

Lesson Four: *Space Invaders*-like game

What You'll Learn

- ✓ Qualifiers: Good and Bad guys
- ✓ Random firing from baddies
- ✓ Movement by X and Y co-ordinates
- ✓ Counters to set conditions

Pseudocode and Asset Lists

Once again, create an asset list and pseudocode. I won't be making any more lists for you! If you don't know Space Invaders, you can find an online version to play. Now think about how you will organize your pseudocode to make the game in MMF. How can you organize aliens to march back and forth and go down a row?

Here are a few things to consider:

The aliens need to move together in a group across the screen.

Periodically, an alien needs to shoot down at us. If they hit us, we lose a life. If they hit our base, the base animation changes direction (thus changing the animation).

We need to be able to shoot back at the aliens. If we hit them, they are destroyed and we get a number of points depending on what type of alien it is.

The aliens can't shoot each other, and we can't shoot our own base.

The aliens march back and forth. Once they have marched across the screen, they move down one line.

If the aliens move down too far they hit our bases and destroy them. If they hit us, we're dead.

Frame 1: Title

We'll skip the steps for making a title/high score screen. You can build those on your own now. Instead of a button, why not make it so the player can press a key (space bar) to begin! (event editor> upon pressing a key> next frame!)

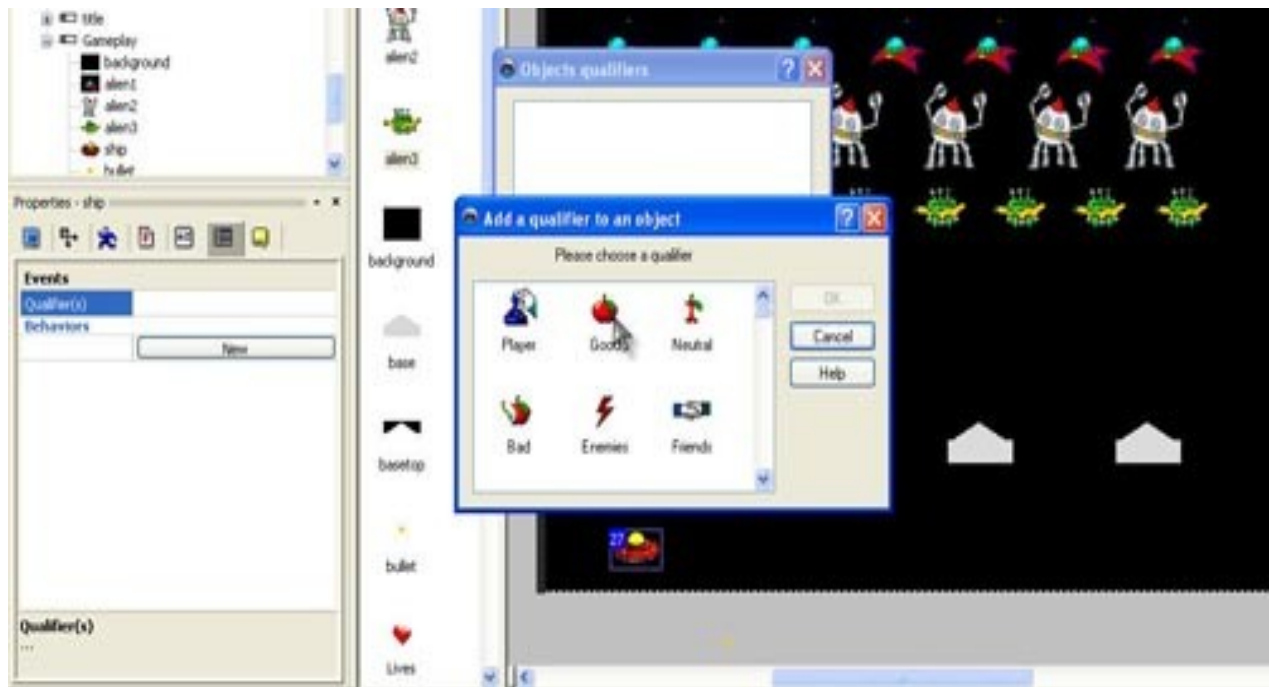
Frame 2: Gameplay

Assets

Let's import some assets this time, instead of making them from scratch. Import our three aliens and one ship. To do this, insert an active object like we have been doing, and click on "import" in the graphics

editor. Import your graphic file, and if the transparency didn't convert, then fill the background with black.

