

A critical reflection on refactoring the Web Witchcraft and Wizardry project

Edmund Mulligan

December 17, 2025

Appendix A - Test Outputs

This appendix contains the complete test results from the automated test suite. All tests were executed on December 17, 2025 and demonstrate compliance with web standards, accessibility guidelines, and readability requirements.

Summary of Test Results

Test Type	Metric	Result
Code Validation	Files validated	29
	HTML errors	0
	CSS errors	0
	JavaScript errors	0
Link Checking	Total links checked	161
	Broken links	0
	Pages checked	5
Axe Accessibility	Total violations	0
	Critical issues	0
	Serious issues	0
Lighthouse	Average score	100%
	Pages tested	5
	Failed audits	0
Pa11y Accessibility	Total errors	0
	Total warnings	0
	Pages tested	5
WAVE Accessibility	Total errors	0
	Alerts (non-critical)	10
	Pages tested	5
Reading Age	Average grade level	9.1
	Pages analyzed	3
	College-level pages	0
Browser Tests	Browsers tested	3
	Tests passed	150
	Tests failed	0

Table 1: Summary of all automated test results

Detailed Test Results

The following sections contain the complete JSON output from each test suite.

Code Validation Results

```
1 {  
  "files": [],  
  "summary": {  
    "htmlErrors": 0,  
    "htmlWarnings": 0,  
6    "cssErrors": 0,  
    "cssWarnings": 0,  
    "jsErrors": 0,  
    "jsWarnings": 0  
  }  
11 }
```

Broken Links Check Results

```
{
  "pages": [
    {
      "url": "index.html",
      "links": [],
      "brokenCount": 0,
      "totalCount": 19
    },
    {
      "url": "pages/students.html",
      "links": [],
      "brokenCount": 0,
      "totalCount": 45
    },
    {
      "url": "pages/glossary-and-faq.html",
      "links": [],
      "brokenCount": 0,
      "totalCount": 16
    },
    {
      "url": "pages/license-and-credits.html",
      "links": [],
      "brokenCount": 0,
      "totalCount": 36
    },
    {
      "url": "pages/about.html",
      "links": [],
      "brokenCount": 0,
      "totalCount": 45
    }
  ],
  "summary": {
    "totalLinks": 161,
    "brokenLinks": 0,
    "excludedLinks": 0
  }
}
```

Axe Accessibility Results

```
1 {  
  "violations": [],  
  "passes": [],  
  "incomplete": []  
}
```

Lighthouse Accessibility Results

```
{
  "pages": [
    {
      "url": "index.html",
      "score": 1,
      "failedAudits": []
    },
    {
      "url": "pages/students.html",
      "score": 1,
      "failedAudits": []
    },
    {
      "url": "pages/glossary-and-faq.html",
      "score": 1,
      "failedAudits": []
    },
    {
      "url": "pages/license-and-credits.html",
      "score": 1,
      "failedAudits": []
    },
    {
      "url": "pages/about.html",
      "score": 1,
      "failedAudits": []
    }
  ]
}
```

Pa11y Accessibility Results

```
1 {
  "pages": [
    {
      "url": "index.html",
      "documentTitle": "Web Witchcraft and Wizardry",
      "pageUrl": "http://localhost:8080/",
      "issues": []
    },
    {
      "url": "pages/students.html",
      "documentTitle": "Web Witchcraft and Wizardry",
      "pageUrl": "http://localhost:8080/pages/students",
      "issues": []
    },
    {
      "url": "pages/glossary-and-faq.html",
      "documentTitle": "Glossary and FAQ|Web Witchcraft and Wizardry",
      "pageUrl": "http://localhost:8080/pages/glossary-and-faq",
      "issues": []
    },
    {
      "url": "pages/license-and-credits.html",
      "documentTitle": "Web Witchcraft and Wizardry",
      "pageUrl": "http://localhost:8080/pages/license-and-credits",
      "issues": []
    },
    {
      "url": "pages/about.html",
      "documentTitle": "About|Web Witchcraft and Wizardry",
      "pageUrl": "http://localhost:8080/pages/about",
      "issues": []
    }
  ]
}
```

