

Using Game Maker

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Getting Game Maker for Free



Click here

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

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What is Game Maker?

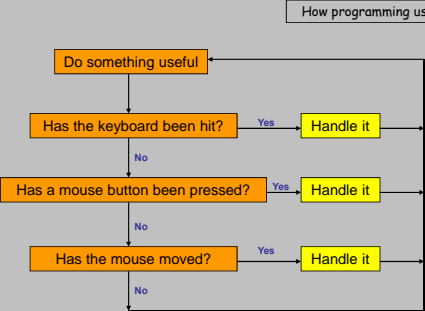
- YoYo Games produced *Game Maker* so that many people could experience the thrill of making a computer do what you ask it to do, under the guise of producing a game.
- Game Maker creates an event-driven, object-oriented simulation with a visual drag-and-drop interface.
- Game Maker program executables can be run standalone or can be run from within a web page (after loading a plug-in)
- The "Lite" Edition can be downloaded for free! There is also a "Pro Edition" that costs money.

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Non-event-based Programming: Polling

How programming used to be



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Getting Game Maker for Free

Go to:
<http://www.yoyogames.com/gamemaker>

Follow the links to the free download (see the next page).

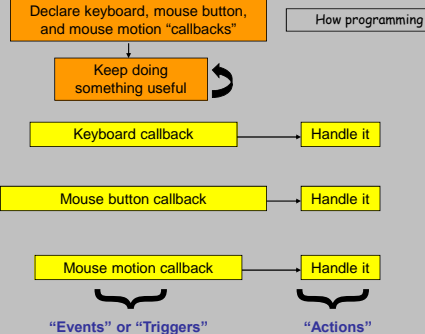
GameMaker comes in Windows 2000/XP/Vista versions.

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Event-based Programming

How programming is now

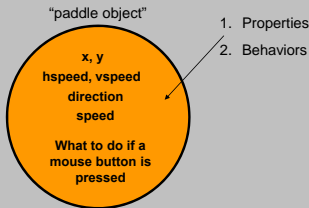


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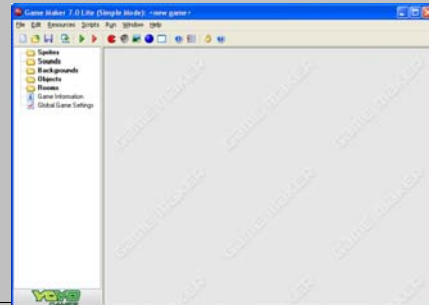
Object-oriented Programming

Each object has properties and behaviors encapsulated inside of it. This entire collection can be referenced by just the object name ("paddle") or by one property ("paddle.hspeed") or behavior ("paddle.leftMouseButton") at a time

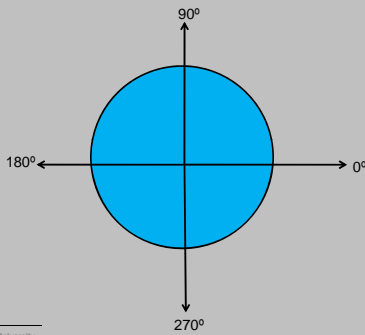


Getting Started

You will then get a start screen that looks something like this:



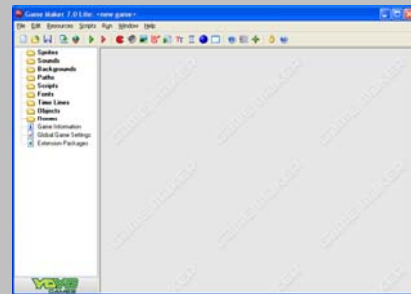
What Game Maker Means by "Direction"




Getting Started

Now, click on **File** → **Advanced Mode**

This isn't really an advanced mode – it just brings up a few more icons, like this:

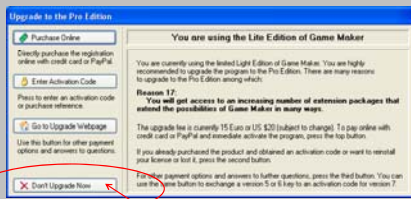


Getting Started

Double-click on the GameMaker icon 

Or click on **Start** → **All Programs** → **Game Maker 7** → **Game Maker**

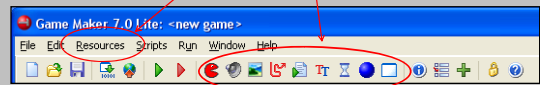
You will get a screen that looks like this:



Click here !

