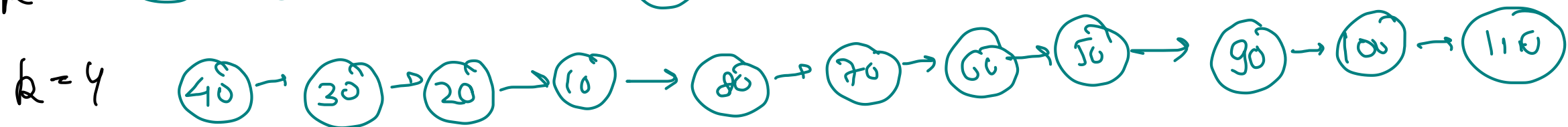
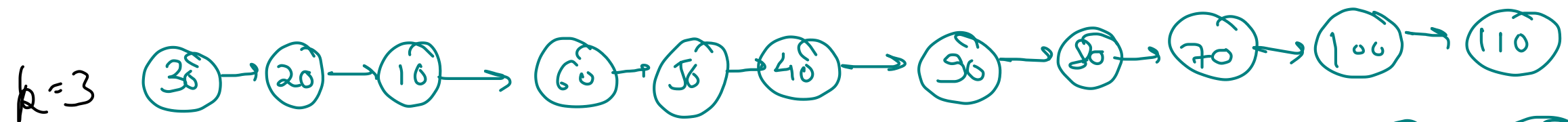
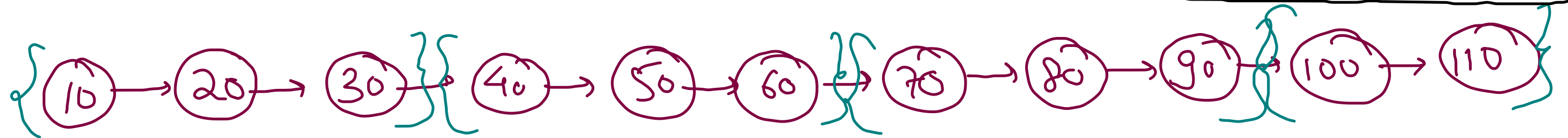


# Remaining Questions

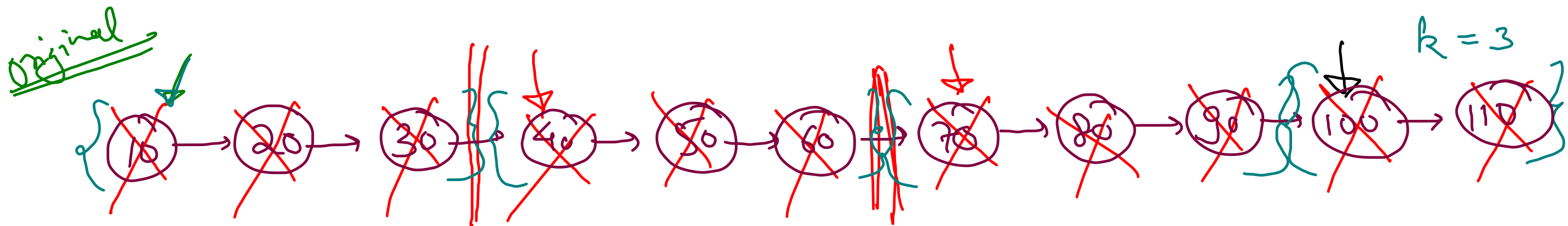
① k Reverse kth

<sup>0(1)</sup> addFirst	<sup>0(1)</sup> addLast
removeLast <sup>0(n)</sup>	removeFirst <sup>0(1)</sup>



k=1 same kth

k=n reverse entire kth

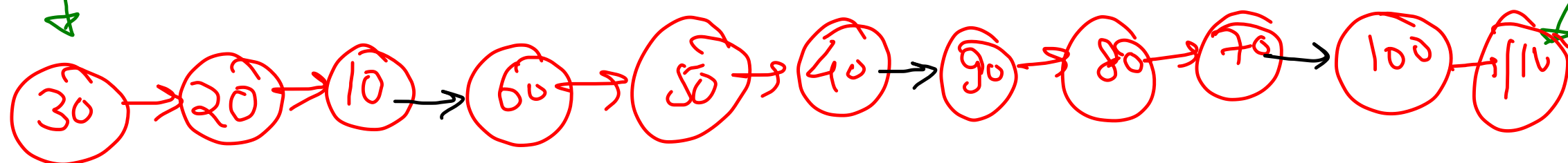


old head  
↓

old LL

old tail

new LL  
new head new tail  
↓ ↓



- ② Median Priority Queue
- ③ Buy & sell stock
- ④ Radix Sort & Sort Dates
- ⑤ Fractional Knapsack
- ⑥ Profit & Loss Evaluation

# Median Priority Queue

add(10)  $\{10\} \Rightarrow 10$

add(40)  $\{10, 40\} \Rightarrow 10$

add(20)  $\{10, 20, 40\} \Rightarrow 20$

add(30)  $\{10, 20, 30, 40\} \Rightarrow 20$

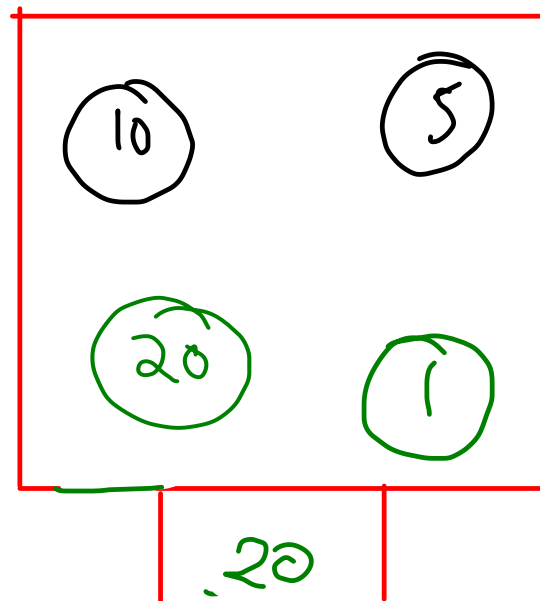
add(50)  $\{10, 20, 30, 40, 50\} \Rightarrow 30$