Align and space each alien object. For each alien, under properties, select: Events>Qualifiers. Add a *qualifier* and click "bad". This is to mark our alien as a baddie. We can then collectively treat our baddies in the same way in the code. Qualifiers let us set events to happen to more than one character/object at a time this way. Move each alien line over to the left side of the screen.



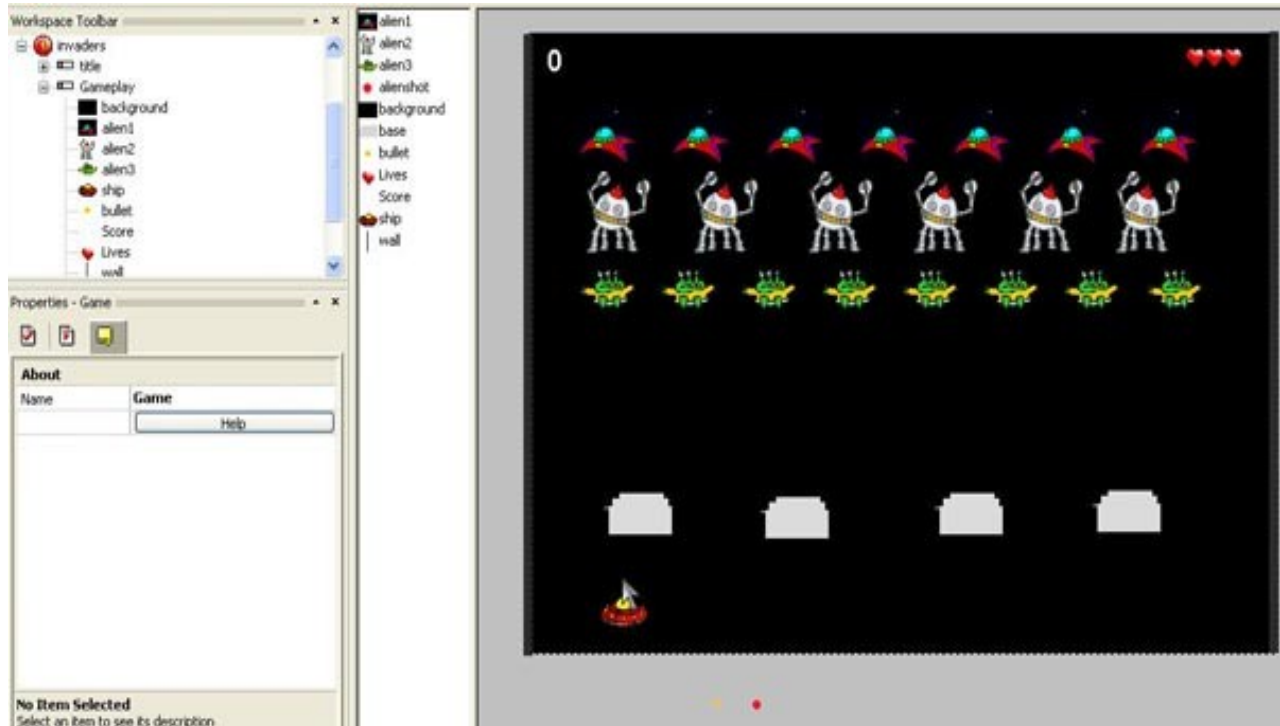
Import our ship graphic and put the shooting hotspot at a suitable place near the top middle of the ship. If you can't remember how to do this, check back in our Arkanoid game, Lesson 3. *Qualify* our ship as good! Although we won't set group actions for "good", it's another useful habit that helps you keep track in more complicated games. Set our ship's movement options to left and right using keypad arrows. Make a bullet active object. Also create an alien bullet active object. Put the bullets off to the top or bottom of the frame at the start.

Insert a score object and a lives object.

Make two active object "walls" at both sides of the screen, so that our aliens have something to collide with at the edges! I've called mine Lwall and Rwall for left and right.

Make a base object. Our base will have four different directional states (and four different *animation frames*) depending on how many times it has been hit, with each successive hit more damaging (making for less of our base object). Copy it four times across the bottom.

You can see in the image below, I've changed my library icons to a smaller size (rightclick> small icons in the library window).



