CS 348: Problem-Solving Tutorial 3

Do problems from the textbook (Computer Networks, by Petersen-Davie, 5th Edition):
Chapter 3: Exercises from 61-64.
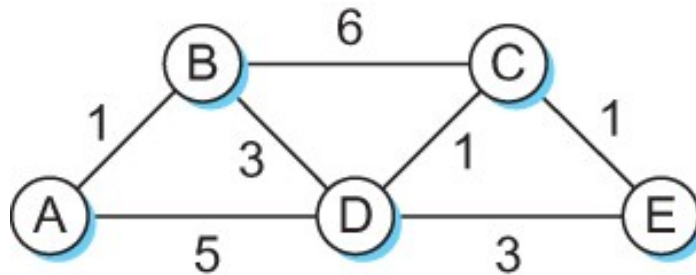Chapter 5: Exercises from 1-46.
Chapter 6: Exercises from 16-32.

For in-class tutorial:

Chapter 3: Exercise 63.
Give the steps as in Table 3.14 in the forward search algorithm as it builds the routing database for node in the network shown in Figure 3.60 (below).

Chapter 5: Exercise 10.
You are hired to design a reliable byte-stream protocol that uses a sliding window (like TCP). This protocol will run over a 1-Gbps network. The RTT of the network is 140 ms, and the maximum segment lifetime is 60 seconds. How many bits would you include in the AdvertisedWindow and SequenceNum fields of your protocol header?

Chapter 6: Exercise 16.
Assume that TCP implements an extension that allows window sizes much larger than 64 KB. Suppose that you are using this extended TCP ove a 1-Gbps link with a latency of 50 ms to transfer a 10-MB file, and the TCP receive window is 1 MB. If TCP sends 1-KB packets (assuming no congestion and no lost packets):
1. How many RTTs does it take until slow start opens the send window to 1 MB?
2. How many RTTs does it take to send the file?
3. If the time to send the file is given by the number of required RTTs multiplied by the link latency, what is the effective throughput for the transfer? What percentage of the link bandwidth is utilized?