Teachers guide to starting to learn Just Basic

This guide is a suggestion in how to learn Just Basic[1]. It is intended for educators and assumes that Just Basic is already installed on the computer.

Most of this work is a summary of the tutorial to be found in the help menu. There is a lot of other good help and guidance that can be found on the web.

Most the programs can be found here in a zipped file.

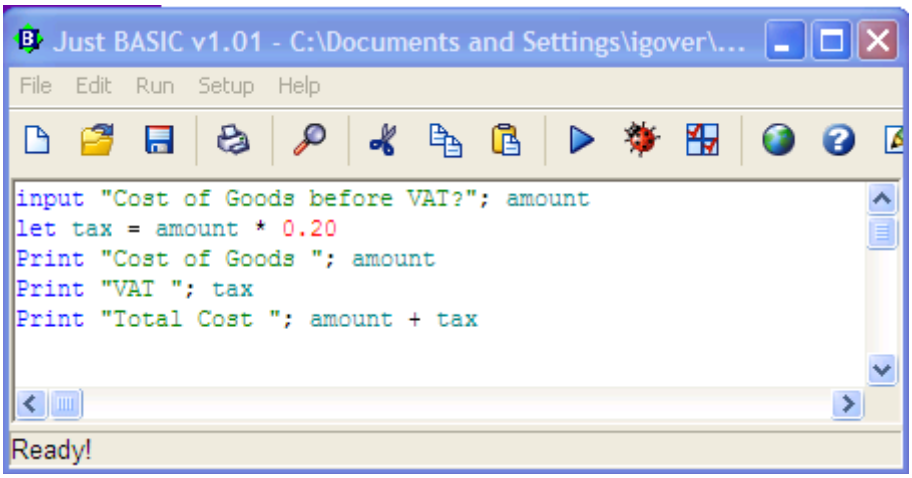
All good programmers plan what they are going to do before they complete a task. This 'mission statement' is normally written in plain English as an algorithm (or pseudo code). Because of the experiential nature of this tutorial this important step is highlighted in italics.

Program 1 – Working out VAT

In this first exercise we are going to create a program that:

1. *Asks for an amount for goods before VAT is added;*
2. *Calculates a 20% VAT tax amount;*
3. *Displays the tax amount the total amount.*

Type in the following into the main window



Click on  will compile and run the program.

A new window should appear that allows you to enter an amount and then work out the VAT.

If you want to step through the program to see it working line by line click on  . Move the windows around so you see both the output window and the debugger.

Click on  to step through the program line by line.

[1] http://justbasic.com/

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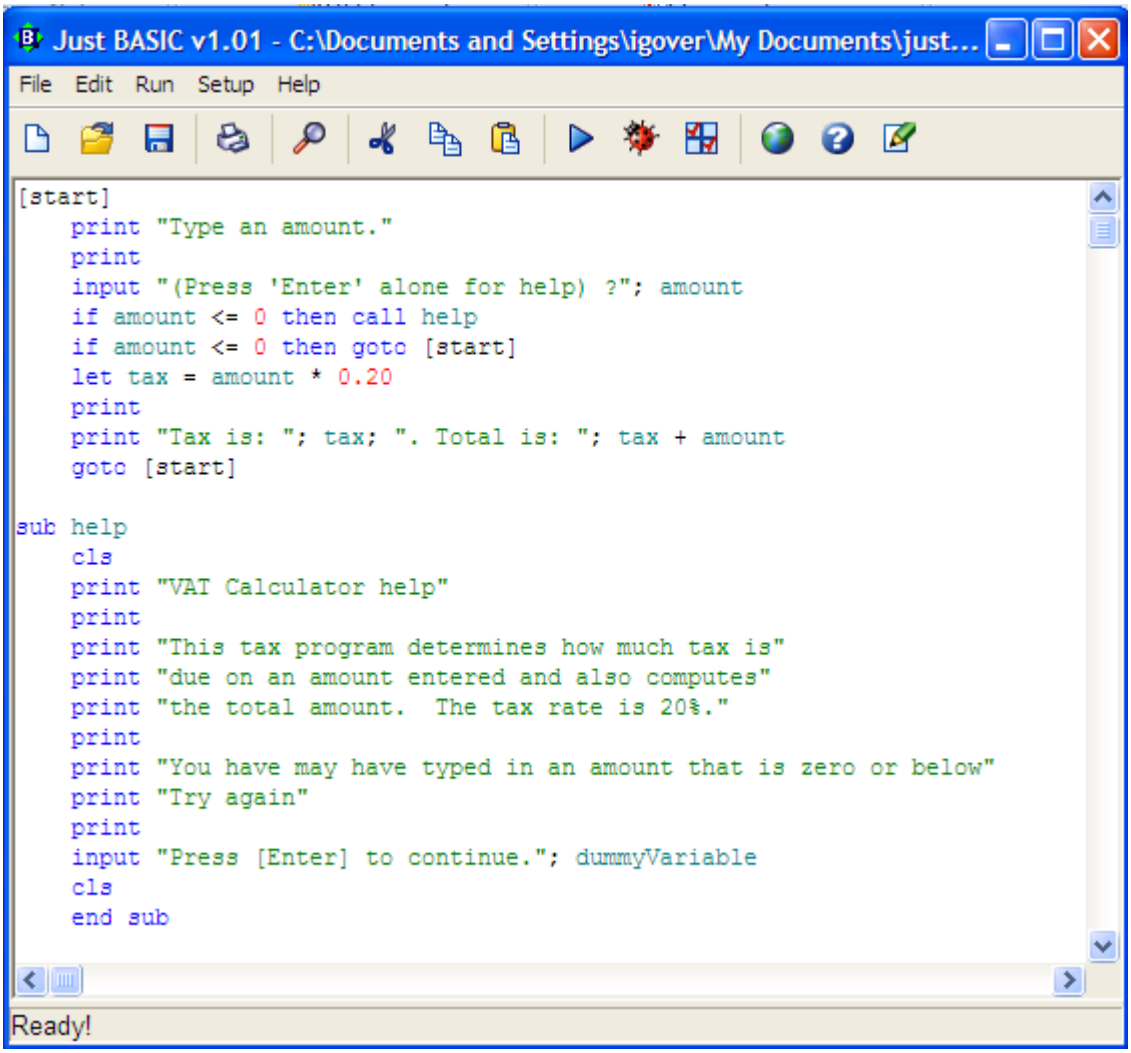
Program 2 – Checking the input for a zero amount

