

**SSW 590 Group 11 Version: 9d4587c**

by

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This document provides the requirements and design details of the PROJECT. The following table (Table 1) should be updated by authors whenever major changes are made to the architecture design or new components are added. Add updates to the top of the table. Most recent changes to the document should be seen first and the oldest last.

Table 1: Document Update History

| Date       | Updates                                                                                                                                                                                  |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10/17/2025 | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Added section detailing using Caddy for SSL certificates. 9)</li></ul>                                                             |
| 10/16/2025 | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Added host and password for Overleaf container. 1) 2)</li></ul>                                                                    |
| 10/15/2025 | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Created Domain Names, SSL, and Versioning chapter 9)</li></ul>                                                                     |
| 10/8/2025  | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Finalized Passwords table with a consistent algorithm. Linked each entry to Hosts. Added Overleaf Docker host row. 1) 2)</li></ul> |
| 10/7/2025  | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Created Overleaf chapter 8)</li></ul>                                                                                              |
| 10/7/2025  | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Updated Hosts 1.1 and Passwords tables 2.1</li></ul>                                                                               |
| 10/6/2025  | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Created Bugzilla chapter 7)</li></ul>                                                                                              |
| 09/24/2025 | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Created LaTeX Docker chapter (Chapter 6)</li></ul>                                                                                 |
| 09/24/2025 | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Created AWS Deployment chapter (Chapter 5)</li></ul>                                                                               |
| 09/24/2025 | JP, BM, JL, CV: <ul style="list-style-type: none"><li>Created Project Proposal chapter (Chapter 4)</li></ul>                                                                             |
| 09/17/2025 | BM: <ul style="list-style-type: none"><li>Finalized Parts I, J, and H</li></ul>                                                                                                          |

Table 1: Document Update History

| <b>Date</b> | <b>Updates</b>                                                                           |
|-------------|------------------------------------------------------------------------------------------|
| 09/16/2025  | JP: <ul style="list-style-type: none"><li>• Created sections Part G and Part I</li></ul> |
| 09/16/2025  | CV: <ul style="list-style-type: none"><li>• Finalized Parts C, D, E</li></ul>            |
| 09/15/2025  | JL: <ul style="list-style-type: none"><li>• Created Parts A and B</li></ul>              |

# Table of Contents

|          |                                                      |           |
|----------|------------------------------------------------------|-----------|
| <b>1</b> | <b>Hosts</b>                                         | <b>1</b>  |
| <b>2</b> | <b>Passwords</b>                                     | <b>2</b>  |
| <b>3</b> | <b>Linux Commands</b>                                |           |
|          | – <i>Charles, Justin, Benedict, Jacky</i>            | <b>3</b>  |
| 3.1      | Part A: Navigation & File Ops . . . . .              | 3         |
| 3.2      | Part B: Viewing & Searching . . . . .                | 4         |
| 3.3      | Part C: Text Processing . . . . .                    | 5         |
| 3.4      | Part D: Permissions & Ownership . . . . .            | 7         |
| 3.5      | Part E: Links & Find . . . . .                       | 8         |
| 3.6      | Part F: Processes & Job Control . . . . .            | 10        |
| 3.7      | Part G: Archiving & Compression . . . . .            | 15        |
| 3.8      | Part H: Networking & System Info . . . . .           | 15        |
| 3.9      | Part I: Package & Services (Debian/Ubuntu) . . . . . | 17        |
| 3.10     | Part J: Bash & Scripting . . . . .                   | 18        |
| <b>4</b> | <b>Project Proposal</b>                              | <b>21</b> |
| <b>5</b> | <b>AWS Deployment</b>                                | <b>22</b> |
| <b>6</b> | <b>LaTeX Docker</b>                                  | <b>28</b> |
| 6.0.1    | Project Directory Setup . . . . .                    | 28        |
| 6.0.2    | Docker Commands . . . . .                            | 28        |
| <b>7</b> | <b>Bugzilla</b>                                      | <b>31</b> |
| <b>8</b> | <b>Overleaf</b>                                      | <b>33</b> |
| <b>9</b> | <b>Domain Names</b>                                  | <b>35</b> |
| 9.1      | Assignment Overview . . . . .                        | 35        |
| 9.2      | Step 1: Domain Registration . . . . .                | 35        |
| 9.3      | Step 2: SSL Certificate Configuration . . . . .      | 35        |
| 9.4      | Step 2.1: SSL Configuration using Caddy . . . . .    | 38        |

|          |                                                              |           |
|----------|--------------------------------------------------------------|-----------|
| 9.5      | Step 3: Overleaf Container Setup on DigitalOcean . . . . .   | 39        |
| 9.6      | Step 4: GitHub Pages Integration (Benedict) . . . . .        | 40        |
| 9.7      | Step 5: Overleaf Subdomain Redirect Verification . . . . .   | 40        |
| 9.8      | Step 6: Overleaf–GitHub Sync (In Progress) . . . . .         | 40        |
| 9.9      | Step 7: Version Control and Hash Key (In Progress) . . . . . | 41        |
| 9.10     | Conclusion and Deliverable Checklist . . . . .               | 43        |
| <b>A</b> | <b>Appendix</b>                                              |           |
|          | <i>– Author Name</i>                                         | <b>44</b> |
|          | <b>Bibliography</b>                                          | <b>46</b> |

# List of Tables

|     |                                                |     |
|-----|------------------------------------------------|-----|
| 1   | Document Update History                        | iii |
| 1   | Document Update History                        | iv  |
| 1.1 | Hosts Table (Edited after Bugzilla Assignment) | 1   |
| 2.1 | Password Table                                 | 2   |

# List of Figures

|      |                                                                                                 |    |
|------|-------------------------------------------------------------------------------------------------|----|
| 3.1  | Part C #13 Terminal Output . . . . .                                                            | 5  |
| 3.2  | Part C #14 Terminal Output . . . . .                                                            | 6  |
| 3.3  | Part C #16 Terminal Output . . . . .                                                            | 7  |
| 3.4  | Part C #19 Terminal Output . . . . .                                                            | 8  |
| 3.5  | Part C #21 Terminal Output . . . . .                                                            | 9  |
| 3.6  | Part C #22 Terminal Output . . . . .                                                            | 9  |
| 3.7  | Part C #23 Terminal Output . . . . .                                                            | 10 |
| 3.8  | Part F #24 Tree View 1 . . . . .                                                                | 10 |
| 3.9  | Part F #24 Tree View 2 . . . . .                                                                | 11 |
| 3.10 | Part F #24 Tree View 3 . . . . .                                                                | 12 |
| 3.11 | Part F #24 Tree View 4 . . . . .                                                                | 13 |
| 3.12 | Part F #24 Tree View 5 . . . . .                                                                | 14 |
| 3.13 | Part F #25 Sleep 120 in the background and its PID . . . . .                                    | 14 |
| 3.14 | Part F #26 TERM signal . . . . .                                                                | 15 |
| 3.15 | Part F #27 Top 5 Processes . . . . .                                                            | 15 |
| 3.16 | Part G Terminal Output . . . . .                                                                | 16 |
| 3.17 | Part H #31 TCP sockets with associated PIDs . . . . .                                           | 16 |
| 3.18 | Part H #32 Default Route (gateway) in a concise form . . . . .                                  | 17 |
| 3.19 | Part H #33 Kernel name, Release, and Machine Architecture . . . . .                             | 17 |
| 3.20 | Part H #34 Last 5 successful logins on the system . . . . .                                     | 17 |
| 3.21 | Part I #35 Terminal Output showing the installed version of package coreutils . . . . .         | 18 |
| 3.24 | Part J #38 One-liner that loops over . . . . .                                                  | 18 |
| 3.22 | Part I #36 Terminal Output showing all available packages whose names contain ripgrep . . . . . | 19 |
| 3.23 | Part I #37 Terminal Output . . . . .                                                            | 19 |
| 3.25 | Part J #39 A command that exports CSV rows . . . . .                                            | 20 |
| 3.26 | Part J #40 Create a variable X with value 42 . . . . .                                          | 20 |
| 5.1  | App Runner service in <i>Running</i> state with the default domain. . . . .                     | 25 |
| 5.2  | Class Diagram for App.js . . . . .                                                              | 26 |
| 6.1  | Folder containing files created from successful Docker build . . . . .                          | 29 |
| 6.2  | Docker compiled LaTeX document . . . . .                                                        | 30 |

|      |                                                                                                         |    |
|------|---------------------------------------------------------------------------------------------------------|----|
| 7.1  | Bugzilla Container Running Screenshot . . . . .                                                         | 32 |
| 8.1  | Overleaf Instance Main Menu Screenshot . . . . .                                                        | 34 |
| 8.2  | Overleaf Instance Example Project Screenshot . . . . .                                                  | 34 |
| 9.1  | Namecheap domain list confirming registration of <code>rymarmar.me</code> . . . . .                     | 36 |
| 9.2  | GitHub Pages settings showing HTTPS enforcement and DNS verification. . . . .                           | 36 |
| 9.3  | Browser confirmation that <code>https://rymarmar.me</code> is secured via SSL. . . . .                  | 37 |
| 9.4  | Namecheap domain list confirming registration of <code>rymarmar.me</code> . . . . .                     | 37 |
| 9.5  | <code>docker-compose.yml</code> additions . . . . .                                                     | 38 |
| 9.6  | <code>Caddyfile</code> . . . . .                                                                        | 38 |
| 9.7  | Digital Ocean DNS records linking to domain . . . . .                                                   | 39 |
| 9.8  | Namecheap DNS records to go to droplet IP address . . . . .                                             | 39 |
| 9.9  | Namecheap Advanced DNS configuration showing A and CNAME records for the root and subdomains. . . . .   | 40 |
| 9.10 | Verification using <code>nslookup</code> confirming successful DNS and subdomain resolution.            | 41 |
| 9.11 | GitHub Pages settings confirming DNS validation and HTTPS enforcement. . . . .                          | 42 |
| 9.12 | Deployed GitHub Pages site confirming build and domain resolution for <code>rymarmar.me</code> .        | 42 |
| 9.13 | The subdomain <code>overleaf.rymarmar.me</code> redirecting to the main site <code>rymarmar.me</code> . | 43 |

# Chapter 1

## Hosts

– *Charles, Justin, Benedict, Jacky*

Table 1.1: Hosts Table (Edited after Bugzilla Assignment)

| Name            | IP Address (or IP:Port) | OS           | Job                                                                                     |
|-----------------|-------------------------|--------------|-----------------------------------------------------------------------------------------|
| devbox          | 10.0.0.10               | Windows      | Primary workstation used for coding and pushing commits to GitHub repositories.         |
| database        | 10.0.0.11               | Linux        | Stores all persistent project data and connects to the backend API host.                |
| testing         | 10.0.0.12               | Linux        | Dedicated environment for integration and regression testing prior to deployment.       |
| api             | 10.0.0.13               | Ubuntu 22.04 | Backend REST API server responsible for serving requests between frontend and database. |
| Bugzilla Docker | 174.138.69.132:8080     | Ubuntu       | Docker container hosting Bugzilla (public HTTP access via port 8080).                   |
| Overleaf Docker | 104.236.74.225:80       | Ubuntu       | Overleaf Community Edition instance (public HTTP access on port 80).                    |

# Chapter 2

## Passwords

*– Charles, Justin, Benedict, Jacky*

Table 2.1: Password Table

| User / Account      | Password (Hint)   | Server Rules / Notes                                                                                 |
|---------------------|-------------------|------------------------------------------------------------------------------------------------------|
| bugzilla_admin      | <KEY><N>@bugzilla | For the Bugzilla Docker container (174.138.69.132:8080). Follows the shared key rule format.         |
| overleaf_maintainer | <KEY><N>@overleaf | For the Overleaf Docker container (104.236.74.225:80). Same structure as others for maintainability. |
| api_svc             | <KEY><N>@api      | Used by the backend API host (10.0.0.13).                                                            |
| db_admin            | <KEY><N>@db       | Used for the main database host (10.0.0.11).                                                         |
| devbox_admin        | <KEY><N>@devbox   | Used for the development workstation (10.0.0.10).                                                    |
| tester              | <KEY><N>@testing  | Used for the testing host (10.0.0.12).                                                               |

Each password follows our shared group convention: a short English word beginning and ending with the same letter (<KEY>), followed by a number equal to twice the number of vowels in that word (<N>), and ending with the site tag. This system allows easy password rotation while keeping host associations clear and consistent.

# Chapter 3

## Linux Commands

*– Charles, Justin, Benedict, Jacky*

### 3.1 Part A: Navigation & File Ops

- 1:

```
1 (base) jackylei@Jackys-MacBook-Pro lx-test % pwd
2 /Users/jackylei/lx-test
3
```

- 2:

```
1 (base) jackylei@Jackys-MacBook-Pro lx-test % ls -a -lh
2 total 136
3 drwxr-xr-x@ 12 jackylei staff 384B Sep 15 16:56 .
4 drwxr-x---+ 58 jackylei staff 1.8K Sep 13 22:14 ..
5 -rw-r--r--@ 1 jackylei staff 6.0K Sep 15 16:53 .DS_Store
6 drwxr-xr-x@ 3 jackylei staff 96B Sep 15 16:52 archive
7 -rw-r--r--@ 1 jackylei staff 48K Sep 13 22:14 blob.bin
8 lrwxr-xr-x@ 1 jackylei staff 13B Sep 13 22:14 link-to-file1 -> src/
      file1.txt
9 -rw-r--r--@ 1 jackylei staff 0B Sep 15 16:56 notes.md
10 -rw-r--r--@ 1 jackylei staff 56B Sep 15 16:56 people.csv
11 drwxr-xr-x@ 5 jackylei staff 160B Sep 13 22:14 src
12 -rw-r--r--@ 1 jackylei staff 56B Sep 13 22:14 sys.log
13 drwxr-xr-x@ 3 jackylei staff 96B Sep 15 16:04 tmp
14 -rw-r--r--@ 1 jackylei staff 28B Sep 13 22:14 words.txt
15
```

- 3:

```
1 (base) jackylei@Jackys-MacBook-Pro lx-test % [ -d tmp ] && cp -v src/
      file1.txt tmp
2 src/file1.txt -> tmp/file1.txt
3
```

- 4:

```

1 (base) jackylei@Jackys-MacBook-Pro ~x-test % mv -v old.txt archive/
2 old.txt -> archive/old.txt
3

```

- 5:

```

1 (base) jackylei@Jackys-MacBook-Pro ~x-test % touch notes.md
2

```

- 6:

```

1 (base) jackylei@Jackys-MacBook-Pro ~x-test % du -h src
2

```

## 3.2 Part B: Viewing & Searching

- 7:

```

1 (base) jackylei@Jackys-MacBook-Pro ~x-test % cat -n sys.log
2      1 INFO boot ok
3      2 WARN disk low
4      3 ERROR fan fail
5      4 INFO shutdown
6

