Subject Code	CS3	Client-side Web Development
Module Code	7.0	Advanced CSS
Lesson Code	7.3	Image Sprites
Time Frame	30 mins.	

TARGET

Time Allocation: 1 minute

After completing this module, you are expected to:

- Enhance web pages by incorporating links styles and events using CSS
- Identify and practice the latest updates in CSS, particularly image sprites.

HOOK

Time Allocation: 1 minute

Graphical elements in websites have become more common to make web pages more appealing and interactive for viewers. Images make web pages come to life and make the appearance of websites more interesting. The downside of using many images on a web page is it makes the loading time slower. Browsers request information from servers to display web pages, and a request only has a specific size limit. Images contribute largely to the file size of the web page. When a web page has a large file size, the browser needs multiple requests from the server to display the whole web page, making the loading time slower.

To reduce the number of requests, web developers combine multiple images into a single image. This resulting large image is called **image sprite**. It is a combination of many images. Given below are some examples of image sprites:

Figure 1. An image sprite for different icons of social media sites

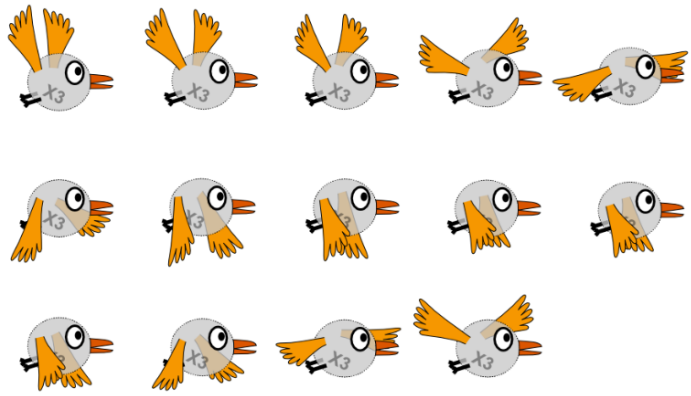


Figure 2. A character at different frame shots of a single movement

IGNITE

Time Allocation: 15 minutes

Image sprites are used by retrieving a single image and displaying small parts of the image at a given instance. Let us look at an example of how image sprites are used.

Application 1: Using image sprites for icons

Let's say you have a "Contact Us" section, and there are multiple social media links that the user can click on. Refer to Figure 1 again (filename in this example is **`icon.png`**). We want to display only the Facebook icon. We can focus on the Facebook icon by getting the coordinates of the chosen area.

Code:

```
<head>
	<style>
		.sprite {
			background: url('icon.png') no-repeat -182px -91px;
			width: 33px;
			height: 33px;
		}
	</style>
</head>
<body>
	<div class="sprite"></div>
</body>
```

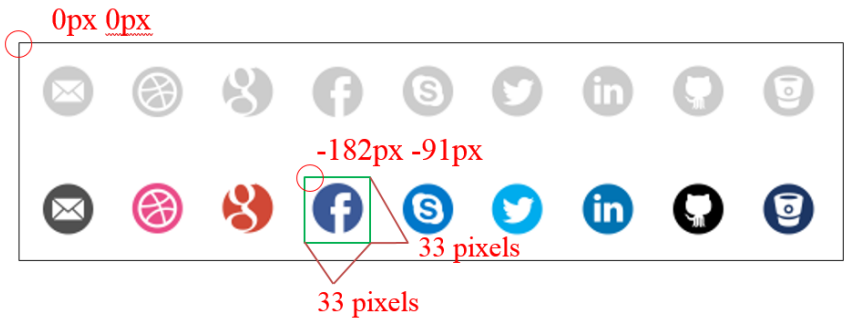
Output:

Code explanation:

In the code, a div tag is set with class name `sprite`. The image sprite where the Facebook icon is located is in `icon.png`. Let us look at this line from the given code above:

```
background: url('icon.png') no-repeat -182px -91px;
```

The image is set as the background of the div tag, but instead of having the whole image as the background, the background will start at **182 pixels to the right** and **91 pixels down** from the top left corner of the image. The top left corner of the image is set at 0px 0px. A negative sign for the first pixel value means it is moving to the right and a negative sign for the second pixel value means it is moving down.



