4 Computer Networking (AWM)

(a) What is the difference between routing and forwarding? [2 marks]

(b) Routing algorithms can be either link-state or distance-vector. Define these two terms and explain the trade-offs between them. [6 marks]

(c) You are required to design a topology discovery protocol for a network of switching nodes interconnected by links. There are \( n \) nodes, \( l \) links, the maximum degree of any node is \( k \) and there is a path between any two nodes of not more than \( d \) hops. All links are bi-directional.

Each node has a unique identifier of four bytes which it knows.

(i) Describe a protocol for a node to learn about its immediate neighbours. You should specify the format of your messages and the size of any message fields. [4 marks]

(ii) Using the characteristics of the network described above, design a protocol for distributing this information across the network. You should specify the format of your messages and the size of any message fields. [8 marks]