, the turtle moves 10 turtle steps, for a ratio of 1 to 10.

```

TO F
(TYPE [ FORWARD ] SPACE)
MAKE "NUMBER INPUT.NUMBER
FD :NUMBER * 10
END

```

The turn commands will need some adjusting, too. We found out the hard way, when one mystified six-year-

old typed F(oward) 5 (which moved the turtle forward 50 turtle steps, in 5 easy-to-see jumps) and then R(ight) 5 (which barely turned it at all). The same range of numbers should be effective as input to distance and direction commands. We generally multiply our turn inputs by 10, so that an input of 3 results in a 30 degree turn, etc.

```

TO R
(TYPE [ RIGHT ] SPACE)
MAKE "NUMBER INPUT.NUMBER
RT :NUMBER * 10
END

```

If you are fairly new at Logo, we remind you to edit the F procedure above as a basis for the rest of the commands you need -- that's what we did to make R (don't type it all in again!).

Corollary to Rule Number 4

A young child should be able to see each step the turtle takes (and count along). While you are in regular Logo, type FORWARD 50 and press RETURN. How many steps did the turtle take? How do you know the turtle really took fifty steps? On most computers, it looks as though the turtle took one giant step instantaneously (pun intended).

The turtle should pause in between steps. Then the child will be able to count along as the turtle moves. We often add a WAIT procedure, causing the turtle to stop briefly after each step. If your students count more slowly, just increase the length of the delay. For example, change WAIT 20 to WAIT 40. (Terrapin and Commodore users will find their version of F and WAIT at the end of the column. WAIT is a built-in or primitive procedure in Apple and IBM Logo.)

```

TO F
(TYPE [ FORWARD ] SPACE)
MAKE "NUMBER INPUT.NUMBER
REPEAT :NUMBER [ FD 10 WAIT 20 ]
END

```

DO Stop!

We interrupt this program to bring you a helpful hint. If you are going to make an INSTANT program that uses the DO command, there is one procedure that you certainly do not want to omit. Be sure to include a command to stop the program! The procedure that follows will allow you to exit Instant, by going to the top level of Logo. (Terrapin and Commodore version at the end of the column.)

```

TO Q
PRINT [ QUIT INSTANT ]
THROW "TOPLEVEL
END

```

Listful Thinking continued

You will also probably want to add to your Instant the capability to CLEARSCREEN, go HOME, and put the pen UP and DOWN.

Customizing Instant

Use of Instant Logo can be empowering for even young children. Instant can be used to facilitate a wide range of instructional objectives. We have suggested that an effective Instant Logo program should have the following characteristics:

1. appropriate turtle step length
2. appropriate turtle step speed
3. visible results with small numbers (for young children)
4. messages telling what is happening on the screen
5. meaningful error messages
6. easy exit and resistance to crashing

We have explained just a few of the modifications to traditional Instant that we use and that we think are important if young children are going to get the most from early exposure to Logo. If this is a topic of special interest to you, get in touch and we will gladly share more of our ideas along this line.

Instant Measures Up

Is a well-constructed Instant program useful for anything besides early turtling experiences? Can older students also use Instant to achieve content-related objectives? We think so. For example, what if we make each Instant turtle step equal one inch (a ratio of about 1 : 32)? The procedure for making the turtle move forward would look like this: (Terrapin users change TYPE to PRINT1.)

```
TO F
(TYPE [FORWARD] SPACE)
MAKE *NUMBER INPUT.NUMBER
REPEAT :NUMBER [FD 32 SLASH WAIT 20]
END
```

```
TO SLASH
RT 90 FD 2
BK 2 LT 90
END
```

Now the command F(orward) 6 results in the turtle moving forward six inches. SLASH adds a little marker after each step (each inch). Suddenly we have a new way to explore estimation and measurement. Picture in your mind's eye...

Mike and Joe are doing their math worksheet. They each have a job in this activity. They choose who does what, and they are allowed to change jobs. At first,

Mike will be the Estimator, and Joe will be the Measurer. They are sitting at a computer with a plastic overlay taped to the monitor. They have a worksheet, a pencil, and a ruler (or tape measure).

