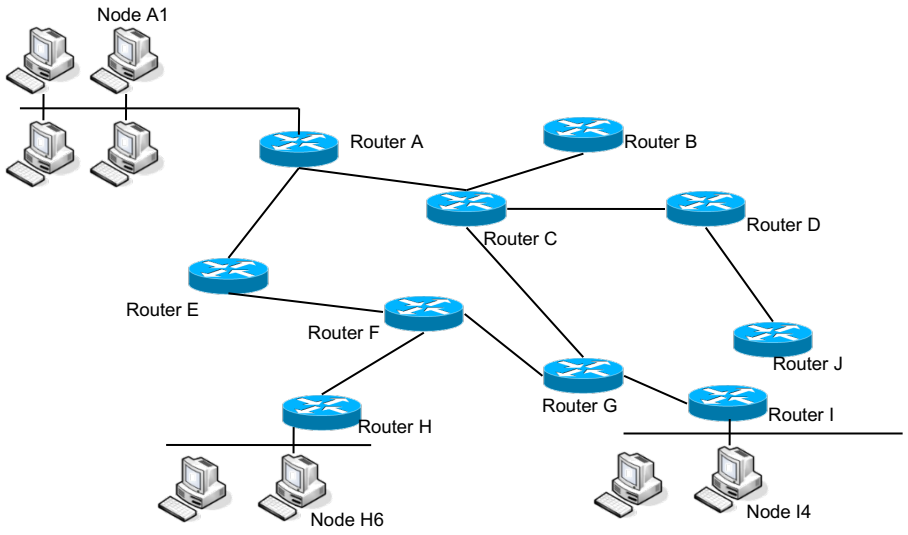
Multicast

1) Assume that the network below uses multicast routing in dense mode. Node A1, H6 and I4 subscribe to the address 224.0.0.1 and Node A1 sends a datagram to the address.

   a) Describe the initial communication between the nodes and the routers at their local network

   b) Describe the distribution of the datagrams between the source and subscribers and the potential pruning of the multicast tree, if Protocol Independent Multicast (PIM) in dense mode (DM) would be used in this network.

   c) Describe the distribution of the datagrams between the source and subscribers if Protocol Independent Multicast (PIM) in sparse mode (SM) would be used in this network.



OpenFlow

1) OpenFlow v1.0 defines a format for flow table entries, shown in figure 2.
   i) Describe how these entries are used to direct traffic in a network with the help of an example.
   ii) Discuss the limitations that this format may pose and suggest how these limitations may be addressed.

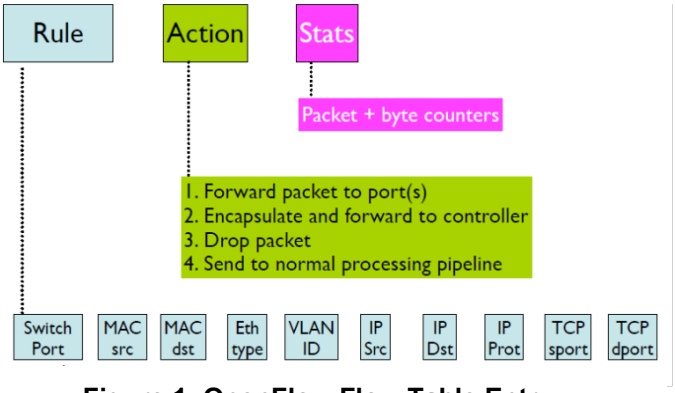


Figure 1: OpenFlow Flow Table Entry

2) Discuss the types of OpenFlow messages that are exchanged at the beginning of a connection between an OpenFlow switch and a controller and the types of message that is issued by a controller to modify a flow table in an OpenFlow switch.