

CS 422 (Spring 2008)  
Homework #1 (due: 1/24/2008, in class)

1. In December 2006, an earthquake near Taiwan severely disrupted Internet communication between Asia and North America. What happened? What kind of cable is used to provide core data connectivity between the two continents? Why is the kind of cable suitable for such a purpose?
2. In class, we use the term *bandwidth* in two different ways: (i) the analog sense to describe the width of a frequency spectrum measured in Hz, and (ii) the digital sense to describe the rate of data communication in bits per second. Find out what gives the fundamental relationship between the two views in a real world communication channel, and report what you found.
3. Consider a link of bandwidth  $x$  bits/s and propagation delay  $d$  s. What is the total delay to transmit  $S$  bits of data through the link? What (bandwidth vs propagation delay) is likely to be the dominating factor determining the total delay of transferring a file over a 500 m Fast Ethernet segment. Please explain with guiding performance numbers. How will the situation change in the case of transmission over a satellite link?
4. K & R R19, P4, P5, P7, P16