ATARI LOGO

A PROPOSED PLAN

BY

BONNIE A. UMPHREYS
SOFTWARE PRODUCT MANAGER

November 10, 1982
PILOT
Programmed Inquiry Learning Or Teaching

PURPOSE

Created to fill need for a programming language for educators which would not require having an extensive mathematical background.

HISTORY

Developed by Dr. John Starkweather at the University of California Medical Center in San Francisco.

FEATURES

- Easy to learn
- Designed for educational applications
- Minimum number of commands

PRIMARY USE

Authoring system used to develop Computer-assisted instruction courseware.
ENHANCEMENTS

- Superset of core Pilot
- Easy access to graphics & sound
- Interactive
- Specialized commands
- Designed as an introductory language
- Turtle Graphics
Figure 6-6 shows how you can use a numeric condition to limit a person to three guesses in a guessing game.

```
10 R:WHAT AM I?
20 T:WELCOME TO 'WHAT AM I?'
30 T:I'LL GIVE YOU 3 HINTS TO GUESS WHAT AM I.
40 T:TO GUESS WHAT I AM . . .
50 PA:60
60 T:
70 T:ARE YOU READY? \n80 A:
90 T:
100 M: Y, SURE, OK, FINE, ALRIGHT
110 JM:*GOODBYE
120 C:#G=1
130 #LOOP
140 T(#G=1): I ROLL ALONG, BUT I DO NOT HAVE WHEELS.
150 T(#G=2): I HAVE A MOUTH, BUT I CANNOT SPEAK.
160 T(#G=3): I HAVE A BED, BUT I NEVER SLEEP.
170 T: WHAT AM I?
180 T:
190 A: ANSWER
200 M: RIVER, STREAM, CREEK
210 JY:*RIGHT
220 J(#G=3): *NOMORE
230 T: NOPE, GUESS AGAIN.
240 T:
250 C:#G=#G+1
260 J:*LOOP
270 *NOMORE
280 T:
290 T: NOPE, THAT'S THREE GUESSES.
300 T: I AM A RIVER.
310 J: *GOODBYE
320 *RIGHT
330 T:
340 T: THAT'S CORRECT! I AM ANSWER.
350 *GOODBYE
360 T:
370 PA: 60
380 T: SEE YOU LATER.
390 E:

READY
```
PASCAL

PURPOSE

Structured programming language created to facilitate the teaching of a systematic approach to computer programming and problem solving.

HISTORY

Created by Niklaus Wirth.

FEATURES

- Allows for modular program design
- Data structures and manipulation
- Arithmetic operations
- Recursive procedures
- File manipulation
- Procedure, functions and program declarations
- Control statements
- Compiled Language

PRIMARY USE

High Level Development Language for serious programmers.

Teaching of Computer Science Curriculum.
PROGRAM CALCULATE;

CONST
  RCONST = -2.5;
  RCONST1 = 65535.5;

VAR R1, R2, TEMP:REAL;
  X : ARRAY [1..2] OF REAL;
  CH1, OP : CHAR;

(*$ID1:STDPROCS*)

FUNCTION SUBREAL(R1, R2:REAL) : REAL;
BEGIN
  SUBREAL := R1 - R2
END;

PROCEDURE ADDREAL(VAR R1:REAL; R2:REAL);
BEGIN
  R1 := R1 + R2
END;

PROCEDURE TF(B:BOOLEAN);
BEGIN
  IF B THEN
    WRITELN(‘TRUE’)
  ELSE
    WRITELN(‘FALSE’)
END;

