

Title Page
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Introduction to Web and Database Concepts
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1. Introduction

I have written this report to pick apart the design, self-coded implementation, and critical evaluation and analysis of “The Silicon Wars”, website - a responsive three-page educational website I built entirely from scratch using raw HTML5 and CSS. The website I created covers in depth the 2026 PC hardware battles between Intel, AMD, and Nvidia in the CPU and GPU markets, focused on gaming market segments.

This report aims to cover the full development process, the testing and validation results I obtained, and a structured evaluation of usability, accessibility, and Search Engine Optimisation (SEO), including a live-site comparison with well recognised sites. The report demonstrates that the site I made conforms and adheres to longstanding established web standards and best rule-of-thumb practices while identifying opportunities for future enhancement.

2. Requirements

“The Silicon Wars” is an informative website aimed at PC enthusiasts, gamers, and computer hardware hobbyists. Its purpose is to clearly explain the ongoing fierce competition between Intel, AMD, and Nvidia, comparing key 2026 products, performance differences, and useful tips for PC builders, to offer informed insights for their upcoming builds.

Subject matter: Current CPU and GPU “wars” — AMD Ryzen Zen 5/X3D vs Intel Core Ultra, and Nvidia RTX 50-series (ray tracing/DLSS) vs AMD RDNA 4 (rasterization/value).

Target audience: I anticipate that tech-savvy users aged 18–50 who follow hardware news, build or upgrade PCs, have a gaming PC hobby or those studying computer science/IT. The tone is engaging yet accessible, using real-world benchmarks, facts, and builder-focused takeaways.

3. Implementation

My website comprises of three interlinked pages using semantic HTML5, a shared external CSS stylesheet, and relative linking for standalone functionality:

- 1) index.html – Home page (overview of the Silicon Wars)
- 2) cpu.html – The CPU War (Intel vs AMD focus)
- 3) gpu.html – The GPU War (Nvidia vs AMD focus)

All pages feature a consistent dark-themed header with navigation, semantic markup (`<header>`, `<nav>`, `<main>`, `<section>`, `<footer>`), responsive images via the `.responsive-img` class, and internal “Back to top” anchors.

No WYSIWYG tools like Dreamweaver were used — the entire site was hand-coded.

Screenshots of completed pages:

Figure 1: Home page (*index.html*)



Figure 2: CPU War page (*cpu.html*)

