**Homework 1:** Network Performance

Assume propagation speed is 2 \* 108 m/sec for all problems.

1. Suppose we have a single link between sender and receiver. The transmission speed (R) is 10 Mbps and packets are 1500 bytes. Link distance is 50m.
   1. What is the transmission delay (dtrans) on the link? Show calculation.

l/r =1500/10\*10^6

* 1. What is the propagation delay (dprop) on the link? Show calculation.

d/s=50/2\*10^8

* 1. How many packets can the link transmit per second? Show calculation.

10Mbps

1. Suppose we extend the network above with three links and two routers: Sender ----> Router1----->Router2----> Receiver. The first and third links have the same properties as above. The middle link has a transmission speed of 50Mbps and a distance of 100km. Assume queuing and processing delays are negligible.
   1. What is the total end-to-end delay? Show calculation.

8.305\*10^-4

* 1. What is the maximum possible end-to-end throughput on this network? Why?

10Mbps/3