PROCEDURE CALC;
BEGIN
  CASE OP OF
    ‘S’: BEGIN
      INLINE($FD/$09);
      WRITELN(SIN(R1));
    END;
    ‘C’: WRITELN(COS(R1));
    ‘A’: WRITELN(ARCTAN(R1));
    ‘L’: WRITELN(LN(R1));
    ‘E’: WRITELN(EXP(R1));
    ‘+’: BEGIN
      ADDREAL(X[1], X[2]);
      WRITELN(X[2]:10:3)
    END;
    ‘-’: WRITELN(SUBREAL(X[1], X[2]):10:2);
    ‘*’: WRITELN(R1 * R2);
    ‘/’: WRITELN(R1 / R2);
    ‘M’: WRITELN(-R1);
    ‘=’: TF(R1 = R2);
    ‘N’: TF(R1 <> R2);
    ‘$’: WRITELN(SQRT(R1):10:3, SQRT(R2):10:3);
    ‘<’: TF(R1 < R2);
    ‘>’: TF(R1 > R2);
    ‘Z’: TF(R1 <= R2);
    ‘G’: TF(R1 >= R2);
    ‘1’: WRITELN(SQR(R1), ', SQR(R2));
    ‘2’: WRITELN(R1 + 1);
    ‘3’: WRITELN(1 + R1);
    ‘4’: WRITELN(ROUND(R1));
    ‘5’: WRITELN(ROUND(R1));
  END;

(*$ID1:STDPROCS*)
PROCEDURE MENU;
BEGIN
  WRITE('S:SIN ');
  WRITE('C:COS ');
  WRITE('A:ARCTAN ');
  WRITE('L:LN ');
  WRITE('E:EXP ');
  WRITE('I:SQR ');
  WRITELN('*:SQRT ');
  WRITELN('+, -, *, / ARITHMETIC OPERATORS');
  WRITELN('M:NEGATE');
  WRITE('=: = EQUAL ');
  WRITELN('N: NOT EQUAL ');
  WRITE('<:LESS THAN ');
  WRITELN('>:GREATER THAN ');
  WRITELN('Z:LESS THAN OR EQUAL TO ');
  WRITELN('G:GREATER THAN OR EQUAL TO ');
  WRITE('4:TRUNC ');
  WRITELN('5:ROUND ');
END;

BEGIN (* MAIN PROGRAM *)
  REPEAT
    WRITE('ENTER FIRST OPERAND? ');
    READ(R1);
    X[1] := R1;
    WRITELN('R1= ', R1); WRITELN;
    WRITE('ENTER SECOND OPERAND? ');
    READ(R2);
    X[2] := R2;
    WRITELN('R2= ', R2); WRITELN;
    WRITELN('ENTER OPERATOR: ');
    MENU;
    WRITE('? ');
    READ(OP);
    WRITELN;
    CALC;
    WRITELN('TYPE <ESCAPE> TO STOP ');
    READ(CH1);
UNTIL CH1 = CHR(27)
END.
**LOGO**

**PURPOSE**

Developed as a learning language designed particularly for problem solving.

**HISTORY**

Dialect of LISP\* developed under the direction of Seymour Papert at MIT.

**FEATURES**

- Procedure oriented
- Interactive
- List processing language
- Recursive
- Turtle Graphics
- User-Friendly
- No threshold/no ceiling
- Extensible
  (Create command words)
LOGO – CON’T

PRIMARY USE

Serious language for learning.

Used to study natural language.

Used for studying associative thought processes and high level problem solving.

*LISP – Developed for use in artificial intelligence research.
LOGO EXAMPLE

By

Brian Harvey

TO PIGLATIN :SENT
IF EMPTYP :SENT [OUTPUT []]
OUTPUT SENTENCE PLWORD FIRST :SENT
    PIGLATIN BUTFIRST :SENT
END

TO PLWORD :WORD
IF MEMBERP FIRST :WORD "AEIOUY" [OUTPUT WORD :WORD "AY]
OUTPUT PLWORD WORD BUTFIRST :WORD FIRST :WORD
END

PRINT PIGLATIN [WE CAN SPEAK PIG LATIN]

EWAY ANCAE EAKSPAY IGPAY ATINLAY
COMPETITIVE PRODUCTS

TI Logo

- Available from Texas Instruments
- Requires the basic TI 99/4A console plus extended memory and the TI LOGO command module
- Suggested retail for minimum system just under $1,000.

