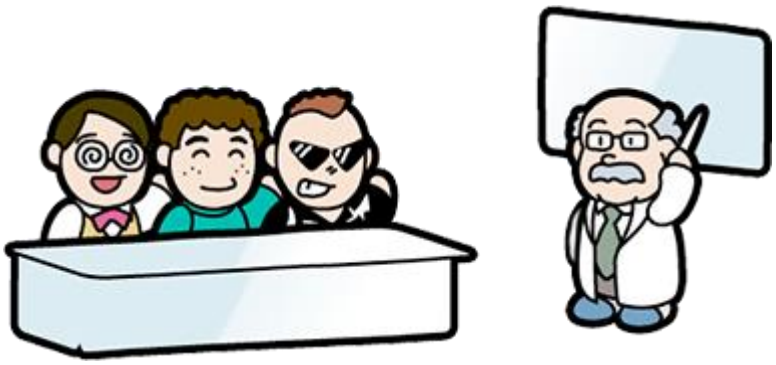
SMILE BASIC 4™

Programming for the First Time

For version 4.3.x

Let’s try programming using SmileBASIC 4!
There are eight different programs available in total.

For basic operations of SmileBASIC, please refer the other material,
“Operating Manual for Programmers.”



Let's input some commands!

This is the display where you create programs with BASIC in SmileBASIC 4.　As you can see, it's a plain looking display with only white letters appearing on a black background.　It's called the Console Display.

Let's try to input simple commands to make sure that they work on the computer. Maybe there're some people who use a keyboard for the first time.　But, no worries! Take your time and make mistakes.　You just need to fix them if you make mistakes!

Experiment!

Let's see what will happen after inputting!

1) `BEEP 69`↵
2) `BGMPLAY 41`↵
3) `GFILL 100,50,200,150,RGB(0,0,255)`↵
4) `GCIRCLE 200,120,60,RGB(255,0,0)`↵

Hello, hello!　I'm Hakase!

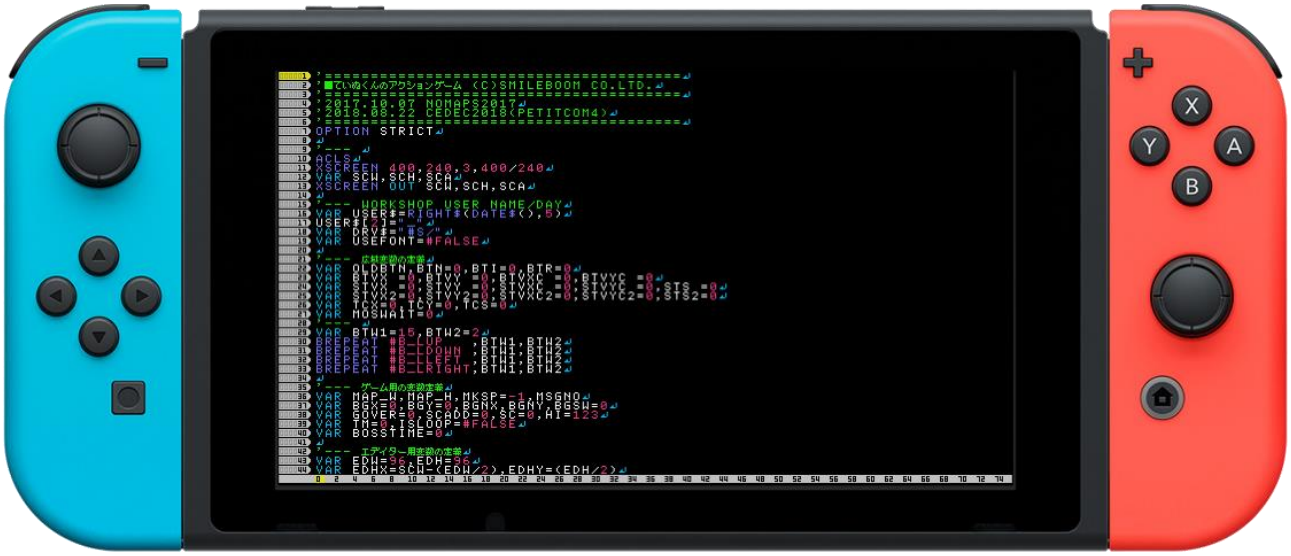
I'll come out from time to time and give advice.
Sometimes the display is hard to see because it shows some results when you stop the program.
Then, use this command. `ACLS`↵
Sometimes a sound just goes on and on, then this is the command you use. `SNDSTOP`↵

Give a lot of Commands to the Computer

Did you get a sense of what it's like to give a computer commands to do something?

