CSS Transforms, Transitions, and Animation Basics

WordCamp Northeast Ohio 2016

Beth Soderberg | @bethsoderberg

What is a transform?

"to change in form, appearance, or structure; metamorphose"

- Dictionary.com

“The CSS transform property lets you modify the coordinate space of the CSS visual formatting model. Using it, elements can be translated, rotated, scaled, and skewed according to the values set.”

- Mozilla Developer Network

Transforms: Syntax

No Transforms

```
transform: none;
```

One Transform

```
transform: transform-function;
```

Multiple Transforms

```
transform: transform-function transform-function transform-function;
```

Transform Functions

- Rotate
- Scale
- Skew
- Translate
- ... and Matrix

Rotate

Rotates an element clockwise from its current position. Counter clockwise rotations can be achieved by using negative values.

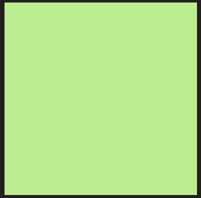
Rotate: Syntax

```
transform: rotate(angle);
```

* angles are expressed as (5deg) or (-5deg), for example.

Examples

Box



```
<div class="box"></div>
```

```
.box {
  width: 3em;
  height: 3em;
  background: #bced91;
}
```

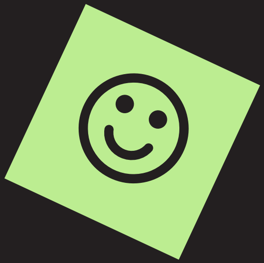
Box with Smiley

```
<div class="box"><i class="fa fa-smile-o"></i></div>
```

```
.box .fa {
  font-size: 2em;
  line-height: 1.45em;
  text-align: center;
  color: #000000;
}
```

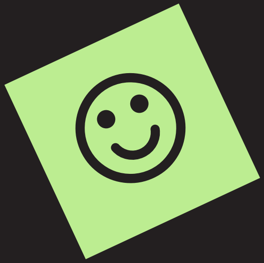
Rotate: Examples

Rotate 25 Degrees to the Right



```
.box {
  transform: rotate(25deg);
}
```

Rotate 25 Degrees to the Left



```
.box {
  transform: rotate(-25deg);
}
```

Scale

Scales an element relative to its original size. The values specified within scale transforms are unitless and should be thought of as a multiplier.

Scale: Syntax

X and Y axis Scale

```
transform:  scale(valueX, valueY);
```

* if only valueX is specified, valueY is assumed to be equal to valueX

Just X axis Scale

```
transform:  scaleX(valueX);
```

Just Y axis Scale

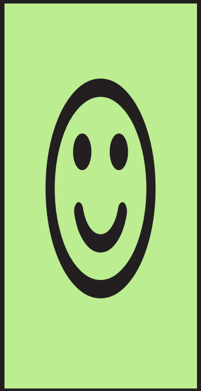
```
transform:  scaleY(valueY);
```

Scale: Examples

Shrink to half size

```
.box {
  transform: scale(0.5);
}
```

Double Y Axis



```
.box {
  transform: scale(1, 2);
}
```

Skew

Skews an element along the X and/or Y axis by an angle value.

Skew: Syntax

X and Y axis Skew

```
transform:  skew(angleX, angleY);
```

* do not use

Just X axis Skew

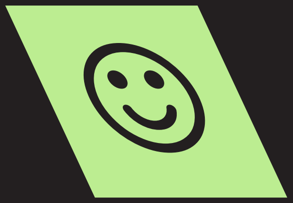
```
transform:  skewX(angleX);
```

Just Y axis Skew

```
transform:  skewY(angleY);
```

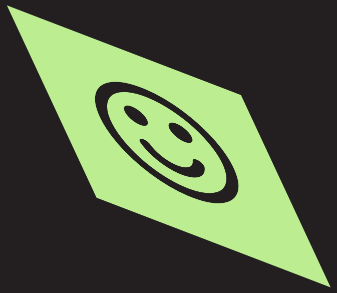
Skew: Examples

Skew left



```
.box {
  transform: skewX(25deg);
}
```

Skew left and up



```
.box {
  transform: skewX(25deg) skewY(25deg);
}
```

Translate

Moves an element vertically and/or horizontally relative to its current position. Positive values will move the element right on the X axis or down on the Y axis. Conversely, negative values will move the element left on the X axis or up on the Y axis. Any regular length value can be used (px, em, etc.).

