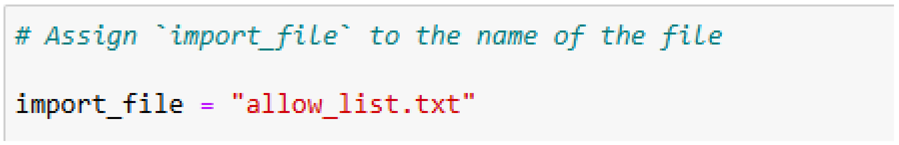
Algorithm for file updates in Python

Project description

At our 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. Hence,I created an algorithm to automate updating the "allow_list.txt" file and remove these IP addresses that should no longer have access.

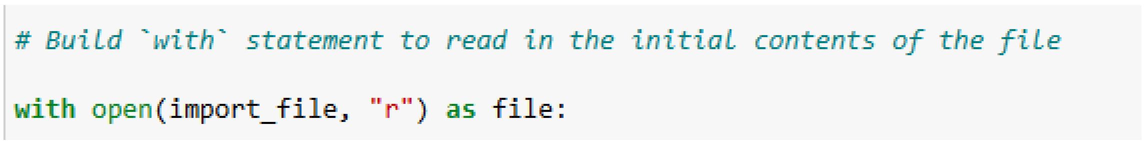
Open the file that contains the allow list

For the first part of the algorithm, I opened the "allow_list.txt" file. First, I assigned this file name as a string to the import_file variable:



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

import_file = "allow_list.txt"
```

Then, I used a with statement to open the file:

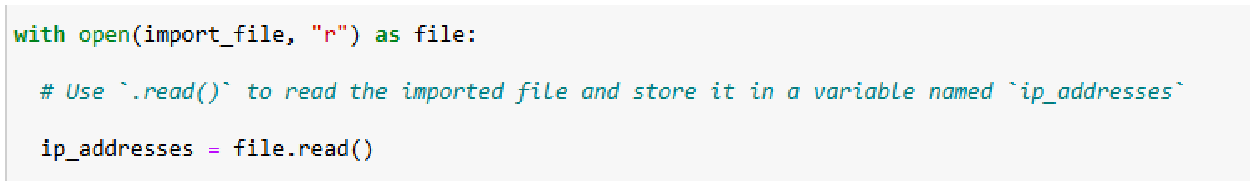


```python
# Build `with` statement to read in the initial contents of the file

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

In this algorithm, the **with** statement is used with the **.open()** function in **read** mode to open the **allow list file** for the purpose of reading it. The purpose of opening the file is to allow me to access the IP addresses stored in the **allow list file**.
The **with** keyword will help manage the resources by closing the file after exiting the **with** statement.
In the code with **open(import_file, "r") as file**:, the **open()** function has two parameters. The first identifies the 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 stores the output of the **.open()** function while I work within the **with** statement.

Read the file contents

To read the contents of the file ,I used .read() function .This will convert the contents to string .



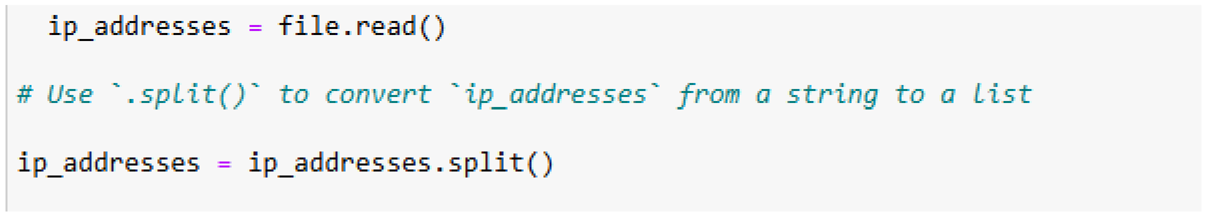
```
with open(import_file, "r") as file:

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

  ip_addresses = file.read()
```

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.

In short, this code reads the contents of the "allow_list.txt" file into a string format that allows me to later use the string to organize and extract data in my Python program.