We are going to complicate our program by making it repeat every time and checking to see if the amount entered is zero.

The algorithm becomes:

1. *Asks for an amount for goods before VAT is added*
2. *Check to see if amount is greater than zero*
    a. *If not display help file*
3. *Calculates a 20% VAT tax amount*
4. *Displays the tax amount the total amount*
5. *Returns to beginning of program*




```
[start]
    print "Type an amount."
    print
    input "(Press 'Enter' alone for help) ?"; amount
    if amount <= 0 then call help
    if amount <= 0 then goto [start]
    let tax = amount * 0.20
    print
    print "Tax is: "; tax; ". Total is: "; tax + amount
    goto [start]

sub help
    cls
    print "VAT Calculator help"
    print
    print "This tax program determines how much tax is"
    print "due on an amount entered and also computes"
    print "the total amount.  The tax rate is 20%."
    print
    print "You have may have typed in an amount that is zero or below"
    print "Try again"
    print
    input "Press [Enter] to continue."; dummyVariable
    cls
    end sub
```

amount and tax are called **variables**.
Note the way in which **label** [start] and the **sub routine** help are used.

If you enter a number such as 123.12 into this program it will give you an answer of 147.744. Whereas this is true it is not a good representation of money.

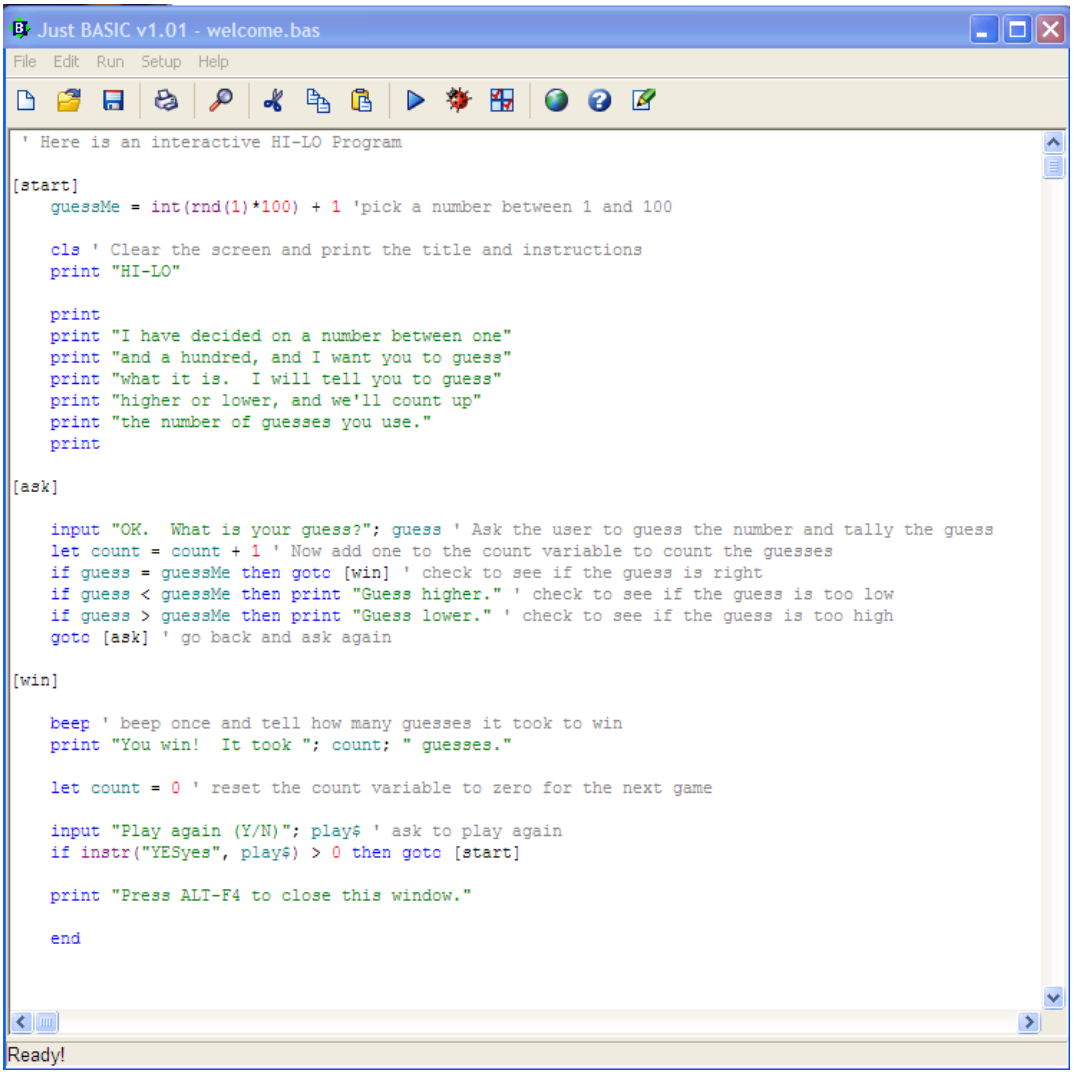
The INT() command can be used to round the number to 2 decimal places.

