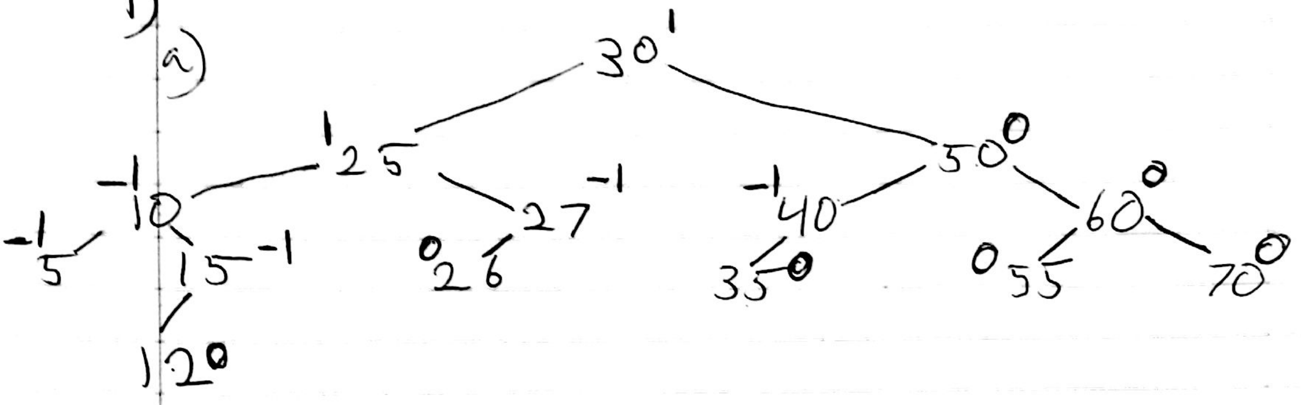
Eli Sobylak
DS Midterm

9-Feb-16

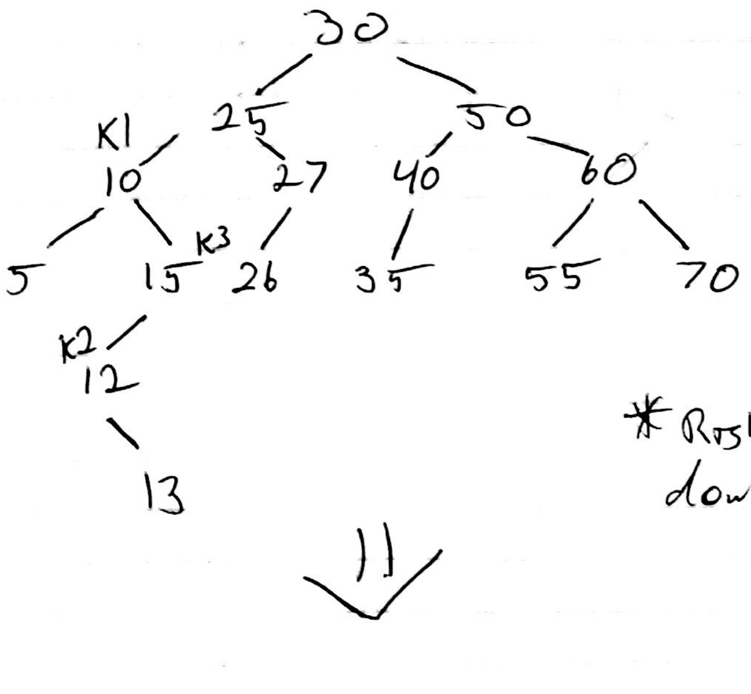
1)

a)