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 next used the **.split()** method to convert the **ip_addresses** string into a list:

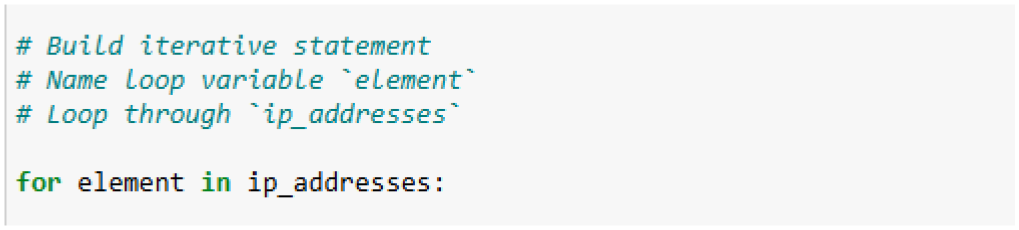


```
  ip_addresses = file.read()

# 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 key part of my algorithm involves iterating through the IP addresses that are elements in the **remove_list**. To do this, I incorporated a for loop:

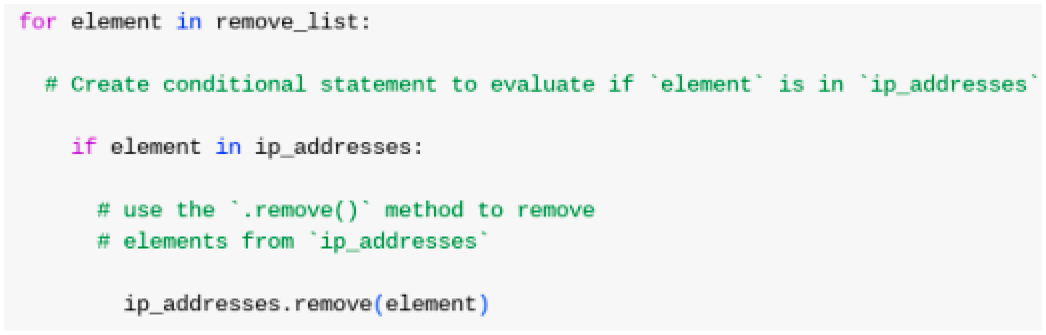


```
# Build iterative statement
# Name loop variable `element`
# Loop through `ip_addresses`

for element in ip_addresses:
```

The **for loop** in Python repeats code for a specified sequence. The overall purpose of the for loop in a Python algorithm like this is to apply specific code statements to all elements in a 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

My algorithm requires removing any IP address from the **allow list**, **ip_addresses**, that is also contained in **remove_list**. Because there were not any duplicates in ip_addresses, I was able to use the following code to do this:

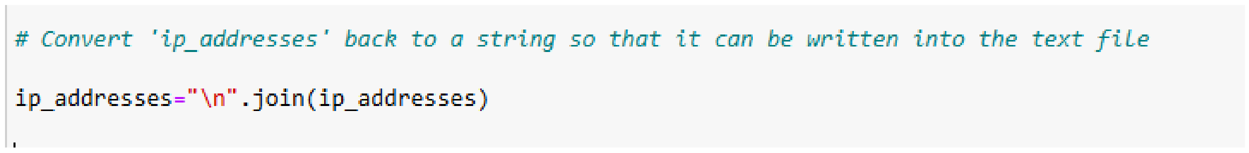


```
for element in remove_list:

  # 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

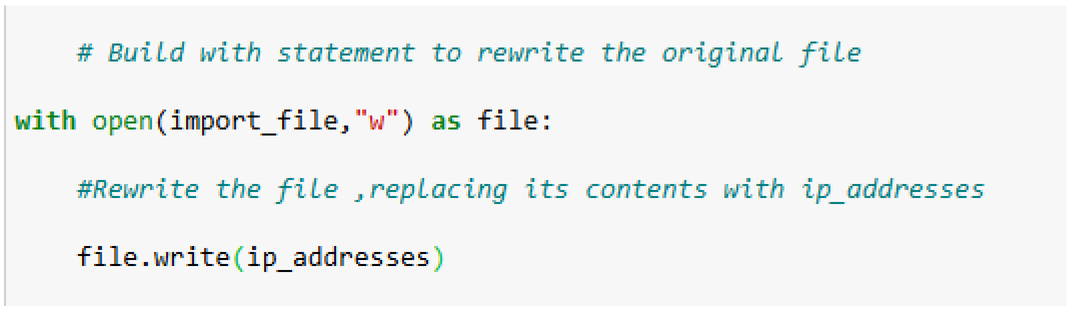
As a final step in my algorithm, I needed to update the allow list file with the revised list of IP addresses. To do so, I first needed to convert the list back into a string. I used the **.join()** method for this:



```
# 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. The **.join()** method is applied to a string containing characters that will separate the elements in the iterable once joined 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 second 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. In this case I wanted to write the updated allow list as a string to the file **"allow_list.txt"**. This way, the restricted content will no longer be accessible to any IP addresses that were removed from the allow list. To rewrite the file, I appended the **.write()** function to the file object file that I identified in the with statement. 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.

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.