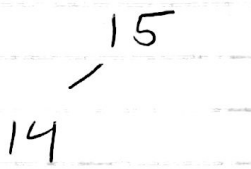
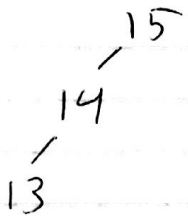
Eli Sobylak
Midterm Review

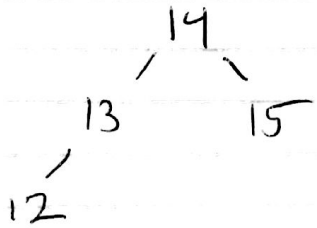
23-Feb-16

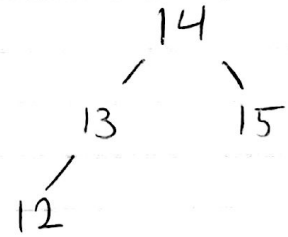
1)

[ ]

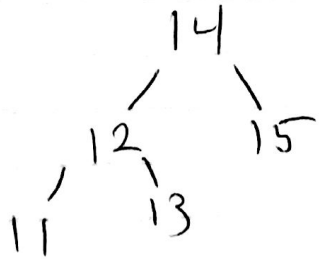


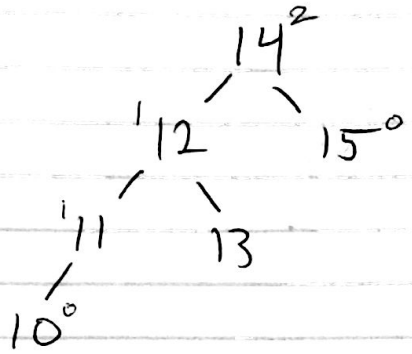




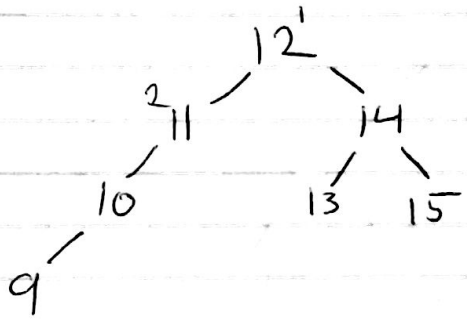


single rotation

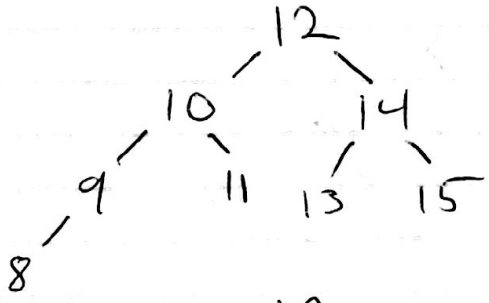


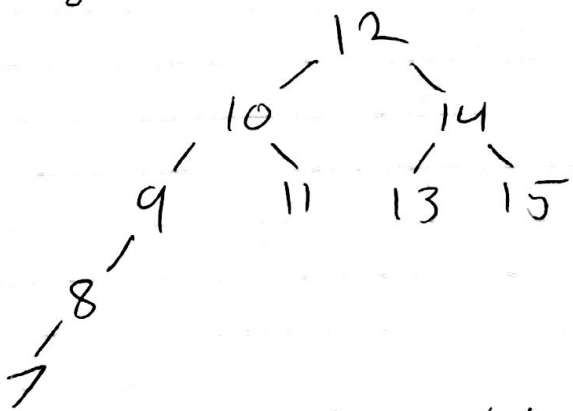


