Homework V

1. You are given a directed graph with edge capacities, and two vertices s and t. Let A and B be two different s–t min-cuts. Is $A \cup B$ also a min-cut between s and t ? How about $A \cap B$? Give reasons for your answer. How will you decide if the graph has a unique minimum s–t cut ?

2. A company wants to set up facility for manufacturing a set of products. The possible choice for products is $P_1, \ldots, P_n$. Further there are a set of machines $M_1, \ldots, M_k$. If it manufactures product P_i, then it will need to invest in buying a subset S_i of the machines. Further, machine M_i has cost c_i and the company will earn r_i amount of revenue if it produces P_i. Which products should it manufacture so that the net revenue, i.e., the total revenue from the products minus the cost of the machines, is maximized ?