(int((tax*100)+0.5))/100 will round the VAT number to the correct number of decimal places

Program 3 – A number guessing game

This is a simple guessing game. The computer will pick a number between 1 and 100. The user guesses the number in as few guesses as possible.
The algorithm is:

1. *Pick a number between 1 and 100*
2. *Print program title and give some instructions*
3. *Ask for the user to guess number*
4. *Tally the guess*
5. *If the guess is right go to step (9)*
6. *If the guess is too low tell the user to guess higher*
7. *If the guess is too high tell the user to guess lower*
8. *Go back to step (3)*
9. *Beep and tell the user how many guess it took to win*
10. *Ask the user whether to play again*
11. *If the user answers yes then clear the guess tally and goto step (1)*
12. *Give the user instructions on how to close the game window*
13. *End the program*




```
' Here is an interactive HI-LO Program

[start]
    guessMe = int(rnd(1)*100) + 1 'pick a number between 1 and 100

    cls ' Clear the screen and print the title and instructions
    print "HI-LO"

    print
    print "I have decided on a number between one"
    print "and a hundred, and I want you to guess"
    print "what it is.  I will tell you to guess"
    print "higher or lower, and we'll count up"
    print "the number of guesses you use."
    print

[ask]

    input "OK.  What is your guess?"; guess ' Ask the user to guess the number and tally the guess
    let count = count + 1 ' Now add one to the count variable to count the guesses
    if guess = guessMe then goto [win] ' check to see if the guess is right
    if guess < guessMe then print "Guess higher." ' check to see if the guess is too low
    if guess > guessMe then print "Guess lower." ' check to see if the guess is too high
    goto [ask] ' go back and ask again

[win]

    beep ' beep once and tell how many guesses it took to win
    print "You win!  It took "; count; " guesses."

    let count = 0 ' reset the count variable to zero for the next game

    input "Play again (Y/N)"; play$ ' ask to play again
    if instr("YESyes", play$) > 0 then goto [start]

    print "Press ALT-F4 to close this window."

    end
```

Compare the program to the algorithm.

The 'grey comments are remark statements and can be used if you come back to a program after a long while.

Program 4 – Using Arrays

Programs are often asked to process a lot of data. To do this they can use arrays. In this program we are going to store up to 20 numbers in an array and then work out their average. The algorithm is:

1. *Define an array to hold up to 20 numbers*
2. *Ask user for a number*
3. *If number is 0 then step 8 to calculate average*
4. *Increase array number by 1*
5. *And number to total*
6. *Check to see if 20 numbers are entered – if so step 8*
7. *Ask for another number – step 2*
8. *Display numbers entered and calculate average*

Note the following

An array numbers has to be set up at the beginning of the program.
The numbers in the array can be displayed by printing numbers(index)

Numbers are treated differently to other variables in BASIC.

A number variable can have a descriptor of just letter or more helpfully a name.

Word (including characters (such as !"£$%^&) are called strings and need variables that have a $ after their name such as firstname$ or lastname$.

You can complete several task with strings – what do think this program does

```
input "First Name "; firstname$
input "Last Name "; lastname$

fullname$ = firstname$ + " " + lastname$

print
print fullname$
Print
print "Your first name is "; len(firstname$); " characters long"
print "Your last name is "; len(lastname$); " characters long"
print "Your full name is "; len(fullname$); " characters long"

print
print "Your full name in lower case "; lower$(fullname$)
print "Your full name in upper case "; upper$(fullname$)
```

Just BASIC v1.01 - C:\Documents and Settings\igover\My Documents\just...

File Edit Run Setup Help

```
    'AVERAGE.BAS
    'Accept some numbers from the user, then total and average them

    dim numbers(20) 'define an array to take upto 20 numbers

    print "AVERAGE.BAS"
    print
    print "Enter up to 20 non-zero values."
    print "A zero or blank entry ends the series."

[entryLoop]  'loop around until a zero entry or until index = 20

    print "Entry "; index + 1; 'get the user's entry
    input entry

    if entry = 0 then [endSeries]  'quit if entry is zero or blank

    index = index + 1        'add one to index
    numbers(index) = entry   'set the specified array item to be entry

    total = total + entry    'add entry to the total

    if index = 20 then [endSeries]  'if 20 values were entered, exit loop

    goto [entryLoop]  'go back and get another entry

[endSeries]  'entries are finished

    entryCount = index 'Set entryCount to index
    if entryCount = 0 then print "No Entries." : goto [quit]

    print "Entries completed."
    print
    print "Here are the "; entryCount; " entries:"
    print "----------------------------"

    'This loop displays each entered value in turn.
    'Notice that we re-use the index variable.  It
    'can be confusing to use a new variable for each
    'new loop.
    index = 0

[displayLoop]
    index = index + 1
    print "Entry "; index; " is "; numbers(index)
    if index < entryCount then [displayLoop]

    'Now display the total and average value
    print
    print "The total is "; total
    print "The average is "; total / entryCount

[quit]

    end
```

Ready!

