COMP 7003
Introduction to Information and Network Security

Assignment-02

User Guide

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Purpose

The purpose of the program is to capture and analyze network traffic at the packet level using Python and Scapy. It will filter packets by protocol (Ethernet, IPv4, ICMP, TCP, UDP, DNS, IPv6, ICMPv6), convert raw packet data into hexadecimal dumps, and parse the packet headers to extract and display key fields such as source/destination MAC and IP addresses, protocol-specific details, and port numbers. The program aims to provide a clear, structured, and human-readable output of packet information.

Installation

Navigate to https://learn.bcit.ca. Download COMP7003-assign02-v1.zip and Extract the contents.

Building

```
No building required
```

Running

```
sudo python3 main.py -i <interface> -f <filter> -c <count>
```

Command Line Arguments

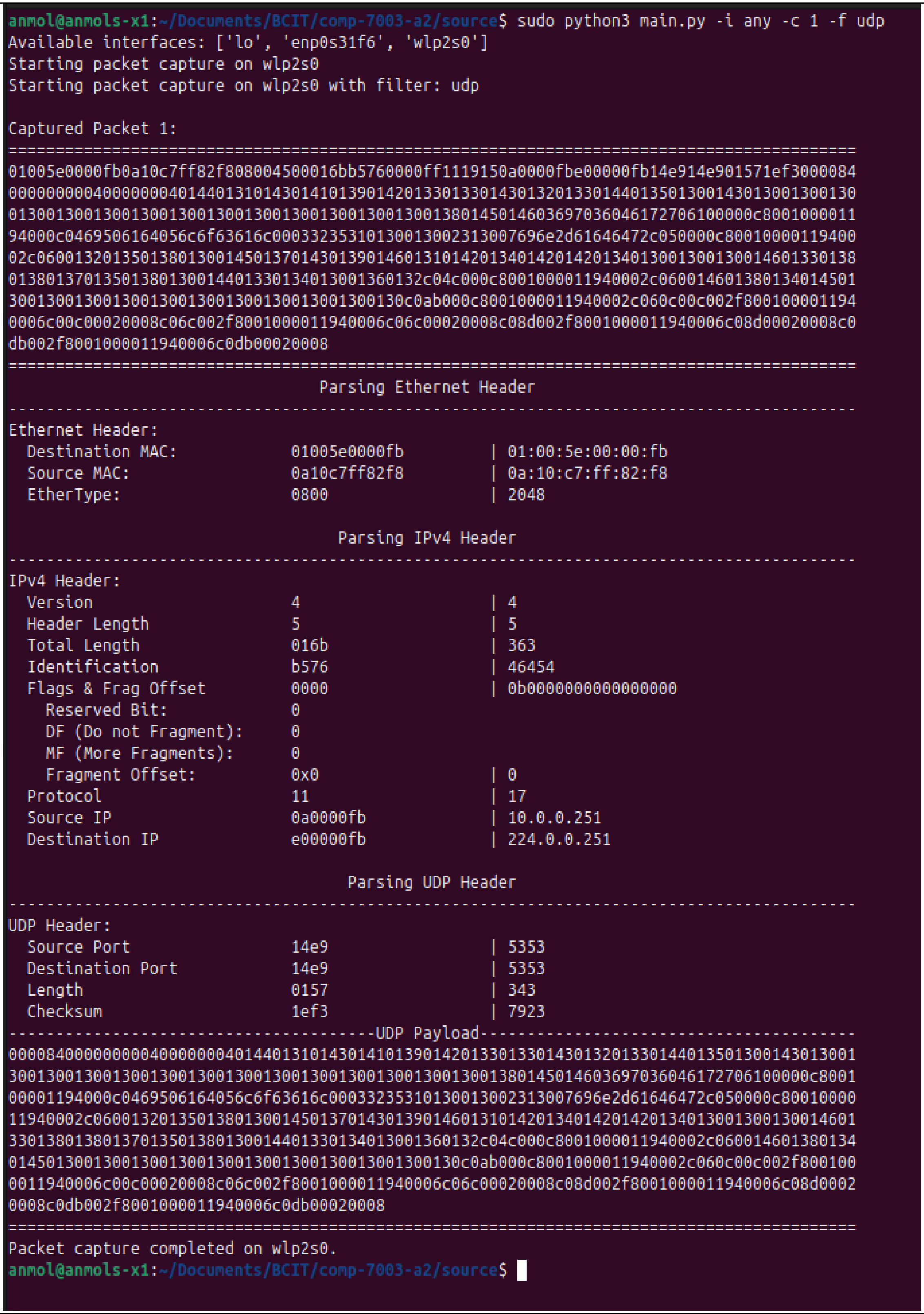
The following configuration values can be set in <file>:

main.py

Variable	Purpose
<-i> or <--interface>	Specifies the network interface to capture packets on. (Default: any)
<-f> or <--filter>	Specifies the BPF to apply. Common filters include tcp, udp, icmp, arp, ip, ip6, icmp6, and dns.
<-c> or <--count>	Specifies the number of packets to capture. (Default: 1)

