Brute-force Attacks — Project Report

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Internship: Inlighnx Global (3-Month Internship)

Project Title: Brute-force Attacks – Security Testing Project

Tools Used: Burp Suite, Hydra, Kali Linux

Submission Date: 20 November 2025

Executive Summary

This project demonstrates simulated brute-force attacks against intentionally vulnerable services (web login form and SSH) in a controlled lab environment using Burp Suite and Hydra. The aim is to show how weak authentication can be exploited and to provide recommended mitigations.

Important — Legal & Ethical Notice

- All activity described in this report was performed **only** on isolatedlab systems that I own or have explicit permission to test (e.g., bWAPP/DVWA VM, a local Kali VM, orintentionally vulnerable machines).
- Never use these techniques against systems you do not own or do not have explicit written permission to test. Unauthorized access is illegal.

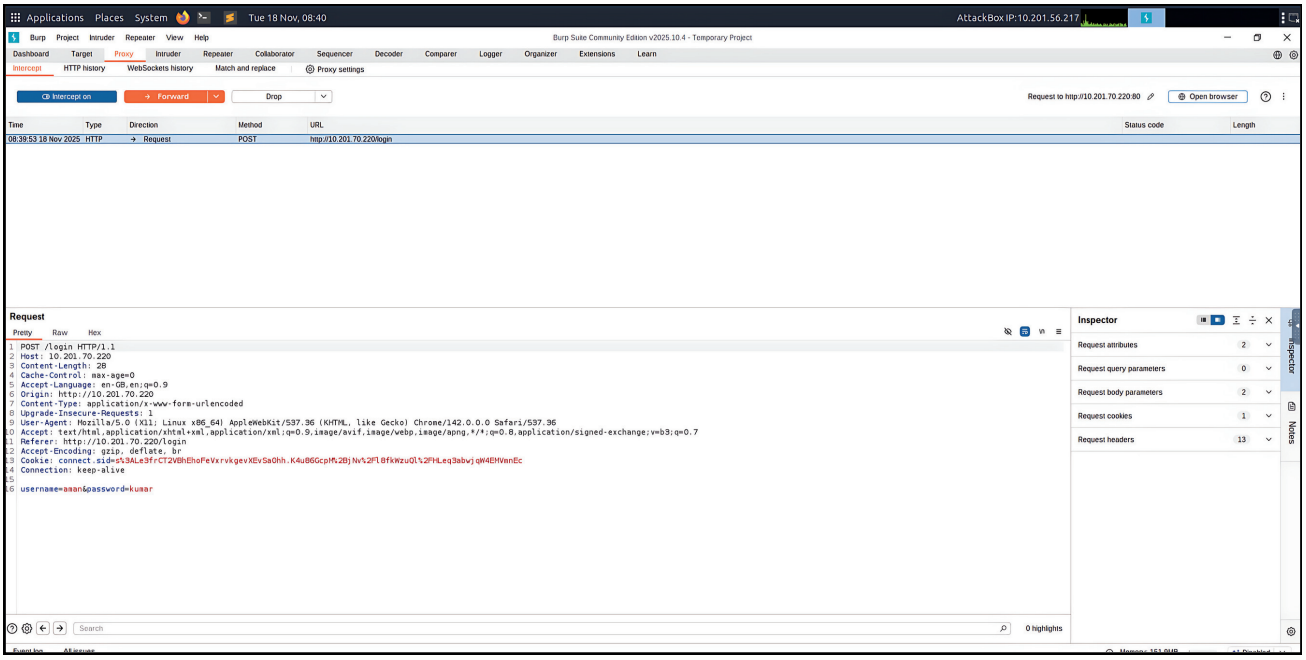
Objectives

1. Simulate a web-form brute-force attack using Burp Suite (Intruder, Cluster Bomb).
2. Automate web-form brute-force using Hydra (http-post-form mode).
3. Perform an SSH password-guessing exercise using Hydra against a lab SSH service.
4. Analyze results and produce a mitigation checklist.