Program 5 –Storing the information on the computer

```
'AGES_STORE.BAS
   'Accept some names and ages from the user, then total and average them
   dim numbers(20)
   dim names$(20)
   print "AGES.BAS"
   print

   'loop up to 20 times, getting numbers
   print "Enter up to 20 non-zero values."
   print "A zero or blank entry ends the series."

[entryLoop]  'loop around until a zero entry or until index = 20

   'get the user's name and age
   print "Entry "; index + 1;
   input name$
   if name$ = "" then [endSeries]  'quit if name$ is blank

   print "Age   ";
   input age

   index = index + 1       'add one to index
   names$(index) = name$   'set the specified array item to be name$
   numbers(index) = age    'set the specified array item to be age
   total = total + age     'add entry to the total

   if index = 20 then [endSeries]  'if 20 values were entered, exit loop

   goto [entryLoop]  'go back and get another entry

[endSeries]  'entries are finished

   'Set entryCount to index

   entryCount = index
   if entryCount = 0 then print "No Entries." : goto [quit]

   print "Entries completed."
   print
   print "Here are the "; entryCount; " entries:"
   print "----------------------------"

   'This loop displays each entered value in turn.
   'Notice that we re-use the index variable.  It can be confusing to use
   'a new variable for each new loop.
   for index = 1 to entryCount
     print "Entry "; index; " is "; names$(index); ", age "; numbers(index)

   next index

   'Write the data into ages.dat
   open "C:\Documents and Settings\igover\My Documents\just basic files\ages.dat"
for output as #ages
   for index = 1 to entryCount
     print #ages, names$(index)
     print #ages, numbers(index)
   next index
   close #ages

   'Now display the total and average value
   print
   print "The total age is "; total
   print "The average age is "; total / entryCount

[quit]
    end
```

This program extends the previous algorithm by adding names and then storing the data on a disc.

Note the ways the names have to be stored in a variable with a dollar $ at the end – names$.

This is the part of the program that stores the data.
open "path.myfile.txt" for output as #myHandle

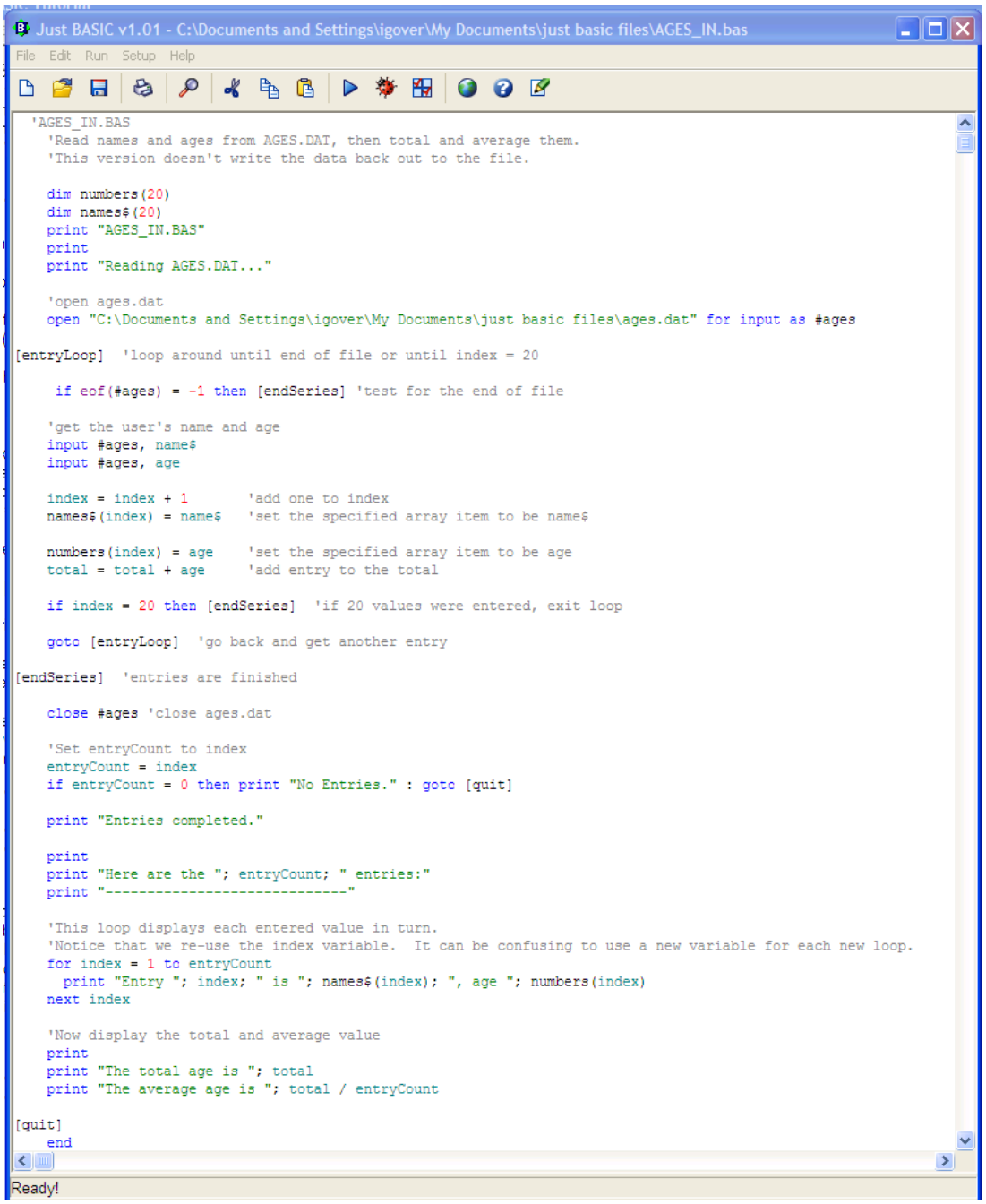
You can see the OUTPUT mode is specified. The last item on the line is #myHandle. It is a name (called a file handle).

The file must be closed.

