Final Project

Computer Networking Course

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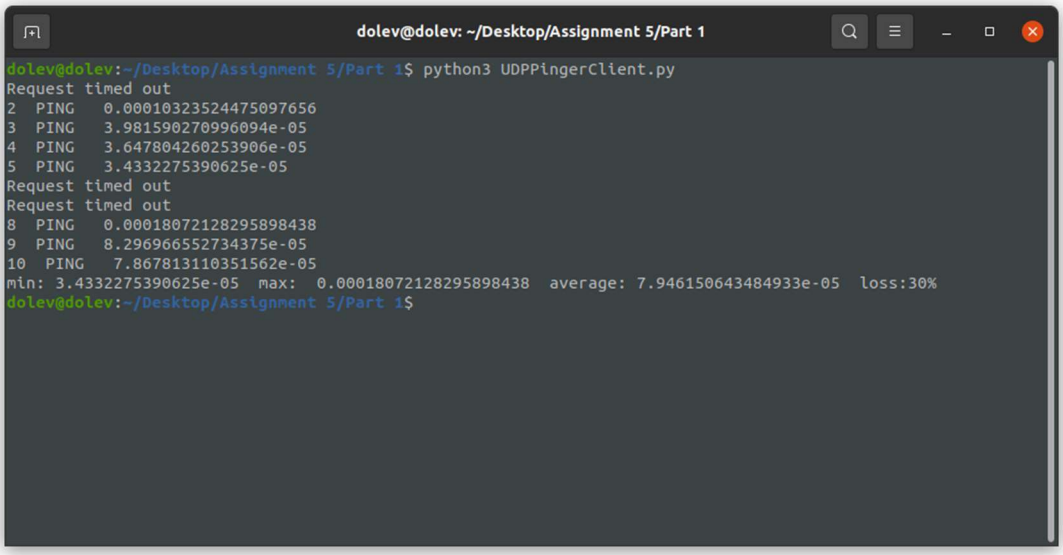
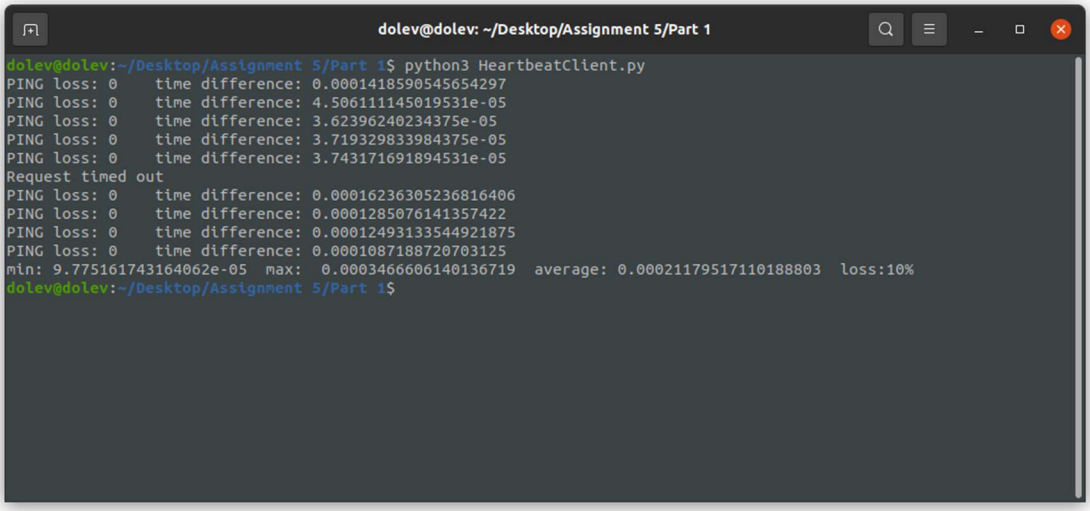
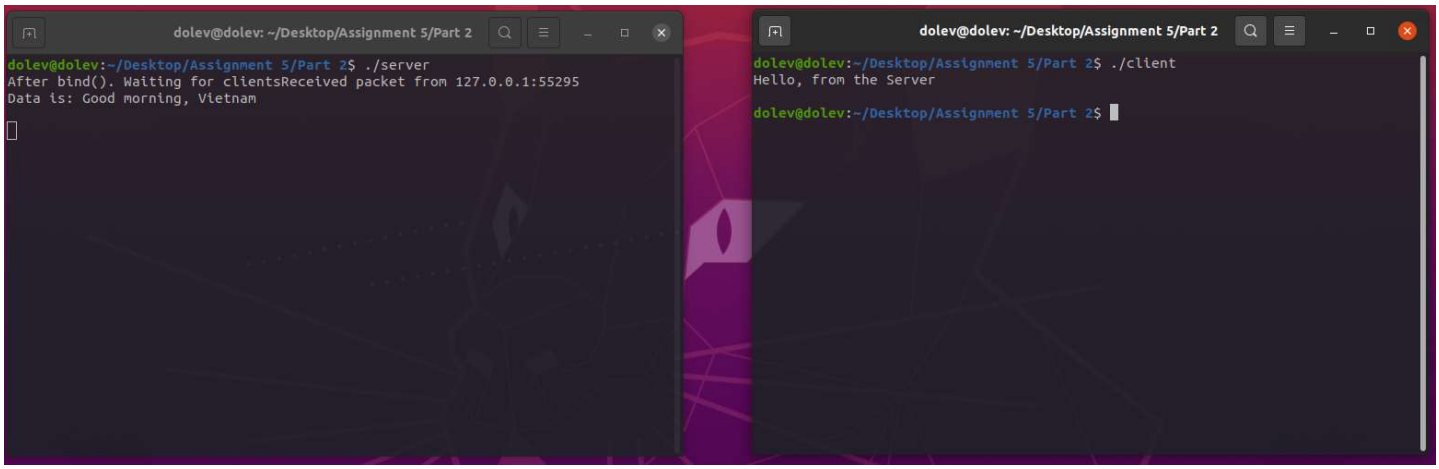
Part 1:



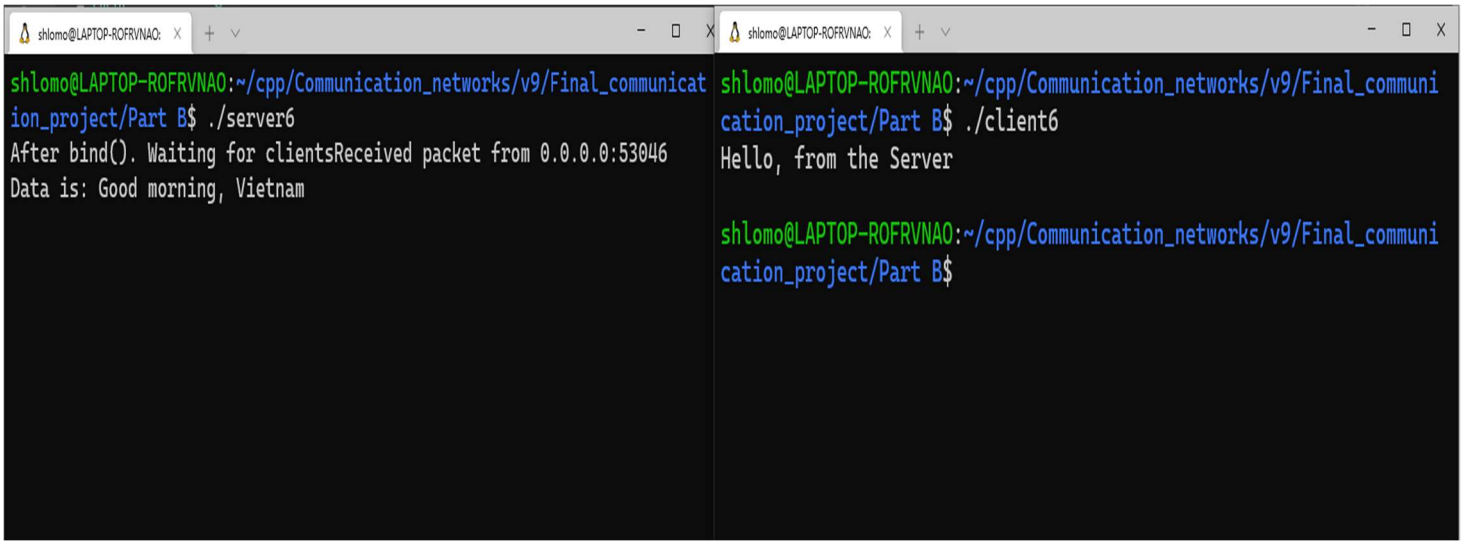


Part 2:

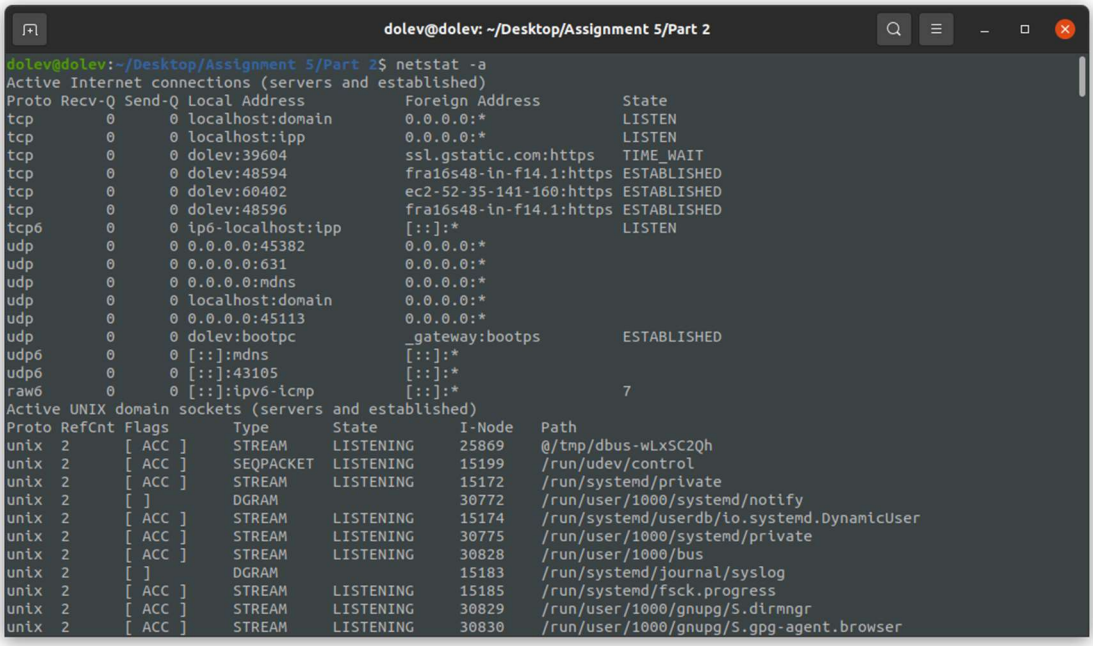
Screen shot of two programs, client and server that used IPv4 :