During the next twenty minutes or so, Mike and Joe are going to estimate and then measure distances between 2 and 10 inches. The worksheet asks them to find out how far it is between the buildings on the overlay. For example, how far is it in inches from the red house to the blue house?

| 1st Estimate (by eye) | 2nd Estimate (by turtle) | Actual Measurement (by ruler) |
|-----------------------------|--------------------------------|-------------------------------------|
|-----------------------------|--------------------------------|-------------------------------------|

Red house to blue house: _____
School to grocery: _____

The boys are supposed to estimate twice before they actually measure the distance. Mike and Joe make a guess. They think it's about 4 inches from the red house to the blue house. That's the first estimate. Mike moves the turtle to the red house, and then moves F(orward) 4. Oops! The turtle is still about an inch from the red house. They estimate that the real distance is close to 5 inches. Now Joe checks their work with a ruler, and they fill out their worksheet.

The next day, they have a similar assignment, except now one turtle step equals a centimeter. Oh! How big is a centimeter, anyhow? (A ratio in normal turtle steps of about 1 : 12.) By estimating, moving the turtle, and perhaps checking themselves with a ruler, they can find out. They can also pose measurement tasks (in turtle steps) for each other, now that they have the idea. How far is it to the grocery from the red house, if you go to the blue house first? What is the shortest distance between two houses? Is it farther in inches or centimeters? (Neither-- HO HO HO).

We hope that you and your students DO enjoy the holiday season. Best wishes for Instant good cheer!

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Glen Bull is a professor in the University of Virginia's Curry School of Education, and teaches Logo courses at both the graduate and undergraduate level. Paula Cochran is a doctoral student at the University of Virginia. She is interested in Logo applications in language arts and speech-language pathology.

Listful Thinking continued

Here are the procedures for users of Terrapin and Commodore Logo:

```
TO DO :COMMAND
IF NOT DEFINED? :COMMAND STOP
RUN ( LIST :COMMAND )
END
```

```
TO DEFINED? :PROCEDURE
OP NOT TEXT :PROCEDURE = []
END
```

```
TO INPUT.NUMBER
MAKE *NUMBER REQUEST
TEST :NUMBER = []
IFTRUE PRINT [ PLEASE TYPE A NUMBER. ]
IFTRUE OP INPUT.NUMBER
TEST NUMBER? FIRST :NUMBER
IFFALSE PRINT SE :NUMBER [ IS NOT A NUMBER. ]
IFFALSE OP INPUT.NUMBER
OP FIRST :NUMBER
END
```

```
TO Q
PRINT [ QUIT INSTANT ]
TOPLEVEL
END
```

```
TO F
(PRINT1 [FORWARD] SPACE )
MAKE *NUMBER INPUT.NUMBER
REPEAT :NUMBER [ FD 10 WAIT 20 ]
END
```

```
TO WAIT :NUMBER
REPEAT :NUMBER []
END
```

TurtleTips

by Jane Toth
and Donna Lanyi

We've been hearing a lot lately about incorporating Logo activities into the established curriculum. Many teachers said that they didn't have the instructional time to add a new subject, such as Logo, into their already hectic schedule. We readily agreed with these comments. But if we want to use Logo in the content areas, how do we begin? To be frank, we were stumped for a while, until we started to analyze each subject in terms of objectives. The light bulb finally came on. Here are some ideas for using Logo to enhance areas such as social studies, language, math, and the like.

The Turtle Teacher

Our students love a challenge. The majority of them enjoy the thrill of competition. We chose the topic of robots. We had been talking about robotics as part of our computer literacy program. As a class, we brainstormed about what marvelous features we'd each like our own personal robot to possess.

Of course, the students came up with some super ideas and a few items which would make their lives easier -- a homework completer, a room straightener, a chore completer. Why, what else would you want a robot for??

The children loved adding unique features to their robots. They then spent several days drawing their robots with Logo on the computer. We printed out their robots and used them for a bulletin board display.

In our social studies series, the fourth grades study US geography. A large portion of the book is devoted to map skills. In last year's December column, we talked about having the children work with mazes. A natural extension of this is to have our students draw their own Logo maps. Steve Tipps' column in last month's NLX contains some excellent ideas for this.

First, we had the class work on maps of the classroom. We had them plan it out, walk it out, and design it on the computer. They loved this activity. After fairly successful classroom maps, we took it a step further and had the students map out their routes to school. This helped to open their eyes and be keen observers on their way to and from school. You could extend this idea even further by measuring (or estimating) distances and drawing *scaled* maps with Glen and Paula's Instant from this month's column. (Ed. note: See "Listful Thinking" elsewhere in this issue.)

