



GameMaker Studio: Easy Game Development for All Ages

<http://www.yoyogames.com/studio>

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Overview

- Why GameMaker Studio?
- Demo: What can GameMaker do?
- Tutorial: Build BreakOut Game
- References: tutorials, books, documentation, forums

Why GameMaker Studio?

- Easy to learn
 - Get started quickly with Drag & Drop
 - Lots of good online tutorials and documentation
- Multiple PC and mobile platforms
 - Windows, Mac, Linux, HTML5, iOS, Android
- Powerful enough for the pros
 - Scripting language with debugging support
 - YoYo compiler available for high performance
- Free unlimited standard version
 - Export to Windows only

Why NOT GameMaker Studio?

- Development tool runs only on Windows
- Standard free version generates only Windows code
- Pro version + export modules costs \$200 to \$800

Recommendation

- Use free version to learn and develop for Windows
- Take advantage of periodic offers of big discounts

Other Game Engines

- Scratch/Snap, Alice, AppInventor
 - great tools for learning, not useful for building “real” applications
- Stencyl, Construct 2, Game Salad
 - quite good, easy to get started, but ...
 - drag & drop only is too limiting, and/or
 - scripting capability is convoluted
- Unity 2D/3D
 - powerful, multiplatform, and free for standard version
 - great for experienced programmers, but too complex for beginners & 2D games

Demos

Veg Ninja, Angry Cats, Ping Pong



Game Design Template

- Description
 - Brief description of the game
- Game Objects
 - examples: player, enemies, wall, bullet
- Game Assets
 - examples: images (sprites and backgrounds), sounds
- Room
 - Scene where objects appear and interact
- Controls
 - keyboard, mouse, gamepad
- Game Play
 - object behaviors
 - win/lose conditions

Screen Shots

Start of game



Brick explodes



Win: All bricks cleared



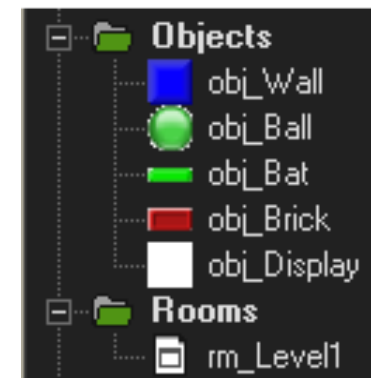
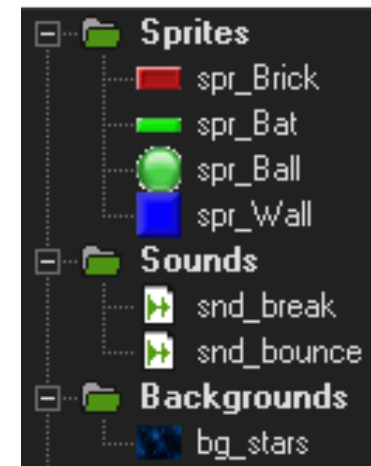
Lose: Ball falls through

Breakout Game Design

- Description
 - Classic breakout game with ball hitting bricks
- Game Objects
 - bat (paddle)
 - ball
 - wall
 - brick
 - display (score)
- Game Assets
 - sprites, background, and sounds
- Room
 - 3 Walls & bricks layout
- Controls (Keyboard)
 - A,D to move left and right
 - Space to start game
 - R to restart game
- Game Play
 - Ball bounces against wall
 - Brick explodes if hit by ball, increase score by 10
 - Player wins if no brick remains
 - Game ends if the ball falls to the bottom

Part I – Game Assets, Objects, Rooms

1. Create Project
2. Create Sprites (“spr_”)
3. Create Sounds (“snd_”)
4. Create Background (“bg_”)
5. Create Objects with Sprites (“obj_”)
6. Create Room with Objects (“rm_”)
7. Test Run Game

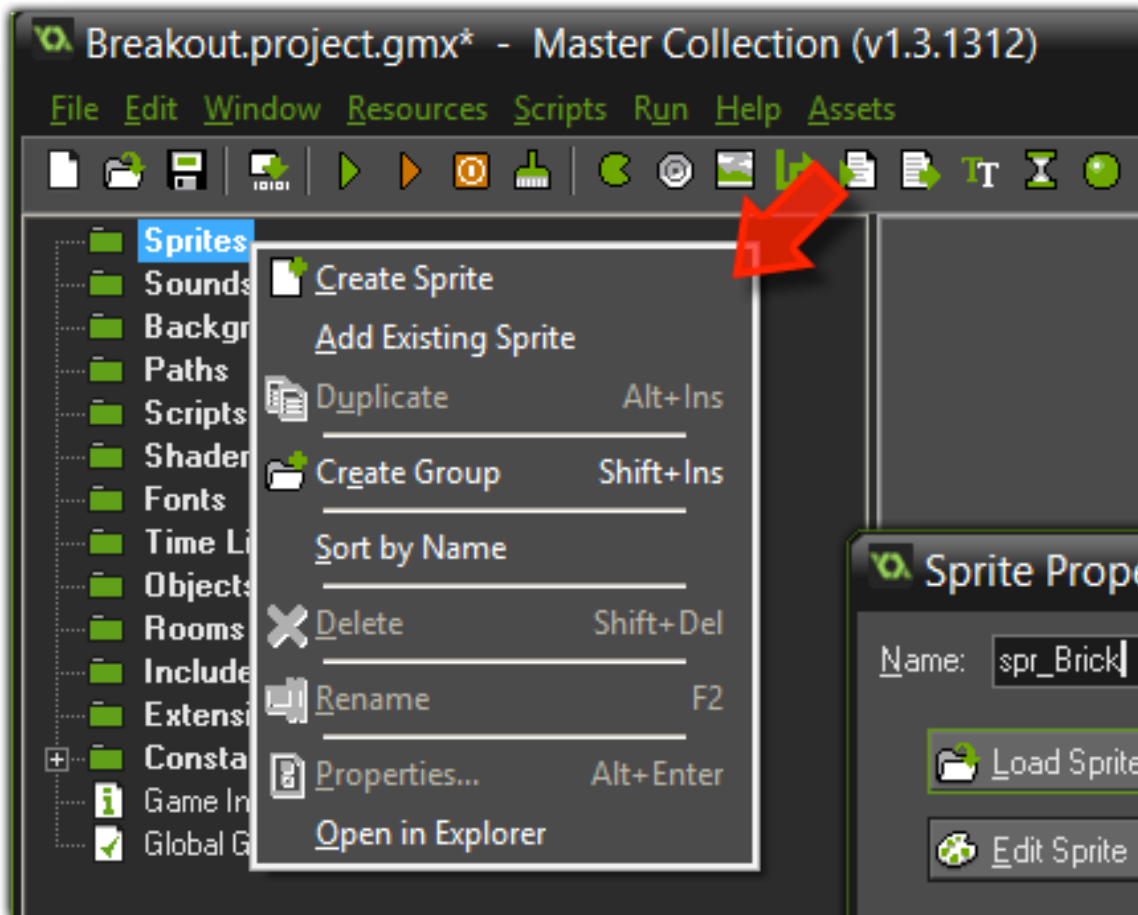


Part II – Event Based Object Actions

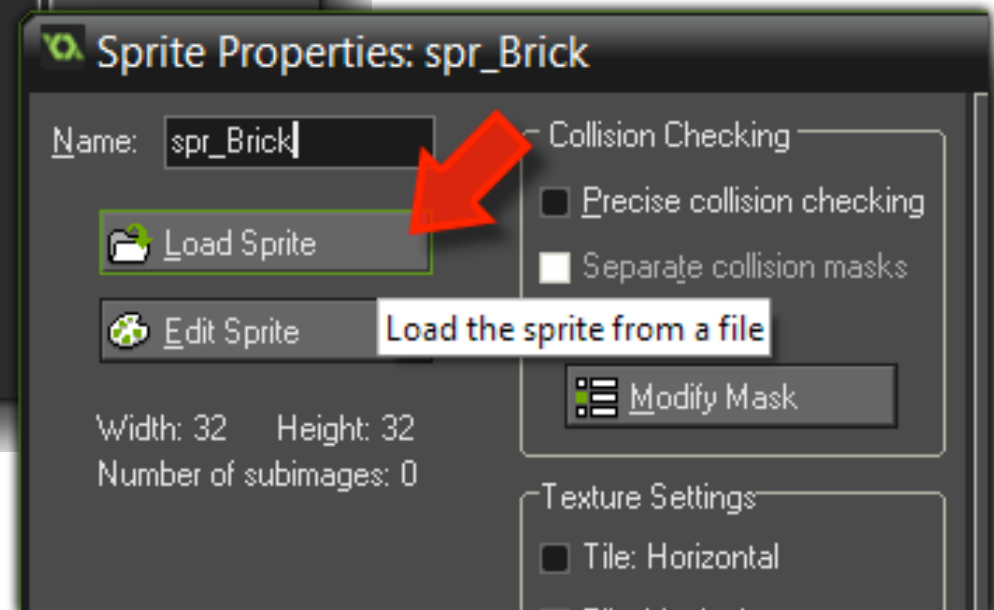
- obj_Bat
 - A-key – move left, stop at left wall
 - D-key – move right, stop at right wall
- obj_Ball
 - Collide with obj_Wall – bounce & play sound
 - Collide with obj_Bat – bounce & play sound
 - Collide with obj_Brick – bounce & play sound, destroy obj_Brick
- obj_Display (no sprite)
 - Create – set score to 0; set color to yellow
 - DrawGUI –
 - help text messages & score
 - “GAME OVER” if ball drops to the bottom
 - “YOU WIN” if there’s no more brick
 - R-key – restart current room