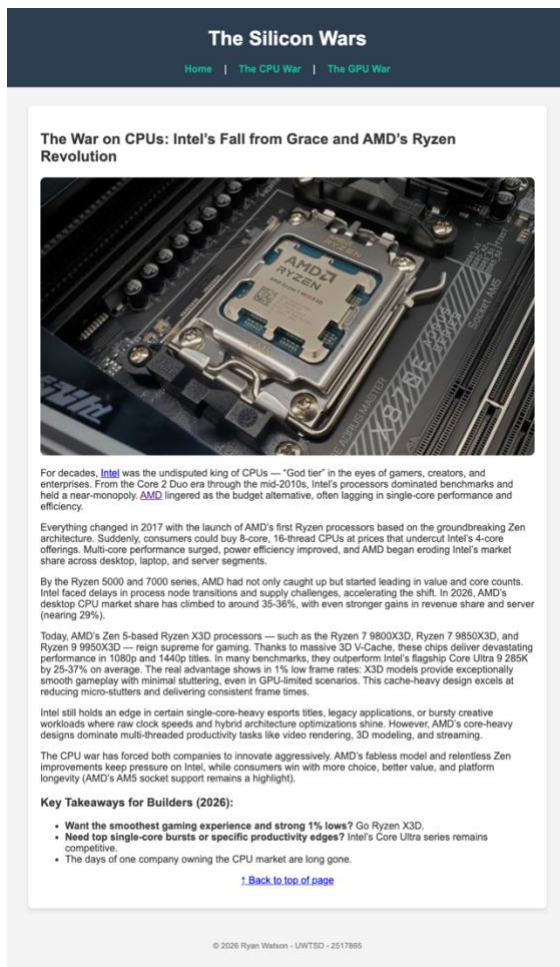
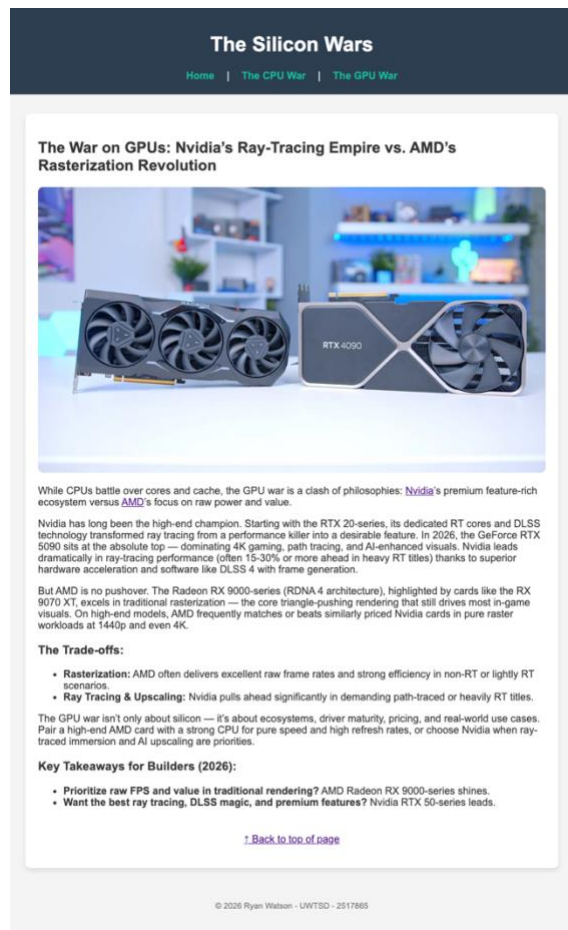


Figure 3: GPU War page (*gpu.html*)



HTML (index.html only – W3C Markup Validator):

HTML (index.html only): The home page was validated using the W3C Markup Validation Service. An initial validation attempt produced a non-critical error related to the external stylesheet (*style.css*) due to the validator being unable to access local files (*file://localhost/style.css: Operation not permitted*).

To obtain an accurate validation, the stylesheet link was temporarily commented out and the HTML was re-validated by direct input. The page then passed with **0 errors and 0 warnings**. All three pages use correct DOCTYPE, *lang="en"*, semantic elements, properly closed tags, and valid attributes. No repeated errors occurred.

CSS (style.css – W3C CSS Validator): The stylesheet passes with no major errors.



(close the img tag with > instead of /> if using HTML <= 4.01)

4. Evaluation

a. Research into usability, accessibility, and SEO

Usability is the extent to which a website can be used by specified users to achieve specified goals with effectiveness, efficiency, and user-satisfaction. It is fairly central to user retention and task success in web development.

A 2025 peer-reviewed study by Eluru et al. developed and usability-tested a web-based research guide for health-solutions grant writing.

Six faculty members completed nine tasks; the guide achieved a 100% task success rate and an “Excellent” System Usability Scale (SUS) score of 89.2.

Key findings that came from the study emphasised that chronological organisation, templating, and feedback mechanisms significantly improved efficiency and satisfaction of an end user [1].

Accessibility ensures websites are usable by people who have disabilities and follows WCAG 2.1 principles (Perceivable, Operable, Understandable, Robust). It is essential for inclusive design and legal compliance.

A 2023 systematic literature review by Ara et al. examined web accessibility evaluation processes (2010–2021) and found that, alarmingly, most university and government sites still fail WCAG compliance, with frequent issues in text alternatives to cater for those with disabilities, keyboard navigation, and colour contrast. The study concluded that hybrid (automated + manual) evaluation using tools such as WAVE and AChecker is vital in order to meet some or all of those WCAG indicators [2].

