CN CSL317 **Instructor Name:** Dr. Anshul Agarwal
Summer 2021
Assignment 1
25/01/2021
Time Limit: 27/01/2021 Wednesday 11:59 pm

This assignment contains 2 pages (including this cover page) and 5 questions.
Total number of points is 10.
INSTRUCTIONS for ANSWER SHEETS (failure to follow will lead to penalty):
1. The answers should be written ONLY in the below mentioned order.
2. Page 1 and 2 (if required) of the answer sheet should consist of questions 1, 2 and 3 only.
3. Question 4 should begin from a fresh page.
4. Question 5 should begin from a fresh page.
5. Write your roll number on the top of every page.
6. Any evidence of copying will attract a serious penalty.
READ THE ABOVE INSTRUCTIONS VERY CAREFULLY.
Assume propagation speed (wherever not mentioned) as 2×10^8m/s.
Clearly state any assumptions that you have taken.
Name your file as *<rollNumber_A1_CNS21.pdf>*
Best of luck!

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1. (1 point) Host A and B are separated from each other by a coaxial cable of length 100 km. What should be the value of bandwidth that makes transmission delay for 200-byte packet equal to propagation delay?

2. (1 point) In a 10 Gbps link, what is the "width" of three bits? What is the length of copper cable for three bits in this link?

3. (1 point) Given a b Gbps link, what is the total time required to transmit a KB data (answer should be a ratio of a and b)?

4. (3 points) Between two hosts A and B (separated by a distance of 390,000 km) in space, assume a transmission link of 200 Mbps is established.
   (a) What is the minimum time required for a bit to make a round trip on this link (ignore transmission delay)?
   (b) How many bits can be sent before a response can be received?
   (c) Suppose host A wants to download some data of 50 MB from host B. Calculate the minimum time that will elapse between the request for the data goes out and complete transfer of data is finished?

5. (4 points) For the following cases, determine the total time required to transfer a 2000 KB file (Assumptions: packet size = 500 Kb, distance between hosts = 0.1 million km and two RTTs reserved for initial communication set-up).

(a) Bandwidth is 2 Mbps and packets are sent continuously.

(b) Bandwidth is 2 Mbps and after sending each packet, we wait for one RTT before sending of next packet.

(c) Bandwidth is "infinite" and upto 4 packets can be sent per RTT.

(d) Bandwidth is "infinite" and during the first RTT, we can send 1 packet (2^0); during the second RTT we can send 2 packets (2^1) and so on.