2. Create Sprites

Right click on Sprites > Create Sprite

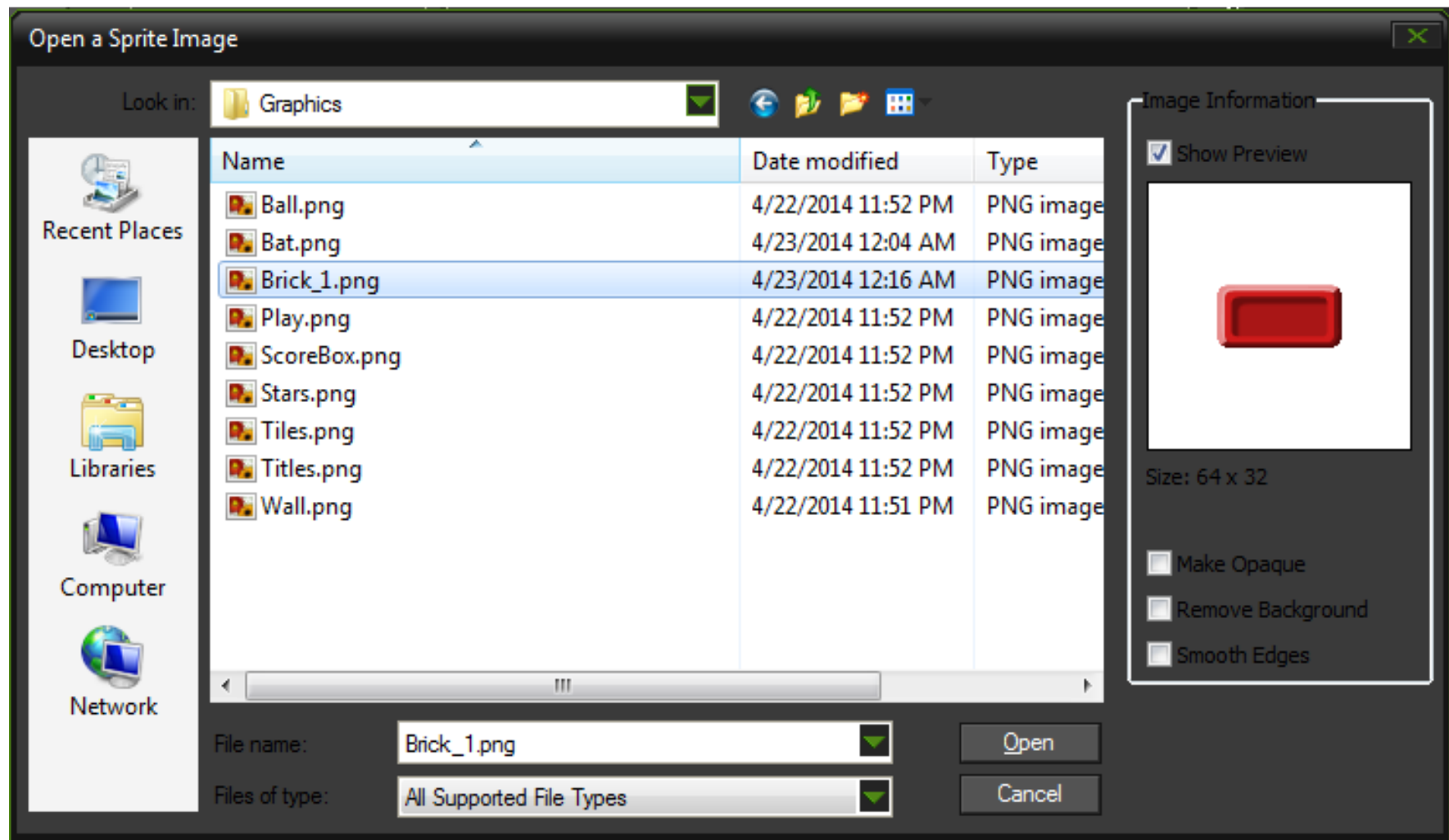


Name with "spr_" prefix,
click Load Sprite



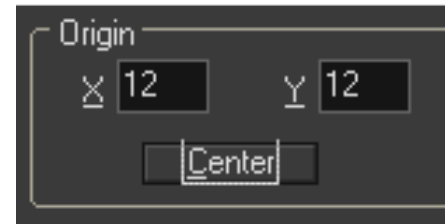
Select File from Graphics Assets

Select file from Graphics assets



Set Sprite Origin & Collision Mask

For the Ball and Bat sprites,
set origin to Center.



For other sprites, set origin to X:0 Y:0



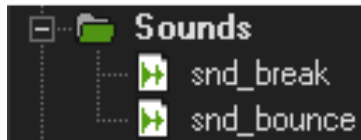
For Ball sprite,
shape Ellipse

 to set

Repeat Create Sprite for
the others



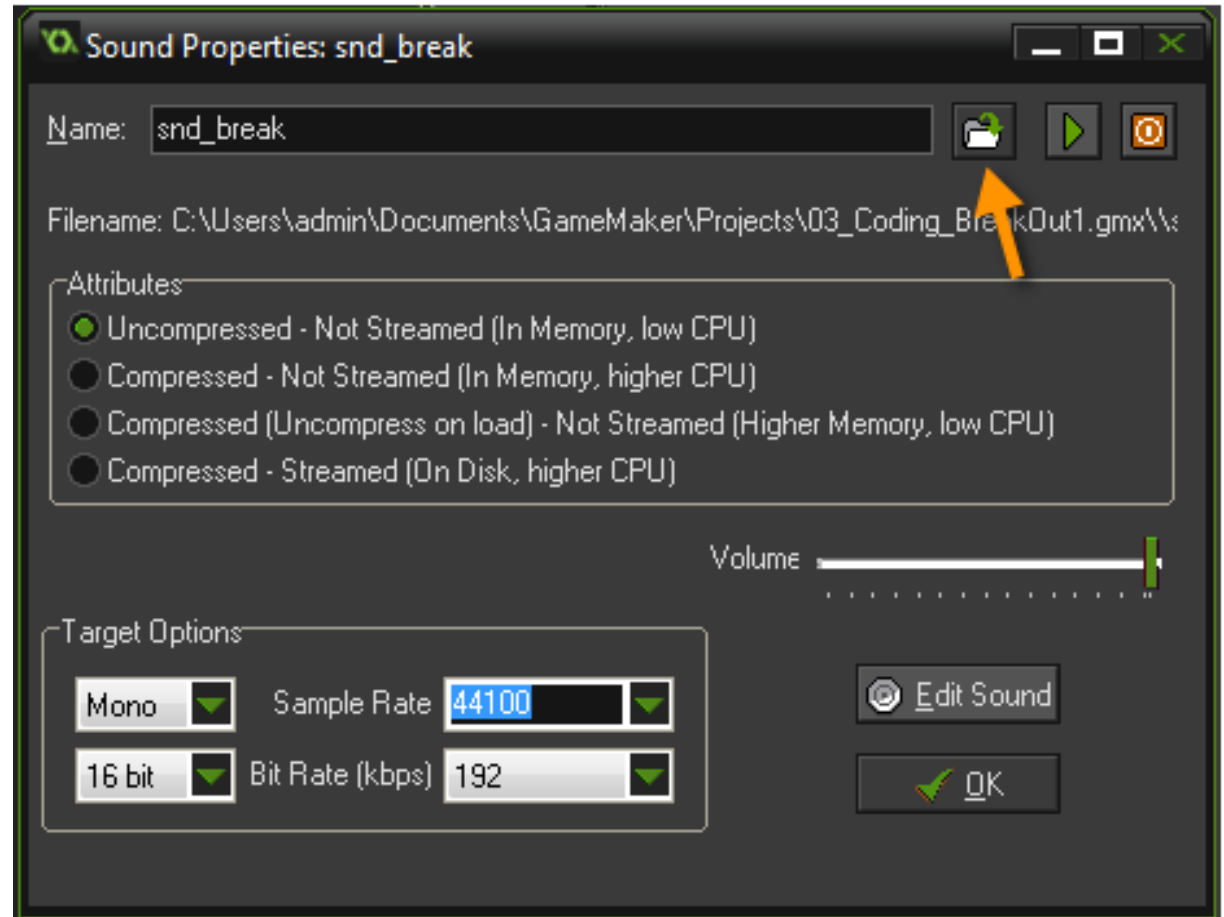
3. Create Sounds



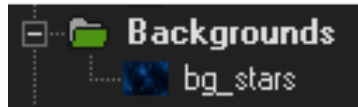
Right click on
Sounds > Create
Sound.