MIT LOGO FOR THE APPLE II

- Available from Terrapin, Inc. $149.95
- Requires 48K, disk drive with 16 sector controller, language card ... complete system around $2,400.

MIT LOGO FOR THE APPLE II

- Available from Krell Software $179.95
- Requires 48K, disk drive with 16 sector controller, language card ... complete system around $2,400.
COMPETITIVE PRODUCTS

LCSI LOGO PRODUCTS

AVAILABLE

APPLE LOGO (APPLE II)
(2nd best selling product for Apple)

- Distributed exclusively by Apple, Inc.
- Requires 48K, disk drive with 16 sector controller, language card ... complete system around $2,400.
- Retail price $175.

FUTURE IMPLEMENTATIONS

- Thompson
- Sinclair
- NABU
- IBM
- Atari Logo
- Others
ATARI LOGO (PROPOSED)

CONFIGURATION

Atari 400 with 16K

Optional:
Atari Disk Drive

PACKAGE CONTENTS

Consumer Product

Product 1-

16K Cartridge
plus documentation.

Educational Products

Product 2-

16K Cartridge
only.

Product 3-

documentation
only.

International Products
(Future)

English (British)
French
German
Spanish

Features

Functionally compatible
to Apple Logo ... minor
differences.

PRICE

Under $100.
ATARI LOGO ENHANCEMENTS

MINIMUM ENHANCEMENTS

Visible Turtle

DESIREND ENHANCEMENTS (Not Prioritized)

- Interface to Atari Disk Operating System
- Player Missile Graphics
- Collision Detection
- Color Map Modifications
- Sound
- Joystick/Paddle
- Serial I/O
- RS232 Interface
- Robot Interface
<table>
<thead>
<tr>
<th>Rating</th>
<th>Criterion</th>
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<tbody>
<tr>
<td>Excellent</td>
<td>Adheres to corporate and divisional goals</td>
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<td>Excellent</td>
<td>Enhances ATARI image in the marketplace</td>
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<td>Excellent</td>
<td>Compares favorably with other media treatments</td>
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<td>- Only Logo available for 16K machine</td>
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<td>Good</td>
<td>Showcases hardware capabilities</td>
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<td>- Atari specific features included</td>
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<td>Excellent</td>
<td>Addresses a currently targeted market segment</td>
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<td>- Consumer and educational market for learning/education products</td>
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<td>Excellent</td>
<td>Function is appropriate to the product line</td>
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<td>- Essential to educational/consumer marketing</td>
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<td>Excellent</td>
<td>Function is new to product line or an improvement over existing products</td>
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<td>- New to product line</td>
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<td>Excellent</td>
<td>Encourages ATARI hardware sales</td>
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<td>- Essential to meet bids for hardware sales to schools and increase hardware sales to consumers</td>
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<tr>
<td>Good</td>
<td>Encourages purchase of other ATARI software</td>
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<td></td>
<td>- Friendliness and quality of Atari Logo expected to encourage other Atari software purchases</td>
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<tr>
<td>None</td>
<td>Improves usefulness of other Atari software</td>
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CONSUMER PROFILE

Atari Logo is a programming language which is both easy enough for very young beginners (5 years old) and powerful enough to interest advanced programmers (has been used with MIT physics students).

Atari Logo is designed as a learning language: the user can start with easily understood features of the language and progress smoothly to more advanced features. For this reason it will appeal to home users of all ages as well as to educational institutions.