Program 6 - Reading the file

The algorithm to read the file is:

1. *Open the file*
2. *Check to see if it is the last one in the file then step 4*
3. *Read the entry and store in an array*
4. *Read next entry – step 2*
5. *Print entries*
6. *Calculate average*



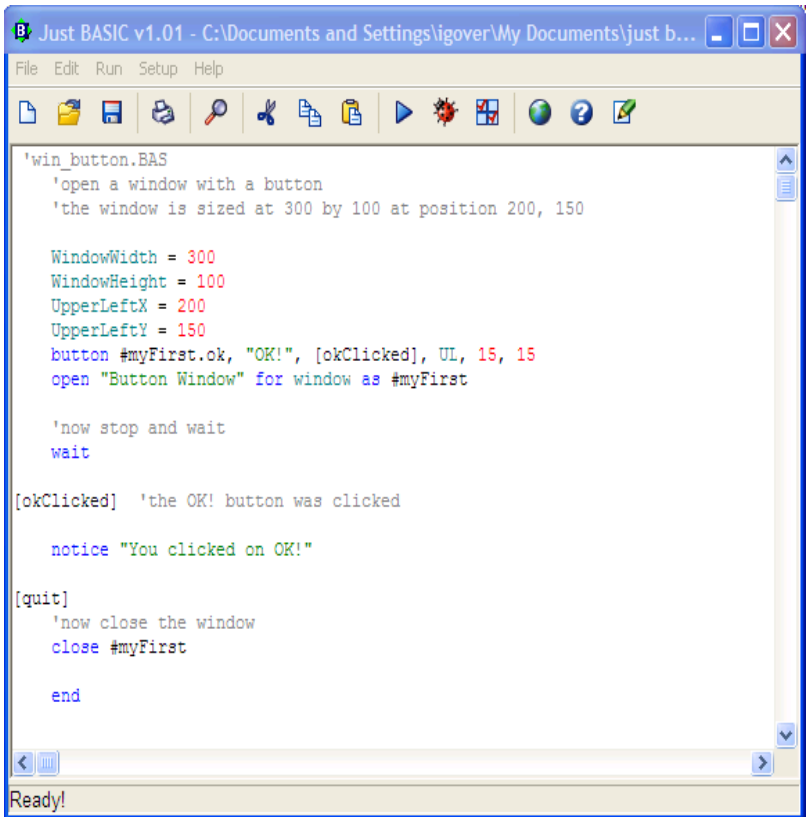

```
'AGES_IN.BAS
  'Read names and ages from AGES.DAT, then total and average them.
  'This version doesn't write the data back out to the file.

  dim numbers(20)
  dim names$(20)
  print "AGES_IN.BAS"
  print
  print "Reading AGES.DAT..."

  'open ages.dat
  open "C:\Documents and Settings\igover\My Documents\just basic files\ages.dat" for input as #ages

[entryLoop]  'loop around until end of file or until index = 20

   if eof(#ages) = -1 then [endSeries] 'test for the end of file

  'get the user's name and age
  input #ages, name$
  input #ages, age

  index = index + 1        'add one to index
  names$(index) = name$    'set the specified array item to be name$

  numbers(index) = age     'set the specified array item to be age
  total = total + age      'add entry to the total

  if index = 20 then [endSeries]  'if 20 values were entered, exit loop

  goto [entryLoop]  'go back and get another entry

[endSeries]  'entries are finished

  close #ages 'close ages.dat

  'Set entryCount to index
  entryCount = index
  if entryCount = 0 then print "No Entries." : goto [quit]

  print "Entries completed."

  print
  print "Here are the "; entryCount; " entries:"
  print "-----------------------------"

  'This loop displays each entered value in turn.
  'Notice that we re-use the index variable.  It can be confusing to use a new variable for each new loop.
  for index = 1 to entryCount
    print "Entry "; index; " is "; names$(index); ", age "; numbers(index)
  next index

  'Now display the total and average value
  print
  print "The total age is "; total
  print "The average age is "; total / entryCount

[quit]
  end
```

This program will read the ages.dat file

The **eof(#ages)** checks to see if the end of the file has been reached. If it has it returns a -1.

The use of the #ages is the file handle.

Program 7 – Opening windows



Just Basic can be used to control windows.

This program:

1. *Opens a window with defined size*
2. *Displays a button*
3. *When clicked displays message*

The button statement needs a little unpacking.

You must give a handle for the button – in this case #myFirst.ok

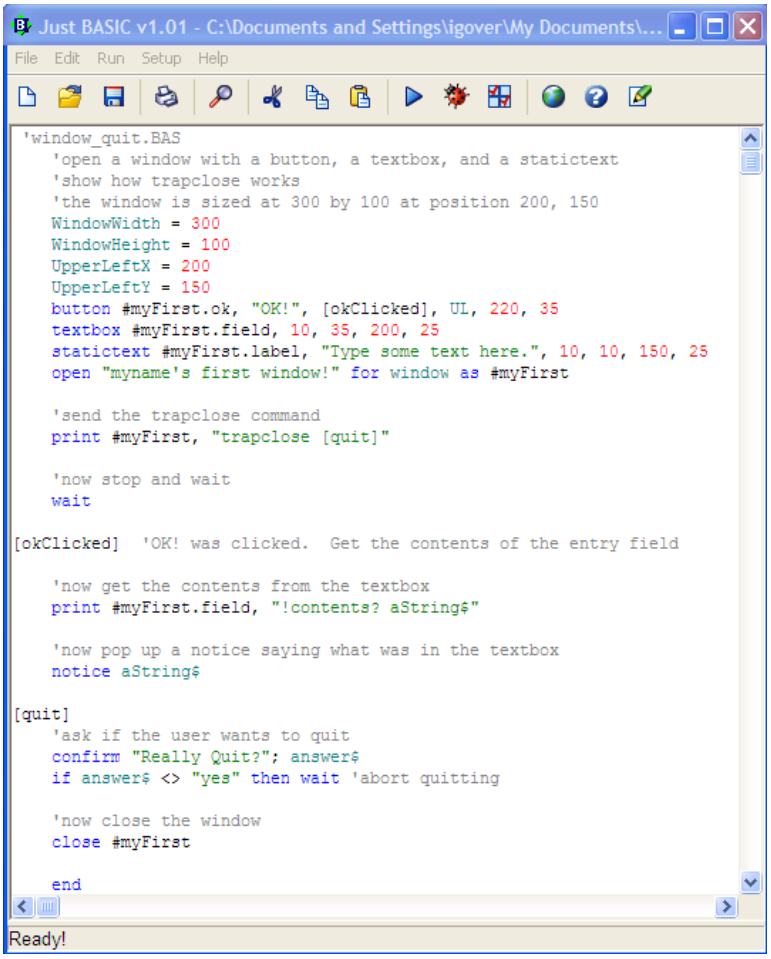
The [okClicked] tells Basic to go to the [okClicked] routine

UL tells Basic to put the button at the Upper Left of the window. You can also have UR, LL and LR. The numbers are the position from the corner.

Program 8 – More window formatting and closing

In this development of the last program we are going to follow the following algorithm:

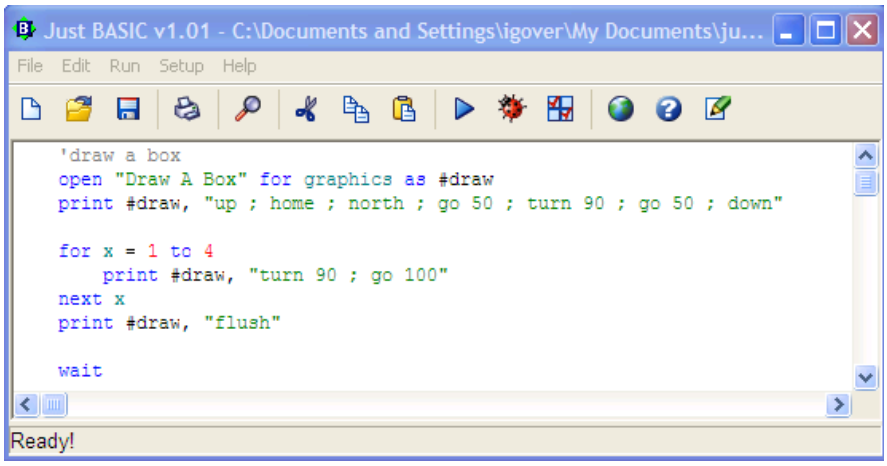
1. *Open a window*
2. *Display*
    a. *OK Button*
    b. *Textbox*
    c. *Instructions*
3. *If Ok clicked then display contents*
4. *Check to see is close window is used*



Note the use of statictext to position instruction.

The **"trapclose** instruction will detect if the window is being closed and move to the label [quit]

Program 9 – Drawing a Square

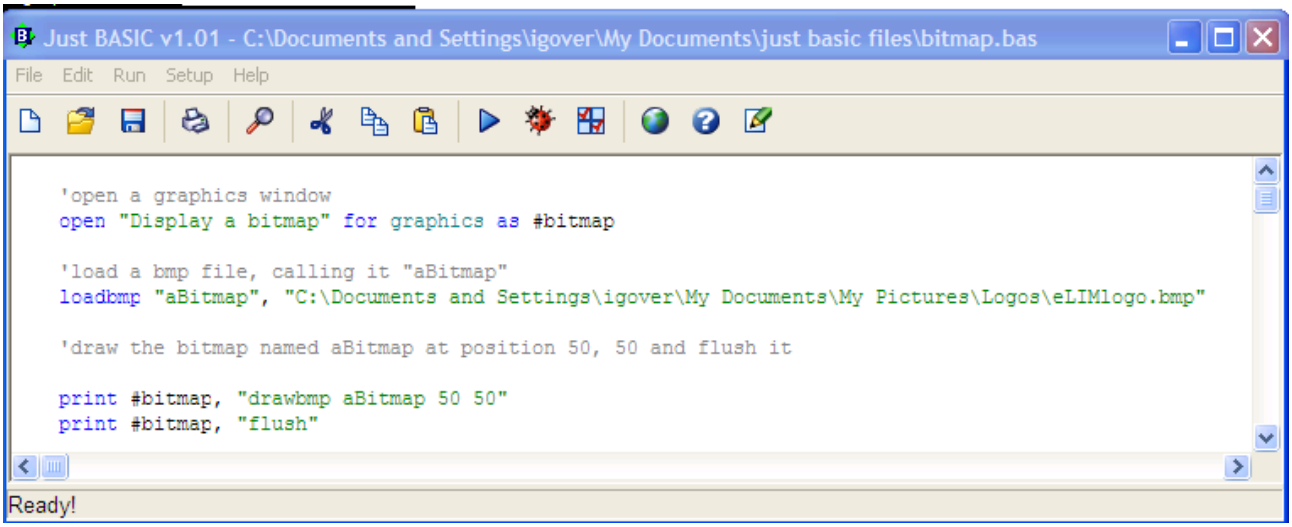


This program opens a graphic window as #draw

and then draws a square

'Flush' fixes the drawing.

Program 10 – Adding a bitmap



This program loads a bitmap into window

There are many other things that you can do with graphics – referring to the help file and then looking at week 5 will help you explore this area.

