National University of Singapore
School of Computing

CS2105 **Problem Set 8** Semester 2 12/13

1. Consider three LANs interconnected by two routers, as shown below in Figure 5.33 in the textbook (Page 531). Let's denote the router on the left in the figure is R_1 and the router on the right as R_2. Use these IP and MAC addresses:

   - A: 1.1.1.2, 00-00-00-00-00-AA
   - B: 1.1.1.3, 00-00-00-00-00-BB
   - R_1, interface on Subnet 1: 1.1.1.1, 00-00-00-00-00-11
   - R_1, interface on Subnet 2: 2.2.2.3, 00-00-00-00-00-33
   - C: 2.2.2.1, 00-00-00-00-00-CC
   - D: 2.2.2.4, 00-00-00-00-00-DD
   - R_2, interface on Subnet 2: 2.2.2.2, 00-00-00-00-00-22
   - R_2, interface on Subnet 3: 3.3.3.4, 00-00-00-00-00-44
   - E: 3.3.3.1, 00-00-00-00-00-EE
   - F: 3.3.3.2, 00-00-00-00-00-FF

   (a) Consider sending an IP datagram from Host E to Host B. Suppose all of the ARP tables are up to date. Enumerate all the steps the hosts, switches, and routers take to move the packets from E to B.

   (b) Repeat the above problem, now assuming that the ARP table in the sending host is empty (and the other tables are up to date).

   (c) Suppose the router between subnets 2 and 3 is replaced by a switch. Explain how your answers to (a) and (b) will change.

2. Consider a hidden node topology with five nodes arranged linearly in a chain. Give an example where collision can still happen with CSMA/CA in this topology, even if RTS/CTS is used and propagation delay is zero.