An overview about DroidBasic For Android™

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About The Author

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DroidBasic For Android™ is a multi-purpose computer programming language that is suitable for most development needs. The language is designed with Rapid Application Development in mind, providing several tools to shorten development time. The following text introduces language fundamentals and covers a variety of the **DroidBasic** Framework.

DroidBasic is the next generation of BASIC programming languages. As a language, **DroidBasic** has the following traits:

Object-Oriented

Visual Basic 6 included limited support for object-oriented design. Encapsulation was supported with Public and Private data types in Classes, as well as special accessor/mutator pairs called Properties. Polymorphism received crude support through the Implements keyword, which would require that one class implement all of the methods in another, skeleton class. Inheritance was neglected completely.

As of **DroidBasic**, all of this has changed. It includes full-blown support for object-oriented concepts, including simple inheritance. Everything inherits from the Object base class.

Event-Driven

Events are recognized, because they use a certain naming convention (ObjectName_EventName).

DroidBasic Framework

As the name implies, **DroidBasic For Android™** runs on top of Android framework, meaning the language has full access to all of the supporting classes in the Java Android framework.

The Integrated Development Environment (IDE) - To simplify application development.

An integrated development environment (IDE), also known as integrated design environment and integrated debugging environment, is a type of computer program that assists computer programmers to develop software.

IDE Contents

The IDE consists of several sections, or tools, that the developer uses while programming. As you view the IDE for a new project you generally have three sections in view:

- The Project Window
- The Code view in the middle

Project Window

This is a section that is used to view and modify the contents of the project. A **DroidBasic** project will generally have a code page, references to System components and possibly other modules with special code that is used by the application.

Code view

This center window of the IDE is also where developers write the code that makes everything in the application work. The code is written in modules, or files, that are either connected to an object or called specifically when needed.

Review

The **DroidBasic** IDE is a complex and exciting work space for developers, providing many enhancements and upgrades from the days of VB6. This section only serves as a mere introduction to this multi-functional interface.

Getting Started - Making your first application.

Okay, it's now time for your first program!

Start up a **DroidBasic** IDE and create a new project.

Enter the following code in main.Activity:

```
Event Init()
  MsgBox("Hello World!")
End Event
```

This creates your classic "Hello World!" program.

Press F5 or go to the run menu and select Start to start the program. You should see an alert box that says "Hello World!" and then the main window (with nothing on it) should open.

Variables

Variables are the entities used to store various types of data. In programing, a variable is simply a place to store data. A variable has a name and a data type. In **DroidBasic**, a variable is declared using the Dim (short for Dimension) statement. Here is the syntax:

```
Dim varName As varType
```

varName is the name of your Variable. varType is the data type of the variable. Types include String, Integer, Double, Boolean, etc.

For example, to declare an Integer named MyInt use:

```
Dim MyInt As Integer
```

Data Types

Data Types define the type of data that a variable can store. Some variables store numbers, others store names. The basic types that can be used are:

Byte

8 bits, stores integer values from 0 to 255.

```
Dim bytMyVariable As Byte
```

Short

Meaning short integer. 16 bits (2 bytes), stores integer values from -32,768 to 32,767.

```
Dim shrtMyVariable As Short
```

Integer

32 bits (4 bytes), stores integer values from -2,147,483,648 to 2,147,483,647.

```
Dim intMyVariable As Integer
```

Single

Meaning single-precision floating point. 32 bits (4 bytes), stores floating-point values from -3.40282347e38 to 3.40282347e38. Cannot store an exact zero due to the required normalized form. Smallest positive value greater than zero is 1.401298e-45. Biggest negative value less than zero is -1.401298e-45.

```
Dim sglMyVariable As Single
```

Double / Float

Meaning double-precision floating point. 64 bits (8 bytes), stores floating-point values from -1.7976931348623157e308 to 1.7976931348623157e308. Cannot store an exact zero due to the required normalized form. Smallest positive value greater than zero is 4.94065645841247e-324. Biggest negative value less than zero is -4.94065645841247e-324.

```
Dim dblMyVariable As Double
```

Boolean

Requires 1 bit (1 byte used), stores boolean true/false values.

```
Dim boolMyVariable As Boolean
```

String

Stores any series of characters. e.g. word, phrase, sentence, paragraph, etc.

```
Dim strMyVariable As String
```

Object / id

Stores a reference to a **DroidBasic/Java** object.

```
Dim objMyObject As Object
```

Using Variables

Assigning Values

A value is the data contained in a variable. To assign a value to a variable that is already declared, use an equal sign.

