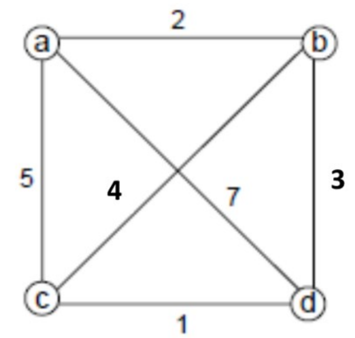
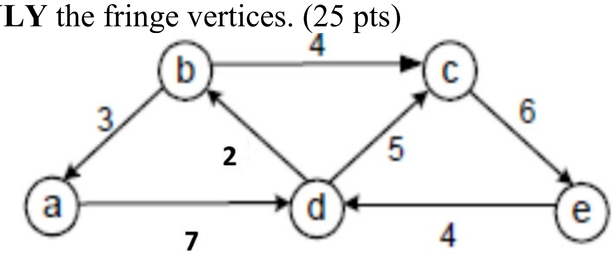
Homework #6

Due on 10:05 am EST, Thursday, April 21

1. Apply Prim's algorithm to find the minimum spanning tree (MST) for the following graph. For each step, you need to give the priority queue including **ALL** the vertices (**BOTH** fringe vertices and unseen vertices). (25 pts)



2. Use the Dijkstra's algorithm to solve the single-source shortest-paths problem with vertex ***a*** as the source for the following graph. For each step, you need to give the priority queue including **ONLY** the fringe vertices. (25 pts)



3. Build the Huffman tree for the following alphabet. Show the resulting Huffman codes for each character. What is the average number of bits per character? (25 pts)

Character	A	B	C	D	E	F	G	H
Frequency	0.05	0.15	0.05	0.25	0.05	0.1	0.2	0.15

4. Apply the **branch-and-bound algorithm** to solve the traveling salesman problem for a graph represented by its weight matrix shown on the right. You **MUST** give the state-space tree with the lower bound (or the total length of the path if you have visited all vertices) shown in each node. (25 pts)

	a	b	c	d	e
a	0	4	5	2	8
b	4	0	6	1	3
c	5	6	0	7	2
d	2	1	7	0	4
e	8	3	2	4	0