WAVE Accessibility Results

```
1 {
  "pages": [
    {
      "url": "index.html",
      "errors": 0,
      "alerts": 2,
      "features": 1,
      "structural": 7,
      "contrast": 0,
      "errorItems": [],
      "alertItems": [
        {
          "id": "h1_missing",
          "description": "Missing first level heading",
          "count": 1
        },
        {
          "id": "noscript",
          "description": "Noscript element",
          "count": 1
        }
      ],
      "contrastItems": [],
      "waveUrl": "http://wave.webaim.org/report?url=https://crinkly-
        majorie-dramatic.ngrok-free.dev/index.html"
    },
    {
      "url": "pages/students.html",
      "errors": 0,
      "alerts": 2,
      "features": 1,
      "structural": 7,
      "contrast": 0,
      "errorItems": [],
      "alertItems": [
        {
          "id": "h1_missing",
          "description": "Missing first level heading",
          "count": 1
        },
        {
          "id": "noscript",
          "description": "Noscript element",
          "count": 1
        }
      ],
      "contrastItems": [],
      "waveUrl": "http://wave.webaim.org/report?url=https://crinkly-
        majorie-dramatic.ngrok-free.dev/pages/students.html"
    },
    {
```

```

51     "url": "pages/glossary-and-faq.html",
    "errors": 0,
    "alerts": 2,
    "features": 1,
    "structural": 7,
    "contrast": 0,
56     "errorItems": [],
    "alertItems": [
        {
            "id": "h1_missing",
            "description": "Missing first level heading",
61            "count": 1
        },
        {
            "id": "noscript",
            "description": "Noscript element",
66            "count": 1
        }
    ],
    "contrastItems": [],
    "waveUrl": "http://wave.webaim.org/report?url=https://crinkly-
        majorie-dramatic.ngrok-free.dev/pages/glossary-and-faq.html"
71 },
    {
        "url": "pages/license-and-credits.html",
        "errors": 0,
        "alerts": 2,
76        "features": 1,
        "structural": 7,
        "contrast": 0,
        "errorItems": [],
        "alertItems": [
81            {
                "id": "h1_missing",
                "description": "Missing first level heading",
                "count": 1
            },
86            {
                "id": "noscript",
                "description": "Noscript element",
                "count": 1
            }
        ],
91        "contrastItems": [],
        "waveUrl": "http://wave.webaim.org/report?url=https://crinkly-
            majorie-dramatic.ngrok-free.dev/pages/license-and-credits.
            html"
    },
    {
96        "url": "pages/about.html",
        "errors": 0,
        "alerts": 2,
        "features": 1,

```



```
101     "structural": 7,  
    "contrast": 0,  
    "errorItems": [],  
    "alertItems": [  
        {  
            "id": "h1_missing",  
106            "description": "Missing first level heading",  
            "count": 1  
        },  
        {  
            "id": "noscript",  
111            "description": "Noscript element",  
            "count": 1  
        }  
    ],  
    "contrastItems": [],  
116    "waveUrl": "http://wave.webaim.org/report?url=https://crinkly-  
        majorie-dramatic.ngrok-free.dev/pages/about.html"  
    }  
]  
}
```

Reading Age Analysis Results

```
1 {
  "pages": [
    {
      "file": "./pages/students.html",
      "wordCount": 526,
      "fleschReadingEase": 64.4,
      "fleschKincaidGrade": 8.9,
      "smogIndex": 11.6,
      "colemanLiauIndex": 9,
      "automatedReadabilityIndex": 9.1,
      "averageGradeLevel": 9.7,
      "readingLevel": "Plain English (High School)",
      "readingAge": "15-16 years"
    },
    {
      "file": "./pages/glossary-and-faq.html",
      "wordCount": 81,
      "fleschReadingEase": 69.8,
      "fleschKincaidGrade": 6.4,
      "smogIndex": 10.3,
      "colemanLiauIndex": 8.6,
      "automatedReadabilityIndex": 6,
      "averageGradeLevel": 7.8,
      "readingLevel": "Fairly Easy (Middle School)",
      "readingAge": "13-14 years"
    },
    {
      "file": "./pages/about.html",
      "wordCount": 1922,
      "fleschReadingEase": 59.6,
      "fleschKincaidGrade": 8.8,
      "smogIndex": 11.4,
      "colemanLiauIndex": 9.9,
      "automatedReadabilityIndex": 8.5,
      "averageGradeLevel": 9.7,
      "readingLevel": "Plain English (High School)",
      "readingAge": "15-16 years"
    }
  ]
}
```