Translate: Syntax

X and Y axis translation

```
transform:  translate(valueX, valueY);
```

Just X axis translation

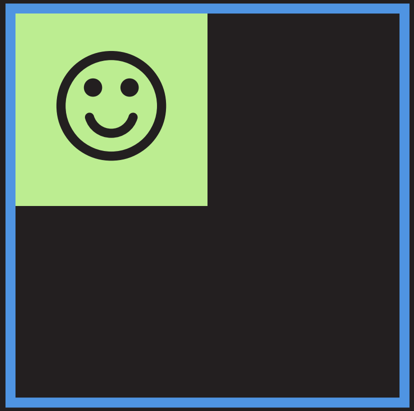
```
transform:  translateX(valueX);
```

Just Y axis translation

```
transform:  translateY(valueY);
```

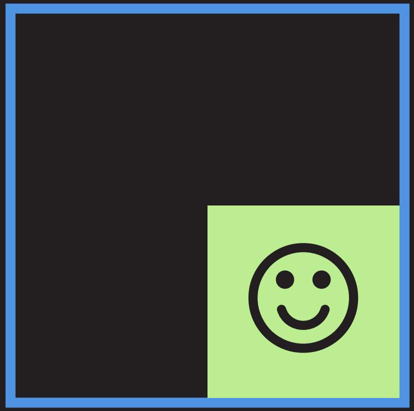
Translate: Example

Starting Point



```
.box-wrap {
  width: 6em;
  height: 6em;
  border: 5px solid #282828;
}
```

Move Box to Bottom Right



```
.box {
  transform: translate(3em, 3em);
}
```

Why would you use translate when you can use more established CSS standards for layout and formatting?

Think of translate as a more efficient way to move placement in a transition or animation.

Transform Origin

A CSS property that defines the point from which a CSS transform is applied to an element. By default, transform-origin is set to the center of an element (50% 50%).

Transform Origin Syntax

```
transform-origin: x-offset y-offset;
```

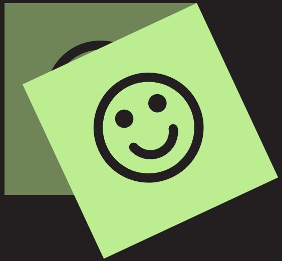
x-offset: a length or percentage from the left edge of the element's box.
y-offset: a length or percentage from the top edge of the element's box.

Accepted keywords

- left (0%)
- center (50%)
- right (100%)
- top (0%)
- bottom (100%)

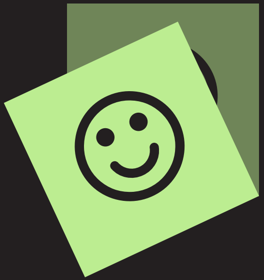
Transform Origin: Examples

Rotate 25 Degrees to the Left & Transform Origin at Top Right



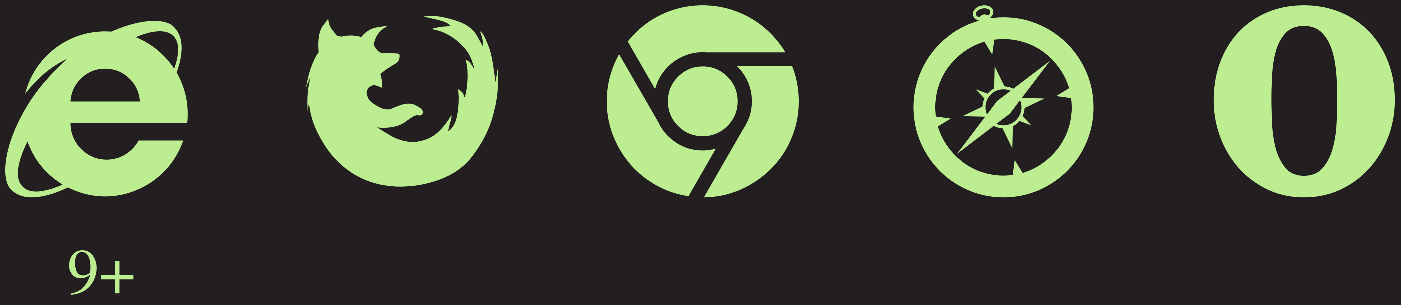
```css
.box {
  transform: rotate(-25deg);
  transform-origin: 100% 0%;
}
```

Rotate 25 Degrees to the Left & Transform Origin at Bottom Right



```css
.box {
  transform: rotate(-25deg);
  transform-origin: right bottom;
}
```

Transforms: Browser Support



NOTE: 3d transforms are coming and can be used in a lot of browsers now, but they are only partially supported in IE11.

Prefix Requirements

- -ms-
- -webkit-

What is a transition?

"movement, passage, or change from one position, state, stage, subject, concept, etc., to another; change"

- Dictionary.com

“The transition property is a shorthand property used to represent up to four transition-related longhand properties [that] allow elements to change values over a specified duration, animating the property changes, rather than having them occur immediately.”

