COMP9332 Sample Exam Questions

Warning – These are *samples* only!

Q1. Consider slides 42 and 43 of lecture "AODV" (in actual exam there will be NO explicit reference to lecture notes). Which nodes will receive RREQ message (assume no intermediate nodes know the route to destination) if

(a) Node 3 is the source and node 6 is the destination?

(b) Node 5 is the source and node 6 is the destination?

(c) Node 7 is the source and node 6 is the destination?

(d) Node 1 is the source and node 6 is the destination?

(e) Node 3 is the source and node 7 is the destination?

Q2. Consider the ad hoc network of Figure 1. Nodes C, D, E, and G are selected as members of a connected dominating set (CDS). Answer the following questions:

(a) Assuming that the nodes in CDS use proactive *table driven* routing, give an example (explain the intermediate steps) of how a packet originated from node A will reach its destination node H. Show the routing tables for nodes C, D, E, and G.
(b) Now assume that the nodes in CDS use AODV, which is reactive (on-demand) routing. Explain the steps involved for routing a packet from node A to node H.
(c) What are the pros and cons of using *table driven* vs *on-demand* routing for the CDS?

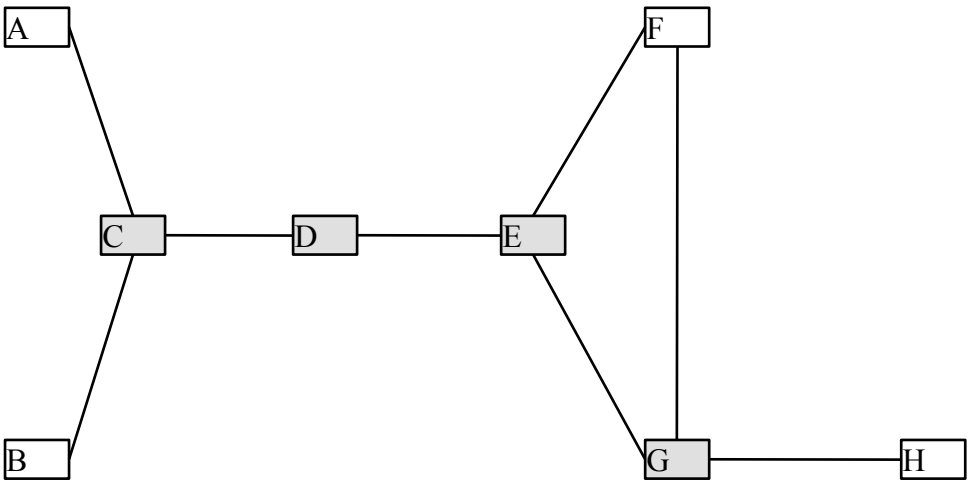

Figure 1 Ad hoc network with a CDS = {C,D,E.G}.

Q3. Consider an enterprise network. Suppose the network administrator doesn't want to run his own DNS server, instead he wants to force all DNS requests from users' machines to be directed to OpenDNS that blocks illegal/inappropriate content (e.g. adult content, gambling sites, etc.). Answer the following questions in sequence:

(a) Describe what match/action rule might be required at each access switch so that DNS requests from a specified device are redirected towards OpenDNS. The IP address of the OpenDNS server is 208.67.222.222.

We need to match the destination IP address of DNS queries. As the OpenDNS is located at 208.67.222.222, so we need a rule to match this IP address. The action should be the port number of Open Flow-enabled switch which forwards packet to the DNS server. Since we decided to use out sourced DNS, we need to redirect traffic to up-link port.

(b) What is the southbound protocol by which the SDN controller pushes the match/action rules above into all the access switches?

(c) Briefly describe the architecture of the "DNS redirect" module in the SDN controller that manages the DNS redirection rules across all access switches in the network. Design the appropriate interface exposed by this module – in other words, specify all parameters needed by an external entity to be able to use this feature.

(d) Based on the parameters you chose above, develop a RESTful API that your module can expose to external entities.

Q4. Routing protocols react to topology changes by updating relevant routing tables to make sure packets are forwarded along the shortest path all the time. In some specific applications, a change in network topology, e.g. disconnection of a link, can be predicted in advance. Propose an OSPF extension that makes use of such predictions. Explain any new message types or new fields in existing message types that you propose.