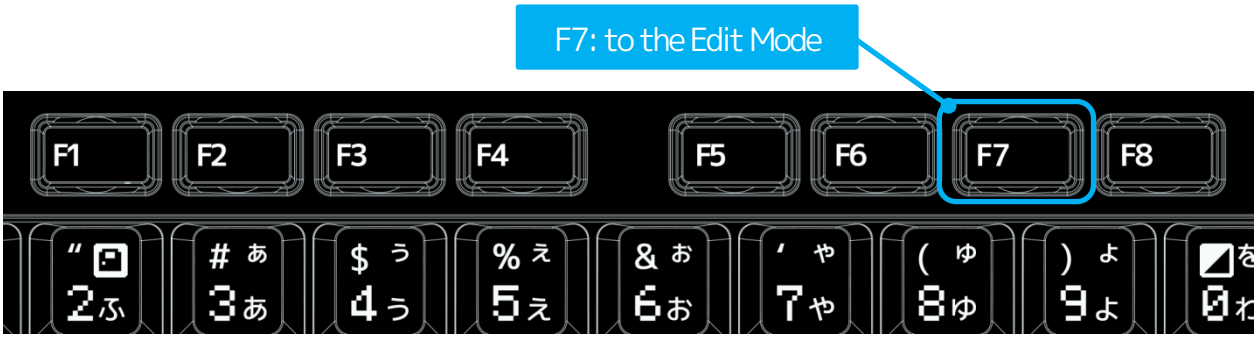
We can easily give commands by typing them from the Console Display, but it's hard and tedious to enter them one at a time.　You need to input more commands and a complex program to a computer in order to make a game.

So, then SmileBASIC 4 has the ability to write a lot of commands all at once.



This is the Edit Mode.

Press the F7 key of the function keys on the top of your keyboard.



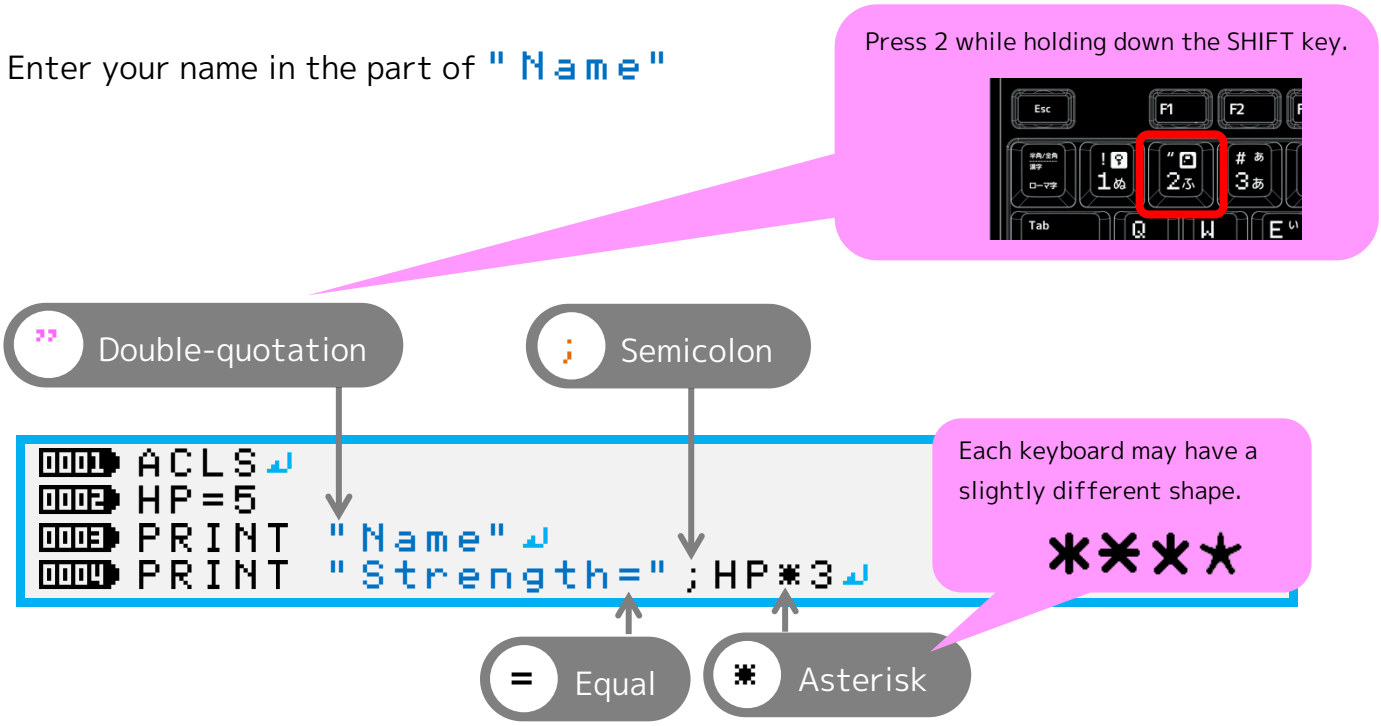
※If you're using the software keyboard, press ZL and touch EDIT0