Cross-Browser Compatibility Results

```
{
  "browsers": [
    {
      "name": "chromium",
      "status": "passed",
      "error": null,
      "tests": [
        {
          "name": "Home page title",
          "status": "passed"
        },
        {
          "name": "Home navigation links",
          "status": "passed"
        },
        {
          "name": "Home JavaScript execution",
          "status": "passed"
        },
        {
          "name": "Home CSS Grid",
          "status": "passed"
        },
        {
          "name": "Home CSS Flexbox",
          "status": "passed"
        },
        {
          "name": "Home CSS Variables",
          "status": "passed"
        },
        {
          "name": "Home SVG support",
          "status": "passed"
        },
        {
          "name": "Home responsive viewport",
          "status": "passed"
        },
        {
          "name": "Home CSS calc()",
          "status": "passed"
        },
        {
          "name": "Home font rendering",
          "status": "passed"
        },
        {
          "name": "About page title",
          "status": "passed"
        }
      ]
    }
  ]
}
```

```

55     {
        "name": "About navigation links",
        "status": "passed"
    },
    {
        "name": "About JavaScript execution",
        "status": "passed"
    },
60     {
        "name": "About CSS Grid",
        "status": "passed"
    },
    {
65         "name": "About CSS Flexbox",
        "status": "passed"
    },
    {
70         "name": "About CSS Variables",
        "status": "passed"
    },
    {
        "name": "About SVG support",
        "status": "passed"
75     },
    {
        "name": "About responsive viewport",
        "status": "passed"
    },
80     {
        "name": "About CSS calc()",
        "status": "passed"
    },
    {
85         "name": "About font rendering",
        "status": "passed"
    },
    {
        "name": "Students page title",
        "status": "passed"
90     },
    {
        "name": "Students navigation links",
        "status": "passed"
95     },
    {
        "name": "Students JavaScript execution",
        "status": "passed"
    },
100    {
        "name": "Students CSS Grid",
        "status": "passed"
    },
    {

```

```

105     "name": "Students CSS Flexbox",
        "status": "passed"
    },
    {
110     "name": "Students CSS Variables",
        "status": "passed"
    },
    {
115     "name": "Students SVG support",
        "status": "passed"
    },
    {
        "name": "Students responsive viewport",
        "status": "passed"
    },
120    {
        "name": "Students CSS calc()",
        "status": "passed"
    },
    {
125     "name": "Students font rendering",
        "status": "passed"
    },
    {
130     "name": "Glossary & FAQ page title",
        "status": "passed"
    },
    {
        "name": "Glossary & FAQ navigation links",
        "status": "passed"
135    },
    {
        "name": "Glossary & FAQ JavaScript execution",
        "status": "passed"
    },
140    {
        "name": "Glossary & FAQ CSS Grid",
        "status": "passed"
    },
    {
145     "name": "Glossary & FAQ CSS Flexbox",
        "status": "passed"
    },
    {
        "name": "Glossary & FAQ CSS Variables",
150     "status": "passed"
    },
    {
        "name": "Glossary & FAQ SVG support",
        "status": "passed"
155    },
    {
        "name": "Glossary & FAQ responsive viewport",

```

```

    "status": "passed"
  },
160  {
    "name": "Glossary & FAQ CSS calc()",
    "status": "passed"
  },
165  {
    "name": "Glossary & FAQ font rendering",
    "status": "passed"
  },
170  {
    "name": "License & Credits page title",
    "status": "passed"
  },
175  {
    "name": "License & Credits navigation links",
    "status": "passed"
  },
180  {
    "name": "License & Credits JavaScript execution",
    "status": "passed"
  },
185  {
    "name": "License & Credits CSS Grid",
    "status": "passed"
  },
190  {
    "name": "License & Credits CSS Flexbox",
    "status": "passed"
  },
195  {
    "name": "License & Credits CSS Variables",
    "status": "passed"
  },
200  {
    "name": "License & Credits SVG support",
    "status": "passed"
  },
205  {
    "name": "License & Credits responsive viewport",
    "status": "passed"
  },
210  {
    "name": "License & Credits CSS calc()",
    "status": "passed"
  },
  {
    "name": "License & Credits font rendering",
    "status": "passed"
  }
]
},
{

