Lab3 Solution&Hint

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Question 1 Description

- Hong likes microeconomics very much. One day, Hong got a ledger of a company which recorded the daily turnover of *N* days. Hong wants to know the economic situation of this company by calculate the sum of daily **Minimum Volatility**. The **Minimum Volatility** of the i-th day is $\min_{1\le j<i}\{|A_j - A_i|\}$, where A_i is the turnover of the i-th day. Especially, the **Minimum Volatility** of the first day is A_1.
- However, Hong is not good at programming. She wants you to calculate the sum of daily **Minimum Volatility**.

Linked List

- Given 3 6 1 7 5 4 2 8
- Make a linked list from small to large, organized as follows:

index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	2	8
rank	2	6	0	5	4	1	3	7
preindex	6	4	8	1	5	0	2	3
nextindex	5	3	6	7	1	4	0	8

- Calculate from backward to front according the order of the original data
- **Minimum Volatility** = min(| A[preindex[curr]]-A[curr] | , | A[nextindex[curr]]-A[curr] |)

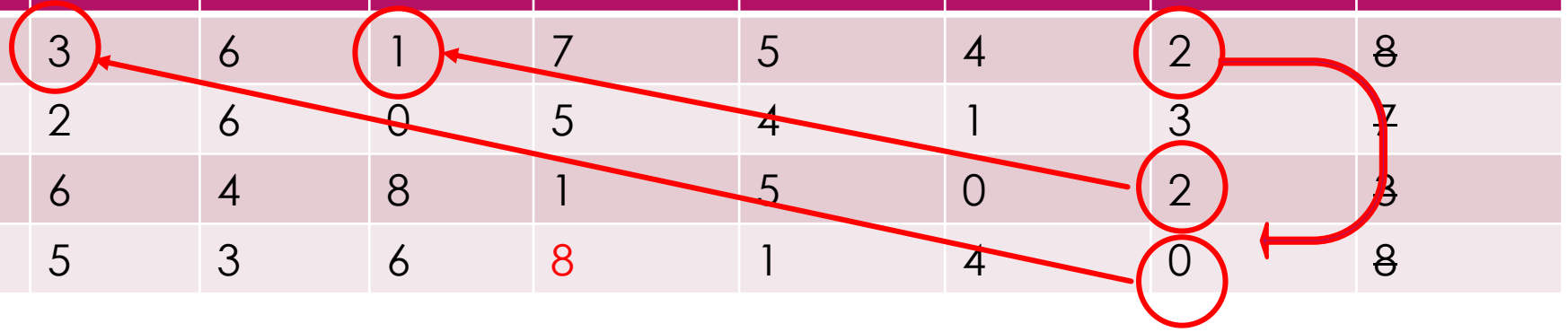
Ps: note the boundary case

index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	2	8
rank	2	6	0	5	4	1	3	7
preindex	6	4	8	1	5	0	2	3
nextindex	5	3	6	7	1	4	0	8

- Delete this value from the link list

index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	2	~~8~~
rank	2	6	0	5	4	1	3	~~7~~
preindex	6	4	8	1	5	0	2	~~3~~
nextindex	5	3	6	~~7~~ --> 8	1	4	0	~~8~~

index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	2	~~8~~
rank	2	6	0	5	~~4~~	1	3	~~7~~
preindex	6	4	8	1	5	0	2	~~3~~
nextindex	5	3	6	8	1	~~4~~	0	~~8~~



sum + = 1 → 2

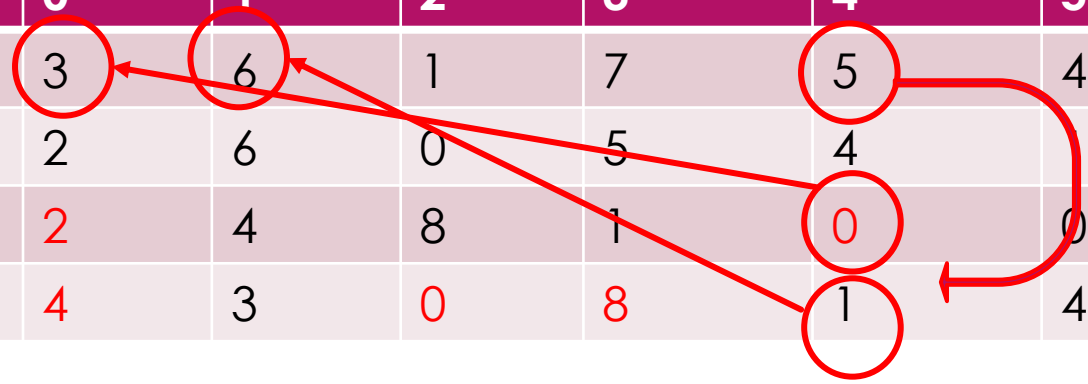
index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	~~2~~	~~8~~
rank	2	6	0	5	4	1	~~3~~	~~7~~
preindex	6→2	4	8	1	5	0	~~2~~	~~3~~
nextindex	5	3	~~6~~ → 0	8	1	4	~~0~~	~~8~~

index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	2	~~8~~
rank	2	6	0	5	4	1	~~3~~	~~7~~
preindex	2	4	8	1	5	0	~~2~~	~~3~~
nextindex	5	3	0	8	1	4	0	~~8~~

sum + = 1 → 3

index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	~~4~~	~~2~~	~~8~~
rank	2	6	0	5	4	~~1~~	~~3~~	~~7~~
preindex	2	4	8	1	5→0	~~0~~	~~2~~	~~3~~
nextindex	5→4	3	0	8	1	~~4~~	~~0~~	~~8~~

