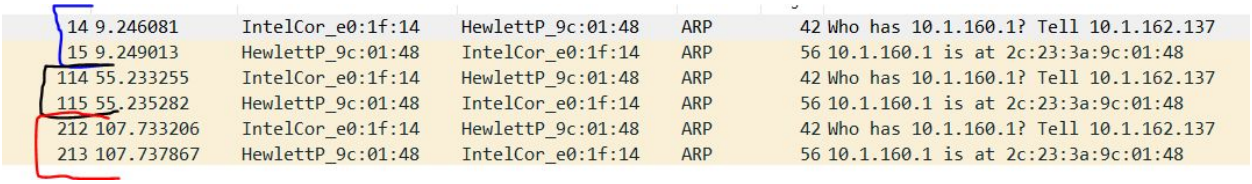
Readme
To run the program use the IDLE/default interpreter. Make sure the pcap assignment4_my_arp.pcap is in the same folder. The program opens the pcap file and searches for the 0x0806 type and stores it in a list. After the pcap is search through, the program deciphers the arp packet and prints out the information.

Part A Wireshark packet capture (15 points)



14	9.246081	IntelCor_e0:1f:14	HewlettP_9c:01:48	ARP	42	Who has 10.1.160.1? Tell 10.1.162.137
15	9.249013	HewlettP_9c:01:48	IntelCor_e0:1f:14	ARP	56	10.1.160.1 is at 2c:23:3a:9c:01:48
114	55.233255	IntelCor_e0:1f:14	HewlettP_9c:01:48	ARP	42	Who has 10.1.160.1? Tell 10.1.162.137
115	55.235282	HewlettP_9c:01:48	IntelCor_e0:1f:14	ARP	56	10.1.160.1 is at 2c:23:3a:9c:01:48
212	107.733206	IntelCor_e0:1f:14	HewlettP_9c:01:48	ARP	42	Who has 10.1.160.1? Tell 10.1.162.137
213	107.737867	HewlettP_9c:01:48	IntelCor_e0:1f:14	ARP	56	10.1.160.1 is at 2c:23:3a:9c:01:48

Part B Analyze the ARP (85 points)
(i) Print the entire ARP request and response for one ARP packet exchange (preferably the one you show in the screenshot above).

```
ARP Request
Destination MAC 2c:23:3a:9c:01:48
Source MAC 20:16:b9:e0:1f:14
Destination IP 10.1.160.1
Source IP 10.1.162.137
Type: 0806 ARP
Optcode: 1
Hardware type: 0001
Protocol type: 0800
Hardware size: 06
Protocol size 04
-------------------------
ARP Reply
Destination MAC 20:16:b9:e0:1f:14
Source MAC 2c:23:3a:9c:01:48
Destination IP 10.1.162.137
Source IP 10.1.160.1
Type: 0806 ARP
Optcode: 2
Hardware type: 0001
Protocol type: 0800
Hardware size: 06
Protocol size 04
```

(ii) Based on the ARP messages, tell us the IP address and MAC address of your router. Explain how you determined this.

The IP address and MAC address of the router is
MAC address: 2c:23:3a:9c:01:48
IP address:10.1.160.1

I determined this by looking at the arp structure of both the arp request and reply packets. The request packet should have the senders MAC and IP address which should be mine. The other MAC and IP address should be the router my computer talks to. The reply should have the routers IP and MAC address. I know what my information is so I was able to determine router's information from the packet.

Bonus: Capture Gratuitous ARP (10%)

I am able to see ARP messages meant for others due to the fact that in Wifi devices are able broadcast information to the surrounding area. The routers sent information using broadcast so that meant all computers are able to see the information. My computer only listens for broadcast and messages meant for it so it shouldn't see messages other computers send to the router. The router uses broadcast so I am able to see the messages meant for the other computer.