```

- 8:

```

1 (base) jackylei@Jackys-MacBook-Pro ~x-test % cat sys.log | grep "ERROR"
2 ERROR fan fail
3

```

- 9:

```

1 (base) jackylei@Jackys-MacBook-Pro ~x-test % grep -o -i '[[:alnum:]]\+' '
2 words.txt | sort -u | wc -l
3
4

```

- 10:

```

1 (base) jackylei@Jackys-MacBook-Pro ~x-test % cat words.txt | grep -i "g"
2 Gamma
3 gamma
4

```

- 11:

```

1 (base) jackylei@Jackys-MacBook-Pro ~x-test % head -2 people.csv
2 id ,name ,dept
3 1 ,Ada ,EE
4

```

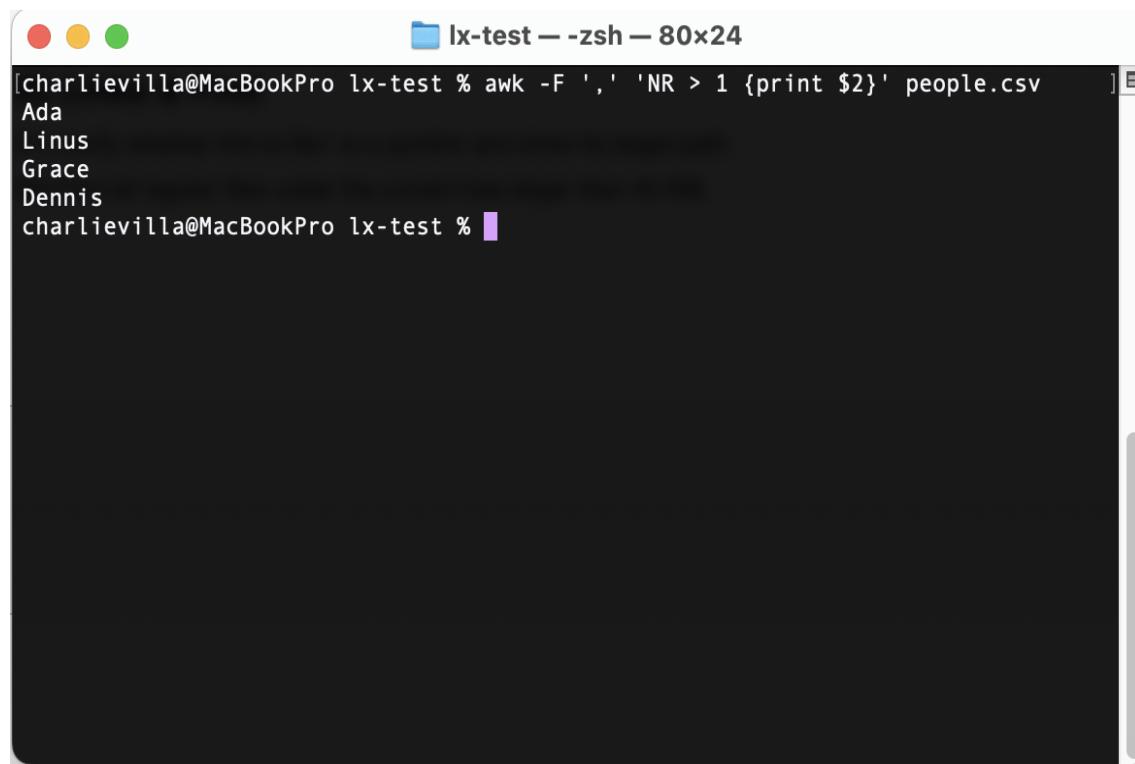
- 12:

```
1 (base) jackylei@Jackys-MacBook-Pro lx-test % tail -3 sys.log
2 WARN disk low
3 ERROR fan fail
4 INFO shutdown
5
```

### 3.3 Part C: Text Processing

- 13:

```
1 awk -F ',' 'NR > 1 {print $2}' people.csv
2
```



A screenshot of a terminal window titled "lx-test --zsh-- 80x24". The window shows the command "awk -F ',' 'NR > 1 {print \$2}' people.csv" being run, followed by the names Ada, Linus, Grace, and Dennis. The terminal has a dark background with light-colored text and a light gray scroll bar on the right.

```
[charlievilla@MacBookPro lx-test % awk -F ',' 'NR > 1 {print $2}' people.csv
Ada
Linus
Grace
Dennis
charlievilla@MacBookPro lx-test %
```

Figure 3.1: Part C #13 Terminal Output

- 14:

```
1 sort -f -u words.txt
2
```

A screenshot of a terminal window titled "lx-test -- -zsh -- 80x24". The window shows the command "sort -f -u words.txt" being run. The output of the command is three lines: "alpha", "beta", and "Gamma". The terminal has a dark background with light-colored text. There are three colored circles (red, yellow, green) in the top-left corner of the window frame.

Figure 3.2: Part C #14 Terminal Output

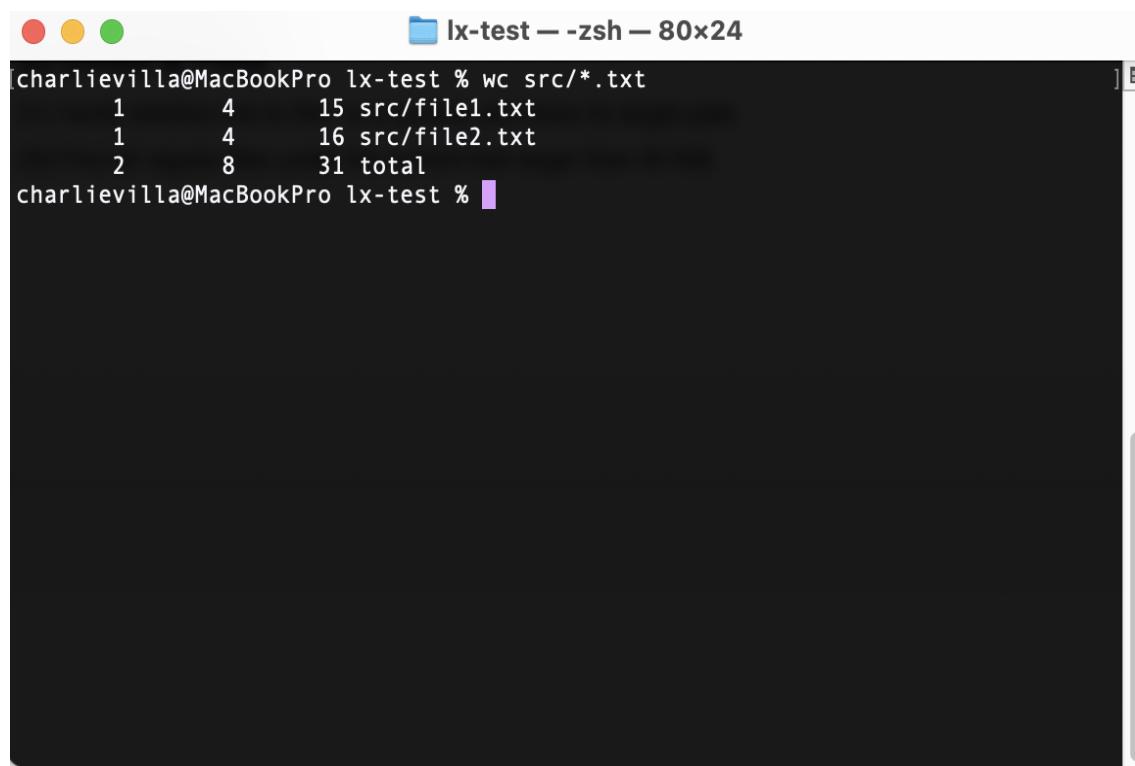
- 15:

```
1 find src/ -type f -exec sed -i.bak 's/three/3/g' {} +  
2
```

No terminal output for question 15

- 16:

```
1 wc src/*.txt  
2
```

A screenshot of a terminal window titled "lx-test -- zsh -- 80x24". The window shows a black background with white text. At the top, there are three colored circles (red, yellow, green) and the title. The text inside the terminal is:

```
[charlievilla@MacBookPro lx-test % wc src/*.txt
 1      4     15 src/file1.txt
 1      4     16 src/file2.txt
 2      8    31 total
charlievilla@MacBookPro lx-test %
```

Figure 3.3: Part C #16 Terminal Output

### 3.4 Part D: Permissions & Ownership

- 17:

```
1 chmod 700 tmp/
2
```

No terminal output for question 17

- 18:

```
1 chmod -R g+x src/lib
2
```

No terminal output for question 18

- 19:

```
1 stat -f %p src/file2.txt
2
```

A screenshot of a terminal window titled "lx-test — -zsh — 80x24". The window shows a black background with white text. At the top, there are three colored circles (red, yellow, green) representing window control buttons. The terminal prompt is "[charlievilla@MacBookPro lx-test %]". Below the prompt, the command "stat -f %p src/file2.txt" is entered, followed by its output "100644". The cursor is shown as a small purple square at the end of the command line.

Figure 3.4: Part C #19 Terminal Output

- 20:

```
1 touch notes.md
2 chflags uappnd notes.md
3
```

No terminal output for question 20

## 3.5 Part E: Links & Find

- 21:

```
1 ls -l link-to-file1
2
```



A screenshot of a terminal window titled "lx-test -- zsh -- 80x24". The window shows a command being run: "ls -l link-to-file1". The output is a single line: "lrwxr-xr-x 1 charlievilla staff 13 Sep 15 17:42 link-to-file1 -> src/file1.tx". Below the command prompt, there is a blank line where the user can type more commands.

Figure 3.5: Part C #21 Terminal Output

- 22:

```
1 find . -type f -size +40k
2
```



A screenshot of a terminal window titled "lx-test -- zsh -- 80x24". The window shows a command being run: "find . -type f -size +40k". The output is a single line: "./blob.bin". Below the command prompt, there is a blank line where the user can type more commands.

Figure 3.6: Part C #22 Terminal Output

- 23:

```
1 touch tmp/some-new-file.txt
2 find tmp/ -type f -mmin -10 -exec stat -f "%z %N" {} +
3
```

Created a new file with "touch" because the tmp/ directory was empty before it.

```
[charlievilla@MacBookPro lx-test % touch tmp/some-new-file.txt
[charlievilla@MacBookPro lx-test % find tmp/ -type f -mmin -10 -exec stat -f "%z"
%N" {} +
0 tmp/some-new-file.txt
charlievilla@MacBookPro lx-test % ]
```

Figure 3.7: Part C #23 Terminal Output

## 3.6 Part F: Processes & Job Control

- 24: Tree View:

```
ubuntu@Ubuntu:~/lx-test$ ps -ef --forest
Sep 17 19:02
ubuntu@Ubuntu:~/lx-test
```

| UID  | PID | PPID | C | STIME | TTY | TIME     | CMD                          |
|------|-----|------|---|-------|-----|----------|------------------------------|
| root | 2   | 0    |   | 18:45 | ?   | 00:00:00 | [kthreadd]                   |
| root | 3   | 2    |   | 18:45 | ?   | 00:00:00 | \_ [pool_workqueue_release]  |
| root | 4   | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-rcu_gp]        |
| root | 5   | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-sync_wq]       |
| root | 6   | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-kvfree_rcu_re  |
| root | 7   | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-slub_flushwq]  |
| root | 8   | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-netns]         |
| root | 9   | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/0:0-rcu_gp]      |
| root | 11  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/0:0H-events_hig  |
| root | 13  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-mm_percpu_wq]  |
| root | 14  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [rcu_tasks_kthread]       |
| root | 15  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [rcu_tasks_rude_kthread]  |
| root | 16  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [rcu_tasks_trace_kthread] |
| root | 17  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [ksoftirqd/0]             |
| root | 18  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [rcu_prempt]              |
| root | 19  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [rcu_exp_par_gp_kthread_  |
| root | 20  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [rcu_exp_gp_kthread_work] |
| root | 21  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [migration/0]             |
| root | 22  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [idle_inject/0]           |
| root | 23  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [cpuhp/0]                 |
| root | 24  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kdevtmpfs]               |
| root | 25  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-inet_frag_wq]  |
| root | 26  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kauditfd]                |
| root | 27  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [khungtaskd]              |
| root | 29  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [oom_reaper]              |
| root | 31  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-writeback]     |
| root | 32  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kcompactd0]              |
| root | 33  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [ksmd]                    |
| root | 34  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [khugepaged]              |
| root | 35  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-kintegrityd]   |
| root | 36  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-kblockd]       |
| root | 37  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-blkcg_punt_b   |
| root | 38  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [irq/9-acpi]              |
| root | 39  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-tpm_dev_wq]    |
| root | 40  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-ata_sff]       |
| root | 41  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-md]            |
| root | 42  | 2    |   | 18:45 | ?   | 00:00:00 | \_ [kworker/R-md_bitmap]     |

