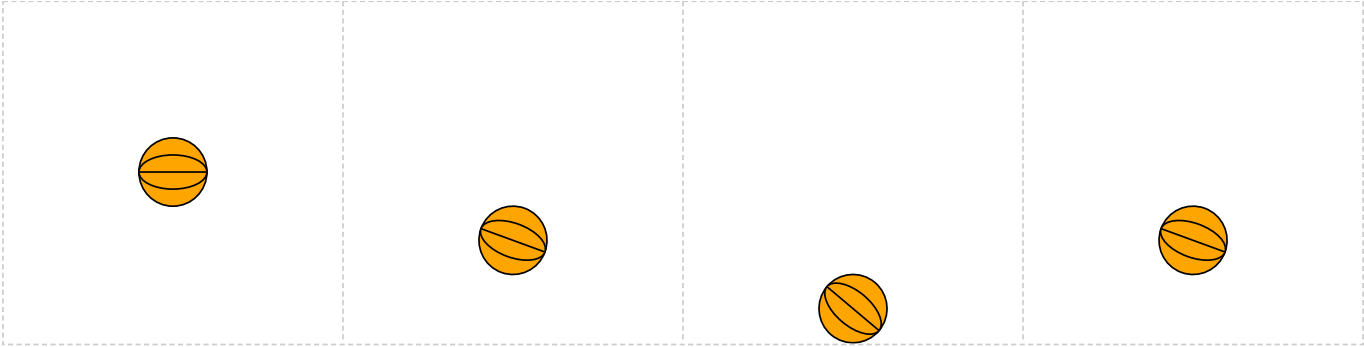


# Bouncing Ball Sprite Sheet



## Coding a Bouncing Ball in SVG

In a text editor, create an <svg> element with a viewBox from (0,0) to (800,200) and save the file as ball.svg and open the file in a browser. In the editor, add the SVG elements (per instructions below).

- 1: Create a <defs> element.
- 2: Add a <symbol> element to the <defs> element. Give the symbol element an id="ball" and a style="fill:orange;stroke:black;"
- 3: Add 3 elements to the "ball" symbol:  
Circle centered at (100,100), radius: 20  
Ellipse centered at (100,100), x-radius: 20, y-radius: 10  
Path drawing a line from (80,100) to (120,100)
- 4: Add a <clipPath> element to the <defs> element. Give the clipPath element an id="cp1" and a viewBox="0 0 200 200"
- 5: Add a <rect> element to the <clipPath> element. Give the rect element an id="cp" starting at x=0, y=0 and a width and height of 200
- 6: Create a grouping <g> element with id="sprites".
- 7: Add a <use> element to the "sprites" grouping referencing the ball symbol, i.e. xlink:href="#ball".
- 8: Add 3 additional <use> elements to the "sprites" grouping each referencing the ball symbol, but transform each one as follows:  
translate(200,40) rotate(20,100,100)  
translate(400,80) rotate(40,100,100)  
translate(600,40) rotate(20,100,100)
- 9: Now that the 4 frame sprite sheet is complete, add a <script> element after the <defs> element as shown below:

```
<script type="application/x-javascript"><![CDATA[  
  
]]>  
</script>
```

The CDATA section tells the browser to ignore symbols contained in it when parsing the SVG elements.

- 10: Inside the CDATA section, create a javascript variable called SpriteSheetAnimation that will contain the code as follows:

```
var SpriteSheetAnimation = new function()  
{  
  
}();
```

Be sure to use proper indentation to help troubleshooting errors like missing or unmatched { } symbols. These symbols group code similar to the way a <g> element groups SVG elements.

- 11: Inside the SpriteSheetAnimation function, add a line of code:

```
alert("Hello World");
```

Refresh the browser, to see that the code is executing and displaying an alert box. The alert() function is useful when troubleshooting code errors.

- 12: Add an `init()` function around the alert box and add an event listener to call the `init()` function after the SVG image loads.

```
window.addEventListener("load",init);

function init()
{
  alert("Hello World");
}
```

It is important to know that the SVG image has finished loading before executing any javascript code that tries to access any SVG elements - otherwise the SVG element may not be found.

- 13: Define a variable called `frame` (first line inside the `SpriteSheetAnimation` function) that will keep track of which frame is to be displayed.

```
var frame=0;
```

`frame` will be a 0 relative variable counter, counting the 4 frames as 0 ,1 ,2, and 3.

- 14: Add an `DisplayNextFrame()` function after the `init()` function with the following lines of code:

```
function DisplayNextFrame()
{
  document.documentElement.setAttribute("viewBox",frame*200+" 0 200 200");
  frame++;
  if(frame>3) frame=0;
}
```

The document object, in this case, is the SVG image. Objects have properties and methods, where properties are like variables, and methods are like functions. Access to these properties and methods uses a dot syntax, so the `documentElement` property of the document object can be accessed with the code "`document.documentElement`". The `documentElement` property contains the root element of the document. It is the first element in the document, which in this case is the `<svg>` element.

The line "`frame++;`" is a simplified way to increment a variable. It is equivalent to "`frame = frame + 1;`"

The last line checks if the `frame` variable is greater than 3 and, if so, sets the `frame` variable back to 0.

- 15: In the `init()` function, comment out the `alert()` function, and add a line of code:

```
function init()
{
  //alert("Hello World");
  setInterval(DisplayNextFrame,150);
}
```

The javascript function `setInterval()` takes 2 passed parameters, the name of the function to call when the timing interval expires and the number of milliseconds for the interval. It sets a timer that will call the `DisplayNextFrame` function every 150 milliseconds.

At this point, the animation works, but overflow is showing the other frames. To solve this, the next step will add a clip-path to display only the desired frame.

- 16: Add a line of code to the beginning of the `init()` function:

```
document.getElementById("sprites").setAttribute("style","clip-path:url(#cp1);");
```

The document object has a `getElementById()` method (function) to find the element with the passed id name, in this case "sprites". Then calls the `setAttribute()` method (function) which adds a "style" attribute to the "sprites" element. The style attribute contains the name:value pair "`clip-path:url(#cp1);`", which adds the clip path with id="cp1". Since the rectangle element in the clip path is set to the dimensions of the first frame, that

is all that is displayed. To solve this, add the line of code in the next step.

- 17: Add a line of code as the second line of code in the DisplayNextFrame() function:

```
document.getElementById("cp").setAttribute("x", frame*200);
```

Use the document object getElementById() method (function) to access the element with id="cp". Then call the setAttribute() method (function) to modify the "x" attribute to 0 when frame=0, 200 when frame=1, 400 when frame=2, and 600 when frame=3.

- 18: To eliminate the flicker, add a line of code in front of the setInterval() function call in the init() function:

```
DisplayNextFrame();
```

This eliminates the 150 millisecond delay before calling the DisplayNextFrame() function. Otherwise the frame is displayed with a viewBox="0 0 800 200" in the first 150 milliseconds.

- 19: To display the sprite sheet without animation, just comment out the line of code as shown:

```
//window.addEventListener("load",init);
```

With this line of code commented out, the init() and therefore the DisplayNextFrame() don't get called.