6 Computer Networking (awm22)

(*a*) Arriving at your college room, you plug into the wired Ethernet jack for the first time. The network admin has a record of your MAC address and your machine can join the network without further action on your part.

Assume: Your laptop's Ethernet address is 0a:0b:0c:0d:0e:0f, DHCP server address is 131.111.7.3, your IPv4 address will be 131.111.7.121, the gateway's IP address is 131.111.7.1, and Ethernet address is 00:01:02:03:04:05, the network netmask is 255.255.255.0

Write the series of protocol/packet exchanges that occur on the wired Ethernet link, up until you can send a single packet to 128.232.0.20. You do not need to describe packets after this packet has left the link. Include ARP and DHCP packets, stating the IP and Ethernet addresses of the packets where possible.

[10 marks]

(*b*) Consider two neighbours, Alice and Bob. Each have wireless IPv4 routers with integrated NAT. Each neighbour connects their laptop to their own wireless router, and each uses appropriate utilities to examine the IP address of each laptop. They realise the laptops have the same IP address.

(*i*) How is that possible? [2 marks]

(*ii*) Justify one reason that wide-spread deployment of IPv6 would remove the need for the NAT devices.

[2 marks]

(*iii*) Justify one reason that an IPv6 user might want to continue using their NAT.

[2 marks]

(*iv*) Further investigations show the two wireless routers are using the same wireless channel, although with different SSIDs. Detail what this situation means, why this situation is both possible and perfectly standards-compliant behaviour, and what implications there are for this situation — including how any negative effects can be made less severe.

[4 marks]