No.	Time	Source	Destination	Protocol	Length	Info
184	30.606912	HewlettP_9c:01:2f	Broadcast	ARP	60	Gratuitous ARP for 10.1.216.1 (Reply)
236	54.469669	HewlettP_9c:01:4e	Broadcast	ARP	60	Gratuitous ARP for 10.1.208.1 (Reply)
237	54.570116	HewlettP_9c:01:2f	Broadcast	ARP	60	Gratuitous ARP for 10.1.216.1 (Reply)
238	55.388101	HewlettP_9c:01:2f	Broadcast	ARP	60	Gratuitous ARP for 10.1.216.1 (Reply)
239	55.897106	HewlettP_9c:01:4e	Broadcast	ARP	60	Gratuitous ARP for 10.1.208.1 (Reply)
240	56.618887	HewlettP_9c:01:4e	Broadcast	ARP	60	Gratuitous ARP for 10.1.208.1 (Reply)
1431	83.136857	HewlettP_9c:01:2f	Broadcast	ARP	60	Gratuitous ARP for 10.1.216.1 (Reply)
4219	101.364234	HewlettP_9c:01:4e	Broadcast	ARP	60	Gratuitous ARP for 10.1.208.1 (Reply)
4534	102.185442	HewlettP_9c:01:4e	Broadcast	ARP	60	Gratuitous ARP for 10.1.208.1 (Reply)
4761	103.106062	HewlettP_9c:01:4e	Broadcast	ARP	60	Gratuitous ARP for 10.1.208.1 (Reply)
6179	117.542834	HewlettP_9c:01:2f	Broadcast	ARP	60	Gratuitous ARP for 10.1.216.1 (Reply)
6180	118.466011	HewlettP_9c:01:2f	Broadcast	ARP	60	Gratuitous ARP for 10.1.216.1 (Reply)
6183	118.977987	HewlettP_9c:01:2f	Broadcast	ARP	60	Gratuitous ARP for 10.1.216.1 (Reply)
6564	161.763258	IntelCor_e0:1f:14	Broadcast	ARP	42	Who has 10.1.160.1? Tell 10.1.162.197
6566	161.775048	HewlettP_9c:01:48	IntelCor_e0:1f:14	ARP	56	10.1.160.1 is at 2c:23:3a:9c:01:48
6572	161.808184	IntelCor_e0:1f:14	Broadcast	ARP	42	Who has 10.1.162.197? Tell 0.0.0.0
6629	162.804352	IntelCor_e0:1f:14	Broadcast	ARP	42	Who has 10.1.162.197? Tell 0.0.0.0
6643	163.810604	IntelCor_e0:1f:14	Broadcast	ARP	42	Who has 10.1.162.197? Tell 0.0.0.0
6656	164.806652	IntelCor_e0:1f:14	Broadcast	ARP	42	Gratuitous ARP for 10.1.162.197 (Request)
8813	472.146187	HewlettP_9c:01:4a	Broadcast	ARP	60	Gratuitous ARP for 10.1.176.1 (Reply)
18727	766.244744	HewlettP_9c:01:48	Broadcast	ARP	60	Gratuitous ARP for 10.1.160.1 (Reply)
18743	767.166336	HewlettP_9c:01:48	Broadcast	ARP	60	Gratuitous ARP for 10.1.160.1 (Reply)
18748	768.292836	HewlettP_9c:01:48	Broadcast	ARP	60	Gratuitous ARP for 10.1.160.1 (Reply)

```
> Frame 183: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)
> Ethernet II, Src: HewlettP_9c:01:2f (2c:23:3a:9c:01:2f), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
> Address Resolution Protocol (reply/gratuitous ARP)
```

```
0000  ff ff ff ff ff ff 2c 23  3a 9c 01 2f 08 06 00 01   ......,# :../....
0010  08 00 06 04 00 02 2c 23  3a 9c 01 2f 0a 01 d8 01   ......,# :../....
0020  34 2e b6 9f 94 7c 0a 01  d8 01 00 00 00 00 00 00   4....|.. ........
0030  00 00 00 00 00 00 00 00  00 00 00 00              ........ ....
```