Set name, and
load sound file

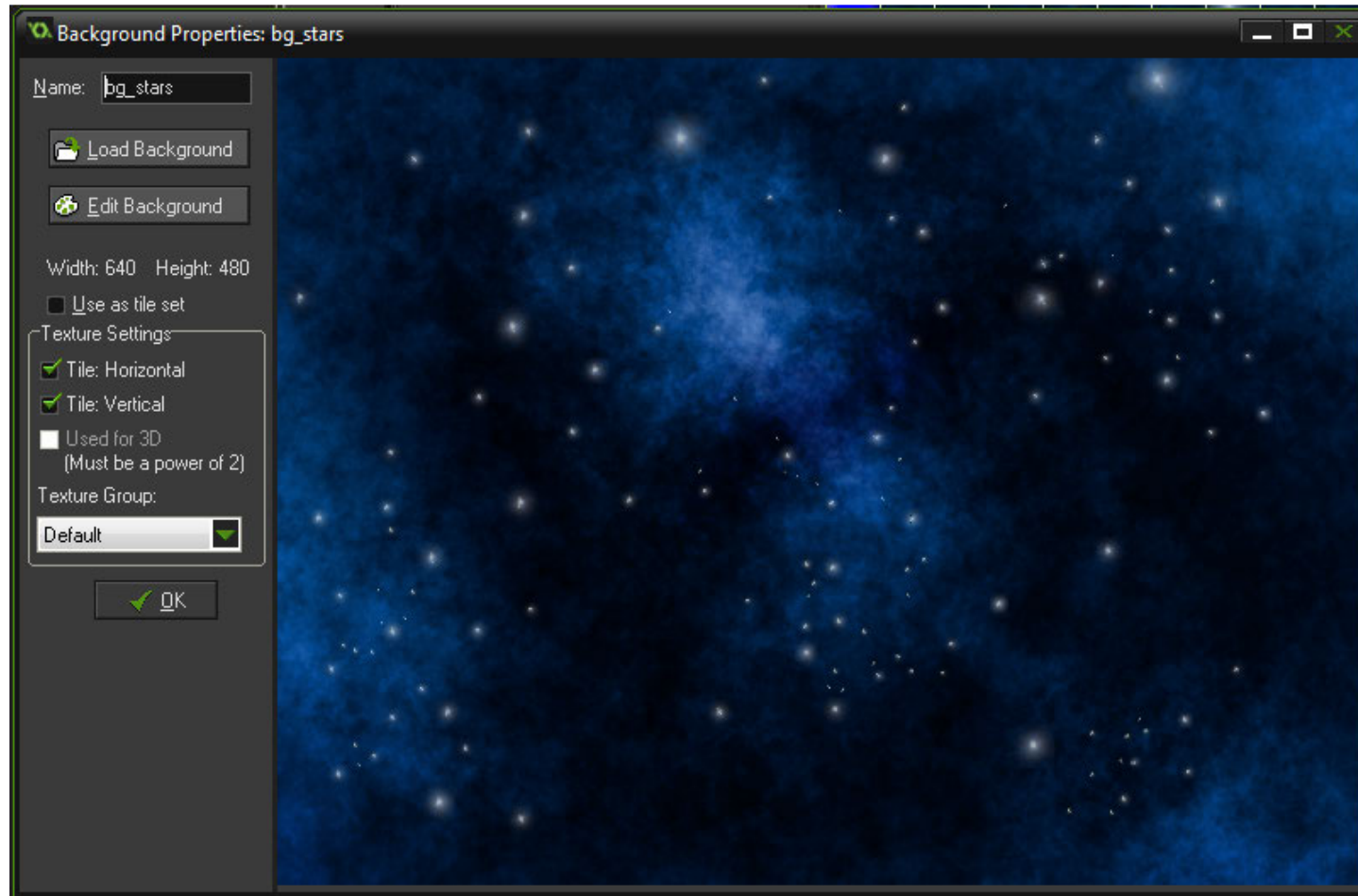
Hit Play to test
sound



4. Create Backgrounds

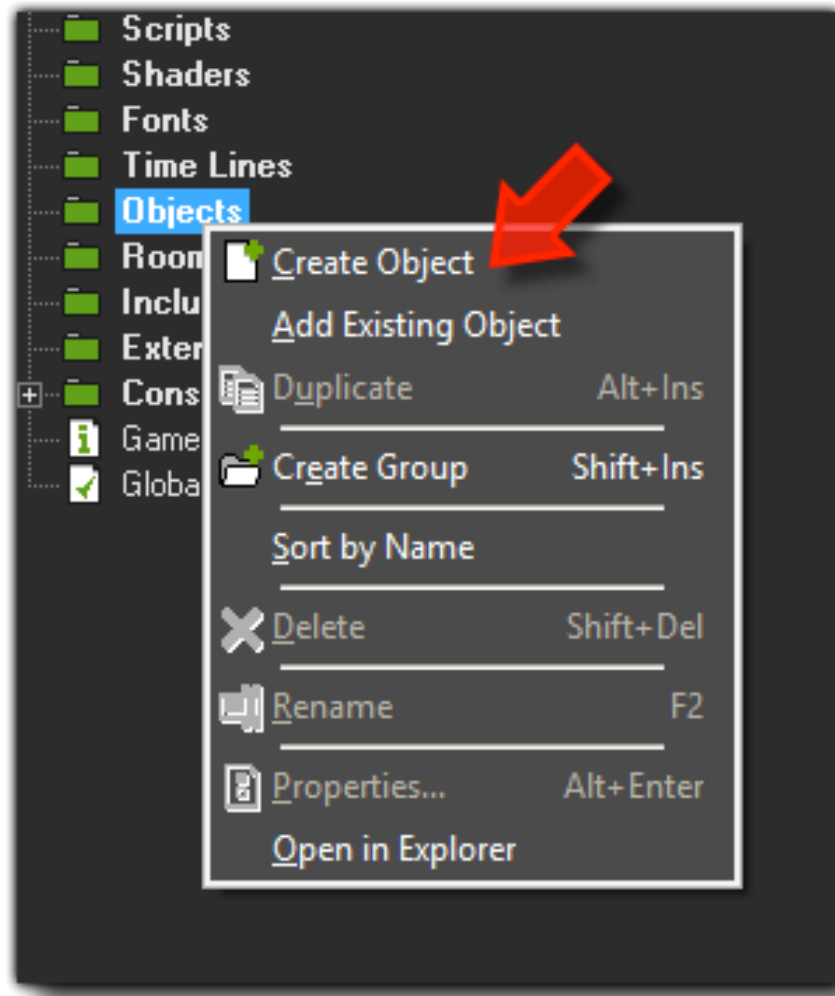


Right click on Backgrounds > Create Sound
Set name and Load Background

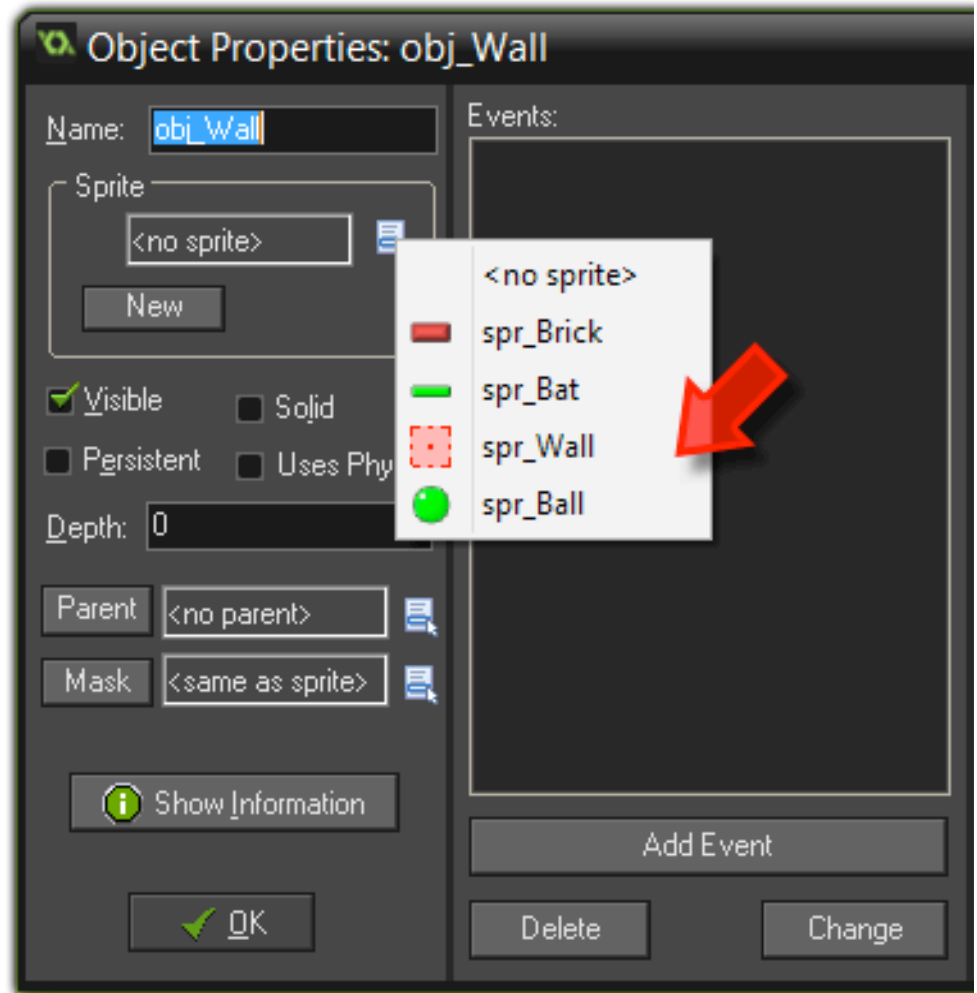


5. Create Objects with Sprites

Right click on Objects >
Create Object



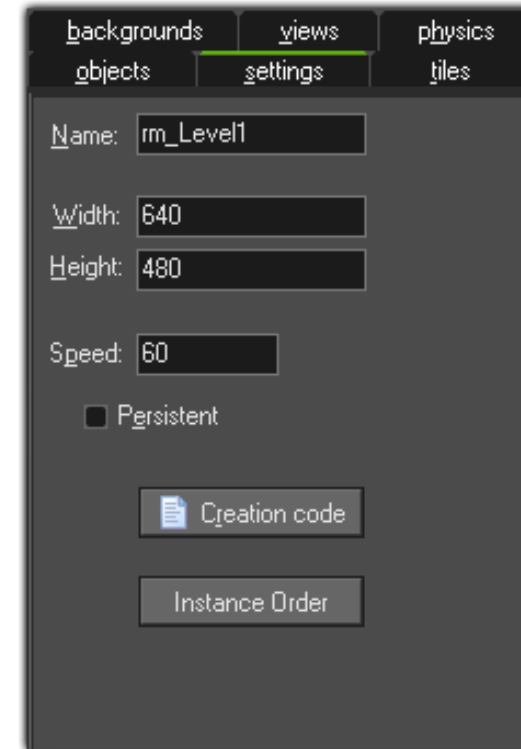
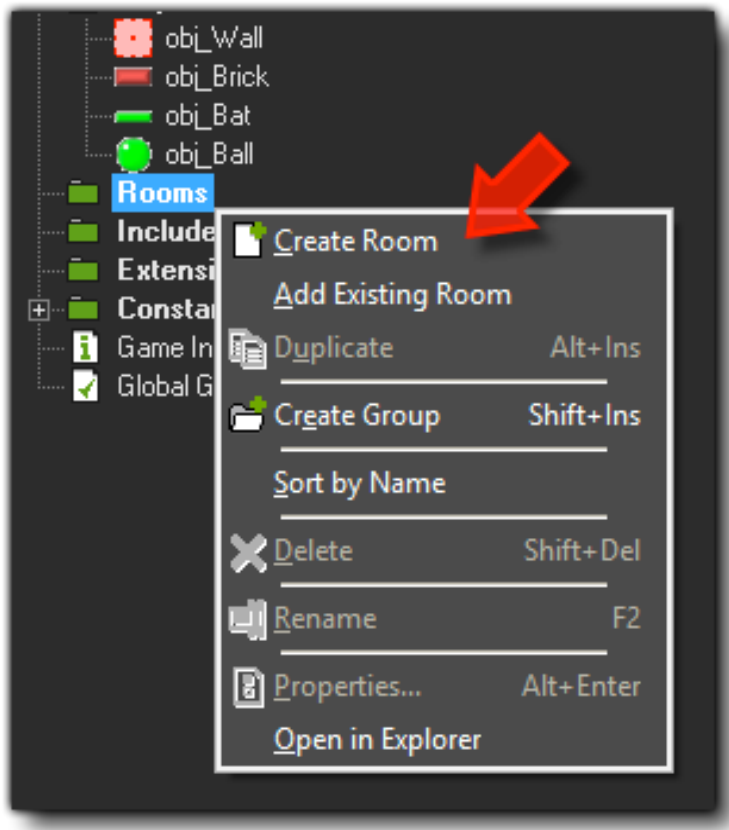
Name object with "obj_" prefix,
select sprite



