REM
GOSUB
LET

NS BASIC

NS BASIC: Introduction for Educators

Contents

"The easiest way to learn visual programming."

Visual programming has taken the software development world by storm. Unfortunately, most visual programming environments are geared to the professional programmer, not the beginner. With NS BASIC, you can start with a traditional environment and move to a visual one once the basic concepts of programming have been mastered.

"More students complete the course work when learning BASIC than Pascal or C++"

Idaho State University found that 60% more beginning students completed their course work when being taught Visual BASIC rather than Pascal or C++.

"Fun and immediate results are the key ingredients that keep new programmers interested."

Interactive programming languages with graphics give the student immediate feedback and encourage them to keep working. NS BASIC is designed to make programming fun!

"We try to force them past the 'ransom note phase' and get them into real code quickly; however, the 'neat junk' you can do keeps them in the game."

When students first start programming, they often become bewildered by error messages and syntax. This often stops them learning the intended problem solving skills. NS BASIC provides an easy to learn syntax, good error messages and lots of opportunities for the student to improve his skills.

"The students know they're learning a language that is used in the real world."

BASIC is the most widely used language for new development these days, from embedded microcontrollers to business applications in Visual BASIC to macros in spreadsheets.

What kind of BASIC is this?

NS BASIC is a complete implementation of the BASIC programming language, with extensions to take advantage of the powerful eMate environment.

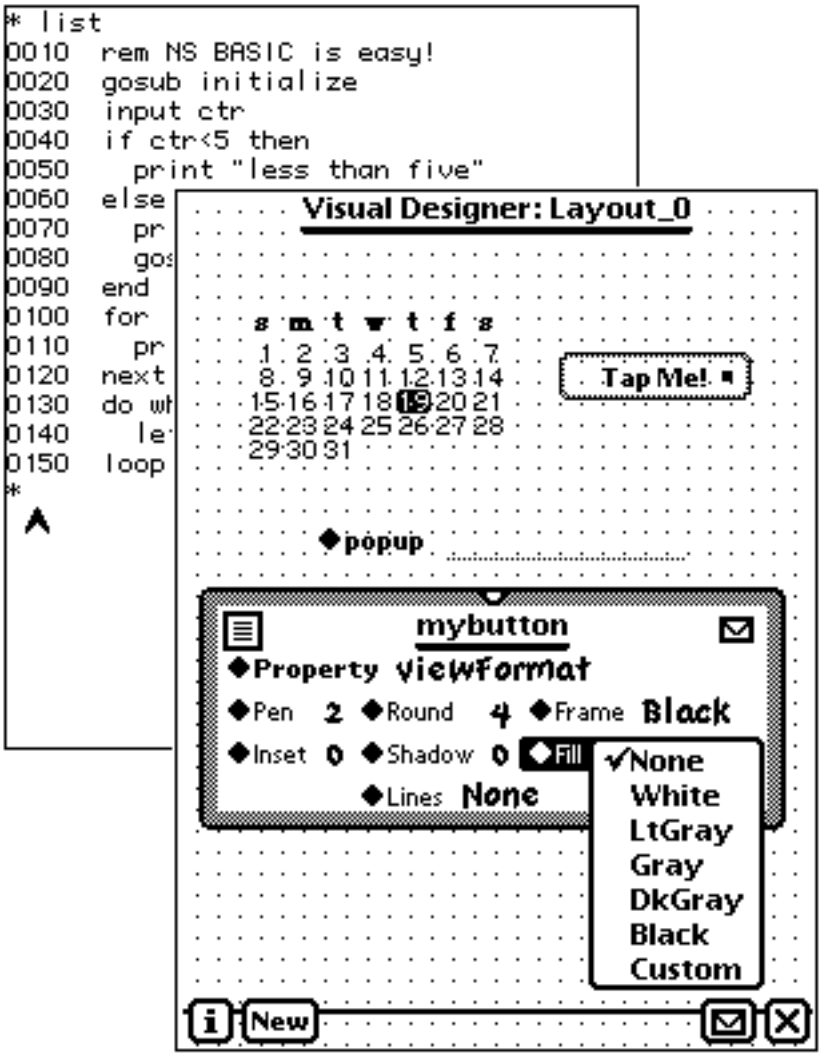
Structured

NS BASIC includes constructs that allow for structured programming. There is no need for students to use `GOTO` statements if the teacher desires.

