

سوال ۱

به کمک ping -? ، توضیحات مربوط به این سوییچ را مشاهده میکنیم:

```
C:\Users\Asus>ping -?

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
           [-r count] [-s count] [[-j host-list] | [-k host-list]]
           [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
           [-4] [-6] target_name

Options:
  -t           Ping the specified host until stopped.
               To see statistics and continue - type Control-Break;
               To stop - type Control-C.
  -a           Resolve addresses to hostnames.
  -n count     Number of echo requests to send.
  -l size      Send buffer size.
  -f           Set Don't Fragment flag in packet (IPv4-only).
  -i TTL       Time To Live.
  -v TOS       Type Of Service (IPv4-only. This setting has been deprecated
               and has no effect on the type of service field in the IP
               Header).
  -r count     Record route for count hops (IPv4-only).
  -s count     Timestamp for count hops (IPv4-only).
  -j host-list Loose source route along host-list (IPv4-only).
  -k host-list Strict source route along host-list (IPv4-only).
  -w timeout   Timeout in milliseconds to wait for each reply.
  -R           Use routing header to test reverse route also (IPv6-only).
               Per RFC 5095 the use of this routing header has been
               deprecated. Some systems may drop echo requests if
               this header is used.
  -S srcaddr   Source address to use.
  -c compartment Routing compartment identifier.
  -p           Ping a Hyper-V Network Virtualization provider address.
  -4           Force using IPv4.
  -6           Force using IPv6.
```

بنابراین به کمک این سوییچ میتوانیم سایز بافر packet های ارسالی را تغییر دهیم. در صورتی که از این سوییچ استفاده نشود سایز پیشفرض این بافر ها مقدار ۳۲ بیت دارند. مثلا میخواهیم سایت aut.ac.ir را با بافر هایی به سایز ۱۶ بیت پینگ کنیم:

```
C:\Users\Asus>ping aut.ac.ir -l 16

Pinging aut.ac.ir [185.211.88.131] with 16 bytes of data:
Request timed out.
Reply from 185.211.88.131: bytes=16 time=24ms TTL=55
Reply from 185.211.88.131: bytes=16 time=25ms TTL=55
Reply from 185.211.88.131: bytes=16 time=24ms TTL=55

Ping statistics for 185.211.88.131:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 24ms, Maximum = 25ms, Average = 24ms
```

سوال ۳

در شکل اول این گزارش که از دستور `ping` استفاده کردیم، توضیحات مربوط به سویچ `-t` با رنگ سبز مشخص شده است. همانطور که گفته شده به کمک این سویچ تا وقتی که `ctrl + c` را نزده ایم به این عمل ادامه می‌دهیم. به عنوان مثال این کار را برای سایت گوگل انجام می‌دهیم و بعد از ارسال ۷ packet دستور را متوقف می‌کنیم:

```
C:\Users\Asus>ping google.com -t

Pinging google.com [172.217.169.238] with 32 bytes of data:
Reply from 172.217.169.238: bytes=32 time=56ms TTL=109
Reply from 172.217.169.238: bytes=32 time=56ms TTL=109
Reply from 172.217.169.238: bytes=32 time=58ms TTL=109
Reply from 172.217.169.238: bytes=32 time=56ms TTL=109
Reply from 172.217.169.238: bytes=32 time=56ms TTL=109
Reply from 172.217.169.238: bytes=32 time=56ms TTL=109
Reply from 172.217.169.238: bytes=32 time=56ms TTL=109
Reply from 172.217.169.238: bytes=32 time=56ms TTL=109

Ping statistics for 172.217.169.238:
    Packets: Sent = 8, Received = 8, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 56ms, Maximum = 58ms, Average = 56ms
Control-C
^C
```

سوال ۴

برای google

```
C:\Users\Asus>tracert google.com

Tracing route to google.com [172.217.169.238]
over a maximum of 30 hops:

  1     1 ms    <1 ms    <1 ms    192.168.1.1
  2    23 ms    23 ms    22 ms    10.255.255.255
  3    22 ms    23 ms    23 ms    10.234.198.161
  4    23 ms    26 ms    22 ms    10.234.198.73
  5    27 ms    25 ms    27 ms    10.234.196.70
  6    30 ms    24 ms    24 ms    10.234.199.55
  7    27 ms    29 ms    24 ms    10.234.199.51
  8    26 ms    25 ms    24 ms    78.38.241.98
  9    28 ms    26 ms    26 ms    10.21.21.22
 10    27 ms    26 ms    26 ms    10.21.211.20
 11    24 ms    26 ms    25 ms    10.21.21.22
 12    57 ms    57 ms    58 ms    213.202.4.172
 13    61 ms    57 ms    59 ms    213.202.5.239
 14    59 ms    56 ms    56 ms    216.239.48.133
 15    58 ms    59 ms    56 ms    172.253.51.133
 16    56 ms    57 ms    56 ms    mct01s10-in-f14.1e100.net [172.217.169.238]

Trace complete.
```