Check visible and solid

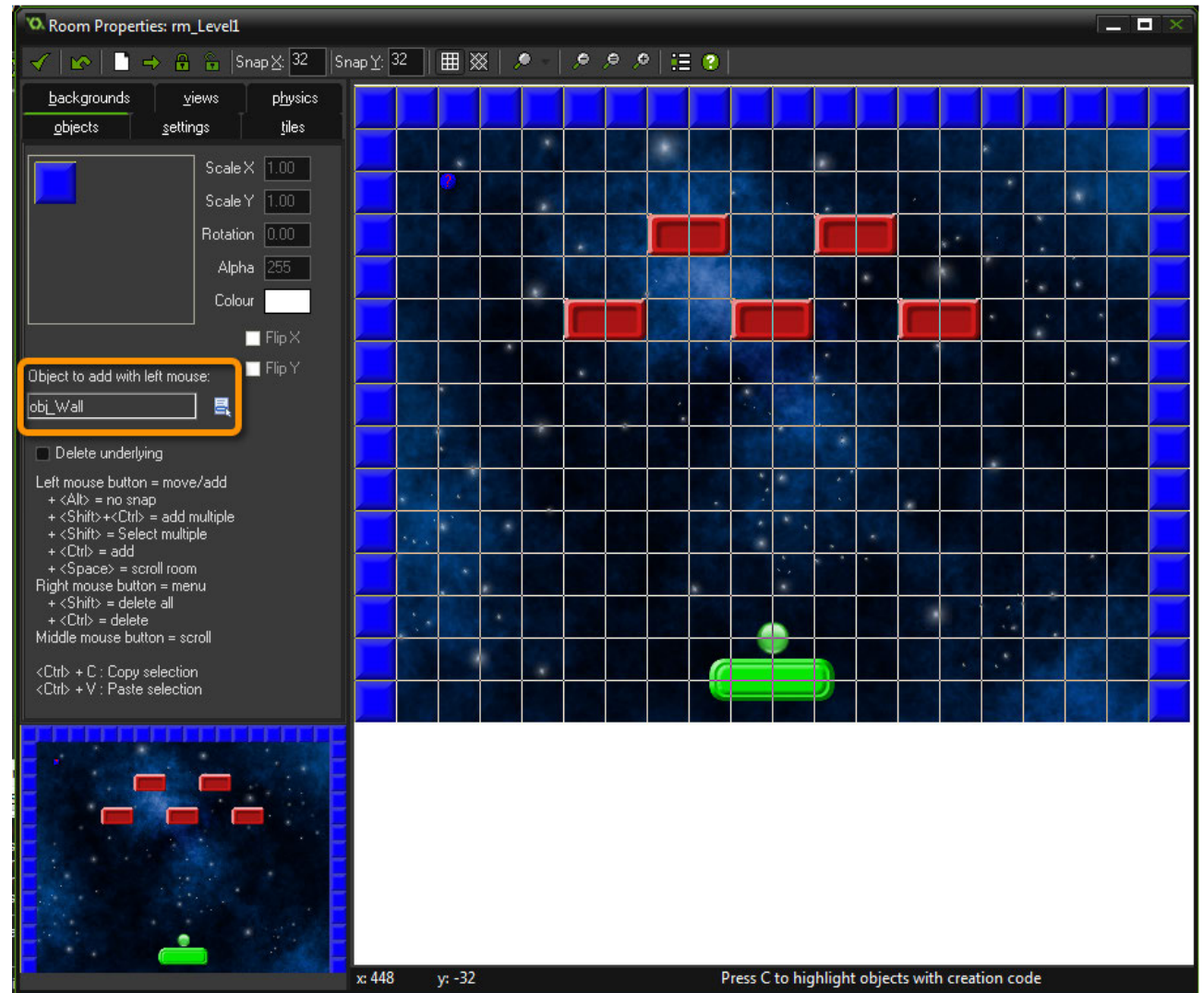
6. Create Room (with Objects)

Right click on Rooms > Create Room Settings tab, Name: rm_Level1



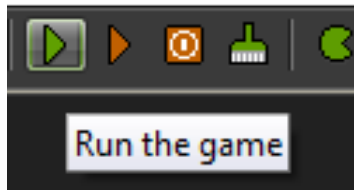
Room Editor

- Select Object
- Shift + Ctrl + Left Mouse and drag to add multiple objects
- Ctrl + Right Mouse and drag over objects to delete