There is a well established Just Basic forum at http://justbasic.conforums.com/index.cgi that has an amazing amount of help and information.

Program 11 – Bouncing Ball

Just BASIC v1.01 - C:\Documents and Settings\igover\My Documents\just bas...

File Edit Run Setup Help

```
OPEN "Moving Graphic DEMO" FOR GRAPHICS_NSB AS #demo
PRINT #demo, "trapclose quit"
PRINT #demo, "FILL lightgray"

WAIT
END  'Never executed, no branch to here, but I prefer an END to all programs.

'SUBs below here
SUB pause mil  'The pause for animation display
    TIMER mil, [cont]
    WAIT
    [cont]
    TIMER 0
    END SUB

SUB upDown handle$
    flag=5
    WHILE 1=1  'Endless loop
    y=y+flag
    PRINT #demo, "FILL lightgray"
    PRINT #demo, "BACKCOLOR red"
    PRINT #demo, "PLACE 250 "; y
    PRINT #demo, "DOWN"
    PRINT #demo, "CIRCLEFILLED 20"
    CALL pause 15
    IF y>380 OR y<5 THEN flag=(flag*-1)  'Change y direction
    WEND
    END SUB

SUB leftRight handle$
    flag=5
    WHILE 1=1  'Endless loop
    x=x+flag
    PRINT #demo, "FILL lightgray"
    PRINT #demo, "BACKCOLOR red"
    PRINT #demo, "PLACE "; x; " 200"
    PRINT #demo, "DOWN"
    PRINT #demo, "CIRCLEFILLED 20"
    CALL pause 15
    IF x>490 OR x<5 THEN flag=(flag*-1)  'Change x direction
    WEND
END SUB

SUB quit handle$
    CLOSE #demo
    END  'Ends the main program
    END SUB  'Completes the SUB
```

Ready!

This program demonstrates what can be completed with graphics.

It introduces several new commands.

See if you can follow it.

Full list of commands

ABS(n)	absolute value of n
ACS(n)	arc-cosine of n
"addsprite"	sprite command to add a sprite
AND	bitwise, boolean AND operator
APPEND	purpose parameter in file open statement
AS	used in OPEN statements
ASC(s$)	ascii value of s$
ASN(n)	arc-sine of n
ATN(n)	arc-tangent of n
"!autoresize"	texteditor command to relocate control automatically
"autoresize"	graphics command to relocate control automatically
"backcolor"	graphics command to set background color
"background"	sprite command to set background image
BackgroundColor$	sets or returns background color for window
BEEP	play the default system wave file
BINARY	purpose parameter in file open statement
Bitwise Operations	modify bit patterns in an object
BMPBUTTON	add a bitmap button to a window
BMPSAVE	save a bitmap to a disk file
BOOLEAN	evaluates to true or false
"box"	graphics command to draw box
"boxfilled"	graphics command to draw filled box
BUTTON	add a button to a window
BYREF	passes an argument to a subroutine or function by reference
CALL	call a user defined subroutine
CASE	specifies a value for select case statement
CHECKBOX	add a checkbox to a window
CHR$(n)	return character of ascii value n
"circle"	graphics command to draw circle
"circlefilled"	graphics command to draw filled circle
CLOSE #h	close a file or window with handle #h
CLS	clear a program's mainwindow
"cls"	graphics command to clear drawing area
"!cls"	text command to clear texteditor
"color"	graphics command to set pen color
COMBOBOX	add a combobox to a window
ComboboxColor$	sets or returns combobox color
CommandLine$	contains any command line switches used on startup
CONFIRM	opens a confirm dialog box
"!contents"	text command to replace contents of texteditor
"!contents?"	text command returns contents of texteditor
"!copy"	text command to copy text to clipboard
COS(n)	cosine of n
"!cut"	text command to cut text and copy to clipboard
DATA	adds data to a program that can be read with the READ statement
DATE$( )	return string with today's date
DefaultDir$	a variable containing the default directory
"delsegment"	graphics command to delete drawing segment
Dialog	window type
DIM array( )	set the maximum size of a data array
"discard"	graphics command to discard unflushed drawing
DisplayWidth	a variable containing the width of the display
DisplayHeight	a variable containing the height of the display
"down"	graphics command to lower pen
"drawbmp"	graphics command to display a bitmap
Drives$	special variable, holds drive letters
DO LOOP	performs a looping action until/while a condition is met
DUMP	force the LPRINT buffer to print
"ellipse"	graphics command to draw an ellipse

