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**The University of Queensland**  
**School of Information Technology and Electrical Engineering**  
**Semester Two, 2009**

**COMS3200 – Tutorial 7**

**Questions**

**MAC:**

1. Sketch the Manchester and differential Manchester encodings for the bit stream 0001110101.
2. 10Base5, 10Base2 and 10 BaseT frames must be at least 64 bytes long to ensure the transmitter is still going in the event of a collision at the far end of the cable. Fast Ethernet has the same 64 byte minimum frame size but can get bits out 10 times faster. How is it possible to maintain the same minimum frame size?
3. Consider building a CSMA/CD network running at 1 Gbps over a 1km cable with no repeaters. The signal speed (signal propagation time) in the cable is 200,000 km/sec. What is the minimum frame size.

**Internetworking:**

1. If connection-oriented protocols are used for packet/frame forwarding they are based on the same principle for both routers and switches. Using the example network given in Figure 1, give the forwarding tables for all the switches after each of the following connections is established. Assume that the sequence of connections is cumulative, that is, the first connection is still up when the second connection is established, and so on. Also assume that the connection identifier (CI) assignment always picks the lowest unused CI on each link, starting with 0.
  - a) Host A connects to host B,
  - b) Host C connects to host G.
  - c) Host E connects to host I.
  - d) Host D connects to host B.
  - e) Host F connects to host J.
  - f) Host H connects to host A.

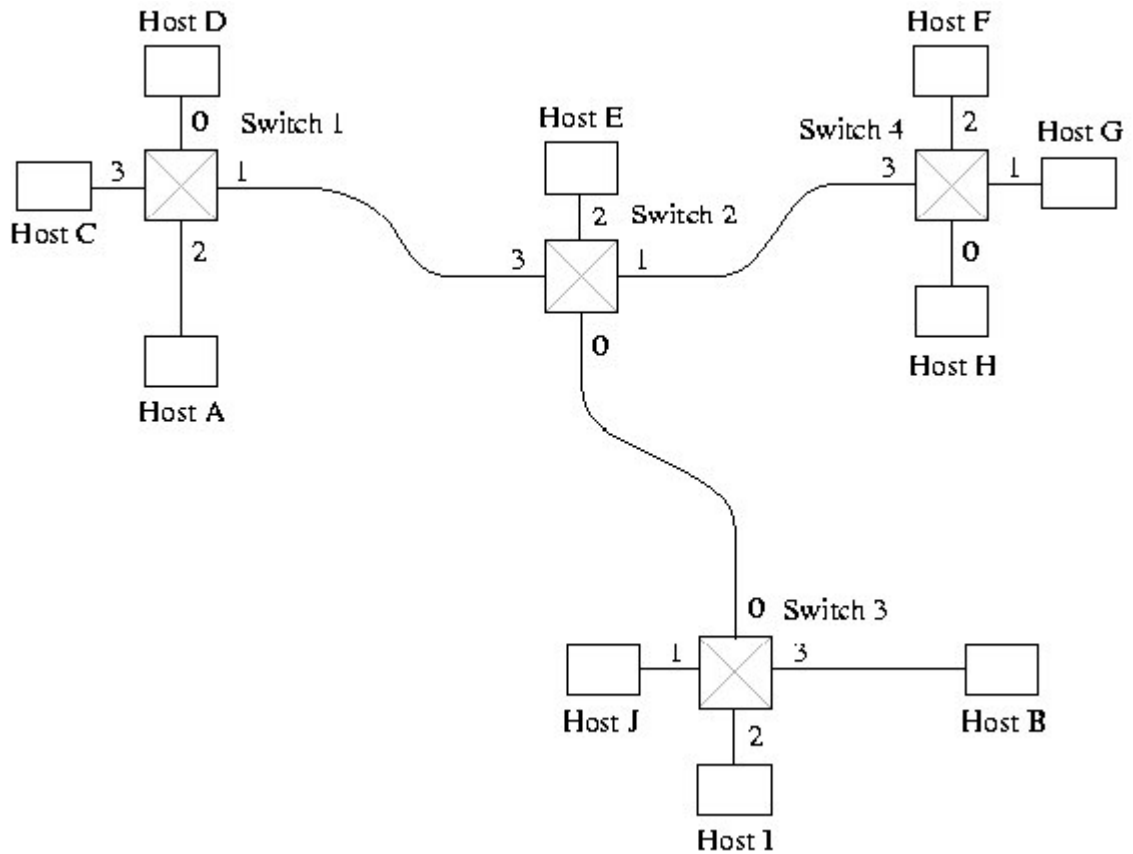


Fig.1

2. Consider the connection-oriented (virtual circuit) switches in Figure 2. Table 1 lists, for each switch, what <port, CI> (or <CI, interface>) pairs are connected to what other. Connections are bidirectional. List all endpoint-to-endpoint connections.

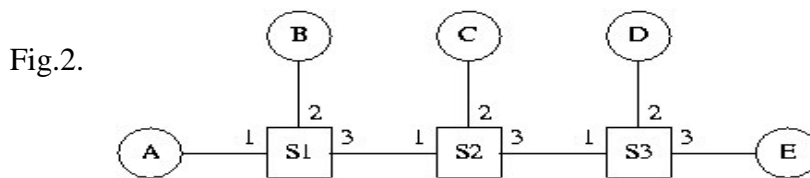


Fig.2.

Table 1

Switch S1				Switch S2				Switch S3			
Port	CI	Port	CI	Port	CI	Port	CI	Port	CI	Port	CI
1	2	3	1	1	1	3	3	1	3	2	1
1	1	2	3	1	2	3	2	1	2	3	1
2	1	3	2								

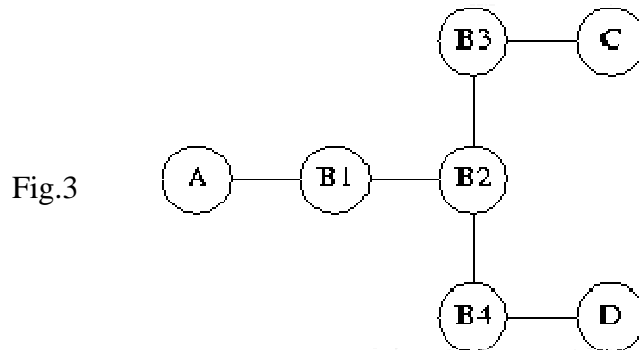
3. Consider the arrangement of learning bridges shown in Figure 3. Assuming all are initially

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empty, give the forwarding tables for each of the bridges B1-B4 after the following transmissions:

- A sends to C
- C sends to A
- D sends to C

Identify ports with the unique neighbour reached directly from that port; that is, the ports for B1 are to be labelled “A” and “B2”.



4. Suppose a 10Mbps Ethernet hub (repeater) is replaced by a 10Mbps switch, in an environment where all traffic is between a single server and N clients. Because all traffic must still traverse the server-switch link, nominally there is no improvement in bandwidth.
  - a) Would you expect any improvement in bandwidth? If so, why?
  - b) What other advantages and drawbacks might a switch offer versus a hub?