Okay, then, let's write a program in the Edit Mode!

① Display Your Name and HP (?) Program

Let's display your name and HP on the display.
Press the F7 key to switch it to the Edit Mode, and input the following program.

Enter your name in the part of "Name"



When you're done inputting, press the F5 key and run the program!
※You can run/stop programs by pressing the + button on the controller.

```
Name
Strength=15
OK
```

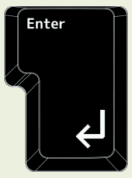
Were your name and strength appeared on the display?
If you change the number "5" next to HP= on the line where

HP=5

is written, your strength will change.

New Line (one step down)

If you see a symbol ↵ the end of each line, input the enter key.



★Description of This Program

What do these commands do?

Commands	Functions
ACLS	Erase all the results that are displayed and return to the initial state.　This command won't erase the program.
PRINT	It shows letters and numbers on the Console Display. (Ex.) PRINT "COMPUTER" PRINT HP;"+";5;"=";HP+5

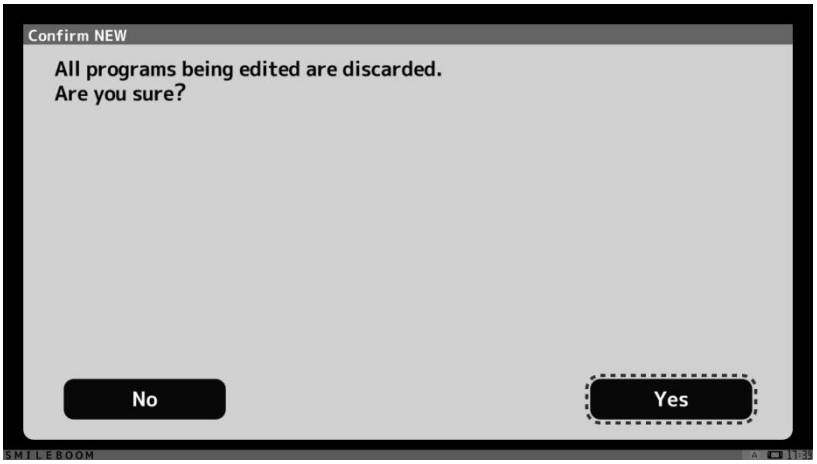
Strings	Functions
HP	This is the name of the memory which stores the number called a variable, your HP in this program.　In a computer, it is stored in memory and used to calculate and check conditions.　You can use any name you like, but only using alphabetic letters, numbers and the _ (called an underbar or underscore) symbol.　Moreover, the first letter cannot be a number. (Ex.) RINGO=1 APPLE=123 TEKITOU=789

② Show Your Name Three Times Program

Let's use a repeating command to show your name three times on the display.
First, we're going to delete the program that has been written so far.
Press the F8 key and input NEW command to delete it on the Console Display.

```
NEW↵
```

When the confirmation window is popped up, select "Yes" with the arrow key and press the ENTER key.