Examples

main.py

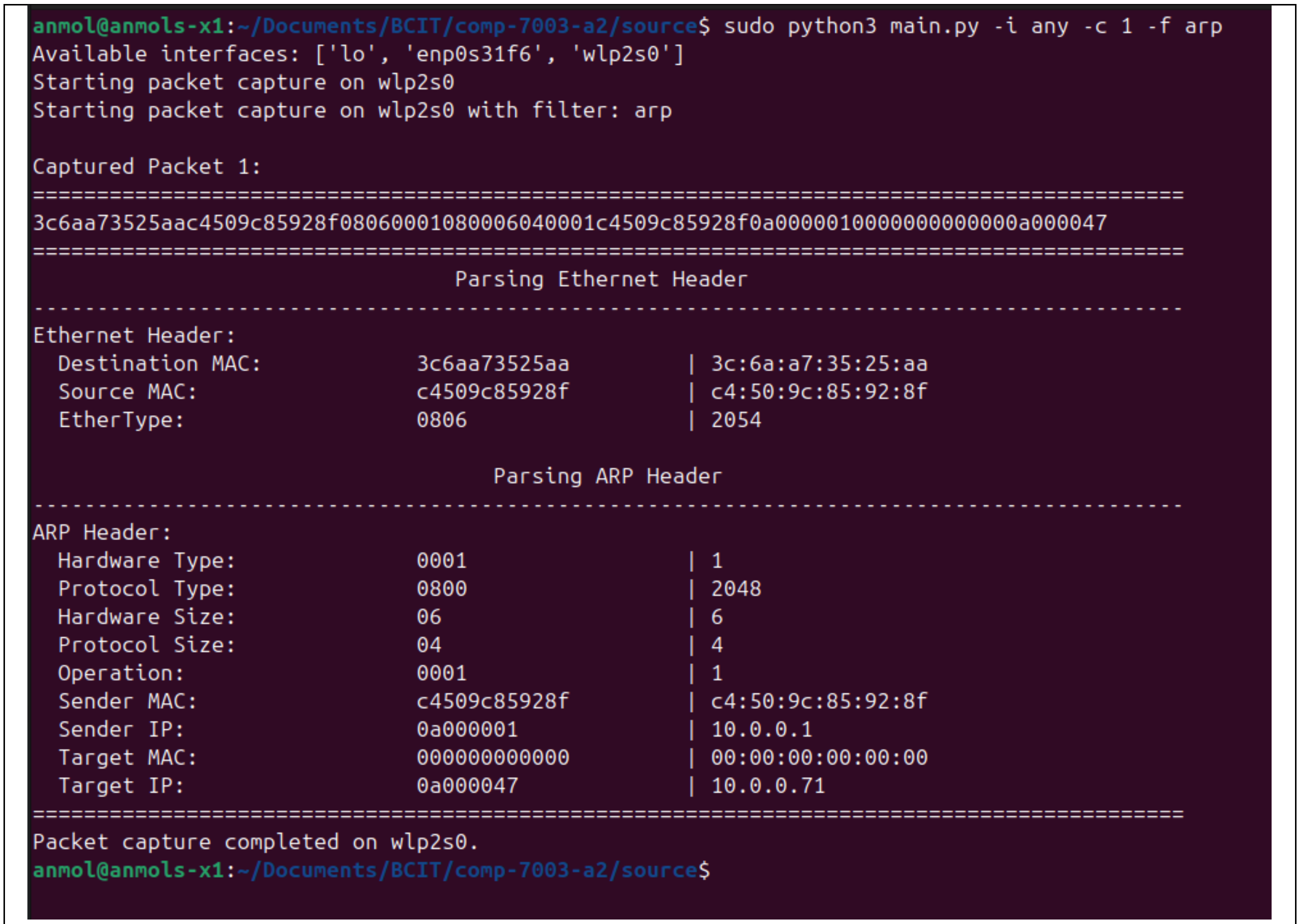


```
anmol@anmols-x1:~/Documents/BCIT/comp-7003-a2/source$ sudo python3 main.py -i any -c 1 -f udp
Available interfaces: ['lo', 'enp0s31f6', 'wlp2s0']
Starting packet capture on wlp2s0
Starting packet capture on wlp2s0 with filter: udp

Captured Packet 1:
==========================================================================================
01005e0000fb0a10c7ff82f808004500016bb5760000ff1119150a0000fbe00000fb14e914e901571ef3000084
000000000400000004014401310143014101390142013301330143013201330144013501300143013001300130
013001300130013001300130013001300130013001300130013801450146036970360461727061000000c8001000011
94000c0469506164056c6f63616c000332353101300130023130076 96e2d61646472c050000c80010000119400
02c0600132013501380130014501370143013901460131014201340142014201340130013001300146013301 38
0138013701350138013001440133013401300136 0132c04c000c80010000011940002c0600146013801340145 01
3001300130013001300130013001300130013001300130c0ab000c80010000011940002c060c00c002f800100001194
0006c00c00020008c06c002f80010000011940006c06c00020008c08d002f80010000011940006c08d00020008c0
db002f80010000011940006c0db00020008
==========================================================================================
                                 Parsing Ethernet Header
------------------------------------------------------------------------------------------
Ethernet Header:
  Destination MAC:            01005e0000fb         | 01:00:5e:00:00:fb
  Source MAC:                 0a10c7ff82f8         | 0a:10:c7:ff:82:f8
  EtherType:                  0800                 | 2048

                                   Parsing IPv4 Header
------------------------------------------------------------------------------------------
IPv4 Header:
  Version                     4                    | 4
  Header Length               5                    | 5
  Total Length                016b                 | 363
  Identification              b576                 | 46454
  Flags & Frag Offset         0000                 | 0b0000000000000000
    Reserved Bit:             0
    DF (Do not Fragment):     0
    MF (More Fragments):      0
    Fragment Offset:          0x0                  | 0
  Protocol                    11                   | 17
  Source IP                   0a0000fb             | 10.0.0.251
  Destination IP              e00000fb             | 224.0.0.251

                                    Parsing UDP Header
------------------------------------------------------------------------------------------
UDP Header:
  Source Port                 14e9                 | 5353
  Destination Port            14e9                 | 5353
  Length                      0157                 | 343
