COMPUTER SCIENCE TRIPOS Part IB – 2023 – Paper 5

3   Computer Networking (awm22)

(a) (i)   Ethernet switches use a spanning tree. Explain briefly what the aims of
          the spanning tree protocol are, and how it works to achieve these aims.
                                                                        [6 marks]

    (ii) Do the switches learn the entire network topology? Explain your answer.
                                                                        [2 marks]

    (iii) Routers using link-state protocols communicate over the shortest path.
          Does each pair of switches communicate over the shortest path?
                                                                        [2 marks]

    (iv) Routers may use a link-state protocol or a distance vector protocol.
          Compare the message-size complexity, computational complexity, and the
          robustness of these two approaches.   [6 marks]

(b) The computer of another student on your college stairwell doesn't connect to
     the Internet.

     They go on to say "...it's weird — my computer can talk with the printer in
     my room and my computer can see your computer, but I can't upload this essay
     due tonight, I can't connect to Google, and I can't even send an email..."

     You suspect their computer is using automatically-allocated *link-local* addresses
     for both IPv4 and IPv6.

     Speculate what has gone wrong to cause the computers to be using link-local
     addresses. You may want to consider: What address did the machine use? Why
     is the computer using link-local addresses? Why are some services are working
     but other services are not?

                                                                        [4 marks]