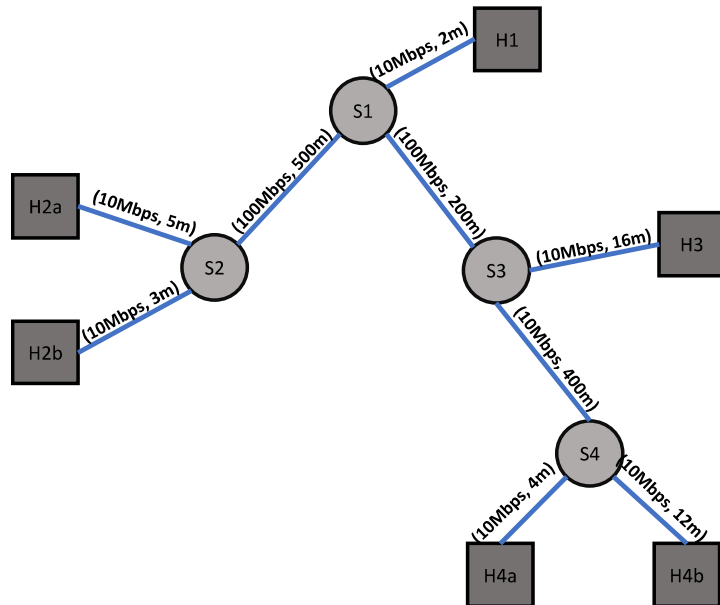# EE 5390 Selected Areas in Communication Networks
Assignment 1
Due: February 2, 2022

1. How long does it take in microseconds (i.e., 10^{-6} seconds) to send 1000 bytes in a single packet from host H2a —> host H1? The network is otherwise idle.
2. H2a and H2b transmit simultaneously to H1 for a long period of time. Suppose we denote the time that their data arrives in the output queue at S2 for the transmission channel headed to S1 as t = 0. What would be the depth of that queue (in bits) after 10 seconds (do notes scientific notation)?
3. H2a and H2b transmit simultaneously to H1 for a long period of time. Suppose we denote the time that their data arrives in the output queue at S1 for the transmission channel headed to H1 as t = 0. What would be the depth of that queue (in bits) after 10 seconds (do not use scientific notation)?
4. H4a and H4b transmit simultaneously to H2a for a long period of time. Suppose we denote the time that their data arrives in the output queue at S4 for the transmission channel headed to S3 as t = 0. What would be the depth of that queue (in bits) after 1 second (do not use scientific notation)?
5. How long does it take in microseconds (i.e., 10^{-6} seconds) to send 1000 bytes in a single packet from host H2b —> host H3? The network is otherwise idle.
6. What is the average waiting time in the queue (i.e., queueing delay) if the arrival rate to that queue follows an exponential distribution with an average rate of 1.7 Mbps and that queue is served by a transmission channel with a 2 Mbps rate?
7. Write a python script that plots the queueing delay (y-axis) vs the average arrival rate (x-axis) for the system in question 6. The range should be from 0.1 Mbps to 1.9 Mbps.