Notice that after this line of CSS code, a `width` and a `height` were defined. We have defined the starting points to be at **`-182px -91px.`** The ending points for the image will now be **33 pixels (width value)** after `-182px` to the right and **33 pixels (height value)** after `-91px` down.

Determining the pixel values in image sprites

To use image sprites, we must be precise in the values that we need. We must know the exact location of the starting point of the portion of the image that we want to use, and we must also have a correct value for the height and width of the portion that we want to use. Now, how can you get the exact values? Is it by estimation and trial and error?

Luckily, there are many web services that automatically generate the CSS background positions of image sprites. An example that will be discussed in this module is **http://www.spritecow.com/**. To use the website, upload the image and select the area that you want to generate a CSS code for. The CSS code will show at the bottom of the page.

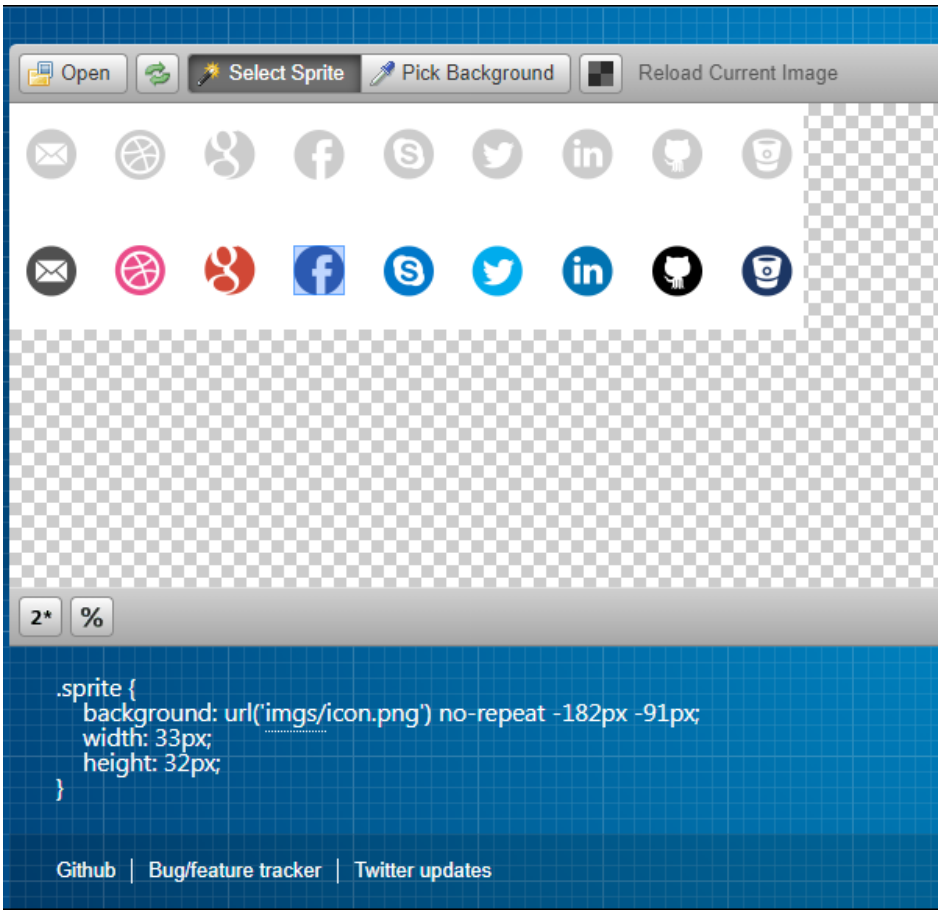


Figure 3. www.spritecow.com

Note: Remember to change the directory of the image when inserting it into your code.

