

TASK 9c: COLLISION DETECTION

EXERCISE 4: COLLISION DETECTION

`hitTest` is one of the primary methods designed for games. It is used to determine when two movie clips collide.

a) Introduction to `hitTest`

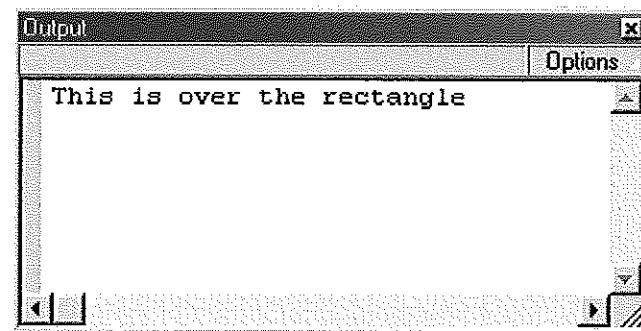
This exercise detects when the mouse pointer is above a **movie clip**.

Start a new Flash document. Draw a rectangle on **stage**. Convert the rectangle to a **movie clip symbol** call it *Rectangle*. Give the **instance** a name like *mcRectangle*.

Attach the following actionscript to the instance:

```
onClipEvent (enterFrame) {  
    if (_root.hitTest(_root._xmouse,_root._ymouse,false)){  
        trace("This is over the rectangle");  
    }  
}
```

Test the **movie** by moving mouse pointer over the rectangle briefly. If it is not brief the message keeps repeating.



Modify the script as follows:

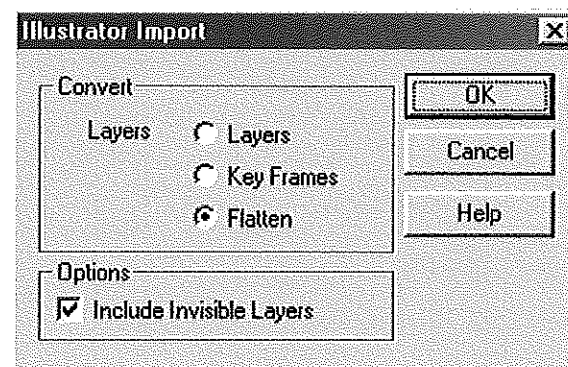
```
onClipEvent (enterFrame) {  
    if (_root.hitTest(_root._xmouse,_root._ymouse,false)){  
        trace("This is over the rectangle");  
        this._xscale=25;  
        this._yscale=25;  
    }  
}
```

Test the **movie**. The square is now 25% of its original size.

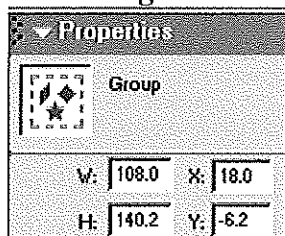
Explanations	
Script	Explanation
<code>_root.hitTest(_root._xmouse,_root._ymouse,false)</code>	The code has been added to the rectangle. It is waiting for the mouse pointer to move over it.
<code>trace</code>	Writes a message in the output window. Usually used for debugging.
<code>this._xscale=25;</code> <code>this._yscale=25</code>	Reduces the movie clip to 25% of its original size in both the x and y directions.

b) Movie Clip Collisions

File import *Blue Spaceship Diagram.ai* and *Red Spaceship Diagram.ai* on to the stage -- when the Illustrator Import dialog box opens, select Flatten. Do not import into your library as they are going to be resized first.



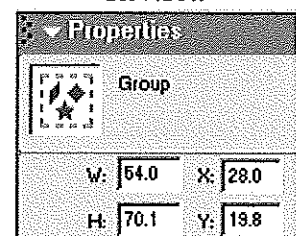
Original



For both spaceships, change the width (W) to 54 pixels and the height (H) to 70. 1 pixels.

Place each spaceship into the **library** as a movie clip symbol – calling them *RedSS* and *BlueSS*. Name the instances *mcRed* and *mcBlue* respectively.

Revised



Move the red spaceship to one side of the **stage** and the blue to the other. Save file as *Collision Template.fla*. This gives us a file with two separate **movie clips** that can be used for different ways of using `hitTest`.

