IPv6 and User Datagram Protocol (UDP)

1) Your computer “fastnet” wants to send a PING packet to a server “www” at Google. Your computer is connected through an IEEE 802.11 access point to the sub-network 134.226.62.0. The two sub-networks 134.226.62.0, 134.226.32.0, etc are separate Ethernet broadcast domains, connected through a router in the School of Computer Science and Statistics with a number of interfaces with the addresses ending in .254 for the individual sub-networks e.g. 134.226.62.254. The computers in the sub-networks use these addresses as the addresses for the default gateway.

   Describe the packets that are involved in the PING exchange. The description should include the information that is necessary for the computers and routers to process the IPv4 packets e.g. ARP requests, DNS requests, etc. You can assume that the routers have a full view of the internal network of TCD and do not have to update their routing information.

fastnet.scss.tcd.ie	134.226.62.183
ns.scss.tcd.ie	134.226.32.58
ns.google.com	216.239.32.10
www.google.com	74.125.24.104

> route –n on fastnet:

Subnet	Gateway	Netmask	Interface
134.226.62.0	0.0.0.0	255.255.255.0	eth1
0.0.0.0	134.226.62.254	0.0.0.0	eth1

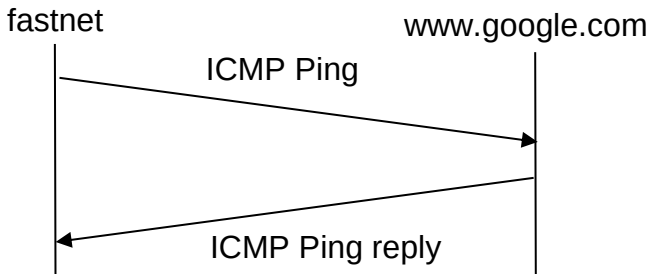

Figure 1: Conceptual view of communication between fastnet and www.google.com

2) IPv6 describes the next version of Internet Protocol that was designed to replace IPv4. Describe the concepts that were introduced with IPv6, contrast them with the concepts in IPv4 and discuss 3 improvements of IPv6 over IPv4.

3) The User Datagram Protocol (UDP) is generally based on the Internet Protocol version 4. IPv4 has a maximum packet size that is determined by the size of the field for packet length in the IPv4 header. IPv6 supports the use of jumbograms. Explore the changes that need to be made to UDP to make use of jumbograms and discuss the advantages and disadvantages of these changes.

4) Draw a diagram of the individual headers i.e. UDP, IP, Ethernet header, of an Ethernet packet that includes an UDP packet addressed to an application on host 156.202.34.43 port 21 from the local application on address 134.226.34.85 port 10567. Assume values for fields of the individual headers if these values are not given above. For each value give a short explanation why you chose this particularly value.