

## MAX-HEAP

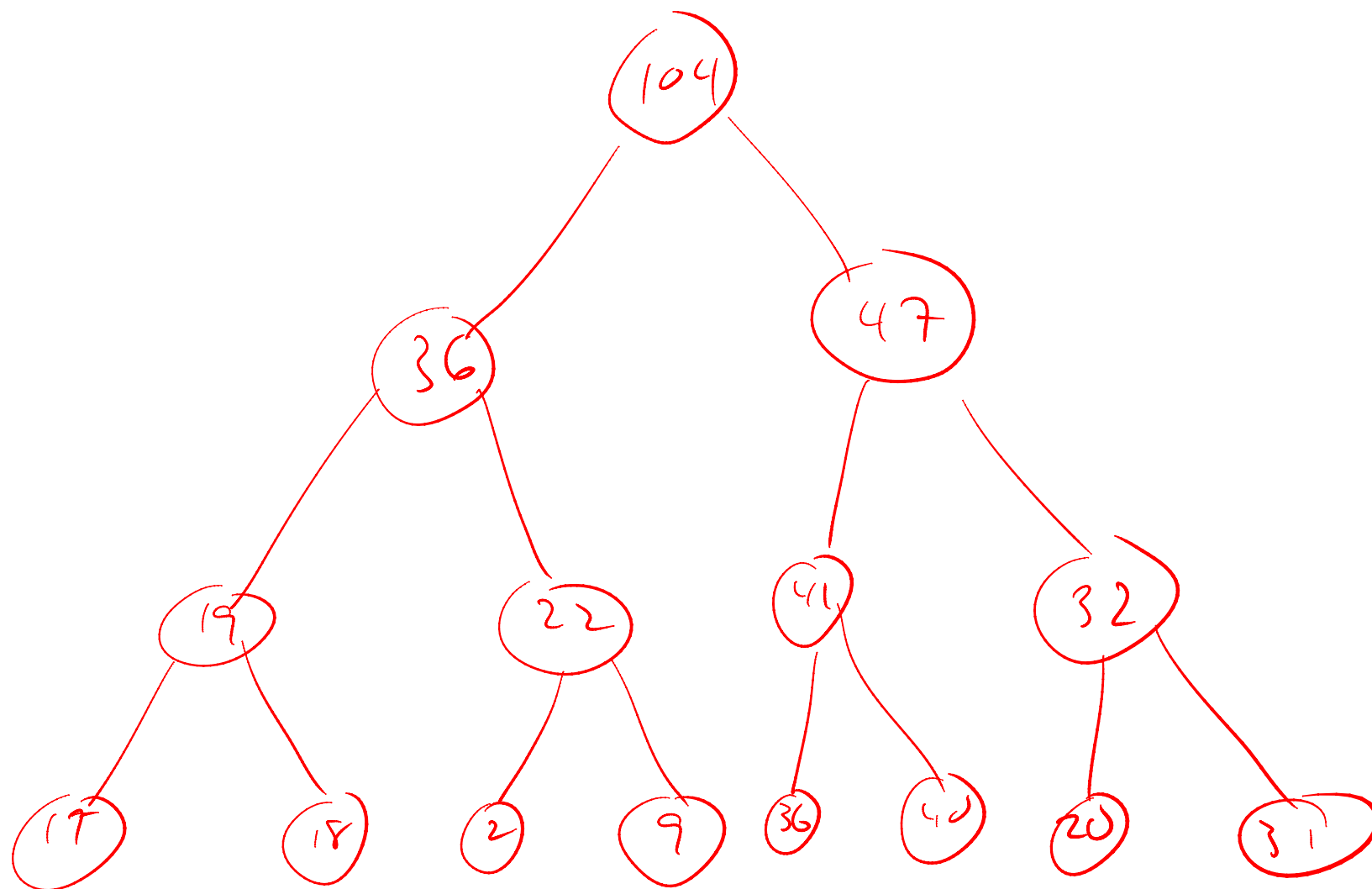
$$\text{Value}(\text{node}) \geq \text{Value}(\text{child node})$$

"heap property"

except leaves

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We have a HEAP if all nodes satisfy the heap prop



bubble sort

for (a=1; i ≤ n-1; ++i)

for (j=i+1; j ≤ n; ++j)

