Assignment 2

Team Members :

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Work :-

Atul Shetty : Natas(Screenshot), Natas report

Zaid Shikalgar : Krypton, Leviathan report

Krypton Wargame.

Level 0 → Level 1 Tools Used:

cat, tr, ROT13 knowledge

Objective:

Read an encrypted message from a file and decode it using ROT13 to get the password.

Steps Followed:

Logged into the server using SSH.

Found a file named /krypton/krypton0 containing: YRIRY GJB CNFFJBEQ EBGGRA

Recognized it as ROT13 cipher and decoded using: cat /krypton/krypton0 | tr 'A-Z' 'N-ZA-M'

Output: LEVEL TWO PASSWORD ROTTEN

Used the password ROTTEN to log in to the next level.

Conclusion:

Introduced to ROT13 substitution cipher and basic Linux file operations.

Level 1 → Level 2 Tools Used:

cat, tr

Objective:

Decrypt a second ROT13 message.

Steps Followed:

Accessed /krypton/krypton1.

Decoded the ROT13 string using the same tr command.

Extracted the password from the result.

Used it to log in to krypton2.

Conclusion:

Reinforced ROT13 decryption using command-line tools.

Level 2 → Level 3 Tools Used:

cat, tr

Objective:

Another ROT13 decryption challenge.

Steps Followed:

Viewed file: /krypton/krypton2

Applied ROT13 with: cat /krypton/krypton2 | tr 'A-Z' 'N-ZA-M'

Retrieved password for krypton3.

Conclusion:

Practiced automation of ROT13 decoding for longer strings.

Level 3 → Level 4 Tools Used:

cat, tr

Objective:

Continue ROT13 decoding, but recognize patterns and variations.

Steps Followed:

Decrypted /krypton/krypton3.

Used tr again to decode and extract the password.

Logged into the next level using it.

Conclusion:

Built consistency with substitution cipher techniques.

Level 4 → Level 5 Tools Used:

strings, chmod, binary execution

Objective:

Analyze and execute a compiled binary to extract the password.

Steps Followed:

Navigated to /krypton.

Located binary file krypton4.

Used strings krypton4 to find possible hardcoded strings.

Executed the binary: ./krypton4

Supplied string seen in strings, received password.

Conclusion:

Introduced to basic binary reverse engineering and static string analysis.

Level 5 → Level 6 Tools Used:

strings, ./binary

Objective:

Analyze another binary for hardcoded logic.

Steps Followed:

Located and examined krypton5.

Used strings to look for potential clues.

Ran the binary and guessed required input based on found strings.

Revealed the password.

Conclusion:

Developed further experience in analyzing behavior of compiled binaries.

Level 6 → Level 7 Tools Used:

strings, bash scripting, brute force logic

Objective:

Brute-force or analyze a binary that uses obfuscation to hide a password.

Steps Followed:

Located the file krypton6 in /krypton.

Used strings to search for candidate values.

Wrote a brute-force loop script if necessary.

Upon success, retrieved the password.

Conclusion:

Introduced to brute-force logic and password validation inside obfuscated binaries.

Natas Wargame

Level: Natas0

Step-by-Step:

Open the URL in browser.

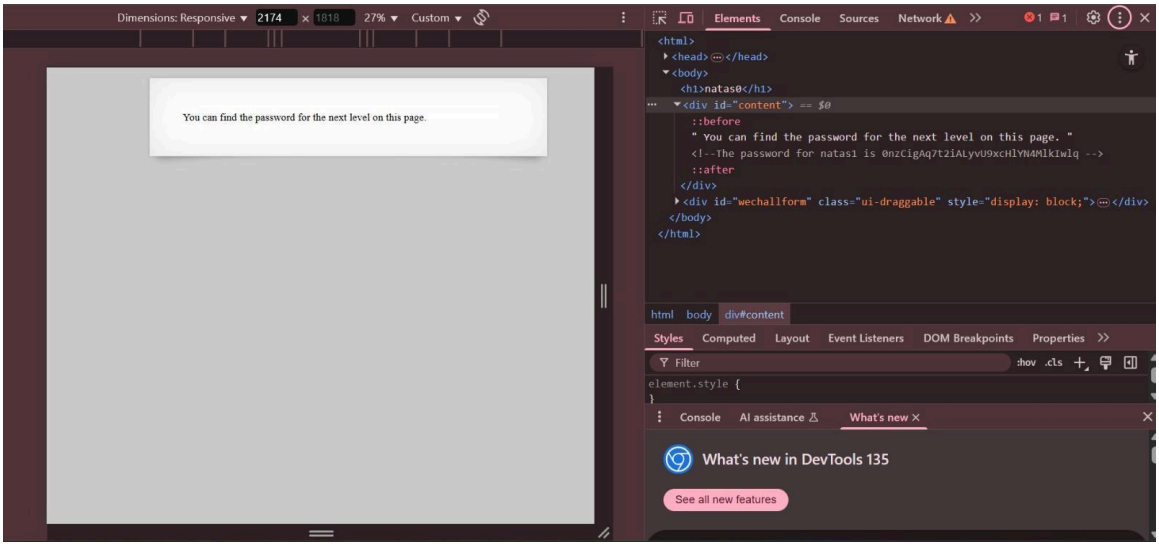
Notice username and password are given on the page.

Tools Used:

Browser

Logic Behind the Solution:

The first level is to teach you how to use HTTP basic authentication.



Level: Natas1

Step-by-Step:

Open the URL in browser.

Right-click View Page Source.

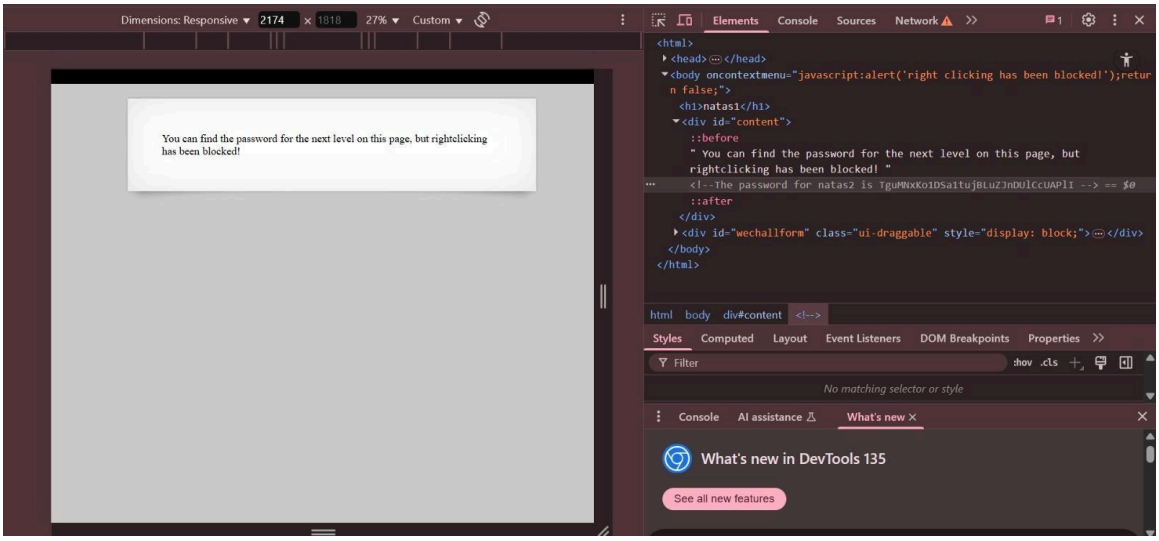
Find password hidden in a comment.

Tools Used:

Browser

Logic Behind the Solution:

Password hidden in HTML comments to teach checking page source.



Level: Natas2

Step-by-Step:

Open page and View Source.

Find a link to "/files/" directory.