- `IF...THEN...ELSE...END IF`
- `GOSUB routine_name`
- `DO WHILE`
- `LOOP UNTIL`

Procedural or Event Driven Programming

Procedural programming is the traditional way of constructing a program: control is held by the program, which prompts the user for input. Event Driven programs put all the possible inputs on the screen, and let the user choose which routine is executed next. NS BASIC supports programs that work either way - start students on procedural programs, and let them move to event driven!



Visual Designer

The Visual Designer make designing visual object and controls easy! Pick lists and popups simplify the work in setting up the many options.

Extensions

- Sound
- Internet Programming
- Graphics
- Communications

Trying it out!

Description

The folder contains NS BASIC with Visual Designer Rev 3.6, information files and examples. NS BASIC is a complete implementation of the BASIC programming language for the eMate 300, with a powerful Visual Designer.

The demo software allows you to save a program named DEMO. It will expire on Sep 1, 1997.

Requirements

Hardware:	An eMate 300 or other device running Newton OS 2.0 or higher. This includes the MessagePad 2000, 130 and 120 2.0.
Space Required:	Approx 250K.

To look at the INFO.PDF and TRYME.PDF files, you will need the Acrobat Viewer.

Installation

Use the Newton Package Installer application. Install the following files:

NSBDEMO.PKG
EXAMPLES.PKG
TRYME.PKG

Finding your way around

NS BASIC will be ready for you to program just by tapping on the NS BASIC icon. From there, you can do two things:

1. Go through the TRYME tutorial. Look at the document TRYME.PDF to see how.

2. Load and test any of the Examples. There are about 150 examples in the EXAMPLES.PKG file. Tap on its icon to look at the code samples; from NS BASIC, type
   * NEW
   * ENTER "EXAMPLES/<title>"
   * RUN

   to try any of them out.

Support

If you have any problems, please contact us by email at support@nsbasic.com.

How to get updates, upgrades, register the software, or get a full working version

Order through the Apple Educational Catalog, the NS BASIC web site (www.nsbasic.com), or by phone at 1 888 NS BASIC or 416 264-5999. Fax us at 416 264-5888.

Documentation

1. NS BASIC Handbook

The NS BASIC Handbook is a 260 page reference manual for NS BASIC. Each of the commands, statements, functions and widgets is explained. Sample code for each is included. (These examples are also part of the downloadable Examples.pkg file)

2. NS BASIC Reference Card

This handy reference card lists all the commands, statements, functions and widgets, and provides the syntax for their use.

3. **BASIC for the Newton**, Schettino and O'Hara

This 404 page soft cover book is published by AP Professional, ISBN # 0-12-623955-X. It is a tutorial approach, starts with simple programs and builds up to creating a visual application to keep track of a collection of trading cards. Includes diskette with examples.

4. Teacher's Guide

This guide is intended to help teachers easily design a good introductory course in Computer Programming for grades 8 to 12. Emphasis is places on getting a good understanding of the required fundamentals and preparation for business oriented applications, while learning good programming style and modern programming techniques. (Available Summer, 1997)

GOSUB **Statement**

GOSUB lineNumber|label

DESCRIPTION
GOSUB causes execution to branch to the line of code specified by lineNumber. You may use a label in place of the actual line number. A GOSUB must be paired with a RETURN Statement. When a RETURN Statement is found, execution continues from the line after the GOSUB. As with the GOTO Statement, if the lineNumber specified in the GOSUB Statement refers to a REM Statement, NS BASIC will also display that comment at the end of the GOSUB Statement as a line comment when the program is listed. The example shows this automatic commenting behaviour of GOSUB.

EXAMPLE

```
10 REM GOSUB Example
20 PRINT "GOSUB Routines-"
30 GOSUB 70 //Routine #2
40 GOSUB routine3
50 PRINT "Routine #1"
60 END
70 REM Routine #2
80 PRINT "Routine #2"
90 RETURN
110 routine3: REM
120 PRINT "Routine #3"
130 RETURN
```