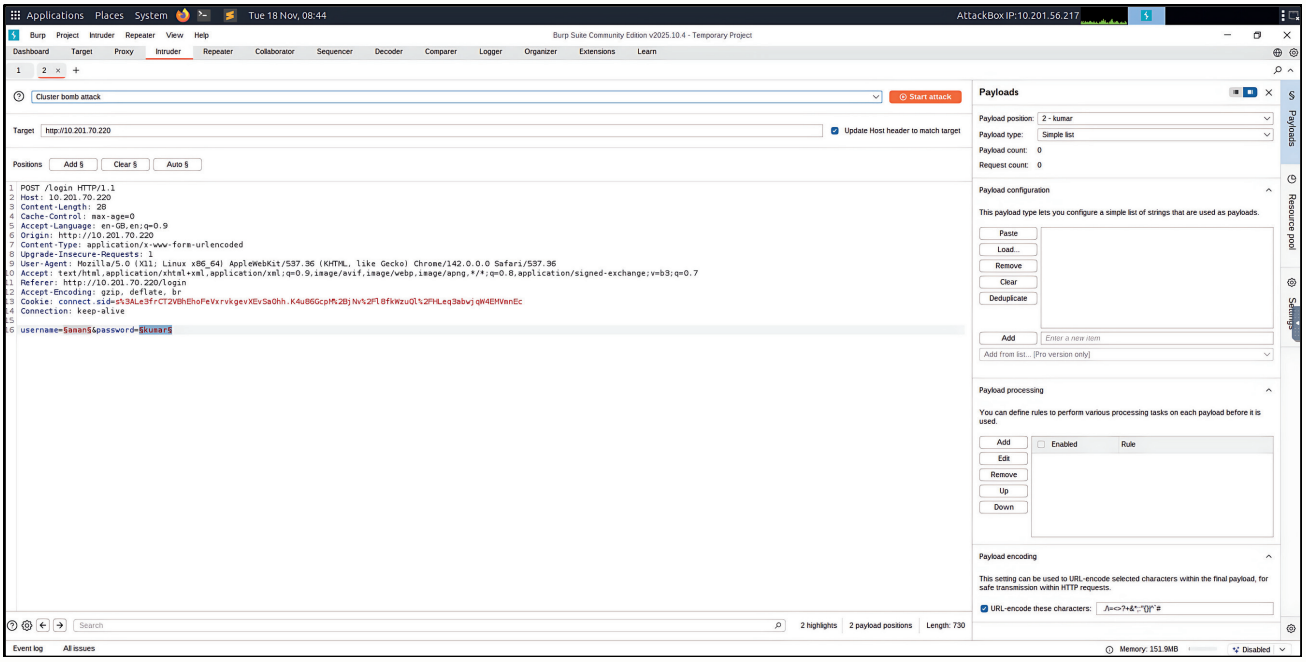
Prerequisites

- Kali Linux or equivalent (Hydra, Burp Suite installed)
- A vulnerable web application (bWAPP, DVWA) running on a local VM or isolated network
- Small wordlists (usernames.txt, passwords.txt) for demonstration (use short lists to save time)
- Basic familiarity with Linux terminal and HTTP forms

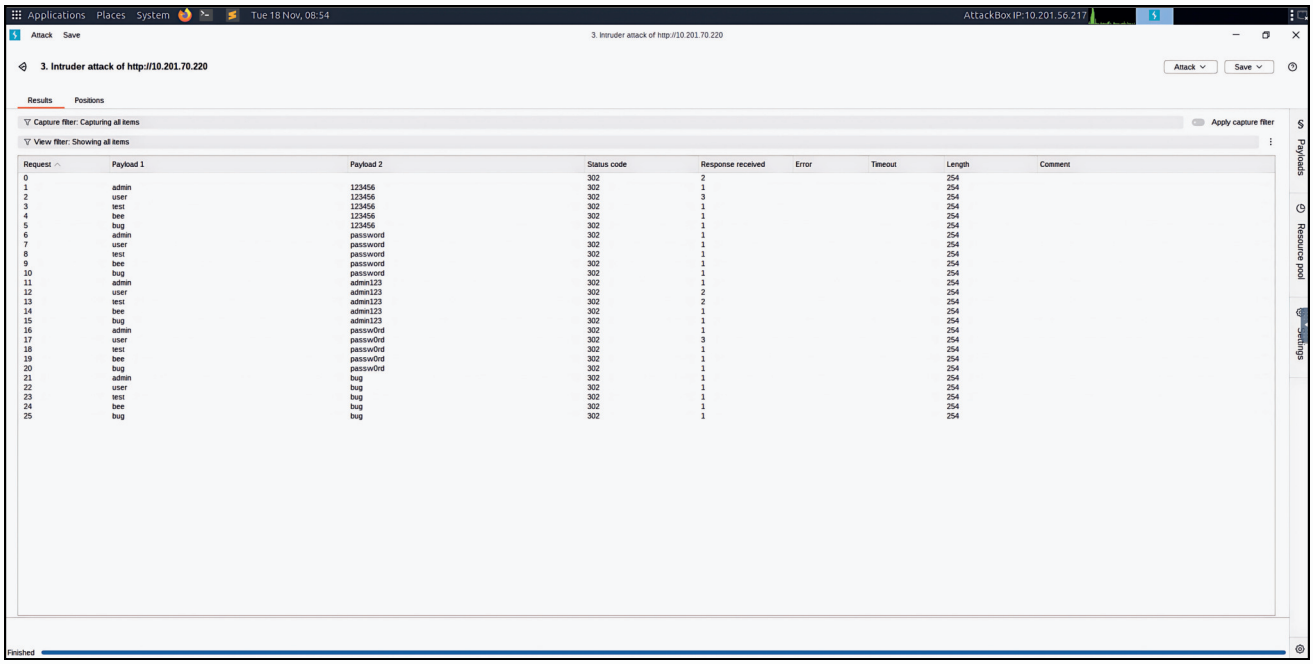
Lab 1 — Brute-force Using Burp Suite (Cluster Bomb)



