COMP 7003
Assignment 2
Report

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Purpose

This program demonstrates how to efficiently capture packets from the network and extract the field of each packet to print out to screen. In specific, the protocols extracted are: IPv4, TCP, UDP and ARP.

Requirements

Task	Status
Extract IPv4, TCP, UDP and ARP packets from the network and print out each field manually.	Fully implemented

Platforms

dc_shell has been tested on:

- macOS 14.2
- Manjaro
- Ubuntu 2023.10
- Fedora 39
- FreeBSD 14.0

Language

- Python 3.11
- Compiles with python3

Documents

- Design
- Testing
- User Guide

Findings

I used the following tables to code my way through the assignment and extract each field for the individual protocols. These were all given to us in a previous lecture.

ARP

	0	1	2	3
0	HW Addr. Type		Prot. Addr. Type	
4	HW Addr Len.	Prot. Addr Len	Opcode	
8	Source Hardware Addr.			
12	Src HW Addr		Src Protocol Addr	
16	Src. Proto Addr		Tgt HW Addr	
20	Tgt HW Address (cont.)			
24	Target Protocol Address			

IPv4 Header

Offset: Add column+row. e.g. Protocol=9
ip[9] = "IP header offset 9" or the protocol field

	0	1	2	3
0	Ver / IHL	TOS	Total Length	
4	IP Identification		x D M / Offset	
8	TTL	Protocol	Checksum	
12	Source Address			
16	Destination Address			
20	Options (optional)			

TCP

	0	1	2	3
0	Source Port		Dest. Port	
4	Sequence Number			
8	Acknowledgement Number			
12	HL / R	Flags	Window Size	
16	Checksum		Urgent Pointer	
20	Options (up to 40 bytes)			

UDP Header

	0	1	2	3
0	Source Port		Destination Port	
4	Length		Checksum	