CSE 5319/6319 Homework 4

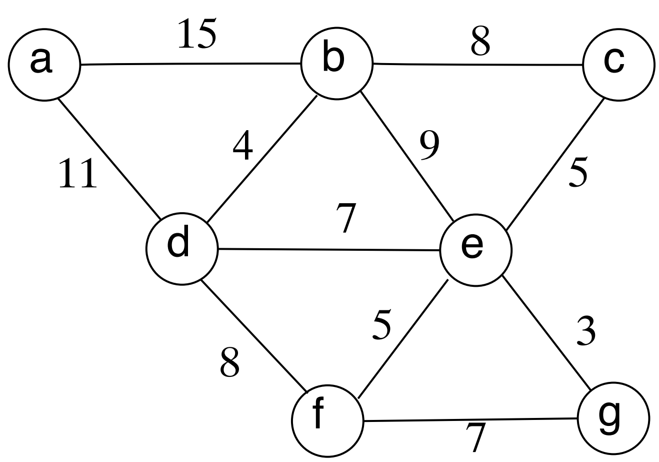
Due April 28, 5:00 p.m. on Canvas

1. KP p. 266, problem 14.18. (10 points)

2. Similar to p. 4-5 of `notes03.2.mech.pdf`, analyze the Allocation Algorithm for Downward Sloping Valuations for following $v_i(k)$ values for buyer i. Note that $v_i(k) = v_{i1} + v_{i2} + \ldots + v_{ik}$. The result is a table of clearing prices and allocations like the one at the top of p. 5. (10 points)

		k								
	$v_i(k)$	0	1	2	3	4	5	6	7	8
	1	0	50	100	143	182	219	244	259	269
			50	50	43	39	37	25	15	10
i	2	0	70	135	188	223	257	287	313	323
			70	65	53	35	34	30	26	10
	3	0	60	115	160	200	236	263	287	304
			60	55	45	40	36	27	24	17

3. Compute the VCG payments for the minimum spanning tree for this graph. (10 points)



4. Determine the optimal fixed price for the following bids for copies of a digital good: (10 points)

`10 10 10 9 9 8 8 8 7 7 6 6 5 5 4 4 4 4 4 4`

5. For `https://ranger.uta.edu/~weems/NOTES6319/AUCTION/auction2.dat`: (20 points)

a. Find a maximum-weight bipartite matching via ascending auction.

b. Compute the lowest envy-free price vector (KP Theorem 17.2.6).

c. Compute the highest envy-free price vector (Corollary 17.2.9).

d. Solve fair division (KP section 17.3) using the above envy-free price vectors for a 5-room apartment with monthly rent of $1000.

6. Determine a minimum-weight bipartite matching for `https://ranger.uta.edu/~weems/NOTES6319/AUCTION/auction2.dat`. (10 points)

7. How many maximum-weight bipartite matchings are there for `https://ranger.uta.edu/~weems/NOTES6319/AUCTION/auction4.dat`? (10 points)

8. How many maximum-weight bipartite matchings are there for `https://ranger.uta.edu/~weems/NOTES6319/AUCTION/auction5.dat`? (10 points)

9. Use Gambit to compute Nash equilibria for: (10 points)

$$A = \begin{bmatrix} 3 & 3 \\ 2 & 5 \\ 0 & 6 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 2 \\ 2 & 6 \\ 3 & 1 \end{bmatrix}$$