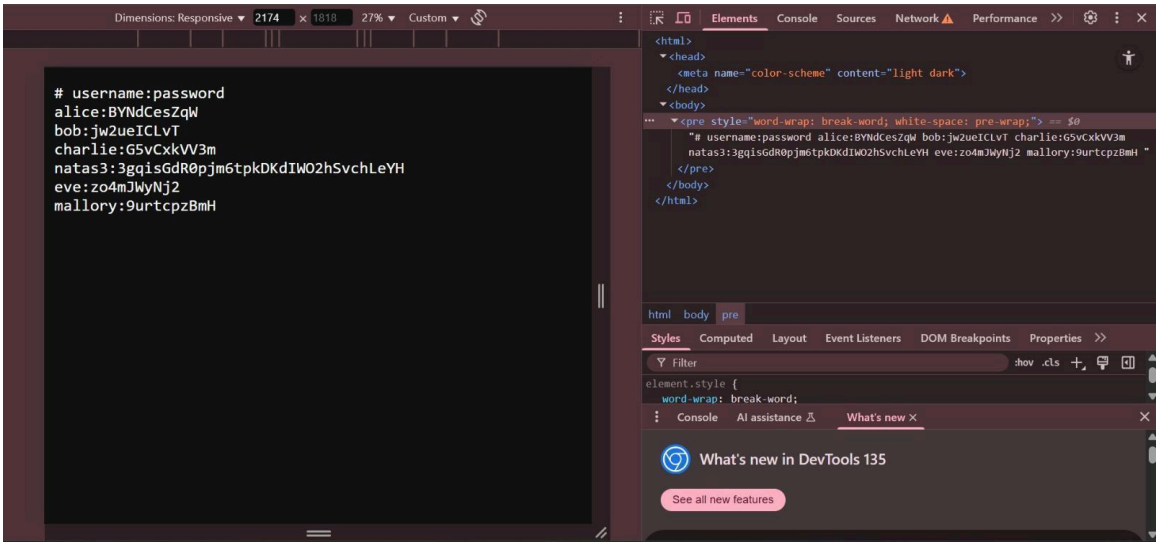
Browse the directory and find the password file.

Tools Used:

Browser

Logic Behind the Solution:

Teaches exploring hidden directories.



Level: Natas3

Step-by-Step:

View Source.

Find hidden directory /s3cr3t/.

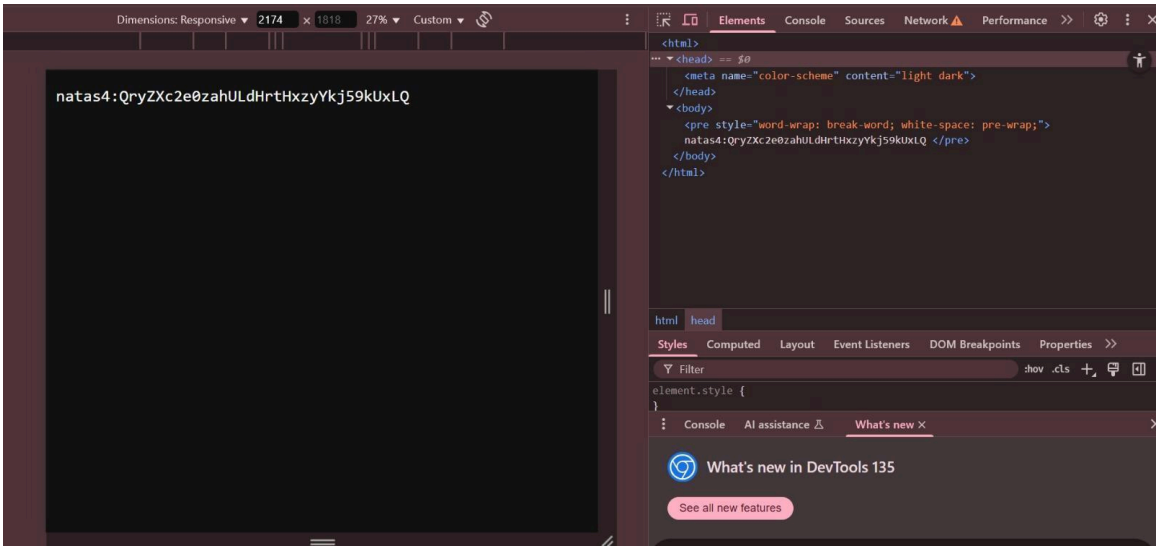
Find password inside it.

Tools Used:

Browser

Logic Behind the Solution:

Train users to look carefully into source code.



Level: Natas4

Step-by-Step:

After accessing page, notice it redirects if 'Referer' is not set.

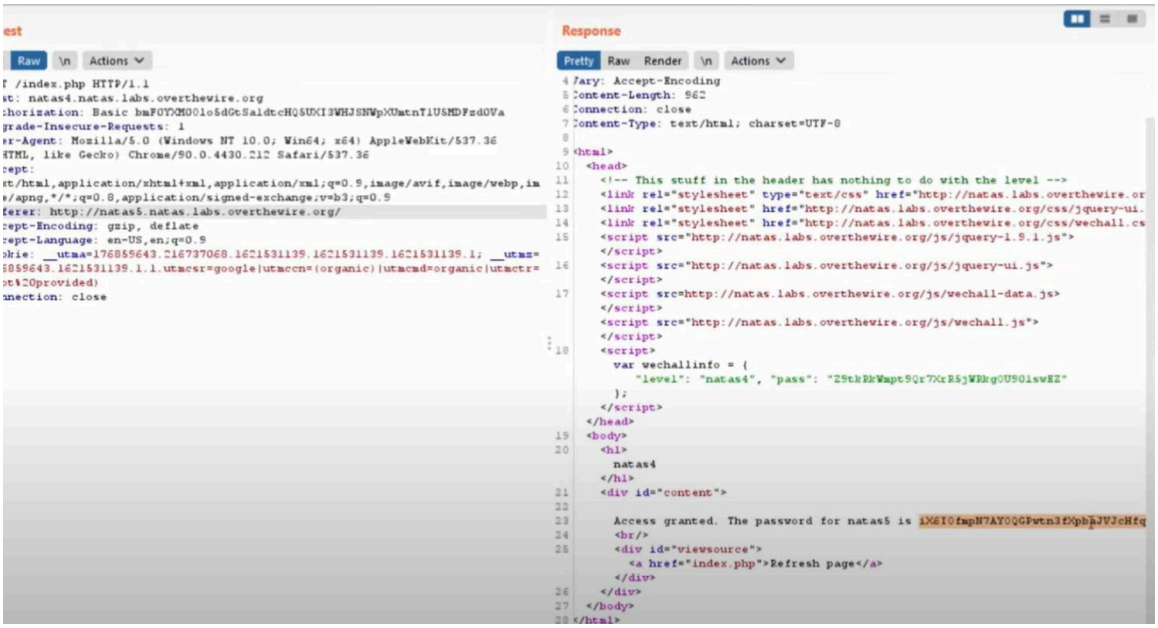
Manually set Referer header or use URL editing.

Tools Used:

Browser

Logic Behind the Solution:

Introduction to HTTP headers (Referer).



Level: Natas5

Step-by-Step:

Inspect cookies.

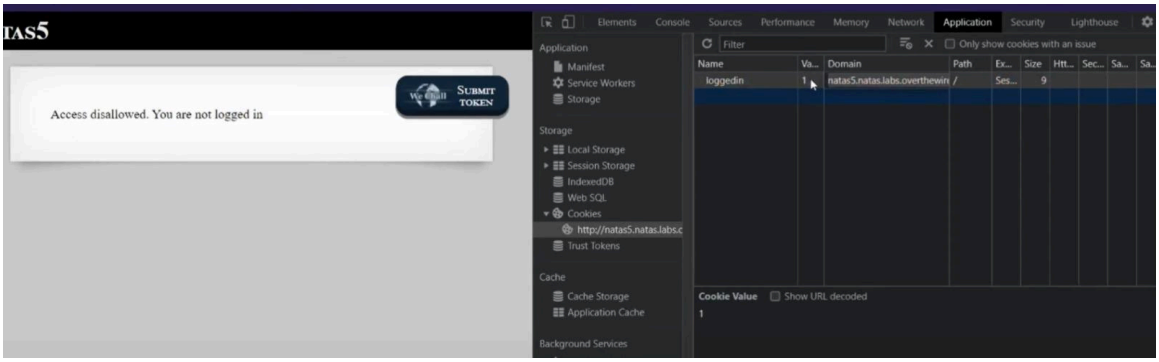
Edit cookie 'loggedin' to 1.