- CSS Tricks

Transition Properties

- transition-property
- transition-duration
- transition-timing-function
- transition-delay

Transitions: Syntax

Shorthand

```
transition: property duration timing-function delay;
```

Longhand

```
transition-property: property;
transition-duration: duration;
transition-timing-function: timing-function;
transition-delay: delay;
```

Transition Property

Specifies which property or properties will be impacted by the transition.

Syntax

```
transition-property: value;
```

Accepted Values

- all (default)
- none
- single property name
- multiple property names, separated by commas

Transitions: Example Stage 1

Transition Property Only

Starting State

```
.box {
  transition-property: color, background-color, width;
  color: #000000;
  background-color: #bced91;
  width: 3em;
}
```

Active State

```
.box:hover {
  color: #FFFFFF;
  background-color: #4f94e2;
  width: 3.6em;
}
```

Transition Duration Property

Specifies the amount of time the transition will take.

Syntax

```
transition-duration: value;
```

Accepted Values

- time in seconds (s) or milliseconds (ms)
- multiple time values, separated by commas
- initial
- inherit

Transitions: Example Stage 2

Transition Property + Duration

Starting State

```css
.box {
  transition-property: color, background-color, width;
  transition-duration: 2s;
  color: #000000;
  background-color: #bced91;
  width: 3em;
}
```

Active State

```css
.box:hover {
  color: #FFFFFF;
  background-color: #4f94e2;
  width: 3.6em;
}
```

Transition Timing Property

Specifies the pace at which the transition will run.

Syntax

```
transition-timing-function:  value;
```

Accepted Values

- ease
- linear
- ease-in
- ease-out
- ease-in-out

step-start

step-end

custom cubic Bézier curve value

custom stepping function value

For an in-depth explanation of the transition timing property, check out this article: http://www.the-art-of-web.com/css/timing-function/

Transitions: Example Stage 3

Transition Property + Duration + Timing

Starting State

```css
.box {
  transition-property: color, background-color, width;
  transition-duration: 2s;
  transition-timing-function: ease-in;
  color: #000000;
  background-color: #bced91;
  width: 3em;
}
```

Active State

```css
.box:hover {
  color: #ffffff;
  background-color: #4f94e2;
  width: 3.6em;
}
```

Transition Delay Property

Specifies when the transition will start relative to the instant the property value changes.

Syntax

```
transition-delay: value;
```

Accepted Values

- time in seconds (s) or milliseconds (ms)
- multiple time values, separated by commas
- initial
- inherit

Transitions: Example Stage 4

Transition Property + Duration + Timing + Delay

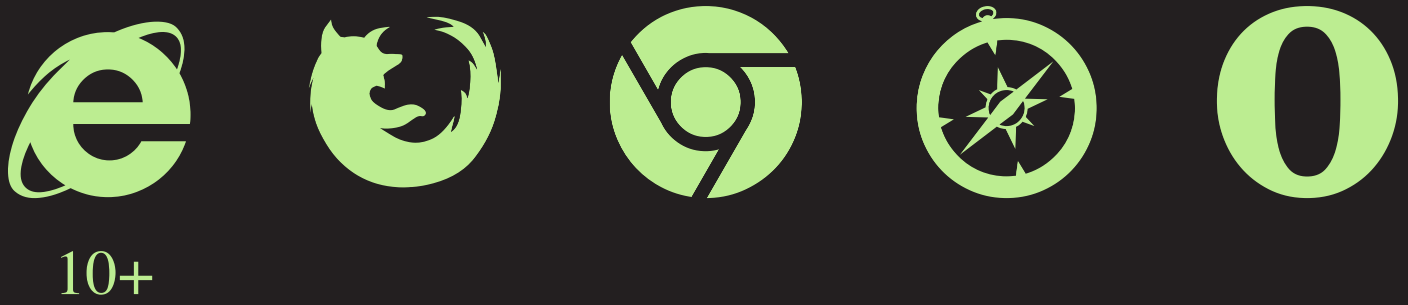
Starting State

```css
.box {
  transition-property: color, background-color, width;
  transition-duration: 2s;
  transition-timing-function: ease-in;
  transition-delay: 3s;
  color: #000000;
  background-color: #bced91;
  width: 3em;
}
```

Active State

```css
.box:hover {
  color: #FFFFFF;
  background-color: #4f94e2;
  width: 3.6em;
}
```

Transitions: Browser Support



Prefix Requirements

- -webkit-

What is an animation?

"the state or condition of being animated"

"containing representations of animals or mechanical objects that appear to move as real ones do"

- Dictionary.com

“A way for authors to animate the values of CSS properties over time, using keyframes. The behavior of these keyframe animations can be controlled by specifying their duration, number of repeats, and repeating behavior.”

