CPE490 Midterm

Theory based questions

(answer the following in a paragraph or two, in less than 20 lines of text)
[10 points per questions]

1. Briefly explain the five layers of the Internet, including: Application, Transport, Network, Data-link and Physical. How does the simple act of “checking email” make use of these five layers?
2. Which layers are “hop-by-hop” and which are “end-to-end”? What’s the difference between these two modes?
3. What are the major differences between TCP and UDP? Give an example application each that is best served by TCP and UDP.
4. How does TCP estimate round-trip-times (RTT) despite it being impossible to measure one way latency on the Internet? Expand on the idea of EWMA and it’s application to RTT estimation.
5. How does TCP ensure reliable data delivery? Expand on the following TCP concepts: (i) Stop-and-wait, (ii) Go-back-N, and (iii) TCP-SACK.
6. Describe the AIMD congestion control algorithm employed by TCP. What is the specific need to increase “additively” and decrease “multiplicatively”?
7. Describe the “three-way-handshake” used by TCP to establish a connection.
8. What is the difference between medium access that is time-based (TDMA) and carrier-sense based (CSMA/CD)?

Plot this on a map

I. A traceroute to a remote destination in Osaka, Japan yielded the following router codes. Describe the cities that were traverseved to reach Osaka from Hoboken, NJ. Do you think this is a direct path that a flight would take from here to there?

A. mco.454a.lightpath.net
B. **atl.as32112.level3.net**
C. stl.as39887.level3.net
D. sat.as889.telegrid.net
E. pdx.as399.level3.net
F. Itm.7689.bigglobe.jp