Figure 3.8: Part F #24 Tree View 1

```

File Machine View Input Devices Help
Sep 17 19:02
ubuntu@Ubuntu: ~/lx-test

root      42      2  0 18:45 ?    00:00:00 \_ [kworker/R-mqd_llcmq]
root      43      2  0 18:45 ?    00:00:00 \_ [kworker/R-edac-poller]
root      44      2  0 18:45 ?    00:00:00 \_ [kworker/R-devfreq_wq]
root      45      2  0 18:45 ?    00:00:00 \_ [watchdogd]
root      46      2  0 18:45 ?    00:00:00 \_ [kworker/0:1H-kblockd]
root      47      2  0 18:45 ?    00:00:00 \_ [kswapd0]
root      48      2  0 18:45 ?    00:00:00 \_ [ecryptfs-kthread]
root      49      2  0 18:45 ?    00:00:00 \_ [kworker/R-kthrotld]
root      50      2  0 18:45 ?    00:00:00 \_ [kworker/R-acpi_thermal_
root      51      2  0 18:45 ?    00:00:00 \_ [scsi_eh_0]
root      52      2  0 18:45 ?    00:00:00 \_ [kworker/R-scsi_tmf_0]
root      53      2  0 18:45 ?    00:00:00 \_ [scsi_eh_1]
root      54      2  0 18:45 ?    00:00:00 \_ [kworker/R-scsi_tmf_1]
root      55      2  0 18:45 ?    00:00:00 \_ [kworker/u4:3-events_unb
root      56      2  0 18:45 ?    00:00:00 \_ [kworker/u4:4-events_unb
root      58      2  0 18:45 ?    00:00:00 \_ [kworker/R-mld]
root      59      2  0 18:45 ?    00:00:00 \_ [kworker/R-ipv6_addrconf
root      61      2  0 18:45 ?    00:00:00 \_ [kworker/u4:5-flush-8:0]
root      67      2  0 18:45 ?    00:00:00 \_ [kworker/R-kstrt]
root      69      2  0 18:45 ?    00:00:00 \_ [kworker/u5:0-ttm]
root      82      2  0 18:45 ?    00:00:00 \_ [kworker/R-charger_manag
root     128      2  0 18:45 ?    00:00:00 \_ [scsi_eh_2]
root     129      2  0 18:45 ?    00:00:00 \_ [kworker/R-scsi_tmf_2]
root     130      2  0 18:45 ?    00:00:00 \_ [scsi_eh_3]
root     131      2  0 18:45 ?    00:00:00 \_ [kworker/R-scsi_tmf_3]
root     189      2  0 18:45 ?    00:00:00 \_ [jbd2/sda2-8]
root     190      2  0 18:45 ?    00:00:00 \_ [kworker/R-ext4-rsv-conv
root     311      2  0 18:45 ?    00:00:00 \_ [psimon]
root     617      2  0 18:45 ?    00:00:00 \_ [kworker/R-iprt-VBoxWQue
root     620      2  0 18:45 ?    00:00:00 \_ [irq/18-vmwgfx]
root     622      2  0 18:45 ?    00:00:00 \_ [kworker/R-ttm]
root     641      2  0 18:45 ?    00:00:00 \_ [kworker/u4:6-events_unb
root     676      2  0 18:45 ?    00:00:00 \_ [kworker/R-cryptd]
root    3068      2  0 18:46 ?    00:00:00 \_ [kworker/0:3-cgroup_dest
root    3174      2  0 18:46 ?    00:00:00 \_ [kworker/0:3-cgroup_dest]
root    3537      2  0 18:53 ?    00:00:00 \_ [kworker/u4:0-events_unb
root    3731      2  0 18:56 ?    00:00:00 \_ [kworker/u4:1-events_unb
root    3778      2  0 18:56 ?    00:00:00 \_ [kworker/0:1-events]
root    3915      2  0 18:56 ?    00:00:00 \_ [psimon]

```

Figure 3.9: Part F #24 Tree View 2

```

root      3915  2  0 18:56 ?    0:00:00  \_ lpsmon
root       1  0  0 18:45 ?    0:00:03 /sbin/init splash noprompt n
root     243  1  0 18:45 ?    0:00:00 /usr/lib/systemd/systemd-jou
systemd+ 263  1  0 18:45 ?    0:00:00 /usr/lib/systemd/systemd-oom
systemd+ 301  1  0 18:45 ?    0:00:00 /usr/lib/systemd/systemd-res
root     310  1  0 18:45 ?    0:00:00 /usr/lib/systemd/systemd-ude
avahi    675  1  0 18:45 ?    0:00:00 avahi-daemon: running [Ubuntu
avahi    839  675  0 18:45 ?    0:00:00  \_ avahi-daemon: chroot hel
message+ 677  1  0 18:45 ?    0:00:01 @dbus-daemon --system --addr
gnome-r+ 687  1  0 18:45 ?    0:00:00 /usr/libexec/gnome-remote-de
polkitd  709  1  0 18:45 ?    0:00:00 /usr/lib/polkit-1/polkitd --
root     740  1  0 18:45 ?    0:00:06 /usr/lib/snapd/snapd
root     743  1  0 18:45 ?    0:00:00 /usr/libexec/accounts-daemon
root     745  1  0 18:45 ?    0:00:00 /usr/sbin/cron -f -P
root     748  1  0 18:45 ?    0:00:00 /usr/libexec/switcheroo-cont
root     764  1  0 18:45 ?    0:00:00 /usr/lib/systemd/systemd-log
root     778  1  0 18:45 ?    0:00:00 /usr/libexec/udisks2/udisksd
syslog   862  1  0 18:45 ?    0:00:00 /usr/sbin/rsyslogd -n -iNONE
root     898  1  0 18:45 ?    0:00:00 /usr/sbin/NetworkManager --n
root     907  1  0 18:45 ?    0:00:00 /usr/sbin/wpa_supplicant -u
root     975  1  0 18:45 ?    0:00:00 /usr/sbin/ModemManager
root    1336  1  0 18:45 ?    0:00:00 /usr/bin/VBoxDRMClient
root    1343  1  0 18:45 ?    0:00:00 /usr/sbin/VBoxService --pidf
root    1593  1  0 18:45 ?    0:00:00 /usr/sbin/cupsd -l
root    1596  1  0 18:45 ?    0:00:00 /usr/bin/python3 /usr/share/
cups-br+ 1610  1  0 18:45 ?    0:00:00 /usr/sbin/cups-browsed
root    1612  1  0 18:45 ?    0:00:00 /usr/sbin/gdm3
root    2202  1612  0 18:46 ?    0:00:00  \_ gdm-session-worker [pam/
ubuntu  2269  2202  0 18:46 tty2  0:00:00  \_ /usr/libexec/gdm-way
ubuntu  2277  2269  0 18:46 tty2  0:00:00  \_ /usr/libexec/gno
rtkit   1692  1  0 18:45 ?    0:00:00 /usr/libexec/rtkit-daemon
colord   1804  1  0 18:45 ?    0:00:00 /usr/libexec/colord
root    1845  1  0 18:45 ?    0:00:00 /usr/libexec/upowerd
root    2145  1  0 18:46 ?    0:00:00 /usr/libexec/power-profiles-
ubuntu  2208  1  0 18:46 ?    0:00:00 /usr/lib/systemd/systemd --u
ubuntu  2209  2208  0 18:46 ?    0:00:00  \_ (sd-pam)
ubuntu  2222  2208  0 18:46 ?    0:00:00  \_ /usr/bin/mpрис-proxy
ubuntu  2224  2208  0 18:46 ?    0:00:00  \_ /usr/bin/pipewire
ubuntu  2225  2208  0 18:46 ?    0:00:00  \_ /usr/bin/pipewire -c fil

```

Figure 3.10: Part F #24 Tree View 3

```

File Machine View Input Devices Help
Sep 17 19:46:23 ubuntu@Ubuntu: ~
[1]+ 0 pts/0    pts/0    0:00 /usr/bin/pipewire -c +lt
ubuntu 2227 2208 0 18:46 ? 00:00:00 \_ /snap/snapd-desktop-inte
ubuntu 2516 2227 0 18:46 ? 00:00:00 | \_ /snap/snapd-desktop-
ubuntu 2228 2208 0 18:46 ? 00:00:00 | \_ /usr/bin/wireplumber
ubuntu 2229 2208 0 18:46 ? 00:00:00 | \_ /usr/bin/pipewire-pulse
ubuntu 2230 2208 0 18:46 ? 00:00:00 | \_ /usr/bin/gnome-keyring-d
ubuntu 2231 2208 0 18:46 ? 00:00:00 | \_ /usr/bin/dbus-daemon --s
ubuntu 2343 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/xdg-documen
root 2365 2343 0 18:46 ? 00:00:00 | \_ fusermount3 -o rw,no
ubuntu 2348 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gcr-ssh-age
ubuntu 2349 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gnome-sessi
ubuntu 2353 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/xdg-permiss
ubuntu 2361 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gvfsd
ubuntu 2898 2361 0 18:46 ? 00:00:00 | \_ /usr/libexec/gvfsd-t
ubuntu 2384 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gvfsd-fuse
ubuntu 2387 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gnome-sessi
ubuntu 2436 2387 0 18:46 ? 00:00:00 | \_ /usr/libexec/at-spi-
ubuntu 2457 2436 0 18:46 ? 00:00:00 | \_ /usr/bin/dbus-da
ubuntu 2611 2387 0 18:46 ? 00:00:00 | \_ /usr/libexec/gsd-dis
ubuntu 2614 2387 0 18:46 ? 00:00:00 | \_ /usr/libexec/evoluti
ubuntu 3203 2387 0 18:47 ? 00:00:00 | \_ /usr/bin/update-noti
ubuntu 2435 2208 2 18:46 ? 00:00:17 \_ /usr/bin/gnome-shell
ubuntu 2670 2435 0 18:46 ? 00:00:00 | \_ /usr/bin/Xwayland :0
ubuntu 3021 2435 0 18:46 ? 00:00:00 | \_ /usr/libexec/mutter-
ubuntu 3111 2435 0 18:46 ? 00:00:01 | \_ gjs /usr/share/gnome
ubuntu 2502 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/at-spi2-reg
ubuntu 2539 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gnome-shell
ubuntu 2546 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/evolution-s
ubuntu 2558 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/goa-daemon
ubuntu 2562 2208 0 18:46 ? 00:00:00 | \_ /usr/bin/gjs -m /usr/sha
ubuntu 2567 2208 0 18:46 ? 00:00:00 | \_ /usr/bin/ibus-daemon --p
ubuntu 2754 2567 0 18:46 ? 00:00:00 | \_ /usr/libexec/ibus-me
ubuntu 2755 2567 0 18:46 ? 00:00:05 | \_ /usr/libexec/ibus-ex
ubuntu 2864 2567 0 18:46 ? 00:00:00 | \_ /usr/libexec/ibus-en
ubuntu 2568 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gsd-a11y-se
ubuntu 2570 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gsd-color
ubuntu 2571 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gsd-datetime
ubuntu 2574 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gsd-houseke
ubuntu 2575 2208 0 18:46 ? 00:00:00 | \_ /usr/libexec/gsd-keyboar

```

Figure 3.11: Part F #24 Tree View 4

```
File Machine View Input Devices Help
[ ] ubuntu@ubuntu: ~]$ ps -ef --forest
ubuntu 2574 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-housekeeper
ubuntu 2575 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-keyboard
ubuntu 2576 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-media-k
ubuntu 2578 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-power
ubuntu 2579 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-printer
ubuntu 2584 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-rfkill
ubuntu 2593 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-screensaver
ubuntu 2603 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-sharing
ubuntu 2608 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-smartcard
ubuntu 2613 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-sound
ubuntu 2625 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-wacom
ubuntu 2664 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-evolution-c
ubuntu 2736 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/goa-identity
ubuntu 2752 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-printer
ubuntu 2782 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/ibus-portal
ubuntu 2797 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gvfs-udisks
ubuntu 2799 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gvfs-evolution-a
ubuntu 2826 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gvfs-mtp-vo
ubuntu 2831 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gvfs-goa-vo
ubuntu 2836 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gvfs-gphoto
ubuntu 2841 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gvfs-afc-vo
ubuntu 2888 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/dconf-service
ubuntu 2896 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gvfsd-metadata
ubuntu 2935 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/xdg-desktop-search
ubuntu 2937 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/gsd-xsettings
ubuntu 2953 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/localsearch
ubuntu 2954 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/xdg-desktop-search
ubuntu 2981 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/ibus-x11
ubuntu 2989 2208 0 18:46 ?
00:00:00 \_ /usr/bin/gjs -m /usr/share/gjs
ubuntu 3000 2208 0 18:46 ?
00:00:00 \_ /usr/bin/VBoxClient --cl
ubuntu 3003 3000 0 18:46 ?
00:00:00 | \_ /usr/bin/VBoxClient
ubuntu 3029 2208 0 18:46 ?
00:00:00 \_ /usr/bin/VBoxClient --vm
ubuntu 3030 3029 0 18:46 ?
00:00:00 | \_ /usr/bin/VBoxClient
ubuntu 3123 2208 0 18:46 ?
00:00:00 \_ /usr/libexec/xdg-desktop-search
ubuntu 3514 2208 0 18:53 ?
00:00:00 \_ /usr/libexec/gnome-terminal
ubuntu 3521 3514 0 18:53 pts/0
00:00:00 \_ bash
ubuntu 3939 3521 99 18:58 pts/0
00:00:00 \_ ps -ef --forest
ubuntu@ubuntu: ~]$
```

Figure 3.12: Part F #24 Tree View 5

- 25:

```
ubuntu@Ubuntu:~/lx-test$ sleep 120 &
[1] 4380
ubuntu@Ubuntu:~/lx-test$ echo $!
4380
ubuntu@Ubuntu:~/lx-test$ jobs -l
[1]+ 4380 Running                  sleep 120 &
```

Figure 3.13: Part F #25 Sleep 120 in the background and its PID

- 26:

```
ubuntu@Ubuntu:~/lx-test$ pkill -TERM -u "$USER" sleep
ubuntu@Ubuntu:~/lx-test$ pgrep -a sleep || echo "no sleep processes found"
no sleep processes found
```

Figure 3.14: Part F #26 TERM signal

- 27:

```
ubuntu@Ubuntu:~/lx-test$ ps -eo pid,ppid,cmd,%mem,%cpu --sort=-%mem | head -n 6
 PID  PPID CMD %MEM %CPU
 2435 2208 /usr/bin/gnome-shell 11.1 3.9
 3021 2435 /usr/libexec/mutter-x11-fra 3.2 0.0
 3003 3000 /usr/bin/VBoxClient --clipb 3.0 0.0
 2937 2208 /usr/libexec/gsd-xsettings 2.4 0.0
 3111 2435 gjs /usr/share/gnome-shell/ 2.0 0.1
```

Figure 3.15: Part F #27 Top 5 Processes

## 3.7 Part G: Archiving & Compression

- 28:

```
1      tar czf src.tar.gz
2
```

- 29:

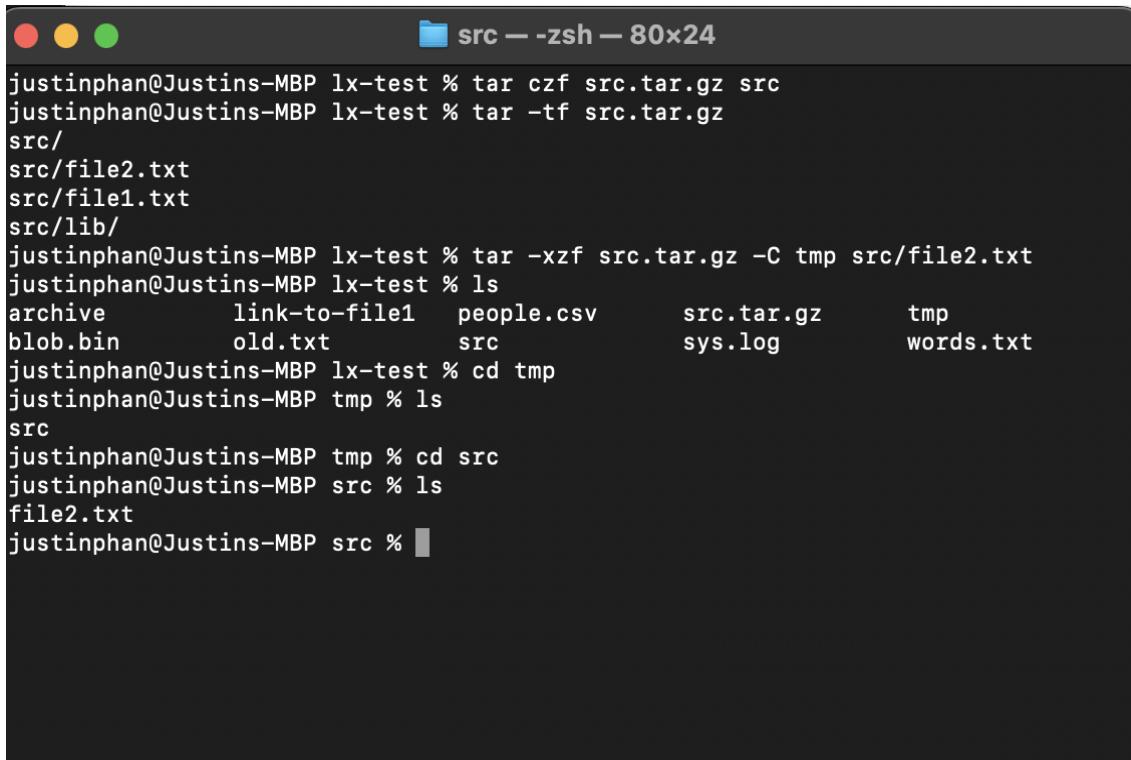
```
1      tar -tf src.tar.gz
2
```

- 30:

```
1      tar -xzf src.tar.gz -C tmp src/file2.txt
2
```

## 3.8 Part H: Networking & System Info

- 31:

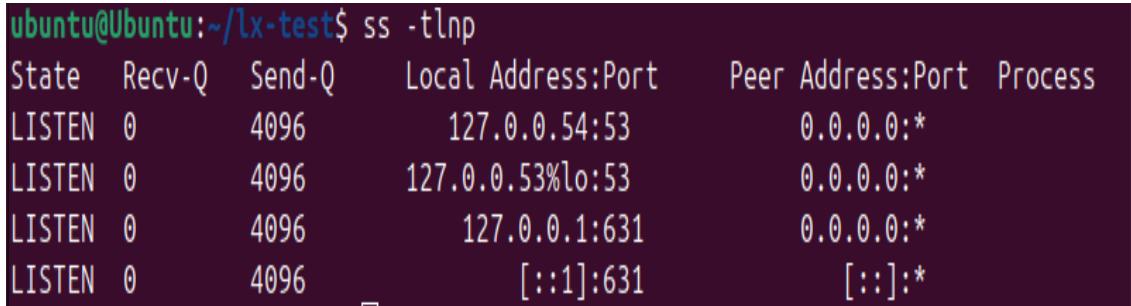


```

justinphan@Justins-MBP lx-test % tar czf src.tar.gz src
justinphan@Justins-MBP lx-test % tar -tf src.tar.gz
src/
src/file2.txt
src/file1.txt
src/lib/
justinphan@Justins-MBP lx-test % tar -xzf src.tar.gz -C tmp src/file2.txt
justinphan@Justins-MBP lx-test % ls
archive      link-to-file1  people.csv      src.tar.gz      tmp
blob.bin     old.txt       src            sys.log       words.txt
justinphan@Justins-MBP lx-test % cd tmp
justinphan@Justins-MBP tmp % ls
src
justinphan@Justins-MBP tmp % cd src
justinphan@Justins-MBP src % ls
file2.txt
justinphan@Justins-MBP src %

```

Figure 3.16: Part G Terminal Output



| ubuntu@Ubuntu:~/lx-test\$ ss -tlnp |        |        |                    |                   |         |  |
|------------------------------------|--------|--------|--------------------|-------------------|---------|--|
| State                              | Recv-Q | Send-Q | Local Address:Port | Peer Address:Port | Process |  |
| LISTEN                             | 0      | 4096   | 127.0.0.54:53      | 0.0.0.0:*         |         |  |
| LISTEN                             | 0      | 4096   | 127.0.0.53%lo:53   | 0.0.0.0:*         |         |  |
| LISTEN                             | 0      | 4096   | 127.0.0.1:631      | 0.0.0.0:*         |         |  |
| LISTEN                             | 0      | 4096   | [::1]:631          | [::]:*            |         |  |

Figure 3.17: Part H #31 TCP sockets with associated PIDs

- 32:

```
ubuntu@Ubuntu:~/lx-test$ ip route show default
default via 10.0.2.2 dev enp0s3 proto dhcp src 10.0.2.15 metric 100
ubuntu@Ubuntu:~/lx-test$ ip route show default | awk '/default/ {print $3}'
10.0.2.2
```

Figure 3.18: Part H #32 Default Route (gateway) in a concise form

- 33:

```
ubuntu@Ubuntu:~/lx-test$ uname -SRM
Linux 6.14.0-29-generic x86_64
```

Figure 3.19: Part H #33 Kernel name, Release, and Machine Architecture

- 34:

```
ubuntu@Ubuntu:~/lx-test$ cat /var/log/wtmp | strings | tail -n 5
ubuntu
login screen
tty2
ubuntu
tty2
```

Figure 3.20: Part H #34 Last 5 successful logins on the system

## 3.9 Part I: Package & Services (Debian/Ubuntu)

- 35:

```
1      brew list --versions coreutils
2
```

- 36:

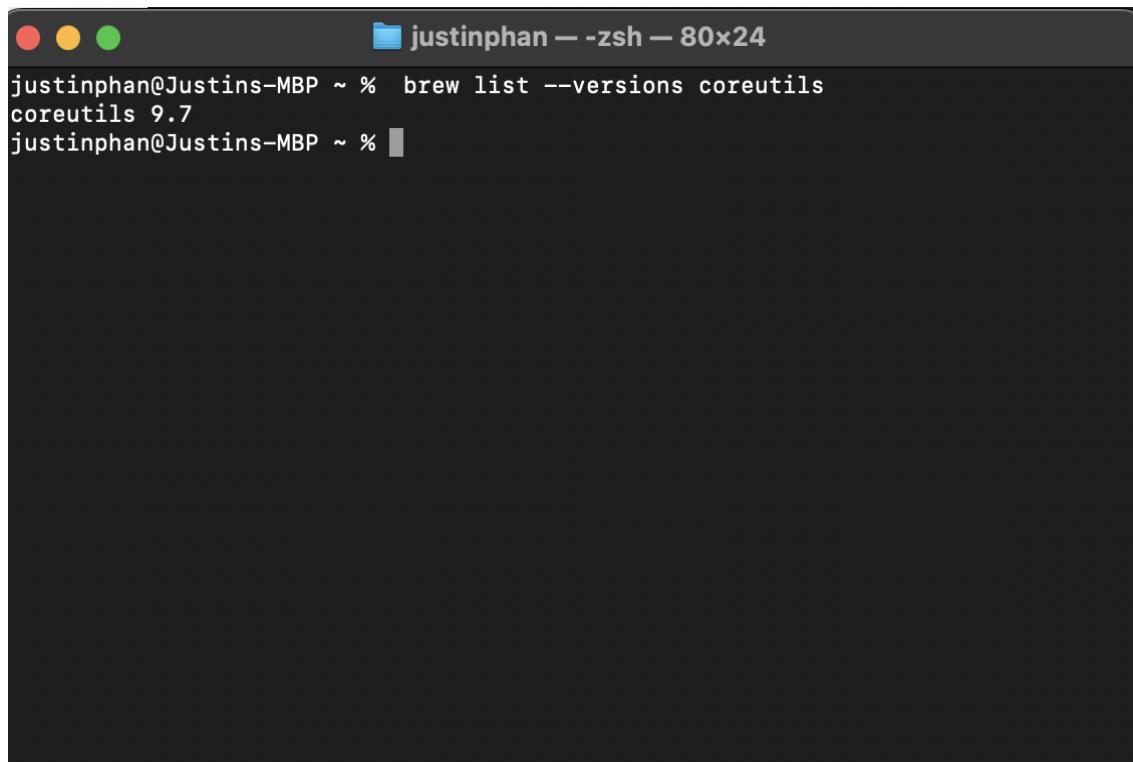
A screenshot of a macOS terminal window titled "justinphan — -zsh — 80x24". The window shows the command "brew list --versions coreutils" being run, with the output "coreutils 9.7" displayed. The terminal has a dark background and standard macOS window controls.

Figure 3.21: Part I #35 Terminal Output showing the installed version of package coreutils

1        brew search ripgrep  
2

- 37:

1        systemctl status cron | grep "Active."  
2

## 3.10 Part J: Bash & Scripting

- 38:

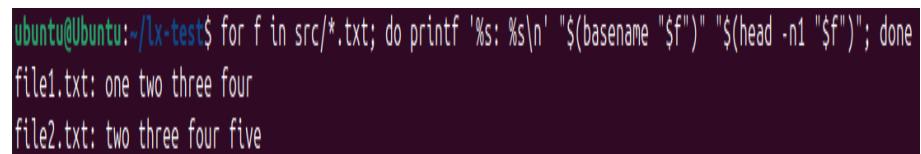
A screenshot of a Linux terminal window titled "ubuntu@Ubuntu:~/lx-test\$". The window shows a one-liner script using a for loop to process files in the "src" directory. The output shows two files, "file1.txt" and "file2.txt", each containing four lines of text. The script uses printf to format the output.

Figure 3.24: Part J #38 One-liner that loops over

- 39:

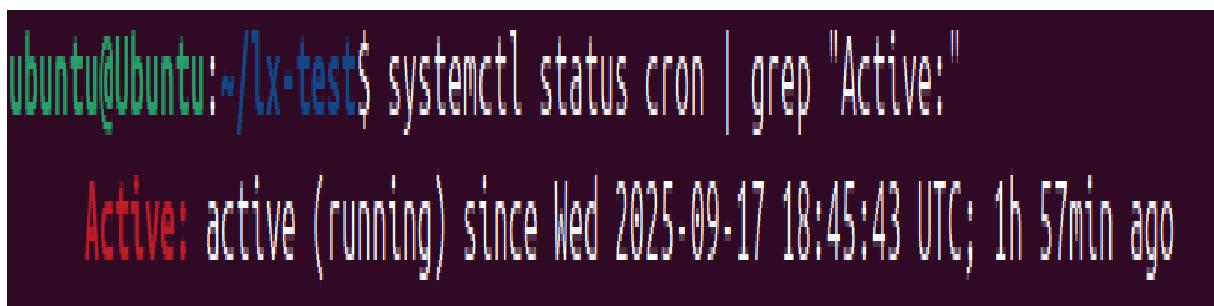
A screenshot of a macOS terminal window titled "justinphan — -zsh — 80x24". The window shows the command "brew search ripgrep" being run. The output lists two packages: "ripgrep" and "ripgrep-all", under the "Formulae" section. There is also a "Casks" section which lists "ripme".

```
justinphan@Justins-MBP ~ % brew search ripgrep

==> Formulae
ripgrep                   ripgrep-all

==> Casks
ripme
justinphan@Justins-MBP ~ %
```

Figure 3.22: Part I #36 Terminal Output showing all available packages whose names contain ripgrep

A screenshot of a Linux terminal window showing the command "systemctl status cron | grep 'Active:'". The output indicates that the cron service is active and has been running since Wednesday, September 17, 2025, at 18:45:43 UTC.

```
Ubuntu@Ubuntu:~/lx-test$ systemctl status cron | grep "Active:"
Active: active (running) since Wed 2025-09-17 18:45:43 UTC; 1h 57min ago
```

Figure 3.23: Part I #37 Terminal Output

```
ubuntu@Ubuntu:~/lx-test$ awk -F, '$NR>1 && $3=="CS" {print}' people.csv > cs.txt
```

Figure 3.25: Part J #39 A command that exports CSV rows

- 40:

```
ubuntu@Ubuntu:~/lx-test$ export X=42
ubuntu@Ubuntu:~/lx-test$ echo "$X"
42
ubuntu@Ubuntu:~/lx-test$ unset X
ubuntu@Ubuntu:~/lx-test$ env | grep -w '^X' || echo "X is unset"
X is unset
ubuntu@Ubuntu:~/lx-test$
```

Figure 3.26: Part J #40 Create a variable X with value 42

# Chapter 4

## Project Proposal

*– Charles, Justin, Benedict, Jacky*

**Project Title:** Dicey DevOps: A Luck-Based Probability Game

**Project Description:** Our project is a web-based luck game that also teaches concepts of probability and the idea of risk versus reward. Players will roll dice and place bets on different outcomes such as totals, pairs, triples, or exact numbers. They can choose to re-roll or lock dice, which adds strategic choices between safer but lower-value options and riskier plays with higher potential rewards. The game will also feature occasional "event rounds" where special conditions apply (such as bonus payouts or inverted win conditions). After each round, the game will provide insights into the actual probability of success and expected value, helping players better understand chance, statistics, and decision-making.

Sample tasks include designing the dice roll system with fair randomness, building a leader board to track high scores, and implementing "learning mode" features that explain probabilities to the player. Some tasks we have brainstormed include implementing the dice roll system, building a leader board, and creating a "learning mode" that explains probability insights to players. We will also design a dashboard to track both system health and game-related metrics such as win/loss ratios, re-roll usage, and outcome distributions.

For the DevOps side, we plan to use version control, testing, deployment pipelines, and monitoring tools. Examples may include GitHub for source control, Gitlab CI/CD pipelines to automate builds and deployments, PostgreSQL or another database for storing results, containerization with Docker, infrastructure as code tools for environment setup, and monitoring solutions such as Prometheus and Grafana. We are still discussing the exact tech stack as a team, but our goal is to keep the setup lightweight and easy to extend while still allowing us to compare multiple DevOps tools as required.

# Chapter 5

## AWS Deployment

– Charles, Justin, Benedict, Jacky

Live URL: <https://zjnbvfpug.us-east-1.awsapprunner.com>

### Overview

We deployed the *Two Buttons* website as a containerized service on AWS. The pipeline is:

1. Authenticate the AWS CLI via **SSO** (IAM Identity Center).
2. Build a Docker image locally and push it to **Amazon ECR**.
3. Deploy from ECR to a managed container runtime using **AWS App Runner**.

**Why App Runner?** For a small stateless web app, App Runner removes the need to manage ECS tasks/services, load balancers, or EC2 capacity. It auto-builds or pulls from ECR, provisions HTTPS and scaling, and exposes a public URL with minimal ops overhead (good for a course project).