Then, press the F7 key to input a program.
For the ")Name" part, write your name without deleting ") " symbol.

```
0001 ACLS↵
0002 FOR N=1 TO 3↵
0003   PRINT N;")Name"↵
0004 NEXT ↵
```

The symbol next to the N is ; a semicolon

When you're done inputting, press the F5 key and run the program!

```
1)Name
2)Name
3)Name
OK
|
```

Your name appears three times with numbers on the display?

★Description of This Program

Commands	Functions
FOR TO	This command uses a single variable to control repetition. The variable N is used to repeat from 1 to 3. FOR VariableName=BeginningNumber TO EndingNumber ' It repeats between FOR and NEXT. NEXT
NEXT	This command acts as the end of the FOR command.

String	Function
N	This is the name of the memory which stores the number called a variable for counting the number of repetitions.

How to Find Errors

You may get an error when you start the program.

`Illegal function call`
(There's a mistake in the argument of the commands.)
`Syntax error`
(Grammatical error)

When this message appears, press the F4 key to show the area near where the error is occurring. Let's compare it with the material and look for mistakes!

③ Image Pop-Up Program

Let's make a program that pops up images on the display.
Press the F8 key and input the NEW command to delete the previous program on the Console Display.

```
NEW↵
```

Press the F7 key and input the program.

```
0001 ACLS↵
0002 @LOOP↵
0003 SPSET RND(4096) OUT ID↵
0004 IF ID>-1 THEN↵
0005  SPOFS ID,200,120↵
0006  SPANIM ID,"XY.",-60,RND(400),RND(240),1↵
0007 ENDIF↵
0008 VSYNC↵
0009 GOTO @LOOP↵
```

When you're done inputting, press the F5 key and run the program!

Images pop out from the center of the display

Press the F5 key to stop the program.

If the display gets messy, enter ACLS↵

★Description of This Program

Commands	Functions
RND()	Return an appropriate number between 0 and "specified number-1".
SPSET	This is a preparatory command for displaying a single stamp-like picture called a sprite, which can be displayed anywhere you want.
SPOFS	This command changes the display position of the sprite.
SPANIM	This command animates the sprite. <Main Animation> "XY" — Change the display position. "C" — Change the color. "S" — Change the scale. "R" — Change the rotation angle.
IF	Check the condition and branch out the process. <Main Condition> A==B — Variables A and B are the same A!=B — Variables A and B are different A>B — Variable A is greater than B A<B — Variable A is less than B A>=B — Variable A is greater than or equal to B A<=B — Variable A is less than or equal to B
THEN	The beginning of the process when the result of the IF statement is correct.
ENDIF	The end of the IF statement
VSYNC	Wait for the display refresh timing.
GOTO	Jump to the row of the specified label.

Strings	Functions
@LOOP	A name beginning with the @ symbol that records the location of a program called a label.
ID	A variable that receives the management number of sprites allocated by SPSET.

④ Draw Lines and Circles in Messy Ways

Let's make a program to draw lines and circles on the screen in a crazy way.
Press the F8 key and input the NEW command to delete the previous program on the Console Display.

```
NEW↵
```

Press the F7 key and input the program.

```
0001 ACLS↵
0002 @LOOP↵
0003 OX=X:X=RND(400)↵
0004 OY=Y:Y=RND(240)↵
0005 C=RGB(RND(256),RND(256),RND(256))↵
0006 IF RND(2) THEN GPAINT X,Y,C↵
0007 IF RND(2) THEN GLINE OX,OY,X,Y,C↵
0008 IF RND(2) THEN GFILL OX,OY,X,Y,C↵
0009 IF RND(2) THEN GCIRCLE X,Y,RND(100),C↵
0010 WAIT 8↵
0011 GOTO @LOOP↵
```

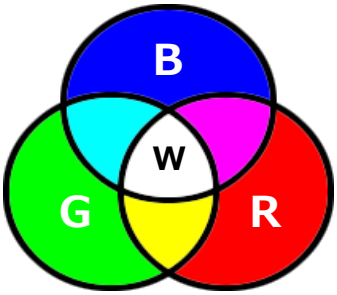
When you're done inputting, press the F5 key and run the program!

