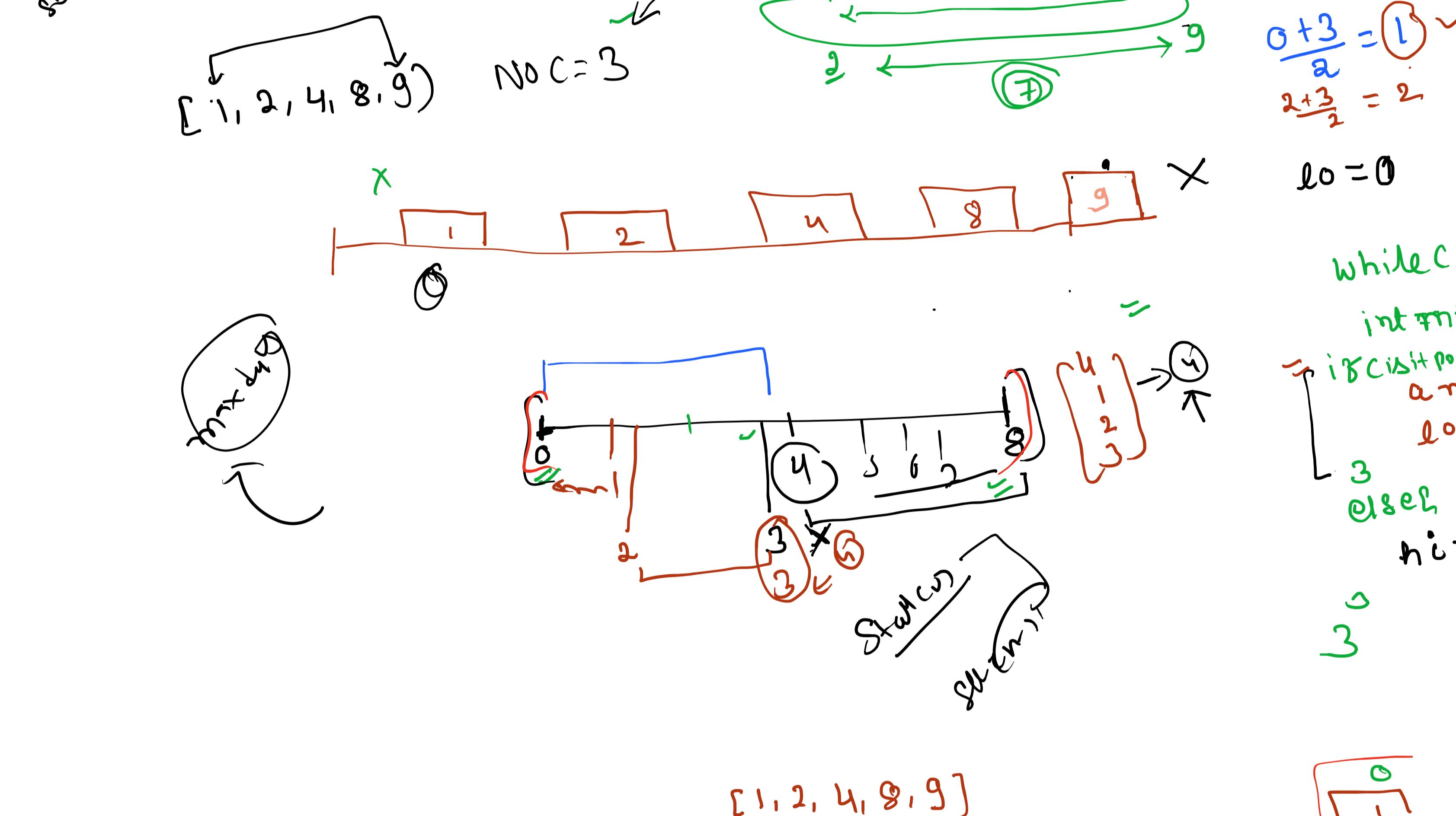
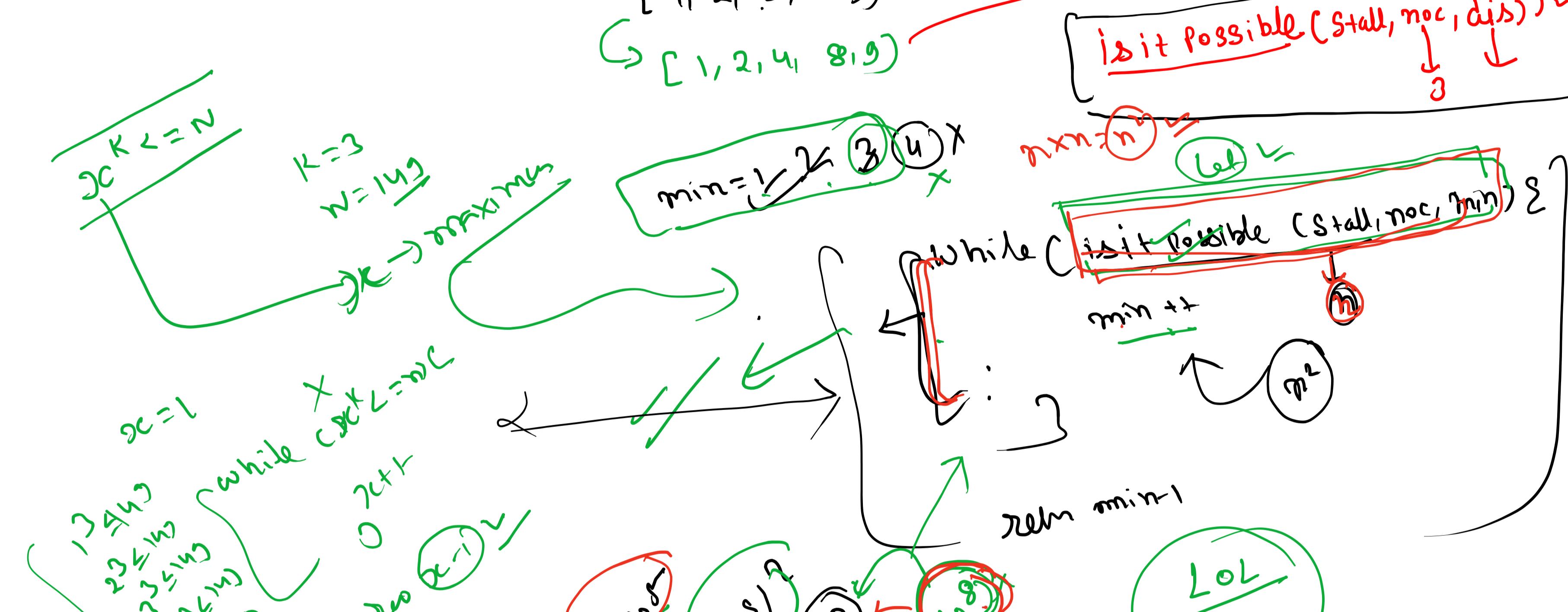