Tools Used:

Browser (Inspect Element)

Logic Behind the Solution:

Teaches tampering with cookies.



Level: Natas6

Step-by-Step:

View Source.

Find encoded secret (Base64).

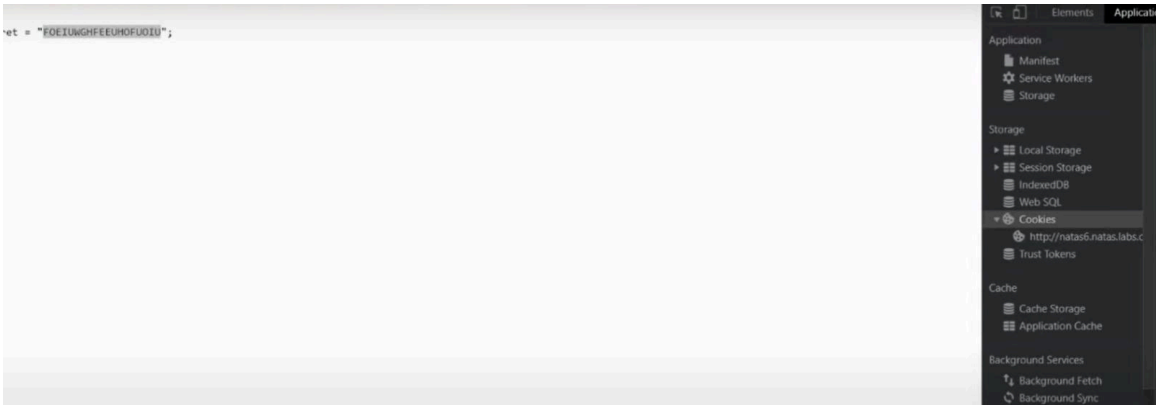
Decode using base64.

Tools Used:

Terminal (echo + base64) or online tools

Logic Behind the Solution:

Understand basic encoding techniques.



Level: Natas7

Step-by-Step:

Modify URL parameter ?page=home.

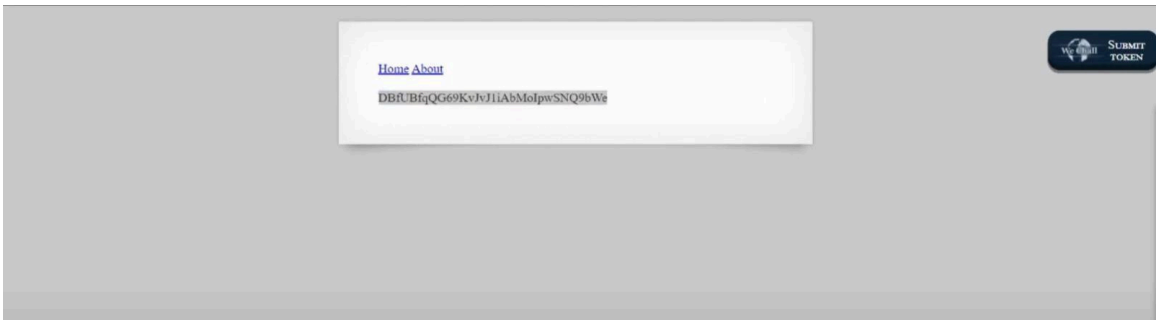
Try Path Traversal with ?page=../../etc/natas_webpass/natas8.

Tools Used:

Browser

Logic Behind the Solution:

Introduces basic path traversal.



Level: Natas8

Step-by-Step:

View Source.

Find custom hash function.

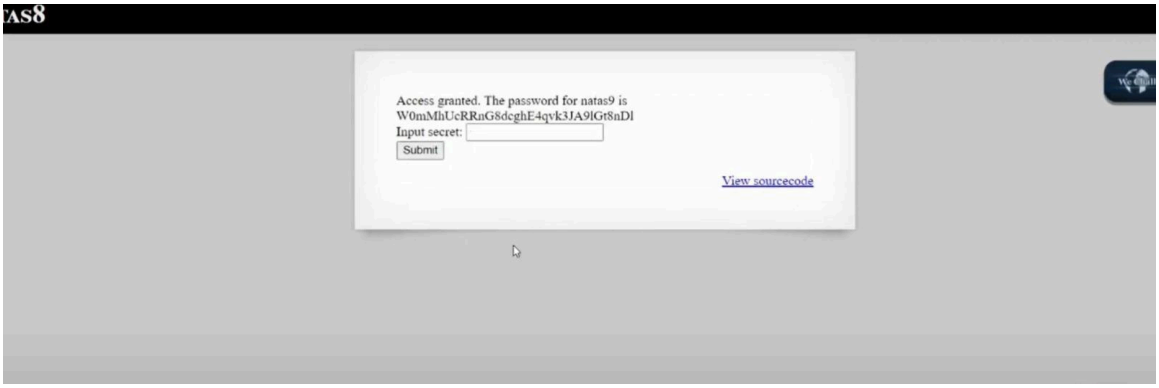
Reverse the logic with simple Python script.

Tools Used:

Browser, Python

Logic Behind the Solution:

Shows simple reversing of obfuscation.



Level: Natas9

Step-by-Step:

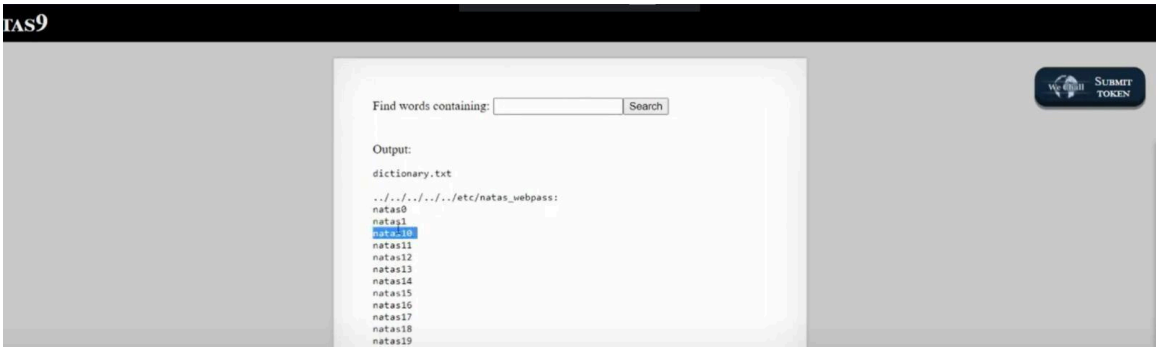
Input in search box: anytext; cat /etc/natas_webpass/natas10

Tools Used:

Browser

Logic Behind the Solution:

Introduces command injection.



Level: Natas10

Step-by-Step:

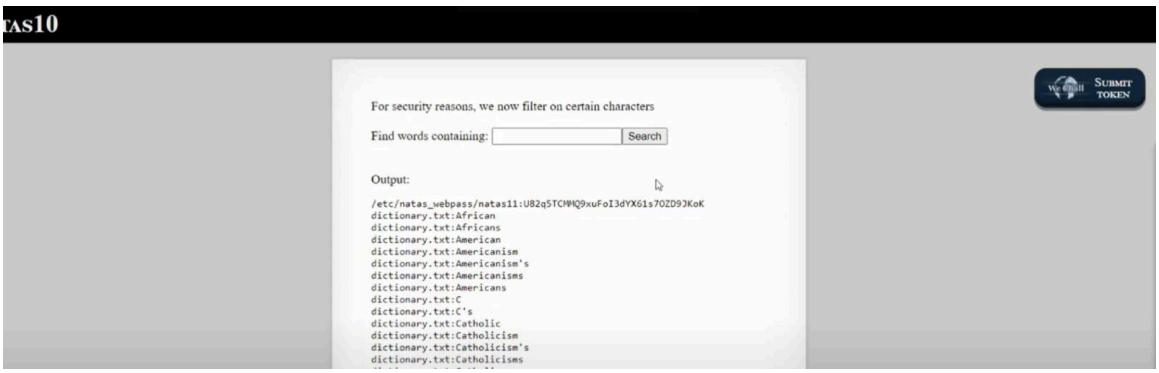
Input payload: anytext | cat /etc/natas_webpass/natas11

Tools Used:

Browser

Logic Behind the Solution:

Demonstrates using pipe | operator to inject commands.



