

CSS Transform & Animation - Detailed Notes

1. CSS Transform

The transform property in CSS allows you to visually manipulate an element by rotating, scaling, skewing, or translating. It doesn't affect the document flow, meaning it won't disturb the surrounding elements.

- 1 `translate(x, y)`: Moves the element along the X and Y axes.
- 2 `scale(x, y)`: Resizes the element. Values >1 enlarge, values <1 shrink.
- 3 `rotate(angle)`: Rotates the element around its center. Supports deg, rad, turn.
- 4 `skew(x-angle, y-angle)`: Skews the element along the X and/or Y axis.
- 5 `matrix()`: A combination of transforms in a single function.
- 6 `transform-origin`: Defines the point of origin for the transform (default: center).

2. CSS Transition

Transitions allow smooth changes between property values over a given duration. They are triggered by user actions like hover, focus, or click.

- 1 `transition-property`: Specifies which property to animate (e.g., color, transform).
- 2 `transition-duration`: How long the transition lasts (e.g., 2s, 500ms).
- 3 `transition-timing-function`: Defines the speed curve of the transition (ease, linear, ease-in, ease-out, ease-in-out, cubic-bezier).
- 4 `transition-delay`: Adds a delay before the transition starts.
- 5 Shorthand: `transition: property duration timing-function delay;`

3. CSS Animation

Animations allow elements to move or change style continuously or repeatedly using keyframes.

- 1 `@keyframes`: Defines the animation sequence with percentage steps or from/to.
- 2 `animation-name`: The name of the @keyframes to use.
- 3 `animation-duration`: How long one cycle of the animation lasts.
- 4 `animation-iteration-count`: How many times the animation repeats (number or infinite).
- 5 `animation-direction`: Defines whether animation runs forward, backward, or alternate (normal, reverse, alternate, alternate-reverse).
- 6 `animation-timing-function`: Defines acceleration/slowdown (ease, linear, steps(n)).
- 7 `animation-delay`: Time before animation starts.
- 8 `animation-fill-mode`: Defines how styles are applied before/after execution (none, forwards, backwards, both).
- 9 Shorthand: `animation: name duration timing-function delay iteration-count direction fill-mode;`

4. Common Transform & Animation Effects

- 1 Spinner: Uses border + rotate keyframes.
- 2 Bouncing Ball: Uses translateY with ease-in-out alternate.
- 3 Sliding Text: Uses translateX keyframes for marquee effect.
- 4 Button Pulse: Uses scale transform with animation loop.
- 5 Fade In/Out Box: Uses opacity animation.
- 6 Hover Zoom Image: Uses transform: scale().
- 7 Card Tilt: Uses rotate + skew on hover.
- 8 Navbar Underline Animation: Uses ::after with width transition.