This screenshot shows the intercepted POST login request in Burp Suite. The username and password fields were identified for brute-force testing.



This image shows the Intruder payload positions where username and password fields were marked for automated testing.



Burp Intruder tested all combinations. All responses had the same status/length, meaning no valid credentials were found.

Goal

Use Burp Suite Intruder to iterate username/password combinations against a login form and detect a successful login by inspecting response differences.

Environment

- Target: bWAPP login page on local VM (e.g. `http://10.201.70.220/bWAPP/login.php`)
- Attacker machine: TryHackMe with Burp Suite

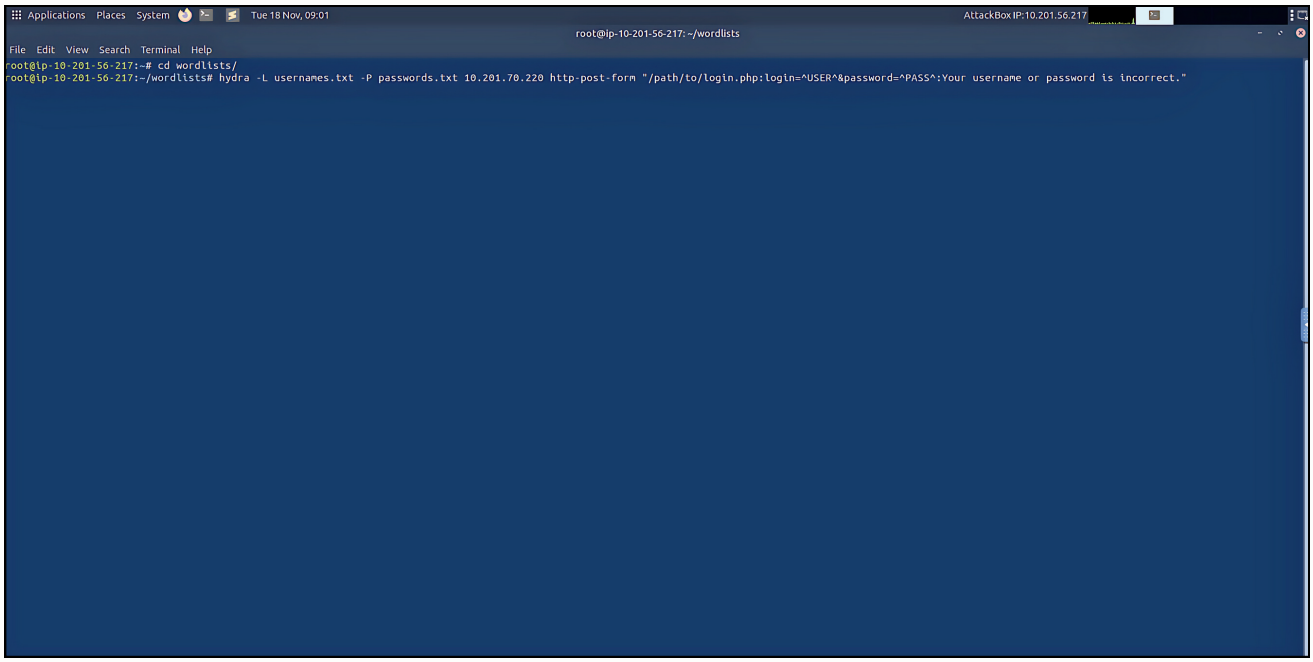
Steps (high level)