  Checksum                    1ef3                 | 7923
---------------------------------------UDP Payload----------------------------------------
000084000000000004000000040144013101430141013901420133013301430132013301440135013001430130 01
3001300130013001300130013001300130013001300130013001380145014603697036046172706100000c8001
00001194000c0469506164056c6f63616c000332353101300130023130076 96e2d61646472c050000c80010000
11940002c060013201350138013001450137014301390146013101420134014201420134013001300130014601
330138013801370135013801300144013301340130013601 32c04c000c80010000011940002c060014601380134
0145013001300130013001300130013001300130013001300130c0ab000c80010000011940002c060c00c002f800100
0011940006c00c00020008c06c002f80010000011940006c06c00020008c08d002f80010000011940006c08d0002
0008c0db002f80010000011940006c0db00020008
==========================================================================================
Packet capture completed on wlp2s0.
anmol@anmols-x1:~/Documents/BCIT/comp-7003-a2/source$ 
```



```
anmol@anmols-x1:~/Documents/BCIT/comp-7003-a2/source$ sudo python3 main.py -i any -c 1 -f arp
Available interfaces: ['lo', 'enp0s31f6', 'wlp2s0']
Starting packet capture on wlp2s0
Starting packet capture on wlp2s0 with filter: arp

Captured Packet 1:
============================================================================================
3c6aa73525aac4509c85928f08060001080006040001c4509c85928f0a0000010000000000000a000047
============================================================================================
                                  Parsing Ethernet Header
--------------------------------------------------------------------------------------------
Ethernet Header:
  Destination MAC:             3c6aa73525aa         | 3c:6a:a7:35:25:aa
  Source MAC:                  c4509c85928f         | c4:50:9c:85:92:8f
  EtherType:                   0806                 | 2054

                                     Parsing ARP Header
--------------------------------------------------------------------------------------------
ARP Header:
  Hardware Type:               0001                 | 1
  Protocol Type:               0800                 | 2048
  Hardware Size:               06                   | 6
  Protocol Size:               04                   | 4
  Operation:                   0001                 | 1
  Sender MAC:                  c4509c85928f         | c4:50:9c:85:92:8f
  Sender IP:                   0a000001             | 10.0.0.1
  Target MAC:                  000000000000         | 00:00:00:00:00:00
  Target IP:                   0a000047             | 10.0.0.71
============================================================================================
Packet capture completed on wlp2s0.
anmol@anmols-x1:~/Documents/BCIT/comp-7003-a2/source$
```