"ellipsefilled"	graphics command to draw a filled ellipse
ELSE	used in block conditional statements with IF/THEN
ENABLE	make a control active
END	marks end of program execution
END FUNCTION	signifies the end of a function
END IF	used in block conditional statements with IF/THEN
END SELECT	signals end of SELECT CASE construct
END SUB	signifies the end of a subroutine
EOF(#h)	returns the end-of-file status for #h
EXIT	exits a looping structure, sub or function
EXIT FOR	terminate a for/next loop before it completes
EXIT WHILE	terminate a while/wend loop before it completes
EXP(n)	returns e^n
FIELD #h, list...	sets random access fields for #h
FILEDIALOG	opens a file selection dialog box
FILES	returns file and subdirectory info
"fill"	graphics command to fill with color
"font"	set font as specified
ForegroundColor$	sets or returns foreground color for window
FOR...NEXT	performs looping action
FUNCTION	define a user function
GET #h, n	get random access record n for #h
"getbmp"	graphics command to capture drawing area
GLOBAL	creates a global variable
"go"	graphics command to move pen
GOSUB label	call subroutine label
"goto"	graphics command to move pen
GOTO label	branch to label
GRAPHICBOX	add a graphics region to a window
GROUPBOX	add a groupbox to a window
Graphics	window type
Graphics Commands	a detailed summary of graphics commands in Just BASIC
"home"	graphics command to center pen
IF THEN	perform conditional action(s)
Inkey$	contains a character or keycode from a graphics window
INPUT	get data from keyboard, file or button
INPUT$(#h, n)	get n chars from handle #h, or from the keyboard
INPUT	purpose parameter in file open statement
INSTR(a$,b$,n)	search for b$ in a$, with optional start n
INT(n)	integer portion of n
JOY-	global variables containing joystick information read by readjoystick command Joy1x, Joy1y, Joy1z, Joy1button1, Joy1button2 Joy2x, Joy2y, Joy2z, Joy2button1, Joy2button2
KILL s$	delete file named s$
LEFT$(s$, n)	first n characters of s$
LEN(s$)	length of s$
LET var = expr	assign value of expr to var
"line"	graphics command to draw line
"!line"	text command to return text from specified line in texteditor control
"!lines?"	text command to return number of lines in texteditor control
LINE INPUT	get next line of text from file
LISTBOX	add a listbox to a window
ListboxColor$	sets or returns listbox color
LOADBMP	load a bitmap into memory
LOC(#handle)	return current binary file position
LOCATE	locate text in the mainwindow
LOF(#h)	returns length of open file #h or bytes in serial buffer
LOG(n)	returns the natural logarithm of n
LOWER$(s$) s$	converted to all lowercase
LPRINT	print to hard copy

MAINWIN	set the width of the main window in columns and rows
MENU	adds a pull-down menu to a window
MID$( )	return a substring from a string
MIDIPOS( )	return position of play in a MIDI file
MKDIR( )	make a new subdirectory
MOD	returns the result of integer division
"!modified?"	text command to return modified status
NAME a$ AS b$	rename file named a$ to b$
NEXT	used with FOR
NOMAINWIN	keep a program's main window from opening
"north"	graphics command to set the current drawing direction
NOT	logical and bitwise NOT operator
NOTICE	open a notice dialog box
ONCOMERROR	set an error handler for serial communications
ON ERROR	set an error handler for general program errors
OPEN	open a file or window
OPEN "COMn:..."	open a communications port for reading/writing
OR	logical and bitwise OR operator
"!origin"	text command to set origin
"!origin?"	text command to return origin
OUTPUT	purpose parameter in file open statement
"!paste"	text command to paste text from clipboard
"pie"	graphics command to draw pie section
"piefilled"	graphics command to draw filled pie section
"place"	graphics command to locate pen
Platform$	special variable containing platform name
PLAYWAVE	plays a *.wav sound file
PLAYMIDI	plays a *.midi sound file
"posxy"	graphics command to return pen position
"print"	graphics command to print hard copy
PRINT	print to a file or window
PrinterFont$	returns or sets the font used with LPRINT
PROMPT	open a prompter dialog box
PUT #h, n	puts a random access record n for #h
RADIOBUTTON	adds a radiobutton to a window
RANDOM	purpose parameter in file open statement
RANDOMIZE	seed the random number generator
READ	reads information from DATA statements
REDIM	redimensions an array and resets its contents
"redraw"	graphics command to redraw segment
REM	adds a remark to a program
RESTORE	sets the position of the next DATA statement to read
RETURN	return from a subroutine call
RIGHT$(s$, n) n	rightmost characters of s$
RMDIR( )	remove a subdirectory
RND(n)	returns a random number
"rule"	graphics command to set drawing rule
RUN s$, mode	run external program s$, with optional mode
SCAN	checks for and dispatches user actions
SEEK #h, fpos	set the position in a file opened for binary access
"segment"	graphics command to return segment ID
SELECT CASE	performs conditional actions
"!selectall"	text command to highlight all text
"!selection?"	text command to return highlighted text
"set"	graphics command to draw a point
"setfocus"	set input focus to control or window
SIN(n)	sine of n
"size"	graphics command to set pen size
SPACE$(n)	returns a string of n spaces
Sprites	all about using sprites in Just BASIC

SQR(n)	details about getting the square root of a number
STATICTEXT	add a statictext control to a window
STOP	marks end of program execution
STOPMIDI	stops a MIDI file from playing
STR$(n)	returns string equivalent of n
SUB	defines a subroutine
TAB(n)	cause tabular printing in mainwin
TAN(n)	tangent of n
Text	window type
Text Commands	a detailed summary of text window commands in Just BASIC
TEXTBOX	add a textbox (entryfield) to a window
TextboxColor$	sets or returns textbox color
TEXTEDITOR	add a texteditor widget to a window
TexteditorColor$	sets or returns texteditor color
TIME$( )	returns current time as string
TIMER	manage a Windows timer
"!trapclose"	text command to trap closing of text window
"trapclose"	trap closing of window
TRIM$(s$)	returns s$ without leading/trailing spaces
"turn"	graphics command to reset drawing direction
TXCOUNT(#handle)	gets number of bytes in serial communications queue
UNLOADBMP	unloads a bitmap from memory
"up"	graphics command to lift pen
UPPER$(s$)	s$ converted to all uppercase
USING( )	performs numeric formatting
UpperLeftX	specifies the x part of the position where the next window will open
UpperLeftY	specifies the y part of the position where the next window will open
VAL(s$)	returns numeric equivalent of s$
Version$	special variable containing LB version info
WAIT	stop and wait for user interaction
"when"	graphics command to trap mouse and keyboard events
WHILE...WEND	performs looping action
Window	window type
WindowWidth	specifies the width of the next window to open
WindowHeight	specifies the height of the next window to open
WORD$(s$, n)	returns nth word from s$
XOR	logical and bitwise XOR operator