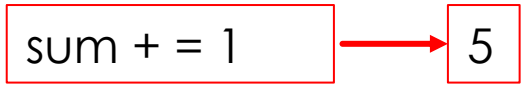
index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	2	~~8~~
rank	2	6	0	5	4	1	3	~~7~~
preindex	2	4	8	1	0	0	2	~~3~~
nextindex	4	3	0	8	1	4	0	~~8~~



sum + = 1 → 4

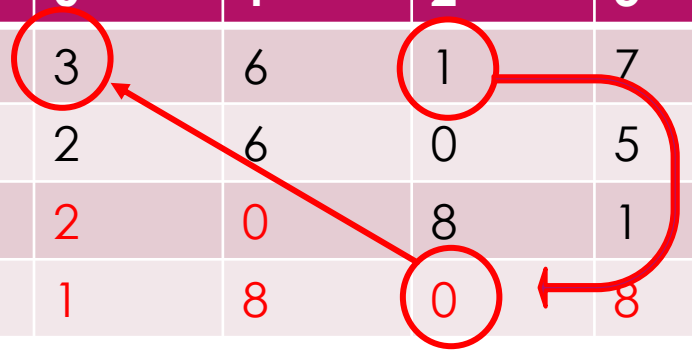
index	0	1	2	3	4	5	6	7
value	3	6	1	7	~~5~~	~~4~~	~~2~~	~~8~~
rank	2	6	0	5	~~4~~	~~1~~	~~3~~	~~7~~
preindex	2	4→0	8	1	~~0~~	~~0~~	~~2~~	~~3~~
nextindex	4→1	3	0	8	~~1~~	~~4~~	~~0~~	~~8~~

index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	2	~~8~~
rank	2	6	0	5	~~4~~	1	3	~~7~~
preindex	2	0	8	1	0	0	2	~~3~~
nextindex	1	3	0	8	1	4	0	~~8~~



index	0	1	2	3	4	5	6	7
value	3	6	1	~~7~~	~~5~~	~~4~~	~~2~~	~~8~~
rank	2	6	0	~~5~~	~~4~~	~~1~~	~~3~~	~~7~~
preindex	2	0	8	~~1~~	~~0~~	~~0~~	~~2~~	~~3~~
nextindex	1	3→8	0	~~8~~	~~1~~	~~4~~	~~0~~	~~8~~

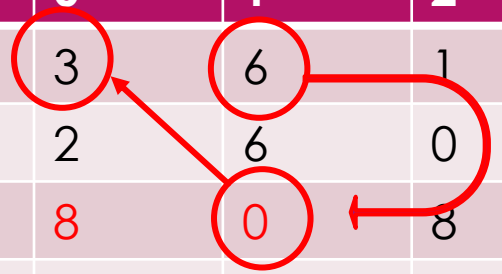
index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	2	~~8~~
rank	2	6	0	5	4	1	3	~~7~~
preindex	2	0	8	1	0	0	2	~~3~~
nextindex	1	8	0	8	1	4	0	~~8~~



sum + = 2 → 7

index	0	1	2	3	4	5	6	7
value	3	6	~~1~~	~~7~~	~~5~~	~~4~~	~~2~~	~~8~~
rank	2	6	~~0~~	~~5~~	~~4~~	~~1~~	~~3~~	~~7~~
preindex	2→8	0	~~8~~	~~1~~	~~0~~	~~0~~	~~2~~	~~3~~
nextindex	1	8	~~0~~	~~8~~	~~1~~	~~4~~	~~0~~	~~8~~

index	0	1	2	3	4	5	6	7
value	3	6	1	7	5	4	2	~~8~~
rank	2	6	0	5	4	1	3	~~7~~
preindex	8	0	8	1	0	0	2	~~3~~
nextindex	1	8	0	8	1	4	0	~~8~~



sum + = 3 → 10

index	0	1	2	3	4	5	6	7
value	3	~~6~~	~~1~~	~~7~~	~~5~~	~~4~~	~~2~~	~~8~~
rank	2	~~6~~	~~0~~	~~5~~	~~4~~	~~1~~	~~3~~	~~7~~
preindex	8	~~0~~	~~8~~	~~1~~	~~0~~	~~0~~	~~2~~	~~3~~
nextindex	1→8	~~8~~	~~0~~	~~8~~	~~1~~	~~4~~	~~0~~	~~8~~

index	0	1	2	3	4	5	6	7
value	3	~~6~~	~~1~~	~~7~~	~~5~~	~~4~~	~~2~~	~~8~~
rank	2	~~6~~	~~0~~	~~5~~	~~4~~	~~1~~	~~3~~	~~7~~
preindex	8	~~0~~	~~8~~	~~1~~	~~0~~	~~0~~	~~2~~	~~3~~
nextindex	8	~~8~~	~~0~~	~~8~~	~~1~~	~~4~~	~~0~~	~~8~~

sum + = 3 → 13

Question 2 Description

- https://adoj.hguandl.com/d/CS208/contest/5e5e0370659e9328b8bb8ec6/1005

Question 2 Hint

10	2*1*1000	2*0*10	2*1*100	2*0*1	2*1*100	1*0*10	1*0*1	2400
30	2*3*1000	2*0*10	2*3*100	2*0*1	2*3*100	1*0*10	1*0*1	7200
3	3*3*10	3*3*1						99
								9699

4	2*4*10	2*4*1						88
52	1*5*1000	(1+2)*5*100	2*2*10	2*2*1				6544
								6632