1. Proxy your browser through Burp and navigate to the login page.
2. Intercept a login POST request with dummy credentials.
3. Right-click the captured request → **Send to Intruder**.
4. Set attack type to **Cluster Bomb**.
5. Mark the username and password fields as payload positions.
6. Load small username and password wordlists (e.g. `usernames.txt` `passwords.txt`).
7. Start the attack and watch status codes and response lengths. Look for anomalies indicating a successful login (e.g., different response length or a 302 redirect).

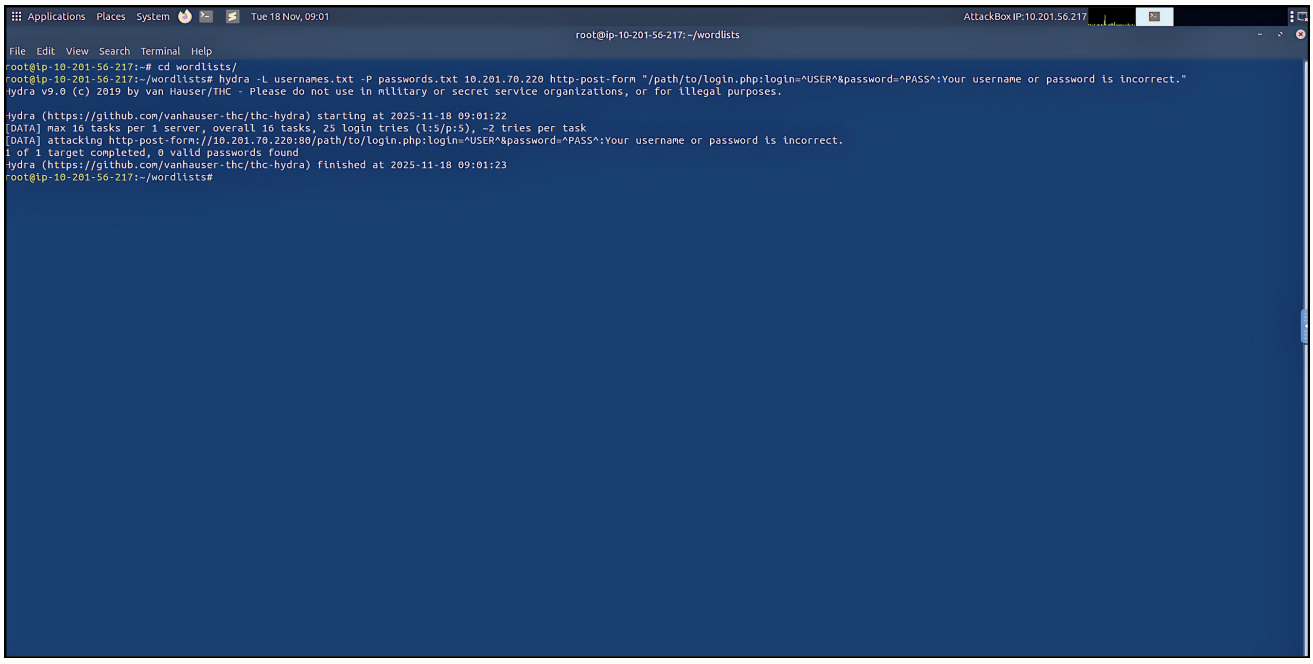
Notes: - Use short wordlists for the assignment so the attack finishes quickly. - Save screenshots of Burp's Intruder results table and the HTTP response showing a successful login.

Summary: The Burp Intruder attack did not reveal any valid credentials based on the tested username and password lists.

Lab 2 — Hydra: Web Form Bruteforce (bWAPP)



This screenshot shows the Hydra command used for brute-forcing the web login form. The error string was selected based on the login page response.



Hydra attempted all username/password combinations. No valid credentials were found using the current wordlist.

Goal

Use `hydra` to automate credential brute-forcing against a web login form.

