16 - Shruti Gauchandra

Assignment - 2

1. You are given a large log file containing various system events. Each line in the log file follows this format: [YYYY-MM-DD HH:MM:SS] [LOG_LEVEL] [MODULE] Message where: • YYYY-MM-DD HH:MM:SS is a timestamp. • LOG_LEVEL can be INFO, WARN, ERROR, or DEBUG. • MODULE represents the system module name (alphanumeric, can contain underscores). • Message is the actual log message (it may contain any characters). Your Task Write a function extract_critical_errors(log_data: str) -> list[tuple] that takes a multiline string log_data (containing log entries) and returns a list of tuples containing:
2. The timestamp
3. The module name
4. The error message BUT only if: • The LOG_LEVEL is ERROR. • The message contains at least one IP address in IPv4 format (xxx.xxx.xxx.xxx, where xxx is in the range 0-255). • The message contains a hexadecimal error code, formatted as 0x followed by exactly 8 hexadecimal digits (0-9, A-F).

```
import re

def extract_critical_errors(log_data: str) -> list[tuple]:
    # Regex pattern to capture the necessary log information
    pattern = r'\[(\d{4}-\d{2}-\d{2} \d{2}:\d{2}:\d{2})\] \[ERROR\] \[(\w+)\] (.*(?:\d{1,3}\.){3}\d{1,3}.*0x[0-9A-Fa-f]{8}.*)'

    # Use re.findall() to find all matches that conform to the pattern
    matches = re.findall(pattern, log_data)

    # Return the matches as a list of tuples
    return matches

def get_user_input():
    # Taking 4 inputs from the user
    LOG_1 = input("Enter the first LOG entry: ")
    LOG_2 = input("Enter the second LOG entry: ")
    LOG_3 = input("Enter the third LOG entry: ")
    LOG_4 = input("Enter the fourth LOG entry: ")

    # Combine the inputs to simulate the log data
    log_data = f"{LOG_1}\n{LOG_2}\n{LOG_3}\n{LOG_4}"

    # Display the inputs on separate lines
    print("\nInputs:")
    print(LOG_1)
    print(LOG_2)
    print(LOG_3)
    print(LOG_4)

    # Call the extract_critical_errors function to process the log data
    result = extract_critical_errors(log_data)

    # Display the result (output)
    print("\nOutput:")
    for item in result:
        print(item)

# Call the function
get_user_input()
```

```
Enter the first LOG entry: [2025-02-10 14:23:01] [INFO] [Auth_Module] User login successful.
Enter the second LOG entry: [2025-02-10 15:45:32] [ERROR] [Net_Module] Connection timeout from 192.168.1.10. Error Code: 0xAB12C
Enter the third LOG entry: [2025-02-10 16:01:10] [WARN] [Disk_Module] Low disk space warning.
Enter the fourth LOG entry: [2025-02-10 17:12:05] [ERROR] [Security_Module] Unauthorized access detected from 10.0.0.5. Error Co

Inputs:
[2025-02-10 14:23:01] [INFO] [Auth_Module] User login successful.
[2025-02-10 15:45:32] [ERROR] [Net_Module] Connection timeout from 192.168.1.10. Error Code: 0xAB12CD34
```

```
[2025-02-10 16:01:10] [WARN] [Disk_Module] Low disk space warning.
[2025-02-10 17:12:05] [ERROR] [Security_Module] Unauthorized access detected from 10.0.0.5. Error Code: 0xDEADBEEF

Output:
('2025-02-10 15:45:32', 'Net_Module', 'Connection timeout from 192.168.1.10. Error Code: 0xAB12CD34')
('2025-02-10 17:12:05', 'Security_Module', 'Unauthorized access detected from 10.0.0.5. Error Code: 0xDEADBEEF')
```