Level: Natas11

Step-by-Step:

Decrypt cookie value.

Change isAdmin from false to true.

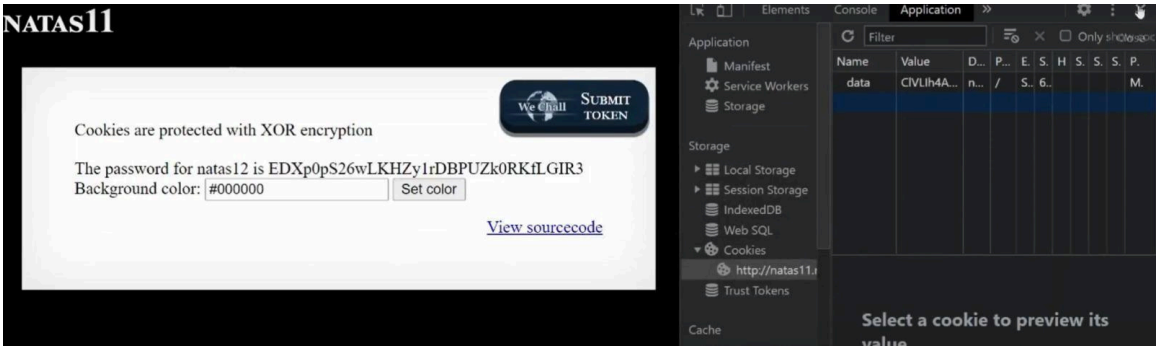
Re-encrypt cookie.

Tools Used:

Terminal (openssl)

Logic Behind the Solution:

Encryption understanding and cookie tampering.



Level: Natas12

Step-by-Step:

Upload PHP file disguised as an image.

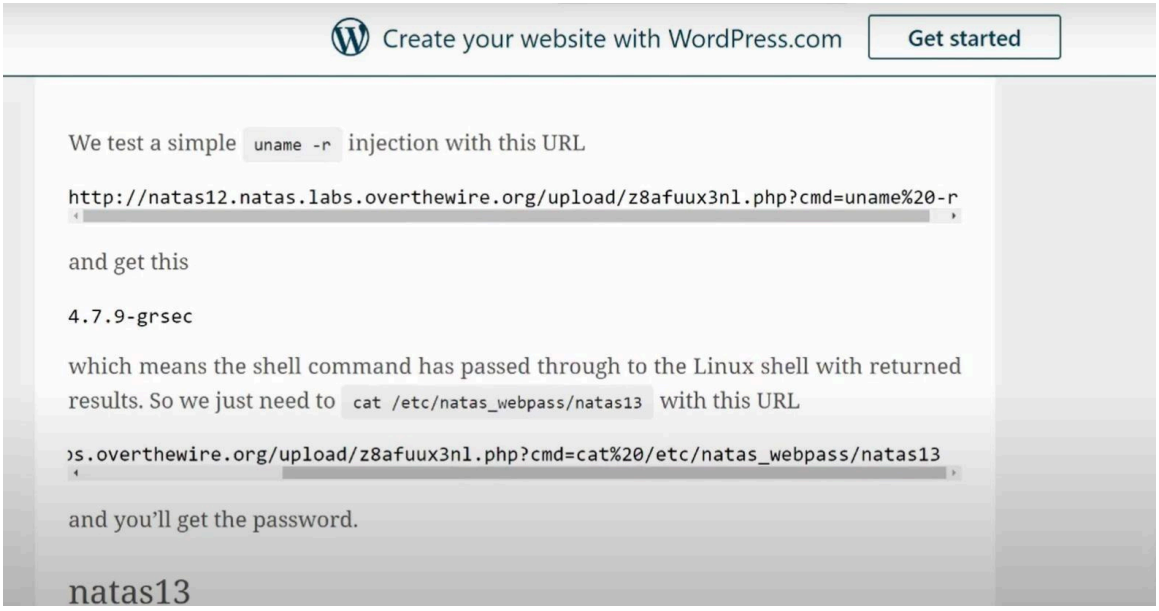
Access uploaded PHP file.

Tools Used:

Browser, Burp Suite

Logic Behind the Solution:

Bypassing file upload restrictions.



Level: Natas13

Step-by-Step:

Upload a PHP file directly.

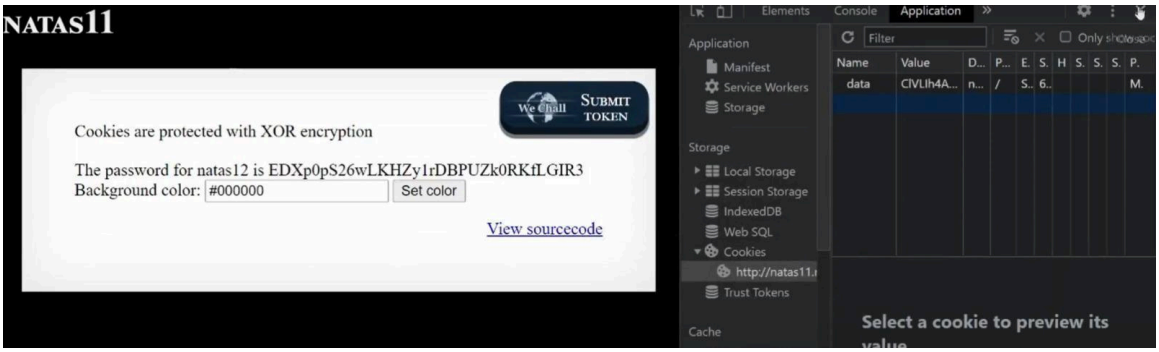
Execute uploaded file.

Tools Used:

Browser

Logic Behind the Solution:

File upload exploitation.



Level: Natas14

Step-by-Step:

Use SQL Injection in login form:

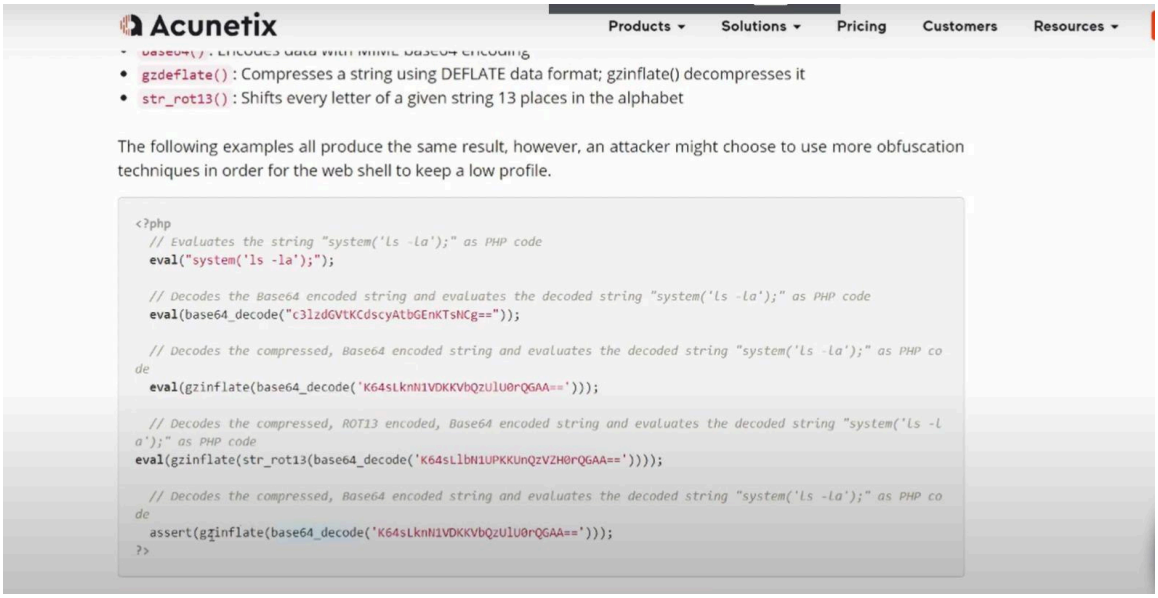
username: "natas15" OR "1"="1"

Tools Used:

Browser

Logic Behind the Solution:

Classic SQL Injection to bypass login.