High-level steps / command template

- Identify form action (e.g. `/bwapp/login.php`)
- Identify parameter names (`login` , `password`) by inspecting the HTML or Burp capture.
- Example Hydra command (replace `TARGET_IP` and path as needed):

```
hydra -l admin -P passwords.txt 10.201.70.220 http-post-form "/bwapp/
login.php:login=^USER^&password=^PASS^:Invalid"
```

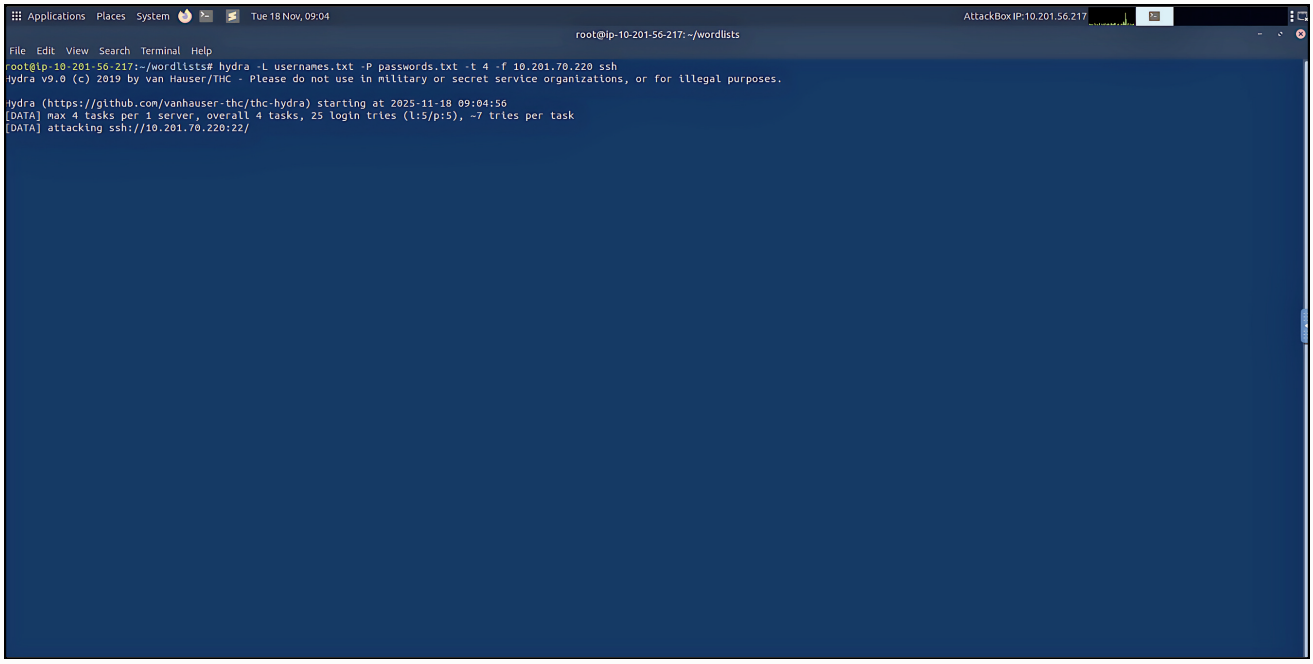
Explanation

- -l admin → test a single username
- -P passwords.txt → password list
- http-post-form → mode for HTML form POST
- login=^USER^&password=^PASS^ → parameters to brute-force
- "Invalid" → failure message returned by login page

