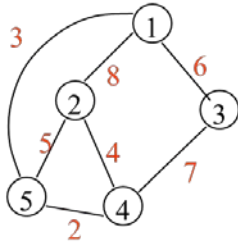


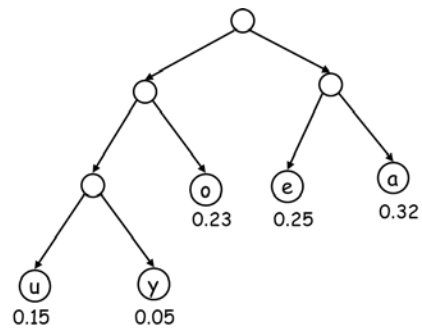
COT5405: Homework 2 (Fall 2017)

- Construct the MST for the following graph using Prim's MST Algorithm. Show your work.

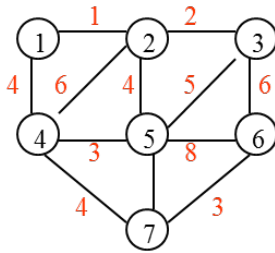


Step	Next edge selected	Partial tree
Initially		
1	(1,5), weight=3	
2	(5,4), weight=2	
3	(4,2), weight=4	
4	(1,3), weight=6	

2. Create the optimal prefix code (Huffman Encoding) for this set of symbols {a, e, o, u, y} where $f_a=0.32$, $f_e=0.25$, $f_o=0.23$, $f_u=0.15$, $f_y=0.05$.



3. Find a 3-clustering of maximum spacing for the following nodes (Hint: modify Kruskal' algorithm, see Slide 19 of mst.ppt)

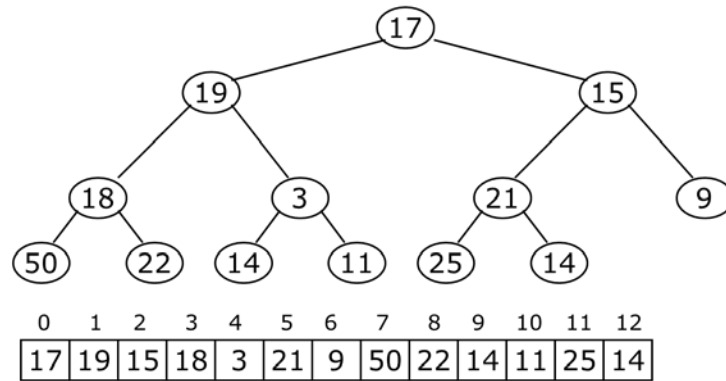


<u>Step</u>	<u>Edge considered</u>	<u>Resulting connections</u>
(initialize)		① ② ③ ④ ⑤ ⑥ ⑦
1	(1,2), cost 1	①—② ③ ④ ⑤ ⑥ ⑦
2	(2,3), cost 2	①—②—③ ④ ⑤ ⑥ ⑦
3	(4,5), cost 3	①—②—③ ④—⑤ ⑥ ⑦
4	(6,7), cost 3	①—②—③ ④—⑤ ⑥—⑦

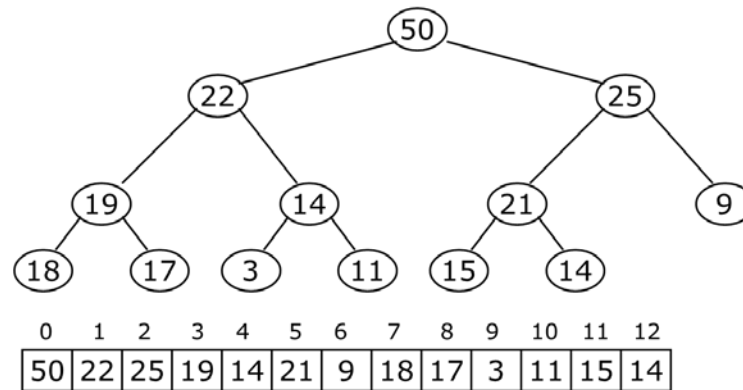
Three clusters are: {1, 2, 3}, {4, 5}, and {6, 7}

4. Heapsort in ascending order the following numbers: 17, 19, 15, 18, 3, 21, 9, 50, 22, 14, 11, 25, and 14 (initial array must store these numbers in this order. Show your work (i.e., after heapify, after the largest number in the correct location,..., and finally, the sorted array.)

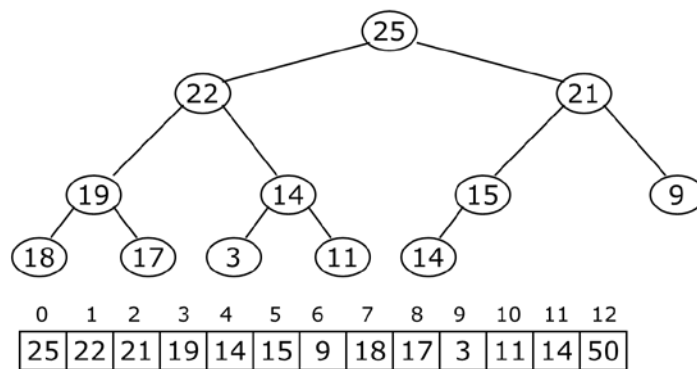
Initial array and tree:



Heapified array:



After first iteration:



...

After last iteration (fully sorted):

0	1	2	3	4	5	6	7	8	9	10	11	12
3	9	11	14	14	15	17	18	19	21	22	22	50