



دانشگاه صنعتی امیر کبیر
(پلی تکنیک تهران)

به نام خدا

دانشکده مهندسی کامپیوتر

گزارش تمرین عملی اول

درس: مبانی امنیت اطلاعات

دانشجو: فرشید نوشی – ۹۸۳۱۰۶۸

بخش اول

قسمت اول

برای این بخش با استفاده از زبان پایتون اسکریپتی برای گرفتن پینگ نوشته شد که خروجی به صورت زیر میباشد.

```

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IP/Domain: google.com
PING google.com (172.217.167.78): 56 data bytes
64 bytes from 172.217.167.78: icmp_seq=0 ttl=119 time=445.234 ms
64 bytes from 172.217.167.78: icmp_seq=1 ttl=119 time=634.285 ms
64 bytes from 172.217.167.78: icmp_seq=2 ttl=119 time=859.095 ms

--- google.com ping statistics ---
4 packets transmitted, 3 packets received, 25.0% packet loss
round-trip min/avg/max/stddev = 445.234/646.205/859.095/169.168 ms
IP/Domain: 172.217.167.78
PING 172.217.167.78 (172.217.167.78): 56 data bytes
64 bytes from 172.217.167.78: icmp_seq=0 ttl=119 time=611.779 ms
64 bytes from 172.217.167.78: icmp_seq=1 ttl=119 time=444.501 ms
Request timeout for icmp_seq 2

--- 172.217.167.78 ping statistics ---
4 packets transmitted, 2 packets received, 50.0% packet loss
round-trip min/avg/max/stddev = 444.501/528.140/611.779/83.639 ms

```

قسمت دوم

برای این قسمت اسکریپتی نوشته شده است که با اسکن یک محدوده آی پی و یافتن هاست‌های فعال آن‌ها را به ما برمیگرداند. برای اینجا از آی پی 89.43.4.0-255 اسکن انجام داده‌ایم (با استفاده از subnet=24

خروجی نیز در زیر آورده شده است که همانطور که مشاهده میکنید ۲۵۶ هاست فعال هستند.

[illegible]

Address: 89.43.4.0

Subnet: 24

```
89.43.4.0:  UP
```

```
89.43.4.1: UP
```

```
89.43.4.10:  UP
```

```
89.43.4.100:  UP
```

89.43.4.101: UP

```
89.43.4.102:  UP
```

```
89.43.4.103:  UP
```

```
89.43.4.104: UP
```

```
89.43.4.105:  UP
```

```
89.43.4.106: UP
```

```
89.43.4.107:  UP
```

```
89.43.4.108:  UP
```

```
89.43.4.109:  UP
```

```
89.43.4.11:  UP
```

89.43.4.84: UP

```
89.43.4.85: UP
```

89.43.4.86: UP

89.43.4.87: UP

89.43.4.88: UP

```
89.43.4.89: UP
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89.43.4.9: UP

89.43.4.90: UP

```
89.43.4.91: UP
```

89.43.4.92: UP

89.43.4.93: UP

```
89.43.4.94: UP
```

89.43.4.95: UP

```
89.43.4.96: UP
```

89.43.4.97: UP

```
89.43.4.98: UP
```

89.43.4.99: UP

Scan results saved to

```
University/Information Security/Proj 1/results/result_ip scan.txt
```

Total number of results: 256

قسمت سوم

اسکن پورت‌های فعال یک هاست باز نیز با استفاده از یک اسکریپت به زبان پایتون نوشته شده است و خروجی نمونه اش در زیر نمایش داده شده است. لازم به ذکر است که برای اجرا و کارکردن با تمامی سه اسکریپت گفته شده در این تمرین لازم است که براساس فایل requirements.txt که فایل ارسالی وجود دارد محیط venv برای زبان پایتون بسازید و فایل اسکریپت مربوط به هر بخش تمرین را اجرا کرده و در محیط ترمینال به آن ورودی مربوط را بدهید. در این بخش دو تصویر آمده اند که مربوط به استفاده از vpn و بدون استفاده از vpn هستند. تصویر اول بدون وی پی ان میباشد و دومی با وی پی ان.