```

```

"name": "firefox",
"status": "passed",
"error": null,
"tests": [
215   {
        "name": "Home page title",
        "status": "passed"
    },
    {
220     "name": "Home navigation links",
        "status": "passed"
    },
    {
        "name": "Home JavaScript execution",
225     "status": "passed"
    },
    {
        "name": "Home CSS Grid",
        "status": "passed"
230     },
    {
        "name": "Home CSS Flexbox",
        "status": "passed"
    },
235     {
        "name": "Home CSS Variables",
        "status": "passed"
    },
    {
        "name": "Home SVG support",
240     "status": "passed"
    },
    {
        "name": "Home responsive viewport",
245     "status": "passed"
    },
    {
        "name": "Home CSS calc()",
        "status": "passed"
250     },
    {
        "name": "Home font rendering",
        "status": "passed"
    },
255     {
        "name": "About page title",
        "status": "passed"
    },
    {
260     "name": "About navigation links",
        "status": "passed"
    },
    {

```

```

265     "name": "About JavaScript execution",
        "status": "passed"
    },
    {
        "name": "About CSS Grid",
        "status": "passed"
270    },
    {
        "name": "About CSS Flexbox",
        "status": "passed"
    },
275    {
        "name": "About CSS Variables",
        "status": "passed"
    },
    {
280        "name": "About SVG support",
        "status": "passed"
    },
    {
        "name": "About responsive viewport",
285        "status": "passed"
    },
    {
        "name": "About CSS calc()",
        "status": "passed"
290    },
    {
        "name": "About font rendering",
        "status": "passed"
    },
295    {
        "name": "Students page title",
        "status": "passed"
    },
    {
300        "name": "Students navigation links",
        "status": "passed"
    },
    {
        "name": "Students JavaScript execution",
305        "status": "passed"
    },
    {
        "name": "Students CSS Grid",
        "status": "passed"
310    },
    {
        "name": "Students CSS Flexbox",
        "status": "passed"
    },
315    {
        "name": "Students CSS Variables",

```



```

    "status": "passed"
  },
  {
320    "name": "Students SVG support",
    "status": "passed"
  },
  {
325    "name": "Students responsive viewport",
    "status": "passed"
  },
  {
    "name": "Students CSS calc()",
    "status": "passed"
330  },
  {
    "name": "Students font rendering",
    "status": "passed"
335  },
  {
    "name": "Glossary & FAQ page title",
    "status": "passed"
  },
  {
340    "name": "Glossary & FAQ navigation links",
    "status": "passed"
  },
  {
    "name": "Glossary & FAQ JavaScript execution",
345    "status": "passed"
  },
  {
    "name": "Glossary & FAQ CSS Grid",
    "status": "passed"
350  },
  {
    "name": "Glossary & FAQ CSS Flexbox",
    "status": "passed"
  },
355  {
    "name": "Glossary & FAQ CSS Variables",
    "status": "passed"
  },
  {
360    "name": "Glossary & FAQ SVG support",
    "status": "passed"
  },
  {
    "name": "Glossary & FAQ responsive viewport",
365    "status": "passed"
  },
  {
    "name": "Glossary & FAQ CSS calc()",
    "status": "passed"

```

```

370     },
    {
        "name": "Glossary & FAQ font rendering",
        "status": "passed"
    },
375     {
        "name": "License & Credits page title",
        "status": "passed"
    },
    {
380        "name": "License & Credits navigation links",
        "status": "passed"
    },
    {
        "name": "License & Credits JavaScript execution",
385        "status": "passed"
    },
    {
        "name": "License & Credits CSS Grid",
        "status": "passed"
390    },
    {
        "name": "License & Credits CSS Flexbox",
        "status": "passed"
    },
395    {
        "name": "License & Credits CSS Variables",
        "status": "passed"
    },
    {
400        "name": "License & Credits SVG support",
        "status": "passed"
    },
    {
        "name": "License & Credits responsive viewport",
405        "status": "passed"
    },
    {
        "name": "License & Credits CSS calc()",
        "status": "passed"
410    },
    {
        "name": "License & Credits font rendering",
        "status": "passed"
    }
415 ]
},
{
    "name": "webkit",
    "status": "passed",
420    "error": null,
    "tests": [
        {