add(60)  $\{10, 20, 30, 40, 50, 60\} \Rightarrow 30$

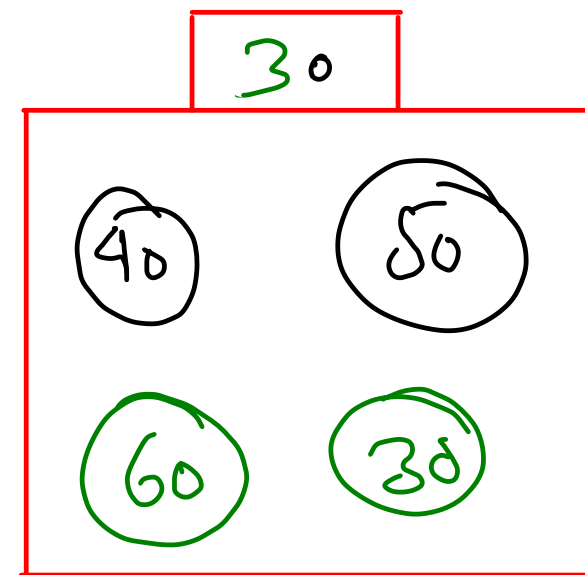
add(5)  $\{5, 10, 20, 30, 40, 50, 60\} \Rightarrow 30$

add(1)  $\{1, 5, 10, 20, 30, 40, 50, 60\} \Rightarrow 20$

left  
max heap



right  
min heap



- add  $\rightarrow O(1)$
- get median (peek)
- remove  $\rightarrow$  median

# Buy & Sell Stock k transactions

days      BS SS  
BSBS BS

		<div>(9) (6) (7) (6) (3) (8)</div>						
		<div>0 1 2 3 4 5 6</div>						
Transactions	0	0	0	0	0	0	0	0
	1	0						
	2	0						
	3	0						

# # Radix Sort

2 1 3 ✓

0 9 7 ✓

7 1 8 ✓

1 2 3 ✓

0 3 7 ✓

4 4 3 ✓

9 8 2 ✓

0 6 4 ✓

3 7 5 ✓

6 8 3 ✓

one  
→

9 8 2 ✓

2 1 3 ✓

1 2 3 ✓

4 4 3 ✓

6 8 3 ✓  $\xrightarrow{\text{tens}}$

0 6 4 ✓

3 7 5 ✓

0 9 7 ✓

0 3 7 ✓

$$O(\textcircled{10} \textcircled{N}) = O(10N) = \textcircled{O(N)} \rightarrow$$

$$\textcircled{+20} \Rightarrow 2^{31} - 1 \Rightarrow \textcircled{10^9}$$

2 1 3 ✓

1 2 3 ✓

0 3 7 ✓

4 4 3 ✓

0 6 4 ✓

3 7 5 ✓

9 8 2 ✓

6 8 3 ✓

0 9 7 ✓

0 3 7

0 6 4

0 9 7

1 2 3

2 1 3

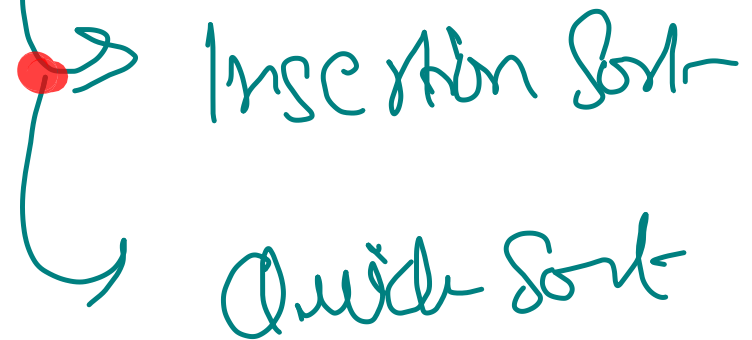
3 7 5

4 4 3

6 8 3

9 8 2

Tim Sort-



$> 16 \Rightarrow QS$

$< 16 \Rightarrow InST$

# Sort Dates

D	M	Y
✓ 12	04	1996
✓ 20	10	1996
✓ 05	06	1997
✓ 12	04	1989
✓ 11	08	1987

↑↑  
 01  
 10

↑↑  
 10

↑↑  
 100  
 100  
 100  
 1



05-06-1997

11-08-1987

12-04-1996

12-04-1989

20-10-1996



12-04-1996

12-04-1989

05-06-1997

11-08-1987

20-10-1996

11-08-1987

12-04-1989

12-04-1996

20-10-1996

05-06-1997



# Fractional Knapsack

```
10
33 14 50 9 8 11 6 40 2 15
7 2 5 9 3 4 1 10 3 3
5
```

capacity = 5

price	28	14	20	9	8	11	6	18	2	15
weight	7	2	5	9	3	4	1	10	3	3
$\frac{\text{price}}{\text{weight}}$	$\frac{28}{7} = 4$	$\frac{14}{2} = 7$	$\frac{20}{5} = 4$	$\frac{9}{9} = 1$	$\frac{8}{3} = 2.66$	$\frac{11}{4} = 2.75$	$\frac{6}{1} = 6$	$\frac{18}{10} = 1.8$	$\frac{2}{3} = 0.66$	$\frac{15}{3} = 5$