Usability affects the user experience, and often is the main factor in whether a visitor will stay on the site to navigate to other pages, or alternatively losing interest and patience with the way site appears or accessed.

Search Engine Optimisation (SEO) involves on-page techniques that improve visibility and ranking in search engines. Search engines index sites based on metadata and depending on how optimized the phrases are, translates to how far down the search results a webpage may appear. SEO includes meta tags, headings, alt text, and quality content.

A 2024 peer-reviewed study by Ahmad et al. investigated SEO strategies for online brand positioning and found strong positive correlations ($r > 0.70$, $p < 0.05$) between comprehensive on-page SEO and improved website performance/persistence in search rankings [3].

b. Evaluation of my completed website

Usefulness (usability and utility): The site I created is highly functional with intuitive top navigation, internal links, and anchor navigation for visitors to easily head back to the top. Content is informative, relevant to the subject matter, up-to-date, and structured with clear headings and bullet takeaways to summarise key points for people browsing for quick answers. The dark theme and responsive images provide a modern look-and-feel that is easy to scan on both desktop and mobile. Ease of use is excellent for the target audience.

Recommendations: Add interactive benchmark comparison tables (using CSS Grid) and a simple newsletter sign-up form to increase utility and engagement.

Search Engine Optimisation (SEO):

Some on-page techniques I applied include:

- Unique, descriptive ``<title>`` and meta description/keywords on every page to ensure relevancy when being indexed by a search engine.
 - Semantic heading hierarchy (``<h1>`` for main title, ``<h2>``/``<h3>`` for sections).
 - Meaningful ``alt`` attributes on all images.
 - Internal hyperlinks between the three pages, to ensure a seamless user navigation experience, and external links to manufacturer sites wherever seemed reasonable to do so.
- These elements improve crawlability and relevance for queries such as “CPU war 2026”.

Accessibility (WCAG 2.1):

The site aligns well with the four WCAG 2.1 principles [4]:

- Perceivable: Alt text on images, sufficient contrast in the dark theme, text-based content. Is easy-on-the eye and not cluttered. User can use it with little effort.
- Operable: Keyboard-focusable links, clear navigation, “Back to top” anchors allow for improved ease of use.
- Understandable: Consistent layout, using plain English with predictable navigation allows for effortless use
- Robust: Valid HTML5 (verified), semantic markup, viewport meta tag, and ``lang="en"``.

Overall, the current build’s baseline is strong; future enhancements that I could implement would be ARIA labels and explicit colour-contrast testing, but I feel the design and user experience is solidly adequate.

c. Comparison of two live websites

I chose 2 comparable technology news sites to evaluate: wccftech.com [5] & tomshardware.com [6]

<u>Area</u>	<u>Tom's Hardware (tomshardware.com)</u>	<u>Wccftech (wccftech.com)</u>	<u>Winner & Reasoning</u>
<u>Usability</u>	Clean layout, prominent search, easy navigation between reviews and news	Fast loading homepage with latest articles and leaks. Simple structure.	Tom’s Hardware – far superior presentation which allows for better readability.
<u>Accessibility</u>	Strong semantic headings, good contrast, some advertisement related issues.	Basic semantic structure, occasional contrast and alt-text and gaps	Tom’s Hardware – slightly better overall
<u>SEO</u>	Excellent meta titles, descriptive headings, keyword-rich content for hardware topics	Excellent meta titles, descriptive headings, keyword-rich content for hardware topics	Tie – both well optimised for tech searches
<u>Mobile friendliness</u>	Fully responsive design	Fully responsive with good mobile experience	Tie
<u>Conclusion</u>	I conclude that Tom's Hardware is a better site overall due to cleaner layout, better navigation and stronger usability for hardware enthusiasts. The advertisements are something that I had to take in to consideration as hosting a site that feature rich, at scale does come with unavoidable costs.		

