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1. Prove that if S_1, S_2, \dots, S_n are connected balanced signed graphs, then the disconnected signed graph S , having S_1, S_2, \dots, S_n as components is balanced.
 2. Prove that a signed graph S is balanced if and only if for every two vertices of S , all paths joining them have the same sign (a path is positive if it has an even number of negative edges).
 3. Essay Question. Suppose you work for a Social Networking company such as MySpace or Facebook, and the management has tasked you with trying to monetize the information about how fads spread on the network. Their idea is to charge manufacturers a fee to convince the most “influential” nodes on the network to adopt their product and therefore cause most of the other nodes to also adopt this product. How exactly would you go about doing this? In answering this question, you should clearly explain what measurements, computations, simulations, promotions, etc. your company should run.