**Why Performance Optimization is Important in Responsive Design**

A slow site frustrates users and loses conversions, especially on mobile.

* **53% of mobile users** abandon sites that take >3 seconds to load.
* Google ranks faster sites higher (Core Web Vitals).
* Performance = better UX, SEO, and accessibility.

**How to Optimize Images and Make Them Responsive**

**1. Choose the Format**

* Use **WebP** or **AVIF** for modern browsers.
* Use **JPEG** or **PNG** as fallbacks for compatibility.

**2. Use the <picture> Element**

Lets the browser choose the best image for the device:

<picture>

<source srcset="img/hero.webp" type="image/webp" />

<img src="img/hero.jpg" alt="Hero image" loading="lazy" />

</picture>

**3. Responsive srcset**

Serve different sizes for different viewports:

<img

src="img-large.jpg"

srcset="img-small.jpg 480w, img-medium.jpg 800w, img-large.jpg 1200w"

sizes="(max-width: 600px) 480px, 800px"

alt="A scenic view"

loading="lazy"

/>

**4. Lazy Load**

Defers offscreen images:

<img src="..." loading="lazy" />

**Minification and Concatenation**

**Minification**

Removes whitespace, comments, and shortens variable names.

* **Tools**: Terser (JS), cssnano (CSS), HTMLMinifier
* Built-in with bundlers like **Webpack**, **Vite**, **Parcel**

**Concatenation**

Combines multiple JS/CSS files into fewer requests.

* Reduces HTTP requests → faster load time
* Use tree shaking to eliminate dead code (ES Modules)