Transitions, Transformations & Animations

WEB DEVELOPMENT FUNDAMENTALS

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Overview of Transitions

- CSS3 allows you to define transitions for property changes
  - E.g. when a user hovers over an element, change its size to XXX over a period of YYY
  - The transition kicks in automatically on the property value changes
- To define a simple transition in a CSS rule:
  - Set the **transition** property
  - Specify the property to vary and the duration of the transition

```
someCssRule {
  …
  transition: aProperty duration;
}
```

- Note:
  - You must use vendor-specific extensions for some browser versions

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Types of Values that Support Transitions

- The following types of values support transitions:
  - Colour
  - Length
  - Percentage
  - Integer
  - Real number
  - Rectangle
  - Visibility
  - Shadow
  - Gradient
  - Transform list

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Properties that Support Transitions

- There is a wide range of CSS3 properties that support transitions, including the following:
  - Colours
  - Backgrounds
  - Locations and dimensions
  - Border, margin, and padding dimensions
  - Font properties
  - Visibility

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Simple Transition Example

- Define a transition for the width of a element
  - Example: SimpleTransition.html

```
#myPanel {
  …
  transition:         width 3s;
  -ms-transition:     width 3s;
  -webkit-transition: width 3s;
  -moz-transition:    width 3s;
  -o-transition:      width 3s;
}
#myPanel:hover {  width: 300px;}
```

```
<div id="myPanel"></div>
```

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Defining Multiple Transitions

- The transition property can specify multiple transitions
  - Specify a comma separated list of property names and durations
  - Example: MultipleTransitions.html

```
#myPanel {
  background-color: yellow;
  width:  200px;
  height: 100px;
  transition: background-color 4250ms, width 1s, height 1s;
}
#myPanel:hover {
  background-color: red;
  width:  300px;
  height: 150px;
}
```

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Setting Transition Properties Individually

- There are several detailed properties that you can set to control every aspect of a transition…
  - transition-property
  - transition-duration
  - transition-timing-function
  - transition-delay
  - transition (shorthand property for the 4 properties above)
- Example: DetailedTransitions.html

```
#myPanel {
  …
  transition-property: width, height, background-color;
  transition-duration: 1s, 1s, 5s;
  transition-timing-function: ease-in-out;
  transition-delay: 0s, 0s, 1s;
}
```

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2D Transformations

- CSS3 supports 2D transforms (and 3D transforms - see later)
  - Enables elements rendered by CSS to be transformed in 2D space
- To define a transformation in a CSS rule:
  - Set the **transform** property
  - Optionally, set the **transform-origin** property

```
someCssRule {
  …
  transform: transformation-function(s);
  transform-origin: horizPosition vertPosition;

}
```

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Translations (1 of 2)

- To translate an element, use one of these CSS functions:

```
translate(tx, [ty])
```

```
translateX(tx)
```

```
translateY(ty)
```

- Example:

```
someCssRule {
  transform: translate(400px, 20px);
}
```

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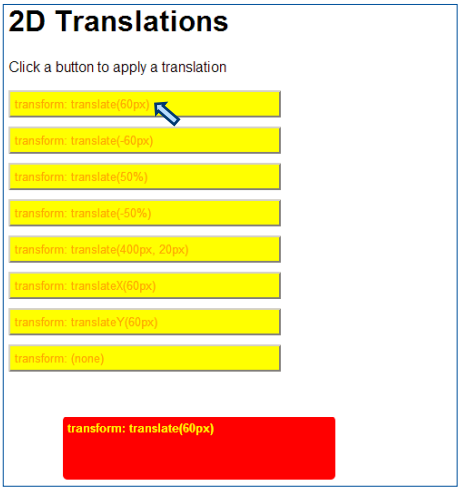
Translations (2 of 2)

- Demonstration:
  - 2DTranslations.html



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Scaling (1 of 2)

- To scale an element, use one of these CSS functions:

```
scale(sx, [sy])
scaleX(sx)
scaleY(sy)
```

- Example:

```
someCssRule {
  transform: scale(0.75, 2.0);
}
```

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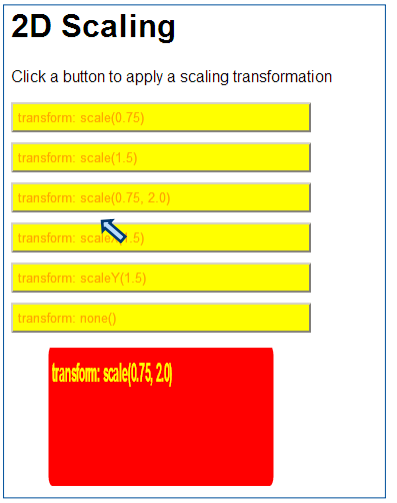
Scaling (2 of 2)

- Demonstration:
  - 2DScaling.html



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Rotations (1 of 2)

- To rotate an element, use the following CSS function:

```
rotate(angle)
```

- Example:

```
someCssRule {
  transform: rotate(45deg);
}
```

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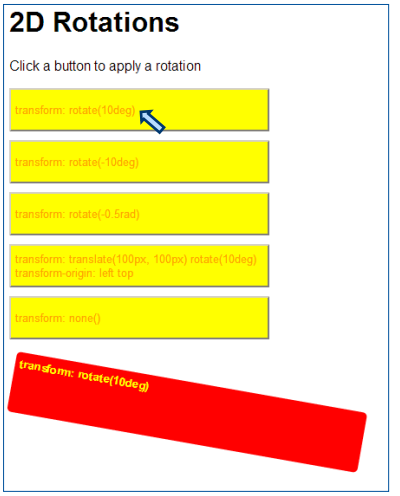
Rotations (2 of 2)