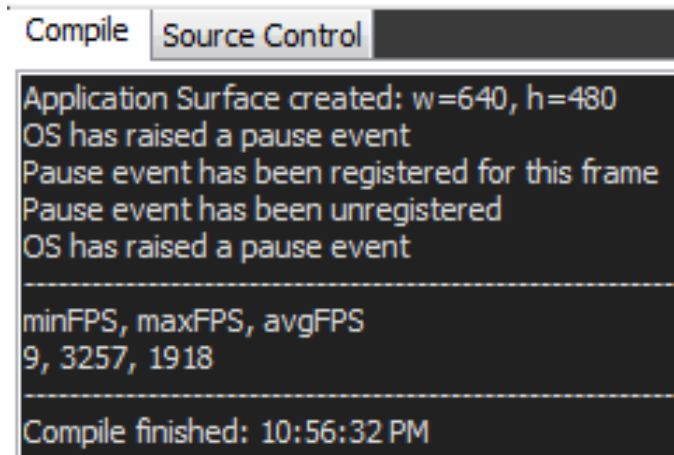


7. Test Run Game

Click on Green Play Icon



Compiler Output

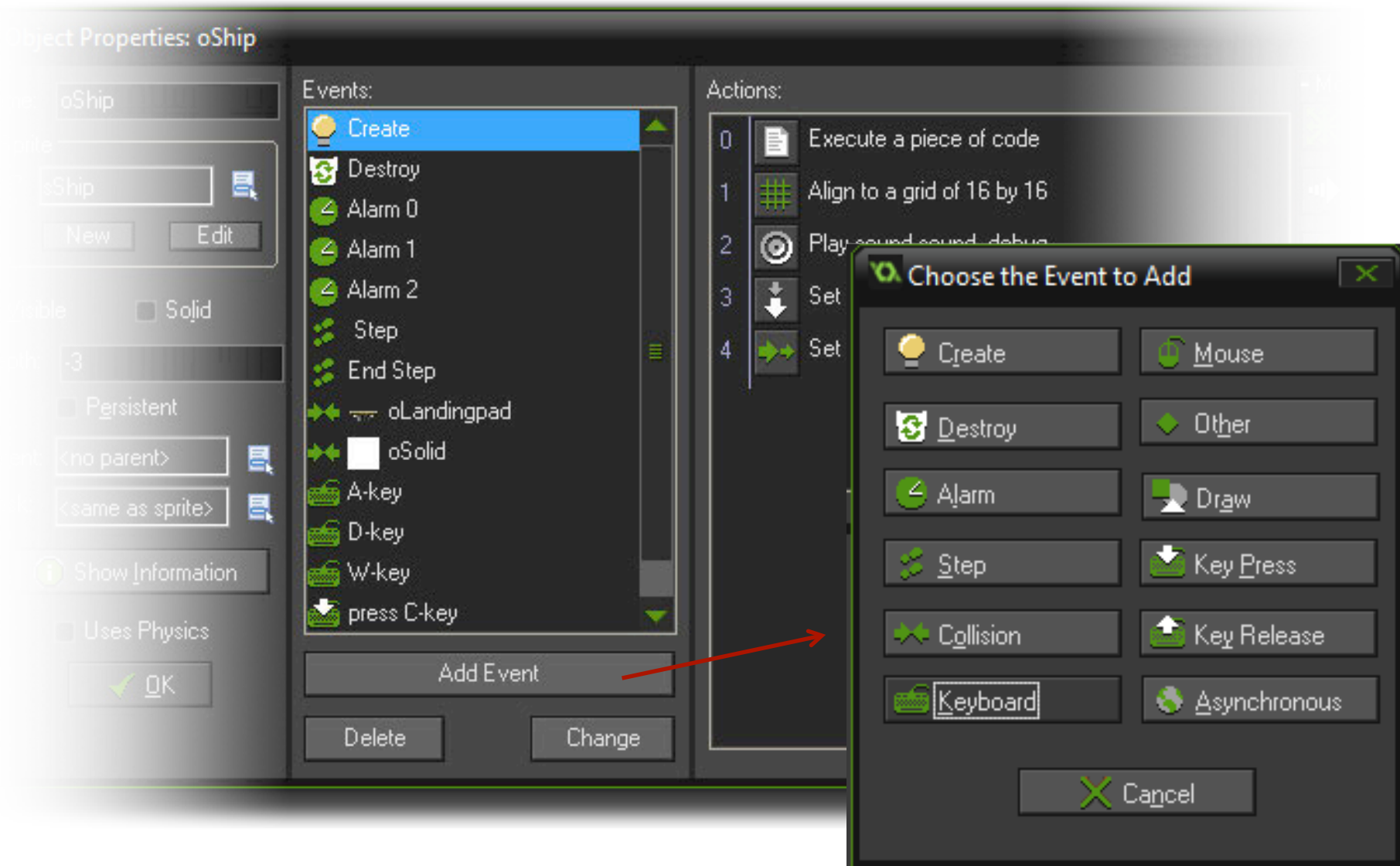


Part II – Event Based Object Actions

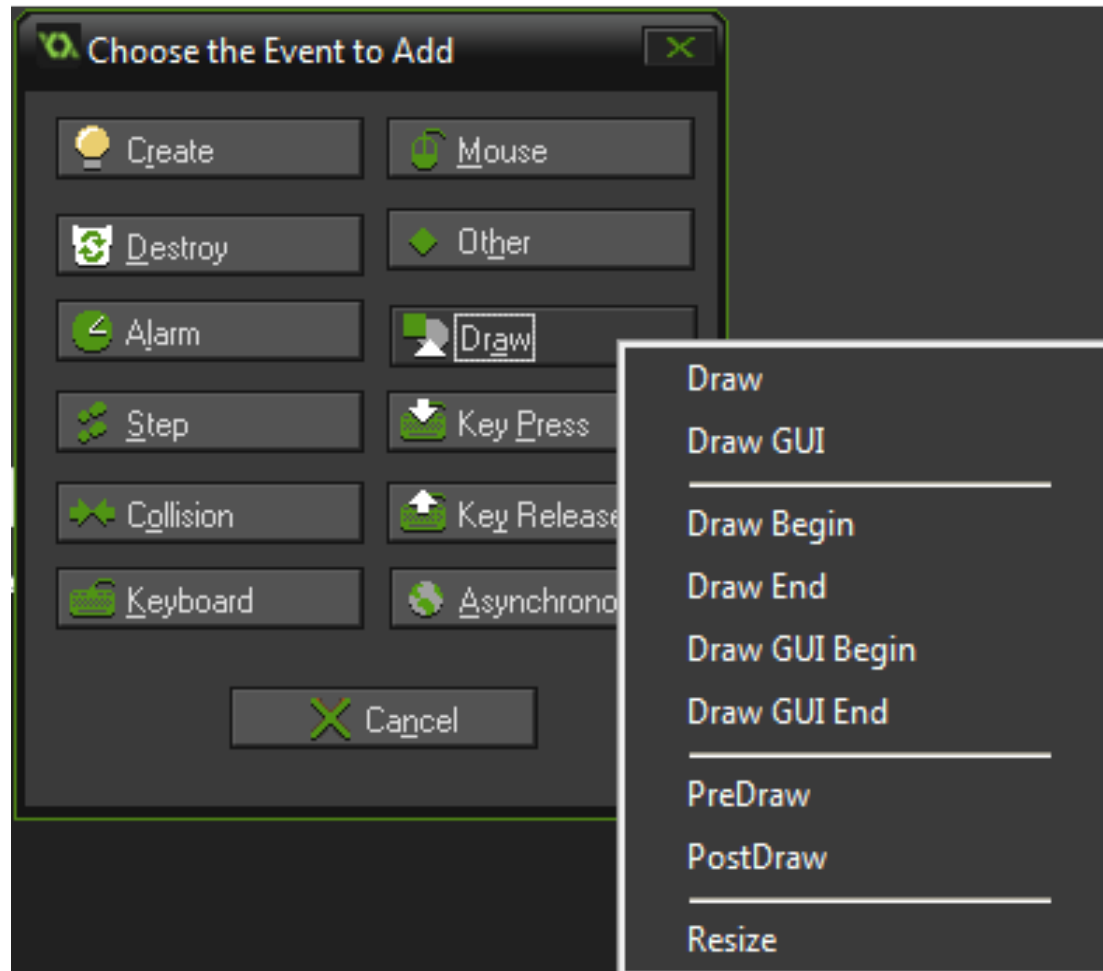
- obj_Bat
 - A-key – move left, stop at left wall
 - D-key – move right, stop at right wall
- obj_Ball
 - Collide with obj_Wall – bounce & play sound
 - Collide with obj_Bat – bounce & play sound
 - Collide with obj_Brick – bounce & play sound, destroy obj_Brick
- obj_Display (no sprite)
 - Create – set score to 0; set color to yellow
 - DrawGUI –
 - help text messages & score
 - “GAME OVER” if ball drops to the bottom
 - “YOU WIN” if there’s no more brick
 - R-key – restart current room

