CS 7270: Networked Services and Applications
Assignment: Due March 27 – in class

NOTE: You are to work on this assignment individually without help from colleagues or classmates. You may discuss with the instructor or TA. You may also consult references from those covered in class or otherwise but make sure you acknowledge any reference you use for your answer.

Question 1

1. List and explain the various factors that influence whether stream replication or layering is a better option for video streaming.
2. Consider a network in which the conditions are variable. Design a video streaming system that can adapt the streaming method between replication and layering according to the current state of the network and the receivers. Your design should clearly indicate your system assumptions (network and vide encoding) and the protocols that are followed by the transmitter and receivers. Your design should also allow for dynamic joining and leaving of receivers.

Question 2

1. A multicast video system can batch requests *on-demand* (i.e., collect requests as theynd to them in batches) or can be *continuous* (i.e., continuously multicast videos). Compare and contrast these two schemes in terms of their performance and the conditions they are most suited for. Focus exclusively on VoD systems.
2. Consider the design of a hybrid VoD system which continuously multicasts some videos but multicasts others based on request batching. Design the basic operation of the server and the clients in such systems. Explain the various parameters of such a system and how you expect these parameters need to be set for various situations.

Question 3

1. Formulate a good definition of what a peer-to-peer system is. Explain how Gnutella, Napster, and Coopnet fit or not fit with your definition.
2. It has been argued that the CoopNet system for handling web server flash crowds is flawed becuase it lacks the proper incentives for clients to stay on and help serve content to other clients.
   (a) Is this argument correct? Elaborate on your answer.
   (b) If the argument has some merit provide the outline a solution to this problem.