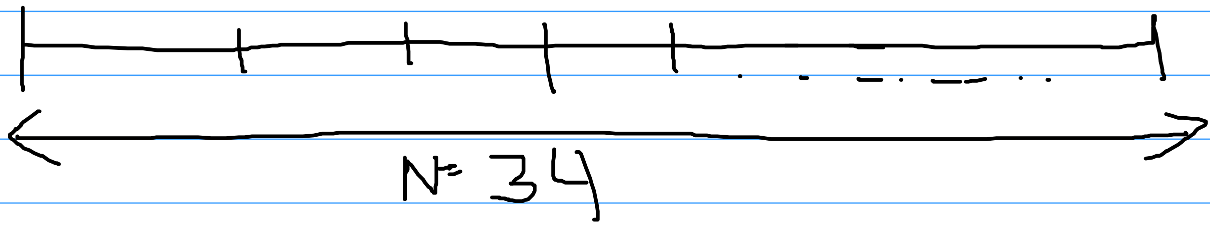
Meet in the Middle

For a large sequence of data, some processing like calculating the sum of subsets is quite expensive in computation.

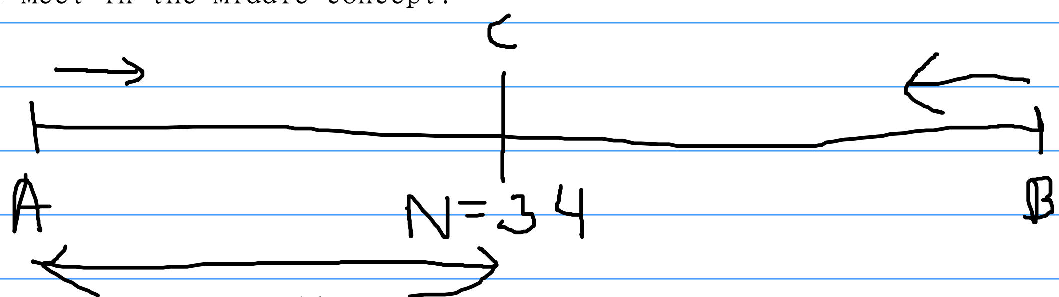


if we calculate the all the possible sum of subset for the above example, then

No. of subset = $2^{34} \approx 10^{11}$

1 sec. -> 10^7 computation.

After Meet in the Middle concept:



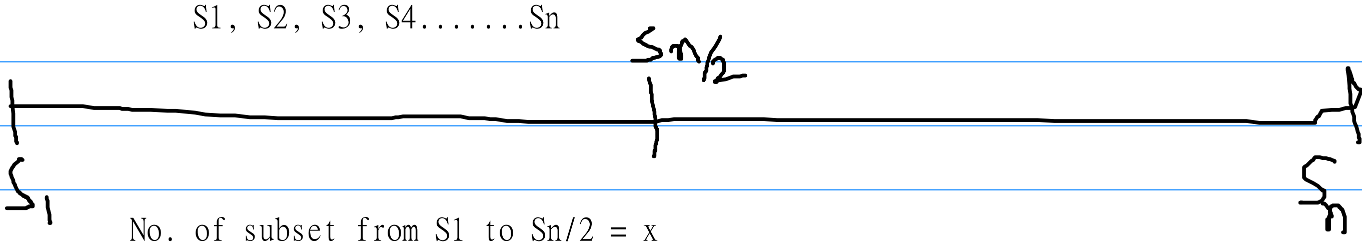
N = 14

No. of subset = 2^{14}

No. of computation = 2^14 + 2^14 = 2^15 $\approx$ 10^5

Question Link : https://www.spoj.com/problems/SUBSUMS/

S1, S2, S3, S4.......Sn



No. of subset from S1 to Sn/2 = x

No. of subset from S(n/2+1) to Sn = y

Lets take one subset sum from S1 to Sn/2 region and same for S(n/2+1) to Sn region.

a+b = Sum of the subset from whole set i.e. S1 to Sn.

$A \leq a+b \leq B$

$A - a \leq b \leq B - a$

$b \in [A - a, B - a + 1)$

Upper bound

Lower bound

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