**Question 1 (35 points):**

Consider the sequencer protocol for total ordering shown in class.

a. Does it also preserve causal ordering when there are no failures? Explain.

b. List two performance benefits of using the sequencer protocol over the vector timestamp causal ordering protocol shown in class.

**Question 2 (35 points):**

a. Why do most live streaming protocols avoid building a random dissemination overlay like Araneola?

b. List 2 benefits of disseminating information by flooding over a random semi-constant overlay like Araneola vs. relying on push based gossip.

**Question 3 (30 points):**

Which architecture, BigTable or Dynamo, is likely to return the results of a read that can be satisfied entirely from main memory more quickly on average? Which is likely to return more quickly in the worse case? Explain your answer and list explicitly any assumptions you make in your answer.

The submission date is Thursday 22/01/2015 before midnight - no extensions!

**Good luck!**