Now one more thing, which will make sense soon. We need to add a counter flag. (insert counter object). Place it offscreen somewhere. Under properties, change the default “display as background” and deselect it so the box is not checked. Name it “dir” for direction. Now in the event editor, at the “start of frame”, set the counter dir to 2. This controls the alien direction of left or right.

Frame 2: Events

Okay, that takes care of our assets. Now we need to think about the events.

Our ship can already move back and forth. We want to test the position and if it moves off the screen on the right or left, pick “wrap” or “bounce”. You can set this up in the event editor now.

Okay, first let's tackle collisions.

In the event editor, let's comment a section for Collisions just so we can keep track of our events.

Add a collision for when an alien bullet hits our ship (subtract a life, and destroy the bullet).

Set a collision for when our bullet hits a baddie (destroy the baddie, add 100 to our score, and destroy our bullet).

Set four collisions for when an alien bullet hits a base (and check which “direction” the base is facing).

For each one, change the direction to the next direction, and change animation frame to the next frame.

On the last one, destroy the base when it's hit.

If a baddie (bad. group) collides with us, the game is over (go to next frame)!

All the events All the objects																	
5	Collision between [red dot] and [alien]												✓				
6	Collision between [red dot] and [base] [base] is facing a direction [down]													✓			
7	Collision between [red dot] and [base] [base] is facing a direction [up]													✓			
8	Collision between [red dot] and [base] [base] is facing a direction [down]													✓			
9	Collision between [red dot] and [base] [base] is facing a direction [up]													✓			
Shooting																	
11	Upon pressing "Shift"											✓					
12	Every 01:00 Pick one of [alien]															✓	

Now reverse the order of those conditions, so that they run in the correct order.

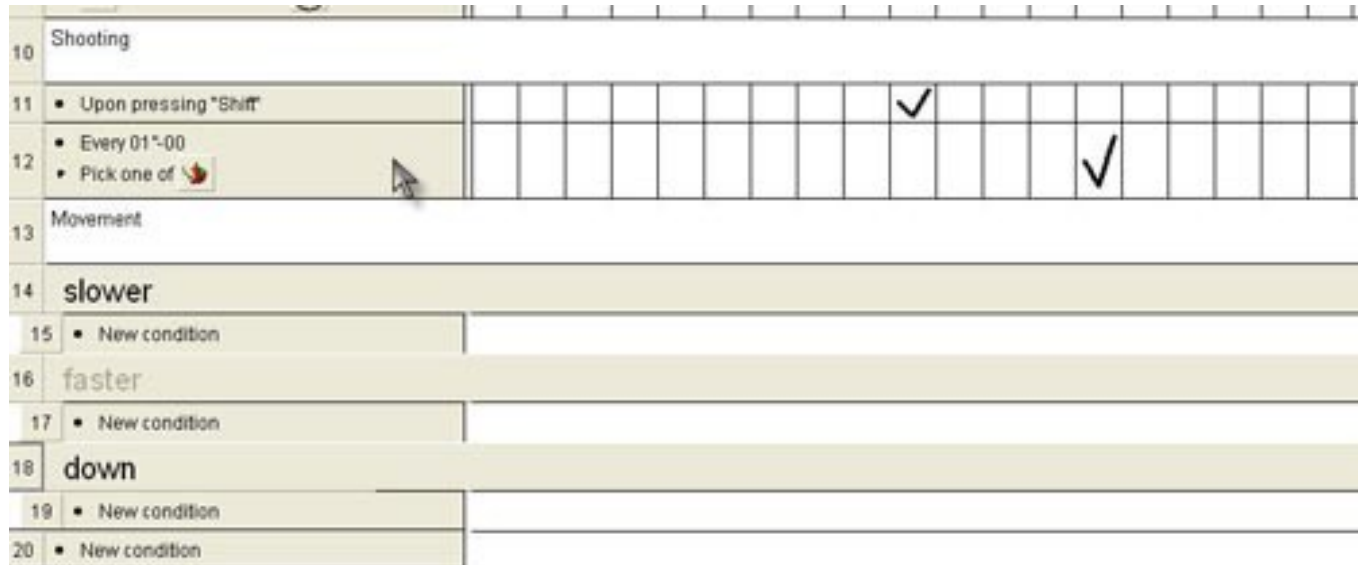
All the events Some objects hidden																	
4	Collision between [red dot] and [alien]											✓					✓
5	Collision between [yellow dot] and [alien]											✓	✓	✓			
6	Collision between [red dot] and [base] [base] is facing a direction [down]													✓			
7	Collision between [red dot] and [base] [base] is facing a direction [down]													✓			
8	Collision between [red dot] and [base] [base] is facing a direction [up]													✓			
9	Collision between [red dot] and [base] [base] is facing a direction [down]													✓			
10	[red dot] collides with the background																✓
11	[yellow dot] collides with the background															✓	
12	Collision between [alien] and [alien]			✓													
Shooting																	
14	Upon pressing "Shift"															✓	
15	Every 01:00 Pick one of [alien]																✓
Alien Movement																	