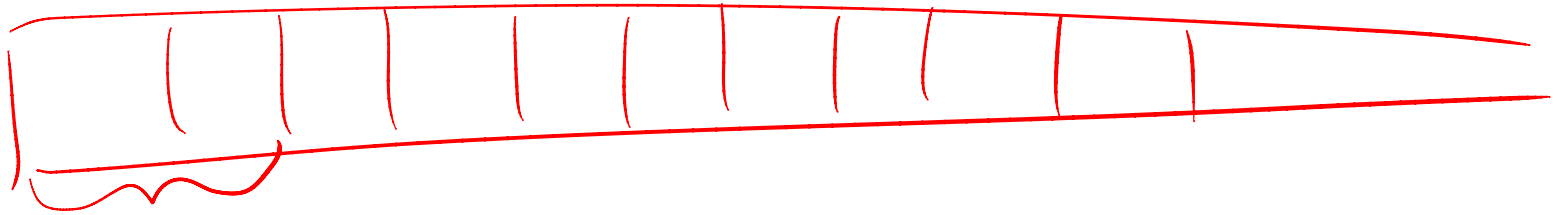
something  $n + n-1 + n-2 + \dots$

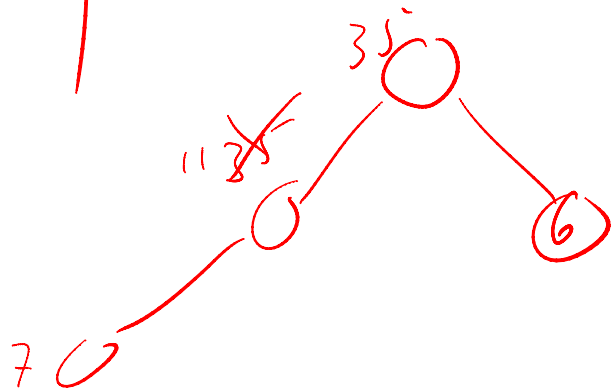
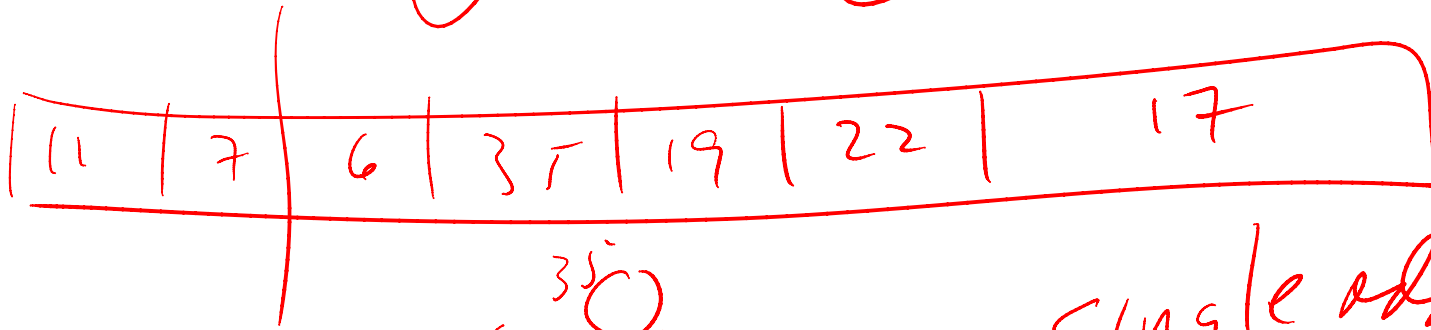
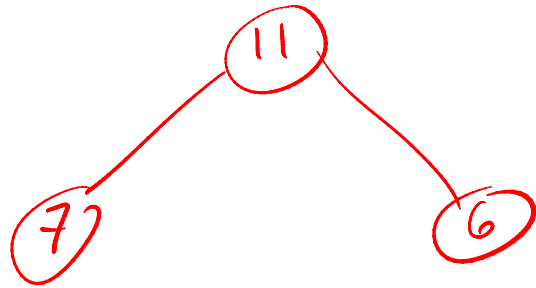
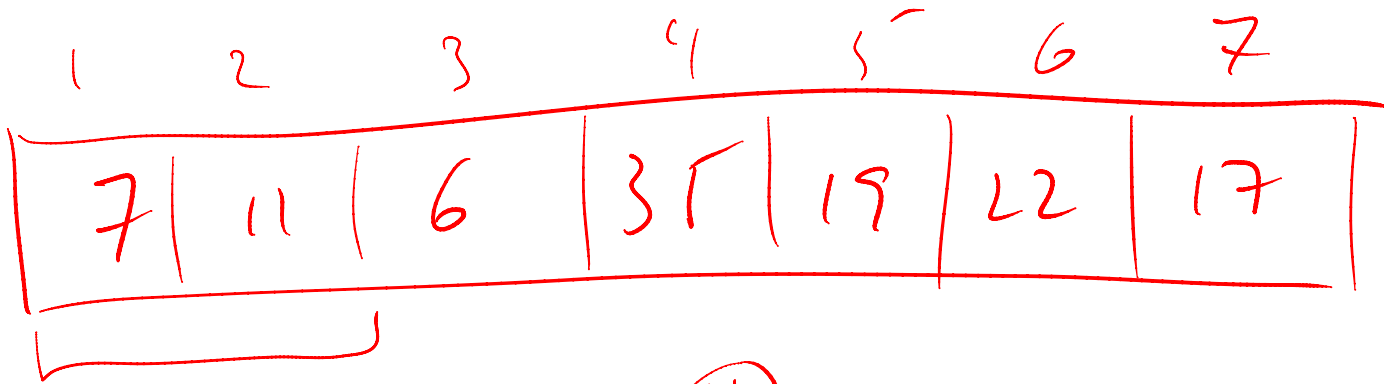
$$= \frac{n(n+1)}{2}$$