You see a variety of colored lines, circles, and filled boxes on the display?

Press the F5 key to stop the program.

The display…ACLS↵

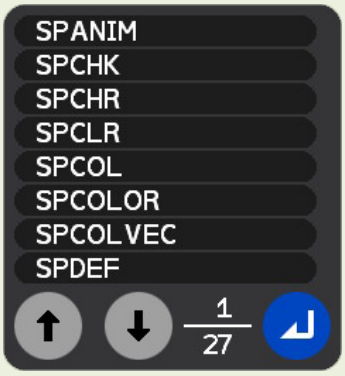
★Description of This Program

Commands	Functions
RGB()	Everything you see on the display is a point of light with color information. The light is made up of three types: R (red), G (green) and B (blue). Each RGB element has a scale from 0 to 255. This command is used to find the number of a color from the three RGB values. The larger the number, the stronger it is. 
GPAINT	Fill from the specified position on the graphic display.
GLINE	Draw a line between the two specified points on the graphic display.
GFILL	Fill the specified area of the graphics display.
GCIRCLE	Draw a circle from the specified position on the graphics display.
WAIT	Wait for the specified time in units of 1/60th of a second to 1.

Strings	Functions
OX, OY	Variables to store the previous positions
X, Y	Variables to receive the various positions
C	A variable to receive the various colors

Input Support Function

If you remember only the first letter
and press the key,
you'll see a list starting with that letter.
When you find the desired command,
press the down arrow key to select it
and press the Enter.



⑤ Drawing by Touch Program

Let's make a program to draw a picture on the display by touch.
Press the F8 key and input the NEW command to delete the previous program on the Console Display.

```
NEW↵
```

Press the F7 key and input the program.

```
0001 ACLS ↵
0002 H=0↵
0003 @LOOP↵
0004 FOR I=0 TO 9↵
0005  TOUCH I OUT T,X,Y,P↵
0006  IF T>0 THEN↵
0007   C=HSV(H MOD 360,255,255)↵
0008   P=P/1000:IF P>100 THEN P=100↵
0009   GFILL X,Y,X+P,Y+P,C↵
0010   H=H+1↵
0011  ENDIF↵
0012 NEXT↵
0013 VSYNC↵
0014 GOTO @LOOP↵
```

When you're done inputting, press the F5 key and run the program!

Let's touch and trace the touch screen with your finger to draw a picture!
You can draw with a rainbow-colored brush that changes thickness according to the amount of pressure applied.

What would happen if you drew with two fingers?

Press the F5 key to stop the program.

★Description of This Program

Commands	Functions
TOUCH	Check the status of the touch screen. Time is 0 when not pressed, but it's not necessarily 1 when pressed.
HSV()	Color is expressed in terms of three elements: the hue (H), the saturation (S), and the lightness (V). The hue part is an angle and expresses the colors like a rainbow in 360 degrees.
MOD	Get the remainder of the division.　(modulo)

Strings	Functions
H	A variable to hold the hue value of HSV
I	A variable to repeat for the number of multi-touches
T	A variable to receive the time of touch
X, Y	A variable to receive the touched position
P	A variable to receive touch pressure information
C	A variable to receive color

How to use the search function to find words/letters

The longer the program, the harder it is to find a place where you want to fix it.　In such cases, press the F3 key to enter the search mode and the text input area will appear at the bottom of the display.　Just type in the words/letters you're looking for and press enter to jump to the line with the words/letters!　If you find a lot of them, you can also jump up and down with the arrow keys.