Events

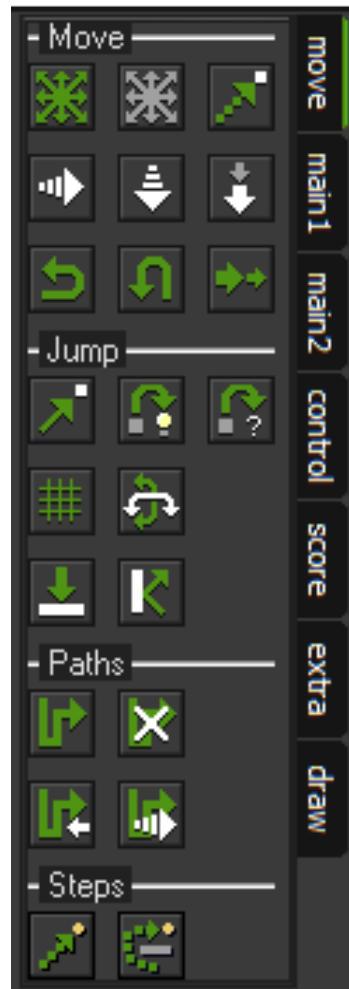
See docs.yoyogames.com Section: Events



Events



Drag & Drop Action Menu

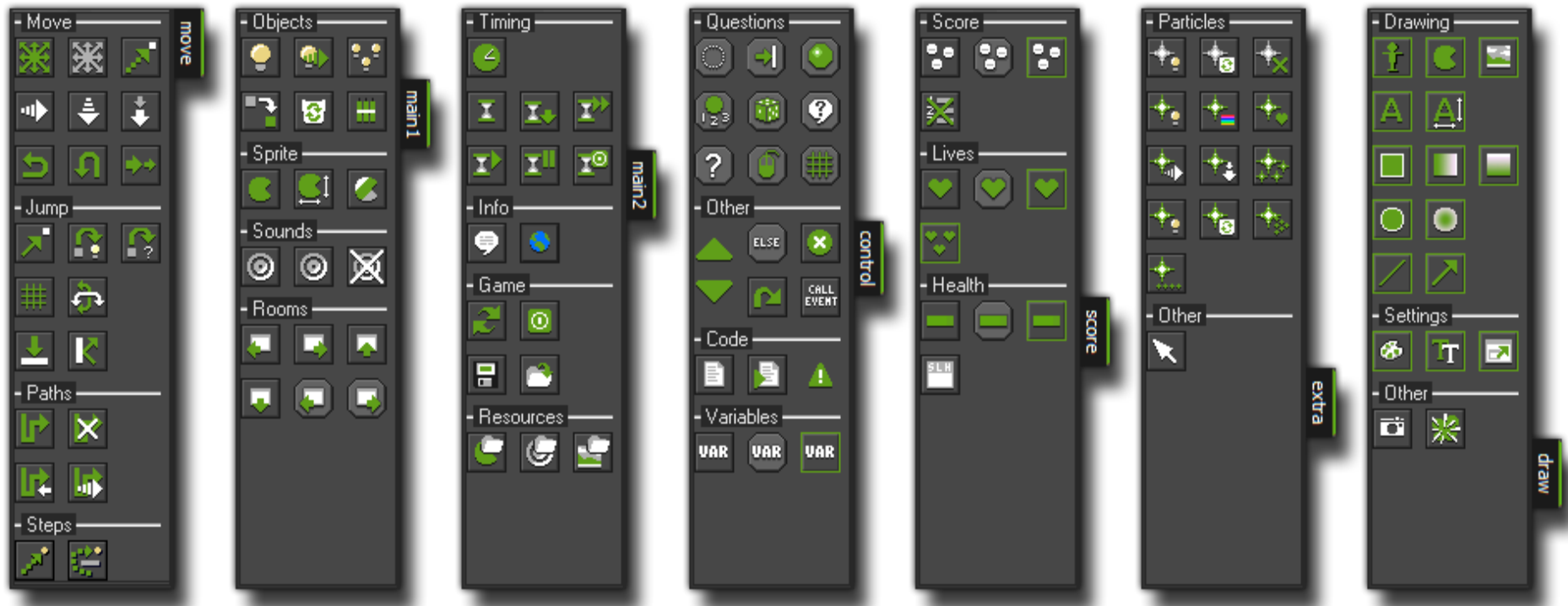


Drag & Drop Actions Menu



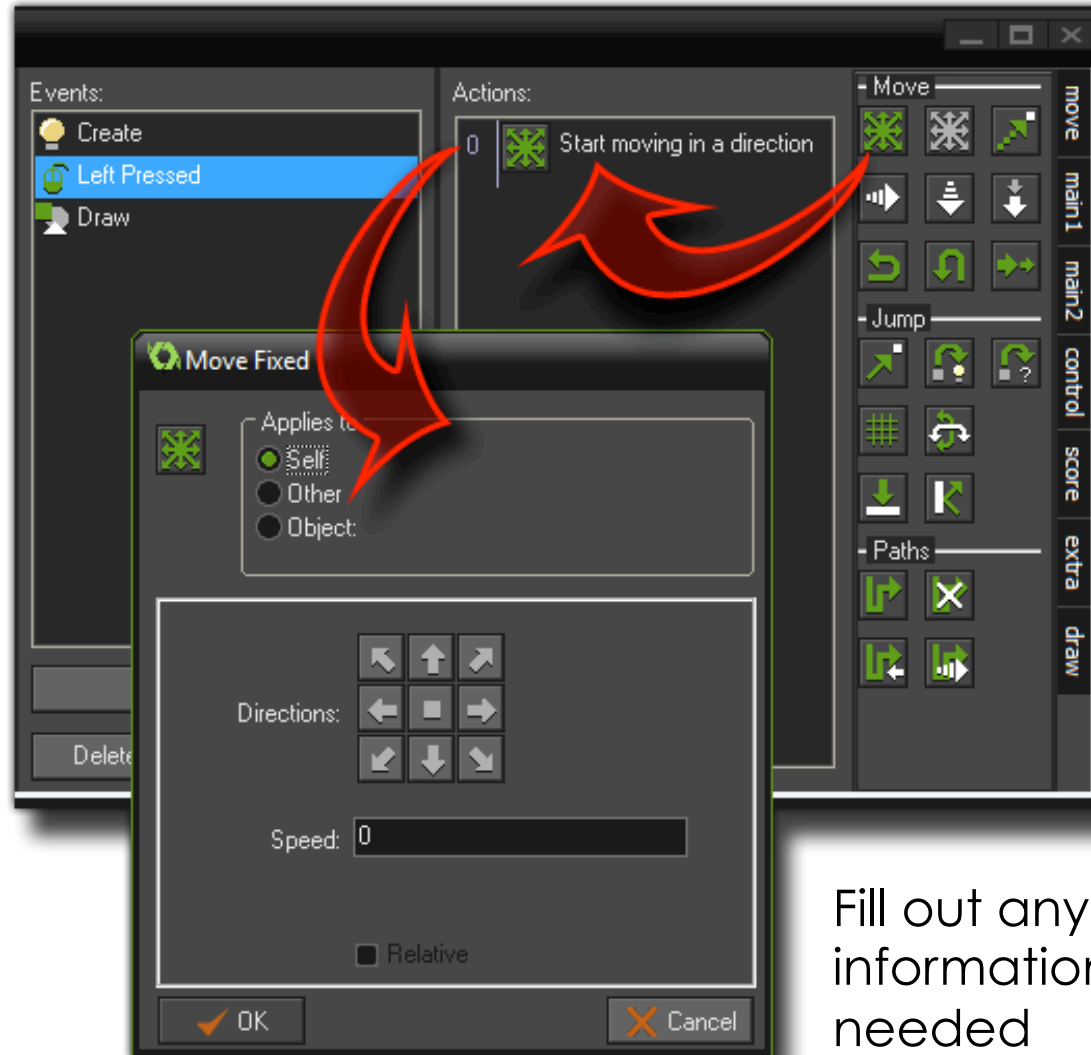
Actions

See docs.yoyogames.com Section: Actions



Add Action to An Event

Drag action from the menu and drop in the Actions panel

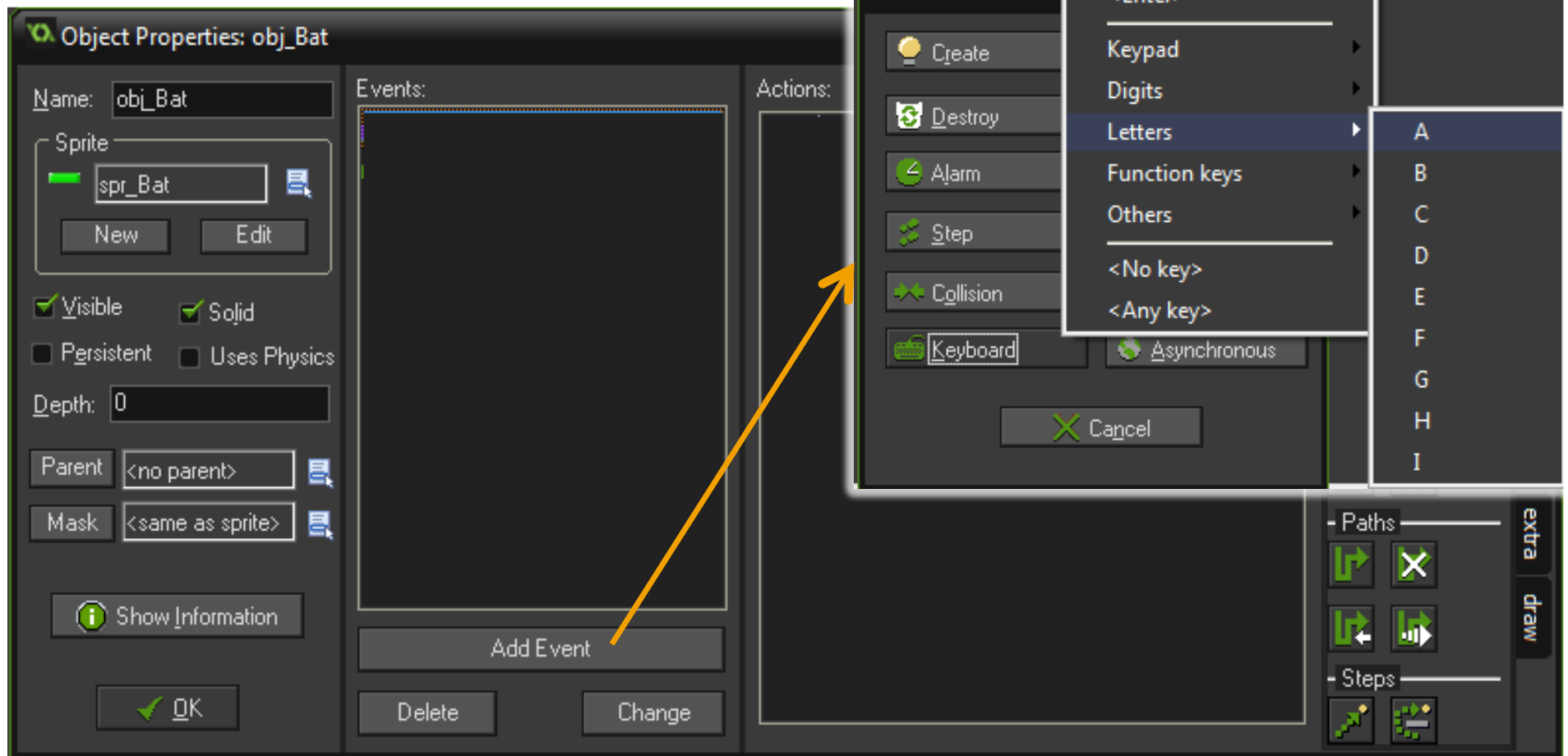


Fill out any
information as
needed

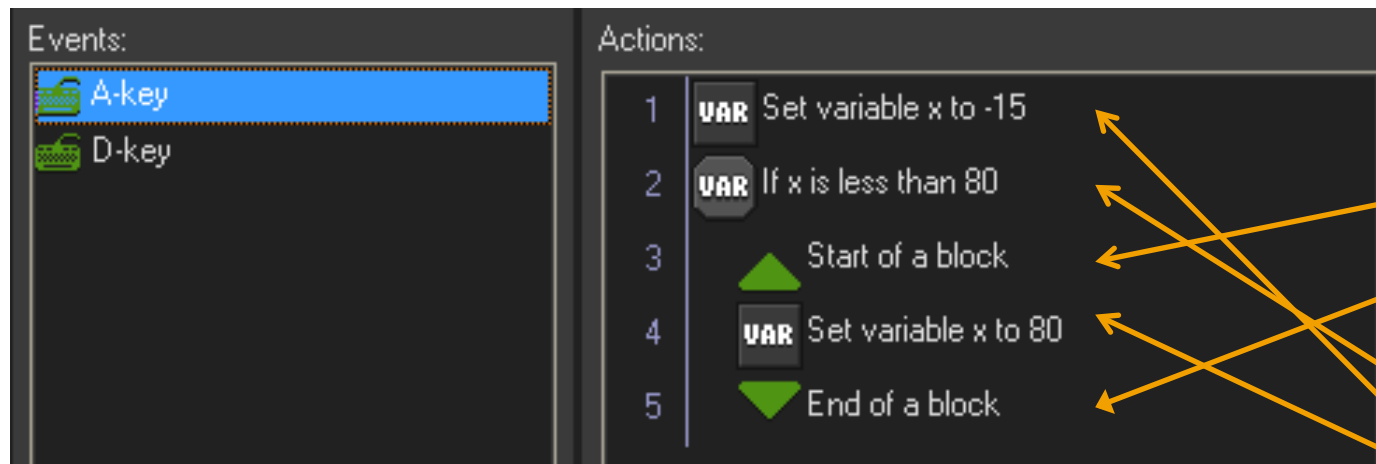
obj_Bat Events

Add Event > Keyboard > Letters > A

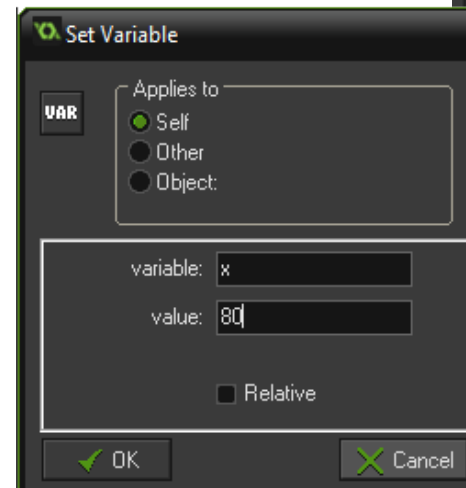
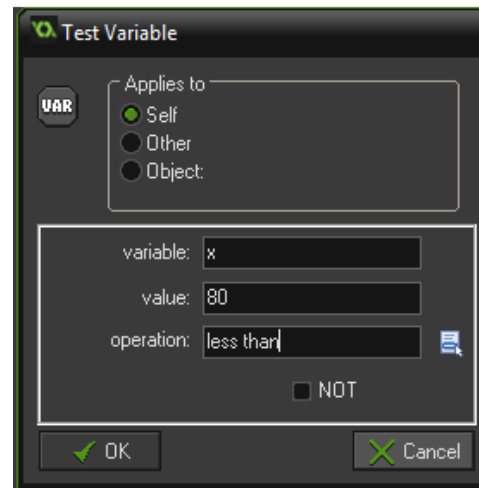
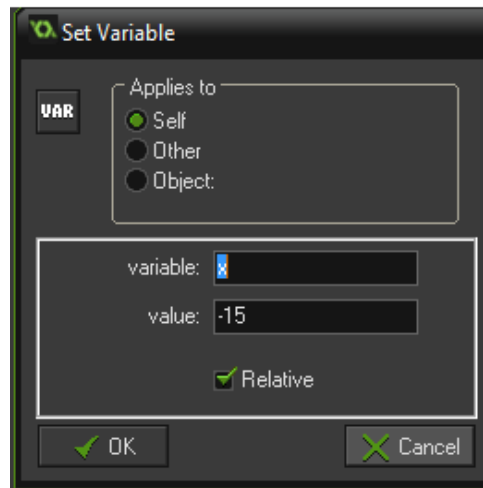
Add Event > Keyboard > Letters > D