```

-----
| _ \ ___ _ _ | | / ___| ___ _ _ _ _ _ _ _ _ _ _
| | ) / _ \ | ' _ | | \ ___ \ / __/ _ ` | ' _ \ | ' \ / _ \ ' _ | | | | | | | |
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| _ | \ _ _ / | _ | \ _ | | _ _ / \ _ _ \ _ _ | | | | | \ _ _ | |

Host IP: 89.43.3.170
Start port: 1
last port: 200
state of the host(): up
protocol: tcp
port: 1, state: closed, service: tcpmux
port: 19, state: closed, service: chargen
open port: 80, service: http
port: 136, state: closed, service: profile
port: 137, state: closed, service: netbios-ns
port: 138, state: closed, service: netbios-dgm
port: 139, state: closed, service: netbios-ssn

Process finished with exit code 0

-----
| _ \ ___ _ _ | | / ___| ___ _ _ _ _ _ _ _ _ _ _
| | ) / _ \ | ' _ | | \ ___ \ / __/ _ ` | ' _ \ | ' \ / _ \ ' _ | | | | | | | |
| _ / ( ) | | | | _ _ _ ) | ( | ( | | | | | | | _ / |
| _ | \ _ _ / | _ | \ _ | | _ _ / \ _ _ \ _ _ | | | | | \ _ _ | |

Host IP: 89.43.3.170
Start port: 1
last port: 200
state of the host(170.mobinn.net): up
protocol: tcp
port: 25, state: closed, service: smtp
open port: 80, service: http

```

بخش دوم

با ابزارهای nmap، netdiscover و hping 3 به همراه یک ابزار آنلاین موارد خواسته شده را انجام دادیم.

```
farshid @ farshids-MacBook-Pro: ~  
[ $ sudo nmap -sn 89.43.4.0-255  
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 18:55 +0330  
Nmap scan report for 89.43.4.0  
Host is up (0.098s latency).  
Nmap scan report for 89.43.4.1  
Host is up (0.063s latency).  
Nmap scan report for 89.43.4.2  
Host is up (0.062s latency).  
Nmap scan report for 89.43.4.3  
Host is up (0.062s latency).  
Nmap scan report for 89.43.4.4  
Host is up (0.062s latency).  
Nmap scan report for 89.43.4.5  
Host is up (0.069s latency).  
Nmap scan report for 89.43.4.6  
Host is up (0.069s latency).  
Nmap scan report for 89.43.4.7  
Host is up (0.069s latency).  
Nmap scan report for 89.43.4.8  
Host is up (0.066s latency).  
Nmap scan report for 89.43.4.9  
Host is up (0.068s latency).  
Nmap scan report for 89.43.4.252  
Host is up (0.032s latency).  
Nmap scan report for 89.43.4.253  
Host is up (0.030s latency).  
Nmap scan report for 89.43.4.254  
Host is up (0.032s latency).  
Nmap scan report for 89.43.4.255  
Host is up (0.032s latency).  
Nmap done: 256 IP addresses (256 hosts up) scanned in 3.20 seconds
```

خروجی مانند کد است.

NMAP TCP Full Scan

با استفاده از آرگومان -sT کار را انجام میدهیم.

```

farshid @ farshids-MacBook-Pro: ~
$ sudo nmap -sT 89.43.3.170
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 18:58 +0330
Nmap scan report for 89.43.3.170
Host is up (0.011s latency).
Not shown: 991 filtered tcp ports (no-response)
PORT      STATE SERVICE
1/tcp     closed tcpmux
19/tcp    closed chargen
25/tcp    closed smtp
80/tcp    open  http
135/tcp   closed msrpc
139/tcp   closed netbios-ssn
445/tcp   closed microsoft-ds
593/tcp   closed http-rpc-epmap
5555/tcp  closed freeciv

Nmap done: 1 IP address (1 host up) scanned in 91.00 seconds

```

همانطور که میبینیم خروجی‌ها یکسان هستند. تصویر زیر نیز با وی پی ان است که مانند کد خروجی داده است.