Shooting: Now for the shootout.

Create a comment line for shooting.

We want to press the shift key to fire (upon pressing a key: shoot an object>bullet).

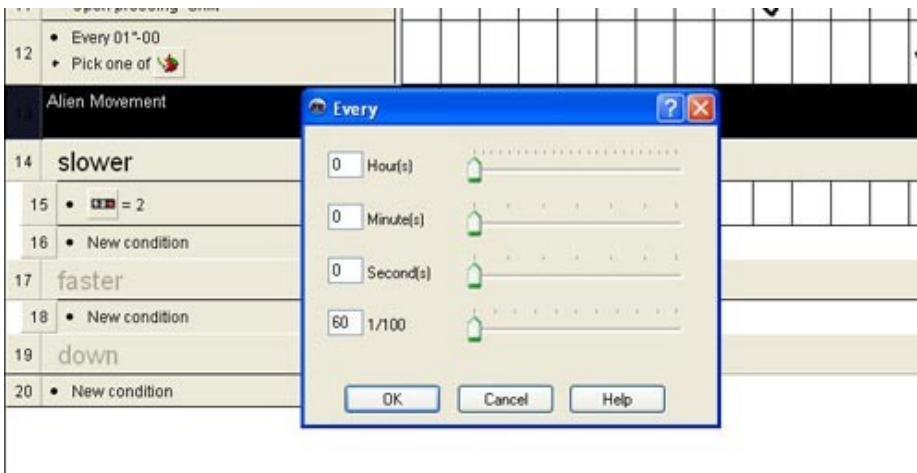
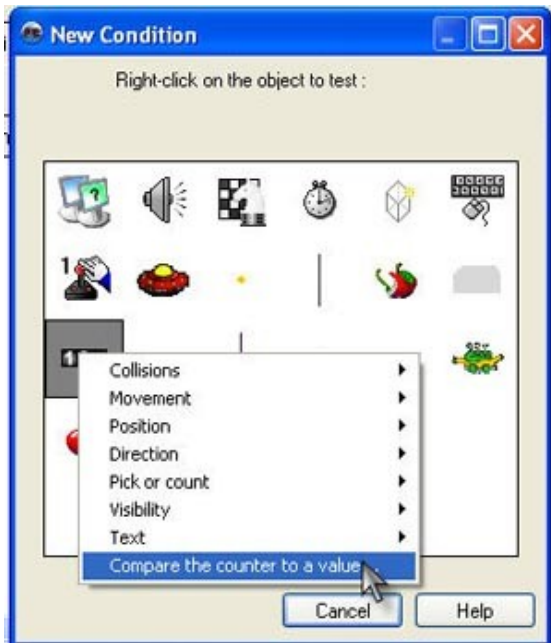
Every 1 second, we want to pick a random baddie to fire on us, so that we don't know where the bullet is coming from. There are two conditions then: one is the timer object set to every one second. The second is baddie> pick or count> pick bad.group at random. Under actions, select the baddies, have it shoot an alien bullet at a slower speed (60) and select the direction down.



Comment a new section for alien movements.

Make three group events: slower (active at start), faster (not active at start), and down (not active at start).