obj_Bat Event-based Actions

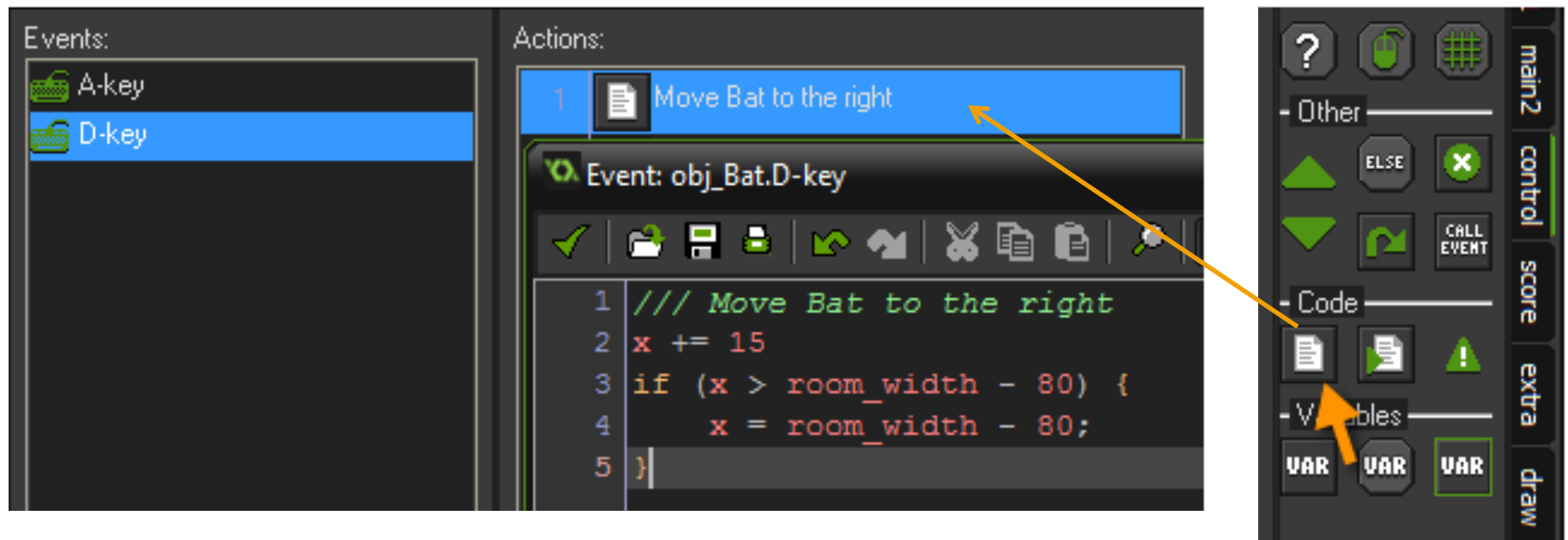


Control Tab: Set Variable, Test Variable, Start Block, End Block



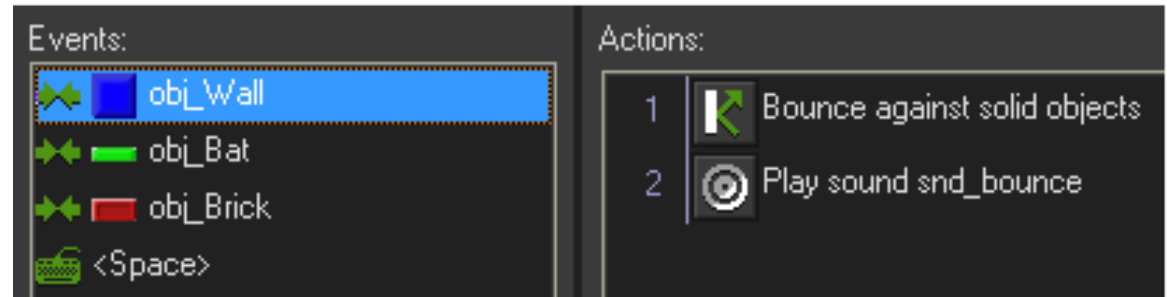
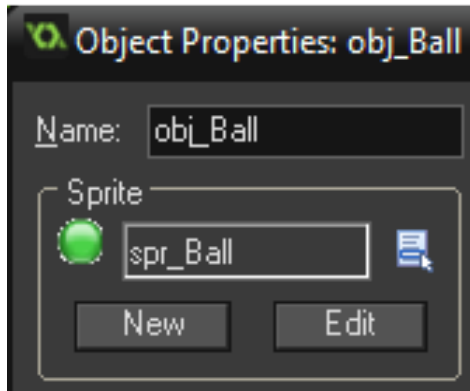
obj_Bat Execute Code

- Select event D-key
- Select Control Tab, Drag Execute Code icon to Actions panel
- Type in code and click green Check icon to save

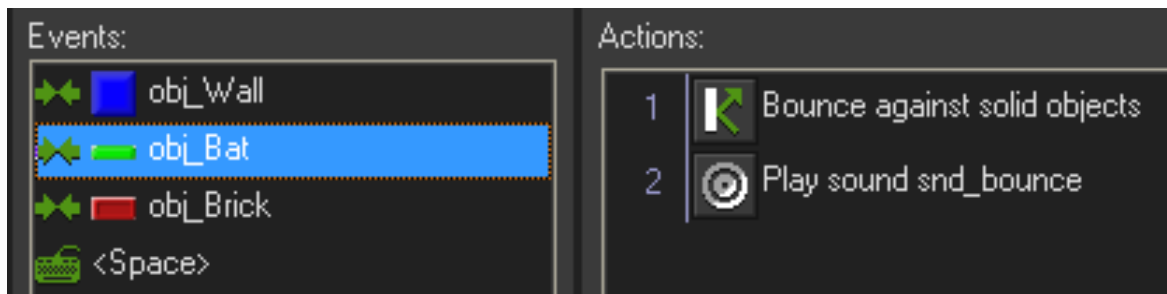


obj_Ball

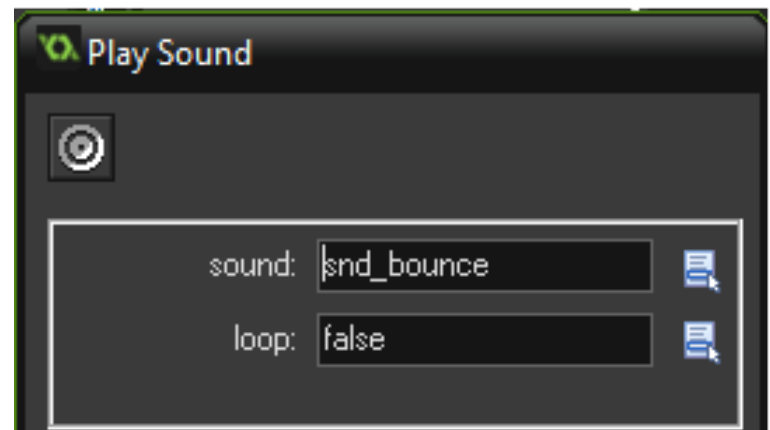
When collide with the wall or the bat, bounce & play sound