All the things you can add to the game are called "Resources"

You can get at them here or here



Getting Started

The icons across the top are *really* important:

Game Make 7.0 Lite: <new game>

Icons and their functions:

- Open
- Create executable
- Run the game
- Create sprite
- Create background
- Create script
- Create room
- Create timeline
- Change global settings
- Upgrade to the Pro Edition
- File
- Edit
- Resources
- Scripts
- Run
- Window
- Help
- Create
- Save
- Run with debugging
- Publish to the web
- Create sound
- Create path
- Create object
- Change game info
- Select extension packages
- Show help

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Game Maker Steps

1. Describe the game you are trying to create. What is it supposed to do? What is it supposed to look like?
2. Define the sprites
3. Define the sounds
4. Define the objects themselves, **but not (yet) their events and actions**
5. Go back and define each object's events and actions
6. Define the room
7. Put the object instances in the room

It is best to define the objects first and their events and actions later because some of those actions will need to be asked for in terms of objects (that might not have been created yet)

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Some Definitions

Background	An image used as a background for a room
Object	The visual things you see in your game
Instance	Multiple uses of a particular object
Rooms	The places (or levels) where objects live
Sounds	Used as background music or as effects
Sprite	An image or set of images that represent something

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Creating a Sprite

1. Select **Resources**→**Create Sprite**
2. Type in a name for this sprite
3. Click **Load Sprite**
4. Navigate to where your Sprite folder is (depends where you installed Game Maker)
5. Pick one
6. Click **OK**

Checking this might make your sprite look nicer

The sprites are just images - you can create your own. Use the .gif or .ico format.)

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Some Definitions

```

graph TD
    Game[Game] --> Room[Room(s)]
    Room --> OI1[Object Instance]
    Room --> OI2[Object Instance]
    Room --> OI3[Object Instance]
    OI1 --> Obj1[Object]
    OI2 --> Obj2[Object]
    OI3 --> Obj4[Object]
    Obj1 --> S1[Sprite]
    Obj1 --> T1[List of triggers and actions]
    Obj2 --> S2[Sprite]
    Obj2 --> T2[List of triggers and actions]
    Obj4 --> S3[Sprite]
    Obj4 --> T3[List of triggers and actions]
  
```

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Creating a Sound

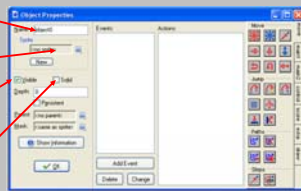
1. Select **Resources**→**Create Sound**
2. Type in a name for this sprite
3. Click **Load Sound**
4. Navigate to where your Sound folder is (depends where you installed Game Maker)
5. Pick one
6. If you want to check what it sounds like, click the green arrow
7. If you click the green arrow, the sound will start playing over and over (yuch). Click the red thing to turn it off.
8. Click **OK**

You can create your own sounds. Use the .wav format.)

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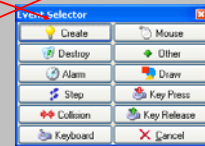
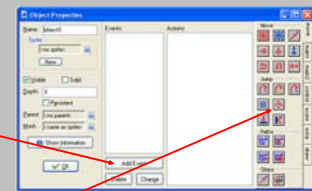
Creating an Object

1. Select **Resources**→**Create Object**
2. Type in a name for this object
3. Select a sprite to represent this object from the **Sprite** pull-down menu
4. Click **Visible** if you want this object to be seen during the game
5. Click **Solid** if you want the object to be a solid that something can bounce off of, like a wall



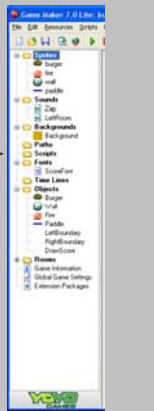
Creating an Object's Events and Actions

1. If you want events associated with this object click **Add Event**
2. Select what will trigger the event from the **Event Selector**
3. Drag and drop what action this event will cause from the action icons into the **Action area**.