```

farshid @ farshids-MacBook-Pro: ~
$ sudo nmap -sT 89.43.3.170
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 19:06 +0330
Nmap scan report for 170.mobinnet.net (89.43.3.170)
Host is up (0.26s latency).
Not shown: 993 filtered tcp ports (no-response)
PORT      STATE SERVICE
25/tcp    closed smtp
80/tcp    open  http
443/tcp   open  https
465/tcp   closed smtps
587/tcp   closed submission
5060/tcp  open  sip
8080/tcp  open  http-proxy

Nmap done: 1 IP address (1 host up) scanned in 275.41 seconds

```


NMAP Stealth Scan

اسکن مخفی نیز یکی از روش‌های اسکن هست که در آن مهاجم میخواهد که عملیات اسکن شدنش از دید فایروال و سیستم‌های اهراز هویت دور بماند و مشخص نشود که دارد اسکن انجام میدهد. روش کلی به این صورت است که به مانند ترافیک عادی شبکه اسکن پورت‌ها انجام می‌شوند.

```
farshid @ farshids-MacBook-Pro: ~  
$ sudo nmap -sS 89.43.3.170  
[Password:  
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 19:13 +0330  
Nmap scan report for 89.43.3.170  
Host is up (0.043s latency).  
Not shown: 991 filtered tcp ports (no-response), 8 filtered tcp ports (admin-prohibited)  
PORT      STATE SERVICE  
80/tcp    open  http  
  
Nmap done: 1 IP address (1 host up) scanned in 9.01 seconds
```

```
farshid @ farshids-MacBook-Pro: ~  
$ sudo nmap -sS 89.43.3.170  
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 19:14 +0330  
Nmap scan report for 89.43.3.170  
Host is up (0.025s latency).  
Not shown: 993 filtered tcp ports (no-response), 6 filtered tcp ports (admin-prohibited)  
PORT      STATE SERVICE  
80/tcp    open  http  
  
Nmap done: 1 IP address (1 host up) scanned in 5.42 seconds
```

NMAP UDP Scan

در این اسکن یک بسته با پروتکل udp برای هر پورت ارسال میشود. در اغلب پورت‌ها این پروتکل بسته بود. برای برخی پورت‌ها یک بسته مخصوص این پروتکل ارسال میشود اما در اینجا همه پورت‌ها همانگونه که در تصویر مشخص است بسته بودند.

```
farshid @ farshids-MacBook-Pro: ~  
$ sudo nmap -sU 89.43.3.170  
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 19:31 +0330  
Note: Host seems down. If it is really up, but blocking our ping probes, try -Pn  
Nmap done: 1 IP address (0 hosts up) scanned in 3.10 seconds
```

```
farshid @ farshids-MacBook-Pro: ~  
$ sudo nmap -sU 89.43.3.170 -Pn  
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 19:33 +0330  
Nmap scan report for 170.mobinnet.net (89.43.3.170)  
Host is up.  
All 1000 scanned ports on 170.mobinnet.net (89.43.3.170) are in ignored states.  
Not shown: 1000 open|filtered udp ports (no-response)  
  
Nmap done: 1 IP address (1 host up) scanned in 202.70 seconds
```


NMAP Fingerprint Scan

در این نوع اسکن همانطور که مشاهده میشود اطلاعات سیستمعامل و پورتها و انواع سرویسها نشان داده میشوند.