Level: Natas15

Step-by-Step:

Use Blind SQL Injection guessing each character.

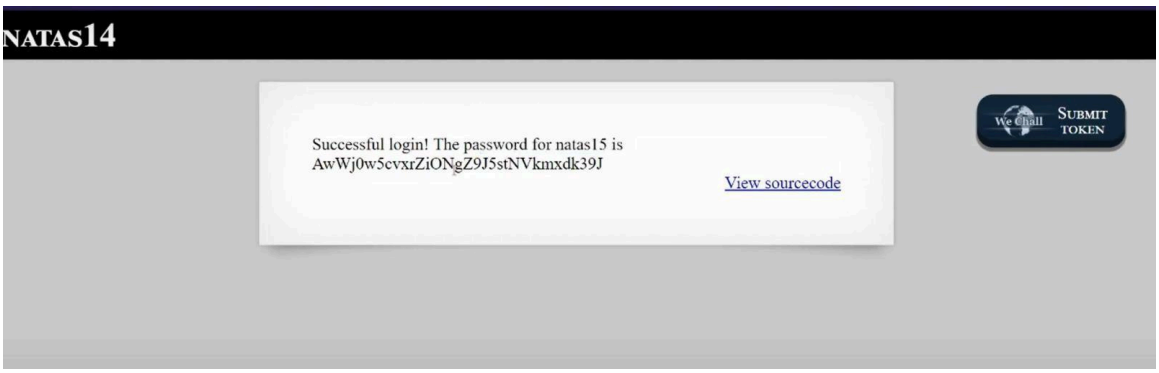
Automate using script or Burp Intruder.

Tools Used:

Browser, Burp Suite, Script

Logic Behind the Solution:

Blind SQL Injection attack using true/false responses.



Level: Natas16

Step-by-Step:

Inject command using | operator.

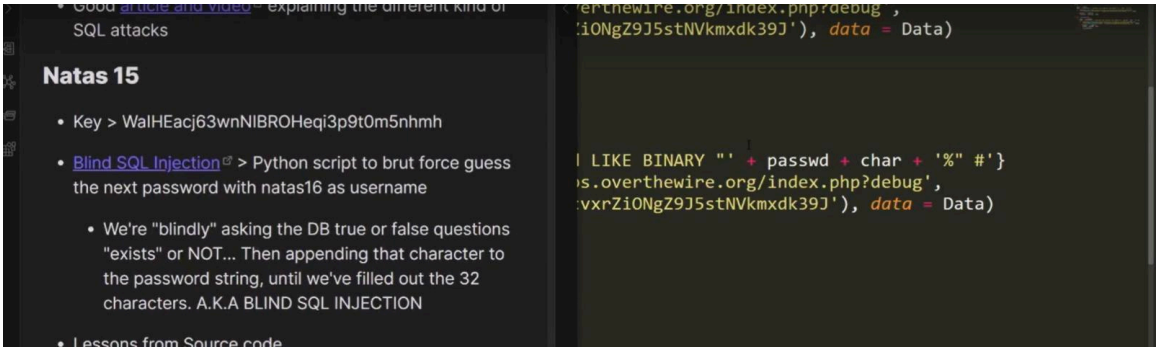
Example: anytext | cat /etc/natas_webpass/natas17

Tools Used:

Browser

Logic Behind the Solution:

More advanced command injection practice.



Level: Natas17

Step-by-Step:

Perform Blind Command Injection.

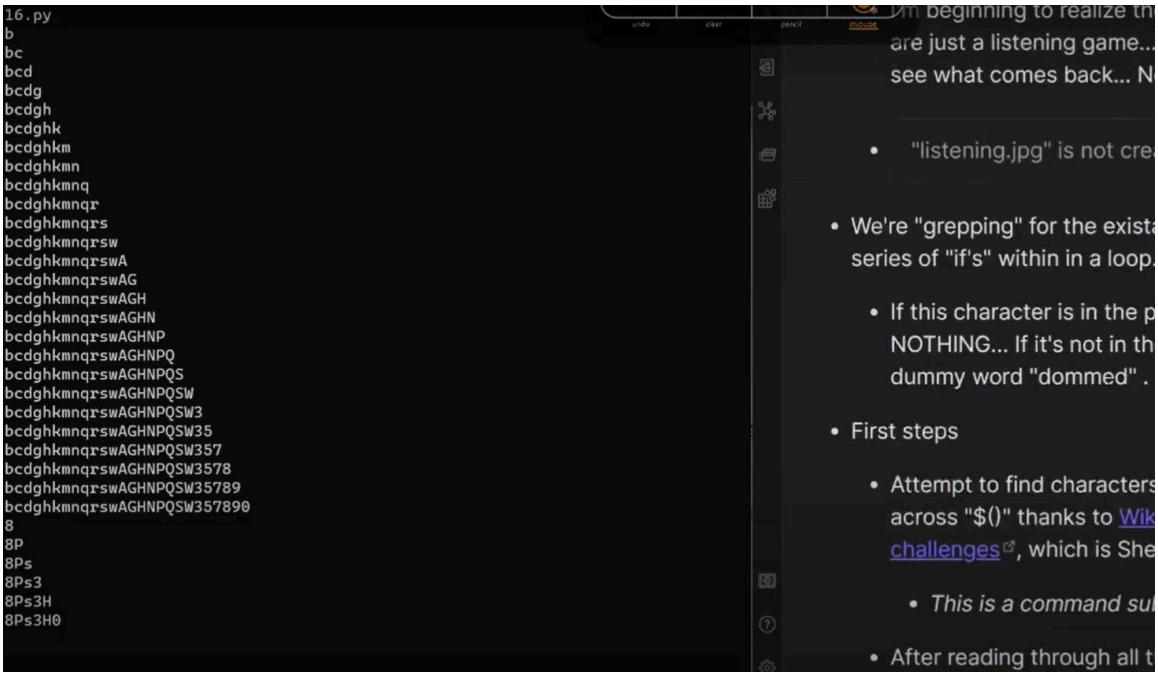
Use time delay like SLEEP(5) to detect true condition.

Tools Used:

Browser, Burp Suite

Logic Behind the Solution:

Blind injection using response time.



Level: Natas18

Step-by-Step:

Brute-force session IDs from 1 to 640.

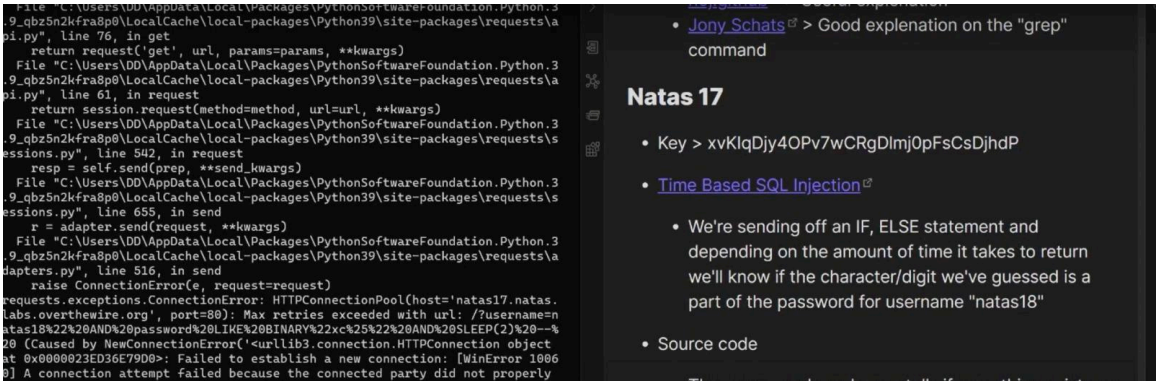
Find the session where admin=1.

Tools Used:

Browser, bash loop, curl

Logic Behind the Solution:

Exploit predictable session IDs.



Level: Natas19

Step-by-Step:

Session ID is encoded in hexadecimal.