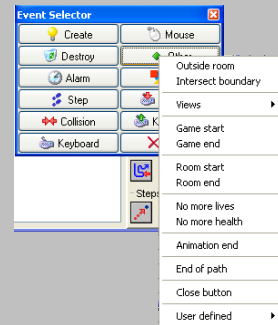


Editing something that you've created

To go back and edit something that you've previously created, double-click on it in this menu area



The "Other" Event List



Adding an Event to an Object with the Event Selector

- This menu allows you to select what will trigger this event
- Some of these events will bring up other dialog boxes to let you be more specific. For example, the **Mouse** event button will bring up another dialog box to let you specify what the mouse has to do (buttons, press/release, moving, etc.) to trigger this event.
- You then drag and drop into the **Actions area** as many actions as this trigger will cause to happen



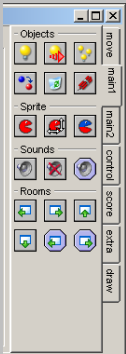
Move Actions

- Move Fixed
- Move Free
- Move Towards
- Speed Horizontal
- Speed Vertical
- Set Gravity
- Reverse Horizontal
- Reverse Vertical
- Set Friction
- Jump to Position
- Jump to Start
- Jump Random
- Align to Grid
- Wrap Screen
- Move to Contact
- Bounce
- Set Path
- End Path
- Path Position
- Path Speed
- Step Toward
- Step Avoiding



Main1 Actions


- Create Instance
- Create Moving
- Create Random
- Change Instance
- Destroy Instance
- Destroy at Position
- Change Sprite
- Transform Sprite (Pro Edition only)
- Color Sprite (Pro Edition only)
- Play Sound
- End Sound
- Check Sound
- Previous Room
- Next Room
- Restart Room
- Different Room
- Check Previous
- Check Next



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Score Actions

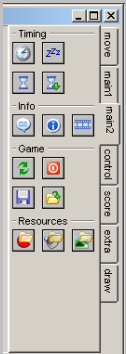
- Set Score
- Test Score
- Draw Score
- Show Highscore
- Clear Highscore
- Set Lives
- Test Lives
- Draw Lives
- Draw Life Images
- Set Health
- Test Health
- Draw Health
- Score Caption



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Main2 Actions


- Set Alarm
- Sleep
- Set Time Line
- Time Line Position
- Display Message
- Show Info
- Show Video (Pro Edition only)
- Restart Game
- End Game
- Save Game
- Load Game
- Replace Sprite (Pro Edition only)
- Replace Sound (Pro Edition only)
- Replace background (Pro Edition only)



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Extra Actions

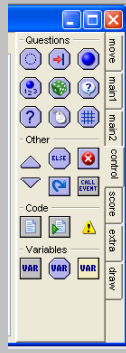
- Create Particle System (Pro Edition only)
- Destroy Particle System (Pro Edition only)
- Clear Particelct System (Pro Edition only)
- Create particle (Pro Edition only)
- Particle Color (Pro Edition only)
- Particle Life (Pro Edition only)
- Particle Speed (Pro Edition only)
- Particle Gravity (Pro Edition only)
- Particle Secondary (Pro Edition only)
- Create Emitter (Pro Edition only)
- Destroy Emitter (Pro Edition only)
- Burst From Emitter (Pro Edition only)
- Stream from Emitter (Pro Edition only)
- Play CD (Pro Edition only)
- Stop CD (Pro Edition only)
- Pause CD (Pro Edition only)
- Resume CD (Pro Edition only)
- Check CD (Pro Edition only)
- Check CD Playing (Pro Edition only)
- Set Cursor (Pro Edition only)
- Open Webpage (Pro Edition only)



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Control Actions

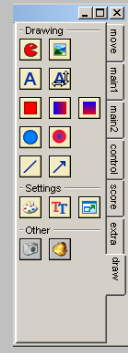
- Check Empty
- Check Collision
- Check Object
- Test Instance Count
- Test Chance
- Test Question
- Test Expression
- Check Mouse
- Check Grid
- Start Block
- Else
- Exit Event
- End Block
- Repeat
- Call Parent Event
- Execute Code
- Execute Script
- Comment
- Set Variable
- Test Variable
- Draw Variable



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Draw Actions

- Draw Sprite
- Draw Background
- Draw Text
- Draw Scaled Text (Pro Edition only)
- Draw Rectangle
- Horizontal Gradient (Pro Edition only)
- Vertical Gradient (Pro Edition only)
- Draw Ellipse
- Gradient Ellipse (Pro Edition only)
- Draw Line
- Draw Arrow
- Set Color
- Set Font
- Set Full Screen
- Take Snapshot (Pro Edition only)
- Create Effect (Pro Edition only)



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Handy Resources

Alphabetized list of Actions and what tab to find them under

<http://cs.oregonstate.edu/~mjb/gamemakeractions.pdf>

276-page PDF Game Maker documentation:

<http://cs.oregonstate.edu/~mjb/gamemaker/gmaker.pdf>



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Global Properties

score	Current score
lives	Current number of lives
health	Current health of the player (0-100)
mouse_x	X position of the mouse
mouse_y	Y position of the mouse

Some of the parameters are global properties that is, belong to the game as a whole, not to a single object. When you type them in, you will ask for them by typing just the property name. For example:

score

mouse_x

mouse_y



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Action Parameters

Most actions ask you to type in parameters. These parameters can be numbers, or they can be mathematical expressions using symbolic parameters



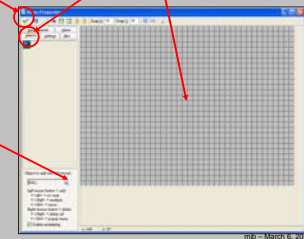
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Creating a Room

1. Select **Resources** → **Create Room**
2. Click on the **Objects** tab
3. Select an object with the pull-down menu
4. Click in the room to place as many instances of them as you want
5. Click the green checkmark when you are done

Game Maker refers to each of these objects in the room as an *Instance*.



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Object Properties

x	Instance's current x coordinate
y	Instance's current y coordinate
xstart	where this instance started
ystart	Where this instance started
xprevious	Previous position
yprevious	Previous position
hspeed	X speed in pixels/step
vspeed	Y speed in pixels/step
direction	Current direction in degrees
speed	Current speed in pixels/step

Some of the parameters are properties of an object. When you type them in, you will ask for them by typing the object name, a period, and then the property name. For example:

Paddle.x

Fire.y



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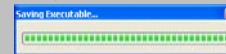
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Running Your Program

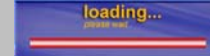
Click on the Green Arrow in the main toolbar



Game Maker will save your executable, which looks like this:



And then load it, which looks like this:



And will then execute it in a new window. Hit the keyboard **Escape** key to stop your program and return to the Game Maker main window.



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Making a Simple Game

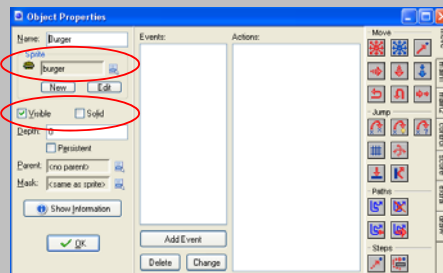
1. A group of hamburgers live inside a room bounded by stone walls on 3 sides
2. A fire bounces around off the walls, cooking (and obliterating) the hamburgers it comes in contact with
3. You need to keep the fire in play long enough to get all the hamburgers
4. You do this by moving a paddle to block the 4th wall of the room



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Define the Burger Object: Resources→Create Object



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Define the Sprites: Resources→Create Sprite

1. burger = Sprites → various → Burger.ico
2. fire = Sprites → various → Fire.ico
3. wall = Sprites → maze → rock.gif
4. paddle = Sprites → breakout → bat1.gif



Define the Sounds : Resources→Create Sound

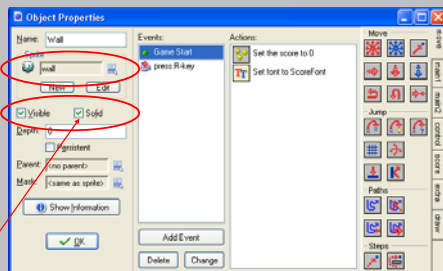
1. Zap = Sounds → zap.wav
2. LeftRoom = Sounds → beep7.wav



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Define the Wall Object: Resources→Create Object



The wall is "Solid" because something (the fire) will bounce off of it



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Define the Background: Resources→Create Background

1. Background = Backgrounds → sand1.gif

Define the Font : Resources→Create Font

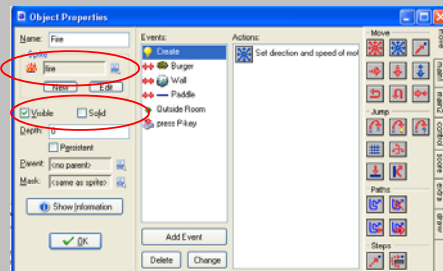
1. ScoreFont = Ariel, 12, Bold



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Define the Fire Object: Resources→Create Object



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Define the Paddle Object: Resources→Create Object

The paddle is "Solid" because something (the fire) will bounce off of it

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Define the Wall Object Events

1. score--Set Score: 0

2. draw--Set Font: ScoreFont

This is the tab This is the event These are the parameters to select or type in

1. main1--Restart Room

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Define the LeftBoundary and RightBoundary Objects: Resources→Create Object

The boundary objects are not "Visible" because they are there just to mark spots, not to be seen

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Define the Fire Object's Events

1. move--Move Free: 45+random(90), 8

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Define the DrawScore Object: Resources→Create Object

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Define the Fire Object's Events

1. main1--Destroy Instance: Other

2. score--Set Score: 1, Relative

3. main1 --Play Sound: Zap, no looping

The red double-arrows designate a Collision event. The picture to the right of the red arrows shows what you are checking for a collision with.