single rotation

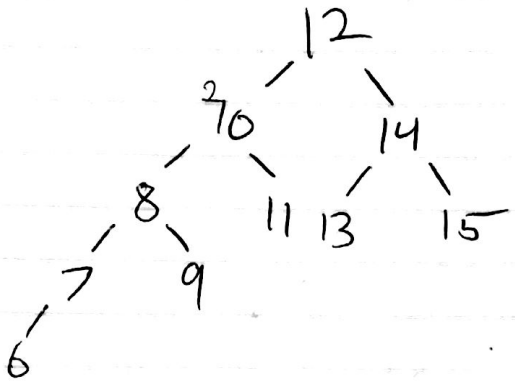


single rotation

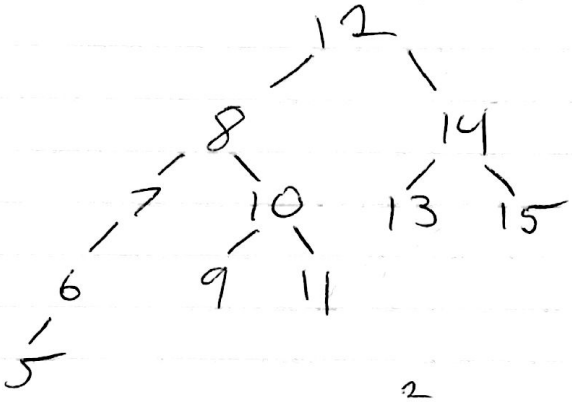


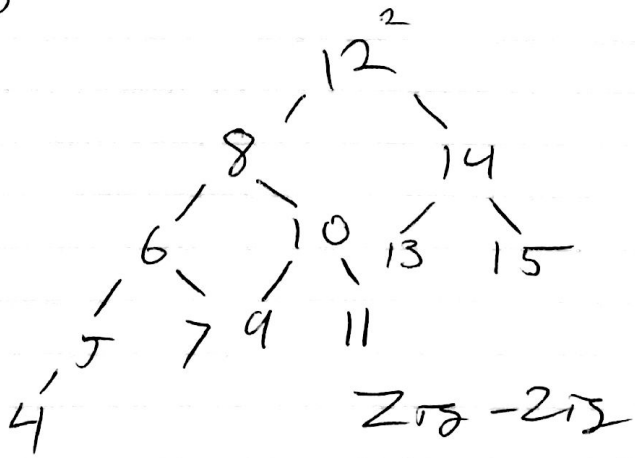


Single rotation



single rotation





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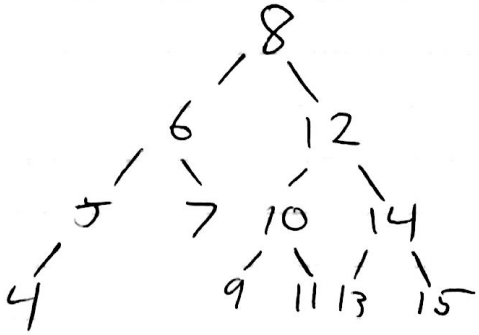
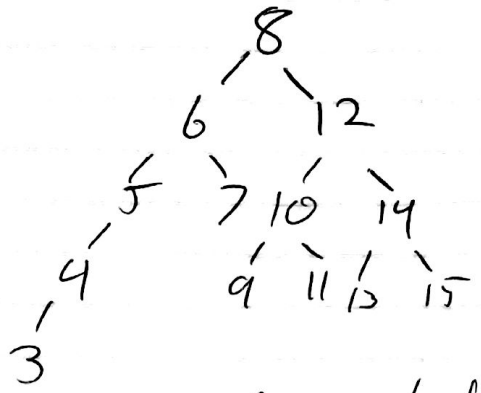
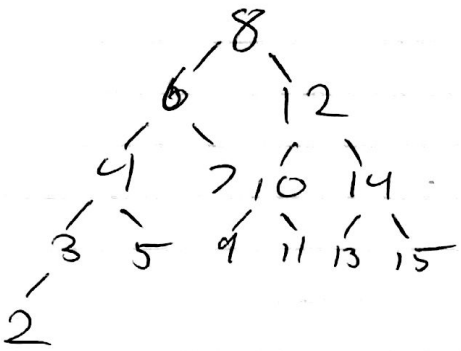
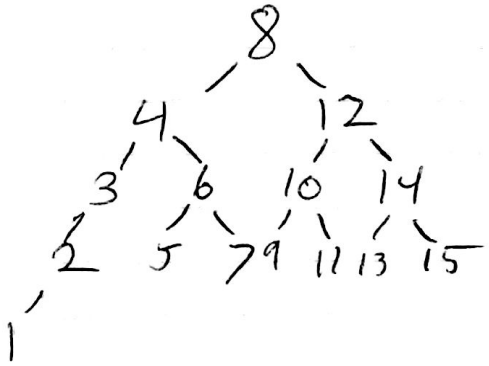




