WEBSITE BLOCKER USING PYTHON

The project aimed to create a Python-based Website Blocker tool to restrict access to specific websites to enhance focus because unrestricted internet usage can lead to distractions, security threats, and reduced productivity.

In this project, Python-based website blocker modifies the system's hosts file to redirect unwanted websites to 127.0.0.1 (localhost), preventing users from accessing them. The objective of this project is to create a GUI-based website blocker with help of Tkinter library for windows as well as Linux, which will also have an option to unblock those websites.

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WORKING

The Website Blocker works by modifying the system's hosts file, which acts like an internal address book for the computer. Normally, when a user enters a website URL in the browser, the computer looks up the correct IP address and connects to the website. However, the Python script alters this process by redirecting blocked websites to 127.0.0.1, which is the local machine's address. Since there is no actual website hosted at 127.0.0.1, the browser is unable to load the blocked site and displays an error message.

To implement this, the script opens the hosts file and checks if the websites that need to be blocked are already listed. If not, it adds them with 127.0.0.1 as their assigned IP address. If a user later decides to unblock a website, the script removes the corresponding entries from the hosts file. Since the hosts file is a system-protected file, modifying it requires administrator or root permissions.

- **localhost** – It is a set of hostnames that refer to your local computer to access the network services being used by your computer. These hostnames usually start with '127'.
- **hostname** – It is an IP address (not specifically on your computer) that is used to identify your computer during electronic communications.
- **localhost 127.0.0.1** – It is a localhost address called the "Internet Loopback Protocol". This address is used to establish an IP connection to the same machine or computer being used by the end-user.
- **hosts file** – It is an operating system file that is used to map a connection between an IP address (localhost in our case) and a domain name, before actually going to the domain name servers. It is a .txt file that contains a mapping of the IP addresses and domain names. It no longer has an extension but can still only be edited as a .txt file. It has different locations on different OS, i.e., it has a different location on Windows and Linux, but the same location on MAC and Linux.

The hosts file, as you know, maps addresses to domains and when you type 127.0.0.1 on the URL bar on your browser, it always refuses to connect (as on local machine usually we don't run a web server). So, to block websites, we will map your desired websites to the localhost address 127.0.0.1 and add that to the hosts file. Similarly, to unblock the website, we will remove that line from the hosts file.

Concept:

- When a user tries to visit a blocked website (e.g., www.facebook.com), the system first checks /etc/hosts (Linux/Mac) or C:\Windows\System32\drivers\etc\hosts (Windows).
- If the website is mapped to 127.0.0.1, the browser fails to connect, effectively blocking the website.

File Path for Hosts File

The location of the hosts file varies by OS:

- **Windows**: C:\Windows\System32\drivers\etc\hosts
- **Linux/macOS**: /etc/hosts

Since modifying the hosts file requires administrator/root permissions, the script must be run with elevated privileges.

CODE & RESULTS

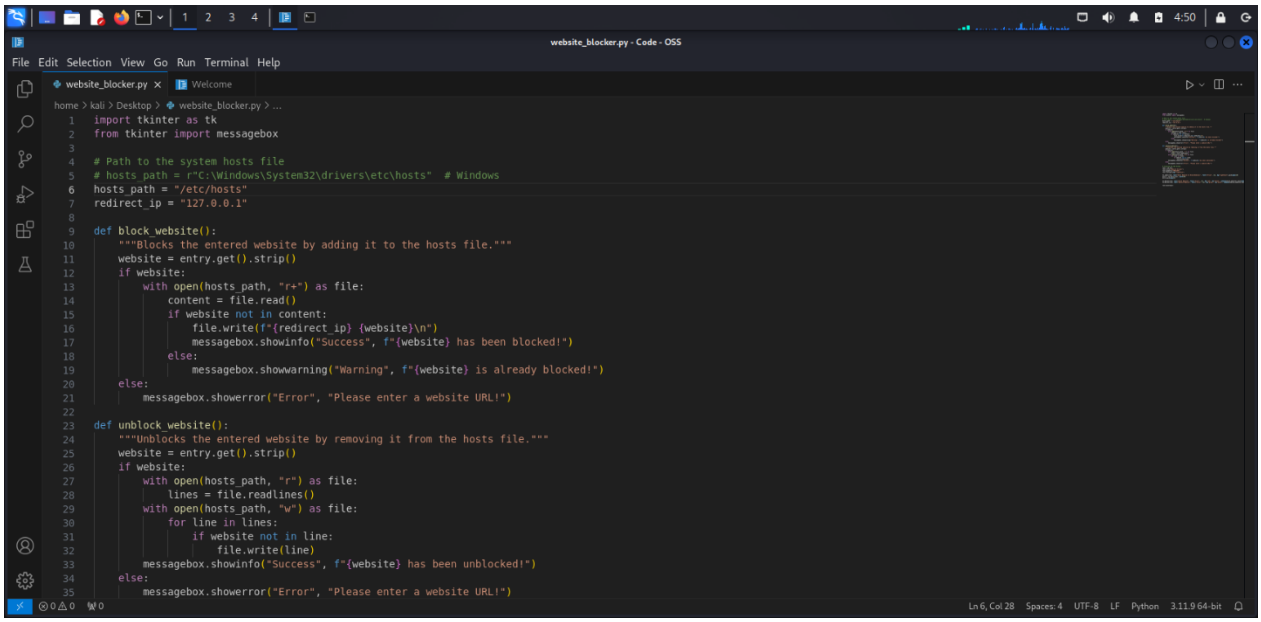
I have used the project for Linux OS and attached here the result snapshot.

