

THE STEP EVENT AND TEST CHANCE ACTION

There may be times where you may want to randomly spawn objects in a game. In the previous unit, we spawned objects using the **Alarm** event. The problem with using the **Alarm** event to spawn objects was that it wasn't really random; the objects were spawned every set number of seconds.

In this lesson, we will learn how to spawn objects randomly – that is, there will be a random chance that an object is created. In order to make this work, we will need to learn how to use the **Step Event** as well as the **Test Chance** action.

THE STEP EVENT

Step Events are great for when you want something to continuously happen, or you want something continuously checked for each step of the game. GameMaker tells time by steps, which is defined by the room speed, which sets how many steps are performed each second.

An example of using a **Step Event** would be if you wanted to determine if certain objects have left the room, and if so, to reappear at the top of the room. As GameMaker needs to continuously check to see if the object left the room, a **Step Event** comes in very handy to use.

The step event is actually comprised of three **sub events** that are outlined below:

1. STEP

This will probably work most of the time.

2. BEGIN STEP

This option is useful when you absolutely need the **Step Event** to be the first event checked, no matter what, every time. GameMaker updates all built-in variables between the **Step** and **End Step**. So, if you want something to happen after the variables have been updated, then choose **End Step**. If you want something to happen before the variables are updated, then choose **Begin Step**.

3. END STEP

This option is just like **Begin Step**, except it's for when you absolutely need this **Step Event** to be checked last, every single time.



THE TEST CHANCE ACTION

This action takes the result of a "one in X" chance, where "X" is the number you input to test. For example, if you set the number to 20, then it's as if you have rolled a 20 sided dice and only if the side numbered 1 comes up will you get a "true" result, and the action will perform the next one below it. The larger the number of "sides" of the dice, the smaller the chance of 1 being true and the next action being carried out, and the number being checked doesn't actually have to be an integer as you could check for a 1 in 2.5 chance, or a 1 in 35.75 chance etc. However, fractions of 1 will not work since you can't have a 1 in 0.5 chance of something happening. This has many, many uses when making games as it can add a controlled, yet random chance of something happening. For example, in each step you could have a bomb check to see if it should explode, or an enemy check to see if it should change direction.



SPAWNING DEMONS

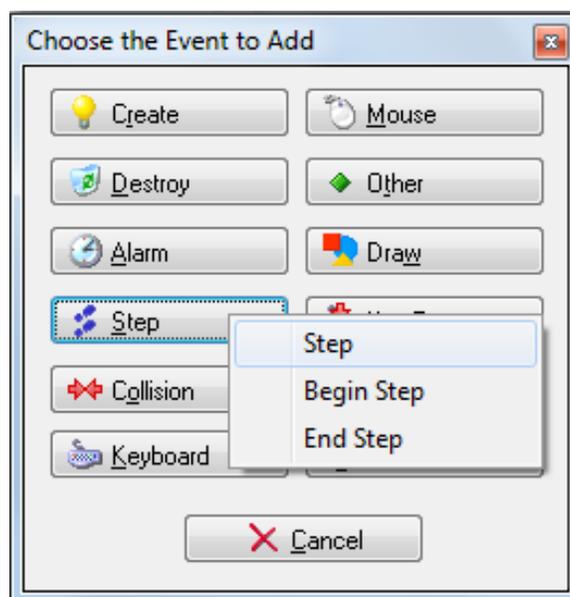
To get started you will need to open the **Evil Clutches** program which you can find in the shared directory. What you will find is the start of a game that we will be creating together as a class as we learn some additional events and actions available in GameMaker.



