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**The University of Queensland**  
**School of Information Technology and Electrical Engineering**  
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**COMS3200 – Tutorial 8**

**Questions**

1. Suppose that instead of using 16 bits for the network part of a class B address, 20 bits had been used. How many class B networks would there have been? How many hosts could be placed on such a class B network?
2. Convert the IP address whose hexadecimal representation is C22F1582 to dotted decimal notation. What class of network does this belong to?
3. A class B network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts per subnet?
4. Describe a way to do reassembly of IP fragments at the destination.
5. Most IP datagram reassembly algorithms have a timer to avoid having a lost fragment tie up reassembly buffers forever. Suppose a datagram is fragmented into four fragments. The first three fragments arrive, but the last one is delayed. Eventually the timer goes off and the three fragments in the receiver's memory are discarded. A little later, the last fragment stumbles in. What should be done with it?
6. What aspect of IP addresses makes it necessary to have one address per network interface, rather than just one per host?
7. Why does the Offset field in the IP header measure the offset in 8-byte units? (Hint: recall that the Offset field is 13 bits long.)
8. Suppose that a TCP message that contains 2048 bytes of data and 20 bytes of TCP header is passed to IP for delivery across two networks on the Internet (i.e., from the source host to a router to the destination host). The first network has an MTU of 1024 bytes; the second has an MTU of 512 bytes. (The MTU is the largest IP frame payload). Give the sizes and offsets of the sequence of fragments delivered to the network layer at the destination host. Assume all IP headers are 20 bytes.
9. What is the maximum bandwidth at which an IP host can send 576-byte packets without having the Ident field wrap around within 60 seconds? Suppose IP's maximum segment lifetime (MSL) is 60 seconds; that is, delayed packets can arrive up to 60 seconds late but no later. What might happen if this bandwidth were exceeded?