EECS 563

Homework 2

1. The value of the network decreases as the number of connected users increase. TRUE or FALSE.

2. The Internet is owned by one company. TRUE or FALSE.

3. A router has a 1 Gb/s fiber connection, an 80000 bit packet (80kb or kbit) is transmitted over this connection.

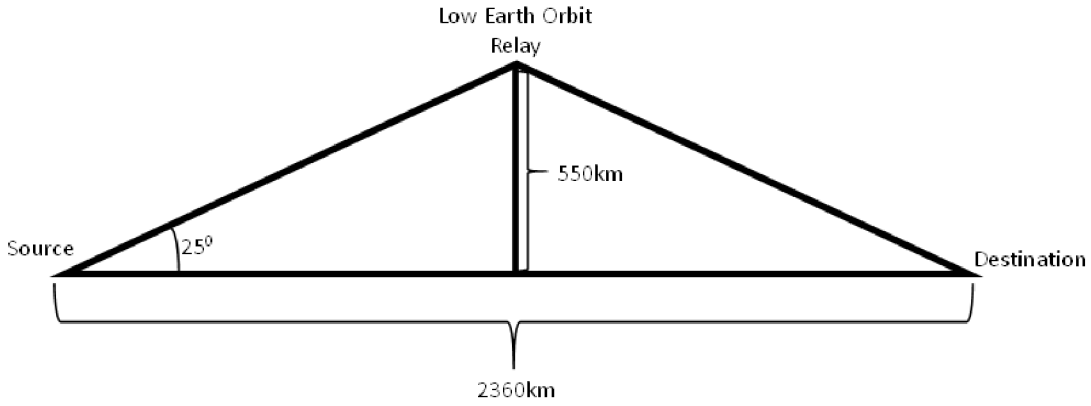
a. Convert the packet length to KB (or Kbyte) in this class 1 KB =8000 bits.

b. What is the packet clocking time in μs.

4. The speed of light (propagation velocity) in optical fiber is ~$2x10^8$ meters/sec. The distance between the source and destination is 2360km. What is the one-way propagation time in ms?

5. The speed of light in free space is ~$3 x10^8$ meters/sec. A low earth orbit (LEO) satellite radio (free space) relay is used to connect a source and to a destination that is 2360km away as shown below. What is the one-way propagation time in ms in this case? Compare the one-way propagation time of a fiber connection (see problem 4) and LEO radio relay connections. [The Starlink LEO network operates at a height of ~550km. This example does not take the curvature of the earth into account.]

In[ ]:=



6. All network protocols are implemented in hardware. TRUE or FALSE.

7. Why is there packet loss in the Internet?

8. Why is there delay in the Internet?

9. Use National Broadband Map @ https://broadbandmap.fcc.gov/#/ to answer these questions.

a. How many Internet providers service your location?

b. List the providers. (ok to provide a screen shot)

c. Report their Downlink and Uplink rates. (ok to provide a screen shot)