One of our recent reading stories was about the Clown College in Venice, Florida. Every year, we've had our students design their own clown faces on paper. This year, we utilized the computer. The students loved adding colorful facial features, a few tear drops, or some wild hair. Each clown designed had its own unique personality. The students then took their clowns and used them in a creative writing story as the main character. Doris Schroeder's Page 1 idea for a LogoShow is a perfect complementary activity for projects such as this!

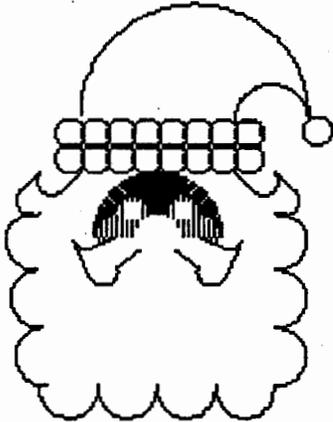
We have finally begun integrating Logo into our existing curriculum! No one said it would be easy, but it is both fun and exciting!

Procedure of the Month

Students love to share products they have completed. Use the Santa Claus procedure to get your class involved in creating festive holiday ideas. Students could use their Logo creations as Christmas cards, wrapping paper, or even ornaments. How about collecting students' holiday pictures and combining them into a Christmas coloring book? The Santa Claus

TurtleTips continued

picture below was created by Pat Arnold, a first grade teacher in Wooster, Ohio. If you are interested in a listing of the procedures for the drawing, please send us a self-addressed stamped envelope.



We invite any teachers or elementary students to send Logo procedures or ideas to be shared in this NLX column. Jane Toth and Donna Lanyi, Beall Avenue School, 716 Beall Avenue, Wooster, OH 44691.

Jane Toth and Donna Lanyi use Logo in their elementary classrooms in the Wooster (OH) City Schools.

LIFT's

Teacher to Teacher A Review of New Logo Materials

by James Fry

This month's column features a guest review of a publication for all Atari Logo users written by Sharon Yuille, a teacher in Flint Michigan, and comments on a set of programming manuals for Apple Logo.

Atari Logo Users

Logo Aide, by Barry A. Hoglund, 1984, published by August Publications, P.O. Box 67, San Rafael, Ca 94915. \$29.95.

Logo Aide is exactly that - an aide that anyone who teaches Logo should be able to call upon. Barry Hoglund speaks in a language that is sophisticated enough to be interesting to adults but at the same time simple enough so that much of the material could be used straightforwardly with students. Mr. Hoglund also treats the multiple turtle (there are four) feature of Atari Logo with the importance it deserves.

Target audience: all grades

Content: The book is organized into seven sequential phases, beginning with simple turtle graphics and progressing through multiple turtles, writing procedures, editing shapes, using variables, and two forms of animation. Each phase has a teacher's guide, with step by step instructions for introducing the primitives for each section. There are also many diagrams and teaching aids.

Format: The book is well-constructed, durable and easy to work with. Commands are printed in large letters on separate sheets so that a teacher could pull them right out of the book and post them by the computer. The book (notebook style) is printed on heavy paper and is divided into 7 sections or phases. Each phase begins with a guide that is very clear and easy to understand. Each section includes activities to do and items to discuss before working on the computer.

Strengths: The Multiple Turtles section was not only clear and concise, but fun to do and appeared to be easy to teach. It seems to be a good idea for the kids to have access to all four turtles before moving into the concept of coordinates. The shape editor section is ample with plenty of exercises and designs.

The section on variables is invaluable. It seems so often that students and teachers do well until they get to variables; then they get frustrated and sometimes drop back. Mr. Hoglund has made learning variables easy to understand and exciting enough so that readers would want to add more variables to their procedures.

Record keeping sheets were excellent. The placement activities would be very helpful to a teacher. I especially liked all of the activities for little ones. My favorite provided a youngster with a reproducible turtle complete with a chalk "pen" for chalkboard pre-computer activities.

Suggestions: Although Mr. Hoglund includes many exercises in the procedures section, I wish he would have included more samples of simple procedures using block letters. I also suggest that more practice sheets and simple geometric figures be added before moving into rotating designs.

I have a concern about teaching color before mastering geometric designs, but I plan to try it this way before passing judgment. However, the book is set up so that a teacher or parent could rearrange parts of a section depending on the group or child's needs.