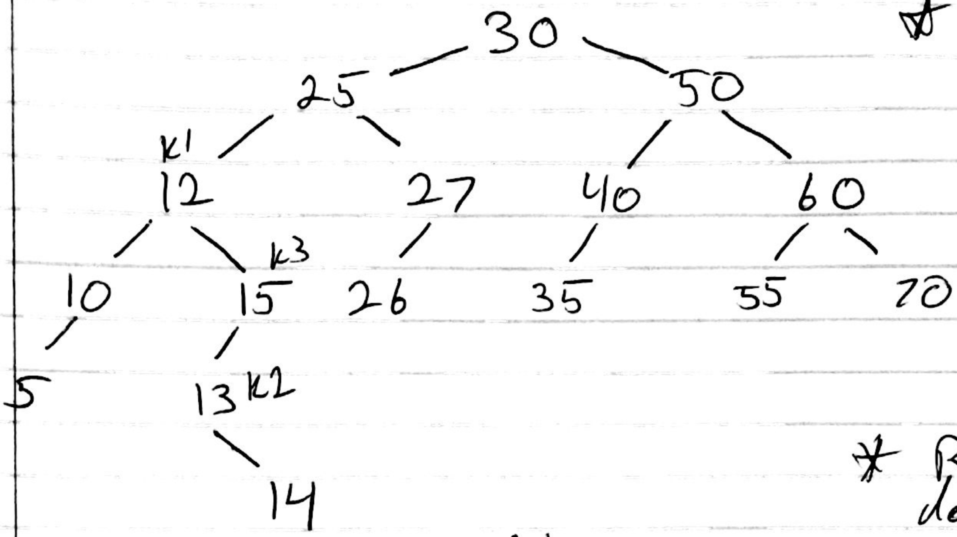


b) Yes it is an AVL tree. The requirements for an AVL tree is that the balance factor for any given node must be between -1 and 1, inclusive.

c)

