

ברק עמרם ת.ז. 209369289

לירוי מלמד ת.ז. 209366970

### חלק א' - myping.c

שליחת פקטת ICMP (פינג) לכתובת כלשהי וקבלת תשובה (reply) מהיעד אשר אליו נשלחה הפקטה.  
הדפסות בטרמינל:

- פינג נשלח בהצלחה
- התקבלה תשובה בהצלחה
- הזמן שלוקח מרגע שליחת הודעת פינג עד להחזרת תשובה ב - milliseconds וב - microseconds

```
barak@barak: ~/Desktop/Study/Communication & co...
barak@barak:~/Desktop/Study/Communication & computer/Ex5$ make all
gcc myping.c -lpcap -o myping
gcc sniffer.c -lpcap -o sniffer
barak@barak:~/Desktop/Study/Communication & computer/Ex5$ sudo ./myping
Successfully sent ping
Successfully received reply
RTT (Round trip time):
* 49739 microseconds
* 49.739 milliseconds
barak@barak:~/Desktop/Study/Communication & computer/Ex5$
```

### Wireshark:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.0.0.13	8.8.8.8	ICMP	61	Echo (ping) request id=0x1200, seq=0/0, ttl=64 (reply in 2)
2	0.049658	8.8.8.8	10.0.0.13	ICMP	61	Echo (ping) reply id=0x1200, seq=0/0, ttl=116 (request in 1)

  

Request	Reply
<p>Wireshark · Packet 1 · enp0s3</p> <p>Frame 1: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on enp0s3 Ethernet II, Src: PcsCompu_26:99:22 (08:00:27:26:99:22), Dst: HeightsT_7e:6d:05 (00:b8:c2:7e:6d:05) Internet Protocol Version 4, Src: 10.0.0.13, Dst: 8.8.8.8 Internet Control Message Protocol Type: 8 (Echo (ping) request) Code: 0 Checksum: 0xae36 [correct] [Checksum Status: Good] Identifier (BE): 4608 (0x1200) Identifier (LE): 18 (0x0012) Sequence number (BE): 0 (0x0000) Sequence number (LE): 0 (0x0000) [Response frame: 2] Data (19 bytes) Data: 54686973206973207468652070696e672e0a00 [Length: 19]</p>	<p>Wireshark · Packet 2 · enp0s3</p> <p>Frame 2: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on enp0s3 Ethernet II, Src: HeightsT_7e:6d:05 (00:b8:c2:7e:6d:05), Dst: PcsCompu_26:99:22 (08:00:27:26:99:22) Internet Protocol Version 4, Src: 8.8.8.8, Dst: 10.0.0.13 Internet Control Message Protocol Type: 0 (Echo (ping) reply) Code: 0 Checksum: 0xb636 [correct] [Checksum Status: Good] Identifier (BE): 4608 (0x1200) Identifier (LE): 18 (0x0012) Sequence number (BE): 0 (0x0000) Sequence number (LE): 0 (0x0000) [Request frame: 1] [Response time: 49.658 ms] Data (19 bytes) Data: 54686973206973207468652070696e672e0a00 [Length: 19]</p>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.0.0.13	8.8.8.8	ICMP	61	Echo (ping) request id=0x1200, seq=0/0, ttl=64 (reply in 2)
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Wireshark · Packet 1 · enp0s3

Frame 1: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on enp0s3  
Ethernet II, Src: PcsCompu\_26:99:22 (08:00:27:26:99:22), Dst: HeightsT\_7e:6d:05 (00:b8:c2:7e:6d:05)  
Internet Protocol Version 4, Src: 10.0.0.13, Dst: 8.8.8.8  
Internet Control Message Protocol  
Type: 8 (Echo (ping) request)  
Code: 0  
Checksum: 0xae36 [correct]  
[Checksum Status: Good]  
Identifier (BE): 4608 (0x1200)  
Identifier (LE): 18 (0x0012)  
Sequence number (BE): 0 (0x0000)  
Sequence number (LE): 0 (0x0000)  
[Response frame: 2]  
Data (19 bytes)  
Data: 54686973206973207468652070696e672e0a00  
[Length: 19]