This is an excellent resource book, reasonably priced. Perhaps best of all, Mr. Hoglund encourages teachers to reproduce pages from the book for the classroom.

-Sharon Yuille, guest reviewer, Flint Community Schools, Flint, Michigan

Teacher to Teacher continued**Apple Logo Users**

Apple Logo Programming Primer, by Donald Martin, Marijane Paulsen, and Stephen Prata, 1984, published by Howard W. Sams & Co., Inc., 4300 West 62nd St., Indianapolis, Indiana, 46268. \$19.95

Target audience: older or experienced Logo students

Content: This book is designed to teach Logo as a structured programming language and be a guide for top-down structured program design. It consists of fifteen chapters starting with an introduction to turtle graphics for a beginner to advanced list processing chapters for an advanced Logo programmer. The book also contains an excellent appendix.

Strengths: The layout of the book is well done and easy to follow. The authors have used what they call the "box chart" method to show Logo procedures and to make it easier to follow and understand. The use of color in the text to highlight areas also helps to clarify ideas.

There are many example procedures or "Logo programs" that can be keyed in and saved for future use in some of your own Logo programs, or for reference. The appendix section containing a summary of Logo commands is excellent and would be a valuable aid to anyone working with Apple Logo. The other appendices on ASCII codes (with chart), managing workspace, error messages, startup, and Logo features are also excellent and valuable.

Companion: There is also a companion book, *88 Apple Logo Programs*, by the same authors and publisher, that goes along with the *Primer*. It gives many more procedures and programs that can be used as is or combined with others of your own. For us who are lazy typists, the 88 programs come on a disk that is available with the book.

Do you know of any new Logo materials and books? Did you find them useful in teaching? If so, we invite you to send information to the Logo Information For Teachers (L.I.F.T) group, PO Box 5396, Plymouth, MI 48170, or send your comments on CompuServe to 76317, 565.

James Fry uses Logo with his Chapter 1 remedial mathematics students at Novi Community School, Novi, MI and is a co-founder of the Logo Information For Teachers group.

Q

and

A

by
Jim

McCauley

Q. I am trying to enter a very long list as data for a Logo program, but I'm having a problem. I can type in about forty numbers, but then the computer just beeps at me and won't let me type in any more. What's wrong?

A. Nothing's wrong. You have hit an interesting limit in the design of most Logos: the text input buffer. As you probably know, when you type things into the Logo editor, you can type in lines that are pretty much as long as you wish. However, if you are typing into Logo from outside the editor, there is usually a limit to the number of characters you can type before pressing the RETURN key. For most versions, the limit is 128 characters.

This limit exists for pretty good reasons. First, the architecture of most computers assumes that information typed directly into a running program (like a program you have written in Logo, or the Logo interpreter itself) is going to be limited in length. There is usually a part of the computer's memory that is set aside especially for this purpose; it is commonly called the text input buffer. The availability of the buffer makes the programmer's job of designing an input system much easier. The Logo editor and many other programs (word processors, for example) allow very long lines to be entered because the programmers have used special techniques to get around the size limit of the text input buffer.

If you wish to associate a very long list of data with a variable, here are two ways to get the job done:

If you want to assign the list to a global variable with MAKE or NAME at the time that you are writing the program, you should use the "name editor." The name editor is actually just a variation on the procedure editor; it works in exactly the same way, but you call it into play with the command EDNS (or, EDIT NAMES; the command varies slightly between implementations). You will be presented with an editing screen full of all of the global values that you (or your programs) have initiated with MAKE or NAME, and you can edit them in exactly the same way that you edit procedures.

If you want to create a very long list while a program is actually running, you must use a different method. This pair of procedures will give you an idea of how this works:

```
TO INPUT :PROMPT
PRINT :PROMPT
PRINT [ Press RETURN at this prompt when finished. ]
OUTPUT DO.INPUT READLIST [ ]
END
```

```
TO DO.INPUT :INP :LST
IF :LST = [ ] [ OUTPUT :LST ]
PRINT :PROMPT
OUTPUT DO.INPUT READLIST LPUT FIRST :INP :LST
END
```

Q and A continued

The idea here is to build up a very long list one element at a time, then output the whole thing once it's built. In most Logos, you can input very large lists in this manner.