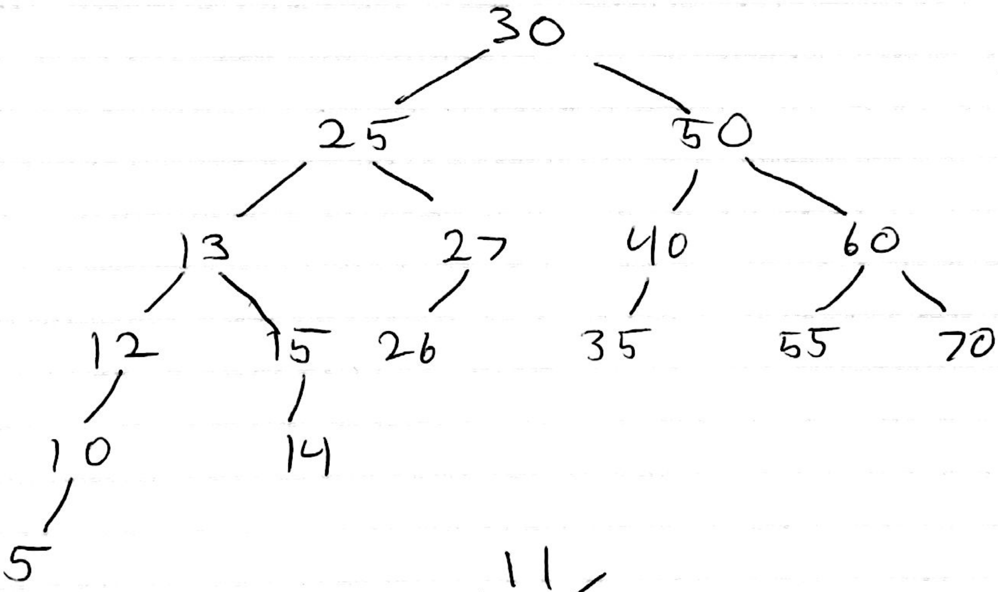


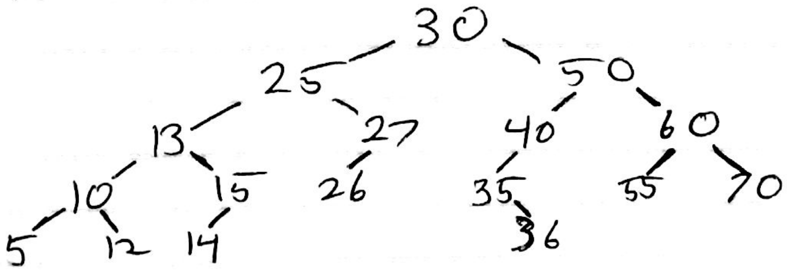
*Right-left double rotation



* 13 inserted
→ insert 14

* Right-left double rotation

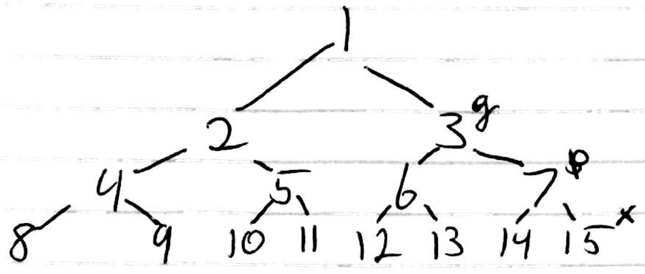




* 14 inserted
→ insert 36

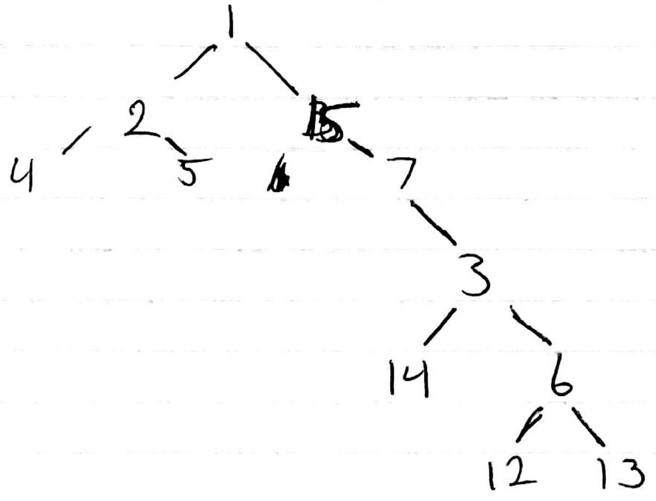
2) Splay tree 1-15:

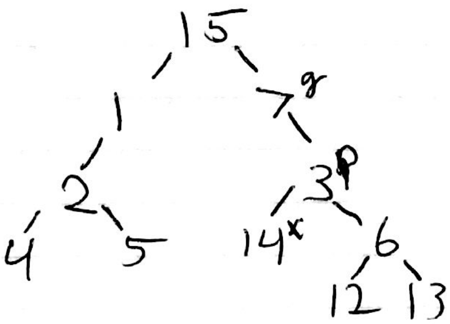
a)



* Splay @ 15

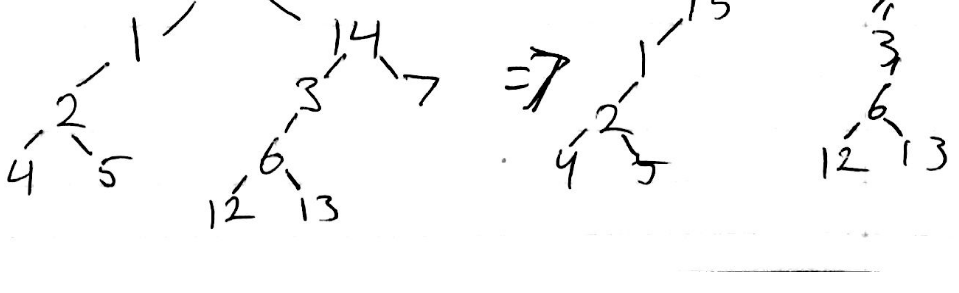
zig-zig





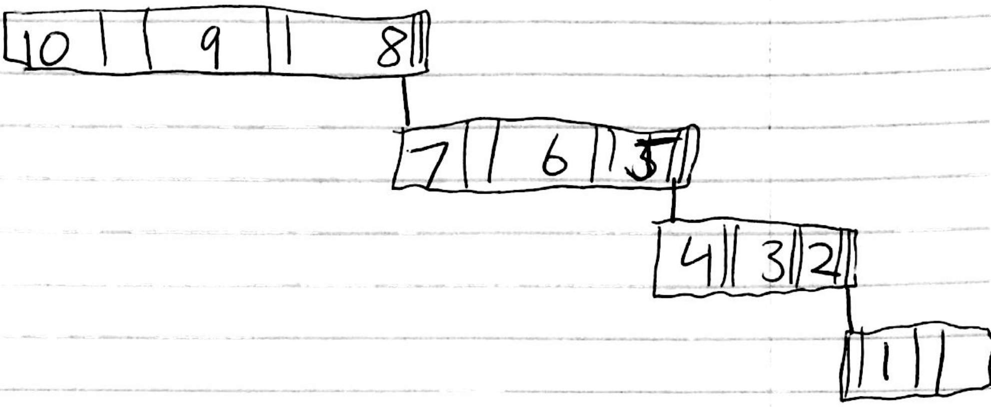
*splay @ 14

zig-zag

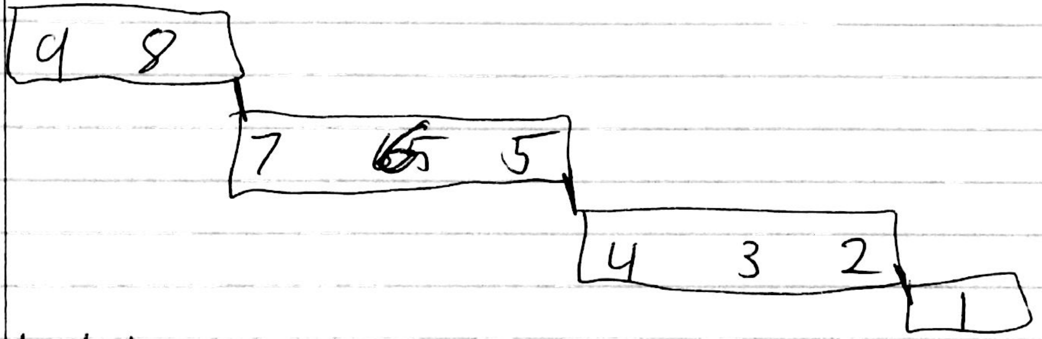


3) B-tree with M = L = 4, nonleaves hold M-1

a)