Move Tab [Jump]:
Bounce

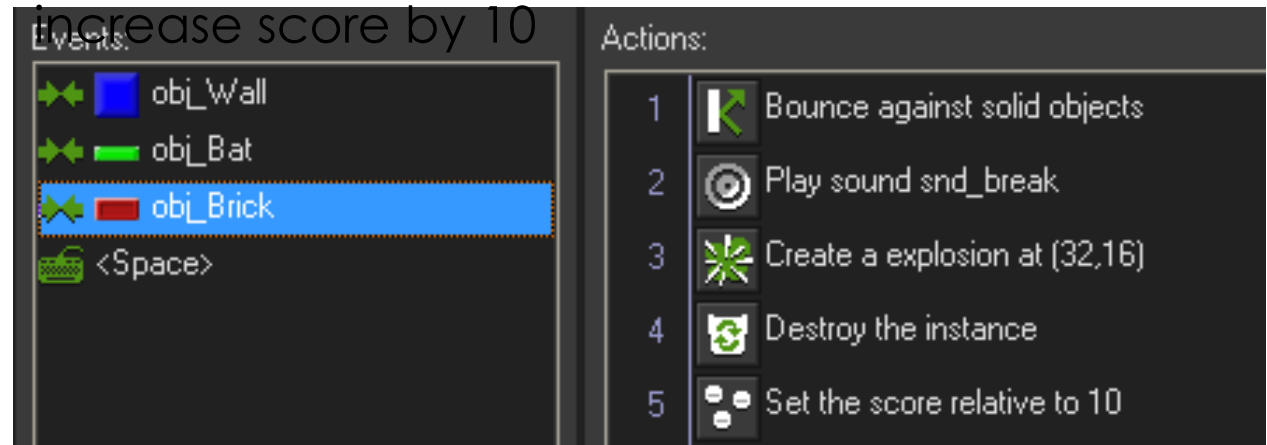


Main1 Tab [Sounds]: Play Sound

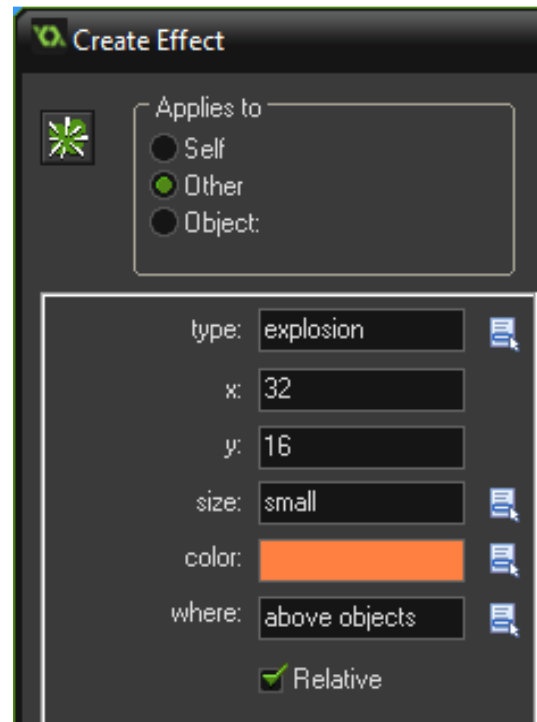


obj_Ball

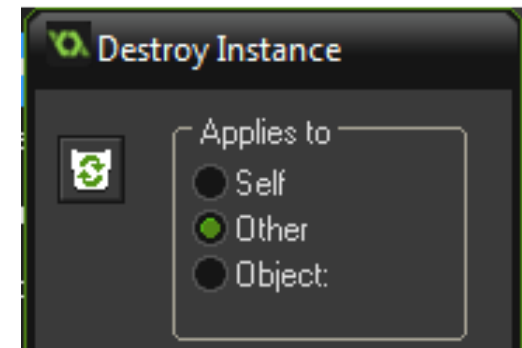
When collide with a brick, bounce & play sound,
create an explosion effect, destroy the brick,
increase score by 10



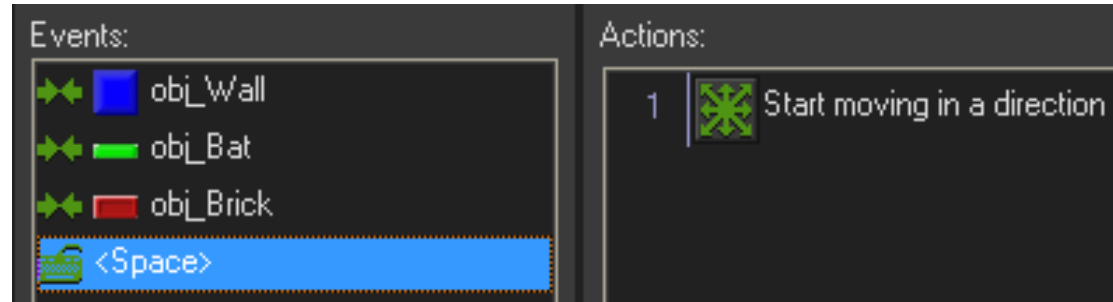
Draw Tab:
Create
Effect



Destroy "the other"
instance (obj_Brick)



obj_Ball



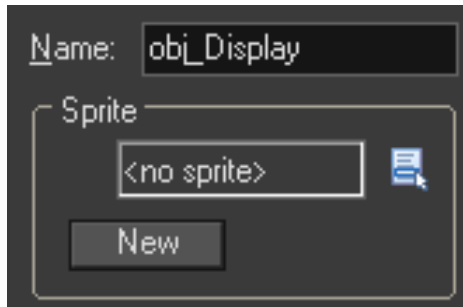
Move Tab: Move Fixed

The ball will start at on the bat, at the bottom of the screen.

When <space> key is hit, the ball starts moving in a one of two *random* positions (45 degrees up to the left or up to the right).



obj_Display

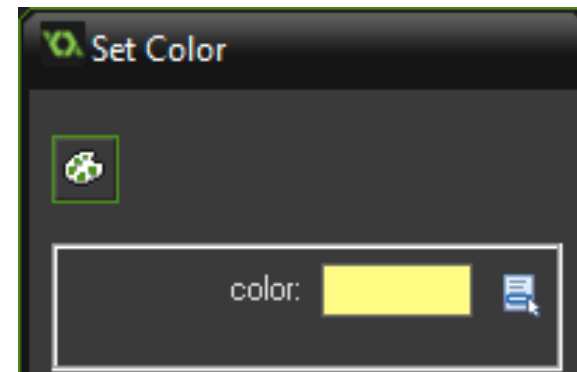
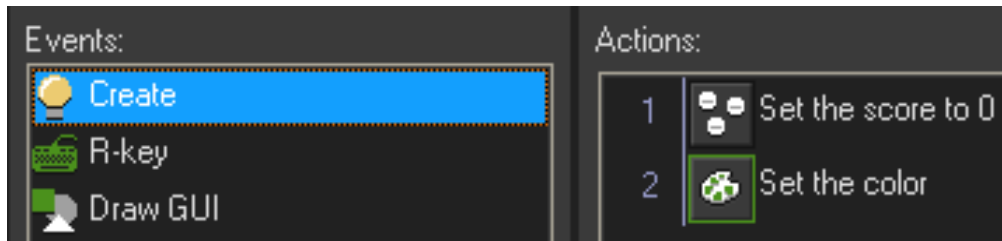


- obj_Display (be sure to add to room)
- has no sprite
 - sets score = 0 & color (for text)
 - draws the text scores
 - draws end of game message
 - GAME OVER: when ball goes off the bottom
 - YOU WIN: when there's no brick left
 - restarts the room when R-key is hit

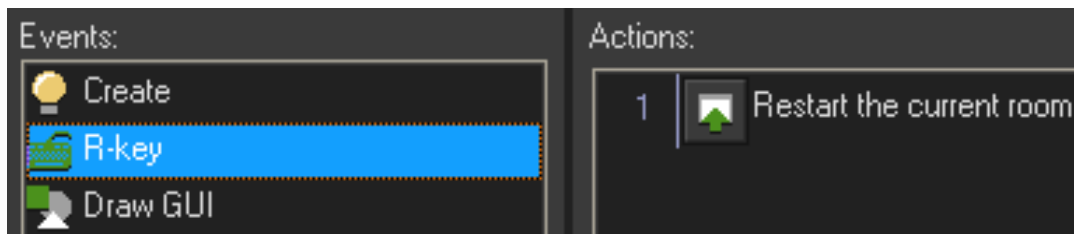
Create event:

set score = 0 (Score Tab (Score))

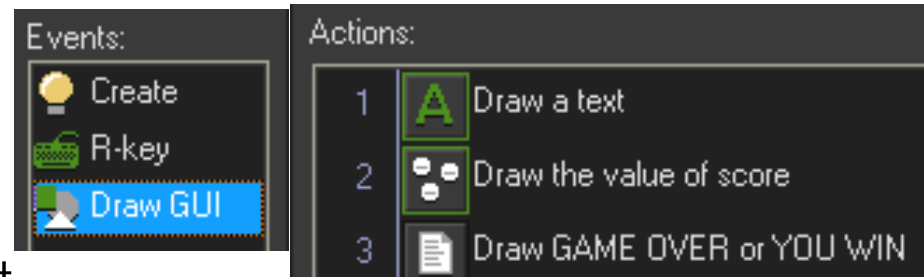
set color



Keyboard R-key event: restart the current room (Main1 Tab (Rooms))



obj_Display



Draw Tab (Drawing): Draw Text

- applies to: Self x: 140, y: 10
- text: "[A,D] to Move, [Space] to Start, [R] to Restart"

Score Tab (Score): Draw Score

- x: 40, y:40
- caption: "Score: "

Control Tab (Code): Execute Code

- Draw GAME OVER or YOU WIN

```
1  /// Draw GAME OVER or YOU WIN
2  // GAME OVER if ball falls to the bottom
3  if (obj_Ball.y > room_height-10) {
4      draw_text(room_width/2-50, room_height-150, "GAME OVER");
5  }
6
7  // YOU WIN if no instance of obj_Brick exists
8  if !instance_exists(obj_Brick) {
9      draw_text(room_width/2-50, room_height-150, "YOU WIN!");
10 }
```

obj_Display

```
1 /// Draw GAME OVER or YOU WIN
2 // GAME OVER if ball falls to the bottom
3 if (obj_Ball.y > room_height-10) {
4     draw_text(room_width/2-50, room_height-150, "GAME OVER");
5 }
6
7 // YOU WIN if no instance of obj_Brick exists
8 if !instance_exists(obj_Brick) {
9     draw_text(room_width/2-50, room_height-150, "YOU WIN!");
10 }
```

Equivalent Drag & Drop
blocks for the code

! Draw end of game message (GAME OVER or YOU WIN)

VAR If y is greater than room_height - 10

Start of a block

A Draw a text

End of a block

1 2 3 If the number of instances is a value

Start of a block

A Draw a text

End of a block

Comment

! comment: Draw end of game message (GAME

Test Variable

VAR

Applies to

☐ Self

☐ Other

☒ Object: obj_Ball

variable: y

value: room_height - 10

operation: greater than

☐ NOT

Test Instance Count

1 2 3

object: obj_Brick

number: 0

operation: equal to

☐ NOT

References

- Documentation: <http://docs.yoyogames.com/>
- Tutorials
 - File > New Project > Tutorials
 - <http://sandbox.yoyogames.com/make/tutorials>
 - YouTube search: "Gamemaker studio tutorial"
 - <http://gamedevelopment.tutsplus.com/articles/how-to-learn-gamemaker-studio--gamedev-10911>
- Books
 - gamemakerstudiobook.com
 - GameMaker: Studio for Dummies – Michael Rohde
 - GameMaker Game Programming with GML – Matthew DeLucas
- Resources (free and paid)
 - <http://sandbox.yoyogames.com/resources>
 - <https://marketplace.yoyogames.com/>
- Community Forum: <http://gmc.yoyogames.com/>