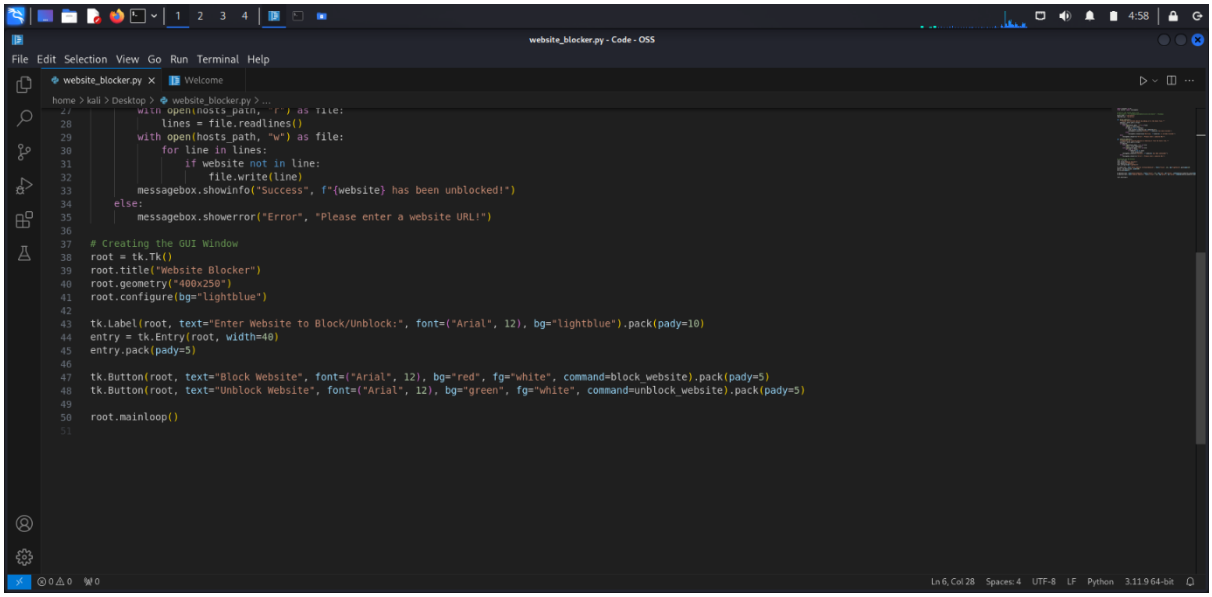
First to run the python code in Linux we have to install VS code and the Linux version is called Code – OSS and to install and launch it we use the command:

$sudo apt update && sudo apt upgrade code-oss

$code-oss

After installing the VS code we will write the code and save it with the name **website_blocker.py** . Here attaching the code snapshot:





And to run this python code we will open the terminal and write these commands to run the code in Linux terminal:

$sudo python3 website_blocker.py

(if the saved file in Desktop directory, first change to directory to Desktop by, $cd ~/Desktop)

or

$ sudo python3 /home/kali/Desktop/website_blocker.py

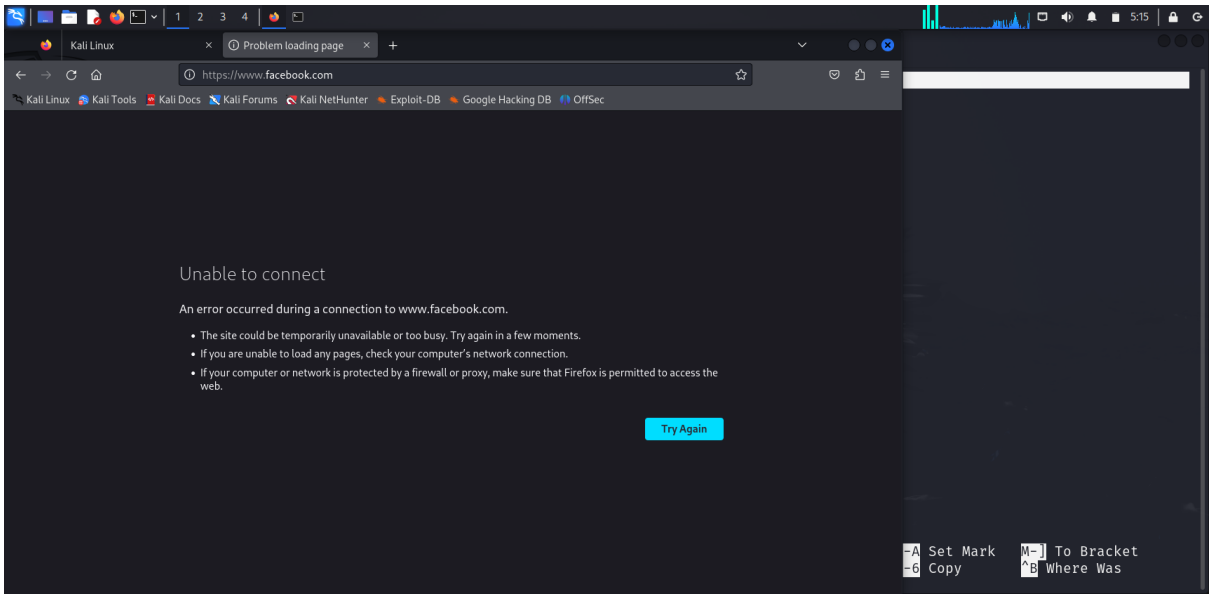
At this command the GUI will guide us to add websites needed to be blocked.

And we can also verify if the domains are added with command:

$sudo nano /etc/hosts

This command will show the entries of the hostfile with “127.0.0.1 www.facebook.com”.

If the domains are not there the script didn’t execute correctly. It is also advised to reboot with **$sudo reboot** command before checking it the website is blocked or not.



Here it is visible that www.facebook.com is unable to connect and successfully blocked.

Explanation of each line of code:

tkinter is Python's built-in library for creating GUI applications. **messagebox** provides popup alerts for success, warnings, or errors.

127.0.0.1 is the localhost IP. When a blocked website is accessed, it will redirect back to the user's computer instead of the actual website.

Function to Block a Website:

entry.get().strip() retrieves the website URL from the input box and removes any extra spaces.

open(hosts_path, "r+" opens the **hosts file** in **read and write mode**.

- **“r+” mode –** A mode that can be used to read and write the contents of a file.

file.read() reads the existing content.

Function to Unblock a Website:

Similar to block_website().

with open(hosts_path, "w") as file opens the file in write mode, overwriting it with lines except those containing the blocked website. This removes the entry without affecting other blocked websites.

Creating the GUI Window:

root = tk.Tk()

root.title("Website Blocker")

root.geometry("400x250")

root.configure(bg="lightblue")

These four lines create the main GUI window.

Adding Widgets (Labels, Entry Box, and Buttons):

tk.Label() creates a label with instructions. And **.pack(pady=10)** adds spacing.

entry = tk.Entry(root, width=40)

entry.pack(pady=5)

These both lines create an input field where users enter a website URL.

tk.Button() Creates two buttons:

- Red for "Block Website"
- Green for "Unblock Website"

Clicking a button calls the respective function.

root.mainloop() starts the Tkinter event loop, keeping the window open until the user closes it.