برای Facebook

```
C:\Users\Asus>tracert facebook.com

Tracing route to facebook.com [10.10.34.36]
over a maximum of 30 hops:

  0  1 ms    1 ms    <1 ms   192.168.1.1
  1  22 ms   23 ms   23 ms   10.255.255.255
  2  22 ms   23 ms   24 ms   10.234.198.161
  3  23 ms   22 ms   22 ms   10.234.198.114
  4  30 ms   25 ms   25 ms   10.7.124.1
  5  *        *        *       Request timed out.
  6  53 ms   26 ms   34 ms   93.118.125.41
  7  *        *        *       Request timed out.
  8  *        *        *       Request timed out.
  9  25 ms   24 ms   26 ms   80.210.16.70
 10  28 ms   28 ms   24 ms   78.39.161.238
 11  27 ms   25 ms   26 ms   185.57.202.242
 12  26 ms   26 ms   25 ms   185.57.202.229
 13  *        *        *       Request timed out.
 14  *        *        *       Request timed out.
 15  *        *        *       Request timed out.
 16  *        *        *       Request timed out.
 17  *        *        *       Request timed out.
 18  *        *        *       Request timed out.
 19  *        *        *       Request timed out.
 20  *        *        *       Request timed out.
 21  *        *        *       Request timed out.
 22  *        *        *       Request timed out.
 23  *        *        *       Request timed out.
 24  *        *        *       Request timed out.
 25  *        *        *       Request timed out.
 26  *        *        *       Request timed out.
 27  *        *        *       Request timed out.
 28  *        *        *       Request timed out.
 29  *        *        *       Request timed out.
 30  *        *        *       Request timed out.

Trace complete.
```

به خاطر فیلتر بودن این سایت، یک بار هم با فیلترشکن همین دستور را اجرا میکنیم:

```
C:\Users\Asus>tracert facebook.com

Tracing route to facebook.com [31.13.65.36]
over a maximum of 30 hops:

  1  224 ms  214 ms  200 ms  us-central-006.whiskergalaxy.com [107.150.30.130]
  2  318 ms  310 ms  311 ms  unassigned.quadranet.com [107.150.30.129]
  3  278 ms  285 ms  279 ms  unassigned.quadranet.com [104.223.91.255]
  4  *        273 ms  *        atl-b24-link.ip.twelve99.net [62.115.183.188]
  5  327 ms  294 ms  286 ms  facebook-ic337853-atl-b24.ip.twelve99-cust.net [62.115.9.79]
  6  330 ms  283 ms  278 ms  po103.psw02.atl3.tfbnw.net [31.13.25.249]
  7  290 ms  291 ms  283 ms  157.240.38.125
  8  290 ms  335 ms  337 ms  edge-star-mini-shv-01-atl3.facebook.com [31.13.65.36]

Trace complete.
```

برای سایت دانشگاه

```
C:\Users\Asus>tracert aut.ac.ir

Tracing route to aut.ac.ir [185.211.88.131]
over a maximum of 30 hops:

  1    1 ms    1 ms    1 ms  192.168.1.1
  2   23 ms   23 ms   23 ms  10.255.255.255
  3   24 ms   23 ms   23 ms  10.234.198.177
  4   24 ms   24 ms   23 ms  10.234.198.114
  5   23 ms   22 ms   24 ms  10.234.198.105
  6   24 ms   24 ms   25 ms  10.234.198.49
  7   24 ms   25 ms   26 ms  82.99.235.51.parsonline.net [82.99.235.51]
  8   24 ms   24 ms   26 ms  212.16.72.66
  9   24 ms   25 ms   26 ms  185.211.88.131

Trace complete.
```

آخرین آدرس IP همان مقصد است که در اول هم مشخص شده بود.

سوال ۵

در برنامه ping plotter ، به کمک قسمت Local Network Discovery اسکن را آغاز میکنیم:

IP	MAC Address	MAC Vendor	Hostname	Ping	Protocols
192.168.1.1	30:5a:3a:66:3b:b4	ASUSTekC ASUSTek COMPUTER INC.		6.4	ICMP ARP
192.168.1.4			DESKTOP-UDM3FTH	0.2	ICMP
192.168.1.110	6c:c7:ec:99:2d:ac	SamsungE Samsung Electro-Mechanics(Thailand)		10	ARP ICMP
192.168.1.6	ec:1f:72:fd:fc:13	SamsungE Samsung Electro-Mechanics(Thailand)		2.1	ICMP ARP

سپس از دستور ipconfig/all استفاده میکنیم:

```

Connection-specific DNS Suffix . : 
Description . . . . . : Intel(R) Dual Band Wireless-AC 8265
Physical Address. . . . . : F4-D1-08-8D-FB-49
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . : Yes
Link-local IPv6 Address . . . . : fe80::2dd7:ef8b:8a22:36cd%20(Preferred)
IPv4 Address. . . . . : 192.168.1.4(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : ۲۲ ۲۲۲۲, 12 ۲۲۲۲ 1399 17:37:40
Lease Expires . . . . . : ۲۲۲۲۲۲۲۲, 13 ۲۲۲۲ 1399 17:37:39
Default Gateway . . . . . : 192.168.1.1
DHCP Server . . . . . : 192.168.1.1
DHCPv6 IAID . . . . . : 167039240
DHCPv6 Client DUID. . . . . : 00-01-00-01-25-47-26-52-F4-D1-08-8D-FB-49
DNS Servers . . . . . : 46.224.1.220
                        8.8.8.8
Primary WINS Server . . . . . : 8.8.8.8
NetBIOS over Tcpip. . . . . : Enabled

```

طبق نتایج به دست آمده، IP لپ تاپی که با آن این اسکن و ipconfig را انجام دادیم برابر **192.168.1.4** میباشد که با رنگ قرمز آن را مشخص کرده ایم.

همچنین طبق اسکن انجام شده، IP یکی از موبایل هایی که به این شبکه متصل است برابر است با **192.168.1.110** که با رنگ آبی مشخص شده است:

