This summary is a section by section discussion of the textbook intended to help you to focus your studying for the mid-term exam. I consider this to be a course about network algorithms (protocols) and how they interact. The test will focus on comprehension of the material as much as possible. I am not interested in your memorization abilities and I will avoid exam questions that involve memory of details as much as possible. I will not ask you about the details of header formats, although I will expect that you can explain the purposes of the most important fields given the format of a header. Similarly, I will not ask for details of switching or routing table formats, but I will expect you to explain how they are used given an example of a table. I will not ask you to perform complex calculations concerning the efficiency of protocols, but I might ask you for simple calculations, and I will expect you to understand how the protocols work. I will not ask about details in tables of examples like Figures 2.4 and 3.6. I will not test you on the Case History, Focus on Security, Principles in Practice, or Interview sections unless explicitly mentioned below.

Chapter 1: Computer Networks and the Internet

This chapter is an overview of material, most of which is treated in detail in later chapters. The sections and sub-sections that contain important concepts that you might see on the exam are 1.3.1, 1.3.2, 1.4 (except Traceroute), and 1.5 (except OSI Model). I also did a more detailed analysis of switching modes and provided a handout of the material (on the Schedule page of the course website). I will not test material in the other sections of this chapter.

Chapter 2: Application Layer

2.1: This section is an overview of the chapter. You should know the concepts in this section. Some of the concepts are treated in more detail in later sections.

2.2: HTTP is an important protocol and you should know its operation in detail.

2.3: We did not discuss electronic mail and I will not test this material.

2.4: DNS is a major protocol and you should know its operation in detail.

2.5: You should understand the concept of peer-to-peer networks and be able to compare and contrast it with the client-server model (i.e., similarities, differences, advantages, disadvantages, how to choose between the two models). I will not test you on BitTorrent.

2.6: We did not discuss video streaming and content distribution networks and I will not test this material.

2.7: You should know the details of both UDP and TCP socket programming but I will not ask you about the pseudo-code.
Chapter 3: Transport Layer

3.1: This section is an overview and all important concepts are treated in more detail in later sections.

3.2: You should understand multiplexing and demultiplexing in detail.

3.3: You should know UDP in detail, but I will not ask you to compute checksums.

3.4: This section introduces a number of important concepts that are used later in the TCP protocol. You should understand these concepts and how they work in detail.

3.5: This section on TCP is one of the most important in the course.

3.6: You should understand the general concepts concerning congestion in this sections.

3.7: This section on TCP congestion control is also quite important. You should understand the general forms of the formulae, but the details, especially the constants, are not important.

Chapter 4: Network Layer: Data Plane

4.1: This section is mainly an overview. You should be familiar with the general concepts. Some material about ATM was briefly discussed in class, but it is not in the textbook and will not be tested.

4.2: This section contains a number of important concepts, especially the causes and locations of blocking and queueing in routers, and approaches to packet scheduling.

4.3: This section on IP is very important with many important concepts and protocols including IP, DHCP, NAT. Subsection 4.4.3 is particularly important including the “Principles in Practice” section on pg. 339. I will not test the material about IPv6 except you should understand the uses and operation of tunneling. The extra material about NAT traversal problems that I discussed in class is not in the textbook and will not be tested.

4.4: SDN is really part of the control plane and other aspects of SDN are covered in Section 5.5. You should understand the general concepts in this section (4.4) but I will not test the details.