OUTPUT

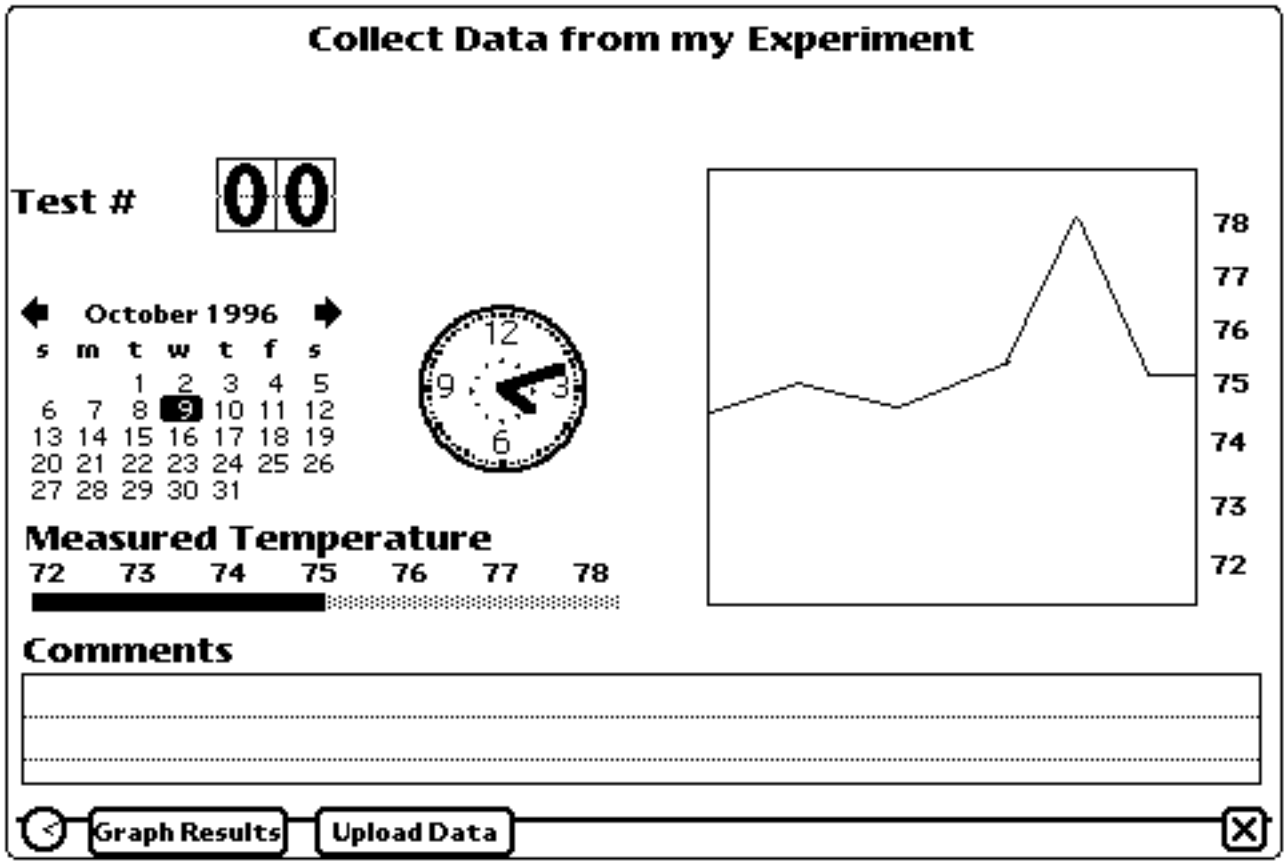
```
GOSUB Routines-
Routine #2
Routine #3
Routine #1
*
```

related items
REM, GOTO, LIST, RETURN

96 NS BASIC Handbook

Sample page from NS BASIC Handbook

NS BASIC and Science



Students can write programs to help in their Science Projects

Data Collection

The eMate is a rugged, portable computer with outstanding battery life, making it ideal for use in the field or lab for data collection. Programs can be written that collect data from screen input or from the eMate's serial port. The serial port on the eMate is easily accessible by NS BASIC, making it possible to write custom data collection applications.

Devices such as multimeters, probes, GPS units and bar code readers have all been used.

Data Analysis

NS BASIC allows you to save data in an indexed data base, allowing for full analysis and interpretation of data. Popups and selectors allow you to write programs that provide a customized view of the data, and graphics and gauges allow you to display the results effectively.

Device Control

Devices such as robots, Lego Dacta, Fisher Technic and PNC (Programmable Numeric Control) machines all can be programmed externally. NS BASIC can be an effective and inexpensive way to perform these tasks.

Scientific Calculations

NS BASIC supports full floating point scientific notation, using 64 bit internal representation. This gives a range of potential values from 1.9x10E4951 to 1.1x10E4932. There are also a full set of trigonometric functions.

NS BASIC Projects by Students

Biology Field Research: Water Temperature in Cup Plants

This project was done by Courtney Teska as part of the Howard Hughes Pre-Collegiate Summer Program. Ms. Teska interfaced an inexpensive Metex Digital Multimeter with a Radio Shack temperature probe to NS BASIC. The equipment was used to measure the temperature of the liquid inside Cup plants (*Silphium perofliatum*), to determine how this effects what organisms are able to live within the plants. With further aid from her sponsors, Ms. Teska has taken the equipment into the field in Indonesia to perform the research. For full information on this project, visit the Educational Resource section of www.nsbasic.com.

