

```
Extra, function  
y for outerHeight, outerWidth  
Name ] = function( margin, value ) {  
ble = arguments.length && ( defaultExtra || typeof arguments[0] === 'string' ? "margin" : "padding" );  
= defaultExtra || ( margin === true || value === true ? "margin" : "padding" );  
ccess( this, function( elem, type, value ) {  
doc;  
( jQuery.isWindow( elem ) ) {  
// S( window ).outerWidth/Height return w/h including scrollbar (if any)  
return funcName.indexOf( "outer" ) === 0 ?  
elem[ "inner" + name ] :  
elem.document.documentElement[ "client" + name ];  
}  
// Get document width or height  
if ( elem.nodeType === 9 ) {  
doc = elem.documentElement;  
// Either scroll(Width/Height) or offset(Width/Height) or client(Width/Height)  
// whichever is greatest  
return Math.max( doc.body[ "scroll" + name ], doc[ "scroll" + name ],  
doc.body[ "offset" + name ], doc[ "offset" + name ],  
doc.body[ "client" + name ], doc[ "client" + name ] );  
}
```

Session 1: Animation and Multimedia Using JavaScript and HTML5 DOM Methods

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DOM Methods

Animation

What is animation?

The simulation of movement created by a series of pictures or effects is animation.

Categories of Animation

- Sprite Animation
- Frame Animation

Sprite Animation and Frame Animation

A high-quality animation contains the combination of both the animations, that is, the sprite animation and the frame animation.

Sprite animation	Frame animation
<p>Sprite animation defines a rectangular image in which the parts of the image are made transparent where you want to show the background. It can move an image over another image.</p>	<p>Frame animation allows you to create fast slide shows. In this animation, one can create several slides of frames by making small changes in each frame. As the slide sets are displayed in quick sessions, the change appears in motion.</p>

JavaScript Functions

Animation Programs

JavaScript provides two functions that are frequently used in animation programs, namely:

1. `setTimeout(function, duration)`
2. `setInterval(function, duration)` IIS 10.0 by default, it runs on port 80

Clearing Animation

The functions used to clear animations are:

1. `clearTimeout(setTimeout_variable)`
2. `clearInterval(setInterval_variable)`

setInterval(function, duration) and clearInterval(function, duration)

Working of setInterval(function, duration) clearInterval(function, duration)

- The setInterval() method calls a function or evaluates an expression at specified intervals (in milliseconds).
- The setInterval() method will continue calling the function until clearInterval() is called, or the window is closed.
- The ID value returned by setInterval() is used as the parameter for the clearInterval() method.
- The duration parameter is specified in milliseconds (1000 ms = 1 second).

- The below function calls the animate function in every 1 second or 1000 ms.

Syntax:

```
setInterval(animate, 1000);
```

```
function animate(){
```

```
    // animation code
```

```
}
```

How to set attributes of a DOM object?

Setting attributes of a DOM object:

- JavaScript can also set a number of attributes of a DOM object including its position on the screen. The example is on the screen.
- JavaScript animations are done by programming gradual changes in an element's style.
- The changes are called by a timer. When the timer interval is small, the animation looks continuous.

Example:

object.style.left = distance in pixels or points;

object.style.top = distance in pixels or points;

Example of Animation Using setInterval Function and DOM Object

Explaining the body of the HTML code

1. First, we need to create a button with onclick event and will trigger the animateSquare() function.
2. Then, we need to create a div tag with id as "square".
3. Inside the script tag created a function called animateSquare().
4. The const variable elem will hold the reference of square with document.getElementById method.
5. moveLeft function is called by setInterval every 5 milliseconds, until the left position is 400 px.
6. moveLeft function will move the elem (square) to left with 1 pixel every 5 millisecond and looks like the square is moving to left.
7. If the elem (square) left position is more than 400px the left position of elem is reset to 0px.

Output

The red square will move to the left by 100 px after 2000 milliseconds or 2 seconds.

RequestAnimationFrame

Importance of requestAnimationFrame

1. RequestAnimationFrame is the standard way to perform animations, and it works in a very different way even though the code looks very similar to the setTimeout/setInterval code.
2. The requestAnimationFrame() is one of the powerful methods present in JavaScript to incorporate amazing and simple animations within our project.
3. Earlier methods like setTimeout() or setInterval() slow down the whole process. The main problem with them was synchronization. Moreover, the transition time was very slow and did not match with the user's system perfectly.
4. Here, requestAnimationFrame() came into the picture. RequestAnimationFrame () method easily syncs in with your browser timings and generates a call to perform the specific animation before the actual loading of the screen. It also slows down its process when the animation is not used, thus saving

resources.

Example of requestAnimationFrame

Explaining the body of the HTML code.

1. The requestAnimationFrame is called until the flight margin-left property is 500px.
2. The requestAnimationFrame is called repeatedly until the pos variable is less than or equal to 500.
3. It will give an animation effect of a flight image moving the left side.

cancelAnimationFrame

cancelAnimationFrame

- When we start an animation using requestAnimationFrame you will get a reference to the animation.
- But we can use anytime the **cancelAnimationFrame** as a global function by passing the reference as a parameter to stop the animation.
- **cancelAnimationFrame** takes one parameter which is the reference of requestAnimationFrame.

Example of cancelAnimationFrame

Understanding the Purpose of using cancelAnimationFrame

1. First, we need to create a stop button, and clicking the button will trigger the stopAnimation function.
2. stopAnimation function calls cancelAnimationFrame.
3. The reference of requestAnimationFrame is stored in the requestAnim variable.
4. The requestAnim variable is passed as a parameter to cancelAnimationFrame function to stop the animation.

Recap

1. The simulation of movement created by a series of pictures or effects is animation.
2. Sprite animation defines a rectangular image in which the parts of the image are made transparent where you want to show the background. It can move an image over another image.
3. Frame animation allows you to create fast slide shows. In this animation, one can create several slides of frames by making small changes in each frame.
4. RequestAnimationFrame is the standard way to perform animations.
5. You can use the cancelAnimationFrame as a global function by passing the reference as a parameter to stop the animation.
