



School of Computer Science Engineering and Information Systems

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"Intruder Insight: Honeypot Snapshot"

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ABSTRACT:

"Intruder Insight: Honeypot Snapshot" gives a brief summary of how honeypots are used, their ability to detect threats, and the changing patterns of cyberattacks. It emphasizes the importance of honeypots in improving cybersecurity by luring and observing malicious behavior. The summary discusses how honeypots are effective in spotting new threats and studying attacker methods, providing valuable information for proactive defense. Additionally, it examines how deception technology helps strengthen network security and reduces risks from advanced adversaries. Overall, the summary offers a concise yet thorough look at how honeypots are used and their impact on cybersecurity resilience.

INTRODUCTION:

"Intruder Insight: Honeypot Snapshot" provides a comprehensive examination of honeypots, an essential component in modern cybersecurity

defenses. This report offers insights into their historical evolution, deployment strategies, and their pivotal role in detecting and responding to cyber threats.

History:

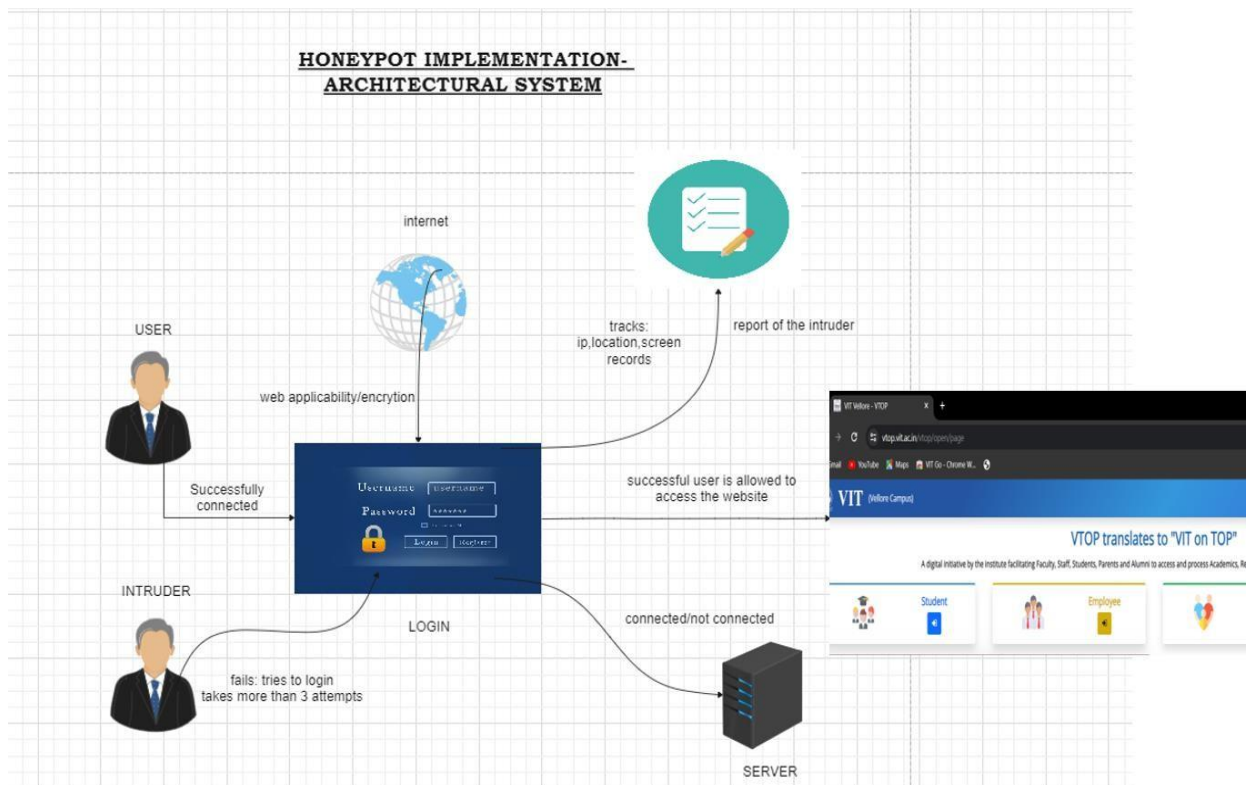
Honeypots trace their origins back to the early 1990s when researchers began exploring the concept of luring and observing attackers to gather intelligence. The first documented honeypot, called "Deception Toolkit," was developed by Fred Cohen in 1991. Initially, honeypots were simple tools designed to emulate vulnerable systems, enticing attackers to interact with them and revealing their tactics and techniques.

Over time, honeypots evolved into sophisticated cybersecurity mechanisms, with organizations worldwide deploying them strategically to bolster their defenses. In the late 1990s and early 2000s, the HoneyNet Project emerged, pioneering the use of high-interaction honeypots to gain deeper insights into attacker behavior.

Today, honeypots come in various forms, from low-interaction honeypots, which simulate only basic services, to high-interaction honeypots that mimic entire systems, providing a rich environment for studying attacker behavior. They play a crucial role in threat intelligence gathering, aiding in the identification of new attack vectors and the development of effective countermeasures.

Understanding the historical context of honeypots provides valuable insight into their continued relevance in contemporary cybersecurity landscapes. As threats continue to evolve, honeypots remain a vital tool for organizations seeking to stay one step ahead of malicious actors.

SYSTEM ARCHITECTURE:



MODULES :

1. Proxy Server Module:

- Acts as a middleman between users and the main server.
- Captures incoming requests and forwards them appropriately.

2. Logging Module:

- Records IP addresses, location data, and user activities.
- Triggers screenshot capture when unusual activity is detected.

3. Screenshot Capture Module:

- Takes screenshots of user systems during suspicious activity.
- Stores captured screenshots for later analysis.

4. Activity Analysis Module:

- Analyzes captured screenshots and logged data.
- Identifies patterns and potential threats in user activities.

5. Alerting Module:

- Generates alerts for system administrators when suspicious activity is detected.
- Enables quick response to potential security threats.

6. Update Design Module:

- Designs system updates and security enhancements based on analysis results.
- Addresses vulnerabilities and strengthens system security.

7. User Interface Module:

- Provides a simple interface for system administrators.
- Allows them to view logs, analyze screenshots, and manage alerts easily.

NOVELTY:

This project is unique because it goes beyond typical honeypots. While regular honeypots just track IP addresses and network activity, this one also takes screenshots of the attacker's computer. This gives a clearer picture of what the attacker is doing. For example, if they're trying to access files or mess with the user interface. Later, experts can study these screenshots to understand the attacker's methods better. This helps improve the system's security against future attacks. So, it's like a honeypot with an extra feature that makes it more powerful for catching and studying hackers.

IMPLEMENTATION:

To implement the HTML code along with the functionality provided by `captureimage.py`, `keylogger.py`, and `Hashconversion.py` in the document, you need to integrate these functionalities into your HTML/JavaScript code and provide a mechanism to trigger the execution of the Python scripts. Here's a general approach:

1. Server-side Integration:

- Create endpoints to handle requests triggered by the HTML/JavaScript code.
- Implement the functionality to run the Python scripts (**`captureimage.py`**, **`keylogger.py`**, **`Hashconversion.py`**) within the appropriate endpoints.

2. Client-side Integration:

- Modify your HTML/JavaScript code to trigger AJAX requests to the backend server when certain events occur (e.g., after three failed login attempts).

- Handle the responses from the server accordingly (e.g., display messages to the user, redirect to another page).

Here's a high-level overview of how you can proceed with the implementation:

Frontend Implementation (HTML/JavaScript):

1. Modify HTML:

- Integrate the existing HTML code with appropriate event handlers (e.g., form submission, login attempts).

2. JavaScript Functions:

- Modify JavaScript code to trigger AJAX requests to the Flask backend when required events occur (e.g., after three failed login attempts).

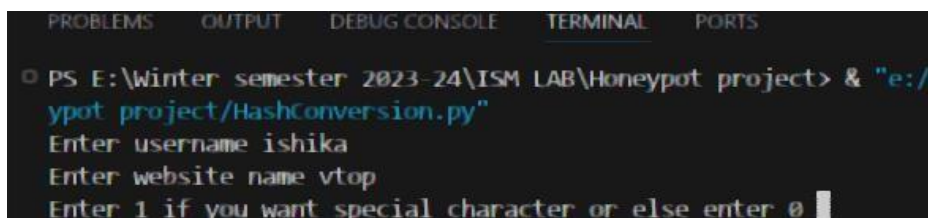
3. Handle Responses:

- Handle responses from the server (e.g., display success/error messages, redirect to another page).