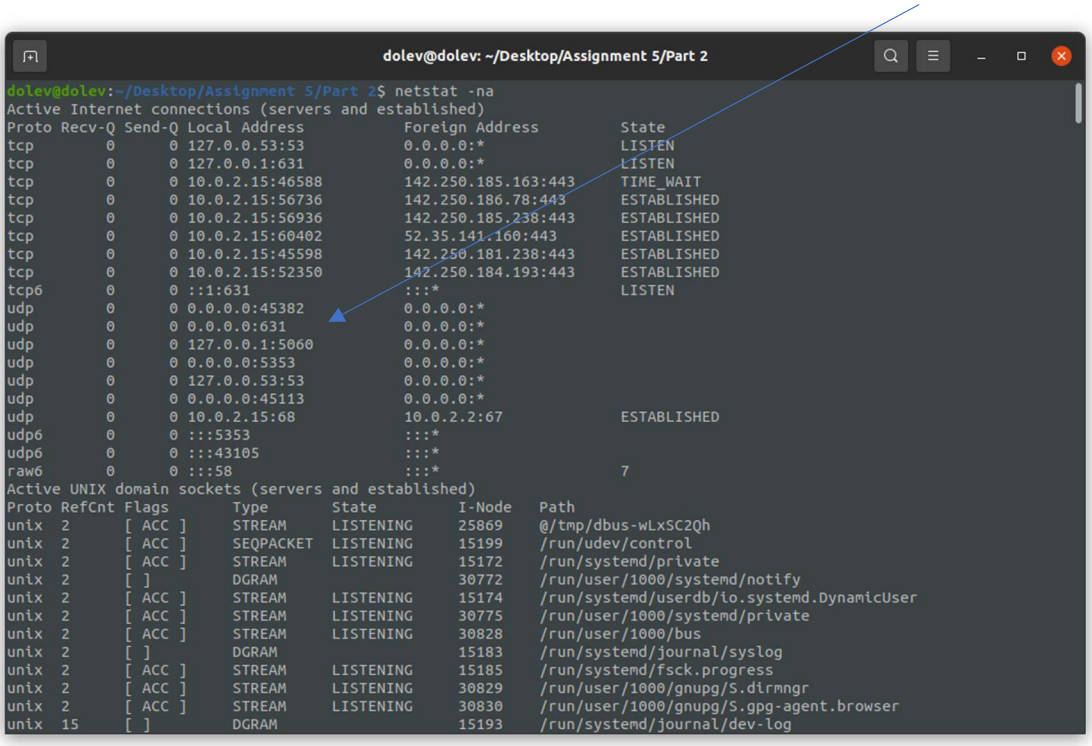
Screen shot of two programs, client and server that used IPv6 :



Screen shot of using the netstat -na command before running the programs :



Screen shot of using the netstat -na command after running the programs :



Comparison between IPV4 and IPV6 headers :

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	127.0.0.1	127.0.0.1	UDP	67	38786 → 5060 Len=23
2	0.000037	127.0.0.1	127.0.0.1	UDP	68	5060 → 38786 Len=24

```
Frame 1: 67 bytes on wire (536 bits), 67 bytes captured (536 bits)
Linux cooked capture v1
Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 51
    Identification: 0xae03 (44547)
  > Flags: 0x40, Don't fragment
    Fragment Offset: 0
    Time to Live: 64
    Protocol: UDP (17)
    Header Checksum: 0x8eb4 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 127.0.0.1
    Destination Address: 127.0.0.1
User Datagram Protocol, Src Port: 38786, Dst Port: 5060
    Source Port: 38786
    Destination Port: 5060
    Length: 31
    Checksum: 0xfe32 [unverified]
    [Checksum Status: Unverified]
    [Stream index: 0]
```

No.	Time	Source	Destination	Protocol	Length	Info
4	11.591838	::1	::1	UDP	87	41901 → 5060 Len=23
5	11.591899	::1	::1	UDP	88	5060 → 41901 Len=24

```
Frame 4: 87 bytes on wire (696 bits), 87 bytes captured (696 bits)
Linux cooked capture v1
Internet Protocol Version 6, Src: ::1, Dst: ::1
    0110 .... = Version: 6
  > .... 0000 0000 .... .... .... .... .... = Traffic Class: 0x00 (DSCP: CS0, ECN: Not-ECT)
    .... .... .... 1010 1001 0011 1011 0110 = Flow Label: 0xa93b6
    Payload Length: 31
    Next Header: UDP (17)
    Hop Limit: 64
    Source Address: ::1
    Destination Address: ::1
User Datagram Protocol, Src Port: 41901, Dst Port: 5060
    Source Port: 41901
    Destination Port: 5060
    Length: 31
    Checksum: 0x0032 [unverified]
    [Checksum Status: Unverified]
    [Stream index: 0]
```

The IPv4 has 32 - bit address length and the IPv6 has 128 - bit address length.
The IPv4 uses a numeric (decimal) addressing method , and The IPv6 using hexadecimal representation.
The header length of 20 bytes in IPv4 whereas the header length is 40 bytes in IPv6.
IPv4 uses the checksum field in the header format for handling errors whereas the IPv6 doesn't have this filed.
IPv6 has no fragmentation, the Sender must send packages of the appropriate size and not packages that are too large.