**Case Study 1: SEO Audit of GeeksforGeeks**

**Objective:**

* To evaluate the **technical SEO performance** of **GeeksforGeeks.org** using Google PageSpeed Insights and Core Web Vitals. The study aims to identify strengths, weaknesses, and provide recommendations for better **mobile & desktop performance**, user experience, and SEO visibility.

**Core Web Vitals Assessment:**

✅ **Passed**

* **Largest Contentful Paint (LCP):** 2.4s → Good (≤ 2.5s).
* **Interaction to Next Paint (INP):** 54ms → Excellent (≤ 200ms).
* **Cumulative Layout Shift (CLS):** 0 → Excellent (≤ 0.1).

**Other Notable Metrics:**

| **Metric** | **Value** | **Status** | **Observation** |
| --- | --- | --- | --- |
| **First Contentful Paint (FCP)** | 2.4s | Needs Improvement | Slightly slower than ideal (≤ 1.8s) |
| **Time to First Byte (TTFB)** | 0.8s | Good | At threshold, can be optimized further |
| **Performance Score** | 91 | Good | Near optimal |
| **Accessibility Score** | 92 | Good | Small improvements possible |
| **Best Practices Score** | 96 | Excellent | Secure setup and optimized |
| **SEO Score** | 100 | Excellent | Fully SEO-compliant |

**Strengths:**

* Core Web Vitals **passed** (Good LCP, INP, CLS).
* **Excellent SEO compliance** (100/100).
* Good use of **responsive design** and semantic HTML.
* Desktop version loads extremely fast (FCP = 0.5s, LCP = 1.7s, CLS = 0).

**Weaknesses:**

* **Images not optimized** → Larger than needed, can reduce load by ~80KB+.
* **Unused JavaScript** (~354KB) increases page size.
* **Unused CSS** (~20KB) present.
* **Legacy JavaScript polyfills** increase overhead.
* **Accessibility gaps** → Poor contrast in some areas, touch targets not optimal.
* **FCP on mobile (2.4s)** slower than recommended.

**Recommendations:**

* **Optimize Images** → Convert heavy PNG/JPEG to **WebP/AVIF**, use responsive sizing.
* **Reduce Unused JavaScript & CSS** → Clean code, defer non-critical scripts.
* **Lazy Load Media** → Defer below-the-fold images/videos.
* **Font Optimization** → Use font-display: swap to avoid invisible text delays.
* **Preconnect to Origins** → Especially for **media.geeksforgeeks.org** and Google Fonts.
* **Improve Accessibility** → Fix low contrast, enlarge touch targets.

**Conclusion:**

* GeeksforGeeks demonstrates **excellent desktop SEO performance** and passes **Core Web Vitals** on both mobile and desktop. However, improvements in **image optimization, unused scripts, and accessibility** can push the **performance score above 95+ consistently**, enhance **mobile UX**, and ultimately strengthen **organic visibility**.

**Below Are The Snapshots(Screenshots) Provided:**





