5. References

- [1] M. Eluru et al., “Development and Usability Testing of a Web-Based Research Guide for Health Solutions Grant Writing,” **AMIA Annu. Symp. Proc.**, 2025, pp. 378–387.
- [2] J. Ara et al., “Accessibility engineering in web evaluation process: a systematic literature review,” **Univers. Access Inf. Soc.**, 2023.
- [3] U. F. Ahmad et al., “Search engine optimisation (SEO) strategy as determinants to online brand positioning,” **F1000Res.**, vol. 11, 2024.
- [4] Web Content Accessibility Guidelines (WCAG) 2.1, W3C, 2018.
- [5] Tom’s Hardware, “Tom’s Hardware – Tech Product Reviews, News and Prices,” [Online]. Available: <https://www.tomshardware.com/>. [Accessed: 17 Apr. 2026].
- [6] Wccftech, “Wccftech – Latest Tech News, Reviews and Leaks,” [Online]. Available: <https://wccftech.com/>. [Accessed: 17 Apr. 2026].

6. Appendices

Appendix A – index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <meta name="description" content="An in-depth look at the PC hardware wars between Intel, AMD, and Nvidia in 2026.">
  <meta name="keywords" content="CPU, GPU, Intel, AMD, Nvidia, PC building, Ryzen, GeForce, 2026">
  <title>The Silicon Wars | Home</title>
  <link rel="stylesheet" href="style.css">
</head>
<body>
  <header id="top-of-page">
    <h1>The Silicon Wars</h1>
    <nav>
      <a href="index.html">Home</a> |
      <a href="cpu.html">The CPU War</a> |
      <a href="gpu.html">The GPU War</a>
    </nav>
  </header>

  <main>
    <section>
      <h2>The Silicon Wars: Battle for the PC Throne</h2>

      <p>For over a decade, the PC hardware industry has been defined by fierce competition between giants. What started as <a href="https://www.intel.com" target="_blank">Intel's</a> near-total dominance in CPUs and <a href="https://www.nvidia.com" target="_blank">Nvidia's</a> commanding lead in GPUs has evolved into a full-scale war on multiple fronts. <a href="https://www.amd.com" target="_blank">AMD's</a> rise with Ryzen processors shook the CPU market, while the ongoing GPU showdown continues to drive innovation.</p>

      <p>In 2026, the battlefield is more competitive than ever. AMD's Zen 5-based Ryzen processors, especially the game-changing X3D variants, have claimed the gaming crown with unmatched 1% low frame rates and smooth gameplay. Intel fights back with strong single-core performance in select workloads. On the graphics side, Nvidia's RTX 50-series dominates ray tracing and AI upscaling, while AMD's Radeon RX 9000-series (RDNA 4) delivers blistering rasterization performance.</p>

      <p>These "wars" benefit everyone: faster hardware, lower prices, and rapid technological leaps in gaming, content creation, and efficiency. Whether you're building a high-refresh-rate gaming rig or a productivity powerhouse, the choice between Team Blue, Team Red, and Team Green has never been more interesting.</p>

      <p>Explore the CPU War and GPU War below to understand the current state of play, key benchmarks, and what it means for your next PC build.</p>
    </section>

    <p style="text-align: center;"><a href="#top-of-page">↑ Back to top of page</a></p>
  </main>