```

```

    "name": "Home page title",
    "status": "passed"
  },
  {
    "name": "Home navigation links",
    "status": "passed"
  },
  {
    "name": "Home JavaScript execution",
    "status": "passed"
  },
  {
    "name": "Home CSS Grid",
    "status": "passed"
  },
  {
    "name": "Home CSS Flexbox",
    "status": "passed"
  },
  {
    "name": "Home CSS Variables",
    "status": "passed"
  },
  {
    "name": "Home SVG support",
    "status": "passed"
  },
  {
    "name": "Home responsive viewport",
    "status": "passed"
  },
  {
    "name": "Home CSS calc()",
    "status": "passed"
  },
  {
    "name": "Home font rendering",
    "status": "passed"
  },
  {
    "name": "About page title",
    "status": "passed"
  },
  {
    "name": "About navigation links",
    "status": "passed"
  },
  {
    "name": "About JavaScript execution",
    "status": "passed"
  },
  {
    "name": "About CSS Grid",

```

```

    "status": "passed"
  },
  {
    "name": "About CSS Flexbox",
480    "status": "passed"
  },
  {
    "name": "About CSS Variables",
485    "status": "passed"
  },
  {
    "name": "About SVG support",
    "status": "passed"
  },
490  {
    "name": "About responsive viewport",
    "status": "passed"
  },
  {
495    "name": "About CSS calc()",
    "status": "passed"
  },
  {
    "name": "About font rendering",
500    "status": "passed"
  },
  {
    "name": "Students page title",
    "status": "passed"
505  },
  {
    "name": "Students navigation links",
    "status": "passed"
  },
510  {
    "name": "Students JavaScript execution",
    "status": "passed"
  },
  {
515    "name": "Students CSS Grid",
    "status": "passed"
  },
  {
    "name": "Students CSS Flexbox",
520    "status": "passed"
  },
  {
    "name": "Students CSS Variables",
    "status": "passed"
525  },
  {
    "name": "Students SVG support",
    "status": "passed"
  }

```

```

    },
530   {
        "name": "Students responsive viewport",
        "status": "passed"
    },
    {
535     "name": "Students CSS calc()",
        "status": "passed"
    },
    {
        "name": "Students font rendering",
540     "status": "passed"
    },
    {
        "name": "Glossary & FAQ page title",
        "status": "passed"
545     },
    {
        "name": "Glossary & FAQ navigation links",
        "status": "passed"
    },
550   {
        "name": "Glossary & FAQ JavaScript execution",
        "status": "passed"
    },
    {
555     "name": "Glossary & FAQ CSS Grid",
        "status": "passed"
    },
    {
        "name": "Glossary & FAQ CSS Flexbox",
560     "status": "passed"
    },
    {
        "name": "Glossary & FAQ CSS Variables",
        "status": "passed"
565     },
    {
        "name": "Glossary & FAQ SVG support",
        "status": "passed"
    },
570   {
        "name": "Glossary & FAQ responsive viewport",
        "status": "passed"
    },
    {
575     "name": "Glossary & FAQ CSS calc()",
        "status": "passed"
    },
    {
        "name": "Glossary & FAQ font rendering",
580     "status": "passed"
    },
    },

```

```

    {
      "name": "License & Credits page title",
      "status": "passed"
    },
    {
      "name": "License & Credits navigation links",
      "status": "passed"
    },
    {
      "name": "License & Credits JavaScript execution",
      "status": "passed"
    },
    {
      "name": "License & Credits CSS Grid",
      "status": "passed"
    },
    {
      "name": "License & Credits CSS Flexbox",
      "status": "passed"
    },
    {
      "name": "License & Credits CSS Variables",
      "status": "passed"
    },
    {
      "name": "License & Credits SVG support",
      "status": "passed"
    },
    {
      "name": "License & Credits responsive viewport",
      "status": "passed"
    },
    {
      "name": "License & Credits CSS calc()",
      "status": "passed"
    },
    {
      "name": "License & Credits font rendering",
      "status": "passed"
    }
  ]
},
"summary": {
  "passed": 3,
  "failed": 0,
  "skipped": 0,
  "total": 3
}
}

```

References