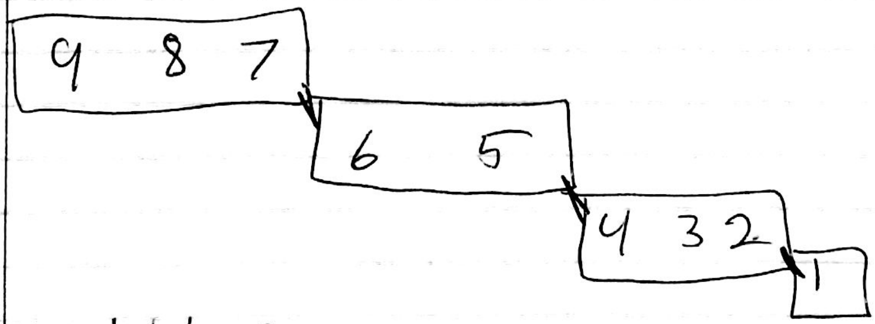


*delete 10

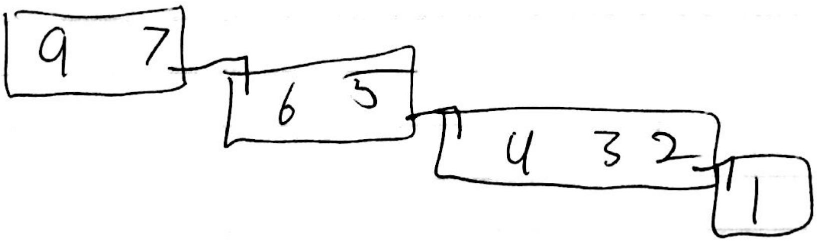


*delete 9

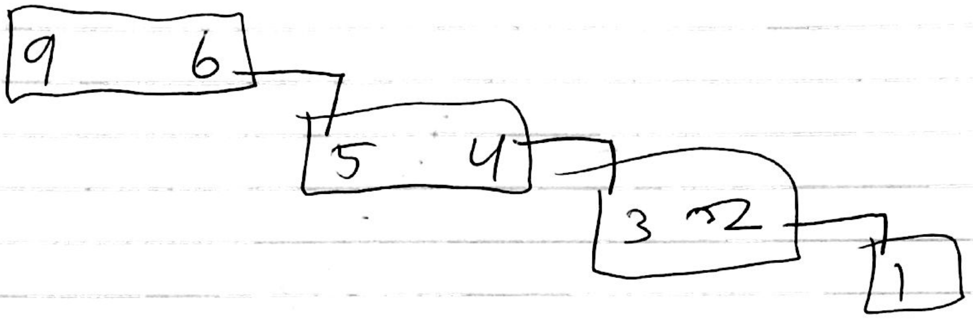
- too few items in root, move 7



*delete 8



* delete 7, too few items on root, move 6 and 4



4) Hash tables

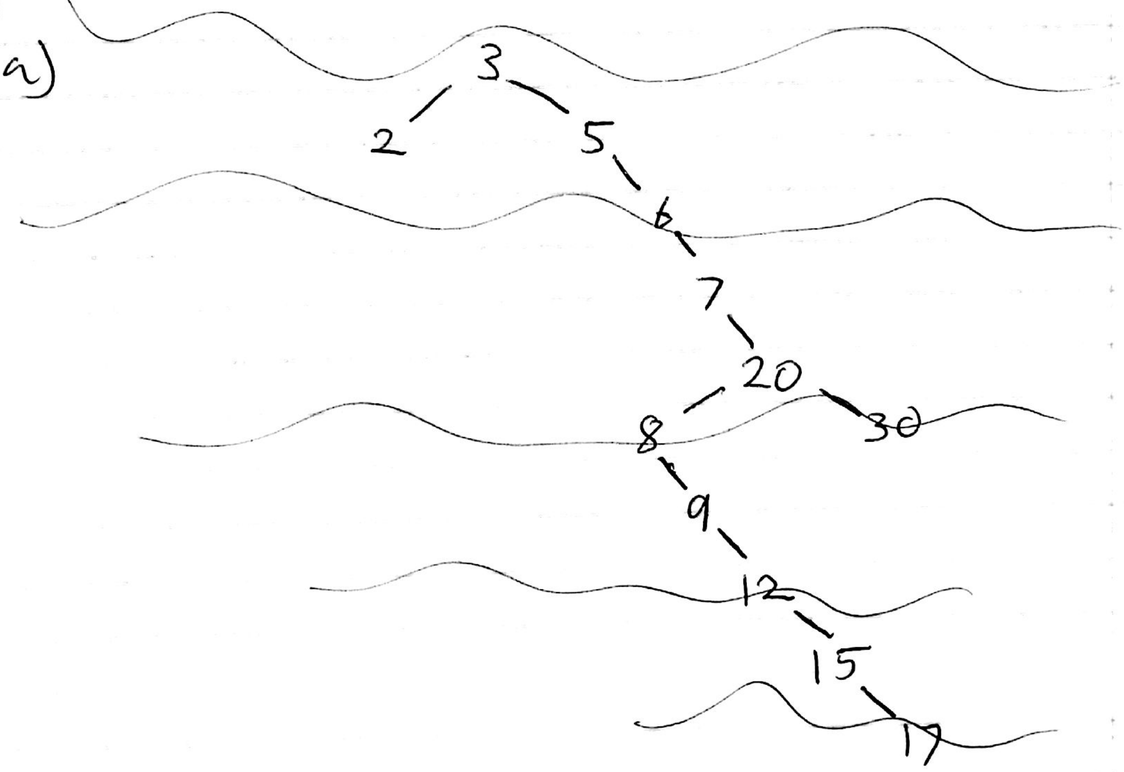
w/ Inserts	0	1	2	3	4	5	6	7	8	9	10	11	12	~~13~~
7								7						
42				42				7						
25				42				7					25	
73				42				7	73				25	
14		14		42				7	73				25	
38		14		42				7	73				25 38	
8		14		42				7	73 8				25 38	
22		14		42				7	73 8	22			25 38	
34		14		42				7	73 8 34	22			25 38	
11		14		42				7	73 8 34	22		11	25 38	