Type in these procedures, and put them to work with something like:

```
SHOW INPUT [Please type in a number.]
```

and see how big a list your Logo allows. It might be as long as several hundred items for the larger Logos.

I hope this gives you some ideas about the assembly and manipulation of long lists in Logo.

Each month, I will answer selected questions in this column about Logo programming techniques and the thinking which leads to programming. If you have a question, send it to: Jim McCauley, 876 East 12th Avenue, #4, Eugene, OR 97401. Please enclose a self-addressed stamped envelope. You may also send questions to me on CompuServe at 70014,1136.

Jim McCauley is a graduate student at the University of Oregon, studying with David Moursund, and has written Logo articles for many national publications.

NLXual Challenges

by Robs Muir

Making List Operators

During the past 8 months, the friends of these NLXual Challenges have been exploring around a fundamental issue in mathematics and logic. These explorations have taken form in challenges asking us to write an IF procedure (March 1985), and a "user-defined" FORWARD procedure (May 1985).

In true Logo fashion, we have been having so much fun with these problems that some of us didn't realize that we were exploring profound, fundamental ideas -- ideas that link the world of computation to the disciplines of mathematics and formal logic.

BUTFIRST

Before we get into this month's challenge, let me share an observation that E. Paul Goldenberg made: When introducing Logo's capacity to manipulate words and lists, most books, articles, and classes typically teach first the primitives FIRST, LAST, BUTFIRST, BUTLAST, and SENTENCE. Occasionally, WORD is included. The standard sequence usually progresses to ITEM, COUNT, and the Logo predicates EMPTYP (EMPTY?), LISTP (LIST?), and WORDP (WORD?). Paul states, "I am not sure I have ever seen LIST, FPUT, or LPUT taught except for the sake of completeness."

Instructors often make distinctions between operations that put lists (or words) together and take them apart. (Ed. note: See Jim McCauley's "Q and A" in the October 1984 NLX.) How often is the related issue of reversibility raised? If we dissect a list in a particular way, how can we reliably reassemble the parts into our original list? Here is an example.

```
TO DONT.CHANGE.MY :LIST
OP _____ (FIRST :LIST)(BF :LIST)
END
```

What Logo primitive should you put in the blank so that this procedure will return an object that is identical to its input whenever the input is a non-empty list? Stop reading right now and solve this problem! (Hint: the answer is *not* SENTENCE.)

It is nice to be able to put back together what one has taken apart, not only for the sake of mathematical logic, but also for purely practical reasons. It is easier to describe the undoing of the FIRST / BUTFIRST pair than it is to describe exactly what SENTENCE does. It is also not any harder to learn the inverse of FIRST / BUTFIRST than it is to learn SENTENCE.

OK ... since you've successfully filled in the blank, we can tell *you* the answer. That inverse is FPUT. FIRST and BUTFIRST provide a way of dissecting a list, element by element. If you want to access the second element of a list, all you need to do is take the FIRST element of the BUTFIRST of the list. A similar approach gets you deeper into the list.

FPUT allows you not only to reconstruct what you have torn asunder, it also permits you to assemble other structures from the building blocks you may collect. For example, the procedure

```
TO BUTSECOND :LIST
OUTPUT FPUT (FIRST :LIST)(BUTFIRST BUTFIRST :LIST)
END
```

will output all but the *second* element of its input list (provided, of course, that the input list contains a second element).

Taking Paul's observations and our past record of torturing and crippling our poor Logo interpreter, let's now suggest a challenge or two for the coming month.

NLXual Challenges continued

Here They Come

Challenge #1 is to build equivalents of LAST, BUTLAST, LIST, SENTENCE, and LPUT using only FIRST, BUTFIRST, FPUT, and WORD for dissection and reassembly. You may use any other Logo primitives you'd like, but Paul suggests you think small. It is possible to do everything with a very limited vocabulary. (You can get along quite well without COUNT, MEMBERP, ITEM, and EMPTYP, for example, though you might decide it is convenient to build one or more of these for use in your solution.) Don't bother dealing with parenthesized versions of LIST, SENTENCE, and FPUT, but rather assume that each takes exactly two inputs always. Do insure that your procedures (you might call them MY.LIST, MY.SE, etc.) perform all of their tasks exactly as their primitive versions do.

