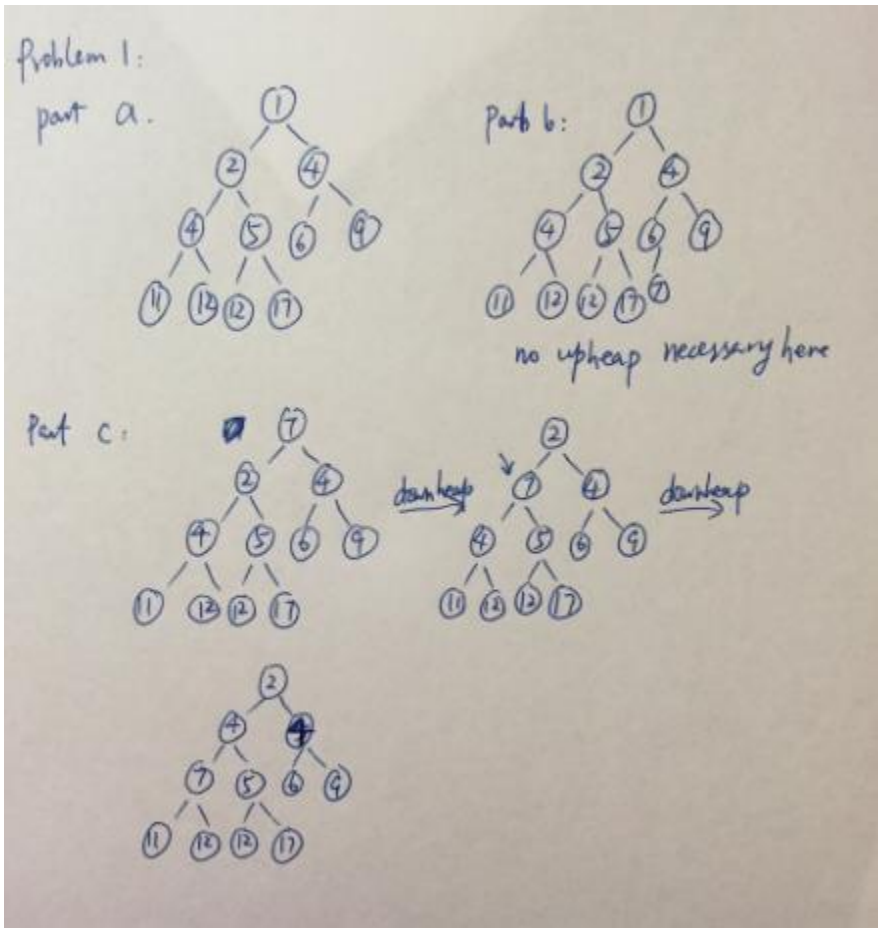
Lab 9 Solutions

Problem 1.



Problem 2. Carry out the steps of the recursive algorithm BottomUpHeap for the input sequence 11, 5, 2, 3, 17, 24, 1

Solution.

BUH([11, 5, 2, 3, 17, 24, 1])
k = 11 A = [5, 2, 3] B = [17, 24, 1]

BUH([5, 2, 3])
k = 5 A = [2] B = [3]

BUH([2]) => [2]

BUH([3]) => [3]

⇨ [5, 2, 3]
downheap

[5, 2 , 3]

BUH([17, 24, 1])
k = 17 A = [24] B = [1]

BUH([24]) => [24]

BUH([1]) => [1]

⇨ [17, 24, 1]
downheap
[24, 17 , 1]

=> [11, 5, 24, 2, 3, 17, 1]
downheap

[24, 5, 11, 2, 3, 17, 1] => [24, 5, 17, 2, 3, 11, 1]

3. Draw an example of a MaxHeap whose keys are all the odd numbers lie in [1, 21] (with no repeats), such that the insertion of an item with key 14 would cause up-heap to proceed all the way up to a child of the root (replacing that child's key with 14).

One solution: (There are other possibilities.)