Animation

JavaScript can be used for animating images on a web page.

The Plan

1) Place first still image(s) on web page
2) Prefetch the series of images and store them
3) Setup a timer to cycle through the images

New.gif, new1.gif, new2.gif, new3.gif

Smooth motion requires 30 times/sec display

Creating GIFs

GIF files for animation are progressively different... make them w/Photoshop
- The series should all have the same size
- Begin with an initial GIF and build all others from it
- Getting the motion to be smooth may take a bit of fiddling

Animated GIFs -- GIFs that automatically cycle use a special format and software

1. Place still image(s)

Placing the image uses a standard <img src=...> tag

<body>
  <img src="new0.gif">
  <script language="JavaScript"> Code here </script>
</body>
</html>

The document.images

When HTML draws a page, the images go in an array: document.images
- Recall, arrays are names w/ indexes, like A(1)
- Each element of document.images array holds one image
- Pictures are put into document images in the order encountered on page build... so for Test Page, document.images[0] = new0.gif
- Changing the src property of the array changes the picture... but the images must be prefetched first!

2. Prefetch images!

"Prefetch" means to get the images and save them in (our own) array so they are handy to assign to doc.im
- We must declare an array (and probably an index variable, too):
  var i, pref = new array(4);
- Then we set it up to hold images:
  for (i=0; i<4; i++) {
    pref[i] = new Image;
  }

Once the array is declared and setup, get the images and assign them to the .src field of the array:

```javascript
for (i = 0; i < 4; i++) {
    pref[i].src = "new" + i + ".gif";
}
```

- Notice that the names of the images, `new0.gif`, `new1.gif`, `new2.gif`, `new3.gif` are constructed using the index variable.

### Test It

```html
<body>
    <img src="new0.gif">
    <script language="JavaScript">
        var i, pref = new Array(4);
        for (i = 0; i < 4; i++) {
            pref[i] = new Image;
        }
        for (i = 0; i < 4; i++) {
            pref[i].src = "new" + i + " .gif";
        }
        document.images[0].src=pref[1].src
    </script>
</body>
```

Place two "0" pix then change the first to "1"

### 3. Change Image

Once Web page is drawn, nothing happens unless you cause an event:

- To animate a series of stills you must cause the computer to "wake-up" and change to the next image 30 times a second.
- Set a timer to cause the wake-up:

```
timerID=setTimeout("animate()",30);
```

#### Animate Function

`animate()` must advance the frame counter, update the image and schedule the next timer:

```javascript
var frame=0, timerID;
function animate() {
    frame=(frame+1)%4; //advance
    document.images[0].src = prefetch[frame].src; //update
    timerID=setTimeout("animate()",30);
}
```

### Watch It Go

```html
<body>
    <img src="new0.gif">
    <script language='JavaScript'>
        var i, pref = new Array(4);
        var frame = 0, timerID;
        for (i = 0; i < 4; i++) {
            pref[i] = new Image;
        }
        for (i = 0; i < 4; i++) {
            pref[i].src = "new" + i + " .gif";
        }
        timerID=setTimeout("animate()",2000); //wait
        function animate() {
            frame=(frame+1)%4; //advance
            document.images[0].src = prefetch[frame].src; //update
            timerID=setTimeout("animate()",30);
        }
        setTimeout("animate()",30);
    </script>
</body>
```

### Changes …

Suppose we want "new" to revolve once every 2 seconds:

- `animate()` sets timer for two different times
- When animating, 30 ms
- When waiting, 2000ms
- Use an if-statement

```javascript
if (frame == 0)
    setTimeout("animate()");
else
    setTimeout("animate()");
```

It's a little more subtle
Watch It Go

```
var myPage = document.getElementById('myPage');
for (i=0; i<4; i++) {
  myPage.images[i].src = 'new' + i + '.gif';
}
```

Another Example

```
var pref = new Array(4);
for (i=0; i<4; i++) {
  pref[i] = new Image();
}
for (i=0; i<4; i++) {
  pref[i].src = 'new' + i + '.gif';
}
timerID = setTimeout('animate()', 2000);
function animate() {
  frame = (frame + 1) % 4;
  myPage.images[0].src = pref[frame].src;
  if (frame == 0)
    timerID = setTimeout('animate()', 2000);
  else
    timerID = setTimeout('animate()', 30);
}
```

Chapter 22

Chapter 22 illustrates solving a large problem – an animated page

- The main topic is how to decompose a large problem into pieces and reassemble
- Project 2 is a large project (that was divided for you to be an assignment)
- When you have time – end of term? – try creating your own animations

Summary

Animation requires a 3 step process

1) Place the initial image(s)
2) Prefetch the series of images that will be the animation
3) Setup the animation function to draw the next item in the series

When creating your own GIFs make sure that the sizes are all the same