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Define the Fire Object's Events

1. **move**→**Bounce**: Self, not precisely, solid objects
2. **move**→**Speed Horizontal**: Self, $-2+\text{random}(4)$, Relative

"random" is a built-in function that returns a random number between 0 and the number you put in the parentheses. So, $-2+\text{random}(4)$ gives you a random number between -2 and +2.

Why is this game randomly altering the fire's speed after a bounce? If you don't, there will likely be times when the fire will end up in a state where it is bouncing back and forth over the exact same path forever and ever. This action alters the fire's speed just enough to prevent that. The trick is to make it big enough to work, but small enough to be unobtrusive.

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Define the LeftBoundary and RightBoundary Objects' Events

None – they are not meant to react to anything, just to mark the limits of the horizontal paddle motion

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Define the Fire Object's Events

1. **move**→**Bounce**: Self, not precisely, solid objects

1. **main1**→**Play Sound**: LeftRoom, no looping
2. **move**→**Jump to Position**: Self, paddle.x, paddle.y-50
3. **move**→**Move Free**: Self, $45+\text{random}(90)$, 8

Warning: Game Maker defines +Y as *down*! "paddle.y-50" is *above* the paddle.

-y
↓
+y

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Define the DrawScore Object's Events

1. **draw**→**Draw Text**: Self, 'Press r to restart', 0, 0
(The single quotes are important!)

1. **score**→**Draw Score**: 500, 0, Score:

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Define the Paddle Object's Events

1. **move**→**Jump to Position**: Self, mouse_x, self.y

Note that the mouse x location is "mouse_x", not "mouse.x"! This is because the mouse is not an object. It is just an input device with some values that your game has access to.

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Define the Room: Resources→Create Room

1. Set the name to **Room** by clicking the **settings** tab and typing the name you want to give it

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Define the Room: Resources--Create Room

1. Set the background by clicking the **background** tab
2. Set the background to **Background**
3. Don't make it a foreground image

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Setting your Game Information

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Double-click on this and enter some information. This will be shown if the player hits the <F1> key while playing your game.

Define the Room: Resources--Create Room

1. Position the objects by clicking the **objects** tab
2. Select an object from the pop-up menu
3. Left-click as many of them into position as you need
4. Right-click an object to delete it

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Setting Global Information about Your Game

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Double-click on this and a tabbed dialog box will pop up. See the next few slides to see what you can do with this.

Define the Room: Resources--Create Room

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It's often useful to turn this checkbox off so that adding a new instance close to an existing instance doesn't delete the existing instance. This is especially true, in this case, for the wall rocks.

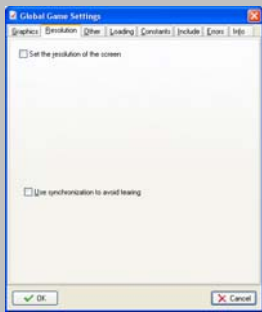
Setting Global Information about Your Game

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Do you want the player to be able to resize the graphics window?

Do you want the game to keep playing or freeze if you click in another window?

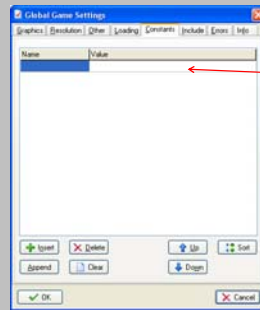
Setting Global Information about Your Game



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Setting Global Information about Your Game



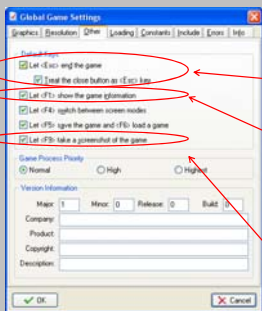
You can pre-define some constants, such as many of something will be in your game, etc. This is probably more useful when you are writing scripts.