Examples

For string variables, use double quotes around the value:

```
strMyVariable = "The String"
```

For all others, remove the quotes:

```
bytMyVariable = 1
sbytMyVariable = -2
intMyVariable = 100
sngMyVariable = 1.234
dblMyVariable = 1.567
boolMyVariable = True
```

To assign a variable the value of another variable, simply replace the value on the right side of the equal sign with the name of the variable that holds the desired data.

You can also assign a value to a variable in the declaration itself.

Dim myVariable As String = "StringValue"

Important: DroidBasic always assigns the value of the right variable to the left variable. The variable on the left takes the value of the right variable. The variable on the right does not change.

Constants

Constants are like variables that don't change. They take the place of values that you would not like to type over and over. Constants are declared using the keyword "Const". Their values are defined in their declaration - they also use data types. Here is the syntax:

```
Const cnstMyConstant As String = "The very long string"
```

Here is an example:

```
Const cnstPi As Float = 3.14159265
```

Arrays

A variable that stores several data of the same data type.

An array is simply a variable that can store more then one piece of data. The data is stored in a list. If you declare an integer, then that variable can only store one integer. An array of integers can store many integers. Each one is given its own number. For example, this line of code:

```
Dim MyArray[5] As Integer
```

will give an array like this

Index	Data
00	0
01	0
02	0
03	0
04	0

Branch statements

The various conditional statements in the language for selective code execution.

If...Else...ElseIf Statement

If/Else Statments are used to conditionally execute code based on the condition provided. If the condition provided in the If statement evaluates to true, the code in the block is executed. Otherwise, execution would proceed to the optional Else If statements, or the Else statement. Else If and Else are not required parts of an If statement.

An example of the If/Else/Else If branch statement is:

```
'The following variable declarations are for the following example only.

Dim x As Integer
Dim y As Integer

If x = y Then
   'Whatever will happen if x = y
Else If x < y Then
   'Whatever will happen if x < y
Else
   'Whatever will happen if x isn't = to y and x isn't < to y
End If
```

Select Statement

Either strings or numbers can be used for a Select statement.

Select Case statements are usually used to avoid long chains of If/Else If/…/Else If/Else statements.

An example of a Select branch statement using an integer is:

```
Dim nCPU as Integer
Select nCPU
    Case 0
        'No CPU!
    Case 1
```

```
        'Single CPU
    Case 2
        'Dual CPU machine
    Case 4
        'Quad CPU machine
    Case 3, 5 To 8
        '3, 5, 6, 7, 8 CPU's
    Case Else
        'Something more than 8
End Select
```

Boolean Operators

Boolean operators in DroidBasic now accomodate for short circuit boolean evaluation, most other languages always apply short citcuit boolean evaluation by default, consider the following boolean statement:

functionA() And functionB()

With this statement, when short-circuit boolean evaluation is used, the second function will only be called if the first function returns true, this is because if functionA returns false it becomes irrelevant to the outcome of the statement whether functionB returns true or not.

However, when no short-circuit boolean evaluation is used, both of the functions will be called irrespective of whether the first part of the statement returns true or false.

Something to note with short-circuit boolean evaluation is that the order of the parameters can become important when it is used.

Due to previous versions of VB6 not having short circuit boolean evaluation, DroidBasic comes with backward compatibility and adds two new boolean logic identifiers which support short-circuit boolean evaluation, so in addition to the standard boolean operators:

```
Not
And
Or
Xor
```

There are also two new operators which function using short-circuit boolean evaluation, and they are:

```
AndAlso
OrElse
```

Loop statements

The various loop statements in the language are for repetitive code execution.

For example:

- Do…Until Loop
- While…Do Loop
- For Loop

Operators

Programming languages have a set of operators that perform arithmetic operations, and others such as Boolean operations on truth values, and string operators manipulating strings of text. Computers are mathematical devices, but compilers and interpreters require a full syntactic theory of all

operations in order to parse formulae involving any combinations correctly. In particular they depend on operator precedence rules, on order of operations, that are tacitly assumed in mathematical writing.

