Sprite Boundary Detection Tip

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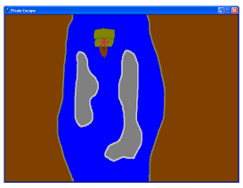
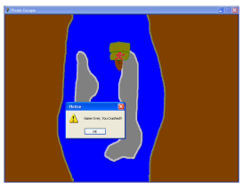
Boundary Detection

The tip in this article will help any beginning game programmer to easily design sprite boundaries. This is especially useful when the background image holds irregular, or non-rectangular, boundaries.



...



Island boundaries defined as collision sites

...

Collision detected against background image

Many games have background boundaries of increasing complexities as the levels increase. This tip benefits this type of game best. There are no complex coding skills needed. Once you learn this technique you can begin designing your level backgrounds in five minutes! (Not including sprites). It’s easy to do using your mouse and this small design program that I have put together for you.

The Detection Program

First, copy and paste the program below into your Liberty/Just BASIC code editor window.

```
Dim X(5000) 'this can be adjusted to fit your boundary needs
Dim Y(5000)
sz=5 'used to determine the cushion for detecting collisions
nomainwin

WindowWidth=800
'these can be changed to match your background image size
WindowHeight=600
UpperLeftX=int((DisplayWidth-WindowWidth)/2)
UpperLeftY=int((DisplayHeight-WindowHeight)/2)

menu #main,"File","New",[new],"Open",[open],"Save",[save],|,
"Test",[test],|,"Exit",[exit]
open "Boundary Designer" for graphics_nsb as #main
print #main,"Down;size ";sz;";color red";
print #main,"trapclose [exit]"


[main.loop]
  wait


[new]
  filedialog "Open BMP Background","*.bmp",bitmapName$
  if bitmapName$<>"" then
    loadbmp "bg",bitmapName$
  end if

  #main,"drawbmp bg 0 0;flush"

  cnt=1
  redim X(5000)
  redim Y(5000)
  print #main,"color red"
  print #main,"when mouseMove";
  print #main,"when rightButtonUp";
  print #main,"when leftButtonMove [check]";
  print #main,"setfocus"
  goto [main.loop]

[check]
  print #main,"set ";MouseX;" ";MouseY
  if MouseX<>X(cnt-1) or MouseY<>Y(cnt-1) then
    X(cnt)=MouseX
    Y(cnt)=MouseY
    cnt=cnt+1
  end if

  goto [main.loop]

[save]
  filedialog "Save level file", "*.lvl", fileName$
  open fileName$ for output as #1
  for x=1 to cnt-1
    tX=X(x)
    tY=Y(x)
    print #1,tX
    print #1,tY
  next x
  close #1
  notice "File saved."
  goto [main.loop]

[exit]
  close #main
end


[open]
  print #main,"when mouseMove ";
  print #main,"when leftButtonMove";
  filedialog "Select file","*.lvl",fileName$
  if fileName$="" then [main.loop]
  cnt=1
  open fileName$ for input as #2
  while eof(#2)<>-1
    line input #2,tX
    line input #2,tY
    X(cnt)=tX
    Y(cnt)=tY
    cnt=cnt+1
  wend
  close #2
  print #main,"cls;color red"
  for d=1 to cnt-1
    print #main,"set ";X(d);" ";Y(d)
  next d
  print #main,"flush"

  goto [main.loop]

[test]
  notice "Right click to stop testing"
  print #main,"when leftButtonMove";
  print #main,"when mouseMove [test.hit]";
  print #main,"when rightButtonUp [end.test]";
  goto [main.loop]

[test.hit]
  for t=1 to cnt-1
'I've made the dots bigger by adding and subracting sz value from each
 point.
'This makes it easier to hit the line
  if MouseX >=X(t)-sz and MouseX <=X(t)+sz and MouseY >=Y(t)-sz and
 MouseY<=Y(t)+sz then
    print #main,"color blue;set ";MouseX;" ";MouseY
    t=cnt-1
    end if
  next t
  goto [main.loop]

[end.test]
  print #main,"when mouseMove";
  print #main,"when rightButtonUp";
  print #main,"when leftButtonMove [check]";
  print #main,"color red";
  notice "Testing complete"
  goto [main.loop]
```

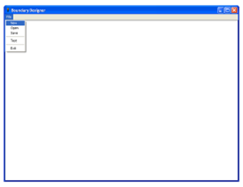
Running the Program

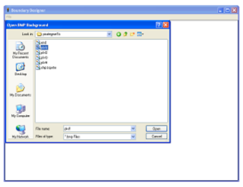
Then, follow these simple steps:

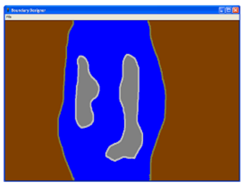
#1 Load a background BMP into the program.
#2 Use your mouse to draw out the boundaries for the level.
#3 Save the level as an .lvl file (basic text file) to be used in your Game.
#4 Use a small programming routine in your game to check for collisions.

