

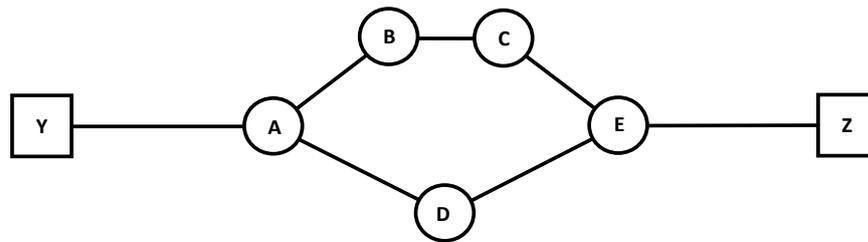
5 Computer Networking (awm22)

- (a) A user complains that their web application Times Out after successfully connecting to a remote host, yet, an investigation with ping indicates the remote host is alive.

Propose a cause of this fault and outline a test-strategy that could be used automatically to detect such a fault. [4 marks]

- (b) A user would like to infer the path between two hosts; they suggest using the utility ping. Make your argument for why traceroute is the more appropriate utility, comparing and contrasting their operation. [4 marks]

- (c) Consider the test network below; Y and Z are two unix IPv4 hosts, while nodes A through E represent fully-conformant IPv4 routers providing the only connectivity between the two hosts.



Per-packet load balancing by A and E means packets may be sent on any valid path. No firewalls or packet filtering is used anywhere in the network.

- (i) Using traceroute infers the following paths:
(Y-A-B-C-E-Z), (Y-A-D-E-Z), (Y-A-B-D-E-Z), and (Y-A-B-E-E-Z)

Explain (with diagrams as appropriate) why these results have occurred and identify the two true and two false results; [8 marks]

- (ii) A firmware upgrade for routers A and E means they now do per-flow and not per-packet load balancing. Despite the functions of the flow-based load balancing, traceroute results have not changed; two false paths are inferred along with two true paths.

Explain this outcome and a strategy to identify only true paths. [4 marks]