

CSE 101 Spring 2020

Quiz 5

Solutions

- (20 Points) Perform $\text{BuildHeap}(A)$ on the following unordered array, making it into a max-heap. Observe that identical keys are accompanied by letters representing different satellite data. Thus the elements 2a and 2b have the same key, but are distinguishable.

A	2a	4	7	1a	2b	3	1b	5a	2c	6	8	5b
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Show the state of array A after the call to $\text{BuildHeap}(A)$.

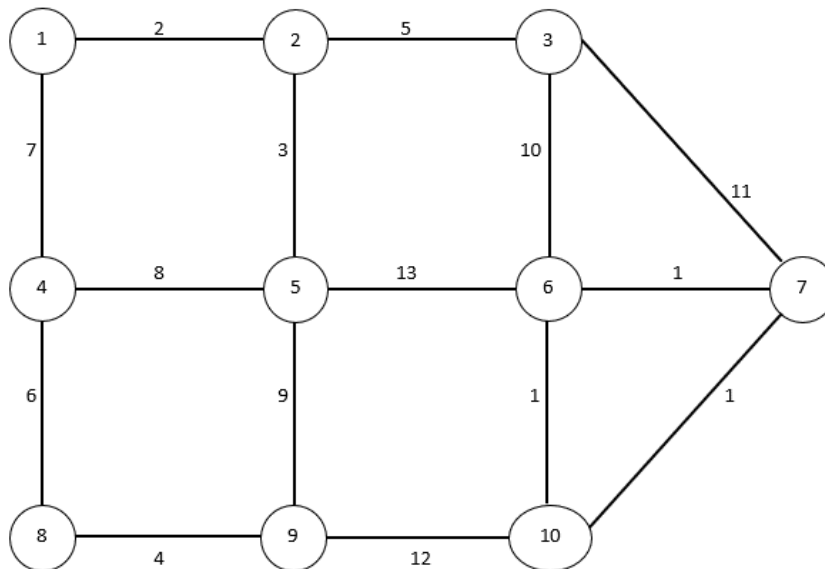
Solution:

A	8	6	7	5a	4	5b	1b	1a	2c	2a	2b	3
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- (30 Points) Perform $\text{Prim}(G, r)$ on the weighted graph below with root vertex $r = 5$. Refer to the pseudo-code in the book (p. 634), or on the class webpage at

<https://classes.soe.ucsc.edu/cse101/Spring20/Examples/Pseudo-Code/GraphAlgorithms>.

If at some point, two vertices have equal minimum keys, remove the one with smaller label first from the Min Priority Queue.



- (10 Points) Determine the order in which vertices are removed from the min Priority Queue.

Solution: 5 2 1 3 4 8 9 6 7 10

- (10 Points) For each vertex x , determine the value $\text{key}[x]$.
- (10 Points) For each vertex x , determine the value $\text{p}[x]$.

Solution to (b) and (c):

x	1	2	3	4	5	6	7	8	9	10
$\text{key}[x]$	2	3	5	7	0	10	1	6	4	1
$\text{p}[x]$	2	5	2	1	nil	3	6	4	8	6