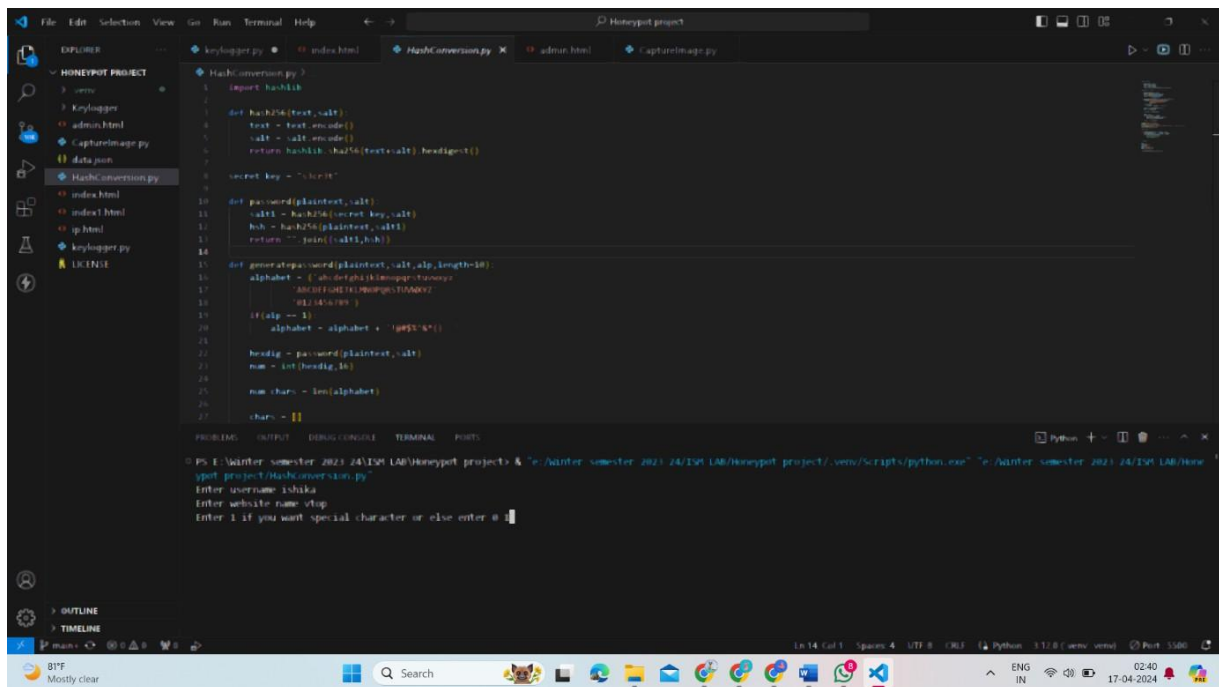
TESTING AND SCREENSHOTS :

1. Username and Password generator for the login :

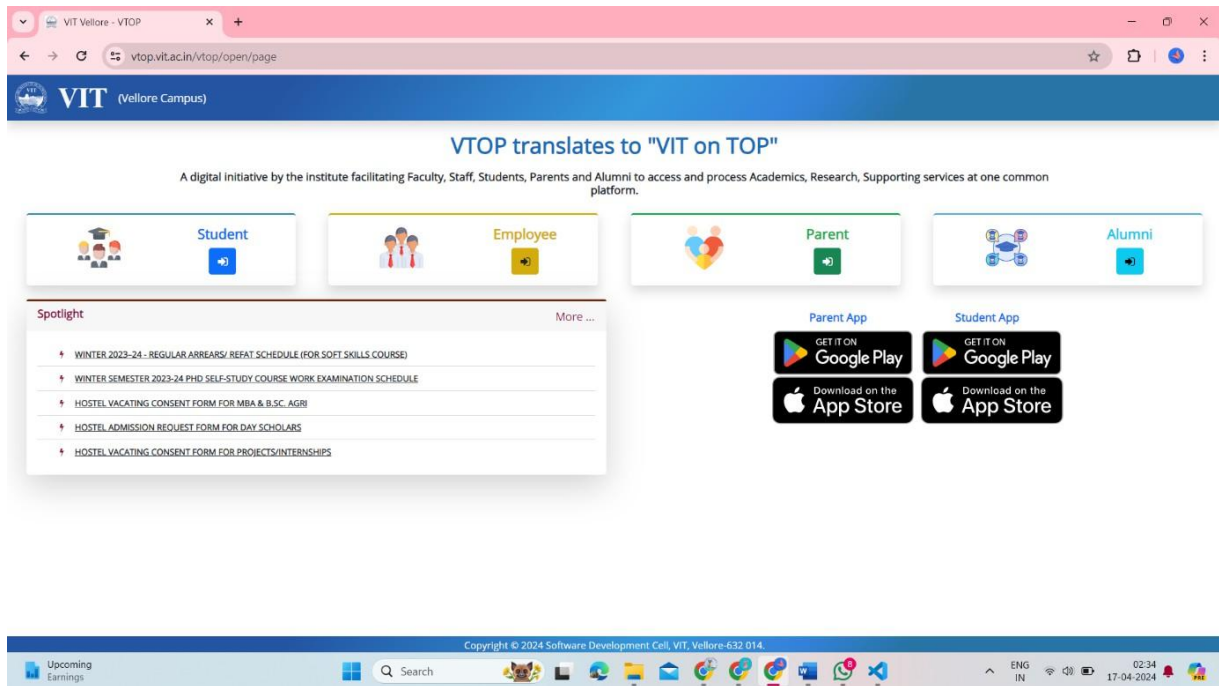
File name : HashConversion.py



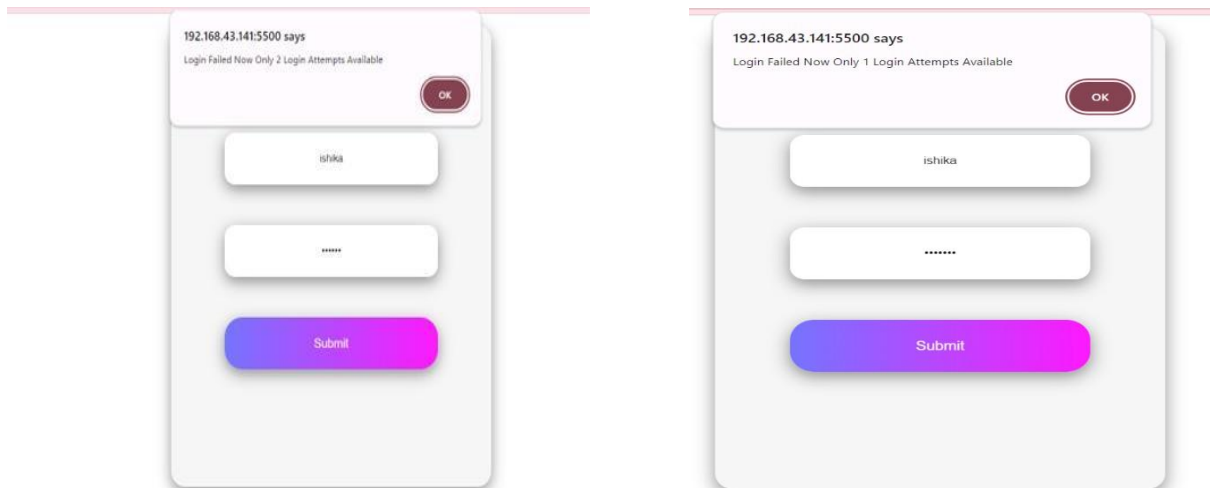
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PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
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Enter username ishika
Enter website name vtop
Enter 1 if you want special character or else enter 0
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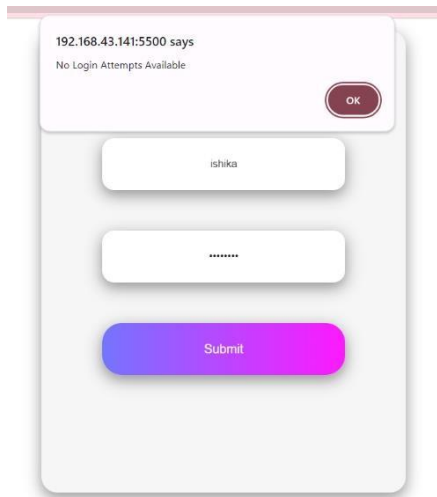


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HoneyPot project
EXPLORER
HONEYPOT PROJECT
  .venv
  Keylogger
  admin.html
  CaptureImage.py
  data.json
  HashConversion.py
  index.html
  ip.html
  keylogger.py
  LICENSE
HashConversion.py
1 import hashlib
2
3 def hash256(text,salt):
4     test = text.encode()
5     salt = salt.encode()
6     return hashlib.sha256(test+salt).hexdigest()
7
8 secret_key = "secret"
9
10 def password(plaintext,salt):
11     salt1 = hash256(secret_key,salt)
12     hsh = hash256(plaintext,salt1)
13     return ''.join((salt1,hsh))
14
15 def generatepassword(plaintext,salt,alp,length=10):
16     alphabet = ['a','b','c','d','e','f','g','h','i','j','k','l','m','n','o','p','q','r','s','t','u','v','w','x','y','z','0','1','2','3','4','5','6','7','8','9']
17     password = ""
18     for i in range(length):
19         alp = random.choice(alphabet)
20         password = password + alp
21     hndig = password(plaintext,salt)
22     nme = int(hndig,16)
23     nme = nme % len(alphabet)
24     char = alphabet[nme]
25     password = password + char
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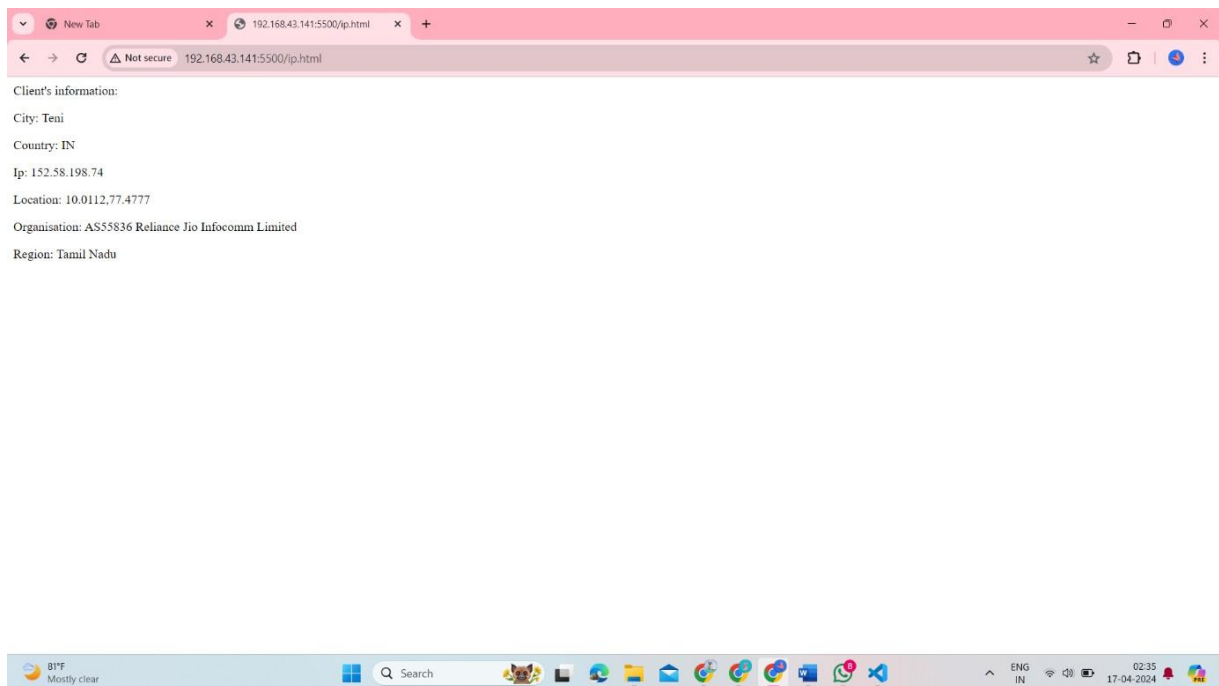


