Algorithm for file updates in Python

Project description

In this project, I acted as a security professional at a health care company responsible for managing network access to sensitive patient data. The organization maintains an **allow list** of IP addresses authorized to access a restricted subnetwork and a **remove list** of IPs that should no longer have access.

I developed a **Python script** that:

- Reads the current allow list from a file
- Compares it against a remove list of unauthorized IPs
- Automatically removes any matching entries
- Rewrites the updated allow list back to the file

This automation helps ensure that network access is always up to date, reduces the risk of unauthorized access, and improves the efficiency of the security process.

Open the file that contains the allow list

```
# File containing the list of allowed IP addresses
import_file = "allow_list.txt"

# List of IP addresses that should be removed from the allow list
remove_list = ["192.168.97.225", "192.168.158.170", "192.168.201.40", "192.168.58.57"]

# Open the allow list file in read mode and store its contents
with open(import_file, "r") as file:
    ip_addresses = file.read()

# Display each IP address on its own line
for ip in ip_addresses.split():
    print(ip)
```

```
192.168.25.60
192.168.6.9
192.168.90.124
192.168.133.188
192.168.218.219
192.168.156.224
192.168.69.116
```

Read the file contents

```
# Assign `import_file` to the name of the text file that contains the security log file
import_file = "login.txt"

# List to store IP addresses line by line
ip_addresses = []

# Open the file and read it line by line
with open(import_file, "r") as file:
    for line in file:
        line = line.strip()  # remove whitespace and newlines
        if line:             # skip empty lines
            ip_addresses.append(line)

# Display the list of IP addresses / log entries
print(ip_addresses)
```

```
['username,ip_address,time,date', 'tshah,192.168.92.147,15:26:08,2022-05-10', 'dtanaka,192.168.98.221,9:45:18,2022-05-09',
'tmitchel,192.168.110.131,14:13:41,2022-05-11', 'daquino,192.168.168.144,7:02:35,2022-05-08', 'eraab,192.168.170.243,1:45:1
4,2022-05-11', 'jlansky,192.168.238.42,1:07:11,2022-05-11', 'acook,192.168.52.90,9:56:48,2022-05-10', 'asundara,192.168.58.2
17,23:17:52,2022-05-12', 'jclark,192.168.214.49,20:49:00,2022-05-10', 'cjackson,192.168.247.153,19:36:42,2022-05-12', 'jclar
k,192.168.197.247,14:11:04,2022-05-12', 'apatel,192.168.46.207,17:39:42,2022-05-10', 'mabadi,192.168.96.244,10:24:43,2022-05
-12', 'iuduike,192.168.131.147,17:50:00,2022-05-11', 'abellmas,192.168.60.111,13:37:05,2022-05-10', 'gesparza,192.168.148.8
0,6:30:14,2022-05-11', 'cgriffin,192.168.4.157,23:04:05,2022-05-09', 'alevitsk,192.168.210.228,8:10:43,2022-05-08', 'eraab,1
92.168.24.12,11:29:27,2022-05-11', 'jsoto,192.168.25.60,5:09:21,2022-05-09']
```

Convert the string into a list

```
# Name of the file containing allowed IP addresses
import_file = "allow_list.txt"

# List of IP addresses that should be removed from access
remove_list = ["192.168.97.225", "192.168.158.170", "192.168.201.40", "192.168.58.57"]

# Open the file and read its contents
with open(import_file, "r") as file:
    ip_addresses = file.read()  # Read the entire file into a string

# Split the string into a list of individual IP addresses
ip_addresses = ip_addresses.split()

# Display the list of IP addresses
for ip in ip_addresses:
    print(ip)
```

```
192.168.25.60
192.168.6.9
192.168.90.124
192.168.133.188
192.168.218.219
192.168.156.224
192.168.69.116
```

Iterate through the remove list

```
# Name of the file containing blocked IP addresses
import_file = "block_list.txt"

# List of IP addresses to remove from the block list
remove_list = ["192.168.12.45", "192.168.85.200", "192.168.99.101"]

# Step 1: Read the current block list from the file
with open(import_file, "r") as file:
    block_ips = file.read()

# Step 2: Convert the string into a list of IP addresses
block_ips = block_ips.split()

# Step 3: Iterate through the remove list and delete any matches from block_ips
for ip in remove_list:
    if ip in block_ips:
        block_ips.remove(ip)

# Step 4: Write the updated block list back to the file
with open(import_file, "w") as file:
    for ip in block_ips:
        file.write(ip + "\n")

# Step 5: Display the updated block list
print("Updated Block List:")
for ip in block_ips:
    print(ip)
```

```
Updated Block List:
192.168.50.77
192.168.23.14
192.168.240.55
192.168.17.222
```

Remove IP addresses that are on the remove list

```
# File containing the allow list of IP addresses
import_file = "allow_list.txt"

# IP addresses that should be removed from the allow list
remove_list = ["192.168.97.225", "192.168.158.170", "192.168.201.40", "192.168.58.57"]

# Read current allow list from the file
with open(import_file, "r") as file:
    ip_addresses = file.read()

# Convert the string into a list of IP addresses
ip_addresses = ip_addresses.split()

# Remove each IP in remove_list from the allow list
for ip in remove_list:
    if ip in ip_addresses:
        ip_addresses.remove(ip)

# Write the updated allow list back to the file (one per line)
with open(import_file, "w") as file:
    for ip in ip_addresses:
        file.write(ip + "\n")

# Display the updated allow list
print("Updated Allow List:")
for ip in ip_addresses:
    print(ip)
```

```
Updated Allow List:
192.168.25.60
192.168.6.9
192.168.90.124
192.168.133.188
192.168.218.219
192.168.156.224
192.168.69.116
```

Update the file with the revised list of IP addresses

```
# File containing the allow list of IP addresses
import_file = "allow_list.txt"

# IP addresses that should be removed from the allow list
remove_list = ["192.168.97.225", "192.168.158.170", "192.168.201.40", "192.168.58.57"]

# Read current allow list from the file
with open(import_file, "r") as file:
    ip_addresses = file.read()

# Convert the string into a list of IP addresses
ip_addresses = ip_addresses.split()

# Remove each IP in remove_list from the allow list
for ip in remove_list:
    if ip in ip_addresses:
        ip_addresses.remove(ip)

# Write the updated allow list back to the file (newline-separated for log style)
with open(import_file, "w") as file:
    file.write("\n".join(ip_addresses))

# Display the updated allow list vertically
print("Updated Allow List:")
for ip in ip_addresses:
    print(ip)
```

```
Updated Allow List:
192.168.25.60
192.168.6.9
192.168.90.124
192.168.133.188
192.168.218.219
192.168.156.224
192.168.69.116
```

Summary

Automated the process of updating an allow list of IP addresses using Python. The script reads from a file, removes unauthorized IPs, updates the file, and outputs a clean, easy-to-read log. This project demonstrates skills in Python scripting, file handling, and data parsing to support network security operations.