```
farshid @ farshids-MacBook-Pro: ~  
$ Sudo nmap -O -v 89.43.3.170  
Password:  
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 19:20 +0330  
Initiating Ping Scan at 19:20  
Scanning 89.43.3.170 [4 ports]  
Completed Ping Scan at 19:20, 0.01s elapsed (1 total hosts)  
Initiating Parallel DNS resolution of 1 host. at 19:20  
Completed Parallel DNS resolution of 1 host. at 19:20, 0.04s elapsed  
Initiating SYN Stealth Scan at 19:20  
Scanning 89.43.3.170 [1000 ports]  
Discovered open port 80/tcp on 89.43.3.170  
Completed SYN Stealth Scan at 19:21, 5.10s elapsed (1000 total ports)  
Initiating OS detection (try #1) against 89.43.3.170  
Retrying OS detection (try #2) against 89.43.3.170  
Nmap scan report for 89.43.3.170  
Host is up (0.011s latency).  
Not shown: 994 filtered tcp ports (no-response), 5 filtered tcp ports (admin-prohibited)  
PORT      STATE SERVICE  
80/tcp    open  http  
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port  
Aggressive OS guesses: HP P2000 G3 NAS device (93%), Linux 3.13 or 4.2 (93%), Android 4.1.1 (91%), Android 4.1.2 (91%), Linux 3.10 - 4.11 (91%), Linux 3.16 - 4.6 (91%), Linux 3.2 - 4.9 (91%), Android 4.2.2 (Linux 3.4) (91%), DD-WRT (Linux 3.18) (91%), DD-WRT v3.0 (Linux 4.4.2) (91%)  
No exact OS matches for host (test conditions non-ideal).  
Uptime guess: 164.470 days (since Thu May 26 09:04:50 2022)  
TCP Sequence Prediction: Difficulty=258 (Good luck!)  
IP ID Sequence Generation: All zeros  
  
Read data files from: /usr/local/bin/./share/nmap  
OS detection performed. Please report any incorrect results at https://nmap.org/submit/ .  
Nmap done: 1 IP address (1 host up) scanned in 11.26 seconds  
Raw packets sent: 2081 (96.576KB) | Rcvd: 26 (1.380KB)
```

NMAP IDLE Scan

در این روش دریافت اطلاعات مهاجم بدون لو دادن ip دستگاه خودش به قربانی حمله میکند. این کار با یک کانال جانبی انجام میشود که دستگاه سوم که آن نیز یک قربانی است بدون اطلاع درحال کمک به مهاجم برای انجام حمله می باشد. در این روش گزارشهای سیستمهای دفاعی سیستم سوم را به عنوان مهاجم نشان می دهند که اشتباه می باشد. این نوع اسکن علاوه بر مخفی بودن امکان کشف روابط اعتماد مبتنی بر IP میان ماشینها را نیز میدهد.

```

farshid @ farshids-MacBook-Pro: ~
$ sudo nmap -sI 89.43.3.170
Password:
WARNING: Many people use -Pn w/Idlescan to prevent pings from their true IP. On the other hand, timing info Nmap gains from pings can allow for faster, more reliable scans.
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 19:35 +0330
WARNING: No targets were specified, so 0 hosts scanned.
Nmap done: 0 IP addresses (0 hosts up) scanned in 2.08 seconds

farshid @ farshids-MacBook-Pro: ~
$ sudo nmap -sI 89.43.3.170 -Pn
Starting Nmap 7.93 ( https://nmap.org ) at 2022-11-06 19:35 +0330
WARNING: No targets were specified, so 0 hosts scanned.
Nmap done: 0 IP addresses (0 hosts up) scanned in 0.05 seconds

```

HPING

```

farshid @ farshids-MacBook-Pro: ~
$ sudo hping3
Password:
Sorry, this hping binary was compiled without TCL scripting support

farshid @ farshids-MacBook-Pro: ~
$ sudo hping3 --count 1 google.com --icmp
HPING google.com (utun5 142.251.36.46): icmp mode set, 28 headers + 0 data bytes
len=28 ip=142.251.36.46 ttl=116 id=0 icmp_seq=0 rtt=139.3 ms

--- google.com hping statistic ---
1 packets tramitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 139.3/139.3/139.3 ms

farshid @ farshids-MacBook-Pro: ~
$ sudo hping3 89.43.3.179 -c 20
HPING 89.43.3.179 (utun5 89.43.3.179): NO FLAGS are set, 40 headers + 0 data bytes

--- 89.43.3.179 hping statistic ---
20 packets tramitted, 0 packets received, 100% packet loss
round-trip min/avg/max = 0.0/0.0/0.0 ms

```

NetDiscover

این ابزار نصب و اجرا شد و خروجی‌اش حین کار در یزر نمایش داده شده است. سرعت اسکن بسیار پایین بود به طوری که خروجی زیر بعد از حدود یک ساعت اجرا تغییری نکرد. اطلاعاتی از جمله‌های درحال اجرا بر روی سیستم در اینجا نمایش داده میشوند. که یعنی ipهای اختصاص داده شده لوکال مشاهده میشوند.

