Department of Mathematical Sciences
Carnegie Mellon University

21-484 Graph Theory

Test 4

Name:____________________________

Problem	Points	Score
1	33	
2	33	
3	34	
Total	100	

Q1 (34 points)
Show that if a tournament is not strongly connected then it can be made so by reversing the orientation of a single edge.

Q2 (33 points)
m families go out to dinner together. Family i has a_i members. The restaurant has n tables and table j can seat b_j people, The families wish to arrange the seating so that no two members of the same family sit at the same table. Construct a network for which a maximum flow provides a seating arrangement, if one exists.

Q3 (33 points)
Show that the edges of graph $G = (V, E)$ can be oriented so that in the digraph D produced, $|d^+(v) - d^-(v)| \leq 1$ for all $v \in V$.
(Hint: by induction on $|E|$. Consider two cases: (i) G has a cycle and (ii) G is a forest.)