Application 2: Using image sprites for animation

Another way that image sprites can be used is in simple animation. To implement this, you need to read more on CSS Animations. But do not worry! This section will give you a simplified explanation of CSS animation features in the context of image sprites.

Let's say that we want to animate the image in Figure 4. It is a frame by frame shot of a girl walking with arms swinging.

Figure 4. A walking girl

Code:

```
<head>
      <style>
          .sprite {
              background: url('walking.jpg') no-repeat 0 0;
              width: 97px;
              height: 124px;
              animation: varName 1s steps(4) infinite;
          }
          @keyframes varName{
              from{background-position-x:0px;}
              to{background-position-x:-405px;}
          }
      </style>
</head>
<body>
      <div class="sprite"></div>
</body>
```

Code explanation:

Let us focus on this line of code under the `.sprite` selector:

```
animation: varName 1s steps(4) infinite;
```

- `animation` – a CSS selector that has four values
- **`varName`** – a variable name to be used later for the definition of animation direction. It can be any string (use variable naming conventions you have learned in programming)
- **`1s`** – the duration of the whole animation, from beginning to end. A longer duration will lead to a "slower" animation, while a shorter duration will give a faster animation.

- **`steps(4)`** – the number inside the parenthesis is the number of frames that you have in the image sprite. In Figure 4, we have 4 frames.
- **`infinite`** – the number of iterations for the animation. The value **`infinite`** means to loop the animation. A numerical value means to loop the animation for that set number of times.

```
@keyframes varName{
    from{background-position-x:0px;}
    to{background-position-x:-405px;}
}
```

The second part of the CSS code is the animation rule. Notice the use of `varName` as a selector.

- `from{background-position-x:0px;}` states the beginning of the animation.
- `to{background-position-x:-405px;}` states the ending of the animation. **`-405px`** means that the animation will move 405 pixels to the right. 405 pixels is the whole width of the image in Figure 4. If you want to animate all the frames in an image sprite, set the value for this property to the width of the whole image (with a negative sign).

To view the animation for Figure 4, copy-paste the code on a text editor, save it as an HTML file, and open the HTML file in your browser. Feel free to experiment with the animation values to create more effects on the animation.

NAVIGATE

Time allotment: 12 minutes

This is a non-graded activity.

Notice that there are two sets of icons in the image sprite for social media icons – the colored versions and the greyed-out versions.

For this exercise, select one social media icon and create a link that leads to the homepage of that website. The link should not be a text, instead, the clickable area of the link should be a div tag containing the image of the icon of the selected website. When the user hovers over the link, the colored icon will become the greyed-out version.

For a copy of the icons image and the walking girl, you may download from the repository below:

Google Drive Folder
https://drive.google.com/drive/folders/1k2nqM4h7LSAj7C_SICWKZF3takyJpYw9?usp=sharing

Sample output:

Normal link → 

Upon hover →

Clue: Use the concept of link states that we have learned in the previous modules.

KNOT

Time allotment: 1 minute

Web pages can reach large file sizes because of images and other graphical components. To reduce the number of separate files that could result in multiple client requests, images are combined into a single, bigger image. A single image only requires one client request for the web page to load all images. This single image composed of multiple images is called an **image sprite**.

The needed images are displayed by defining the portion of the image sprite that contains the image.

REFERENCES

Coyier, C. (2017). Css sprites: what they are, why they're cool, and how to use them | css-tricks. *CSS-Tricks.* https://css-tricks.com/css-sprites/.

CSS Animations. (n.d.). https://www.w3schools.com/css/css3_animations.asp

CSS Image Sprites. (n.d.). https://www.w3schools.com/css/css_image_sprites.asp

Images used:

Social media icons - https://icon-library.com/icon/icon-sprite-26.html
Walking girl - https://www.iconspng.com/image/68214/walking-girl-2-sprite-sheet
Flying bird - https://www.kissclipart.com/sprite-clipart-sprite-animation-clip-art-x2wcec/

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