Q1. **Persistent and Non-persistent HTTP.** Consider a short, 10-meter link, over which a sender can transmit at a rate of 150 bits/sec in both directions. Suppose that packets containing data are 100,000 bits long, and packets containing only control (e.g., ACK or hand-shaking) are 200 bits long. Assume that $N$ parallel connections each get $1/N$ of the link bandwidth. Now consider the HTTP protocol and suppose that each downloaded object is 100 Kbits long, and that the initial downloaded object contains 10 referenced objects from the same sender. Would parallel downloads via parallel instances of non-persistent HTTP make sense in this case? Now consider persistent HTTP. Do you expect significant gains over the non-persistent case? Justify and explain your answer.

Q2. **SMTP & HTTP.** How does SMTP mark the end of a message body? How about HTTP? Can HTTP use the same method as SMTP to mark the end of a message body? Explain.

Q3. **Local Cache Information.** Suppose you can access the caches in the local DNS servers of your department. Can you propose a way to roughly determine the Web servers (outside your department) that are most popular among the users in your department? Explain.

Q4. **Overlay Network.** Consider an overlay network with $N$ active peers, with each pair of peers having an active TCP connection. Additionally, suppose that the TCP connections pass through a total of $M$ routers. How many nodes and edges are there in the corresponding overlay network?

Q5. **RFCs.** RFC 2616 discusses HTTP. Find out what are RFCs 7230-7235 and 2817, 5785, 6266, and 6585. Find out the relations, similarities, changes, updates, and additions in these protocols and describe them. You can use a table or a chart to summarize your answer. Which ones are obsolete? Why?

Please submit your answers in pdf format, before the midnight on June 4, 2019 on the canvas system HW2 activity.