Challenge #2 is to figure out the best building blocks from which to begin. We suggested that you use FIRST, BUTFIRST, LPUT, and WORD. Perhaps another starting set might make the task easier? Perhaps any set that includes some dissection equipment (such as

FIRST) and some recombiners (like SENTENCE) allows you to build all the others? Or perhaps some tools are truly more primitive than others? What is the smallest set you can use?

Some workers in computer science, as well as workers in formal logic and mathematics (notably A. Church's work with *lambda calculus*), have dealt with this challenge in one form or another. For example, P. J. Landin's work, "The Mechanical Evaluation of Expressions," (*Computer Journal*, 1964) proposes that seven objects (null, h, t, nullist, prefix, if, and Y) provide a basis for describing a wide range of functions. Can you guess which seven Logo primitives correspond to Landin's?

And you thought Logo was only good for drawing pictures...

Send your solutions, along with a stamped self-addressed envelope, to NLXual Challenges, Attn: Robs Muir, 1688 Denver Avenue, Claremont, CA 91711. We will compile several interesting solutions and redistribute them to all contributors. By the way, you may send solutions to any past Challenges at any time.

Robs Muir is a teacher in the Claremont (CA) Unified School District and Claremont Graduate School

Logo Notices

So far, no one has come up with a "fix" for the Image-writer overprinting with Apple Logo II (see September 1985 NLX), although solutions are now available for Terrapin and Apple Logo (see October NLX). Anyone figuring this one out please send us a solution which can be shared with NLX readers. If you like such technical challenges, send \$3 to Tom Weishaar, 10026 Roe Avenue, Overland Park, KS 66207, and ask for a copy of the November issue of his outstanding *Open-Apple* newsletter. The lead article in that particular issue is devoted to solving printer problems, and may contain a clue to this dilemma. (By the way, you might want to subscribe to his newsletter - it's a real deal at \$24 per year.)

Regina Sapon, editor of the NLX's popular *Logo Research Directory*, is preparing for an updated edition. If you would like to be listed, send a summary of your research activities and interests to Regina Sapon, 2715 East Towers Drive, #11, Cincinnati, OH 45238. For a copy of the current directory, send \$3 to NLX Research Directory, Box 5341, Charlottesville, VA 22905.

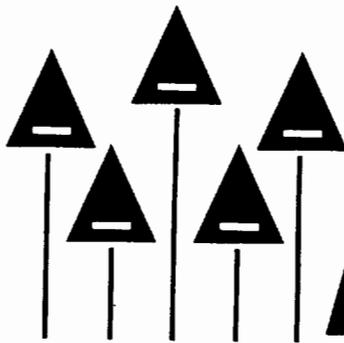
Only one month remains before the International Logo Exchange newsletter begins publication! The first reports from the continental Logo field editors are in production and contain news about exciting Logo activities from all around the world! If an international Logo perspective is important to you, subscribe now, and begin with the first issue in January. The newsletter is published bimonthly (6 issues per year), and costs US\$19.50 for addresses in the USA, Canada, and Mexico, and US\$24.50 elsewhere. The International Logo Exchange, PO Box 5686, Charlottesville, VA 22905.

Kentucky Educational Television announces the rebroadcast of the "Educational Computing" television program series which features Logo. Here is a schedule of the rebroadcast dates. Consult your local public television station for local airdates and times. For more information, write to: Mary Campbell, Kentucky Educational Television, 600 Cooper Drive, Lexington, KY 40502, or call (800) 354-9067.

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|-------------|---------------------------|
| Nov 28 & 29 | "The Many Worlds of Logo" |
| Dec 26 & 27 | "Logo Under Fire" |
| Jan 9 & 10 | "The Future of Logo" |
| Jan 23 & 24 | "Teacher Training" |

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Editor.....Tom Lough



NLXtra

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FORWARD 100!

December 1985 Page 1

Online from Paradise: World Logo Conference Report

by *Sandy Dawson*

What do you get if you invite 90 Logo people to a retreat centre in the Canadian mountain wilderness 85 kilometres north of Vancouver, British Columbia? What if you then give them two computer terminals connected via phone lines to the CompuServe computer in Columbus, Ohio, and arrange for their calls to be managed by a man in a garage in Richardson, Texas? What if Logo people from all over the world start calling in? People from England, Spain, and Israel. People from Iceland, Denmark, and Australia. People from Boston, New York, Chicago, St. Louis. People from Keene NH, Carmel CA, Eugene OR, Newton MA, Ellison WI, and Charlottesville VA, to say nothing of Canadian cities like Kingston, Bathurst, and Vancouver itself.