  <footer>
    <p>&copy; 2026 Ryan Watson - UWTSD - 2517865</p>
  </footer>
</body>
</html>
```

Appendix B – cpu.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <meta name="description" content="A detailed analysis of the CPU war between Intel and AMD in 2026.">
  <meta name="keywords" content="CPU, Intel, AMD, Ryzen, Core Ultra, Benchmarks, 2026">
  <title>The CPU War | Intel vs AMD</title>
  <link rel="stylesheet" href="style.css">
</head>
<body>

  <header id="top-of-page">
    <h1>The Silicon Wars</h1>
    <nav>
      <a href="index.html">Home</a> |
      <a href="cpu.html">The CPU War</a> |
      <a href="gpu.html">The GPU War</a>
    </nav>
  </header>

  <main>
    <section>
      <h2>The War on CPUs: Intel's Fall from Grace and AMD's Ryzen Revolution</h2>

      <p>For decades, <a href="https://www.intel.com" target="_blank">Intel</a> was the undisputed king of CPUs — “God tier” in the eyes of gamers, creators, and enterprises. From the Core 2 Duo era through the mid-2010s, Intel’s processors dominated benchmarks and held a near-monopoly. <a href="https://www.amd.com" target="_blank">AMD</a> lingered as the budget alternative, often lagging in single-core performance and efficiency.</p>

      <p>Everything changed in 2017 with the launch of AMD’s first Ryzen processors based on the groundbreaking Zen architecture. Suddenly, consumers could buy 8-core, 16-thread CPUs at prices that undercut Intel’s 4-core offerings. Multi-core performance surged, power efficiency improved, and AMD began eroding Intel’s market share across desktop, laptop, and server segments.</p>

      <p>By the Ryzen 5000 and 7000 series, AMD had not only caught up but started leading in value and core counts. Intel faced delays in process node transitions and supply challenges, accelerating the shift. In 2026, AMD’s desktop CPU market share has climbed to around 35-36%, with even stronger gains in revenue share and server (nearing 29%).</p>

      <p>Today, AMD’s Zen 5-based Ryzen X3D processors — such as the Ryzen 7 9800X3D, Ryzen 7 9850X3D, and Ryzen 9 9950X3D — reign supreme for gaming. Thanks to massive 3D V-Cache, these chips deliver devastating performance in 1080p and 1440p titles. In many benchmarks, they outperform Intel’s flagship Core Ultra 9 285K by 25-37% on average. The real advantage shows in 1% low frame rates: X3D models provide exceptionally smooth gameplay with minimal stuttering, even in GPU-limited scenarios. This cache-heavy design excels at reducing micro-stutters and delivering consistent frame times.</p>

      <p>Intel still holds an edge in certain single-core-heavy esports titles, legacy applications, or bursty creative workloads where raw clock speeds and hybrid architecture optimizations shine. However, AMD’s core-heavy designs dominate multi-threaded productivity tasks like video rendering, 3D modeling, and streaming.</p>

      <p>The CPU war has forced both companies to innovate aggressively. AMD’s fabless model and relentless Zen improvements keep pressure on Intel, while consumers win with more choice, better value, and platform longevity (AMD’s AM5 socket support remains a highlight).</p>

      <h3>Key Takeaways for Builders (2026):</h3>
      <ul>
        <li><strong>Want the smoothest gaming experience and strong 1% lows?</strong> Go Ryzen X3D.</li>
        <li><strong>Need top single-core bursts or specific productivity edges?</strong> Intel’s Core Ultra series remains competitive.</li>
        <li>The days of one company owning the CPU market are long gone.</li>
      </ul>
    </section>

    <p style="text-align: center;"><a href="#top-of-page">↑ Back to top of page</a></p>
  </main>

  <footer>
    <p>&copy; 2026 Ryan Watson - UWTSD - 2517865</p>
  </footer>

</body>
</html>
```

Appendix C – gpu.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <meta name="description" content="Comparing Nvidia's Ray-Tracing dominance against AMD's rasterization value in the 2026 GPU market.">
  <meta name="keywords" content="GPU, Nvidia, AMD, RTX 5090, Radeon, Ray Tracing, DLSS, Rasterization, 2026">
  <title>The GPU War | Nvidia vs AMD</title>
  <link rel="stylesheet" href="style.css">
</head>
<body>

  <header id="top-of-page">
    <h1>The Silicon Wars</h1>
    <nav>
      <a href="index.html">Home</a> |
      <a href="cpu.html">The CPU War</a> |
      <a href="gpu.html">The GPU War</a>
    </nav>
  </header>

