👷 Developer:

Anushree401

📁 Repository:

GitHub: TCP-network-scanner

📌 Overview:

This project implements a TCP port scanner using Python, leveraging the Nmap module (python-nmap) and the standard library tools like argparse, sys, and colorama. It allows users to scan a target IP address or hostname for open ports, displaying details about services running on those ports.

⚙️ Features:

- Accepts target hostname/IP and port range as input.
- Uses argparse for CLI interface.
- Integrates with nmap to perform efficient and detailed scanning.
- Displays service and port information in a readable format.
- Uses colorama for color-coded terminal output.
- Verbose mode to show closed or filtered ports (optional).
- Handles exceptions for invalid input or scanning errors.

🧱 Technologies Used:

Tool/Library	Purpose
Python	Programming language
Argparse	Command-line argument parsing
Nmap	Network scanning backend
python-nmap	Python wrapper for Nmap
Colorama	Colored terminal output
Sys	System-level operations

```
import argparse
import nmap
import sys
from colorama import Fore, Style
```

🔧 Core Functionality

It scans the TCP ports of a given host (IP or hostname), and:

- Tells you which ports are **open**, **filtered**, or **closed**.
- Tries to identify what **service** is running on each open port.
- Supports **verbose** mode to show all port states, not just open ones.
- Handles **single ports**, **comma-separated lists**, and **port ranges**.

📌 Breakdown of Each Part:

✅ argument_parser()

Parses command-line arguments:

- --host (-H): IP address/hostname to scan (default: 127.0.0.1)
- --port (-p): Comma-separated list or range (default: 80)
- --verbose (-v): Shows all ports, not just open ones

Returns: A dictionary of arguments.

✅ nmap_scan(host_id, port_num, verbose=False)

Handles scanning:

1. **Validates input ports**.
2. **Checks if the host is alive** (ping scan).
3. **Performs TCP scan** using -sT (connect scan) on the specified ports.
4. For each port or port range:
    - Calls process_port() to extract info and format the result.

Returns: A list of formatted scan result strings.

✅ process_port(scanner, host_id, port, result, verbose=False)

Processes a **single port**:

- If open: adds detailed info about host, port, and service.
- If closed or filtered:
    - Only added if verbose mode is on.
- Catches KeyError in case no response is received for that port.

Adds results directly to the result list.

✅ main()

The main function:

- Parses arguments using argument_parser().
- Calls nmap_scan() and stores results.
- Prints all results.
- Summarizes:
  - Number of open ports.
  - Hidden ports if verbose was off.
- Handles exceptions like:
  - KeyboardInterrupt
  - AttributeError (missing/invalid args)
  - Any unexpected error

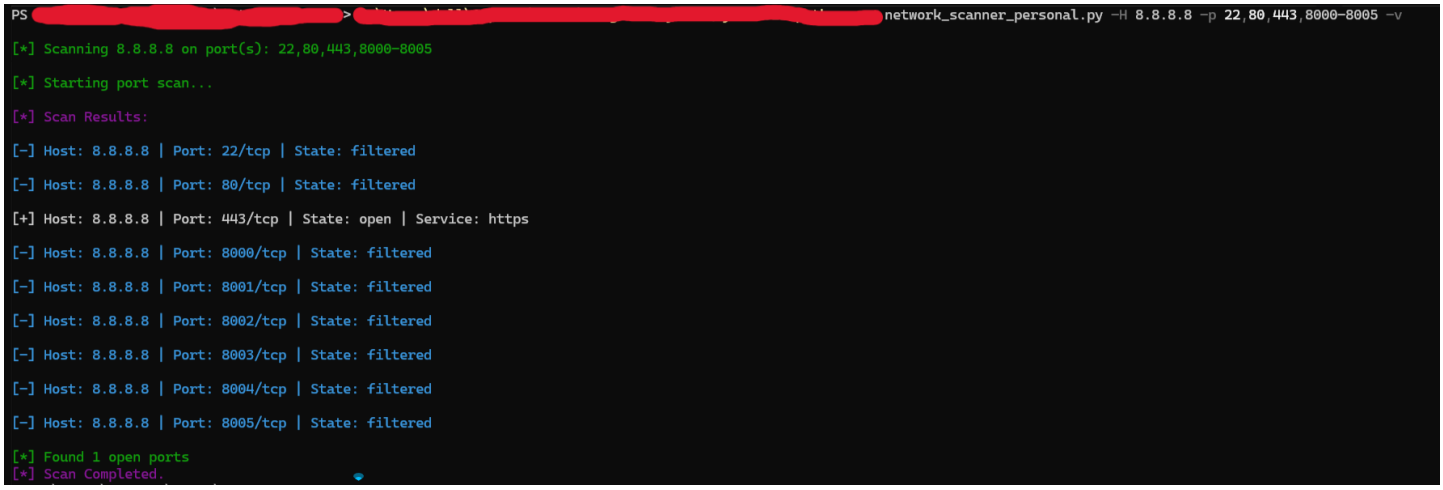
🔍 Sample Usage:

python network_scanner_personal.py -H 192.168.1.1 -p 22,80,443,8000-8005 -v

This will:

Scan host 192.168.1.1 on ports 22, 80, 443, and 8000 to 8005.

Show all ports including closed/filtered.



🛡️ Error Handling:

- Invalid IP/hostname
- Improper port formats
- Nmap not installed or permission denied
- Missing arguments

📈 Applications:

- Network auditing
- Penetration testing
- Learning and practicing port scanning concepts
- Custom security scripts in enterprise environments

✅ **Future Improvements:**

- Add support for UDP scans
- Export results to CSV/JSON
- Web GUI for user-friendly interaction
- Multi-threaded scanning for speed
- Scan entire subnet ranges

📚 **References:**

- Nmap Documentation
- Python-nmap GitHub
- Colorama Docs