⑥ Fruit Instruments Program

Let's make a program that makes sounds on the touch screen.
Press the F8 key and input the NEW command to delete the previous program on the Console Display.

```
NEW
```

Press the F7 key and input the program.

```
ACLS
FOR Y=0 TO 6
 FOR X=0 TO 11
  S=SPSET(RND(7))
  SPOFS S,24+X*32,24+Y*32
  SPCOL S,1
  SPSCALE S,2,2
  SPHOME S,8,8
 NEXT
NEXT
'---
DIM VC[]=[69,70,19,68,62,30,47]
LOOP
 FOR I=0 TO 9
  TOUCH I OUT T,X,Y
  IF T==1 THEN
   S=SPHITRC(X,Y,1,1)
   IF S>-1 THEN
    N=S MOD 12
    P=S DIV 12
    BEEP VC[P],N*100
    SPANIM S,"R",-8,360,1,0,1
   ENDIF
  ENDIF
 NEXT
 VSYNC
ENDLOOP
```

When you're done inputting, press the F5 key and run the program!
Did you hear a sound when you touch the screen?
Press the F5 key to stop the program.

Sound…SNDSTOP

★Description of This Program

Commands	Functions
SPCOL	Enable the sprite's collision detection
SPSCALE	Set the scale of the sprite
SPHOME	Adjust the display origin of the sprite
DIM	Define array variables
LOOP	The beginning of an infinite loop
ENDLOOP	The end of an infinite loop.　It is a control function to repeat infinitely between LOOP and ENDLOOP commands.
SPHITRC()	Check if a sprite is touched using the specified coordinates and size
DIV	Get the divided answer as an Int

Strings	Functions
VC　[]	Array of tone numbers
I	A variable to repeat for the number of multi-touches
T	A variable to receive the touch time
X, Y	Variables to receive the position of the touch. They also apply to repetition.
S	A variable to receive the management number of sprites
N	A variable to receive pitch information
P	A variable to receive the number of the tone array

⑦ King Jumping Game Program

Let's make a game in which the king jumps and dodges his enemies.
Press the F8 key and input the NEW command to delete the previous program on the Console Display.
Press the F7 key and input the program.

```
ACLS
SC=0:OY=180:OV=0:VM=8:JP=0
SPSET 0,2624:SPOFS 0,100,OY
SPCOL 0,1,1,1,1
EC=0:BY=OY+1:BS=1:BM=512/16
FOR I=0 TO BM-1
 S=SPSET(243):SPOFS S,I*16,BY
 SPCOLOR S,HSV((I*30) MOD 360,255,255)
 SPFUNC S,"BLOCK"
NEXT
'---
LOOP
 LOCATE 0,1:PRINT "SCORE:";SC
 IF JP THEN
  SPOFS 0 OUT X,Y
  SPOFS 0,X,Y+OV
  OV=OV+0.25:IF OV>VM THEN JP=0
 ELSE
  IF BUTTON(0,#B_RRIGHT) THEN
   JP=1:OV=-VM:BEEP 8
  ENDIF
 ENDIF
 IF SPHITSP(0)>-1 THEN BEEP 14:BREAK
 BS=BS+0.001:SC=SC+FLOOR(BS)
 CALL SPRITE
 VSYNC
ENDLOOP
END
'---
DEF BLOCK
S=CALLIDX()
SPOFS S OUT X,Y:X=X-BS
IF X<-16 THEN
 X=X+512:INC EC
 IF EC>RND(32)+8 THEN
  E=SPSET(3072):SPCOL E
  SPOFS E,400+RND(32),BY-RND(64)
  SPFUNC E,"ENEMY":EC=0
 ENDIF
ENDIF
SPOFS S,X,Y
END
'---
DEF ENEMY
S=CALLIDX()
```

```
0046 SPOFS S OUT X,Y
0047 SPOFS S,X-1,Y+(RND(3)-1)
0048 IF X<-16 THEN SPCLR S
0049 END
```

When you're done inputting, press the F5 key and run the program!
How far can you go by jumping the king with good timing?