- Intruder input : 3 attempts of failed login



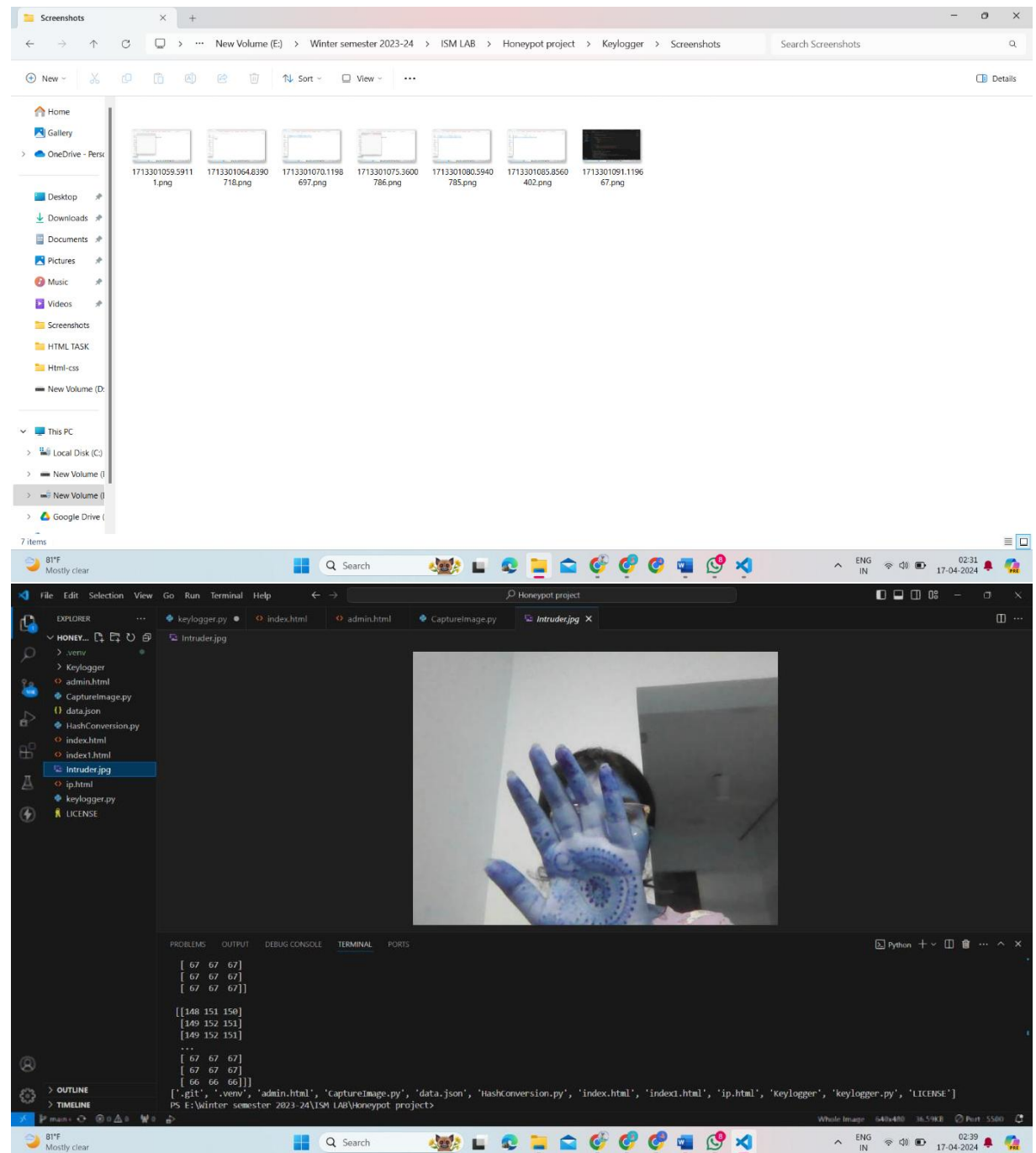


- Redirected to file ip.html and displays location and rest info of intruder



3. Screenshots and Photo capture of the intruder:

Filename : Keylogger.py and CaptureImage.py



CONCLUSION :

"Intruder Insight: Honeypot Snapshot" stresses the importance of honeypots in modern cybersecurity. It talks about how honeypots help companies spot and understand cyber threats, providing valuable insights to bolster their defenses and handle risks effectively. The research also mentions how honeypots have evolved from simple tools to sophisticated cybersecurity systems. This shows the constant battle between cyber attackers and defenders. It underscores the need for staying updated with the latest

technology and trends in managing and using honeypots to adapt to ever-changing threat landscapes.

REFERENCES :

a) Books:

"The Honeynet Project: Trapping the Hackers" by Lance Spitzner.

b) Online Resources:

- The Honeynet Project (<https://www.honeynet.org/>): Provides various resources, including whitepapers, tools, and research findings related to honeypots and cybersecurity.
- Open Source Security Information Management (OSSIM) (<https://www.alienvault.com/open-threat-exchange/blog/ossim-free-opensource-siem>): OSSIM offers open-source security information and event management (SIEM) solutions, including features for deploying and monitoring honeypots.

THANK YOU...



INTRUDER INSIGHT:

Ishika
21BIT0657

Khandelwal:

ABSTRACT



"Intruder Insight: Honeypot Snapshot" offers a succinct overview of honeypot deployment strategies, threat detection capabilities, and evolving cyberattack trends. It highlights the significance of honeypots in enhancing cybersecurity defenses by attracting and monitoring malicious activity. The abstract delves into the effectiveness of honeypots in identifying emerging threats and analyzing attacker tactics, providing valuable intelligence for proactive defense measures. Furthermore, it explores the role of deception technology in augmenting network security and mitigating risks posed by sophisticated adversaries. Overall, the abstract presents a concise yet comprehensive glimpse into the evolving landscape of honeypot usage and its impact on cybersecurity resilience.

INTRODUCTION

"Intruder Insight: Honeypot Snapshot" provides a comprehensive examination of honeypots, an essential component in modern cybersecurity defenses. This report offers insights into their historical evolution, deployment strategies, and their pivotal role in detecting and responding to cyber threats.

History

Honeypots trace their origins back to the early 1990s when researchers began exploring the concept of luring and observing attackers to gather intelligence. The first documented honeypot, called "Deception Toolkit," was developed by Fred Cohen in 1991. Initially, honeypots were simple tools designed to emulate vulnerable systems, enticing attackers to interact with them and revealing their tactics and techniques.