Method 1: Bounding box meet

For this exercise you will use the mouse pointer to move the blue spaceship. When the bounding boxes of the two **movie clips** meet the red spaceship carries out an action.

Open *Collision Template.fla* and save it as *Exercise 4 Method 1.fla*.

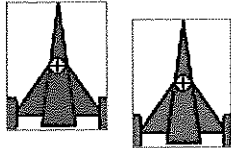
Similarly to exercise 3, the script for the blue spaceship (below), allows you to click on the blue spaceship and drag it somewhere – then release it when you release the mouse button. For the blue spaceship add the script:

```
onClipEvent (mouseDown) {  
    this.startDrag();  
}  
onClipEvent (mouseUp) {  
    this.stopDrag();  
}
```

To the red spaceship add the following script:

```
onClipEvent (enterFrame) {  
    if (this.hitTest(_root.mcBlue)){  
        _xscale=50;  
        _yscale=50;  
    }  
}
```

Test the movie several times. See how close you have to get to the red spaceship before the action occurs – look where it works best and worst. Save the movie.



The spaceships have bounding boxes around them, in this case the noses of the craft are very thin – there is a lot of white space between the nose and the top corners. The `hitTest` code, as written, would detect a hit on the red spaceship as soon as the blue spaceship touched any of the bounding box – this includes the top corners.

Explanations

Script	Explanation
<code>this.hitTest(_root.mcBlue)</code>	The blue spaceship moves – its position is given by <code>_root.mcBlue</code> . The script is attached to the red spaceship so is referred to as <code>this</code> . The script tests when the bounding box of the blue spaceship meets the bounding box of the red spaceship.
<code>_xscale=50;</code> <code>_yscale=50;</code>	Reduces the movie clip to 50% of its original size in both the x and y directions.

Method 2: A point and a movie clip

In this exercise you will be finding when the **registration point** of the blue spaceship meets the shape of the red spaceship.

Save the file *Exercise 4 Method 1.fla* as *Exercise 4 Method 2.fla*. Leave the code of the blue spaceship as it is.

Modify the red spaceship code to the following:

```
onClipEvent (enterFrame) {  
    if (this.hitTest(_root.mcBlue._x,_root.mcBlue._y,true)){  
        _xscale=50;  
        _yscale=50;  
    }  
}
```

Test the movie. Again test to see the positions you can move the blue spaceship to before the action occurs. Save the file.

Explanations

Script	Explanation
<code>this.hitTest(_root.mcBlue._x,_root.mcBlue._y,true)</code>	<p>This tests to see when the registration point of the blue spaceship is over the red spaceship.</p> <p>The <code>true</code> means we are using the shape of the red spaceship and not the bounding box.</p>

Method 3: Using a 'hit spot' on a movie clip

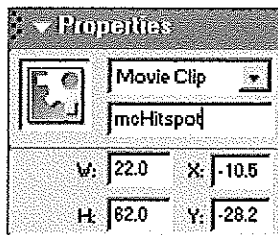
In this exercise you will add a hit spot on the red spaceship. You will then move the red spaceship to the blue spaceship for the action to occur (by the blue spaceship).

Open *Collision Template.fla* and save it as *Exercise 4 Method 3.fla*. Add the following script to the red spaceship instance:

Add the following red script to the red spaceship so that you can drag it:

```
onClipEvent (mouseDown) {  
    this.startDrag();  
}  
onClipEvent (mouseUp) {  
    this.stopDrag();  
}
```

Double click on the red spaceship to open this **movie clip** on its **timeline**. You will see the **timeline** of the movie clip instance (see diagram). You will be creating a movie clip within a movie clip!



Call the movie clip instance *mcHitspot*.

Attach the following script on the hitspot

```
onClipEvent (load) {
    _visible=false;
}
```

Return to the main timeline by clicking on Scene 1.



Click here

Now add the following script to the blue spaceship.

```
onClipEvent (enterFrame) {
    if (this.hitTest(_root.mcRed.mcHitspot)){
        _xscale=50;
        _yscale=50;
    }
}
```

Test the movie. See how well it works.

Explanations

Script	Explanation
<code>this.hitTest(_root.mcRed.mcHitspot)</code>	Checks when the hit spot of the red spaceship meets the bounding box of the blue spaceship.

Conclusion

No method is perfect – it depends on the shapes and types of games or multimedia product you are creating.