Wireshark · Packet 2 · enp0s3

Frame 2: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on enp0s3  
Ethernet II, Src: HeightsT\_7e:6d:05 (00:b8:c2:7e:6d:05), Dst: PcsCompu\_26:99:22 (08:00:27:26:99:22)  
Internet Protocol Version 4, Src: 8.8.8.8, Dst: 10.0.0.13  
Internet Control Message Protocol  
Type: 0 (Echo (ping) reply)  
Code: 0  
Checksum: 0xb636 [correct]  
[Checksum Status: Good]  
Identifier (BE): 4608 (0x1200)  
Identifier (LE): 18 (0x0012)  
Sequence number (BE): 0 (0x0000)  
Sequence number (LE): 0 (0x0000)  
[Request frame: 1]  
[Response time: 49.658 ms]  
Data (19 bytes)  
Data: 54686973206973207468652070696e672e0a00  
[Length: 19]

```
barak@barak: ~/Desktop/Study/Communication & computer/Ex5$ make all
gcc myping.c -lpcap -o myping
gcc sniffer.c -lpcap -o sniffer
barak@barak:~/Desktop/Study/Communication & computer/Ex5$ sudo ./myping
Successfully sent ping
Successfully received reply
RTT (Round trip time):
* 49739 microseconds
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barak@barak:~/Desktop/Study/Communication & computer/Ex5$
```

## חלק ב' - sniffer.c

בחלק זה נדרשנו לכתוב תוכנית שתתפוס פקטות ICMP שנשלחו/התקבלו כמו ה - wireshark.  
את ה sniffer.c מריצים לפני myping וה sniffer ממתין לקבלת פקטות ICMP ויציא את פרטיהם על המסך:

- כתובת המקור
- כתובת היעד
- פרטי ההודעה (סוג וקוד)

הפקטה הראשונה שמופיעה היא ping request מה VM במחשב שלי שנמצא בכתובת 10.0.0.13 ליעד 8.8.8.8 Google Public DNS IP וכתובתו הוא 8.8.8.8  
הפקטה השנייה היא החזרת תשובה מ 8.8.8.8 אל המחשב שלי.

```
barak@barak: ~/Desktop/Study/Communication & com...
barak@barak:~/Desktop/Study/Communication & computer/Ex5$ sudo ./sniffer
Sniffing...

*****
ICMP Packet Number 1:
 * Source IP: 10.0.0.13
 * Destination IP: 8.8.8.8
ICMP Details:
 * Type: 8
 * Code: 0
*****
ICMP Packet Number 2:
 * Source IP: 8.8.8.8
 * Destination IP: 10.0.0.13
ICMP Details:
 * Type: 0
 * Code: 0
```

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.0.0.13	8.8.8.8	ICMP	61	Echo (ping) request id=0x1200, seq=0/0, ttl=64 (reply in 2)
2	0.049658	8.8.8.8	10.0.0.13	ICMP	61	Echo (ping) reply id=0x1200, seq=0/0, ttl=116 (request in 1)

Wireshark · Packet 1 · enp0s3

▶ Frame 1: 61 bytes on wire (488 bits), 61 bytes captured (488 bits)

▶ Ethernet II, Src: PcsCompu\_26:99:22 (08:00:27:26:99:22), Dst: HeightsT\_7e:6d

▶ Internet Protocol Version 4, Src: 10.0.0.13, Dst: 8.8.8.8

▼ Internet Control Message Protocol

Type: 8 (Echo (ping) request)

Code: 0

Checksum: 0xae36 [correct]

[Checksum Status: Good]

Identifier (BE): 4608 (0x1200)

Identifier (LE): 18 (0x0012)

Sequence number (BE): 0 (0x0000)

Sequence number (LE): 0 (0x0000)

[Response frame: 2]

▼ Data (19 bytes)

Data: 54686973206973207468652070696e672e0a00

[Length: 19]

Wireshark · Packet 2 · enp0s3

▶ Frame 2: 61 bytes on wire (488 bits), 61 bytes captured (488 bits)

▶ Ethernet II, Src: HeightsT\_7e:6d:05 (00:b8:c2:7e:6d:05), Dst: PcsCompu\_26:9

▶ Internet Protocol Version 4, Src: 8.8.8.8, Dst: 10.0.0.13

▼ Internet Control Message Protocol

Type: 0 (Echo (ping) reply)

Code: 0

Checksum: 0xb636 [correct]

[Checksum Status: Good]

Identifier (BE): 4608 (0x1200)

Identifier (LE): 18 (0x0012)

Sequence number (BE): 0 (0x0000)

Sequence number (LE): 0 (0x0000)

[Request frame: 1]

[Response time: 49.658 ms]

▼ Data (19 bytes)

Data: 54686973206973207468652070696e672e0a00

[Length: 19]

```
*****
ICMP Packet Number 1:
 * Source IP: 10.0.0.13
 * Destination IP: 8.8.8.8
ICMP Details:
 * Type: 8
 * Code: 0
*****
ICMP Packet Number 2:
 * Source IP: 8.8.8.8
 * Destination IP: 10.0.0.13
ICMP Details:
 * Type: 0
 * Code: 0
```