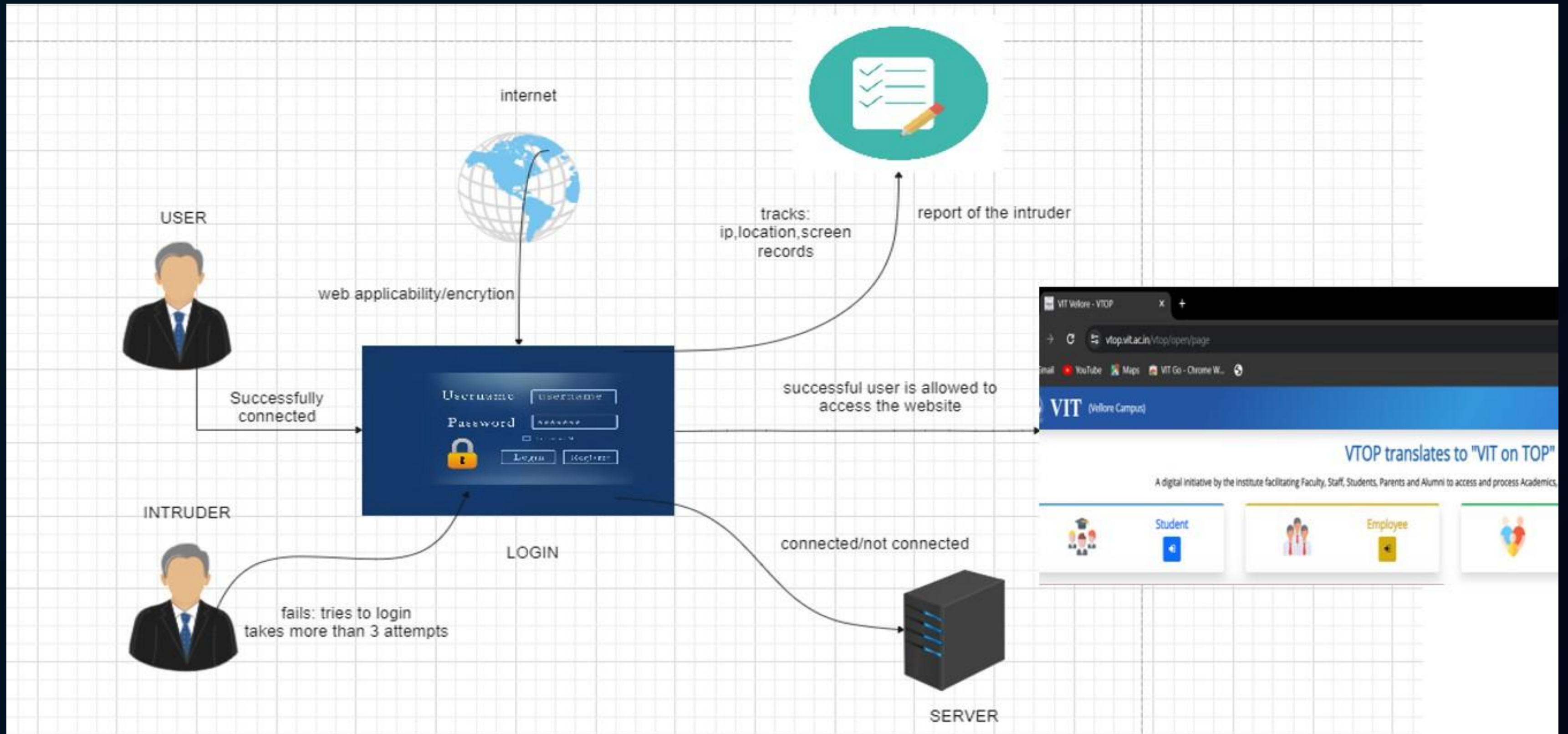
Over time, honeypots evolved into sophisticated cybersecurity mechanisms, with organizations worldwide deploying them strategically to bolster their defenses. In the late 1990s and early 2000s, the HoneyNet Project emerged, pioneering the use of high-interaction honeypots to gain deeper insights into attacker behavior.

Today, honeypots come in various forms, from low-interaction honeypots, which simulate only basic services, to high-interaction honeypots that mimic entire systems, providing a rich environment for studying attacker behavior. They play a crucial role in threat intelligence gathering, aiding in the identification of new attack vectors and the development of effective countermeasures.

Understanding the historical context of honeypots provides valuable insight into their continued relevance in contemporary cybersecurity landscapes. As threats continue to evolve, honeypots remain a vital tool for organizations seeking to stay one step ahead of malicious actors.



ARCHITECTURE

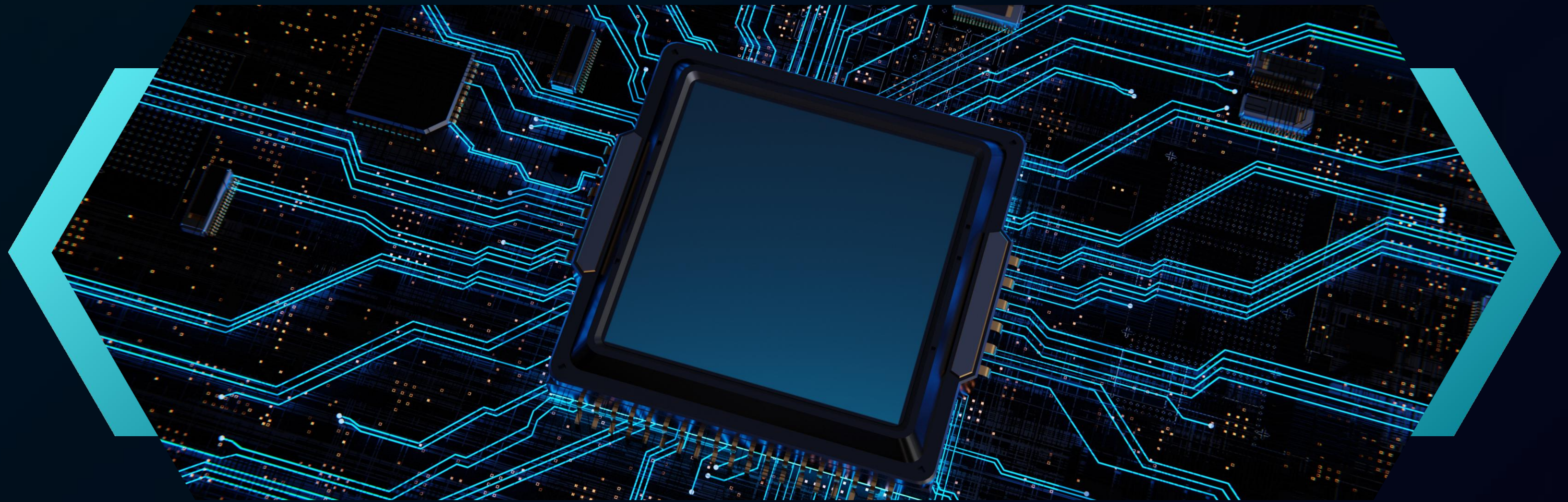


NOVELTY

"Intruder Insight: Honeypot Snapshot" goes beyond traditional discussions of honeypots by focusing on the latest advancements and emerging trends in honeypot technology and deployment strategies. It explores innovative approaches to honeypot design, such as the integration of machine learning and artificial intelligence for more efficient threat detection and response.

Furthermore, the report delves into novel use cases of honeypots beyond passive threat detection, including active defense measures and deception tactics to mislead and disrupt attackers. Additionally, it highlights the integration of honeypots with broader cybersecurity frameworks, such as Security Information and Event Management (SIEM) systems, to enhance threat intelligence and incident response capabilities.

By showcasing these novel applications and advancements, "Intruder Insight: Honeypot Snapshot" provides valuable insights for cybersecurity professionals and organizations looking to strengthen their defensive posture and stay ahead of evolving cyber threats.



MODULES

Introduction to Honeypots This module provides a foundational overview of honeypots, including their definition, historical evolution, and the fundamental principles behind their operation

Types of Honeypots: This section explores the various types of honeypots, ranging from low–interaction to high–interaction honeypots, along with their respective strengths, weaknesses, and use cases.

Honeypot Deployment Strategies: Here, different deployment strategies for honeypots are discussed, including network, host, and application–based honeypots. This module covers best practices for deploying honeypots effectively within diverse network environments.

Threat Detection and Intelligence: This module focuses on the role of honeypots in threat detection and intelligence gathering. It examines how honeypots capture and analyze attacker behavior to provide valuable insights into emerging threats and attack trends.

Advanced Honeypot Techniques: Advanced techniques for enhancing honeypot effectiveness are explored in this section, including the integration of machine learning algorithms, active defense measures, and the use of deception tactics to deceive and disrupt attackers.

Honeypots in Cyber Defense: This module discusses the broader implications of honeypots within cybersecurity defense strategies. It covers their integration with Security Information and Event Management (SIEM) systems, incident response workflows, and their role in proactive defense measures.

Case Studies and Practical Applications: Real–world case studies and practical examples are presented in this module to illustrate how organizations are leveraging honeypots to strengthen their cybersecurity posture and mitigate risks effectively.

Future Trends and Emerging Technologies: Finally, this module explores future trends and emerging technologies in the field of honeypots, including the adoption of cloud–based honeypots, IoT honeypots, and the potential impact of advancements in artificial intelligence and automation.





IMPLEMENTATION



To implement the HTML code along with the functionality provided by `captureimage.py`, `keylogger.py`, and `Hashconversion.py` in the document, you need to integrate these functionalities into your HTML/JavaScript code and provide a mechanism to trigger the execution of the Python scripts. Here's a general approach:

1. **Server-side Integration:**

- Create endpoints to handle requests triggered by the HTML/JavaScript code.
- Implement the functionality to run the Python scripts (`captureimage.py`, `keylogger.py`, `Hashconversion.py`) within the appropriate endpoints.

2. **Client-side Integration:**

- Modify your HTML/JavaScript code to trigger AJAX requests to the backend server when certain events occur (e.g., after three failed login attempts).
- Handle the responses from the server accordingly (e.g., display messages to the user, redirect to another page).

Here's a high-level overview of how you can proceed with the implementation:
Frontend Implementation (HTML/JavaScript):

1. **Modify HTML:**

- Integrate the existing HTML code with appropriate event handlers (e.g., form submission, login attempts).

2. **JavaScript Functions:**

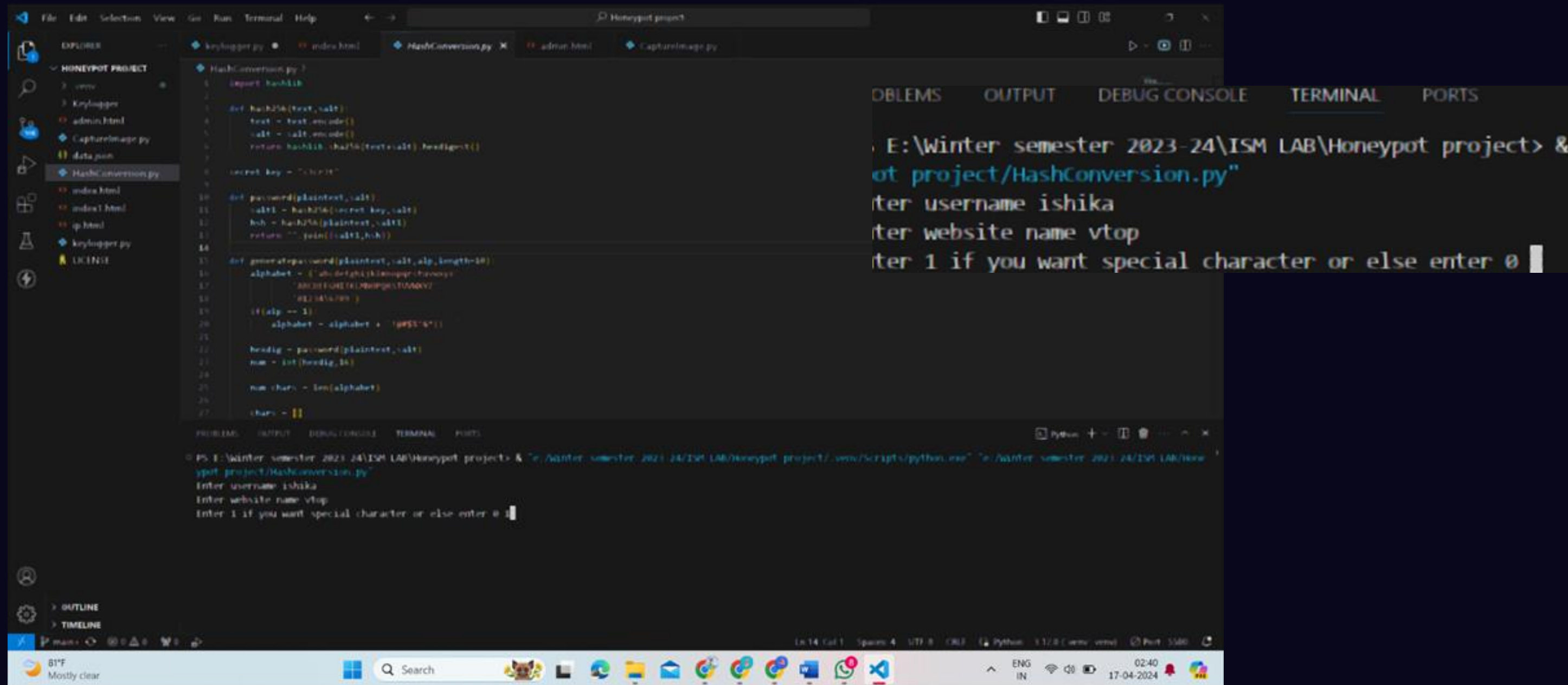
- Modify JavaScript code to trigger AJAX requests to the Flask backend when required events occur (e.g., after three failed login attempts).

3. **Handle Responses:**

- Handle responses from the server (e.g., display success/error messages, redirect to another page).

TESTING AND SCREENSHOTS

1. Username and Password generator for the login :
File name : HashConversion.py



The screenshot displays the Visual Studio Code editor with the 'HashConversion.py' file open. The file contains Python code for generating a password based on a username and a website name. The code includes functions for hashing, password generation, and a main function that prompts the user for input.

```
1 import hashlib
2
3 def hash256(text, salt):
4     text = text.encode()
5     salt = salt.encode()
6     return hashlib.sha256(text+salt).hexdigest()
7
8 secret_key = "123456"
9
10 def password(plaintext, salt):
11     salt1 = hash256(secret_key, salt)
12     hsh = hash256(plaintext, salt1)
13     return ''.join([salt1, hsh])
14
15 def generatepassword(plaintext, salt, alp, length=10):
16     alphabet = ('abcdefghijklmnopqrstuvwxyz'
17                '0123456789'
18                '!@#$%^&*()_~`{|}~')
19     if(alp == 1):
20         alphabet = alphabet + 'P@$$%&*()_~`{|}~'
21
22     hndig = password(plaintext, salt)
23     num = int(hndig, 16)
24
25     num_chars = len(alphabet)
26
27     chars = []
```

The terminal window shows the command to run the script and the user's input:

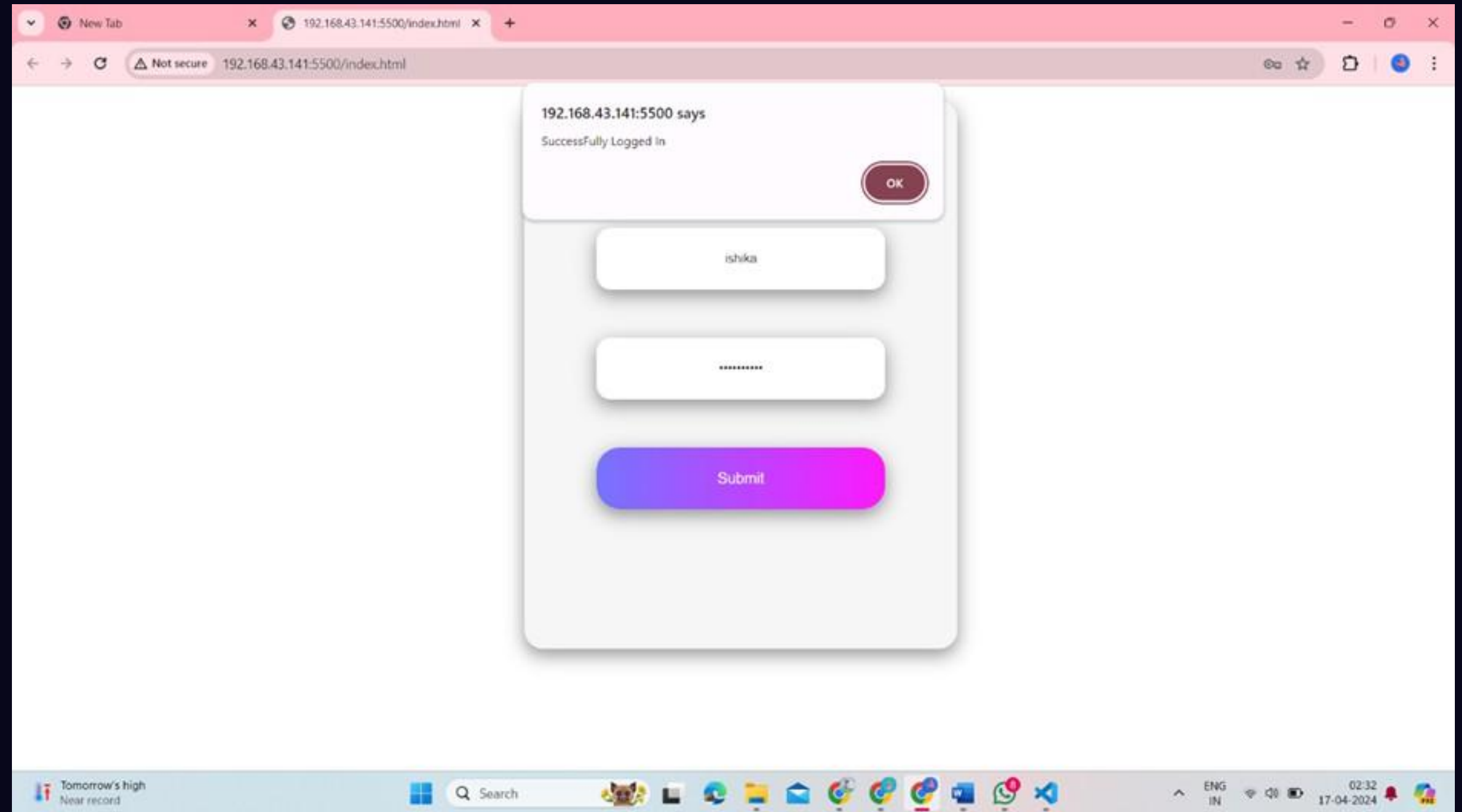
```
PS E:\Winter semester 2023-24\ISM LAB\Honeypot project> & "python .\Honeypot project\HashConversion.py"
Enter username ishika
Enter website name vtop
Enter 1 if you want special character or else enter 0 1
```

TESTING AND SCREENSHOTS

2. Home Page :

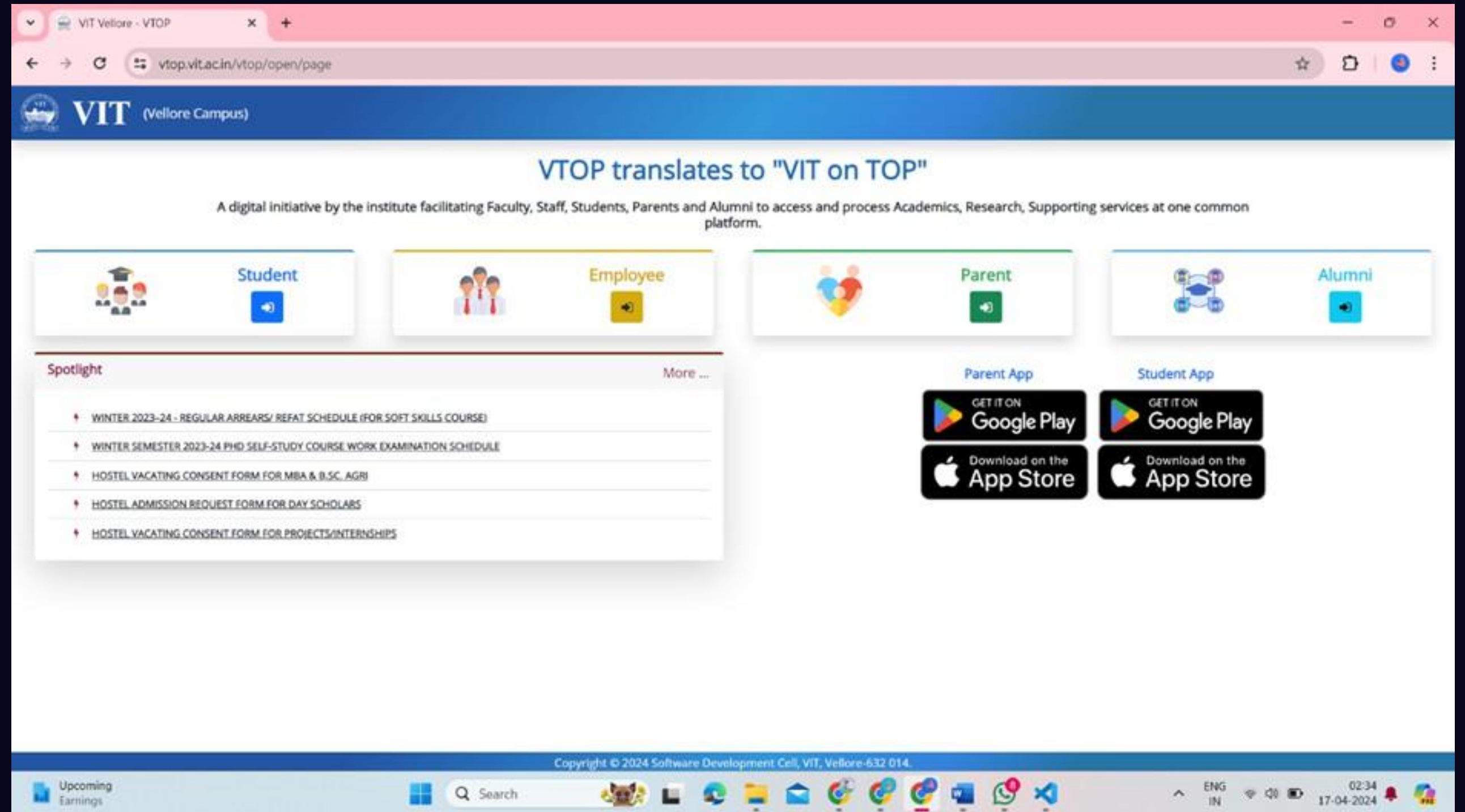
File name : index.html

- User input : successfully logged in