```

netdiscover — farshid@farshids-MacBook-Pro — ~/netdiscover — -zsh — 100x72
Currently scanning: 172.22.146.0/16 | Screen View: Unique Hosts

61 Captured ARP Req/Rep packets, from 4 hosts. Total size: 2562

-----
IP                At MAC Address    Count  Len  MAC Vendor / Hostname
-----
192.168.0.1       98:de:d0:60:d7:b1  32     1344 TP-LINK TECHNOLOGIES CO.,LTD.
192.168.0.103     f4:d4:88:79:69:09  27     1134 Apple, Inc.
192.168.0.101     f0:99:bf:4e:71:e5   1       42 Apple, Inc.
192.168.0.104     96:51:ee:e3:c9:8b   1       42 Unknown vendor

```


[illegible]


```

ERROR Opening: http://89.43.3.70 - Connection reset by peer
ERROR Opening: http://89.43.3.55 - Connection reset by peer
ERROR Opening: http://89.43.3.63 - Connection reset by peer
ERROR Opening: http://89.43.3.57 - Connection reset by peer
ERROR Opening: http://89.43.3.74 - Connection reset by peer
ERROR Opening: http://89.43.3.58 - Connection reset by peer
ERROR Opening: http://89.43.3.52 - Connection reset by peer
ERROR Opening: http://89.43.3.54 - Connection reset by peer
ERROR Opening: http://89.43.3.65 - Connection reset by peer
ERROR Opening: http://89.43.3.67 - Connection reset by peer
ERROR Opening: http://89.43.3.71 - Connection reset by peer
http://89.43.3.72 [200 OK] ActiveX[FD3BEB0C-AB43-4253-9146-C371D48FBE0D], Country[ROMANIA][RO], IP[89.43.3.72], Object[application/nptest-plugin][CLSID:FD3BEB0C-AB43-4253-9146-C371D48FBE0D], PasswordField, Script[JavaScript,javascript,text/javascript], Title[NETSurveillance WEB], X-UA-Compatible[IE=edge]
http://89.43.3.97 [403 Forbidden] Country[ROMANIA][RO], Frame, HTTPServer[Mikrotik HttpProxy], IP[89.43.3.97], Script[im&size=160x320&name=opc]
ERROR Opening: http://89.43.3.81 - Connection reset by peer
http://89.43.3.80 [200 OK] Country[ROMANIA][RO], IP[89.43.3.80], MikroTik-RouterOS[6.43.5][Telnet], PasswordField, Script, Title[RouterOS router configuration page]
ERROR Opening: http://89.43.3.82 - Connection reset by peer
http://89.43.3.89 [200 OK] Country[ROMANIA][RO], IP[89.43.3.89], MikroTik-RouterOS[6.48.3][Telnet], PasswordField, Script, Title[RouterOS router configuration page]
ERROR Opening: http://89.43.3.95 - Connection reset by peer
http://89.43.3.90 [200 OK] Country[ROMANIA][RO], HTML5, IP[89.43.3.90], Script[text/javascript], Title[WEB SERVICE], UncommonHeaders[content-security-policy,x-content-type-options], X-Frame-Options[SAMEORIGIN], X-UA-Compatible[IE=edge], X-XSS-Protection[1;mode=block]
http://89.43.3.88 [200 OK] Country[ROMANIA][RO], IP[89.43.3.88], MikroTik-RouterOS[6.46.3][Telnet], PasswordField, Script, Title[RouterOS router configuration page]
ERROR Opening: http://89.43.3.75 - end of file reached
ERROR Opening: http://89.43.3.83 - execution expired
ERROR Opening: http://89.43.3.87 - execution expired
ERROR Opening: http://89.43.3.94 - execution expired
ERROR Opening: http://89.43.3.91 - execution expired
ERROR Opening: http://89.43.3.96 - execution expired
ERROR Opening: http://89.43.3.92 - execution expired