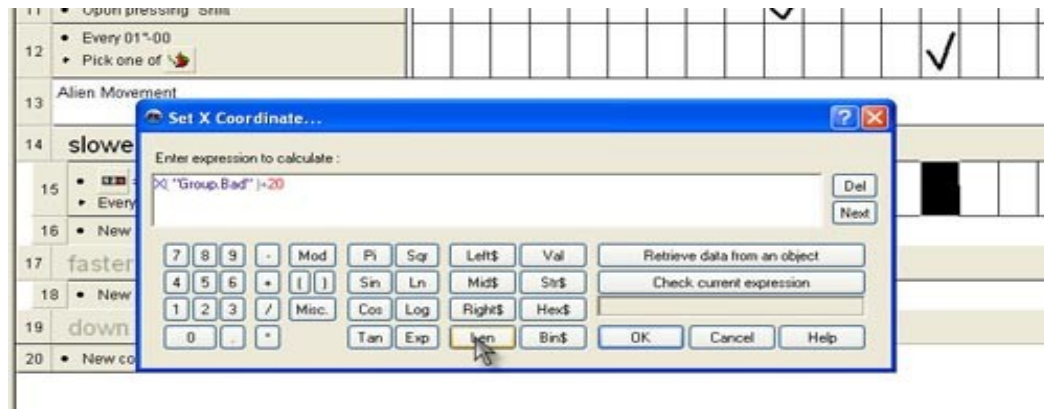
First the slow group: depending on which direction the baddies are heading in, and if the baddies reach a wall, we want to set an action. If they hit a wall, we want them to move down a row (activating our group event for moving down).



First: the right side (Rwall).

Condition: compare the counter dir value to 2. In the same condition, insert the line Timer every 60/100s of a second. This means we've made a condition that reads, " If we're touching the right wall, what direction are we going in "1" or "2" (= left or right): If it is 2, then every fraction of a second (60/100s)" do this action:

Action: under bad.group: Set a new X coordinate (x handles horizontal movement). This will bring up the expression calculator. Retrieve the data from the object (group bad)> x coordinate, and add "+20." This will check the x (horizontal) coordinate, and add 20 points every 1/2 second or so, moving the objects along the X axis by 20 points.



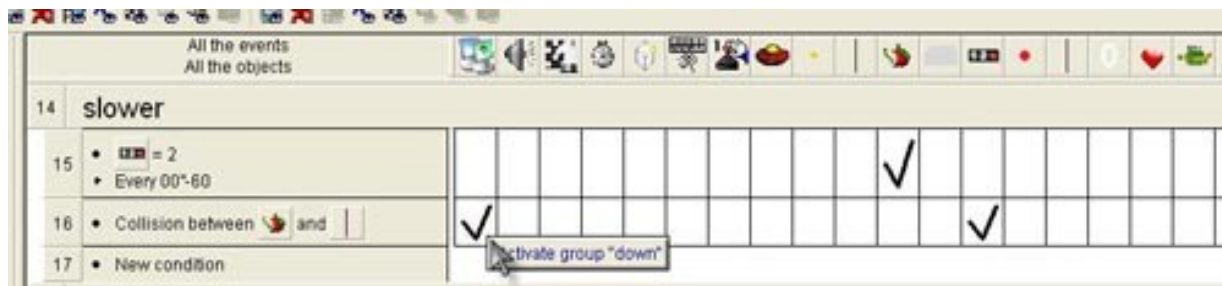
When a baddie reaches (collides with) the Rwall, set the counter to 1 (changing the counter so we know we've changed direction), and activate the DOWN group of events.

Now for the left side: still under the "Slower" group of events:

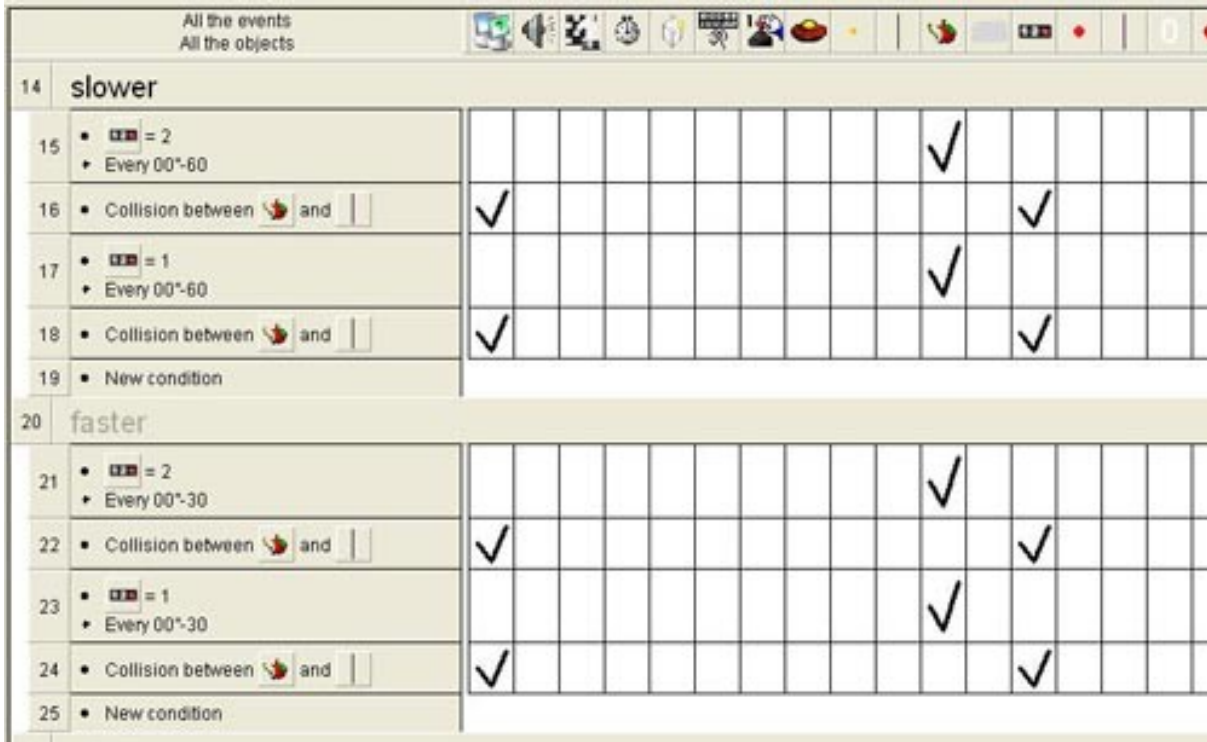
Set a condition just like we did above, but where if the counter = 1 (compare the counter to a value equal to 1). Set a second condition for the timer to every 60/100s of a second. Just like you did above, change the X coordinate, this time to -20.

When a baddie now collides with Lwall, change the counter back to 2, and activate group event Down.

So what we've just done is said, if we're moving to the right, then every half second or so, move another jump to the right. If we hit the right wall, jump to event "down" (which will move us down a row) and change our movement to the left, and start jumping over to the left until we hit the left wall.



OK, now for when the baddies move more quickly (that is, when they hit our bases, they will speed up!) Copy and paste the four event lines from the group event “slower” and then edit the timers so it’s every 30/100s of a second. So every approximately one third of a second they are going to be moving along the X axis--therefore moving more quickly.



That’s it for that section. Now to our “DOWN” event group.

Condition: Special: Only one action when event loops.(we only want to do this once for every time we hit a wall): Under the baddies group, select Position> Set Y coordinate (the vertical coordinate). Retrieve the Y coordinate of the baddie, and add +25 to take it down a row (numbers increase as we move down the screen). And then we want to de-activate our event group of down, since we don’t want to loop this event.



Now go back to collisions, because we want to add one that says, if our baddies collide with our base, activate event group faster and deactivate group slower. We've just said, "if the baddies reach the bottom and hit our bases, they are going to speed up".

All the events Some objects hidden		[Icons]																
19	• Collision between [Icon] and [Icon]	✓											✓					
20	• [Icon] = 1 • Every 00:60													✓				
21	• Collision between [Icon] and [Icon]	✓															✓	
22	• New condition																	
23	faster																	
24	• [Icon] = 2 • Every 00:30																✓	
25	• Collision between [Icon] and [Icon]	✓																✓
26	• [Icon] = 1 • Every 00:30																	✓
27	• Collision between [Icon] and [Icon]	✓																✓
28	• New condition																	
29	down																	
30	• Only one action when event loops	✓																✓
31	• New condition																	
32	• New condition																	

Additional Exercises

1. Add an event for what happens when all the baddies are dead, and all our lives are dead (your choice).
2. Add some sounds. Add background music that changes when the gameplay hits "faster".
3. Add a bonus ship that flies across the screen every minute and is worth 500 points if hit.
4. Add a free life at 1000 points.
5. Add a collision event between aliens and our bases where the base gets destroyed when the aliens collide with it.