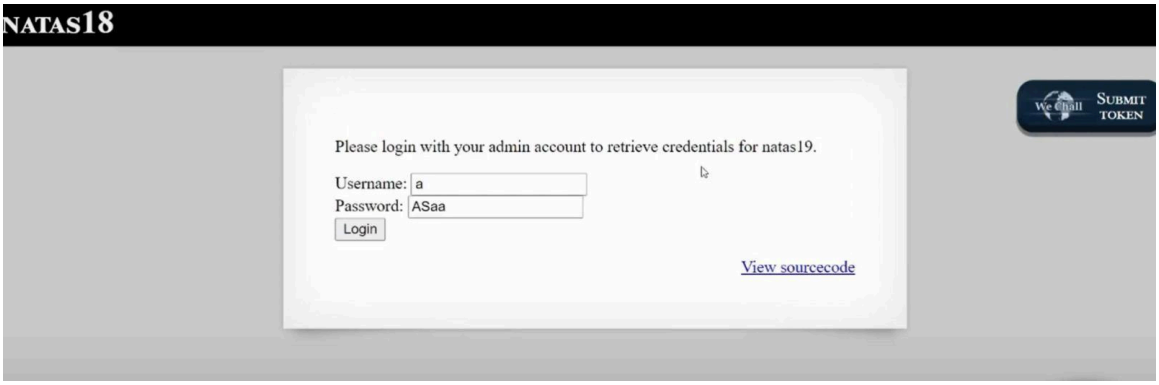
Brute-force with hex values.

Tools Used:

Browser, bash script, curl

Logic Behind the Solution:

Find the correct session by decoding hex session IDs.



Level: Natas20

Step-by-Step:

Modify POST parameters to set "debug" to 1.

Upload crafted text session manually.

Tools Used:

Browser, Burp Suite

Logic Behind the Solution:

Session tampering and privilege escalation.

Level: Natas21

Step-by-Step:

Two different subdomains handle different requests.

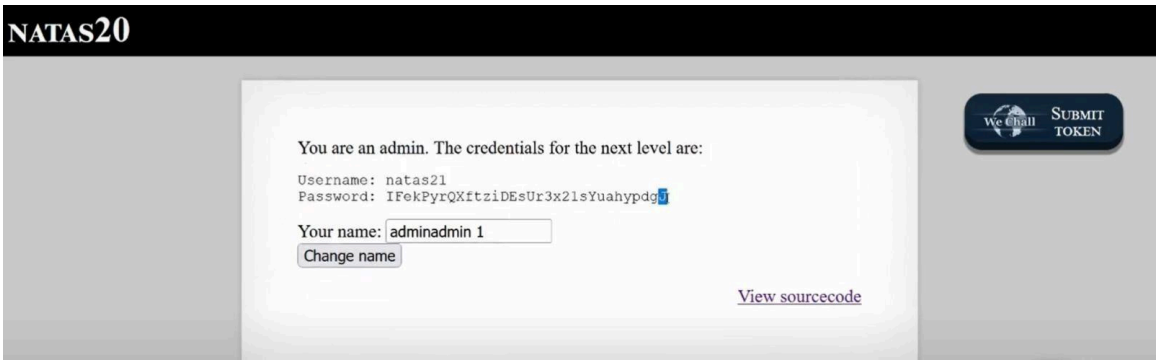
Modify session to "admin=1" manually.

Tools Used:

Browser, Burp Suite

Logic Behind the Solution:

Handling multiple sessions across subdomains.



Level: Natas22

Step-by-Step:

The page redirects instantly.

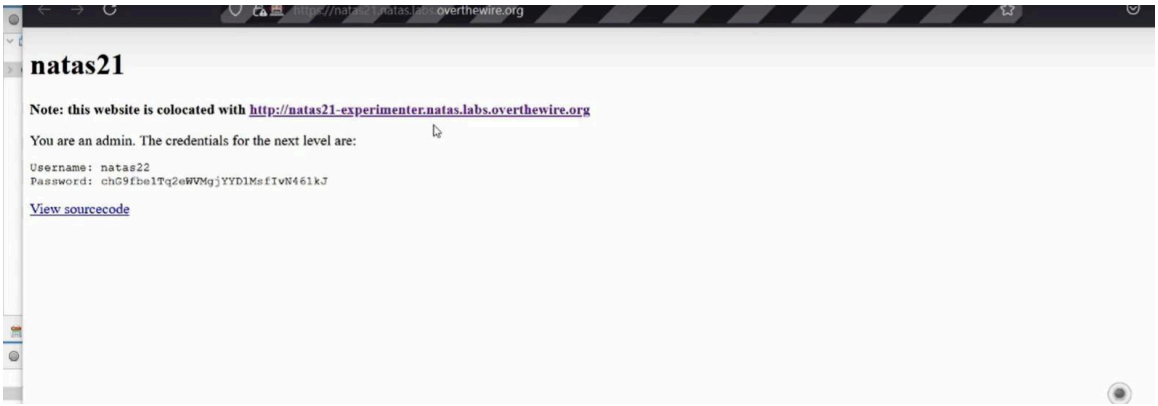
Use curl -i to inspect HTTP headers and get the response before redirection.

Tools Used:

curl

Logic Behind the Solution:

HTTP redirection behavior exploitation.



Level: Natas23

Step-by-Step:

View Page Source.

Find the expected secret input.

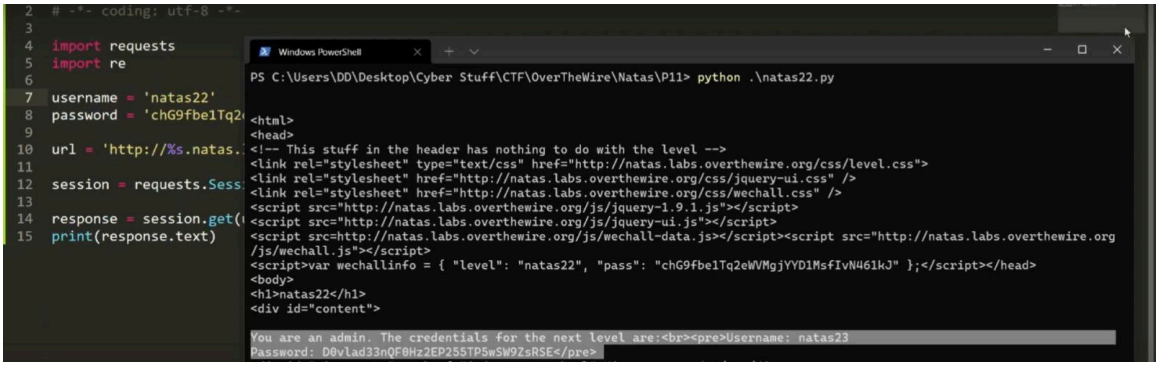
Submit the correct secret.

Tools Used:

Browser

Logic Behind the Solution:

Simple logic puzzle based on input validation.



Level: Natas24

Step-by-Step:

Inject command using POST parameters.

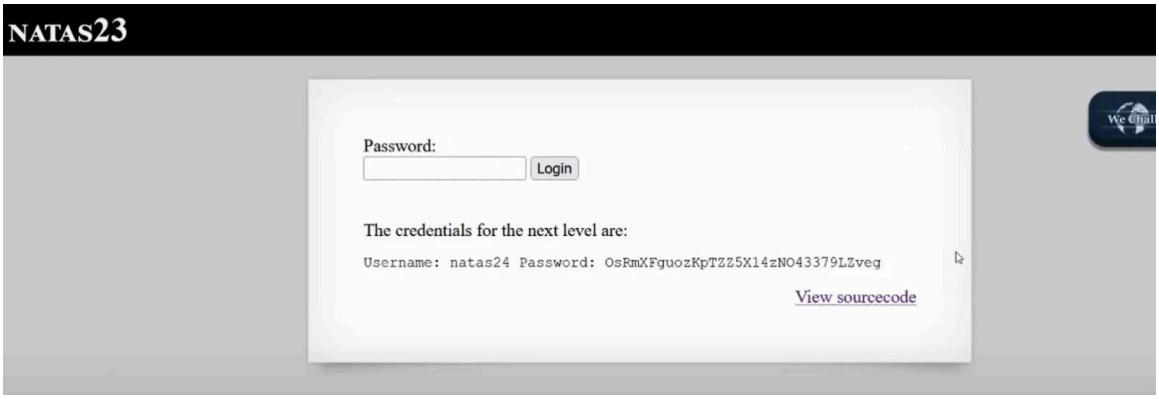
Example: "test$(cat /etc/natas_webpass/natas25)"

Tools Used:

Browser

Logic Behind the Solution:

Exploiting input parsing and command injection.