6)

Deletoons	0	1	2	3	4	5	6	7	8	9	10	11	12
		14		42				7	73 8 34	22		11	25 38
73		14		42				7	8 34	22		11	25 38
22		14		42				7	8 34			11	25 38

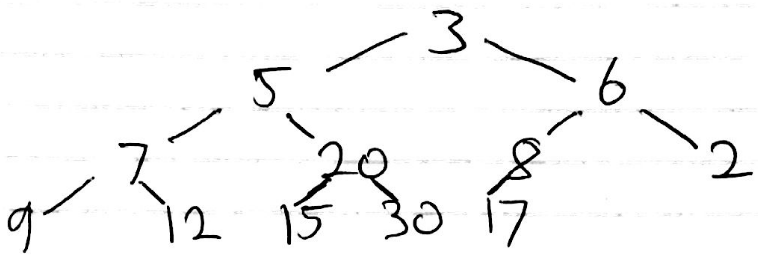
5) Heaps

a)



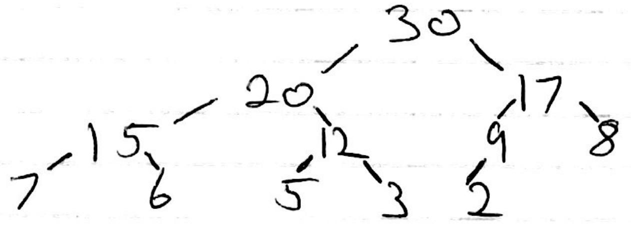
5) Heaps

a)

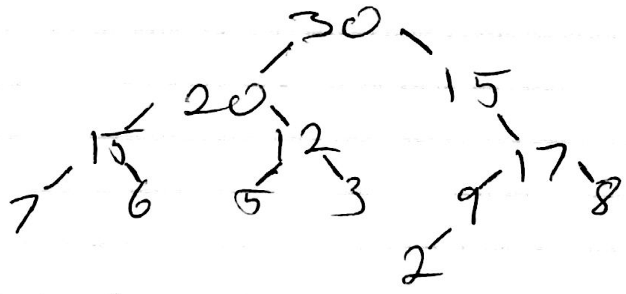


b) Find Max()
delete ()

the Max Heap=[-,2,3,5,6,7,8,9,12,15,17,20,30]

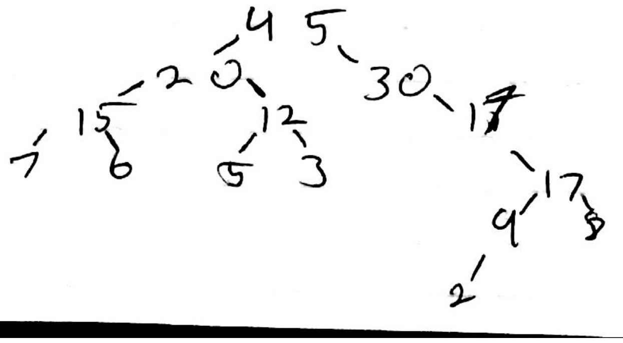


c) * insert 15



* insert 20
It's already in the Heap

* insert 45



Scanned by CamScanner

6) This code is to move holes down the heap, or percolate down. The hole passed in is the index where the percolate will begin, and it ends when the Heap is restored