Loading the Background BMP Image

Run the program and load any BMP file onto the graphic screen. If you can, use a background graphic you want to use in your game. Once you have your background loaded you can begin drawing your boundaries on top of your background.


...


...



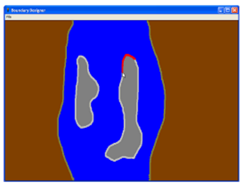
Choose New from menu, ...

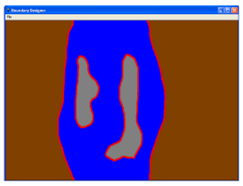
Load the bitmap and ... the program

will Display that background image

Drawing the Boundaries

Press and hold the left mouse button to draw on your background. Release the button to stop drawing. You can begin drawing again anywhere on your picture. You will want to draw slowly so the program can capture your mouse locations.


...

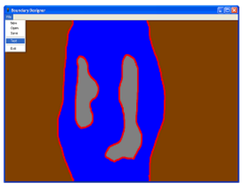


Defining the collision boundary ...

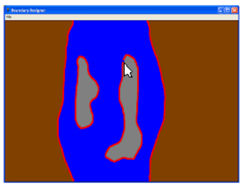
Red areas depict collision

boundaries

Testing the Boundaries
After your boundaries are all drawn, you can test them by selecting File-Test from the File menu.



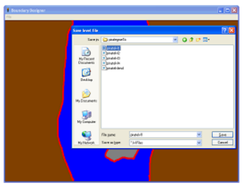
...



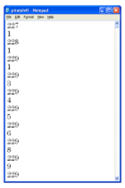
Choose Test from menu, ... Move your mouse to test boundaries

This will switch to test mode and you will no longer be able to draw. Use your mouse pointer to test the background collision locations. When your mouse location collides with a collision boundary you should see your mouse location turn blue. This indicates that you have collided with that boundary. Again you can not move your mouse too fast or it will skip over the boundary and not get detected.

Saving the Boundaries
When you have completed drawing your boundary you can save it as a `.lvl` file. The `.lvl` file is just a text file with the extension of `.lvl`. I use this extension to distinguish the file from other file types. You can change this to another extension if you wish. The file contains all the positions on the graphic screen that we designated as boundaries.



...



```
227
1
228
1
229
1
229
3
229
4
229
5
229
6
229
8
229
9
229
```

From the menu, Save the boundaries ... The saved .lvl file

Once you have saved the file, you can use the file in your game with just a small amount of code.

Using the `.lvl` Information in Your Code

Reading the `.lvl` File
Using the boundary file in your game is really simple to do. First you must open and load the file into an array. You can add this code to your game level load routine.

```
 Dim X(5000) ‘5000 can be changed if you need less or more
```

```
  Dim Y(5000)
  cnt=1 ‘setup up loop counter
  cush=5
  Open “level.lvl” for input as #lvl

  While eof(#lvl)=0
    line input #lvl,tX
    line input #lvl,tY
    X(cnt)=tX
    Y(cnt)=tY
    cnt=cnt+1
  wend

  close #lvl ‘close file
```

Checking for Collision With Each Sprite Movement
Once the `.lvl` file is loaded into the array you can check for collisions by adding the following code to your main loop. I will use an example of a routine I have used in my game. The code was designed to be used with one sprite on the game screen. The routine would have to be changed in order to check more then one sprite. You may only want to check for the player's sprite if the other sprites have a pre determined path.

```
[mainloop] 'check for crash
  print #main ,"spritexy? ship1 sx sy"

‘ This loop will quickly check if
 my boundary position is inside the position of a sprite.
‘You can switch this, if you rather reverse the check.
‘You can also remove the "cush" from the if then line if you wish.

  for t=0 to cnt-1
    if X(t)-cush>= (sx+20) and X(t)+cush<= (sx+45) and Y(t)-cush>=(
sy+20) and Y(t)+cush<=(sy+70) then
      print #main,"spritemovexy ship1 0 0";
      t=cnt-1
      hit=1
      EXIT FOR
    end if
  next t

  if hit=1 then
    notice “You’ve hit something!”
  end if
```

Author Information and Demo Program

This is basically all there is to creating simple boundaries for your sprites. This is a simple technique that can be used in your games until you become more experienced with Liberty/Just BASIC and find more sophisticated methods of collision detection for boundaries.

You can find a game I created named Pirate Escape that uses this method on the LB Downloads file depot under Games. The illustrations in this article are screenshots taken from the creation of that game. You can contact me at ben_jimenez@yahoo.com with any questions or comments.