- W3C Draft Specification

Animation: Keyframes

Keyframes establish the behavior of an animation over time.

Required Properties

- animation-duration
- animation-name

Optional Properties

- animation-timing-function
- animation-delay
- animation-iteration-count
- animation-direction
- animation-fill-mode
- animation-play-state

Animation: Animation Duration Property

Specifies the length of time one cycle of the animation will take.

Syntax

```
animation-duration: value;
```

Accepted Values

- Time in seconds (s) or milliseconds (ms)

Animations: Animation Name Property

Specifies the animation/s that should be applied to the CSS element.

Syntax

```
animation-name: [custom-value];
```

Accepted values

- Custom string with no spaces

Animations: Animation Interation Count Property

Specifies the number of times the animation cycle should run.

Syntax

```
animation-iteration-count: value;
```

Accepted values

- a number
- infinite
- initial
- inherit

Animation: Syntax to Call Animation

```
.element {
  animation-duration: value;
  animation-name: custom-value;
}
```

*Optional animation properties would be included in the same code block as animation-duration and animation-name.

Animation: Keyframes Syntax

```
@keyframes animation-name {
  keyframe-location {
    css-properties;
  }
  keyframe-location {
    css-properties;
  }
}
```

animation name: the animation-name string from your CSS

keyframe location: waypoint of the animation

Can either be percentages between 0-100% or in the case of animations with only two waypoints, the keywords “from” and “to.”

CSS properties: the CSS properties that change throughout the animation. Not all CSS properties are “animatable.”

A detailed list of which properties are and are not able to be animated is located here: https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_animated_properties

Animations: Example

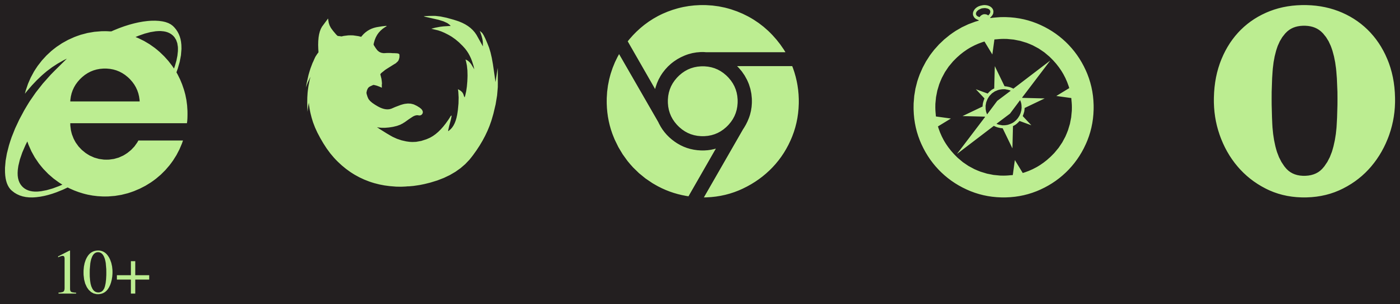
```css
.box {
  animation-duration: 1s;
  animation-name: zoom-pulse;
  animation-iteration-count: infinite;
}

@keyframes zoom-pulse {
  0% { transform: rotate(-9deg) scale(0.8); }
  17% { transform: rotate(-3deg) scale(1); }
  34% { transform: rotate(3deg) scale(1.2); }
  51% { transform: rotate(9deg) scale(1.4); }
  68% { transform: rotate(3deg) scale(1.2); }
  85% { transform: rotate(-3deg) scale(1); }
  100% { transform: rotate(-9deg) scale(0.8); }
}
```

Animations: Default Animation Property Values

```
animation-name: none;
animation-duration: 0s;
animation-timing-function: ease;
animation-delay: 0s;
animation-iteration-count: 1;
animation-direction: normal;
animation-fill-mode: none;
animation-play-state: running;
```

Keyframe Animations: Browser Support



Prefix Requirements

- -webkit-

Where to Learn More

W3C Working Drafts

Transforms: http://www.w3.org/TR/css3-2d-transforms/
Transitions: http://www.w3.org/TR/css3-transitions/
Animations: http://www.w3.org/TR/css3-animations/

Books

Animation in HTML, CSS, and JavaScript, Kirupa Chinnathambi
Learning CSS3 Animations and Transitions, Alexis Goldstein

Blog Posts

http://bethsoderberg.com/blog/dynamic-css/

Thank you!

@bethsoderberg

bethsoderberg.com

http://bethsoderberg.com/slides/2016/wordcamp-northeast-ohio/index.html#/