Level: Natas25

Step-by-Step:

Perform directory traversal in the lang parameter.

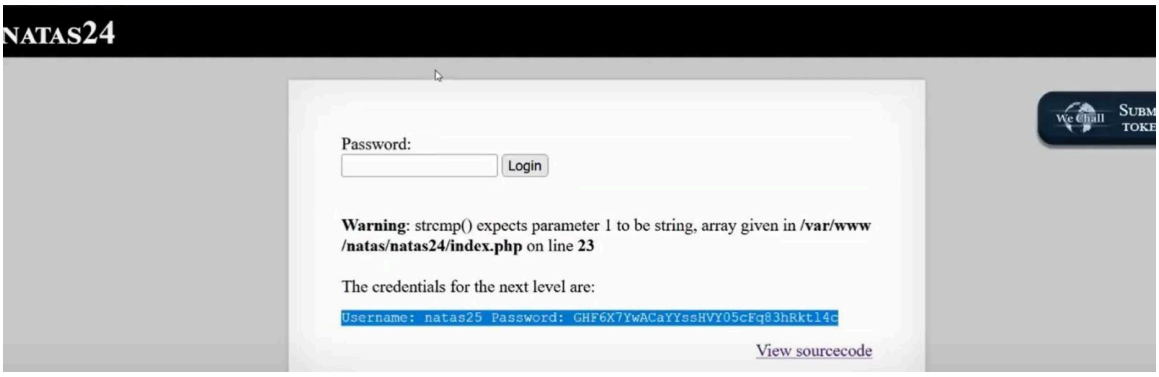
Try multiple ../ to reach /etc/natas_webpass.

Tools Used:

Browser

Logic Behind the Solution:

Advanced path traversal attack.



Level: Natas26

Step-by-Step:

Modify cookie that stores serialized object.

Decode, edit, re-encode using base64.

Tools Used:

Browser, Python, PHP

Logic Behind the Solution:

Object serialization manipulation.

```python
# -*- coding: utf-8 -*-

import requests
import re

username = 'natas25'
password = 'GHF6X7YwACaYYssHVY05cFq83hRktl4c'

url = 'http://%s.natas.labs.overthewire.org/' % username

session = requests.Session()

headers = {"User-Agent": "<?php system('cat /etc/natas_webpass/natas26'); ?>"}

response = session.get(url, auth = (username, password))

response = session.post(url, headers = headers, data = {"lang" :
    "..././..././..././..././..././var/www/natas/natas25/logs/natas25_"
    + session.cookies['PHPSESSID'] + ".log"}, auth = (username, password))

```

Level: Natas27

Step-by-Step:

SQL Injection using case sensitivity.

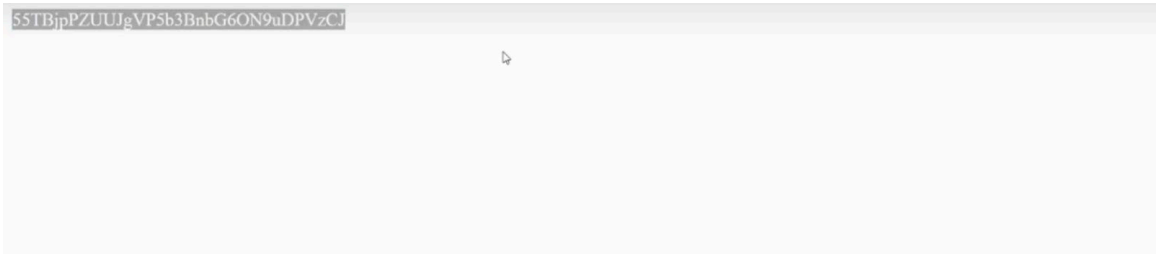
Payload: ' UNION SELECT password FROM users WHERE username LIKE BINARY 'natas28'
--

Tools Used:

Browser

Logic Behind the Solution:

Using "BINARY" keyword to perform case-sensitive queries.



Level: Natas28

Step-by-Step:

SQL Injection bypassing escaping techniques.

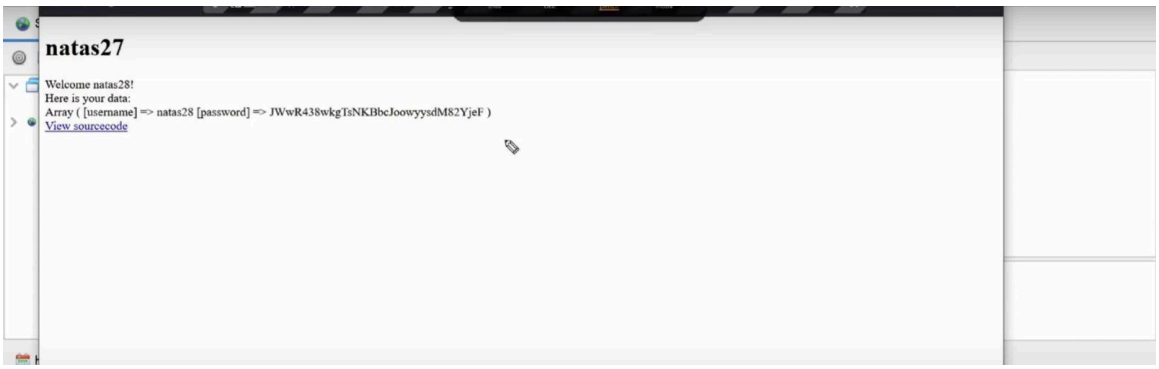
Use complicated payloads like ") UNION ALL SELECT password #

Tools Used:

Browser

Logic Behind the Solution:

Escaping characters properly to break query structure.



Level: Natas29

Step-by-Step:

Understand serialized PHP object.

Craft malicious serialized object manually.

Tools Used:

PHP scripting

Logic Behind the Solution:

Abuse serialization to manipulate application behavior.

Level: Natas30

Step-by-Step:

Send multiple parameters with the same name.

Example: passwd[]=123&passwd[]=123

Tools Used:

Browser, Burp Suite

Logic Behind the Solution:

Exploit how PHP processes multiple same-named parameters.

Level: Natas31

Step-by-Step:

Use multipart/form-data content type.

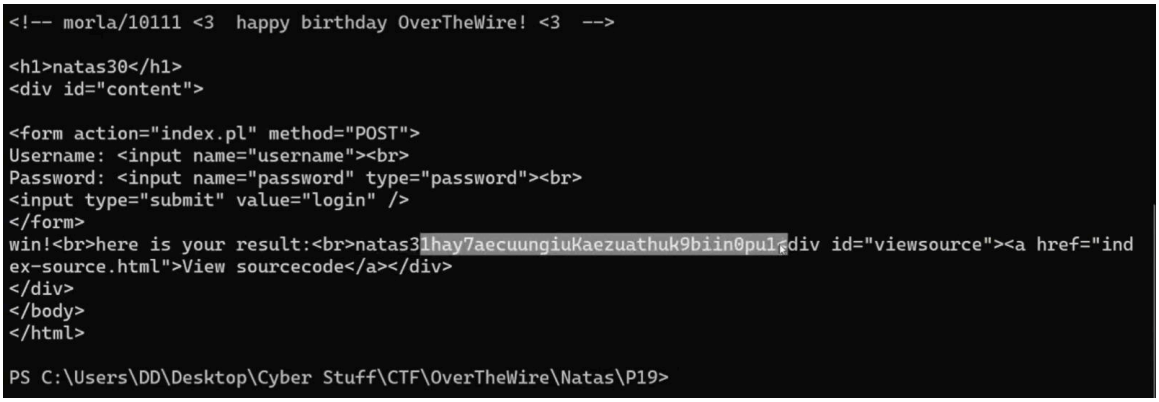
Submit crafted HTTP request via Burp Repeater.