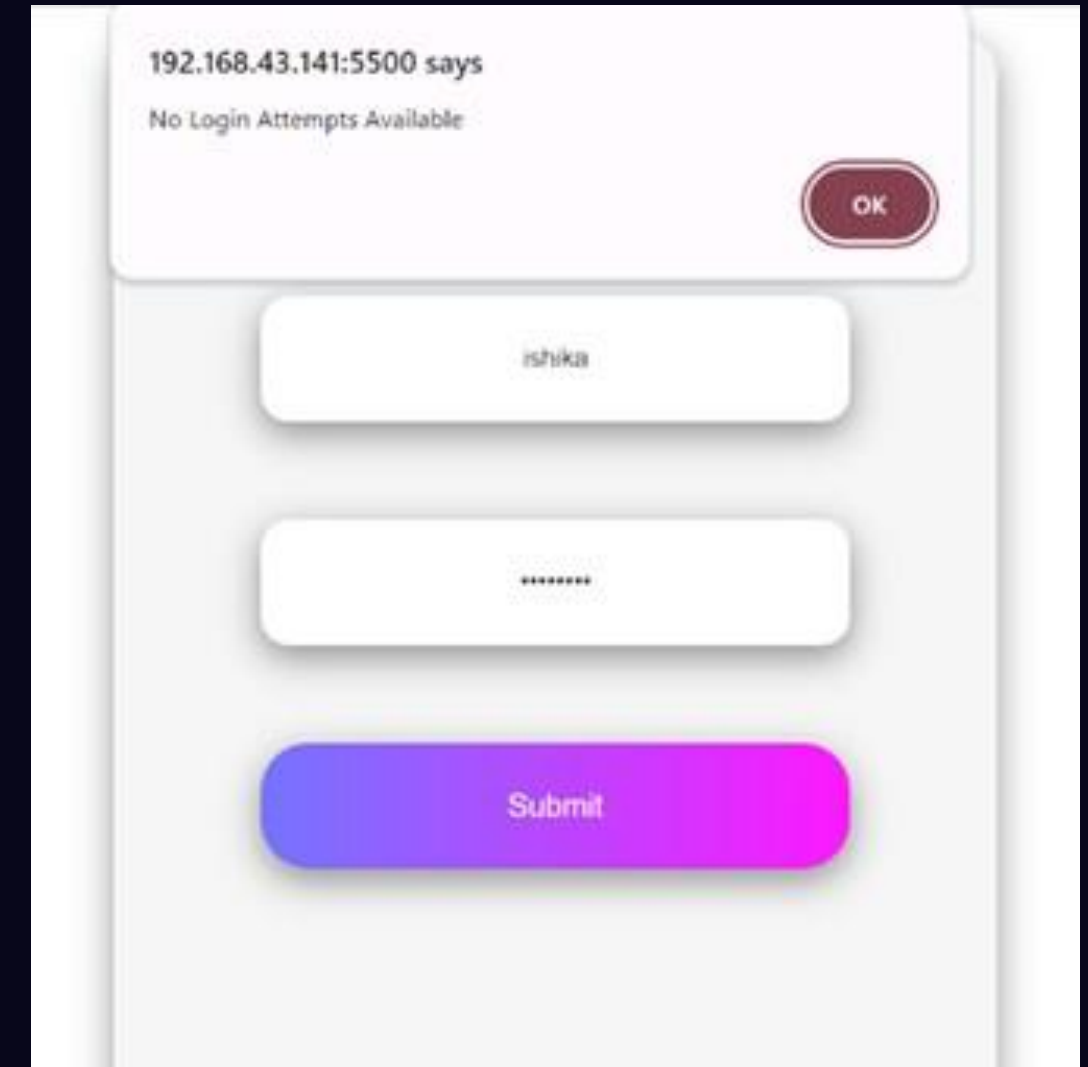
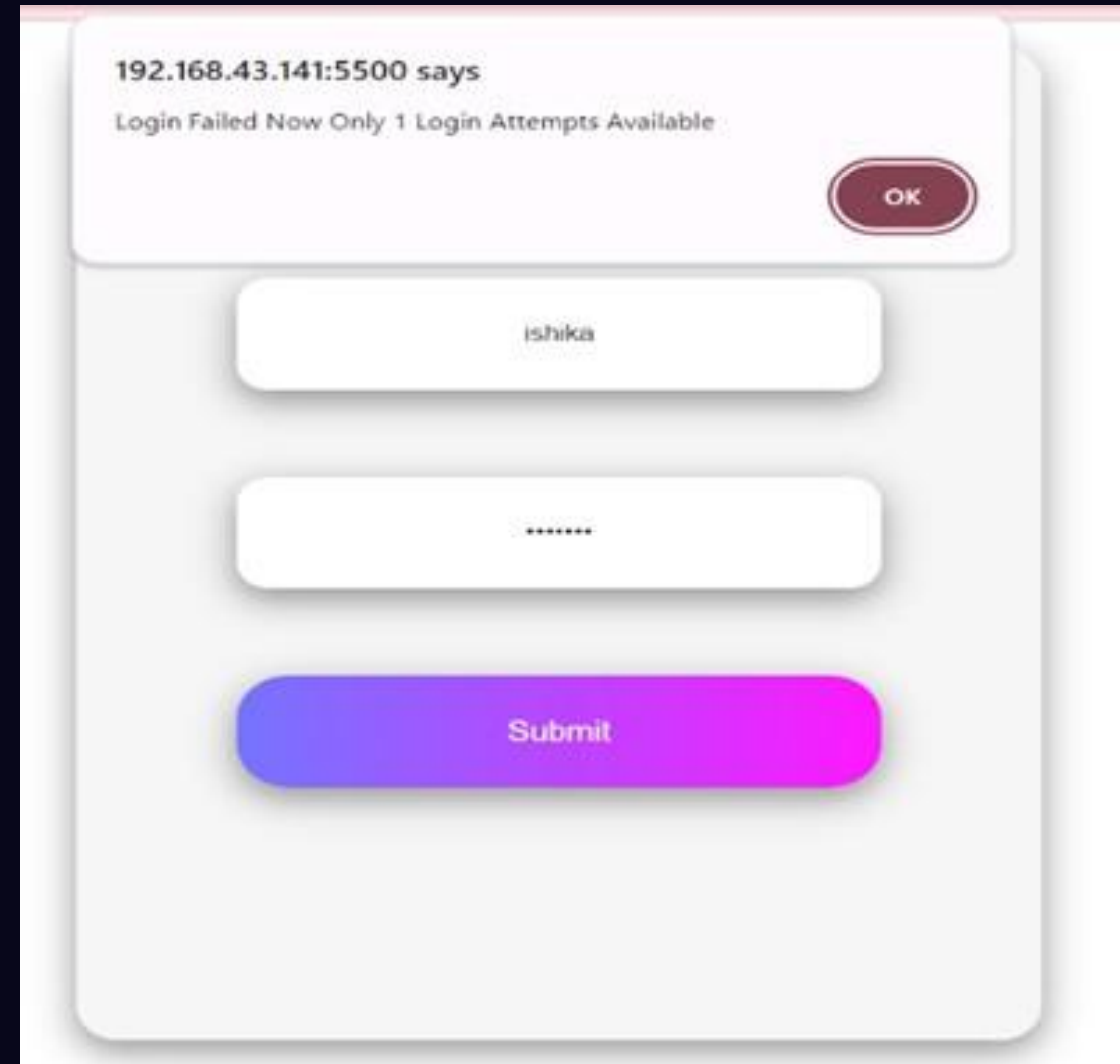
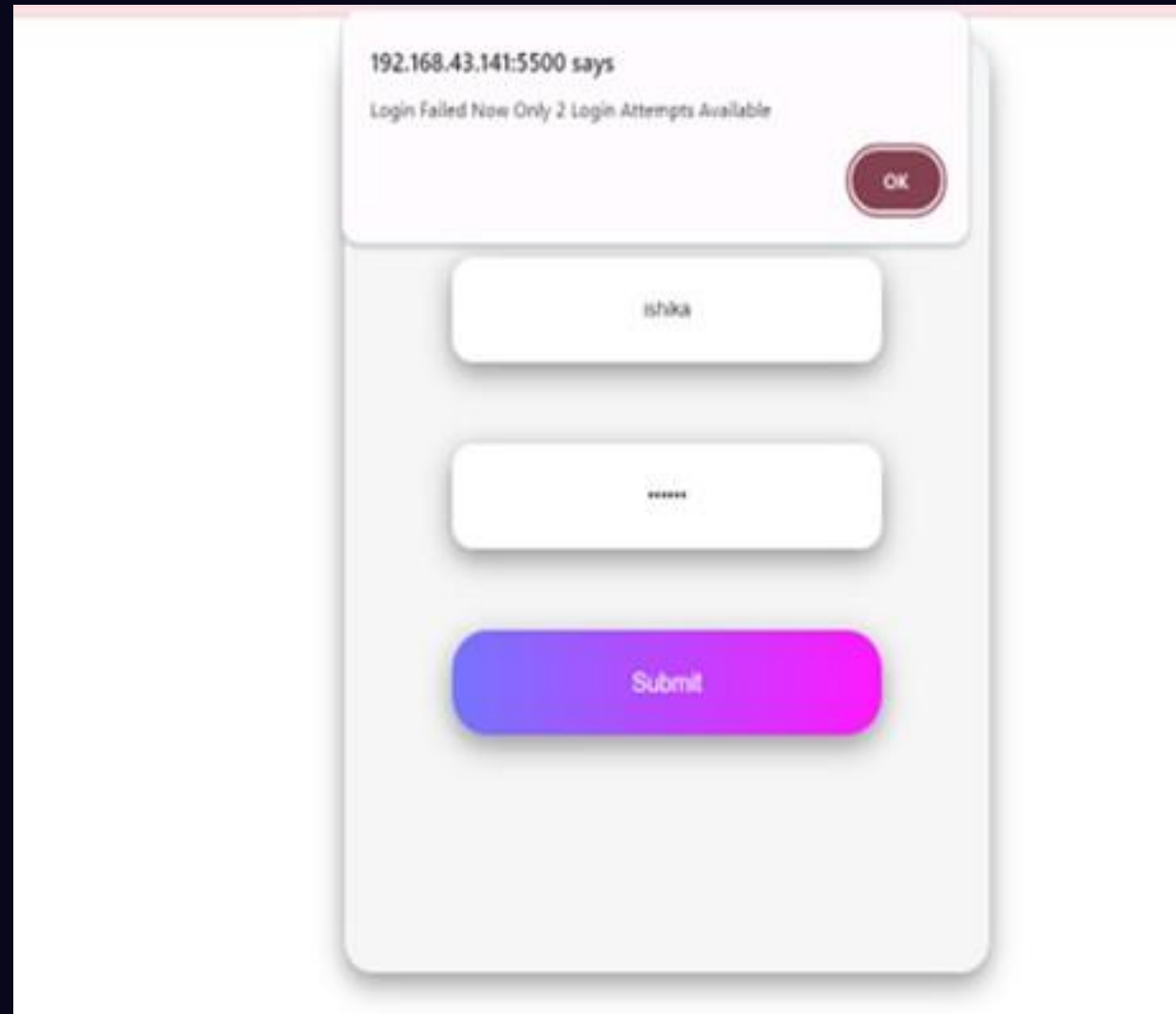
TESTING AND SCREENSHOTS