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Setting Global Information about Your Game



Normally the Escape key terminates the game. However, you can disable this if you want. At times this is useful if you want to force the player to save the game before exiting.

Yes, of course you want <F1> to show your game information.

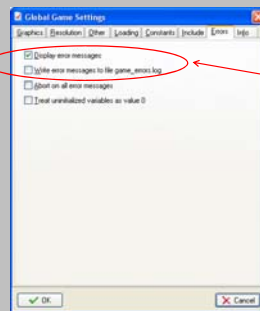
This feature is *really* handy, so of course you want it enabled! Hitting the <F9> key while playing the game will put an image of the current state of the game in a file called screenshotXXX.bmp, where XXX is 100, 101, 102, etc. The files live in the same folder where your game .gmk file lives.



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Setting Global Information about Your Game



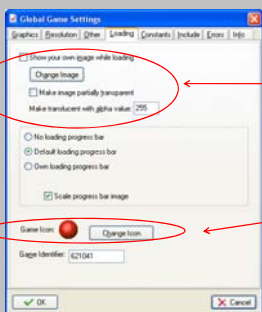
Of course you want to see error messages! If you really care, you can also record them to a file for further examination or printing.



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Setting Global Information about Your Game



By default, the YoYo Games logo displays during loading. You can change this. This image can be one of around 30 different image file types.

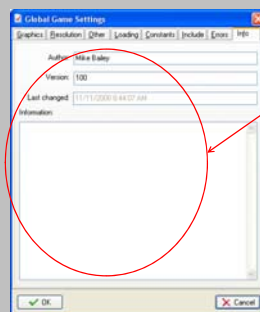
You can make your own game program icon! This image must be in .ico format however. Many image manipulation programs are capable of producing this. Sadly, Photoshop doesn't appear to be one of them.



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Setting Global Information about Your Game



This is more program info. This is not the same as the information that will come up when a player hits the <F1> key.




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Running Your Game


Click the **green triangle arrow** in the titlebar



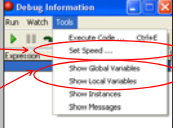
Hit the **Escape** key to exit your game

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Running the Game in Debug Mode



Normally, Game Maker tries to run your game at a refresh rate of 30 frames per second ("fps"). You can change that here to slow down the game play. This is useful for debugging, so that you can get a better idea what is going on.




These are useful for debugging, especially if you are using scripts

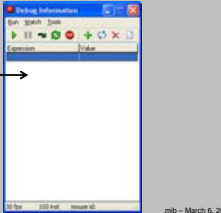
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Running the Game in Debug Mode

Click the **red triangle arrow** in the titlebar




This brings up a new information window



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Sharing Your Game with Others

Click **File** → **Create Executable**



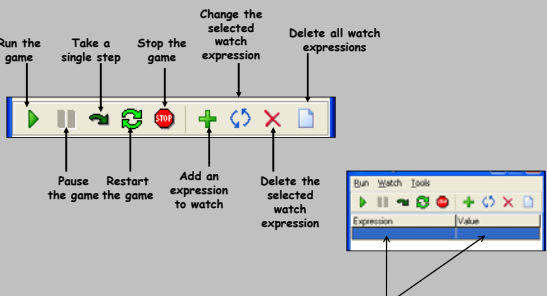
This creates a file with a **.exe** extension. This can be given (email, web page posting, ~~memory stick, etc.~~) to others.

However, there is the usual warning about running a .exe file sent to you from an untrusted source!!

It's safer to send around .gmk files and read them into Game Maker!

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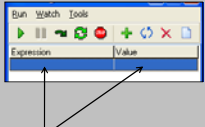
Running the Game in Debug Mode



- Run the game
- Take a single step
- Stop the game
- Change the selected watch expression
- Delete all watch expressions
- Pause the game
- Restart the game
- Add an expression to watch
- Delete the selected watch expression

If you setup "watch expressions", they will display here


(If you want to experiment, try a watch express of: **mouse_x**)



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You can also embed your game in a Web Page

You need to load a YoYo Games Internet Explorer plug-in to make this work



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Good Game Maker Web Links

General Game Maker Site:

<http://www.yoyogames.com>

These notes:

<http://cs.oregonstate.edu/~mjb/gamemaker>

276-page PDF Game Maker documentation:

<http://cs.oregonstate.edu/~mjb/gamemaker/gmaker.pdf>

Reference Book

Jacob Habgood and Mark Overmars, *The Game Maker's Apprentice*, Apress, 2006.

(\$27 on Amazon)

