Question 1:

What is the average queuing delay experienced by the 1000-byte packets?

The shortest time doesn't have a queue, so you subtract the shortest time from all the other packet times and divide by the number of packets to get the queueing delay for 1000 byte packets.

[(11-2.8)+(10-2.8)+(3-2.8)+(5.5-2.8)]/5= **3.66 ms queueing average for 1000 bytes**

What are reasonable estimates of transmission and propagation delays that will be experienced by a packet of size 600 bytes sent through the link K?

To find the transmission delay and propagation delay we look at the smallest time for both 500 bytes and 1000 bytes (doesn't have a processing delay or a queueing delay).

The shortest time for both sizes is 2.8 and 2.4. The difference between these two times is .4. To scale this time to any packet size, we divide by the difference in size, 500.

.4 ms/500 bytes = transmission delay for 1 bytes.

We want to know the transmission delay for 600 bytes so multiply it by 600.

(.4 ms/500 bytes) * 600 = **.48 ms transmission delay for 600 bytes**

For the propagation delay (not dependent on size) we can plug any delay time into the delay formula.

Delay = delay-propagation + delay-transmission + delay-processing + delay-queueing

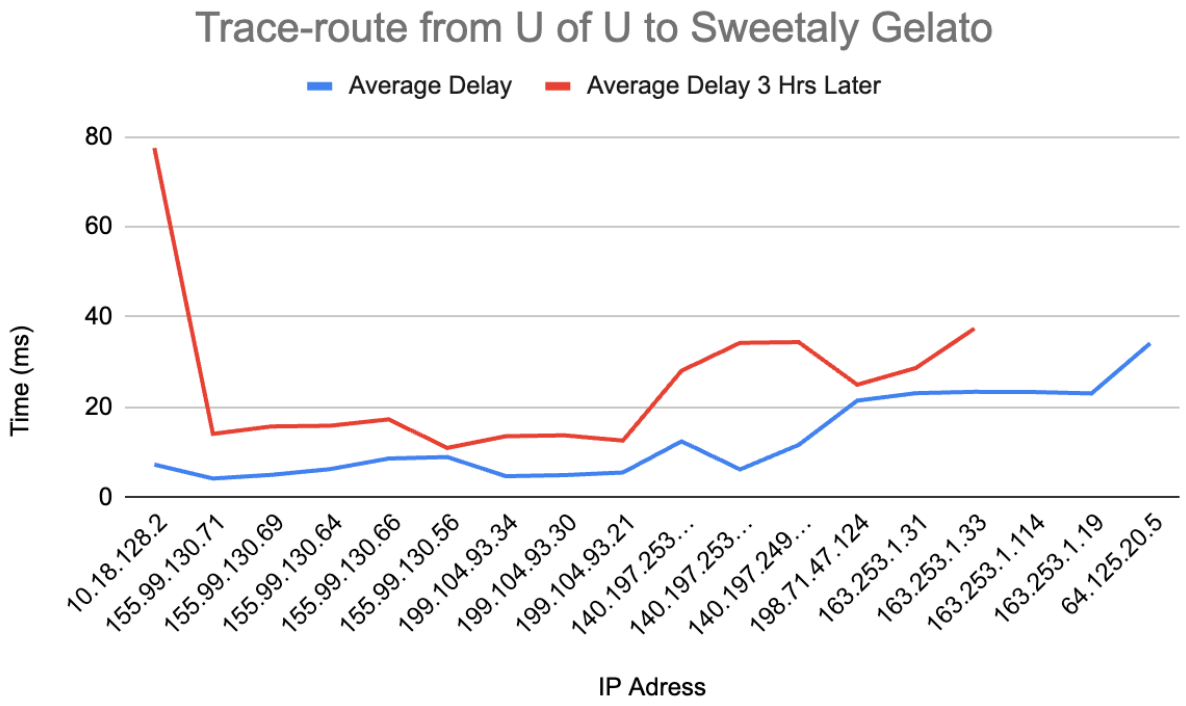
2.4 ms = delay-propagation + .48ms + 0 + 0

delay-propagation = 2.0 ms

Question 2:

Part A:

Trace-route from U of U to Sweetaly Gelato



To deal with incomplete data the program takes the average of the times available. If there are no times then those do not get counted. In calculating the average, it sums all the times available to that IP address (some only have 1 or 2) and divides by the count, it does not divide by three every time since three values is not guaranteed.

Part B:
One reason is network congestion or traffic load on the network path and can lead to transmission delays.If there's a lot of data being transmitted through the network at a specific point in time, it can result in increased latency for packets traversing that segment.
Another reason could be packet loss and retransmissions, which can occur due to network errors, faulty equipment, or unreliable connections. In such cases, the delay times may be affected by the need to resend packets, leading to higher latency for those particular packets.

Question 3:

The average round trip queuing delay to https://www.kongehuset.dk/en/ is **8.09347983870968 ms**.