Conventionally, the computing usage of operator also goes beyond the mathematical usage (for functions).

So operators are special symbols that are used to represent for example simple computations like addition and multiplication. Most of the operators in DroidBasic do exactly what you would expect them to do, because they are common mathematical symbols. For example, the operator for adding two integers is +.

Assignment and comparison operators

Assignment

The "=" operator is used for assignment. The operator also serves as a comparison operator (see Comparison).

- To set values:

```
x = 7       ' x is now seven; in math terms we could say "let x = 7"
x = -1294
x = "example"
```

You can use variables in the equal operator, as well.

```
Dim x As Integer
x = 4  ' Anywhere we use x, 4 will be used.
```

Comparison

The "=" operator is used for comparison. The operator also serves as a assignation operator (see Assignment).

- To compare values:

```
If 4 = 9 Then       ' This code will never happen:
    End  ' Exit the program.
End If
If 1234 = 1234 Then ' This code will always be run after the check:
    MsgBox("Wow!  1234 is the same as 1234.")
      ' Create a box in the center of the screen.
End If
```

You can use variables in the equal operator, as well.

```
If x = 4 Then
    MsgBox("x is four.")
End If
```

Let's try a slightly more advanced operation.

```
MsgBox("Seven equals two is " & (7 = 2) & ".")
' The parentheses are used because otherwise, by order of operations
' (equals is processed last), it would be comparing "Seven equals two is 7" and
"2.".
' Note here that the & operator appends to the string.  We will talk about this
later.
'
'  The result of this should be a message box popping up saying "Seven equals
```

```
two is
'    False."   This is because (7 = 2) will return False anywhere you put it.   In
the
'    same sense, (7 = 7) will return True:
MsgBox("Seven equals seven is " & (7 = 7) & ".")
```

You will get an error if you try to assign a constant or a literal a value, such as 7 = 2. You can compare 7 and 2, but the answer will always be False.

In the case of two equal operators appearing in a statement, such as

```
Dim x As Boolean
x = 2 = 7
```

The second equal operator will be processed first, comparing 2 and 7, giving a False. Then the first equal operator will be processed, assigning False to x.

Arithmetic operators

Describes the operators that work on numerical values, such as the '+' in addition.

DroidBasic provides a basic set of operators to calculate simple arithmetic.

```
+    Addition
-    Subtraction
*    Multiplication
/    Division
\    Integer division
Mod Remainder Division
^    Exponentiation
&    String concatenation

7 + 2       produces 9
7 - 2       produces 5
7 * 2       produces 14
7 / 2       produces 3.5
7 \ 2       produces 3
7 Mod 2   produces 1
7 ^ 2       produces 49
"7" & "7" produces "77"
```

Let's look at a short example of arithmetic operations before we jump into the operators themselves.

In this example we will also be using some basic variables. The Dim operator creates the variable.

```
Dim Commission As Single
Dim Sales As Single
Sales = 3142.51
Commission = 0.3 * Sales  ' Calculate 30% commission.
```

First, we set the total sales to 3142.51.

The * operator calculates multiplication, so the last line is equivalent to Commission = 0.3 * Sales. This means that our second step is multiplying 0.3 and Sales. Sales is 3142.51, so our result should be the product of 0.3 and 3142.51.

Why the funny symbols?

With the exception of addition and subtraction, the symbols used are different to the ones used in real life. This is simply because the other symbols are not available on a standard keyboard.

Addition

This adds two numbers together, and is denoted by the "+" symbol. If strings are involved it may also do String concatenation. Examples:

```
Dim x As Integer
x = 7 + 2      ' Results in 9.
x = 25 + -4    ' Results in 21.
Dim StringA As String
StringA = "A string" + "Another string" ' Results in "A stringAnother string"
```

Subtraction

This subtracts two numbers, and is denoted by the "-" symbol. Examples:

```
Dim x As Integer
x = 7 - 2      ' Results in 5.
x = 25 - -4    ' Results in 29.
```

Multiplication

This multiplies two numbers, and is denoted by the "*" symbol. Examples:

```
Dim x As Integer
x = 7 * 2   ' Results in 14.
x = 25 * -4 ' Results in -100.
```

Division

There are more types of division than the one denoted by the "/" symbol. There is also integer division and remainder division.