What you get, of course, is the **World Logo Conference!**

In addition, if you arrange formal working sessions onsite, plus the time for impromptu gatherings and discussions, mix that with candlelight dinners, instruction in and debugging of "contra" dancing (a form of New England line dancing imported via Dan Watt to Vancouver), astound folks with the swirl of the Scottish "pipes" accompanying a highland fling, and top it off with a cake commemorating the first birthday of the British Columbia Logo Users Group, then you have the makings of one heckuva celebration!

The World Logo Conference took place October 25-27, 1985. Gerri Sinclair and Sandy Dawson, conference co-chairs, initiated the online conference with an electronic wine and cheese, chatting with Jim Muller, systems operator of CompuServe's Logo Forum, and the man in the Texas garage. The conference was launched, and to the amazement of many, everything was working. For, you see, a conference such as this had never been done before. No one, to our knowledge, had tried to run simultaneous onsite and online conferences; nor had anyone tried to run such a geographically diverse conference as was being attempted

here. And it all worked! The pace of the conference accelerated quickly.

As onsite participants watched the premiere of a new Logo film called, "Beyond Turtle Graphics: Growing Up with Logo," online participants partook of discussions with Tony Stavely from New Hampshire, Jim Muller from Texas, and Brian Silverman, Harold Brochmann, and Molly Watt from onsite, closing off the evening of the 25th with the Logo nightowls.

Seymour Papert, scheduled to be the featured onsite speaker the next day, telephoned in ill, but arrangements were quickly made for him to host a session online from Boston. With Seymour's presence being monitored around the world and throughout the Paradise site, the conference shifted into overdrive. By Saturday night's candlelight dinner, the participants had been stimulated to explore "technocentricity," Logo for the able and not so able, Logo dilemmas, ceilings and thresholds, and had been challenged by researchers and workers such as David Thornburg, Tom Lough, Dan Watt, Dale Burnett, Joel Hillel, Rina Cohen, Bill Higginson, and Tom Kieren.

Onsite, local users and learners of Logo shared their experiences and expertise. Members of Logo user groups from St. Louis, Chicago, London, Australia, and New Hampshire contributed their enthusiasm and critical concern for the extension of Logo into new areas.

Molly Watt (an onsite presenter and godmother to the BC Logo Users Group) commented about the conference: "When I was online talking to people around the world, it was so exciting that I didn't want to be bothered with the onsite program. But, when I got involved in the onsite activities, I couldn't have cared less about the online stuff! It was so *hard* to decide which part to choose and which part to leave out."

On Sunday morning, Uri Leron appeared on the network from Israel right on schedule. The following five hours flowed by like the rushing waters of the Squamish River nearby, with Uri, Dr. Logo (Joe Power), Jim McCauley, and Paul Goldenberg blending their discussions together with online participants to concoct a rich, satisfying drink of Logo extensions and criticisms. Meanwhile onsite, Brian Silverman was talking about

World Logo Conference continued

"nothings" as he made his Life Game dance across Logo monitors.

But what about outcomes? Well, we know the onsite people experienced a tremendous "high," and that an environment which was warm, supportive, self-correcting, and non-threatening was created at Paradise. We know that, although some folks had difficulty getting online, they really enjoyed the conference, as evidenced by their own expressions in the online transcripts. We also noted that such a conference can be run literally from anywhere in the world, because Paradise Valley is *remote!*

But I've said nothing about Logo! All of the above is about a Logo environment. Paradise Valley was a model for learning Logo. Did we learn more Logo? Probably not; but what we did learn was how to help others learn and teach with Logo. We explored some extensions of Logo, as well as some limits.

We met one another, and perhaps that is the most important thing of all. Though this conference was very "high tech" in nature, it also demonstrated the power of the teleconferencing medium for fostering "high touch" interactions. We saw Gerri interrupt the British Logo Users Group online from England to ask them to run downstairs to answer the phone so she could give them instructions on how to help a group from Iceland make their online connections. Molly Watt chatted online with her daughter in an apartment in New York's lower east side. Joel Hillel, Rina Cohen, and Ofer Arad (all onsite) and Paul Goldenberg (online) created an emotional Israeli connection with Uri Leron.

