Homework Assignment #5.

1. A modification to the DOCSIS (Data Over Cable System Interface Specification) standard is being designed to accommodate broadband data transmission over satellite links. As part of the protocol specification, the SEQNUM and ADVERTISEDWINDOW fields will be redefined to accommodate the delays. For geosynchronous satellites, the RTT is 250msec and the transponders have a 120 Mbps capacity. Identify the number of bits required for SEQNUM and ADVERTISEDWINDOW (show your logic and calculations).

2. As part of the DOCSIS modifications for LEO (Low Earth Orbit) satellites, a concern is how quickly the SEQNUMs will wrap. For LEOs, the link throughput is 1.5 Gbps. Assume that the SEQNUM field is unchanged from current TCP specs. How long (in terms of seconds) before the sequence numbers wrap? In addition, assume that a 32-bit timestamp field increments 1350 times during the wraparound time you just calculated. How long (in terms of years) will it take for the timestamp to wrap around?