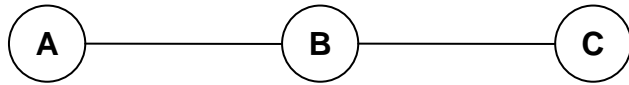


# CS138 Homework Assignment 1

Due: 11:59pm, February 24, 2009

1. Suppose we have two disjoint Chord rings, labeled A and B. Assuming that one node in ring B knows the address of a node in ring A, give an algorithm for combining the two rings into a single well formed Chord ring. You may assume that no nodes are added, fail, or are removed while the combining is taking place. Give a good argument for why your algorithm works. (Hint: use the stabilization procedure given in slide II-30.)
2. Suppose a node is to be deleted in Tapestry (it didn't just temporarily fail — it was sold). Explain what must be done to remove it completely, without losing any important information or data.
3. [From Peterson and Davie, *Computer Networks*.] Consider the following network in which a distance-vector routing protocol is used and both links have cost one:



Suppose the link between A and B fails.

- a. Give a sequence of routing-table updates that leads to a routing loop between B and C. Assume that split horizon is not used.
- b. Estimate the probability of the scenario given in part a, assuming B and C send out routing updates at random times, each at the same average rate.
- c. Estimate the probability of a loop forming if B broadcasts an updated report within one second of discovering the B-A link failure, and C broadcasts every 60 seconds.