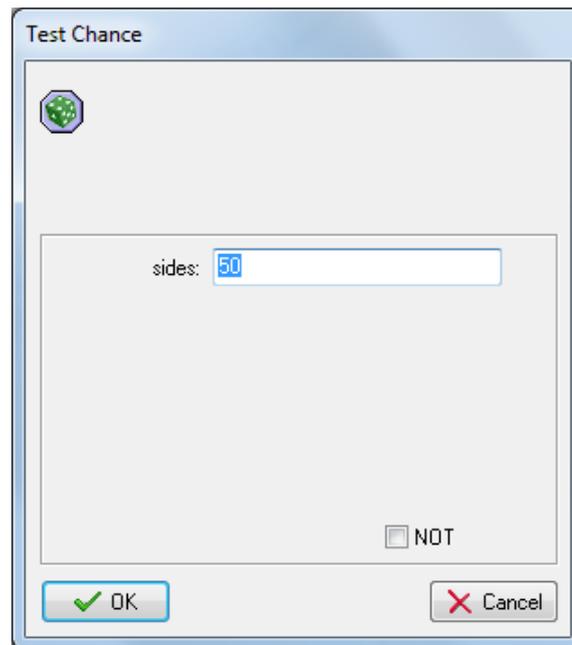
For our Evil Clutches game, we want to randomly create demons that fly across the screen. We will achieve this by using a **Test Chance** action, which acts like throwing a die with many sides. In each step we will throw the die, but only one side will trigger the chance action and create a demon. In this way, we create a steady, but unpredictable, flow of demons.

ADDING A STEP EVENT TO OUR BOSS OBJECT

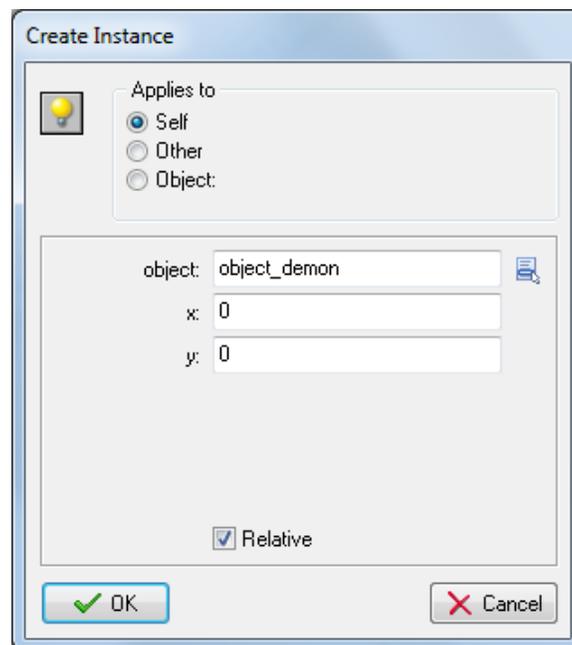
1. Double-click the boss object (**obj_boss**), click the **Add Event** button, select the **Step** event and choose **Step** again from the popup menu.



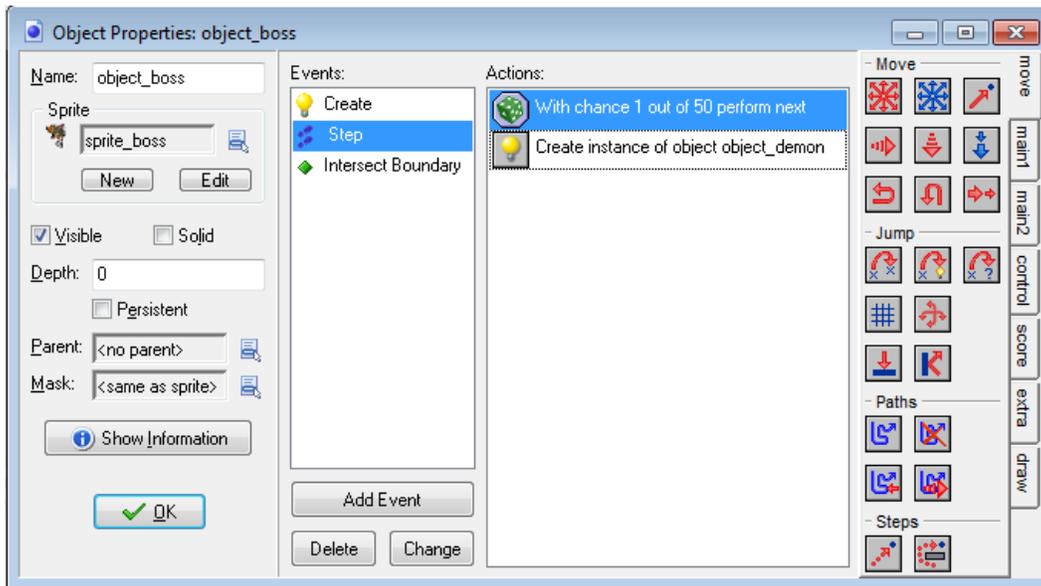
2. Add the **Test Chance** action and set the sides of the die to **50** in the action's properties.