Tools Used:

Burp Suite

Logic Behind the Solution:

Exploit how web apps parse file uploads differently.



Level: Natas32

Step-by-Step:

Upload a malicious PHP file.

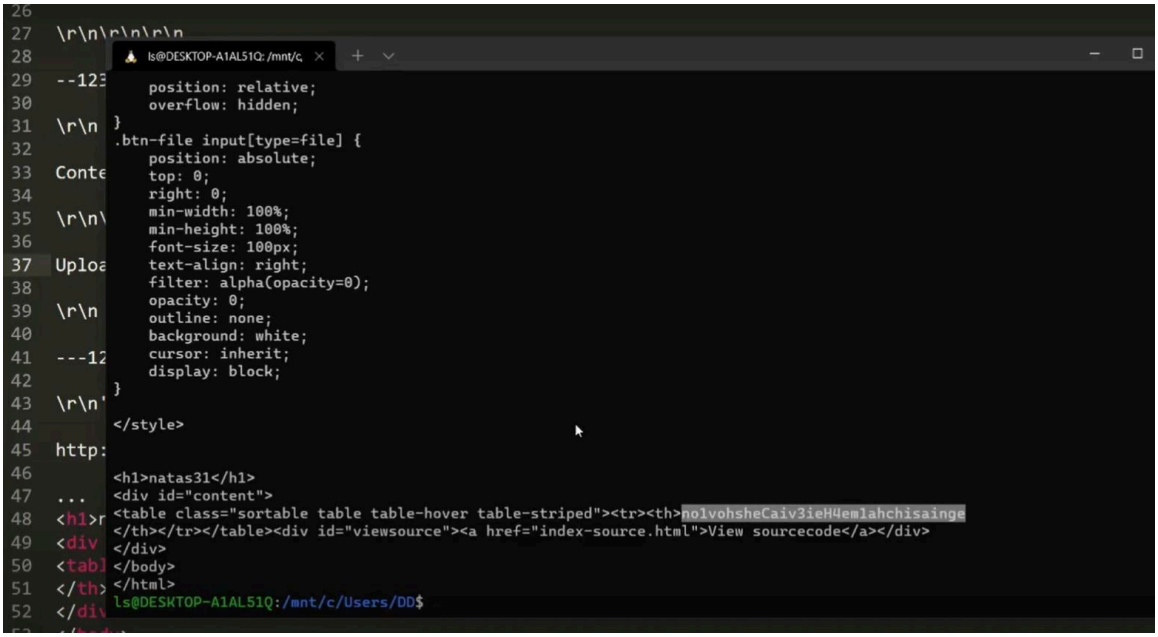
Wait for a cron job to execute it automatically.

Tools Used:

Browser

Logic Behind the Solution:

Understand webserver and cron job timing attacks.



Level: Natas33

Step-by-Step:

Use SQL Injection.

Payload: ' OR 1=1 --

Tools Used:

Browser

Logic Behind the Solution:

Bypass login forms via always-true SQL queries.

Level: Natas34

Step-by-Step:

Decode JWT token.

Modify the payload (admin:true).

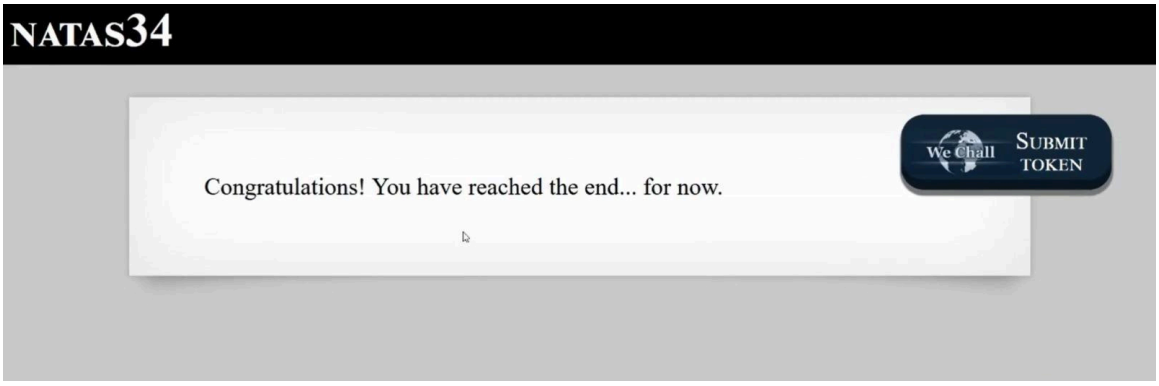
Re-sign with known key (or no verification if vulnerable).

Tools Used:

jwt.io, Browser

Logic Behind the Solution:

JWT forgery and authentication bypass.



Tools Commonly Used:

Browser (View Source, Inspect, Edit Cookies)

curl and bash scripts (for brute forcing)

Burp Suite (for modifying requests)

Online Tools (jwt.io, base64 decoders)

Scripting languages (Python, PHP)

Leviathan Wargame

Level 0 → Level 1 Tools Used:

ls, strings, ./binary

Objective:

Analyze the check binary and find the hardcoded password.

Steps Followed:

Listed files in the home directory of leviathan0 and found the check binary.

Ran strings check to reveal readable strings inside the binary.

Found a hardcoded password (e.g., sex).

Executed the binary with the found password:

./check sex

Got the password for leviathan1.

Conclusion:

Learned to extract hardcoded values from simple binaries using strings.

Level 1 → Level 2 Tools Used:

./binary, file path manipulation

Objective:

Use the printfile binary to access the password file for leviathan2.

Steps Followed:

Found a binary named printfile.

Tried different file paths like /etc/passwd, etc.

Successfully ran:

./printfile /etc/leviathan_pass/leviathan2

Password was printed on the screen.

Conclusion:

Learned about file reading through custom binaries and using absolute paths.

Level 2 → Level 3 Tools Used:

ln -s, ./binary

Objective:

Bypass filename filtering using symbolic links.

Steps Followed:

printfile may restrict filenames.

Created a symlink:

ln -s /etc/leviathan_pass/leviathan3 mylink

Ran:

./printfile mylink

Retrieved the password for leviathan3.

Conclusion:

Used symbolic linking to trick the binary into accessing restricted files.

Level 3 → Level 4 Tools Used:

Bash scripting, brute-force loop

Objective:

Find a 4-digit PIN to reveal the next password.

Steps Followed:

Ran the level3 binary — it asked for a 4-digit pin.

Used a brute-force loop:

for i in {0000..9999}; do ./level3 $i; done

Found correct pin and received password in output.

Conclusion:

Learned to automate brute-force attacks using simple bash loops.

Level 4 → Level 5 Tools Used:

find, file, SUID analysis

Objective:

Find and exploit a SUID binary.

Steps Followed:

Ran:

find / -user leviathan4 -perm -4000 2>/dev/null

Located the binary and executed it.

It executed whoami or id, revealing useful environment or privilege info.

The binary gave access to the password for leviathan5.

Conclusion:

Used SUID binary behavior to elevate access or extract restricted data.

Level 5 → Level 6 Tools Used:

ltrace, strings, function tracing

Objective:

Trace the binary to find how it compares input to a password.

Steps Followed:

Ran:

ltrace ./leviathan5

Saw that it uses strcmp() to compare input with a hardcoded string.

Found the correct password in ltrace output or by trying strings found inside.

Logged in with password.

Conclusion:

Introduced to binary instrumentation using ltrace to intercept function calls.

Level 6 → Level 7 Tools Used:

strings, environment variable manipulation

Objective:

Use a binary that relies on environment or paths to run external commands.

Steps Followed:

Ran the binary — it attempted to execute a program like echo or ls.

Changed the $PATH environment to point to a custom script: echo "/bin/sh" > /tmp/echo

chmod +x /tmp/echo export PATH=/tmp:$PATH

./leviathan6

Binary executed /tmp/echo which launched a shell as leviathan7.

Read the password from /etc/leviathan_pass/leviathan7.

Conclusion:

Demonstrated environment manipulation and command hijacking via $PATH.