**Project root used for the build** C:\Users\benma\Documents\docker-examples-benedict\docker-examples\color-buttons-app

### Prerequisites

- Windows 10/11 with **Docker Desktop** and **AWS CLI v2**.
- **SSO** set up in the AWS Console (IAM Identity Center) with an AdminAccess permission set (temporary for the lab).
- Overleaf configured to compile with `minted` (shell escape enabled).

## Authenticate the AWS CLI (SSO)

```
aws configure sso
aws sso login --profile default
aws sts get-caller-identity --profile default
# Confirm the returned Account ID is yours and an SSO role is assumed.
```

## Build, Tag, and Push the Image to Amazon ECR

```
# Go to the project folder
cd "C:\Users\benma\Documents\docker-examples-benedict\docker-examples\color-buttons-app"

# Environment
$Env:AWS_REGION="us-east-1"
$Env:ECR_REPO="color-buttons-app"
$Env:IMAGE_TAG="v1"
$Env:AWS_ACCOUNT_ID=(aws sts get-caller-identity --query Account --output text
    --profile default)

# Create the ECR repo if missing
aws ecr describe-repositories --repository-names $Env:ECR_REPO --region
    $Env:AWS_REGION --profile default *> $null ; if ($LASTEXITCODE -ne 0) {
    aws ecr create-repository --repository-name $Env:ECR_REPO
        --image-scanning-configuration scanOnPush=true
        --region $Env:AWS_REGION --profile default
}

# Log in Docker to ECR
aws ecr get-login-password --region $Env:AWS_REGION --profile default | docker login --username AWS --password-stdin
    '$($Env:AWS_ACCOUNT_ID).dkr.ecr.$($Env:AWS_REGION).amazonaws.com'

# Build, tag, and push (force linux/amd64 for App Runner build fleet
    compatibility)
docker build --platform linux/amd64 -t "$($Env:ECR_REPO):$($Env:IMAGE_TAG)" .
docker tag "$($Env:ECR_REPO):$($Env:IMAGE_TAG)"
    "$($Env:AWS_ACCOUNT_ID).dkr.ecr.$($Env:AWS_REGION).amazonaws.com/$($Env:ECR_REPO):$($Env:IMAGE_TAG)"
docker push "$($Env:AWS_ACCOUNT_ID).dkr.ecr.$($Env:AWS_REGION).amazonaws.com/$($Env:ECR_REPO):$($Env:IMAGE_TAG)"
```

## Deploy with AWS App Runner (Console)

1. **Create service → Source:** Container registry → Amazon ECR.  
Choose repository color-buttons-app and tag v1.

2. **Service name:** color-buttons-app   **Port:** 3000.
3. **ECR access role:** *Create new service role* (let App Runner pull from ECR).
4. **Health check:** HTTP on path / (timeout 5s, interval 10s).
5. Click **Create & Deploy**; wait for *Status: Running* and note the *Default domain*.

## Verification

```
# Expect HTTP/2 200 (or similar)
curl -I https://zjnbvfpug.us-east-1.awssapprunner.com
```

Manually verify the page renders and both buttons switch background color (blue/red).

## Operating the Service (Logs, Scaling, Rollback)

- **Logs:** In App Runner → *Logs* tab to view system/app logs.
- **Scaling:** Default concurrency is 100 requests/instance, min 1, max 25 instances.
- **Re-deploy:** Push the same tag and choose *Actions* → *Deploy* for manual trigger services.
- **Rollback:** Keep prior image tags; re-point the service to the last known-good tag and redeploy.

## Cost Guardrails & Cleanup

App Runner and ECR are pay-as-you-go. To avoid charges after grading:

1. In **App Runner**: *Actions* → *Pause* or *Delete* the service.
2. In **ECR**: delete the image(s) and (optionally) the repository.

(We also set an AWS Budget alarm earlier to notify on any unexpected spend.)

## Figure

### Class-based JavaScript Refactor

We replaced the old function-based handlers with an class that encapsulates all behavior (buttons, events, and background updates). Only the public assets changed (`public/index.html`, `public/app.js`); the server continues to serve `public/` and listen on `0.0.0.0:3000`.

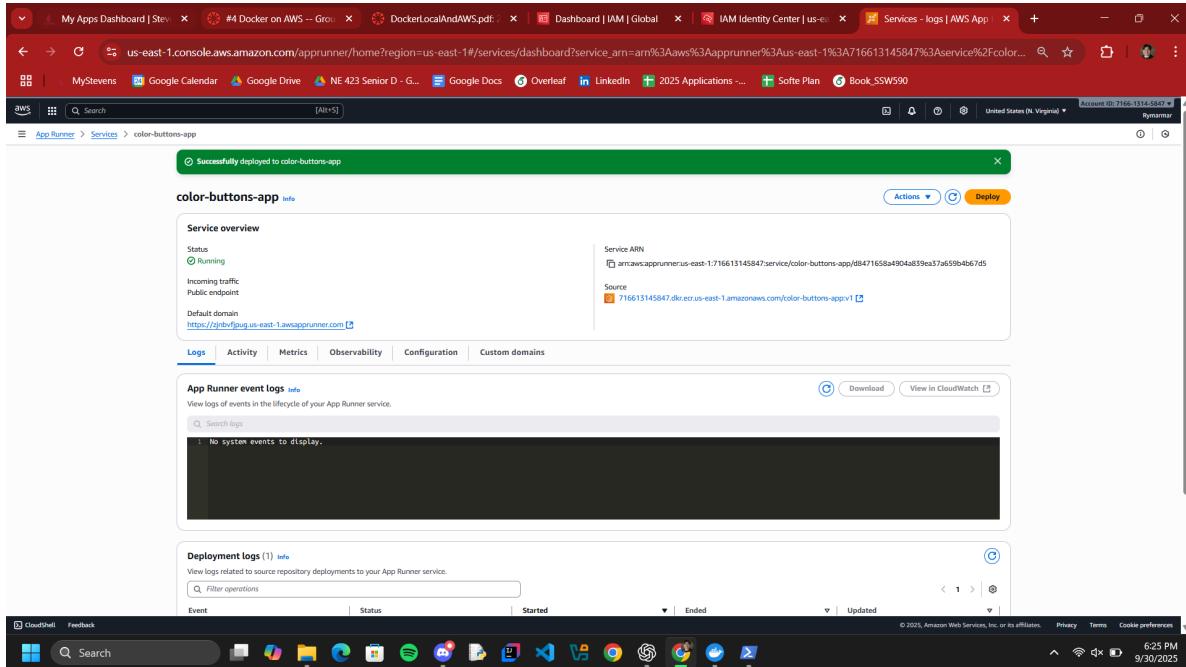


Figure 5.1: App Runner service in *Running* state with the default domain.

## Updated public/index.html

```
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8" />
  <title>Two Buttons</title>
</head>
<body>
  <h1>Two Buttons</h1>
  <button id="blueBtn">Blue</button>
  <button id="redBtn">Red</button>

  <script src="app.js"></script>
</body>
</html>
```

## New public/app.js (class-based)

```
class ColorButtonsApp {
  constructor() {
    this.$blue = document.getElementById("blueBtn");
    this.$red = document.getElementById("redBtn");
    this.bindEvents();
  }
}
```

```

bindEvents() {
  this.$blue.addEventListener("click", () => this.setBg("steelblue"));
  this.$red.addEventListener("click", () => this.setBg("crimson"));
}
setBg(color) { document.body.style.backgroundColor = color; }
}
window.addEventListener("DOMContentLoaded", () => new ColorButtonsApp());

```

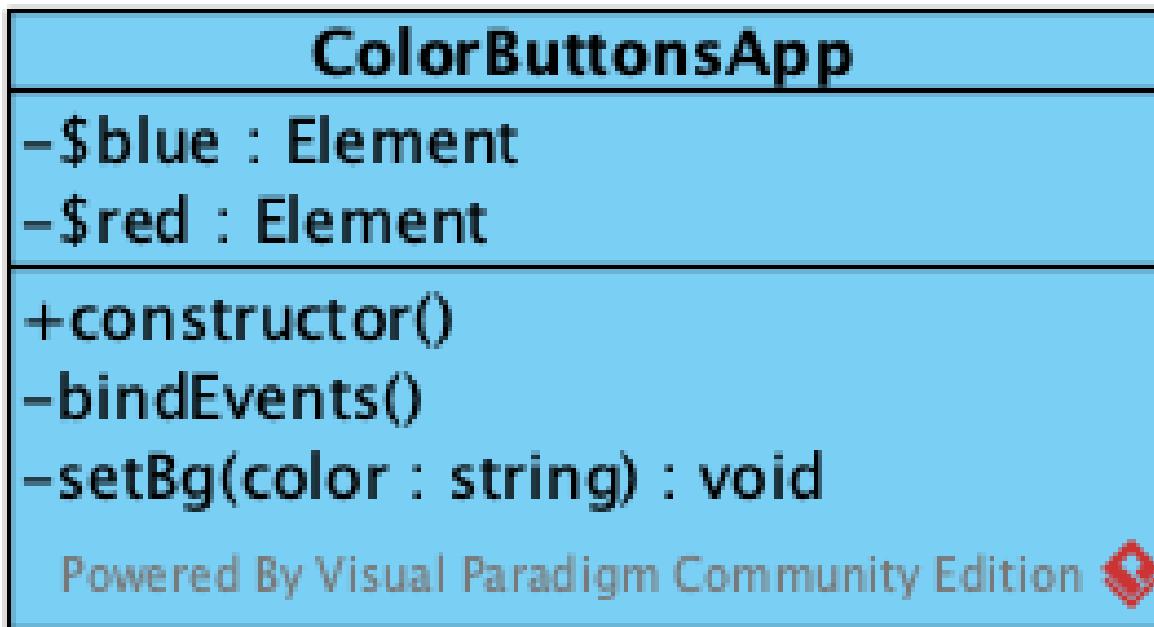


Figure 5.2: Class Diagram for App.js

## Server.js

```

import express from "express";
import path from "path";
import { fileURLToPath } from "url";

const __filename = fileURLToPath(import.meta.url);
const __dirname = path.dirname(__filename);

const app = express();
const PORT = process.env.PORT || 3000;

// Serve static files from public/
app.use(express.static(path.join(__dirname, "public")));

app.listen(PORT, "0.0.0.0", () => {

```

```
  console.log(`Server running at http://0.0.0.0:${PORT}!`);  
});
```

## package.json

```
{  
  "name": "color-buttons-app",  
  "version": "1.0.0",  
  "type": "module",  
  "main": "server.js",  
  "scripts": {  
    "start": "node server.js"  
  },  
  "dependencies": {  
    "express": "^4.18.2"  
  }  
}
```

**Result.** Clicking **Blue** or **Red** now triggers methods on a single `ColorButtonsApp` instance, keeping the global scope clean and making the behavior easy to unit test or extend.

# Chapter 6

## LaTeX Docker

– Charles, Justin, Benedict, Jacky

### 6.0.1 Project Directory Setup

- Create a folder docker-latex
- Start docker
- Make sure docker is running by using docker run hello-world
- cd into that folder directory

### 6.0.2 Docker Commands

- Create a Dockerfile with the content below

```
FROM debian:bullseye-slim

ENV DEBIAN_FRONTEND=noninteractive

RUN apt-get update && \
    apt-get install -y \
        texlive-latex-base \
        texlive-latex-recommended \
        texlive-fonts-recommended \
        texlive-latex-extra \
        make \
    && apt-get clean && rm -rf /var/lib/apt/lists/*

WORKDIR /doc

CMD ["pdflatex", "main.tex"]
```

- Run nano main.tex and paste your desired LaTeX content
- Build the docker image

- Run the docker command
- Check your folder to see if the main.pdf file is created

```
nano main.tex  
docker build -t docker-latex .  
docker run --rm -v "$PWD":/doc docker-latex
```