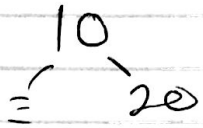
Single rotation

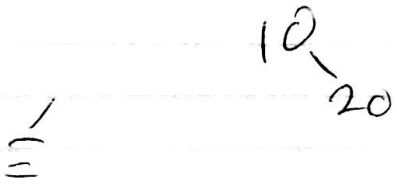


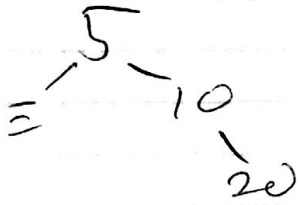
Single rotation

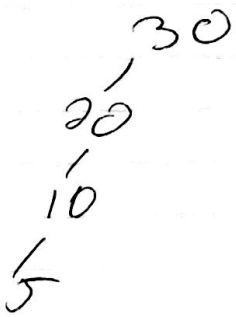


2)

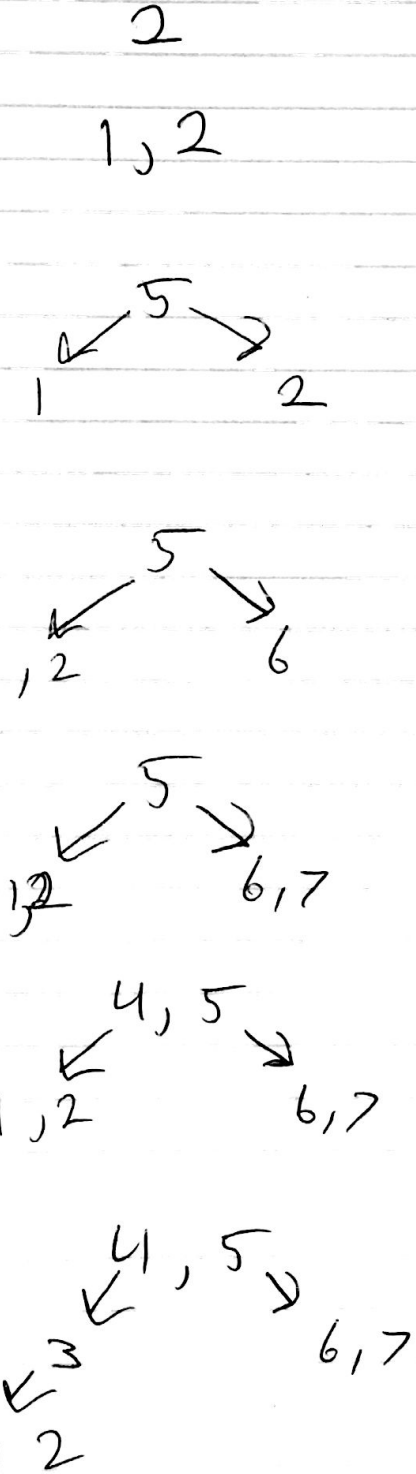


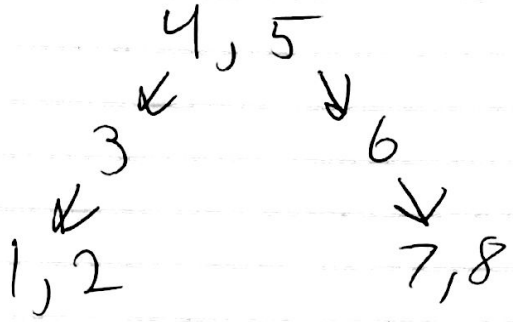


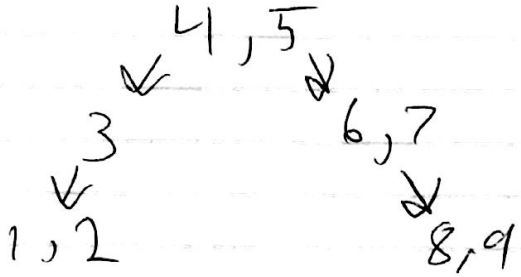


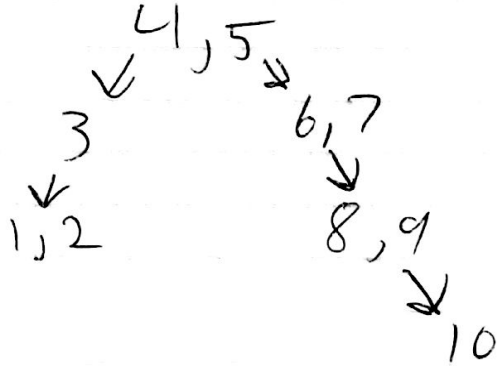


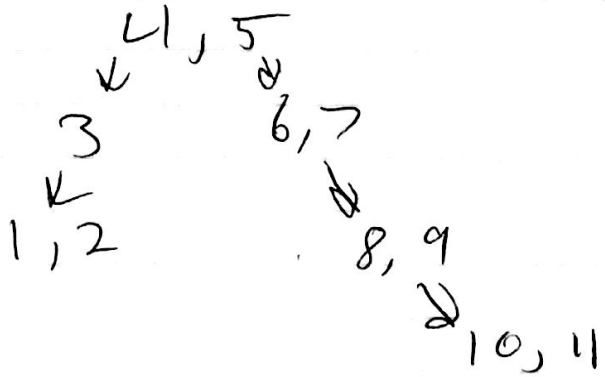
3) $M = 3$; most 2 keys, at least 1 child for all except leafs











4) b = 17 buckets (0-16)

a) hash function = $f(k) = k \bmod b$