ERROR Opening: http://89.43.3.85 - Connection reset by peer
ERROR Opening: http://89.43.3.77 - end of file reached
http://89.43.3.93 [200 OK] ActiveX[5D5D2077-5734-4d78-A9BE-3C4D3BBC63AE], Boa-WebServer[0.94.14rc21], Country[ROMANIA][RO], HTML5, HTTPServer[Boa/0.94.14rc21], IP[89.43.3.93], JQuery[1.11.1], Object[VideoPlugNVR.exe#version=1,0,0,4381][clsid:5D5D2077-5734-4d78-A9BE-3C4D3BBC63AE], PasswordField, Script[javascript,text/javascript], Title[NVR], X-UA-Compatible[IE=edge]
ERROR Opening: http://89.43.3.76 - Net::ReadTimeout
ERROR Opening: http://89.43.3.79 - Connection reset by peer
ERROR Opening: http://89.43.3.78 - Connection reset by peer
ERROR Opening: http://89.43.3.100 - Connection reset by peer
ERROR Opening: http://89.43.3.99 - end of file reached
http://89.43.3.98 [200 OK] Country[ROMANIA][RO], IP[89.43.3.98], MikroTik-RouterOS[6.49.2][Telnet], PasswordField, Script, Title[RouterOS router configuration page]
ERROR Opening: http://89.43.3.86 - end of file reached
ERROR Opening: http://89.43.3.84 - end of file reached

```

farshid @ farshids-MacBook-Pro: ~/WhatWeb

master

\$ █

Whatweb website

WhatWeb - Next generation web scanner.
Identify what websites are running.



WhatWeb is a next generation web scanner.

WhatWeb recognises web technologies including content management systems (CMS), blogging platforms, statistic/analytics packages, JavaScript libraries, web servers, and embedded devices.

WhatWeb has over 1800 plugins, each to recognise something different. WhatWeb also identifies version numbers, email addresses, account IDs, web framework modules, SQL errors, and more.

Enter a domain to analyze:

89.43.3.0-100

 [Download](#)

 [Wiki](#)

The requested domain is unavailable. Please check the domain and try again.

<https://www.ipfingerprints.com/portscan.php>

از ابزار آنلاین بالا برای اسکن و بدست آوردن اطلاعات بیشتر از ۸۹.۴۳.۳.۱۷۰ و رنج پورت‌های ۲۰-۱۰۲۴ استفاده میکنیم.

The screenshot shows the IP Fingerprints Port Scanner interface. At the top, the IP address is 89.43.3.170, Start Port is 20, and End Port is 120. The 'Scan' button is visible. Below the input fields, there are radio buttons for 'Normal' and 'Advance' (selected). Under 'Scan Type', there are radio buttons for 'connect()' (selected), 'SYN Stealth', 'NULL Stealth', 'FIN Stealth', 'XMAS Scan', 'ACK Scan', and 'Window Scan'. Under 'Ping Type', there are radio buttons for 'TCP & ICMP', 'ICMP', 'TCP', and 'Don't Ping' (selected). Under 'General Options', there are checkboxes for 'UDP Scan' (checked), 'Detect OS' (checked), and 'Fragment Packets' (unchecked). The results section shows: 'Host is up.', 'All 202 scanned ports on 170.mobinn.net (89.43.3.170) are **filtered** (101) or open|filtered (101)', 'Too many fingerprints match this host to give specific OS details', and 'Click [here](#) to find out port STATE meanings.'

همانطور که مشاهده میکنیم اطلاعات بدست آمده از اینجا نیز میگویند تعداد بسیار زیادی از پورت‌ها فیلتر هستند برای udp و دیگر بسته‌ها و همینطور os نیز تشخیص داده نشد.