Logo is now in strong demand in schools because of its history as an MIT research development in the tradition of Jean Piaget, the influential developmental psychologist.
### ATARI LOGO FORECAST

**Expected Sales**

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<th>1983</th>
<th>1984</th>
<th>1985</th>
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<tr>
<td>Education</td>
<td>5,000</td>
<td>10,000</td>
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<tr>
<td>Consumer</td>
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<td>International</td>
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<td><strong>Total</strong></td>
<td>62,100</td>
<td>167,500</td>
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ESTIMATED MATERIAL COST

16K Cartridge .......................... 9.50
Quick Reference Card .................. 0.25
Introduction to Programming Guide (175 pages) .... 2.00
Logo Reference Manual ............... 2.00
New Carton (2 @ .35) ................. 0.70
Packing & Handling ................... 0.45

Total Est. Material Cost ................ 14.70

16K Material Cost ...................... 2.35
Est. Preliminary Standard Cost ....... 17.05
THE ORCHESTRA

Conducted by:
Bonnie Umphreys

Developed by:
Logo Computer Systems, Inc.

Technical assistance by:
Brian Harvey
Jim Dunion/Harry Stewart
Cynthia Solomon
Bob Kahn

Alpha testing by:
Brian Harvey
Cynthia Solomon

Beta testing by:
Capital Children's Museum
New York City School of the Future
Phoenix School in Cambridge
Santa Clara School District
Harold Abelson - Professor MIT

Manufacturing by:
Cartridge - Atari
Documentation & box - Atari or LCSI

Exclusive World-Wide Distribution by:
Atari, Inc.
THE TARGET

NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
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<th>Task</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
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<th>May</th>
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<td>1. Conversion to Atari</td>
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<td>3. Add Visible Turtle</td>
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<td>4. Atari Enhancements</td>
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<td>5. Documentation</td>
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<td>6. Alpha Test</td>
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<td>7. Announcement</td>
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<td>8. Beta Test</td>
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<td>9. Educational Shows</td>
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<td>10. Pre-Release</td>
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<td>11. Manufacture</td>
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<td>12. Inventory</td>
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1. Intellectual development requires a rich social environment.

2. A key part of development is the invention by each child of certain powerful ideas (e.g., conservation) which are abstracted from exploration of the environment.
1. Computers can be used not only to process numeric data, but also to manipulate **symbolic information**.

2. The most interesting applications of computers include high-level problem solving (e.g., playing chess) and the understanding of human (natural) language.

3. These applications require programming languages which provide advanced **control** structures (recursive procedures) and **data** structures (list processing).

4. "Teaching" a computer to solve a problem can shed light on how human beings solve similar problems.
ENGLISH LANGUAGE PROCESSING

Data Hierarchy: letter - word - sentence.

Primitive procedures to analyze linguistic units:

FIRST
FIRST [THIS IS A SENTENCE]  "THIS
FIRST "HELLO"  "H"

BUTFIRST
BUTFIRST [I LIKE COMPUTERS]  [LIKE COMPUTERS]
BUTFIRST "BANANA"  "ANANA"

LAST
LAST [LOGO IS FUN]  "FUN"
LAST "AARDVARK"  "K"

BUTLAST
BUTLAST [E.T. PHONE HOME]  [E.T. PHONE]
BUTLAST "ZYLON"  "ZYLO"
TO SECOND :THING
OUTPUT FIRST BUTFIRST :THING
END

PRINT SECOND [THIS IS A LONG SENTENCE]
IS

PRINT SECOND "HELLO
E
POWERFUL IDEAS

FUNCTION

COMPOSITION OF FUNCTIONS
TO PIGLATIN :SENT
IF EMPTYP :SENT [OUTPUT []]
OUTPUT SENTENCE PLWORD FIRST :SENT
   PIGLATIN BUTFIRST :SENT
END

TO PLWORD :WORD
IF MEMBERP FIRST :WORD "AEIOUY" [OUTPUT WORD :WORD "AY"]
OUTPUT PLWORD WORD BUTFIRST :WORD FIRST :WORD
END

PRINT PIGLATIN [WE CAN SPEAK PIG LATIN]

EWAY ANCAI EAKSPAY IGPAY ATINLAY
POWERFUL IDEAS

FUNCTION

COMPOSITION OF FUNCTIONS

MODULARITY

RECURSION

SUBPROCEDURE