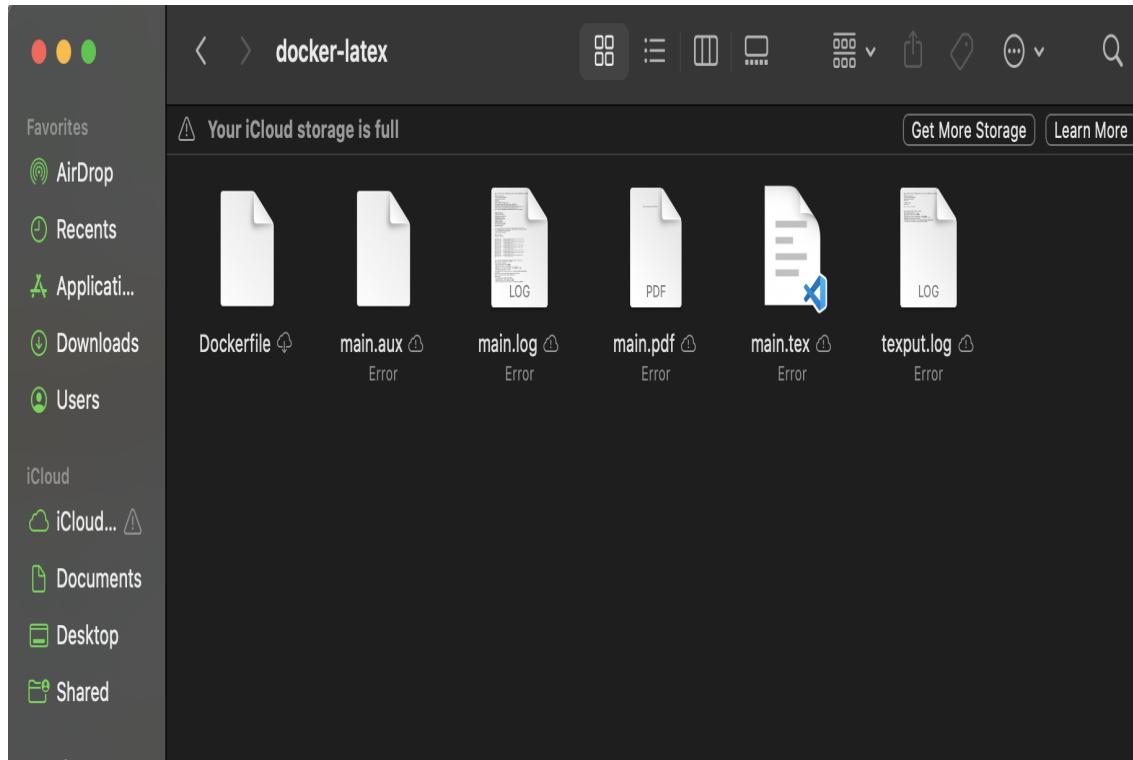


Figure 6.1: Folder containing files created from successful Docker build

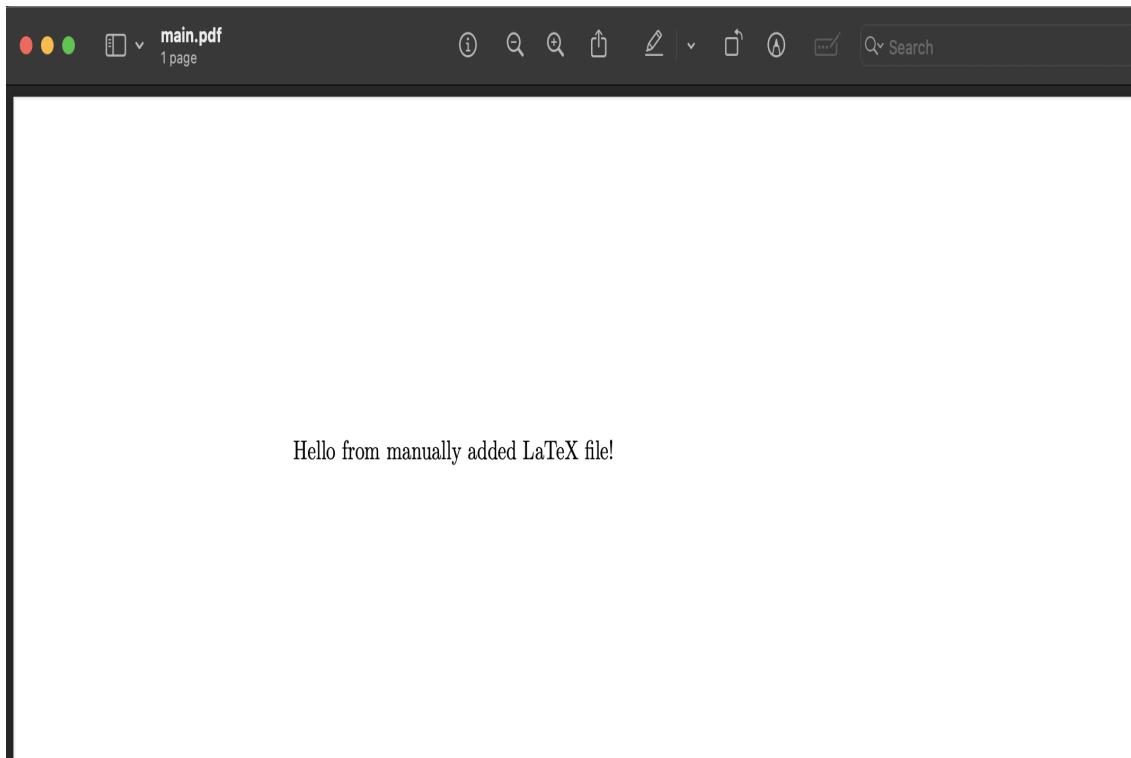


Figure 6.2: Docker compiled LaTeX document

# Chapter 7

## Bugzilla

*– Charles, Justin, Benedict, Jacky*

### 1. Setup Cloud Infrastructure and Access

- Created a Digital Ocean account and created a Ubuntu Droplet VM.
- Secured access by generating and adding an SSH key to the Droplet.

### 2. Prepare Container Environment

- Cloned the Bugzilla source code.
- Installed and fixed the missing dependencies (Docker Compose and the Docker service daemon) needed to run containers.

### 3. Deploy Application Containers

- Used Docker Compose to launch two linked services: the Bugzilla web application container and the MariaDB database container.
- Ensured the application's internal network port was mapped to the Droplet's external port 8080.

### 4. Finalize Configuration

- Executed the required Bugzilla setup script (`checksetup.pl`) inside the running web container to build the database schema and verify system readiness.

### 5. Access and Admin Creation

- Confirmed the application was accessible in a web browser at the public IP and port (<http://174.138.69.132.8080>).
- Completed the final step by creating the administrator account via the web interface.
- Deleted the Droplet (which is why the link might not work anymore) to avoid any unnecessary billing.

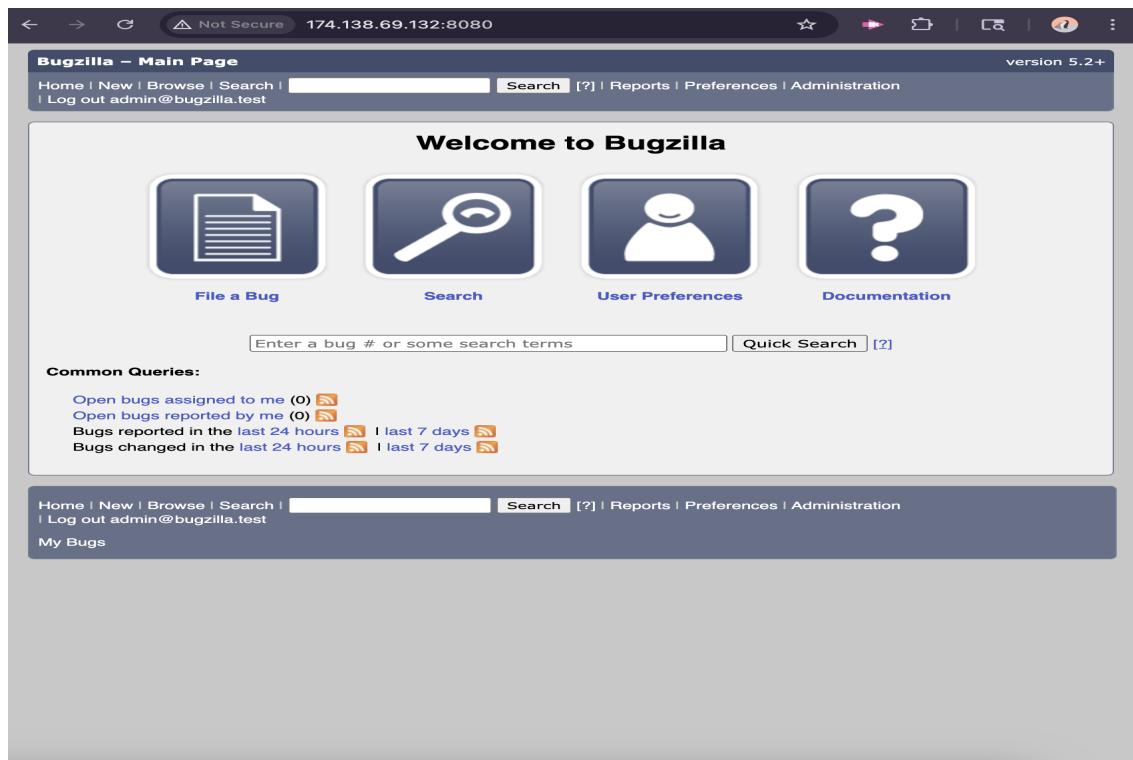


Figure 7.1: Bugzilla Container Running Screenshot

# Chapter 8

## Overleaf

*– Charles, Justin, Benedict, Jacky*

### 1. Setup Cloud Infrastructure and Access

- Created a Digital Ocean Droplet (VM) running Ubuntu.
- Secured access to the server by using the SSH protocol through the local terminal, which was made in the Bugzilla step.
- Resolved an initial SSH access issue to gain root privileges on the Droplet.

### 2. Prepare Container Environment

- Installed the necessary container tools (Docker Engine and Docker Compose V1), resolving dependency issues with the correct package name.
- Cloned the Overleaf Toolkit source code into the overleaf-ce directory.
- Edited the config/overleaf.tc file to set the application's public-facing address and listen on the appropriate IP/Port:
  - Set OVERLEAF\_LISTEN\_IP=0.0.0.0 and OVERLEAF\_PORT=80

### 3. Deploy Application Containers

- Launched the linked services (sharelatex, mongo, and redis) using the Toolkit's wrapper script "bin/up -d".
- Configured the host firewall (UFW) to allow external HTTP traffic on Port 80, exposing the application to the public internet.

### 4. Access and Admin Creation

- Confirmed the application was accessible in a web browser at the public IP and port (<http://104.236.74.225>).
- Deleted the Droplet (which is why the link might not work anymore) to avoid any unnecessary billing.

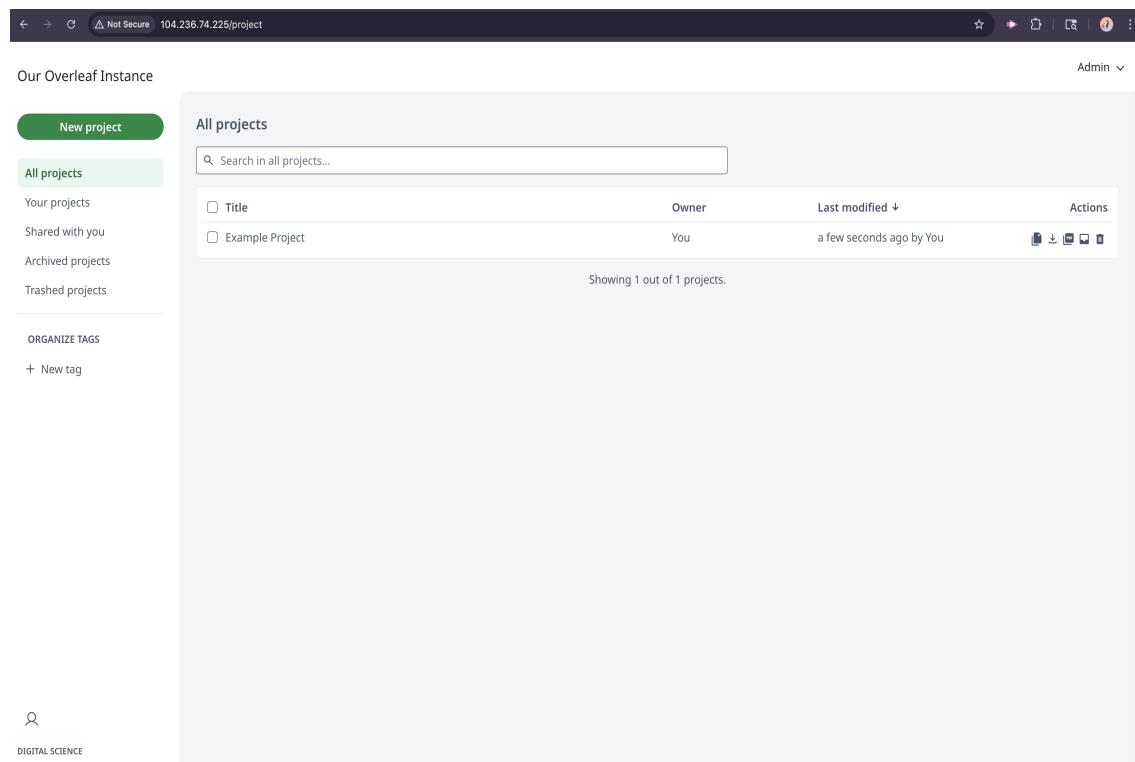


Figure 8.1: Overleaf Instance Main Menu Screenshot

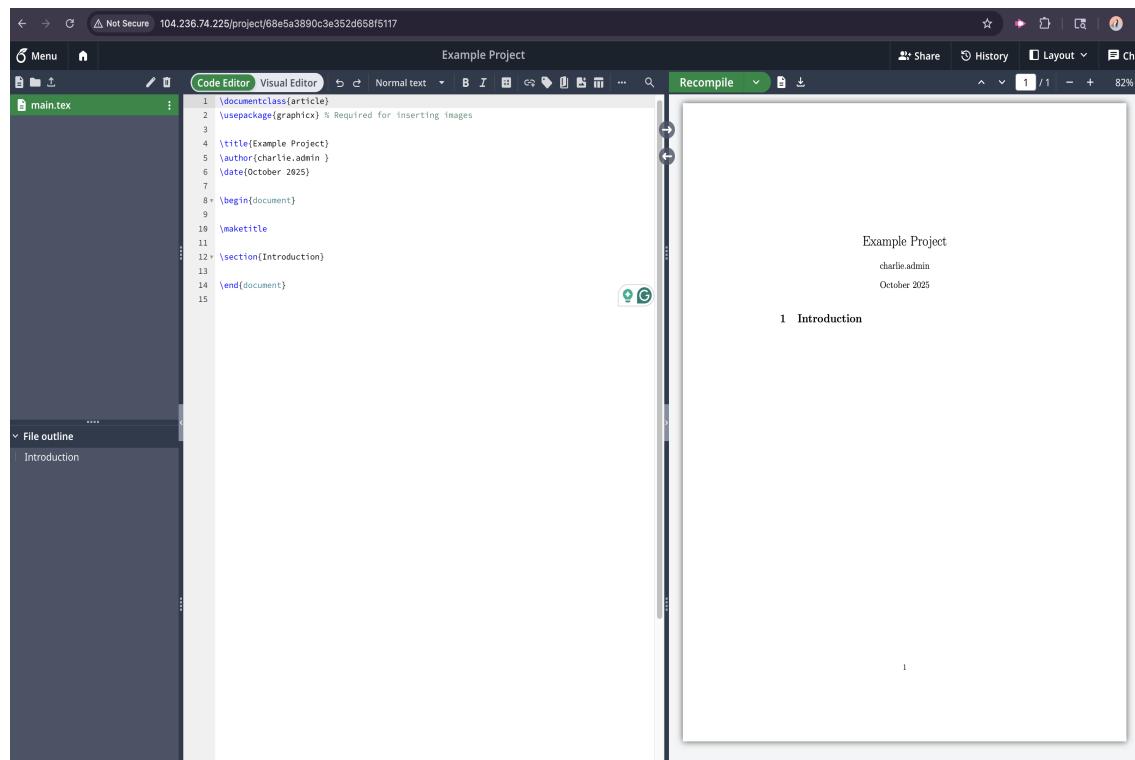


Figure 8.2: Overleaf Instance Example Project Screenshot

# Chapter 9

## Domain Names, SSL, and Versioning

*– Charles, Justin, Benedict, Jacky*

### 9.1 Assignment Overview

This chapter documents how our group configured a custom domain, secured it with SSL, and connected it to an Overleaf instance hosted via DigitalOcean and GitHub Pages. The work combines the DigitalOcean setup (completed by team members on macOS) with my GitHub Pages + SSL configuration. Screenshots and command examples are provided for each major step.

### 9.2 Step 1: Domain Registration

Our team registered the domain **rymarmar.me** using Namecheap through the GitHub Student Developer Pack (free for one year). The domain was verified, includes WHOIS privacy protection, and is configured to auto-renew.

### 9.3 Step 2: SSL Certificate Configuration

To secure all traffic, we enabled **HTTPS enforcement** using GitHub Pages, which automatically provisions SSL certificates through Let's Encrypt (renewed every 90 days). This provides secure HTTPS access without needing to manually install certificates.