Inserts	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7								7,									
42								7,	42								
25								7,	42,	25							
73							73,	,	7,	42,	25						
14							73,	,	7,	42,	25,	,	,	,	14		
38						38,	73,	,	7,	42,	25,	,	,	,	14		
8						38,	73,	,	7,	42,	25,	8,	,	,	14		
22						38,	73,	22,	7,	42,	25,	8,	,	,	14		
34	34,	,	,	,	38,	73,	22,	7,	42,	25,	8,	,	,	,	14		
11	34,	,	,	,	38,	73,	22,	7,	42,	25,	8,	11,	,	,	14		

b) load factor after last insert

$\lambda = 0.58$ or $10/17$

c) unsuccessful searches

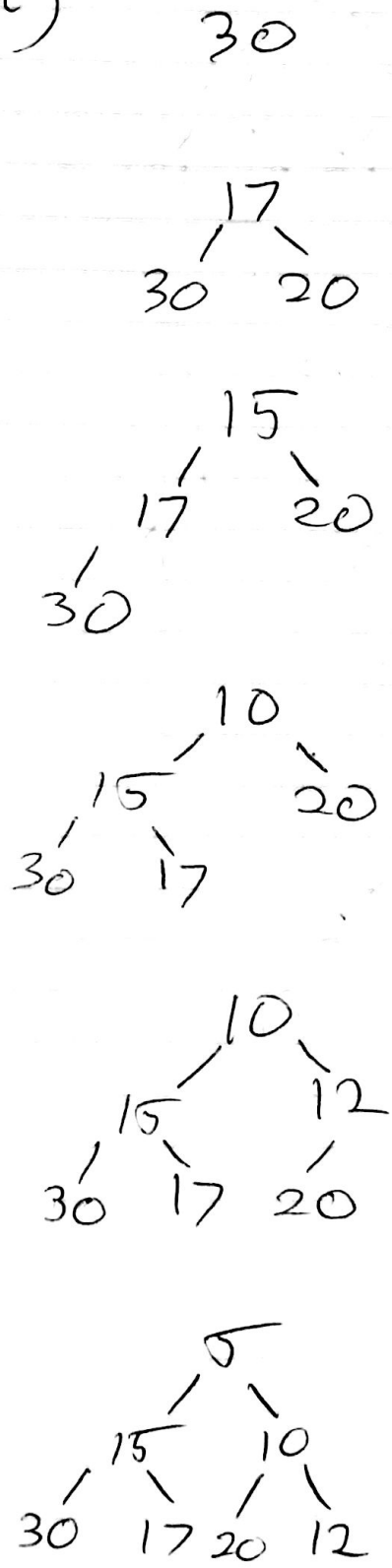
$\approx \frac{1}{2}(1 + 1/(1 - 0.58)^2)$