$$O(n^2)$$

Insertion sort

$$1 + 2 + 3 + \dots + n = O(n^2)$$

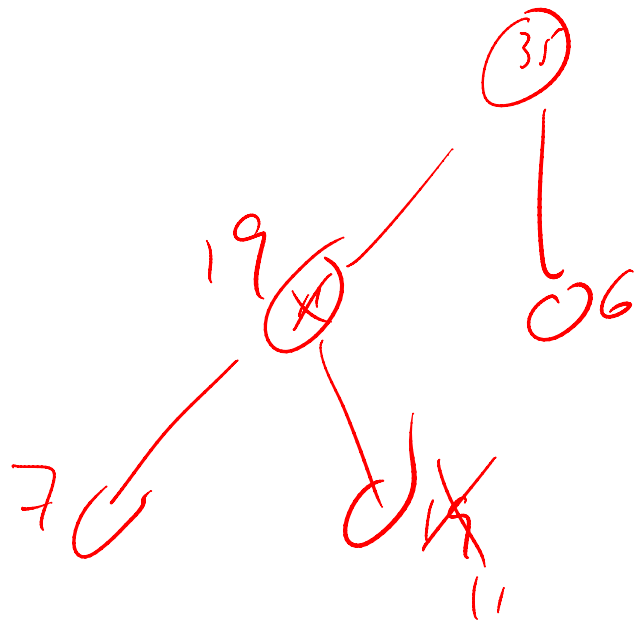




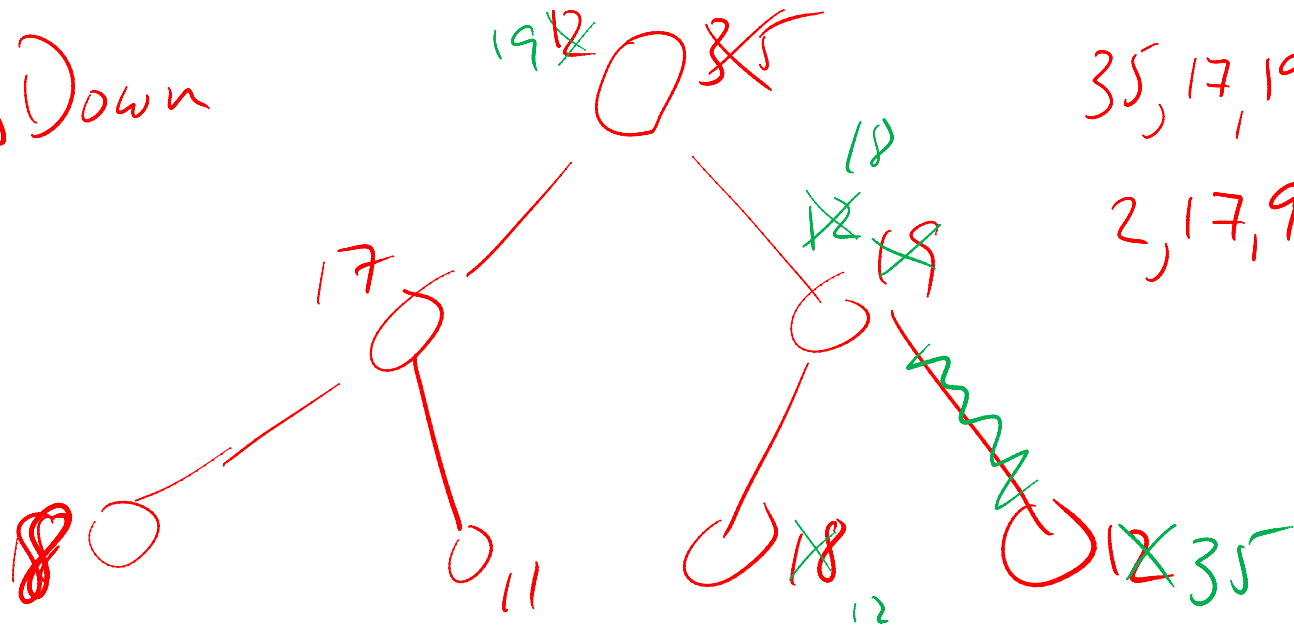
single addition  
lg N

$O(N \lg N)$

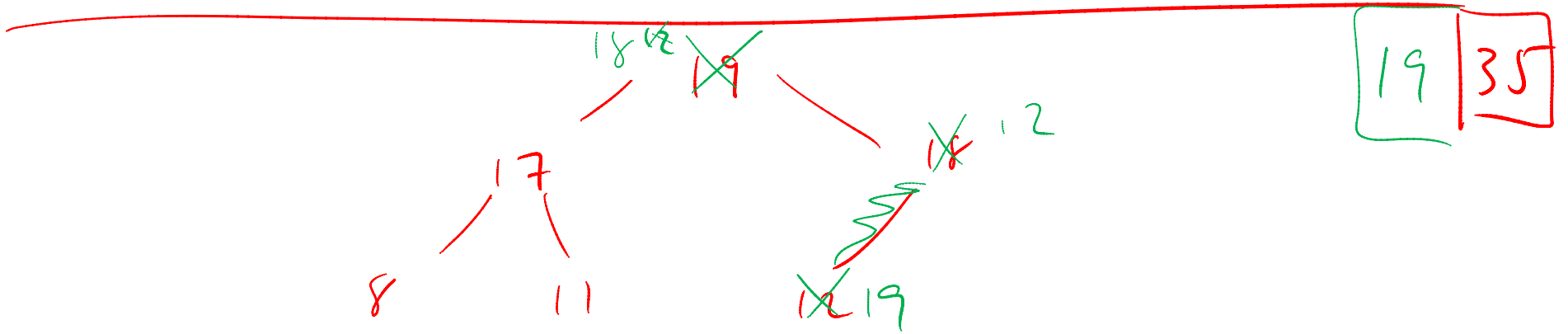
35	11	6	7	19	22	17