- Division

```
    This is the most commonly used form of division and is denoted by the "/"
operator. Examples:
```

Dim x As Single ' (note that we must use the Single class to have decimals) x = 7 / 2 ' Results in 3.5. x = 25 / 4 ' Results in 6.25.

- Integer division

```
    This divides two numbers, and gives the result without the remainder if
the quotient is a decimal. Examples:
```

Dim x As Integer x = 7 \ 2 ' Results in 3. x = 25 \ 4 ' Results in 6.

- Remainder Division

This divides two numbers, and gives the result's remainder if the quotient is a decimal. This is denoted by the operator "Mod." Examples:

Dim x As Integer x = 7 Mod 2 ' Results in 1. x = 25 Mod 4 ' Results in 1.

Exponentiation

This is raising a number to a power. For example:

```
Dim x As Integer
x = 7 ^ 2    ' Results in 49.
```

This results in the number 49 being assigned to the variable x. It can also be used to calculate the

square root of a number. The square root of a number is the number raised to the power of 0.5.

```
Dim x As Single
x = 7 ^ 0.5 ' Results in a number around 2.645.
```

Note: It is necessary to ensure that the variables be correctly declared to get the desired results. The following example works, but will produce the wrong result. This is because the Integer class does not allow decimal places (just like mathematical integers.)

```
Dim x As Integer
x = 7 ^ 0.5 ' Results in 3.
```

Since x is declared as an Integer type, the value square root, a real number, is stored incorrectly.

Any nth root of number is the can be calculated by raising the number to the power of 1 / n:

```
Dim x As Single
Dim n As Single
n = 7
x = 2 ^ (1 / n)
```

String operators

Describes the operators used for string and character manipulation, such as the '&' and '+' operators.

String concatenation

The "&" operator joins two strings together.

Example:

Dim String1 As String = "123"

Dim String2 As String = "456"

Dim String3 As String String3 = String1 & String2 ' Results in "123456".

This will result in String3 being equal to "123456"

The "+" operator may be used in place of "&". However, it is not recommended.

Logical operators

Describes the operators used in boolean logic, such as the 'And' and 'Or' operators.

Not

The Not operator returns True when the condition is False. Otherwise, it returns False. Example,

```
If Not (1 = 2) Then
   MsgBox("(1 = 2) is False. So Not False is True")
End If
```

Truth Table Condition	Not Condition
True	False
False	True

And

The And operator returns True when the conditions of the left and right are True. Otherwise, it returns False. Both conditions are evaluated before the result is returned. Example,

```
If (1 = 1) And (2 = 2) Then
   MsgBox("(1 = 1) is True. (2 = 2) is True. So True And True is True")
End If
```

Truth Table Condition1	Condition2	Condition1 And Condition2
True	True	True
True	False	False
False	True	False
False	False	False

AndAlso

The AndAlso operator returns False when the condition on the left hand side is False. Else, it returns True when the conditions of the left and right are True. Otherwise, it returns False. The condition on the right hand side is never evaluated when that on the left hand side is False. This is called short-circuited logic.

Truth Table Condition1	Condition2	Condition1 AndAlso Condition2
True	True	True
True	False	False
False	-	False

Or

The Or operator returns True when the condition on either side is True. Otherwise, it returns False. Both conditions are evaluated before the result is returned.

Truth Table Condition1	Condition2	Condition1 Or Condition2
True	True	True
True	False	True
False	True	True
False	False	False

OrElse

The OrElse operator returns True when the condition on the left hand side is True. Else, if the condition on the right hand side is True, it returns True. Otherwise, it returns False. The condition on the right hand side is never evaluated when that on the left hand side is True. This is called short-circuited logic.

Truth Table Condition1	Condition2	Condition1 OrElse Condition2
True	-	True
False	True	True
False	False	False

Xor

The Xor operator returns True when the condition on the left hand side or right hand side is True, but not when both are True. Xor means "Exclusive OR".

Truth Table Condition1	Condition2	Condition1 Xor Condition2
True	True	False
True	False	True
False	True	True
False	False	False