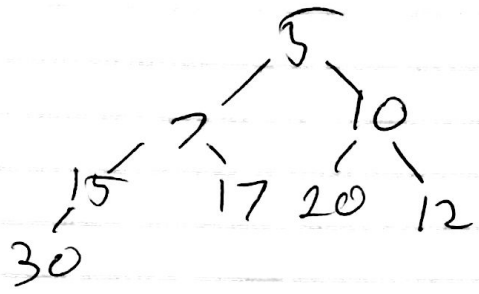
d successful searches

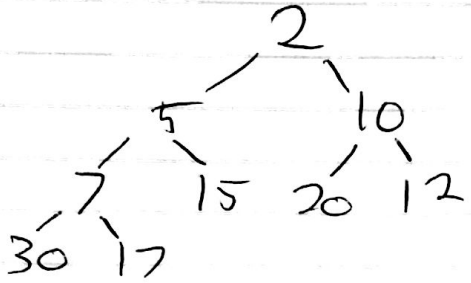
$\approx \frac{1}{2}(1 + 1/(1 - 0.58))$

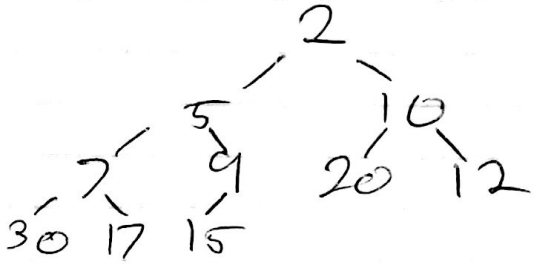
5)

a)

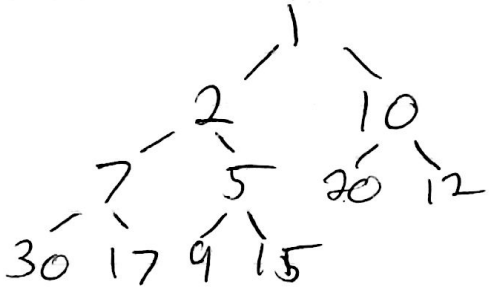




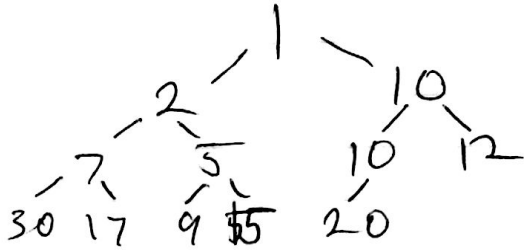




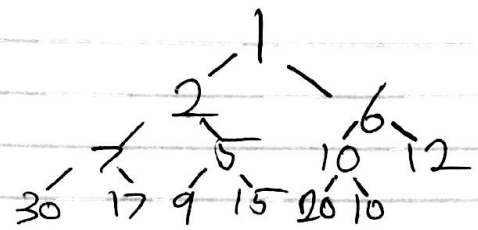
b) insert 1



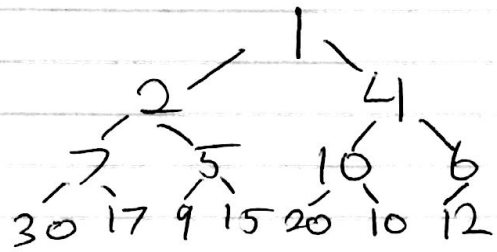
insert 10



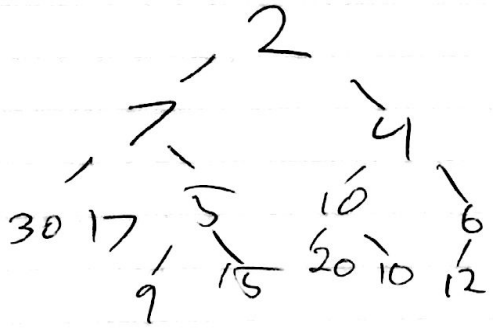
Insert 6



Insert 4



c) remove 1



6)

```
                    node v
heapHeight (v) {
int i = Map (rightChild(v))
height = 2 · i + 2
return height
   3
```