CS 444
Computer Networks
Spring, 2016

Exam #1

1. In what sense is the HTTP header Keep-Alive header a violation of network layering? (4 points)

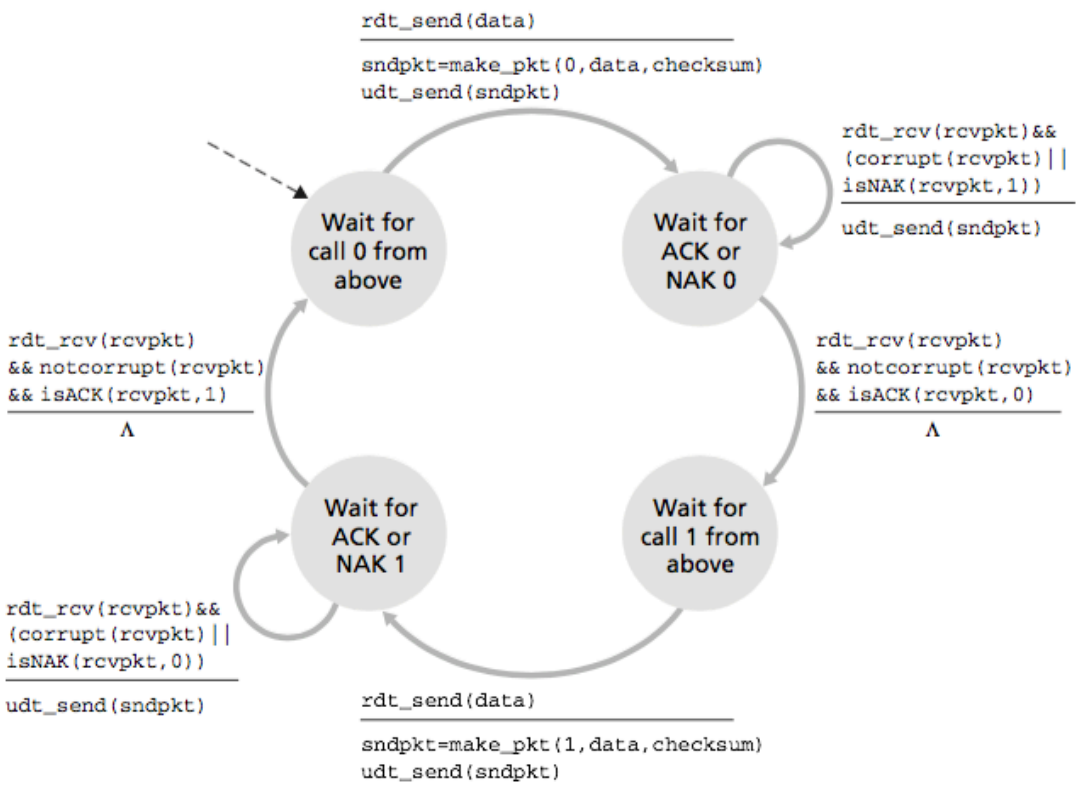
2. Why is it impossible to run two different Web servers (e.g. Apache and Microsoft IIS) on the same machine on port 80? Is it possible to run two different Web servers that are addressed by the same domain name, (e.g. myservice.com) on port 80? Why or why not? (4 points)

3. Explain how a packet filtering firewall needs to operate to handle FTP Port commands where the client provides the server with a high numbered random port for the data connection. Be sure to explain why special handling is needed and why your solution solves the problem. If it helps, you can draw a picture. (8 points)

4. Give a detailed example scenario where a web cache can provide better throughput between a LAN with client computers and a web server farm. Provide details on the throughputs between the clients and the upstream router and the access link capacity. Assume that the Web cache provides a 40% hit rate (40% fewer bits have to be retrieved). Specify the before and after throughputs on the access link. Give specifics about the level of improvement. (8 points)

5. Describe two different ways caching is used in Web accesses. Describe how caching is used in DNS. For all 3 types of caching (2 in the Web and 1 for DNS) describe what the timeout considerations are for the cached content. (9 points)

6. What is the difference between flow control and congestion control? Be specific. (4 points)



7. Take the FSM above. This is for the sender in a NAK-free rdt protocol for a channel with bit errors, but without packet loss. How many states are needed in the receiver? Identify the states in the receiver, and for each one, describe the state and the transitions to the other states. (8 points)

8. Say that a transport layer protocol is using Selective Repeat to implement a reliable channel. Explain what problem can arise if the number of sequence numbers is slightly less than the window size. Show an example packet flow between a sender and a receiver that demonstrates the problem. Does this problem also exist if the number if sequence numbers is equal to the window size? (8 points)