



Animation

JavaScript can be used for animating images on a web page

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The Plan

An animation is the rapid display of a series of still images ... like cartoons
There are three steps to animation

- 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

`new0.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



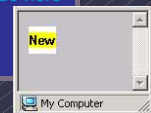
1. Place Still Image(s)

Placing the image uses a standard `` tag

```

<html><head><title>Test Page</title></head>
<body>
  
  <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 I

"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;
}`



Prefetch Images II

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

```
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

```
<body>


<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"

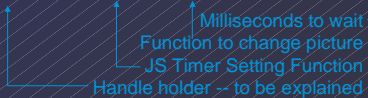


3. Change Image

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 ...

```
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>
<head>
<title>My</title>

<script language="JavaScript">
var i, pref = new Array(4);
var frames=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);
function animate(){
  frame = (frame+1)%4;
  document.images[0].src=pref[frame].src;
  timerID = setTimeout("animate()",30);
}
</script></head>
<body>
<h1>My</h1>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto 10px auto;">
  New
  </div>
<h2>Page</h2>
</body>
</html>
```



Start action



Changes ...

Suppose we want "new" to revolve once ever 2 seconds ...

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

```
if (frame == 0)
  setTimeout("animate()",2000);
else
  setTimeout("animate()",30);
```

It's a little more subtle



```

<h1>My</h1>
<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);
function animate(){
    frame = (frame+1)%4;
    document.images[0].src=pref[frame].src;
    if (frame == 0)
        timerID = setTimeout("animate()",2000);
    else
        timerID = setTimeout("animate()",30);
}
</script><h1>Page</h1>

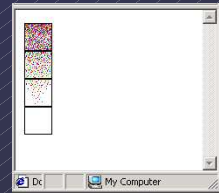
```

Watch It Go



Another Example

Ten "confetti" images



Names: Confett<number>.gif



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