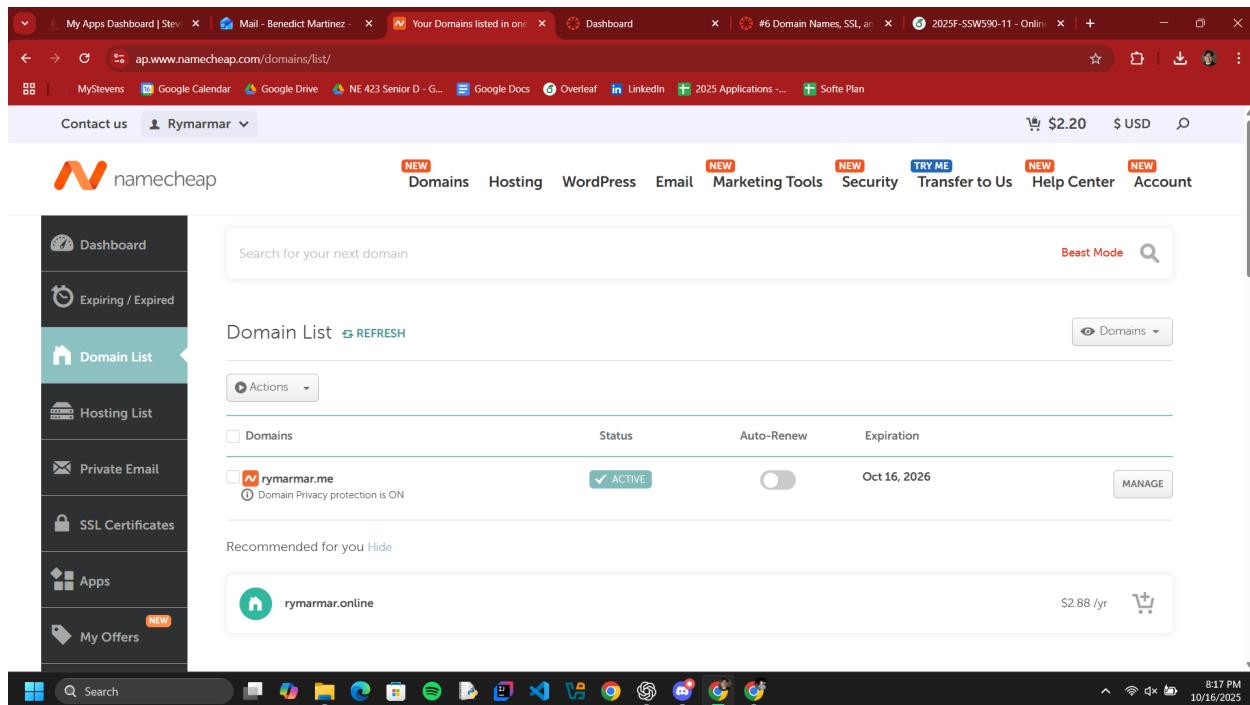


Figure 9.1: Namecheap domain list confirming registration of rymarmar.me.

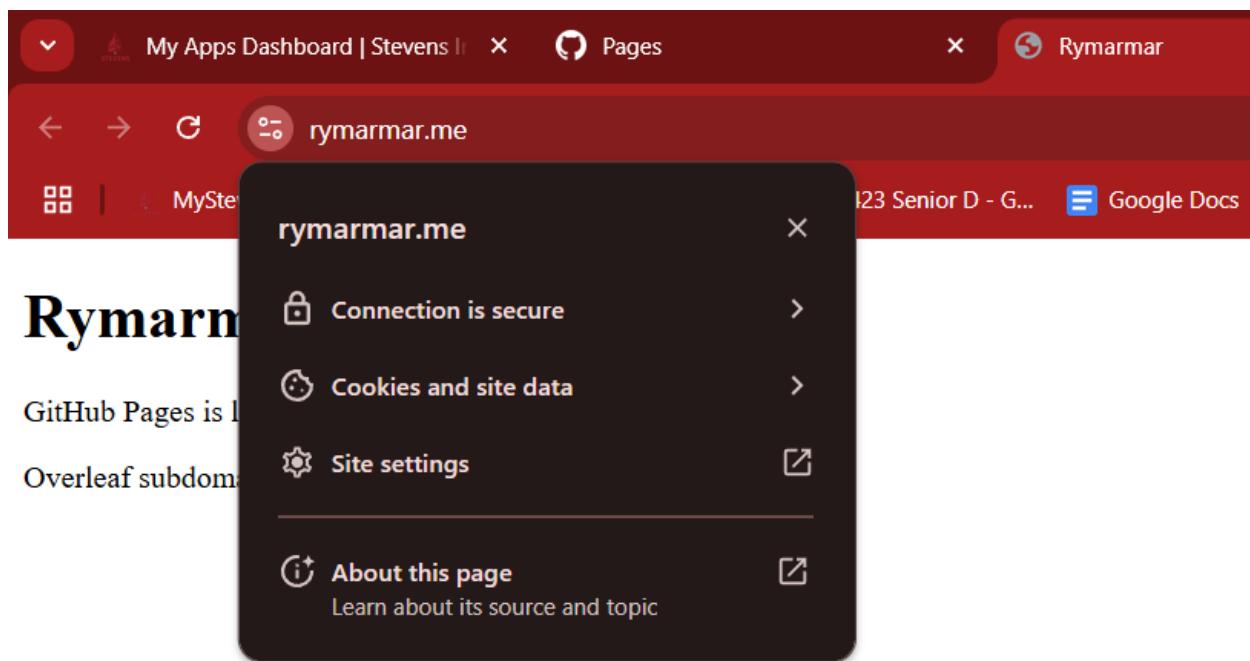


Figure 9.2: GitHub Pages settings showing HTTPS enforcement and DNS verification.  
Chapter 9 ©Stevens – October 22, 2025 – Do Not Distribute!

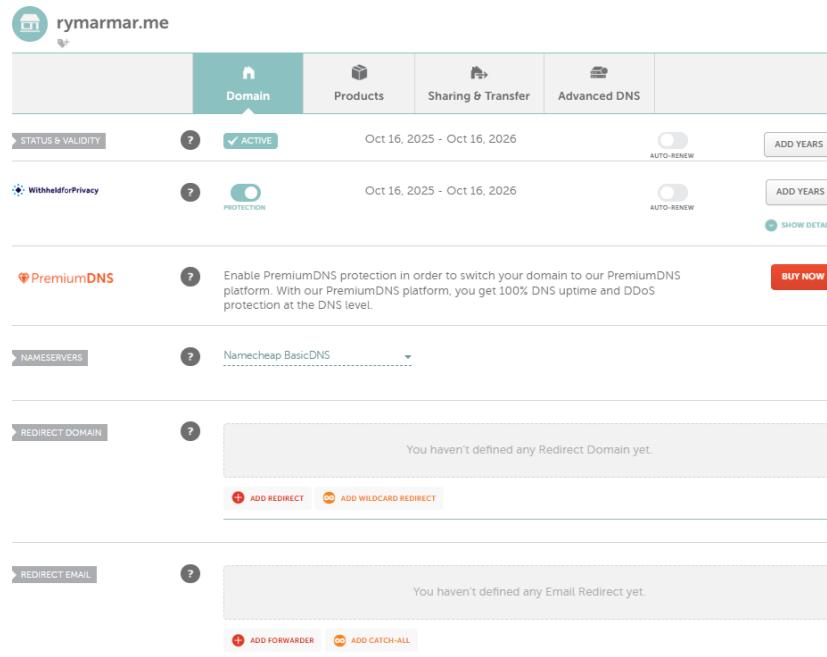


Figure 9.3: Browser confirmation that <https://rymarmar.me> is secured via SSL.

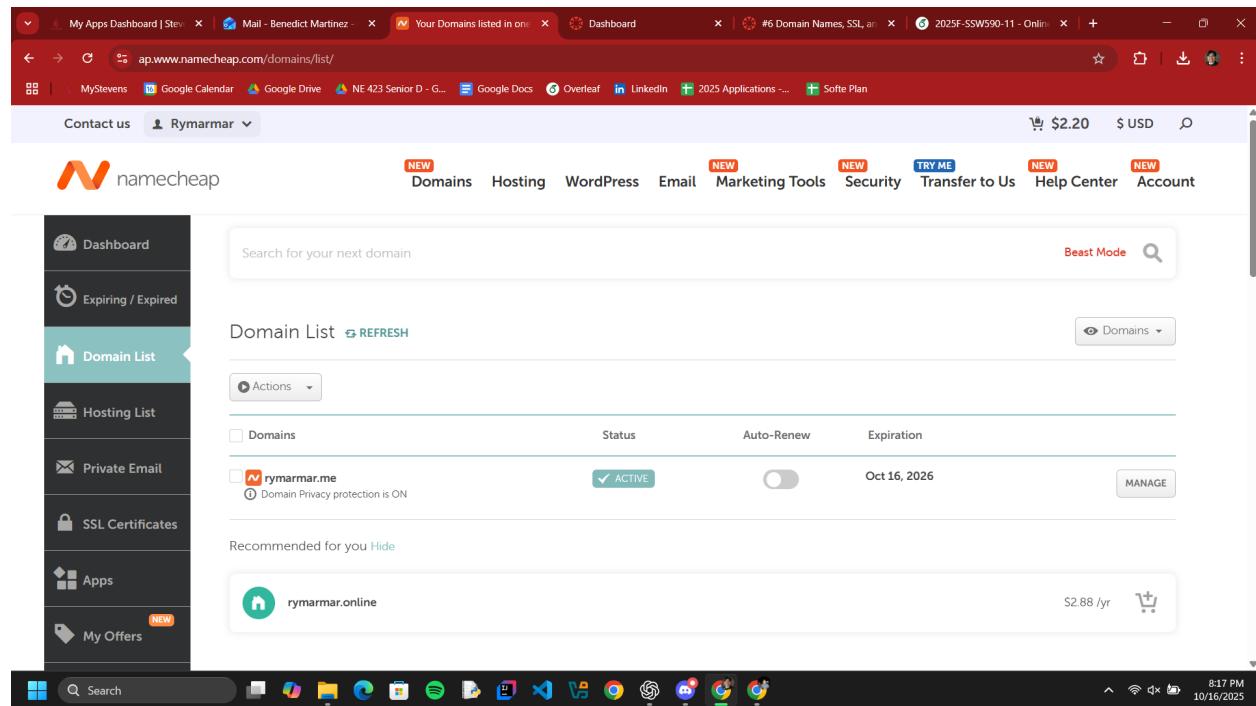


Figure 9.4: Namecheap domain list confirming registration of rymarmar.me.

## 9.4 Step 2.1: SSL Configuration using Caddy

Another option for providing SSL to the domain is using Caddy. Once installed using apt install caddy, we made a Caddyfile and modified the docker-compose file.

```

1      1      services:
2      2      sharelatex:
3      16      volumes:
4      33      OVERLEAF_SITE_URL: "https://ssw590team11.me"
5      156     caddy:
6      157     image: caddy:latest
7      158     container_name: caddy
8      159     ports:
9      160     - "80:80"
10     161     - "443:443"
11     162     volumes:
12     163     - ./Caddyfile:/etc/caddy/Caddyfile
13     164     - caddy_data:/data
14     165     - caddy_config:/config
15     166     depends_on:
16     167     - sharelatex
17     168     restart: unless-stopped
18     169     volumes:
19     170     mongo_data:
20     171     caddy_data:
21     172     caddy_config:
```

Figure 9.5: docker-compose.yml additions

```

1 ssw590team11.me {
2     reverse_proxy sharelatex:80
3 }
```

Figure 9.6: Caddyfile

We also added records on Digital Ocean and Namecheap to link our droplet to the domain.

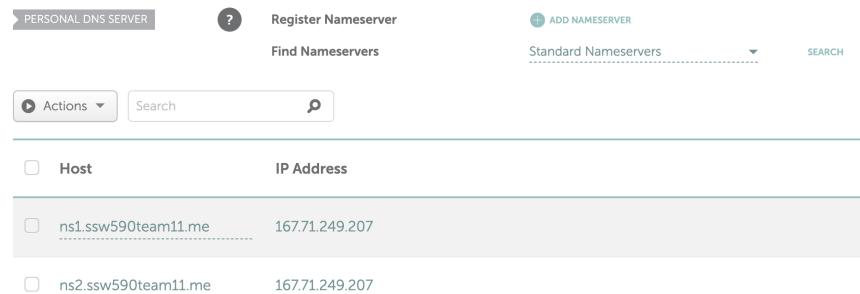


Figure 9.7: Digital Ocean DNS records linking to domain

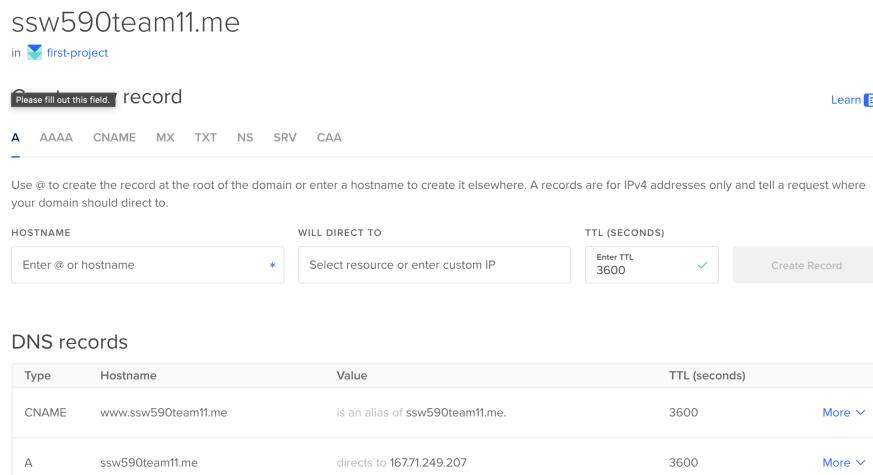


Figure 9.8: Namecheap DNS records to go to droplet IP address

## 9.5 Step 3: Overleaf Container Setup on DigitalOcean

Our teammates (Charles and Justin) deployed an Overleaf Community Edition container using a DigitalOcean droplet. This ensured the Overleaf instance supported all LaTeX packages and allowed testing of compilation consistency. The container was connected to our team GitHub repository and included a custom domain mapping for the subdomain.

```
# Example Docker-based deployment used on DigitalOcean
sudo docker run -d --name overleaf -p 80:80 sharelatex/sharelatex
```

This step satisfied the “configure container/image” requirement for Overleaf hosting. The configuration process was documented and replicated locally for testing.