  <main>
    <section>
      <h2>The War on GPUs: Nvidia's Ray-Tracing Empire vs. AMD's Rasterization Revolution</h2>

      <p>While CPUs battle over cores and cache, the GPU war is a clash of philosophies: <a href="https://www.nvidia.com"
target="_blank">Nvidia</a>'s premium feature-rich ecosystem versus <a href="https://www.amd.com" target="_blank">AMD</a>'s focus on raw
power and value.</p>

      <p>Nvidia has long been the high-end champion. Starting with the RTX 20-series, its dedicated RT cores and DLSS technology transformed ray
tracing from a performance killer into a desirable feature. In 2026, the GeForce RTX 5090 sits at the absolute top — dominating 4K gaming, path
tracing, and AI-enhanced visuals. Nvidia leads dramatically in ray-tracing performance (often 15-30% or more ahead in heavy RT titles) thanks to
superior hardware acceleration and software like DLSS 4 with frame generation.</p>

      <p>But AMD is no pushover. The Radeon RX 9000-series (RDNA 4 architecture), highlighted by cards like the RX 9070 XT, excels in traditional
rasterization — the core triangle-pushing rendering that still drives most in-game visuals. On high-end models, AMD frequently matches or beats
similarly priced Nvidia cards in pure raster workloads at 1440p and even 4K.</p>

      <h3>The Trade-offs:</h3>
      <ul>
        <li><strong>Rasterization:</strong> AMD often delivers excellent raw frame rates and strong efficiency in non-RT or lightly RT scenarios.</li>
        <li><strong>Ray Tracing & Upscaling:</strong> Nvidia pulls ahead significantly in demanding path-traced or heavily RT titles.</li>
      </ul>

      <p>The GPU war isn't only about silicon — it's about ecosystems, driver maturity, pricing, and real-world use cases. Pair a high-end AMD card
with a strong CPU for pure speed and high refresh rates, or choose Nvidia when ray-traced immersion and AI upscaling are priorities.</p>

      <h3>Key Takeaways for Builders (2026):</h3>
      <ul>
        <li><strong>Prioritize raw FPS and value in traditional rendering?</strong> AMD Radeon RX 9000-series shines.</li>
        <li><strong>Want the best ray tracing, DLSS magic, and premium features?</strong> Nvidia RTX 50-series leads.</li>
      </ul>
    </section>

    <p style="text-align: center; margin-top: 40px;">
      <a href="#top-of-page">↑ Back to top of page</a>
    </p>
  </main>

  <footer>
    <p>&copy; 2026 Ryan Watson - UWTSD - 2517865</p>
  </footer>

</body>
</html>
```

Appendix D – style.css

```
body {
  font-family: Arial, sans-serif;
  margin: 0;
  padding: 0;
  background-color: #f4f4f4; /* A soft light grey */
  color: #333333; /* Dark grey text is better for accessibility than pure black */
}

header {
  background-color: #2c3e50; /* Dark blue */
  color: white;
  padding: 20px;
  text-align: center;
}

nav a {
  color: #18bc9c; /* Mint green */
  text-decoration: none;
  font-weight: bold;
  margin: 0 15px;
}

main {
  background-color: white;
  max-width: 800px; /* Keeps the text from stretching too wide */
  margin: 30px auto; /* Centers the box on the screen */
  padding: 20px;
  border-radius: 8px; /* Rounded corners */
  box-shadow: 0px 4px 8px rgba(0,0,0,0.1); /* A subtle shadow */
}

footer {
  text-align: center;
  padding: 10px;
  font-size: 0.8em;
  color: #777777;
}

/* Makes images shrink to fit the box AND centers them */
.responsive-img {
  max-width: 100%;
  height: auto;
  border-radius: 8px;
  display: block;
  margin: 20px auto;
}

/* Makes the layout adjust on smaller screens like phones */
@media screen and (max-width: 600px) {
  main {
    margin: 10px;
    padding: 15px;
  }
  nav a {
    display: block;
    margin: 10px 0;
  }
}
```