★Description of This Program

Commands	Functions
SPCOLOR	Specify a color for the sprite
SPFUNC	Assign a specific program to a sprite
LOCATE	Specify the position to display letters
BUTTON()	Get the button information of the controller
SPHITSP()	Check the contact between the sprites
BREAK	Forcibly exit from loops such as LOOP, WHILE, and FOR
FLOOR()	Get the rounding value
CALL	Call a specific sprite program using CALL SPRITE.
DEF	Use it to define a new command
CALLIDX()	Return the sprite number called by CALL SPRITE
INC	Increase the value of the variable by one
SPCLR	Delete unused sprites

Strings	Functions
SC	For saving the score
OY	The king's vertical display position
OV, VM, JP	Jump change amount, maximum jump change amount, jump state
EC	For controlling the timing of the enemies' occurrence.
BY, BM	Block display heights and maximum number of blocks
BS	Moving speed of the floor blocks
Others	Commonly used variables to store values

⑧ Ninja Training Game Program

Let's make the program of the training game that controls the ninja and defeats the enemies.

Press the F8 key and input the NEW command to delete the previous program on the Console Display.

Press the F7 key and input the program.

```
ACLS
SPSET 0,2664:SPOFS 0,200,120
SPANIM 0,"I",-16,2664+4,0
'---
DIM ET[]=[2728,2744,2968,2984,3048,3088]
EM=100
FOR I=0 TO EM-1
 N=ET[RND(6)]:S=SPSET(1000,3999,N):SPCOL S
 SPCOLOR S,#C_CLEAR
 SPANIM S,"I",-(RND(16)+8),N+4,0
 SPANIM S,"C",-(RND(120)+60),#C_WHITE,1
 SPOFS S,RND(400),RND(240)
 SPFUNC S,"ENEMY"
NEXT
'---
SPD=4:RST=EM:TM=999
LOOP
 LOCATE 0,1
 PRINT "TIME:";TM;"(";RST;") "
 STICK 0 OUT VX,VY
 SPOFS 0 OUT X,Y
 X=X+VX*SPD:Y=Y+VY*SPD
 SPOFS 0,X,Y
 R=DEG(ATAN(VY,VX)):SPROT 0,R
 IF BUTTON(0,#B_RRIGHT,1) THEN
  S=SPSET(1,3,3394)
  IF S>-1 THEN
   SPCOL S:SPOFS S,X,Y:BEEP 59
   X=X+COS(RAD(R))*400
   Y=Y+SIN(RAD(R))*400
   SPANIM S,"XY.",-60,X,Y,1
  ENDIF
 ENDIF
 TM=TM-1:IF TM<0 || RST==0 THEN BREAK
 CALL SPRITE
 VSYNC
ENDLOOP
'---
T$="LOSE"
IF RST==0 THEN T$="WIN":SPANIM 0,"S",-60,4,4,1
PRINT:PRINT T$
END
'---
DEF ENEMY
```

```
0045 S=CALLIDX():H=SPCHK(S)
0046 IF H AND #CHKC THEN RETURN
0047 E=SPHITSP(S,1,999)
0048 IF E>-1 THEN
0049  SPANIM S,"C.",-8,#C_RED,1:SPCOL S,0,0
0050  SPCLR E
0051  BEEP 115:DEC RST:RETURN
0052 ENDIF
0053 IF H AND #CHKXY THEN RETURN
0054 T=RND(60*15)+60
0055 SPANIM S,"XY",-T,RND(400),RND(240),1
0056 END
```

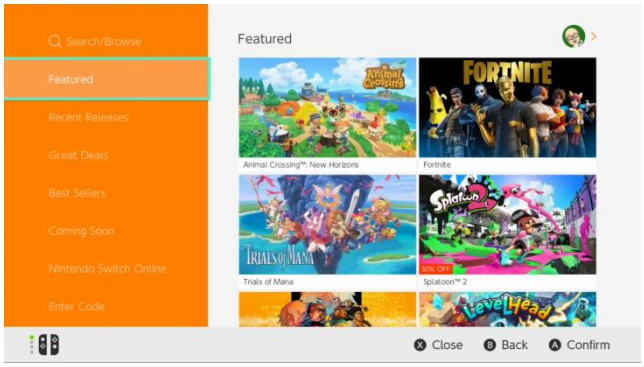
When you're done inputting, press the F5 key and run the program!
Move with the stick, attack with the A button, can you defeat all the enemies within the time limit?

