Homework 3

20. Consider an ARQ algorithm running over a 20-km point-to-point fiber link.
    - (a) Compute the propagation delay for this link, assuming that the speed of light is 2×10^8 m/s in the fiber.
    - (b) Suggest a suitable timeout value for the ARQ algorithm to use.
    - (c) Why might it still be possible for the ARQ algorithm to time out and retransmit a frame, given this timeout value?

21. Suppose you are designing a sliding window protocol for a 1-Mbps point-to-point link to the moon, which has a one-way latency of 1.25 seconds. Assuming that each frame carries 1 kB of data, what is the minimum number of bits you need for the sequence number?

22. Suppose you are designing a sliding window protocol for a 1-Mbps point-to-point link to the stationary satellite evolving around the Earth at 3×10^4 km altitude. Assuming that each frame carries 1 kB of data, what is the minimum number of bits you need for the sequence number in the following cases? Assume the speed of light is 3×10^8 meters per second.
    - (a) RWS = 1.
    - (b) RWS = SWS.