Introduction to WhippleWay Tiny BASIC

Tiny BASIC was written by me for the WhippleWay Emulator and is based on the design originally suggested in the People's Computer Company magazine (Vol 3 No 4 Nov 1975) and published by John Arnold and me in Dr. Dobb's Journal (Vol 1 No 1 Jan 1976). I made some minor corrections and changes but it closely resembles what I published then.

I frankly admit that this version has some weaknesses that I plan to correct in time. I am publishing it here for demonstration purposes only. I make no claims as to its worthiness for any purpose.

Load the Tiny BASIC Intel hex file as you would any other hex file then click "Load Hex", "Reset", and "Run".

The list below contains instructions and commands in this Tiny BASIC implementation.

1. LET variable = expression – Assigns the computed value of expression to designated variable.
   Example: LET W = 2 * (A - 2)
2. INPUT variable list – Accepts numeric input from the keyboard and stores it in a designated variable(s).
   Example: INPUT A,B
3. PRINT – Outputs string (text enclose in quotation marks) and/or computed expression value. Items separated by semicolon (single space) or comma (zone spacing). A semicolon or colon at the end of the line inhibits new line.
   Example: PRINT "The result is "; 3*X
4. IF relational-expression THEN expression – Compares two computed expression values and executes the expression following "THEN" if true.
   IF A<=10 THEN A=A*A:GOTO 200
5. GOTO line-number – Branches to a specified line number
   Example: GOTO 100
6. GOSUB line-number – Branches to a subroutine at the specified line number.
7. RETURN –Returns from a subroutine to the instruction following the corresponding GOSUB
8. END – When encountered, returns execution to the command mode
9. DIM variable(array-size) - Dimensions the variable as a single array of given size.

In addition, there are three commands:

1. NEW – Clears memory so that a new Tiny BASIC program can be entered
2. RUN – Executes the Tiny BASIC program in memory
3. LIST – Lists the Tiny BASIC program in memory. Lists 16 lines and waits for any key to be typed to continue.

Other features include:

- To interrupt an executing program, click "STOP", "EXAMINE" address 000:003, and click "RUN". This performs a "Warm Boot" leaving the program undisturbed.
- To restart BASIC (cold boot), click "STOP", "RESET", and "RUN". An existing program will be erased.
- Command mode prompt is ">".
- From the command mode, the user enters a line of text terminated with ENTER key. Based on the text, one of the following happens:
  - If no line number present – Attempts to directly execute a command or instruction.
  - If line number present in range of 1 to 65535
    - If line number not found in program
      - Line inserted in numerical order
      - Returns to command mode
    - If line number found in program

    - If entered line consists of line number only
        - Line is deleted
        - Returns to command mode
    - If entered line consists of line number and instruction(s)
        - Line is deleted
        - Entered line inserted in numerical order
        - Returns to command mode
- Run mode – After executing the RUN command, the Tiny BASIC program executes beginning at the first line.
- Capital letters A to Z can be used to represent integer variables.
- Any variable can be dimensioned as a single array.
- Integer constants range from 32,767 to -32768.
- Integer arithmetic only is employed; values and calculations are limited to the range -32,768 to +32767.
- The following operators are permitted:
    - - negation
    - + addition
    - - subtraction
    - * multiplication
    - / division – result (quotient) truncated to a whole number (remainder ignored)
- The order of operations is as follows:
    - negation
    - multiplication, division
    - addition, subtraction
- The order of operation can be modified using parentheses.
- One integer function is defined:
    - RND – Returns a randomized value between 0 and 10,000.
- Multiple statements on a line are separated by a colon ":".
- For the IF instruction, the following relational operators can be used:
    - < Less than
    - > Greater than
    - = Equal to
    - <= Less than or equal to
    - >= Greater than or equal to
    - <> Not equal to
- The "LET" instruction is optional; i.e., A=0 is the same as LET A=0.
- Tiny BASIC is case sensitive; i.e., let a=0 is NOT the same as LET A=0.
- Error codes
    - 100 Syntax error
    - 101 Input buffer overflow
    - 102 Invalid label
    - 103 Unexpected character at end of line
    - 104 Unterminated string in PRINT
    - 105 Internal error (stack error) - Please report
    - 106 Internal error (IL error) - Please report
    - 107 Unknown line number
    - 108 Arithmetic divide by zero
    - 109 DIM not allowed in direct command
    - 110 Invalid array argument

  - 111 Expected variable or invalid variable
  - 112 Missing or invalid relational operator
  - 113 Invalid expression
  - 114 Not used
  - 115 Out of memory
  - 116 Missing 'THEN" in IF statement
- To save a BASIC program, enter the LIST command. Copy and paste 16 lines at a time into a text editor like Notepad (no special formatting) until the entire program has been assembled. Save it.
- To load a BASIC program, copy and paste the entire program's text into the cleared Code Window. Click "Load ASCII".

Tiny BASIC Programs

Hurkle – Adapted for WW Tiny BASIC. Find more information at:

http://www.atariarchives.org/basicgames/showpage.php?page=94 .

Life – Adapted for WW Tiny BASIC. Execution may seem slow by modern standards. Tiny BASIC implemented per the PCC specification is inherently slow, but it is what it is. The WW emulation is several times faster than an actual Altair 8800. Find more information at:

https://en.wikipedia.org/wiki/Conway's_Game_of_Life.

Enjoy!