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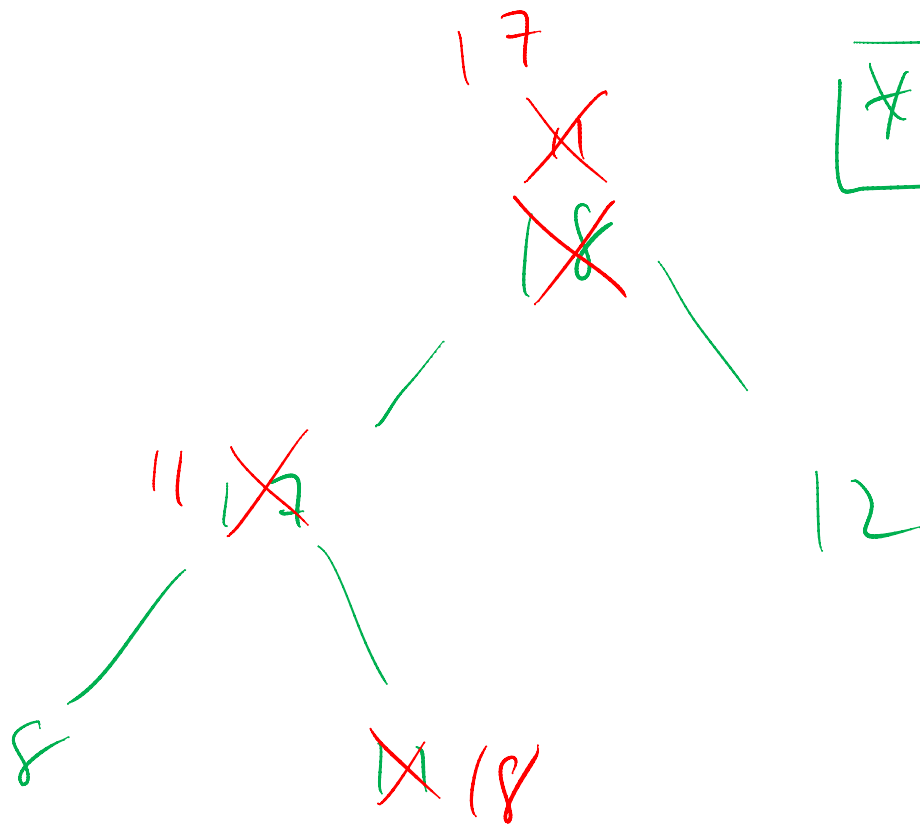


fix Heap Down



35, 17, 19, 8, 11, 18, 2  
2, 17, 9, 8, 11, 18, 35





<del>*</del>	18	17	12	8	<del>X</del>	<b>19</b>	35
	17	11	12	8	18		