Let's Start with Just a Simulation

1. A fire bounces around off walls, forever and ever
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

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

Define Two Sprites: Resources→Create Sprite

1. Fire = Sprites → various → Fire.ico
2. Rock = Sprites → maze → rock.gif
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.

Define a Bouncing Sound: Resources → Create Sound

Bounce = Sounds → boink2.wav

Also, while we’re at it:

Define the Background: Resources → Create Background

Background = Backgrounds → sand1.gif
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

Define the Wall Object: **Resources → Create Object**

The wall is "Solid" because something (the fire) will need to bounce off of it.
Define the Bouncer Object: Resources → Create Object

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

For example, to go back and add events and actions, double-click on one of the objects
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 Event will cause to happen.

The “Other” Event List

I’m not sure why these are in a separate list instead of the main Event Selector.
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(s) this Event will cause from the action icons into the **Action area**.

**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

Main2 Actions

- Set Alarm
- Sleep
- Set Time Line
- Time Line Position
- Time Line Speed
- Start Time Line
- Pause Time Line
- Stop Time Line
- Display Message
- Show Info
- Splash Text (Pro Edition only)
- Splash Image (Pro Edition only)
- Splash Webpage (Pro Edition only)
- Splash Video (Pro Edition only)
- Splash Settings (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)
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

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
Extra Actions

- Create Particle System (Pro Edition only)
- Destroy Particle System (Pro Edition only)
- Clear Particle 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)

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)
A Handy List of Game Maker Actions and What Tab to Find them Under

Get this sheet at:
http://cs.oregonstate.edu/~mjb/gamemaker/actions.pdf

Action Parameters

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>Instance's current x coordinate</td>
</tr>
<tr>
<td>y</td>
<td>Instance's current y coordinate</td>
</tr>
<tr>
<td>xstart</td>
<td>Where this instance started</td>
</tr>
<tr>
<td>ystart</td>
<td>Where this instance started</td>
</tr>
<tr>
<td>xprevious</td>
<td>Previous position</td>
</tr>
<tr>
<td>yprevious</td>
<td>Previous position</td>
</tr>
<tr>
<td>hspeed</td>
<td>X speed in pixels/step</td>
</tr>
<tr>
<td>vspeed</td>
<td>Y speed in pixels/step</td>
</tr>
<tr>
<td>direction</td>
<td>Current direction in degrees (0-360)</td>
</tr>
<tr>
<td>speed</td>
<td>Current speed in pixels/step</td>
</tr>
</tbody>
</table>

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`

There are some special names for objects. One of the most common is "self", designating the object that triggered this event. You can find out where it is, for example, by typing `self.x` and `self.y`.

### Global Names

<table>
<thead>
<tr>
<th>Global Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>score</td>
<td>Current score</td>
</tr>
<tr>
<td>lives</td>
<td>Current number of lives</td>
</tr>
<tr>
<td>health</td>
<td>Current health of the player (0-100)</td>
</tr>
<tr>
<td>mouse_x</td>
<td>X position of the mouse</td>
</tr>
<tr>
<td>mouse_y</td>
<td>Y position of the mouse</td>
</tr>
</tbody>
</table>

Some of the parameters are global names, that is, they 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. Three of the most common are:

- `score`
- `mouse_x`
- `mouse_y`

Note that these are spelled with an underscore not a period. These are names, not objects with properties.
1. **Define the Wall Object Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>press R-key</td>
<td>Restart the current room</td>
</tr>
</tbody>
</table>

1. **main1→Restart Room** (the transition you choose is up to you)

![Diagram showing arrow transitions]

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

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2. **Define the Bouncer Object's Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Wall</td>
<td>Set direction and speed of move</td>
</tr>
</tbody>
</table>

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

The `random(N)` function returns a random number between 0 and N.

So, the phrase "45+random(90)" will give a random number between 45° and 135°.
Define the Bouncer Object’s Events

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.

<table>
<thead>
<tr>
<th>Events</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create</td>
<td>Bounce against solid objects</td>
</tr>
<tr>
<td>wall</td>
<td>Set the horizontal speed</td>
</tr>
<tr>
<td></td>
<td>Play sound Bounce</td>
</tr>
</tbody>
</table>

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

   “-2+random(4)” gives you a random number between -2 and +2.

3. **main1→Play sound**: Bounce

   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.

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.*
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

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
Running Your Simulation!

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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Running Your Simulation!

Try arranging the rocks from the wall differently.
Try setting different values for the starting speed and direction.
Try using `random()` in the speed setting.

How does this affect your simulation?