- Demonstration:
  - 2DRotations.html



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Skewing (1 of 2)

- To skew an element, use one of these CSS functions:

```
skew(ax, [ay])
skewX(ax)
skewY(ay)
```

- Example:

```
someCssRule {
  transform: skew(-15deg);
}
```

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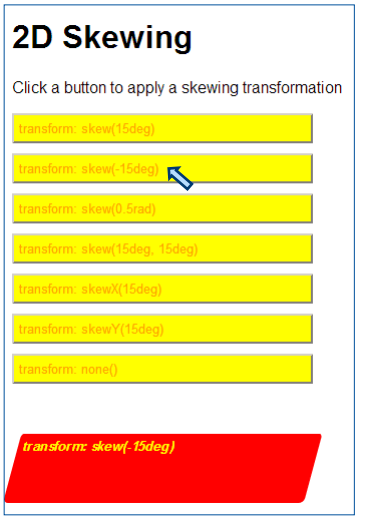
Skewing (2 of 2)

- Demonstration:
  - 2DSkewing.html



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Applying Transitions to Transformations (1 of 2)

- You can apply transitions to transformations
  - Set the CSS **transition** property
  - Specify **transform** as the target CSS property
- Example:

```
someCssRule {
  transition: transform 3s;
  …
```

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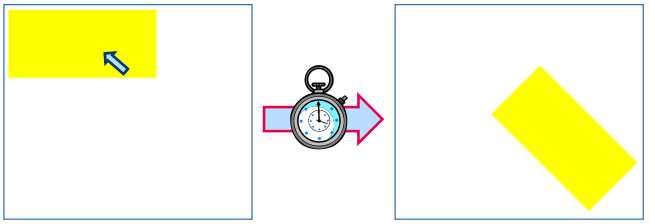
Applying Transitions to Transformations (2 of 2)

- Demonstration:
  - TransformTransition.html

```
#myPanel {
  …
  transition: transform 3s;
}
#myPanel:hover {  transform: rotate(45deg) translateX(200px);}
```



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3D Transformations (1 of 3)

- CSS3 supports 3D transformations
  - Via a set of additional 3D functions for the **transform** property
  - Similar to their 2D equivalents
- 3D translation functions:

```
translate3d(tx, [ty], [tz])
```

```
translateZ(tz)
```

- 3D scaling functions:

```
scale3d(sx, [sy], [sz])
```

```
scaleZ(sz)
```

- 3D rotation function:

```
rotate3d(xnum, ynum, znum, angle)
```

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3D Transformations (2 of 3)

- For 3D transformations, you should specify a perspective
  - Defines the disappearing point, to give the effect of depth in the Z axis
  - Either call the **perspective()** function in every 3D transformation

```
someCssRule {
  transform: translateZ(-100px) perspective(400px);
  …
```

  - Or set the perspective CSS property for the parent element

```
someCssRule {
  perspective: 400px;
  …
```

- You can also specify the perspective origin

```
someCssRule {
  perspective-origin: -100px -50px;
  …
```

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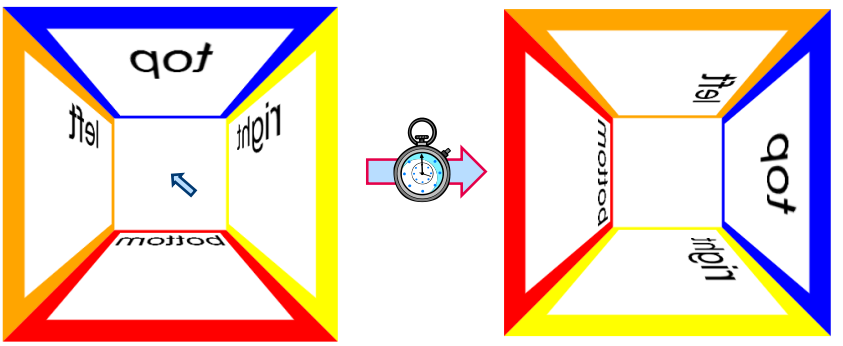
3D Transformations (3 of 3)

- Demonstration:
  - 3DTransformations.html



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Key Frame Transitions (1)

- @keyframes allows more sophisticated animation
  - First define the animation

```
@keyframes YOUR-ANIMATION-NAME
   {
       0%   { opacity: 0; }
       50%  { opacity: 0.5;}
       100% { opacity: 1; }
   }
```

- Then apply the animation against a selector:

```
#box {
   animation: YOUR-ANIMATION-NAME 5s infinite;
 }
```

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Key Frame Transitions (2)

- The animation can be refined using additional properties

```
#box.animate {
   animation-name: YOUR-ANIMATION-NAME;
   animation-duration: 10s;
   animation-timing-function: ease;
   animation-iteration-count: 1;
   animation-direction: normal;
   animation-delay: 5s;
   animation-play-state: running;
}
```

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Review

- CSS3 Transitions
  - Overview of Transitions
  - Types of Values that Support Transitions
  - Properties that Support Transitions
  - Defining Multiple Transitions
  - Setting Transition Properties Individually
- CSS3 2D Transformations
  - Translations
  - Scaling
  - Rotations
  - Skewing
- Additional Techniques
  - Applying Transitions to Transformations
  - 3D Transformations

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Exercise

- Creating a CSS driven roll over
- Creating a navigation system using CSS3

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