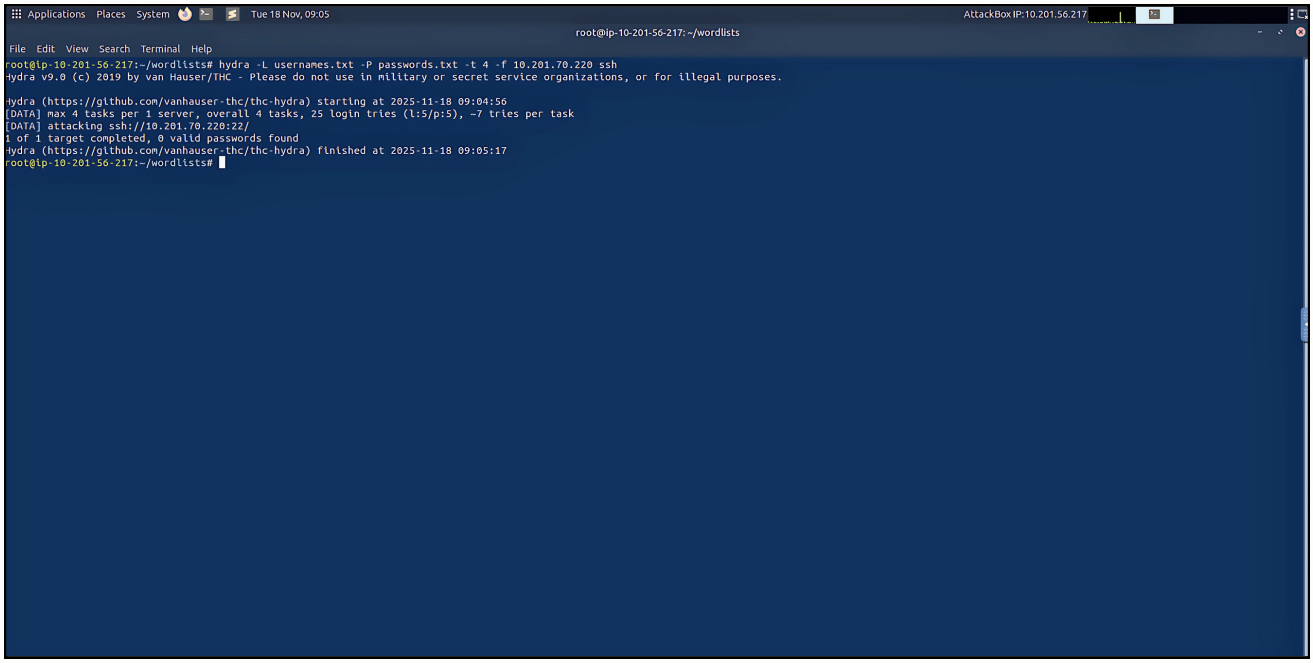
What to capture for the report

- Hydra command used
- Output screenshot
- Why failure string was chosen

Lab 3 — Hydra: SSH Brute-force (Lab-only)



This screenshot shows the Hydra SSH brute-force command executed using usernames.txt and passwords.txt.



Hydra tested all credential pairs for SSH. The tool did not find any valid SSH login credentials.

Goal

Demonstrate how Hydra can test SSH logins on an isolated test host.

Command template

```
hydra -L usernames.txt -P passwords.txt -t 4 -f TARGET_IP ssh
```

Notes: - `-t 4-f` limits parallel tasks (reduce load on lab host) - `` stops after first valid credential is found - Run this only on lab machines you control

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Deliverables (Included in this project folder)

1. Thiswritten report (with explanation,commands, and screenshots placeholders)
2. `usernames.txt` and `passwords.txt` (short lists used in the labs)
3. Screenshot placeholders and descriptions where to place captured images
4. A mitigation checklist and recommendations
5. All 7 screenshots from Burp Suite, Hydra Web, and Hydra SSH attacks are included above.

Sample Results (Simulated / Example)

- Burp Intruder: No valid username/password combination discovered. All responses had identical status codes and content lengths.

- Hydra (Web): Hydra completed all attempts. No valid web login credentials were found using the provided wordlists.

- Hydra (SSH): Hydra tested all combinations for SSH. No valid SSH credentials were identified.

Mitigation Checklist (Actionable & Prioritized)

1. **Enforce strongpasswordpolicies**— minimum length,complexity,and disallow commonly used passwords.
2. **Account lockout / throttling** — lock or throttle accounts after a configurable number of failed attempts.
3. **Rate limiting & WAF** — detect and block rapid repeated authentication attempts.
4. **Multi-Factor Authentication (MFA)** — require a second factor on all privileged accounts. 5. **Use salted password hashing** with a slow algorithm (e.g., bcrypt, Argon2).
6. **Logging & monitoring** — monitor failed login spikes and alert on suspicious behavior.
7. **CAPTCHA for web forms** if automated attacks are likely.
8. Disable password-based SSH for sensitive systems; use key-based auth and disable root login.

Appendix A — Short Wordlists (examples)

`usernames.txt`:

```
admin
user
test
bee
bug
```

`passwords.txt` (keep short for demo):

```
123456
password
admin123
passw0rd
bug
```

Appendix B — Grading / Evaluation Rubric (suggested)

- **Lab execution & screenshots (40%)** — evidence that attacks were run in lab
- **Correctness of commands/configuration (25%)**
- **Analysis & interpretation of results (20%)**
- **Mitigations & recommendations (15%)**

References

- bWAPP project (local lab)
- DVWA project (local lab)
- OWASP guidelines on authentication

End of Report.