★Description of This Program

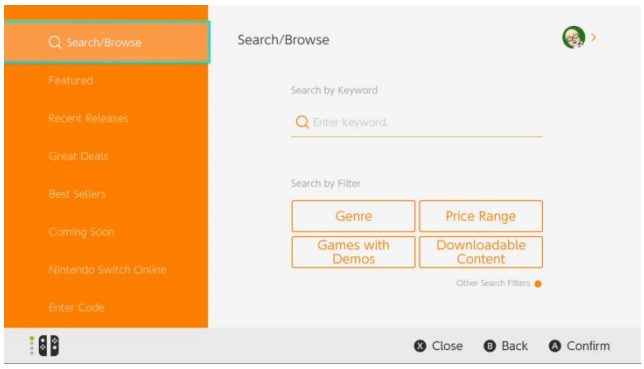
Commands	Functions
STICK	Check the state of the stick on the controller
DEG()	Convert from radian value to angle in radian
ATAN()	Arctangent, return an angle in radian from the given amount of change
RAD()	Convert from an angle to a radian value
COS()	Cosine, return a cosine value from the given angle in radian
SIN()	Sine, return a sine value from the given angle in radian
SPCHK ()	Check the state of the sprite's animation
SPCLR	Delete unused sprites
RETURN	Return to the place where it was called by CALL or GOSUB
DEC	Decrease the value of the variable by one

Strings	Functions
ET[]	Array to manage the display number of enemies
EM	A variable to store the maximum number of enemy appearances
SPD	A variable to manage the time remaining
RST, TM	A variable to receive the amount of change on the stick
Others	Commonly used variables to store values

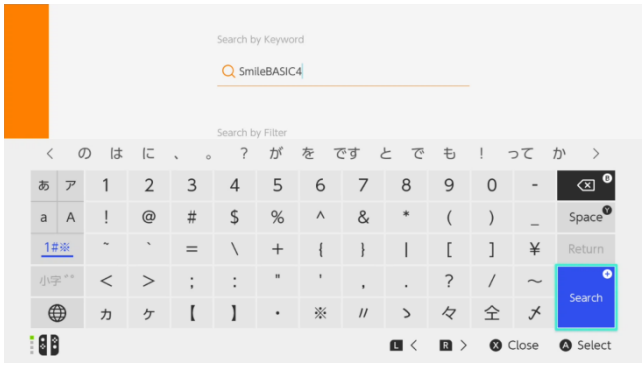
How to Purchase SmileBASIC 4



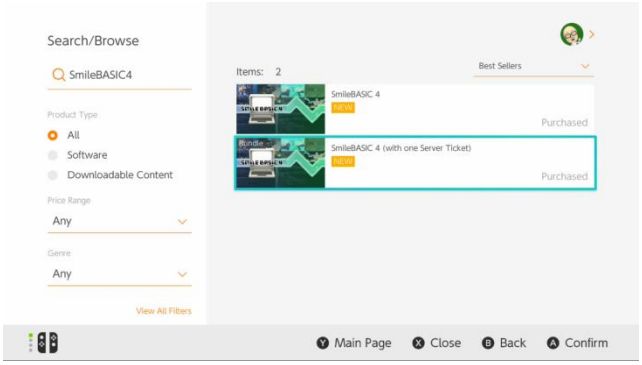
Get your own Nintendo Switch and create a new account.　You need to log in with an account that allows you to purchase software from Nintendo eShop.



Choose “Search”.



Enter “SmileBASIC 4” to search the software.



Choose "SmileBASIC 4 with one Server Ticket" and purchase it.　You need a credit card or Nintendo eShop card to purchase it.

Price: $29.99 USD or €26.99 EUR
(Including tax)

Without a service ticket, downloading is limited to every 8 hours and you cannot upload or publish your work to the SmileBASIC 4 server.

We hope you enjoy programming.

Have a nice day!