Animal Tracking Project: South Africa

The Animal Tracking Project was done by Jacqlyn Edge, Andrea Foster, Lindsay Steventon, all students in the Computer Science Department at the University of Capetown in South Africa. They interfaced NS BASIC to a GPS (Global Positioning System) to enable highly skilled (but illiterate) animal trackers to record their observations in the field. The trackers take the units out into the wild to count animals: the program has graphic buttons for them to tap when they spot an animal and the GPS records their current position. For full information on this project, visit http://www.cs.uct.ac.za/~jedge/html/project/TrackFrames.html.

NS BASIC Detailed Product Specification

Data Types

Integers, Reals, Floating Point, Strings, Booleans, Arrays And Frames.

Commands

Load, Save, List, Dir, Vars, Enter, Run, Edit, Bye, Renum, Delete, Stats, Con, Replace, MakePackage, NewProgram, Tools

Statements

Rem, Let, If..then..else, Loop While/Until Goto, Gosub, On ..Goto, On..Gosub, On Error, Read, Data, Restore, Dim, Input, Cls, Print, Wait, Randomize, End, Bye, Stop, Beep, Enter, Get, Put, Del, Open, Close, Chain, Trace, HWinput, Window, Show, Hide, Wprint, makePackage, setIcon

Math

Abs, Atn, Cos, Exp, Log, Min, Max, Sign, Sin, Sqrt, Tan, Mod, Div, Acos, Asin, Atan, Atan2, Cosh, Fabs, Fmod, Log10, Pow, Sinh, Tanh, Gamma, Hypot, Ldexp, Lgamma

Strings

Substr, StrLen, StrPos, Ord, Chr, StringToNumber, NumberString, StrCompare, BeginsWith, EndsWith, Stringer, SplitString, StrConcat, StrTruncate, Numberstr, TrimString, StringToNumber, UpCase, DownCase, Capitalize

Dates

Ticks, Time, DateNTime, StringToTime, StringToDate

Drawing

MakeLine, MakeRect, MakeRoundRect, MakeOval, MakeWedge, MakePolygon, MakeText, HitShape

Financial

Annuity, Compound

Other

ArrayPos, ArrayRemoveCount, Sort, Ceiling, Floor, Real, Random, Length, FindStringInArray, hexdump, Intern, SendIRremote, Elements

Controls

App, Aztabs, AzvertTabs, Checkbox, closeBox, DigitalCLock, Draw, Glance, LabelPicker, Month, NumberPicker, Paragraph, Picker, Setclock, Slider,Text, Title

Visual Designer

Layout your forms interactively! Control all aspects of your application's appearance using a WYSIWYG editor.

File Access

File I/O statements allow the creation of new soups or the access of any of the soups which come with the eMate. Indexed (ISAM) files are supported. Integrate your own data with the Names, To Do or Calendar soups.

Windowed Output

NS BASIC allows the use of all the fonts and styles contained in the eMate for attractive, easy to read results

Buttons

NS BASIC supports user programmable buttons that can be used to create event driven applications.

Internals Access

NS BASIC gives complete access to the internal information on the eMate. It can used to browse the internals, open other applications and call routines within other applications.

Graphs

Using built in drawing functions you can draw graphs and Pie Charts.

Serial and IR I/O

The INPUT and PRINT statements can use the serial and infrared ports instead of the screen. Programs can then communicate to a variety of devices and systems.

Infrared Control

Control your TV, VCR and other home appliances!

Internet

Email, News and web commands from within your program.

Other Applications

Control and Exchange data with other eMate applications.

For more information (and how to get it)

How to get NS BASIC

NS BASIC with Visual Designer is sold as a single unit or in a Lab Pack with 8 licences.

The Standard Edition includes an NS BASIC licence, the NS BASIC Handbook and DOS and Mac format diskettes. The diskette contains the software, examples, and a set of over 30 Tech Notes dealing with advanced and applied uses of NS BASIC.

The Lab Pack includes 8 licences, two copies of the NS BASIC Handbook, 8 Reference Cards and DOS and Mac format diskettes. The diskette contains the software, examples, and a set of over 30 Tech Notes dealing with advanced and applied uses of NS BASIC.

NS BASIC is available from the Apple Educational Catalog, Newton resellers and directly from the company.

How to reach us

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