Algorithm for file updates in Python

Project description

At my organization, access to restricted content is controlled with an allow list of IP addresses. The `"allow_list.txt"` file identifies these IP addresses. A separate remove list identifies IP addresses that should no longer have access to this content. I created an algorithm to automate updating the `"allow_list.txt"` file and remove these IP addresses that should no longer have access.

Open the file that contains the allow list

For opening the `"allow_list.txt"` file, Firstly I assigned the file name as a string to the variable `import_file` so that I don't have to specify the path to the file located each time and then I used a `with` statement to open the file:

```
# Assign `import_file` to the name of the file

import_file = "allow_list.txt"
```

```
# Build `with` statement to read in the initial contents of the file

with open(import_file, "r") as file:
```

The `with` statement is used with the `.open()` function to open the allow list file for the purpose of reading it or updating it. In the code `with open(import_file, "r") as file:`, the `open()` function has two parameters. The first identifies which file to import, and then the second indicates what I want to do with the file. In this case, `"r"` indicates that I want to read it. The code also uses the `as` keyword to assign a variable named `file`; `file` variable stores the output of the `.open()` function while I work within the `with` statement.

Read the file contents

In order to read the file contents, I used the `.read()` method to convert it into the string in order to read and understand the file content.

```
with open(import_file, "r") as file:

  # Use `.read()` to read the imported file and store it in a variable named `ip_addresses`

  ip_addresses = file.read()
```

When using an `.open()` function that includes the argument `"r"` for "read," I can call the `.read()` function in the body of the `with` statement. The `.read()` method converts the file into a string and allows me to read it. I applied the `.read()` method to the `file` variable identified in the `with` statement. Then, I assigned the string output of this method to the variable `ip_addresses`.

Convert the string into a list

In order to remove individual IP addresses from the allow list, I needed it to be in list format. Therefore, I used the `.split()` method to convert the `ip_addresses` string into a list:

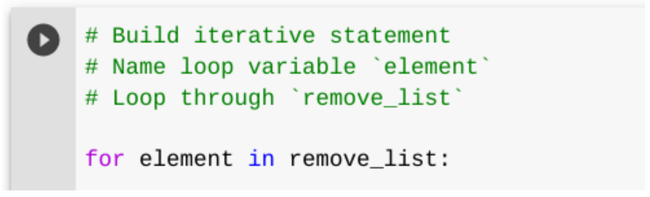
```
# Use `.split()` to convert `ip_addresses` from a string to a list

ip_addresses = ip_addresses.split()
```

The `.split()` function is called by appending it to a string variable. It works by converting the contents of a string to a list. The purpose of splitting `ip_addresses` into a list is to make it easier to remove IP addresses from the allow list. By default, the `.split()` function splits the text by whitespace into list elements. In this algorithm, the `.split()` function takes the data stored in the variable `ip_addresses`, which is a string of IP addresses that are each separated by a whitespace, and it converts this string into a list of IP addresses. To store this list, I reassigned it back to the variable `ip_addresses`.

Iterate through the remove list

A second list called `remove_list` contains all of the IP addresses that should be removed from the ip_addresses list. A key part of algorithm involves iterating through the IP addresses that are in the `remove_list`. To do this, I incorporated a `for` loop:



```
# Build iterative statement
# Name loop variable `element`
# Loop through `remove_list`

for element in remove_list:
```

The `for` loop in Python repeats code for a specified sequence. The `for` keyword starts the `for` loop. It is followed by the loop variable `element` and the keyword `in`. The keyword `in` indicates to iterate through the sequence `ip_addresses` and assign each value to the loop variable `element`.

Remove IP addresses that are on the remove list

In the body of iterative statement, added the code which will remove all the IP addresses from the allow list that are also on the remove list. First, created a conditional that evaluates if the loop variable `element` is part of the `ip_addresses` list. Then, within the condition, used the `.remove()` method to the `ip_addresses` list and remove the IP addresses identified in the loop variable `element`.

```
for element in remove_list:

  # Create conditional statement to evaluate if `element` is in `ip_addresses`

    if element in ip_addresses:

      # use the `.remove()` method to remove
      # elements from `ip_addresses`

        ip_addresses.remove(element)
```

First, within my `for` loop, I created a conditional that evaluated whether or not the loop variable `element` was found in the `ip_addresses` list. I did this because applying `.remove()` to elements that were not found in ip_addresses would result in an error. Then, within that conditional, I applied `.remove()` to `ip_addresses`. I passed in the loop variable `element` as the argument so that each IP address that was in the `remove_list` would be removed from `ip_addresses`.

Update the file with the revised list of IP addresses

As a final step in my algorithm, I needed to update the allow list file with the revised list of IP addresses. To do so, I first needed to convert the list back into a string. I used the `.join()` method for this:

```
# Convert `ip_addresses` back to a string so that it can be written into the text file

ip_addresses = "\n".join(ip_addresses)
```

The `.join()` method combines all items in an iterable into a string. In this algorithm, I used the `.join()` method to create a string from the list `ip_addresses` so that I could pass it in as an argument to the `.write()` method when writing to the file `"allow_list.txt"`. I used the string `("\n")` as the separator to instruct Python to place each element on a new line. Then, I used another `with` statement and the `.write()` method to update the file:

```
# Build `with` statement to rewrite the original file

with open(import_file, "w") as file:

  # Rewrite the file, replacing its contents with `ip_addresses`

  file.write(ip_addresses)
```

This time, I used a argument of `"w"` with the `open()` function in my `with` statement. This argument indicates that I want to open a file to write over its contents. When using this argument `"w"`, I can call the `.write()` function in the body of the `with` statement. The `.write()` function writes string data to a specified file and replaces any existing file content. I passed in the `ip_addresses` variable as the argument to specify that the contents of the file specified in the `with` statement should be replaced with the data in this variable. This way, the restricted content will no longer be accessible to any IP addresses that were removed from the allow list.

Summary

I created an algorithm that removes IP addresses identified in a `remove_list` variable from the `"allow_list.txt"` file of approved IP addresses. This algorithm involved opening the file, converting it to a string to be read, and then converting this string to a list stored in the variable `ip_addresses`. I then iterated through the IP addresses in `remove_list`. With each iteration, I evaluated if the element was part of the `ip_addresses` list. If it was, I applied the `.remove()` method to it to remove the element from `ip_addresses`.. After this, I used the `.join()` method to convert the `ip_addresses` back into a string so that I could write over the contents of the `"allow_list.txt"` file with the revised list of IP addresses.