3. Add the **Create Instance** action, set the properties to create a demon object (**obj_demon**), and select the **Relative** option, so that the demon is created relative to the boss's position.



4. The **Step Event** for the boss object should now look like this:



The **Test Chance** action is an example of a **conditional** action. **Conditional actions** control the action that immediately follows them so that it is only performed if some condition is met. So in this case the **Create Instance** action is only performed if the **Test Chance** action rolls a 1 using a 50-sided die – otherwise it is skipped.

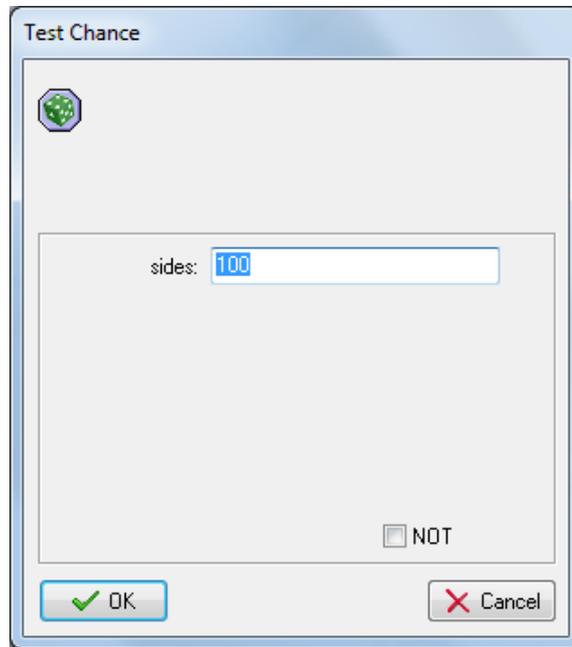
When you run the game, demons should now be randomly appearing.

SPAWNING BABY DRAGONS

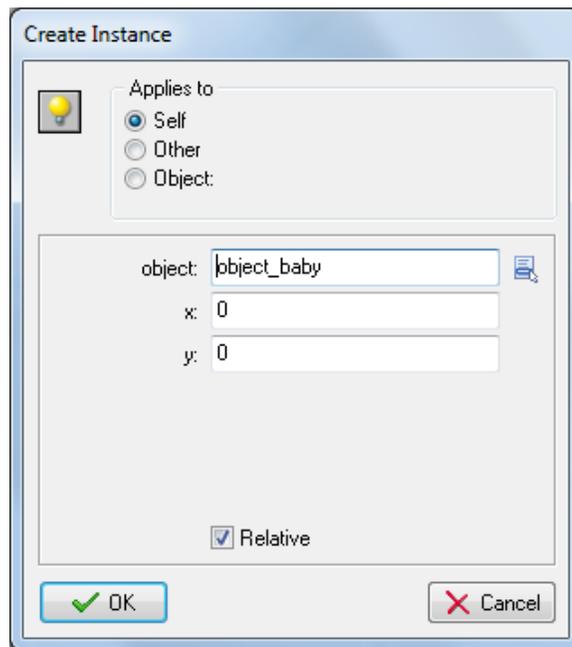
The next thing we will do is randomly create baby dragons along with the demons. If the player shoots a baby dragon, they will lose 300 points, but if they rescue one they will gain 500 points. This will mean that the player will have to be much more careful about when they shoot, thereby increasing the challenge of the game.



1. Open the boss object (**obj_boss**), click on the existing **Step** event, and add another **Test Chance** action in the **Step** event.
2. Set the sides of the die to **100** in the action's properties.



3. Add a **Create Instance** action below the new **Test Chance** action, set the properties to create a baby object (**obj_baby**), and select the **Relative** option.



Now when you run the game you should see demons and dragons randomly spawned.

SOURCE: Habgood, Jacob and Mark Overmars. *The Game Maker's Apprentice: Game Development for Beginners*. New York: Apress, 2006. Print.