- Redirected to vtop:



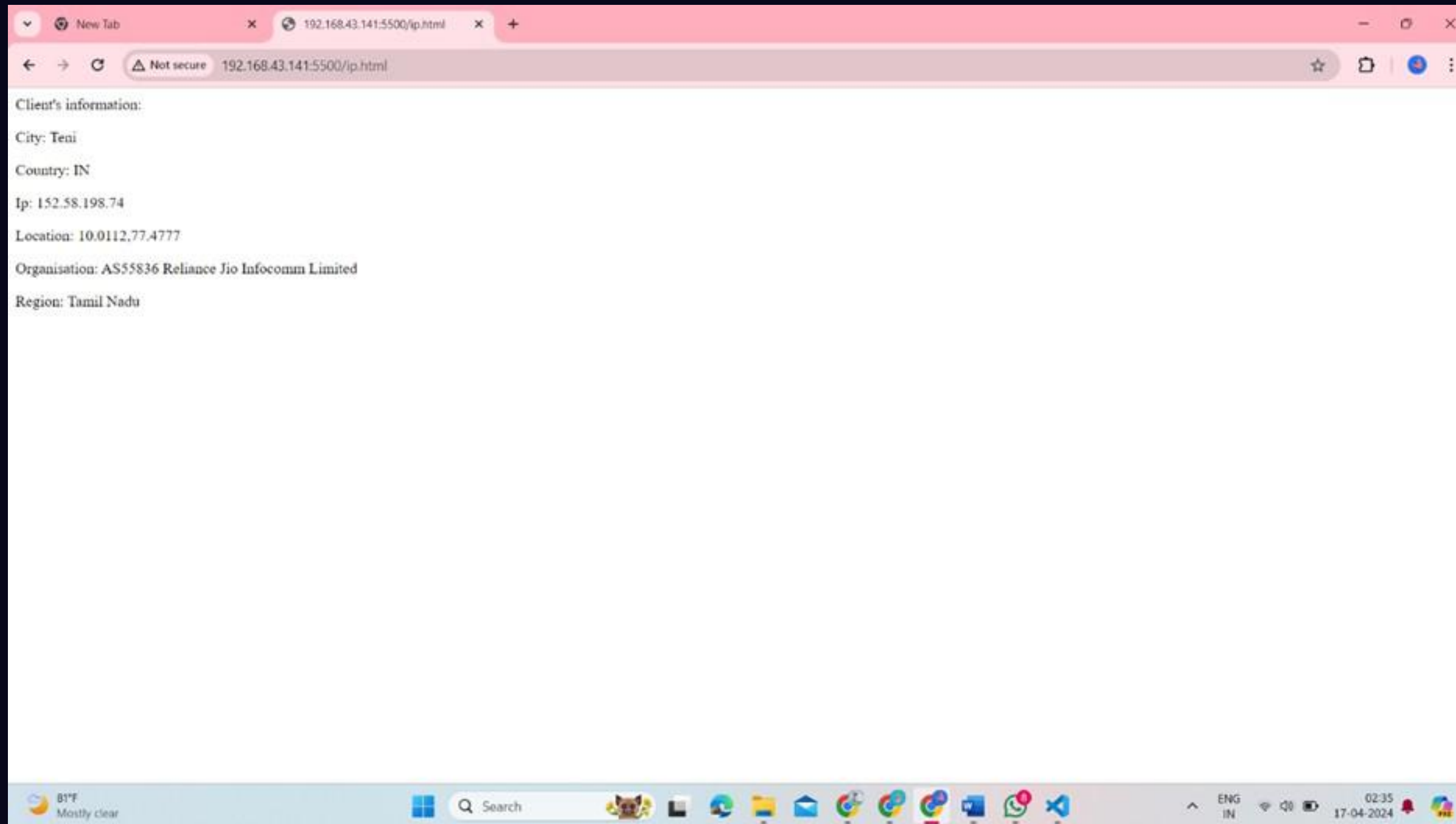
TESTING AND SCREENSHOTS

- Intruder input : 3 attempts of failed login



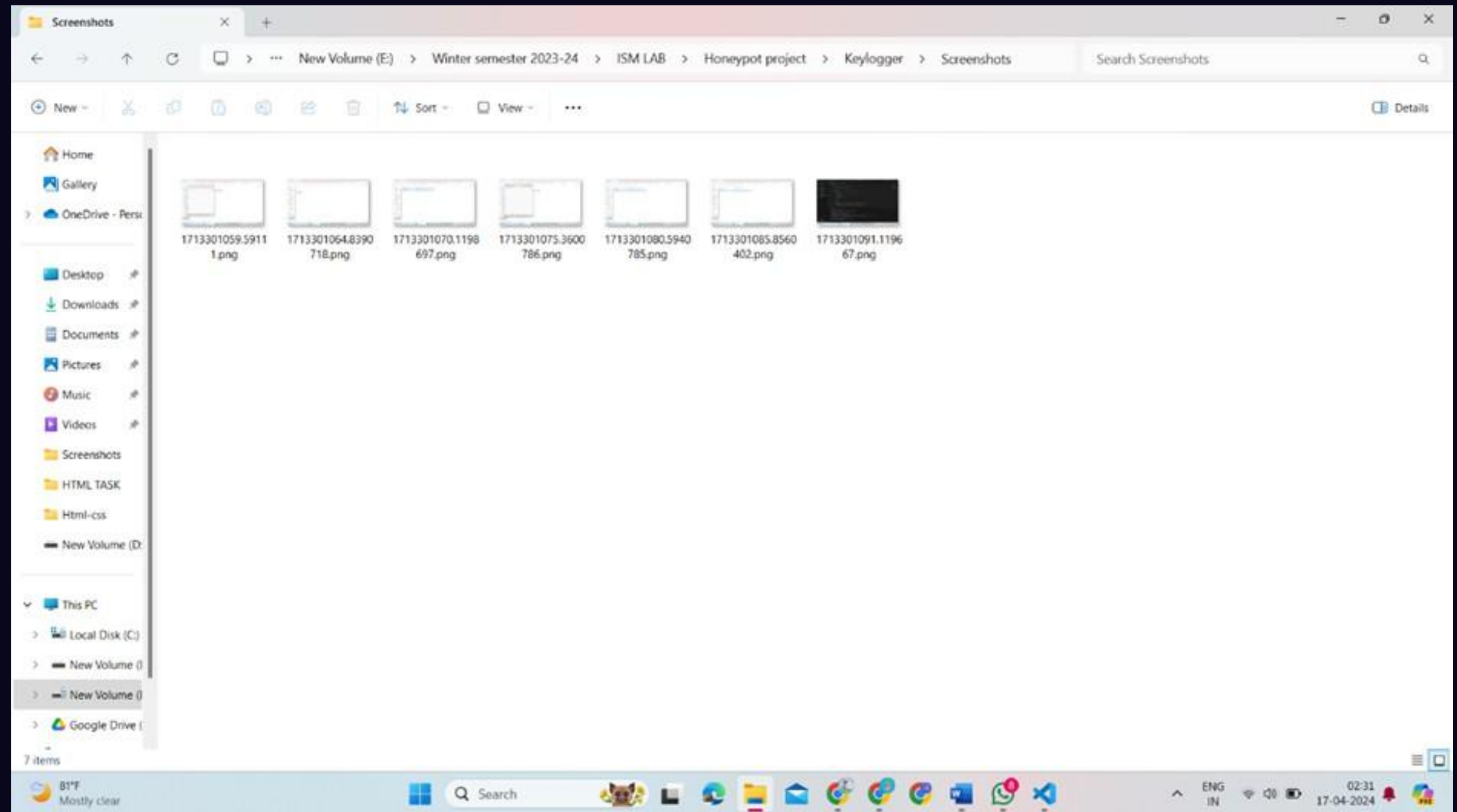
TESTING AND SCREENSHOTS

- Redirected to file ip.html and displays location and rest info of intruder



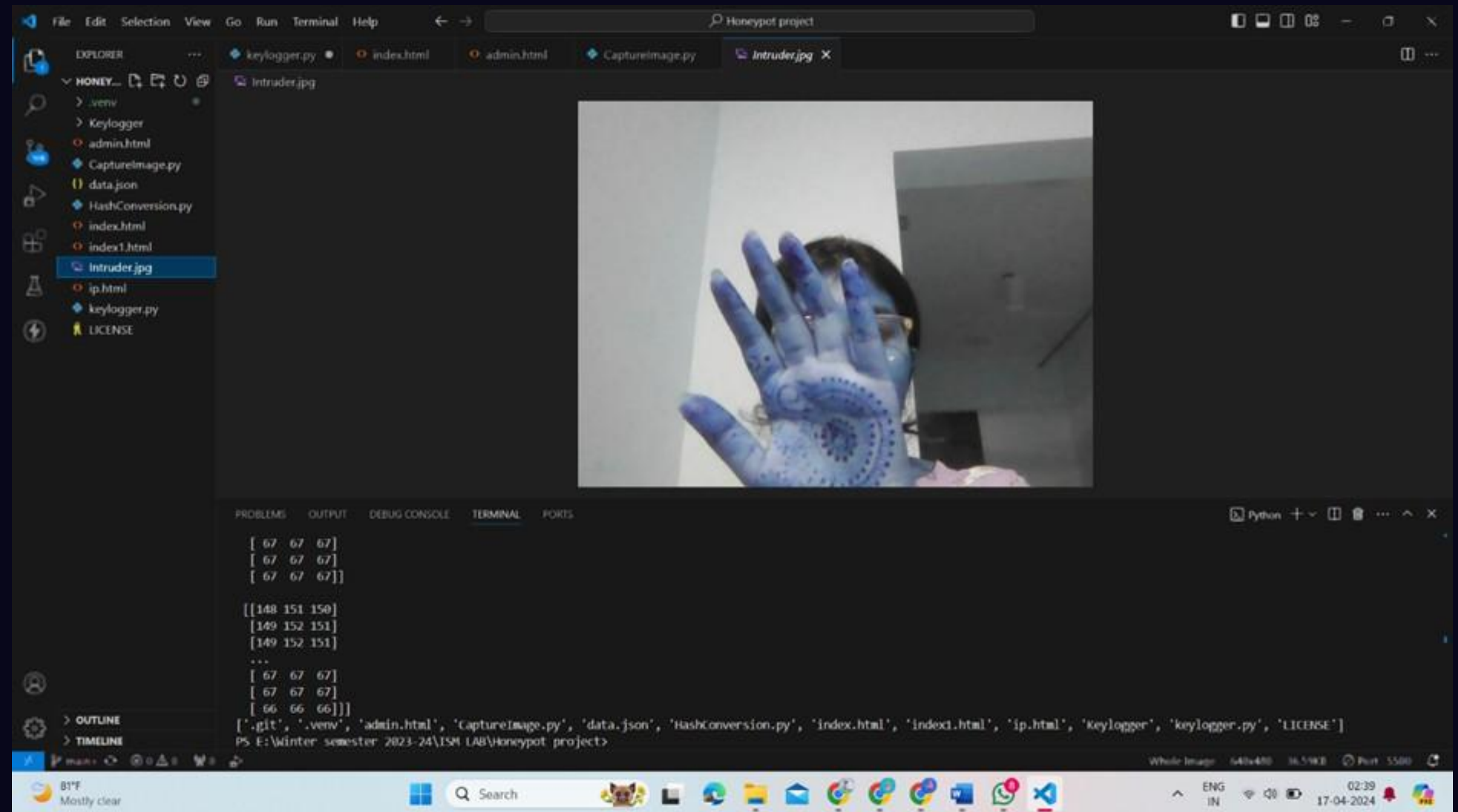
TESTING AND SCREENSHOTS

3. Screenshots and Photo capture of the intruder:
Filename : Keylogger.py and CaptureImage.py



TESTING AND SCREENSHOTS

3. Screenshots and Photo capture of the intruder:
Filename : Keylogger.py and CaptureImage.py



CONCLUSION



"Intruder Insight: Honeypot Snapshot" concludes by emphasizing the indispensable role of honeypots in modern cybersecurity defense strategies. It underscores how honeypots serve as valuable tools for detecting and analyzing cyber threats, providing organizations with actionable intelligence to fortify their defenses and mitigate risks effectively.

The report highlights the evolution of honeypots from simple emulation tools to sophisticated cybersecurity mechanisms, reflecting the ongoing arms race between defenders and adversaries in cyberspace. It emphasizes the importance of staying abreast of emerging trends and technologies in honeypot deployment and management to adapt to evolving threat landscapes. Furthermore, the conclusion underscores the need for collaboration and information sharing within the cybersecurity community to maximize the effectiveness of honeypots in combating cyber threats collectively. By leveraging the insights gleaned from honeypots, organizations can enhance their proactive defense measures, strengthen incident response capabilities, and ultimately, safeguard their digital assets against malicious actors.

As cyber threats continue to evolve in complexity and sophistication, honeypots remain a critical component of a holistic cybersecurity strategy. "Intruder Insight: Honeypot Snapshot" serves as a valuable resource for cybersecurity professionals, providing insights, best practices, and practical guidance for effectively leveraging honeypots to defend against evolving cyber threats in an ever-changing digital landscape.

REFERENCES

a) Books:

"Virtual Honeypots: From Botnet Tracking to Intrusion Detection" by Niels Provos and Thorsten Holz.

"The Honeynet Project: Trapping the Hackers" by Lance Spitzner.

b) Online Resources:

* The Honeynet Project (<https://www.honeynet.org/>): Provides various resources, including whitepapers, tools, and research findings related to honeypots and cybersecurity.

* Open Source Security Information Management (OSSIM) (<https://www.alienvault.com/open-threat-exchange/blog/ossim-free-opensource-siem>): OSSIM offers open-source security information and event management (SIEM) solutions, including features for deploying and monitoring honeypots.