The screenshot shows the Namecheap domain management interface. On the left is a sidebar with links: Domain List, Hosting List, Private Email, SSL Certificates, Apps, My Offers (with a NEW badge), and Profile. The main area has tabs for Domain, Products, Sharing & Transfer, and Advanced DNS, with Advanced DNS selected. Under DNS TEMPLATES, it says 'Choose DNS Template'. The HOST RECORDS section shows a table of DNS records:

| Type         | Host     | Value               | TTL    |
|--------------|----------|---------------------|--------|
| A Record     | @        | 185.199.108.153     | 30 min |
| A Record     | @        | 185.199.109.153     | 30 min |
| A Record     | @        | 185.199.110.153     | 30 min |
| A Record     | @        | 185.199.111.153     | 30 min |
| CNAME Record | www      | Rymarmar.github.io. | 30 min |
| CNAME Record | overleaf | rymarmar.github.io. | 30 min |

At the bottom is a red 'ADD NEW RECORD' button.

Figure 9.9: Namecheap Advanced DNS configuration showing A and CNAME records for the root and subdomains.

## 9.6 Step 4: GitHub Pages Integration (Benedict)

The GitHub repository `Rymarmar.github.io` was configured to serve as the main site using the custom domain `rymarmar.me`. Deployment is configured directly from the `main` branch, and HTTPS is now enforced. This serves as a simple landing page while the Overleaf container is being finalized.

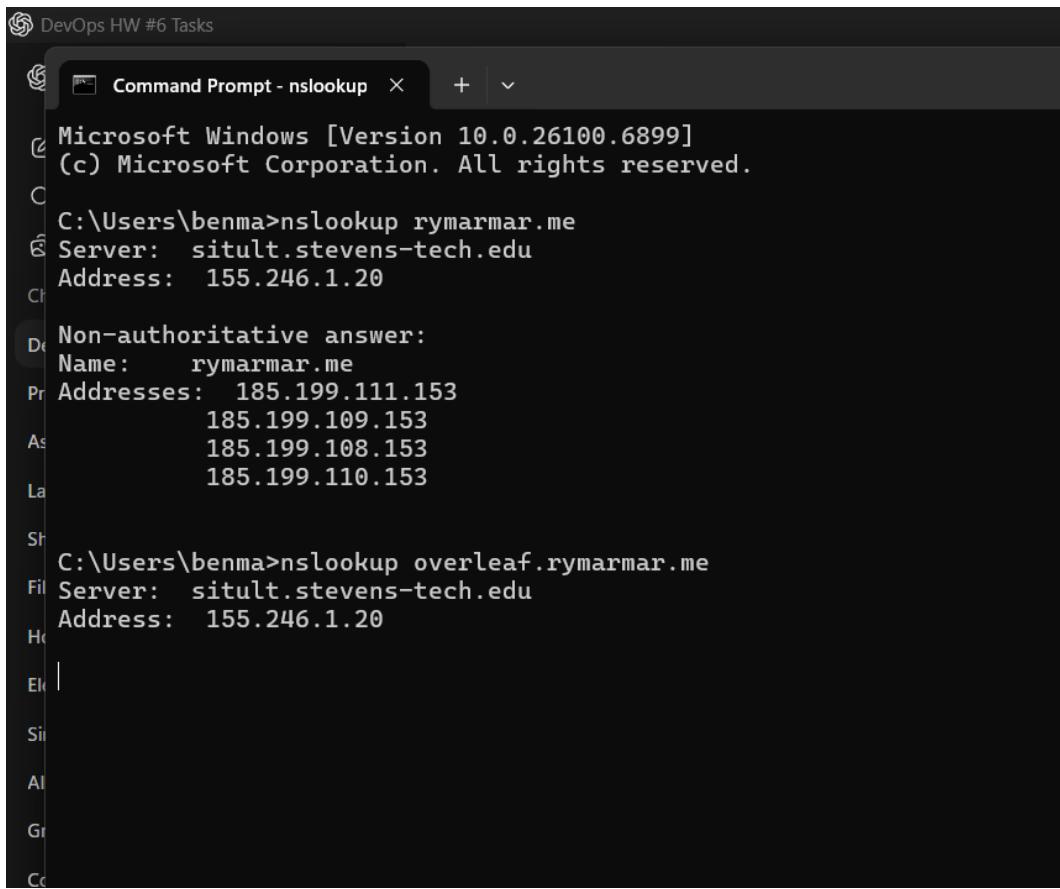
The `index.html` page was published successfully. Some users experienced delays when loading the domain due to DNS propagation time, but configuration remains correct.

## 9.7 Step 5: Overleaf Subdomain Redirect Verification

A subdomain `overleaf.rymarmar.me` was created in Namecheap and configured to redirect to our GitHub Pages site. This verifies that DNS records for the Overleaf subdomain resolve correctly.

## 9.8 Step 6: Overleaf–GitHub Sync (In Progress)

Overleaf's paid Git integration feature is unavailable for free users, so synchronization is currently being replicated manually using Git commands. The workflow allows us to update Overleaf projects locally and push them to GitHub for version tracking.



```
Microsoft Windows [Version 10.0.26100.6899]
(c) Microsoft Corporation. All rights reserved.

C:\Users\benma>nslookup rymarmar.me
Server:  sitult.stevens-tech.edu
Address: 155.246.1.20

Non-authoritative answer:
Name:    rymarmar.me
Addresses: 185.199.111.153
          185.199.109.153
          185.199.108.153
          185.199.110.153

C:\Users\benma>nslookup overleaf.rymarmar.me
Server:  sitult.stevens-tech.edu
Address: 155.246.1.20
```

Figure 9.10: Verification using nslookup confirming successful DNS and subdomain resolution.

```
git clone https://github.com/Rymarmar/Overleaf.Rymarmar.me.git
cd Overleaf.Rymarmar.me
latexmk -pdf main.tex
```

This process is being tested in parallel with the DigitalOcean instance to confirm compatibility between both platforms.

## 9.9 Step 7: Version Control and Hash Key (In Progress)

To map each document version to a Git commit, versioning will be added to the LaTeX title once the sync process is finalized:

```
\title{SSW 590 - Domain Names, SSL, and Versioning (v1.0 - Commit 6fdbbf1)}
```

This ensures full traceability between the Overleaf PDF and the GitHub repository version.

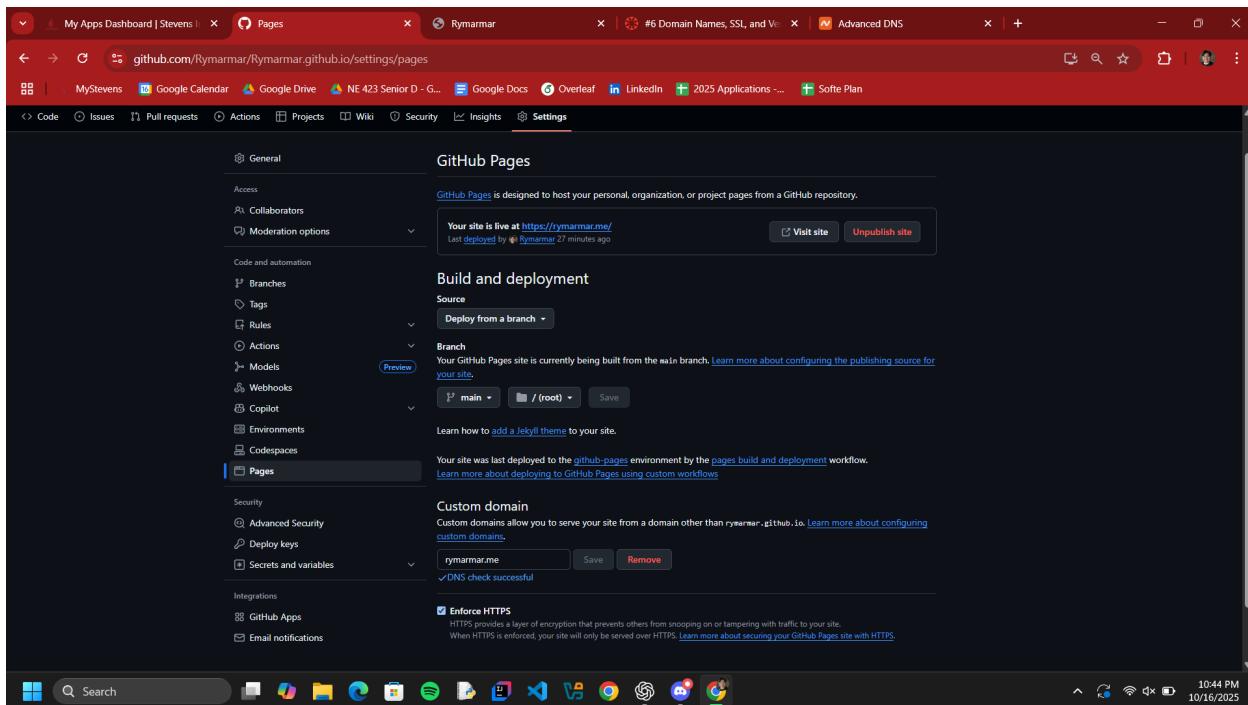


Figure 9.11: GitHub Pages settings confirming DNS validation and HTTPS enforcement.

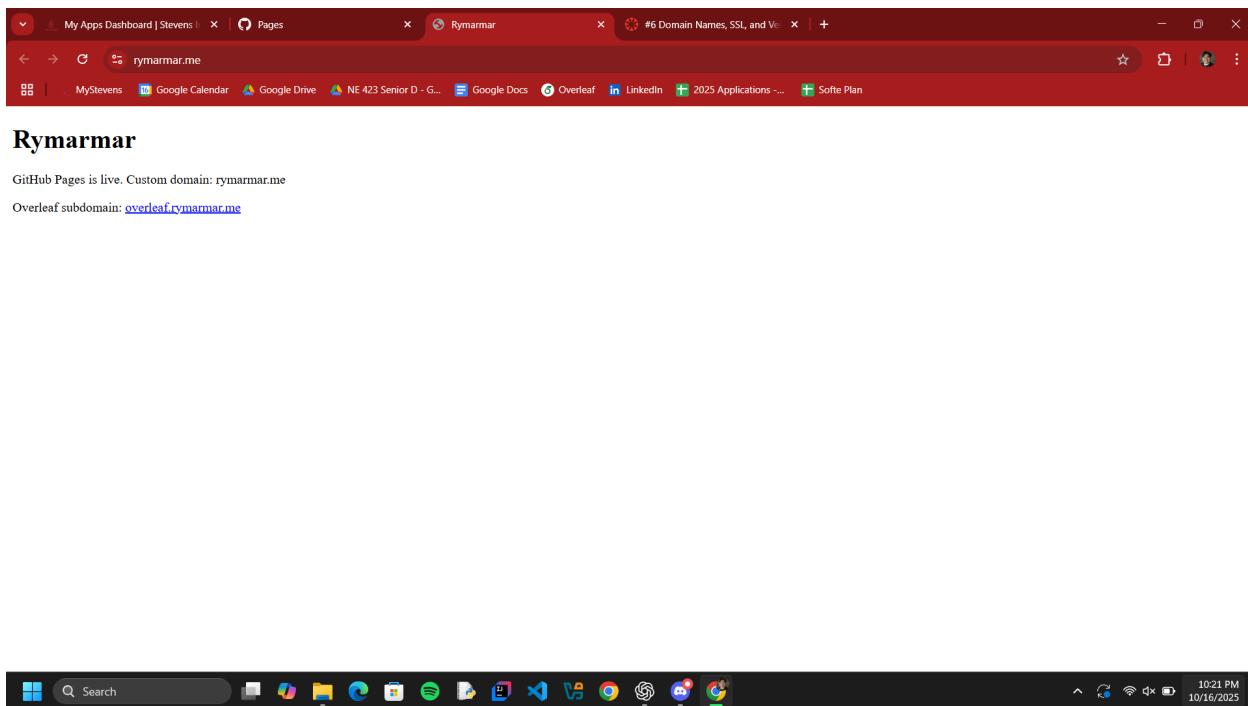
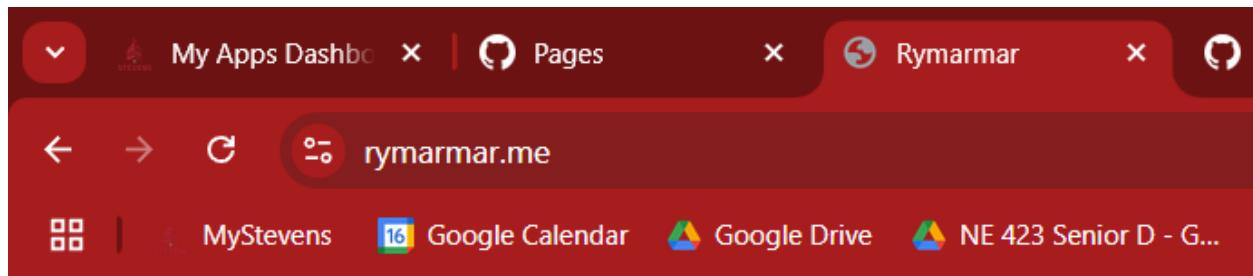


Figure 9.12: Deployed GitHub Pages site confirming build and domain resolution for rymarmar.me.



# Rymarmar

GitHub Pages is live. Custom domain: [rymarmar.me](https://rymarmar.me)

Overleaf subdomain: [overleaf.rymarmar.me](https://overleaf.rymarmar.me)

Figure 9.13: The subdomain `overleaf.rymarmar.me` redirecting to the main site `rymarmar.me`.

## 9.10 Conclusion and Deliverable Checklist

This assignment demonstrates the end-to-end setup of a secured domain with SSL, integration with GitHub Pages, and configuration for an Overleaf instance hosted on DigitalOcean. Minor remaining work includes automating Overleaf  $\leftrightarrow$  GitHub syncing and embedding commit hashes in titles for traceability.

1. **Domain Name:** Registered `rymarmar.me` via GitHub Student Pack – ✓
2. **SSL Configuration:** HTTPS enforced via GitHub Pages / Let's Encrypt – ✓
3. **Overleaf Container Setup:** Hosted on DigitalOcean droplet – ✓
4. **GitHub Pages Integration:** Site deployed and DNS verified – ✓
5. **Overleaf Subdomain Redirect:** Verified redirect to GitHub Pages – ✓
6. **Overleaf  $\leftrightarrow$  GitHub Sync:** Manual workflow setup – *In Progress*
7. **Version/Hash in Title:** Format added, implementation pending – *In Progress*

# **Appendix A**

## **Appendix**

*– Author Name*



# **Bibliography**

# Index

appendix, 44

Chapter

    Appendix, 44

    AWS Deployment, 22

    Bugzilla, 31

    Domain Names, 35

    Hosts, 1

    LaTeX Docker, 28

    Linux Commands, 3

    Overleaf, 33

    Passwords, 2

    Project Proposal, 21

Linux Commands, 3