These "high touch" memories linger long after the conference is over. Ultimately, that is what Logo is all about, isn't it?

Sandy Dawson is a member of the faculty of Simon Fraser University in North Vancouver, British Columbia.

Logo Notices

How about a turtle you can ride? Innovations offers such a toy on page 26 of their current catalog! And it is green and triangular shaped, too! To make it go, you just sit down on it and move the handles. For a copy of the catalog, write to Innovations, 110 Painters Mill Road, Owings Mill, MD 21117, or call (800) 638-6170 or (800) 228-5000. To order the Flying Turtle, specify item number 15537, and send \$39.95 plus \$3.95 for shipping and handling.

The Virginia Department of Education has produced a 30-minute videocassette on programming and problem solving with Logo as part of a 16 part series of instruction with microcomputers. Based on a script written by Steve Tipps, the Logo video features a

number of Virginia Logo users and examples of their classroom work. A 90-page activity guide for the entire series is available with the video. For more information, write to Pete Pantsari, Southern Educational Communications Association, PO Box 5966, Columbia, SC 29250, or call (803) 799-5517.

Microquests is a quarterly Logo publication dedicated to mathematics explorations. Authors Kathleen Martin and Donna Bearden are experienced Logo educators, and do a masterful job with each content-packed issue. For more information, write to Microquests, Martin-Bearden, Inc., 2502 Peach Tree, McKinney, TX 75069.

Brian Schott of the Decision Sciences Department of Georgia State University, has sent listings for Commodore Logo procedures which allow a rather fast graphics dump to selected printers within Logo. Brian has tested the procedures with a C.Itoh 8510 printer, but feels that they should work on most Epson and Gemini printers as well. He is willing to furnish copies of these listings at no cost to Commodore Logo users. For a free copy of these listings, send a self addressed *stamped* envelope to: NLX Commodore Logo Listing, PO Box 5341, Charlottesville, VA 22905.

ExperTelligence announces *French ExperLogo* and *ExperLogo-Talk* for the Macintosh. For more information on these products, write to ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108, or call (805) 969-7874.

The latest Unisource catalog lists TI Logo II for \$69.95. For more information, write to Unisource, PO Box 64240, Lubbock, TX 79464.

Deals on Disks

The following business firms offer economical prices on disks. Write or call for their most recent prices.

- Blackship, PO Box 883362, San Francisco, CA 94188. (800) 235-6646 ext. 31. From CA, call (800) 235-6647 ext. 31.
- Disk World!, Inc., 30 East Huron Street, Suite 4806, Chicago, IL 60611. (312) 944-2788.
- Diskette Co-op, PO Box 65816, West Des Moines, IA 50265. (515) 225-6629.
- Magnetic Media of New England, PO Box 780, Beverly, MA 01915. (800) 992-0123.
- Megasoft, PO Box 1143, Freehold, NJ 07728. (800) 222-0490.
- Unitech, 20 Hurley Street, Cambridge, MA 02141. (800) 343-0472.
- User Friendly East, PO Box 830, Point Pleasant, NJ 08742. To order, call collect (201) 892-9399.

LOGO 86

FIRST ANNOUNCEMENT / CALL FOR PAPERS

The Third International Logo Conference
Massachusetts Institute of Technology
Cambridge, Massachusetts

July 9 - 11, 1986

Logo 86 is being organized to give people engaged in Logo work a continuing opportunity to share what they have learned, developed, and discovered. In order to facilitate the building of networks, the conference will provide a variety of settings: major speakers, presentations, poster sessions, and special interest groups. The conference will be preceded by two days of Logo tutorials.

CALL FOR PAPERS

Papers for presentations and / or poster sessions are encouraged. Papers outlining the major features of presentations (not more than 3 pages) or poster sessions (not more than 1 page) should be submitted by **March 1, 1986** to:

Brian Harvey, Logo 86 Program Chairperson
Massachusetts Institute of Technology, E15-309, 20 Ames Street
Cambridge, MA 02139

If desired, papers may be submitted electronically to: logo86@media-lab.mit.edu

Papers selected for presentation will be published in the conference pre-proceedings. Please encourage your students to submit proposals. The conference registration fee for full-time student presenters will be waived.

For general conference information, contact:

Joyce Tobias, Logo 86 Local Arrangements Chairperson
Massachusetts Institute of Technology, E15-309, 20 Ames Street
Cambridge, MA 02139