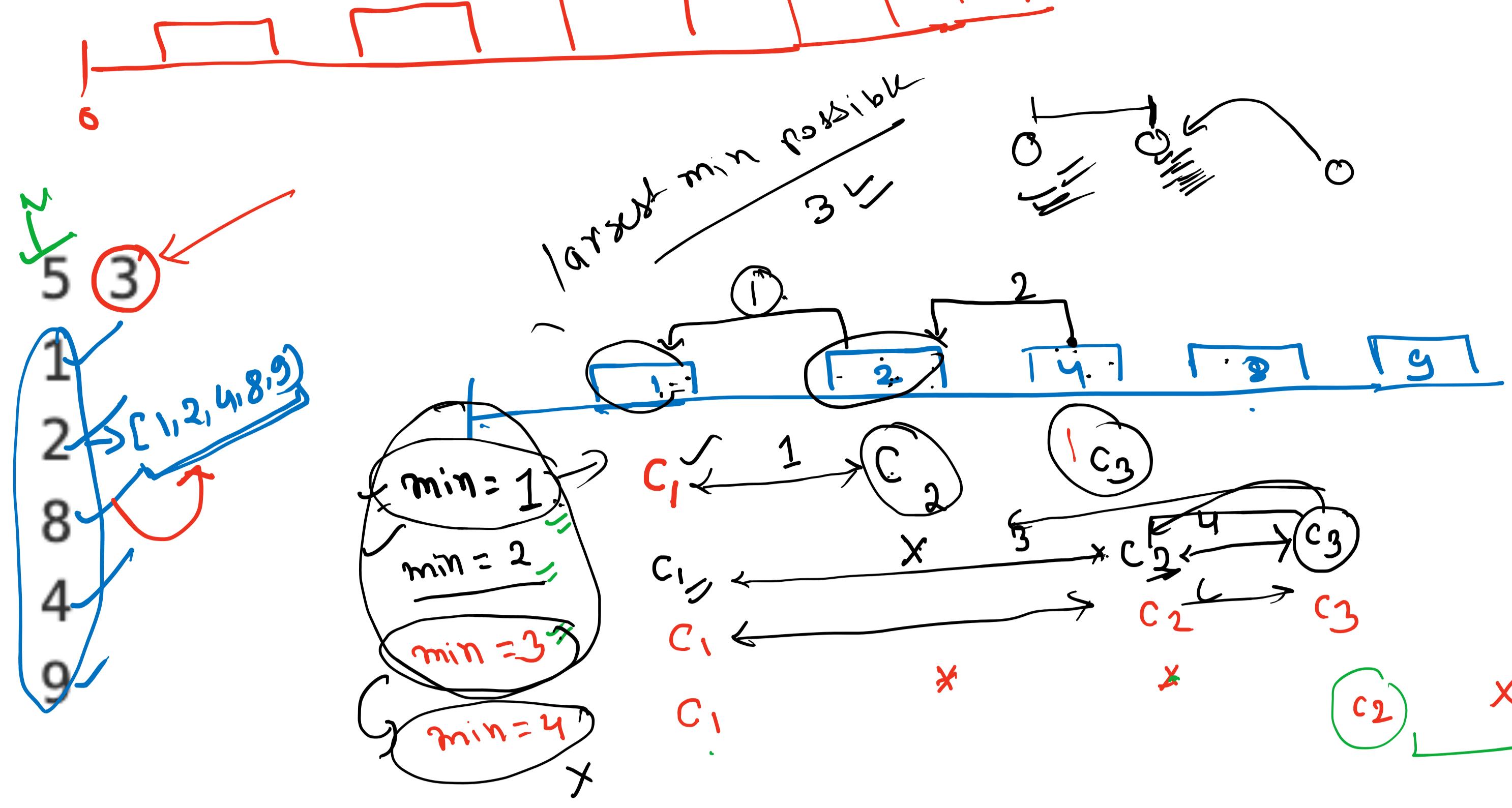


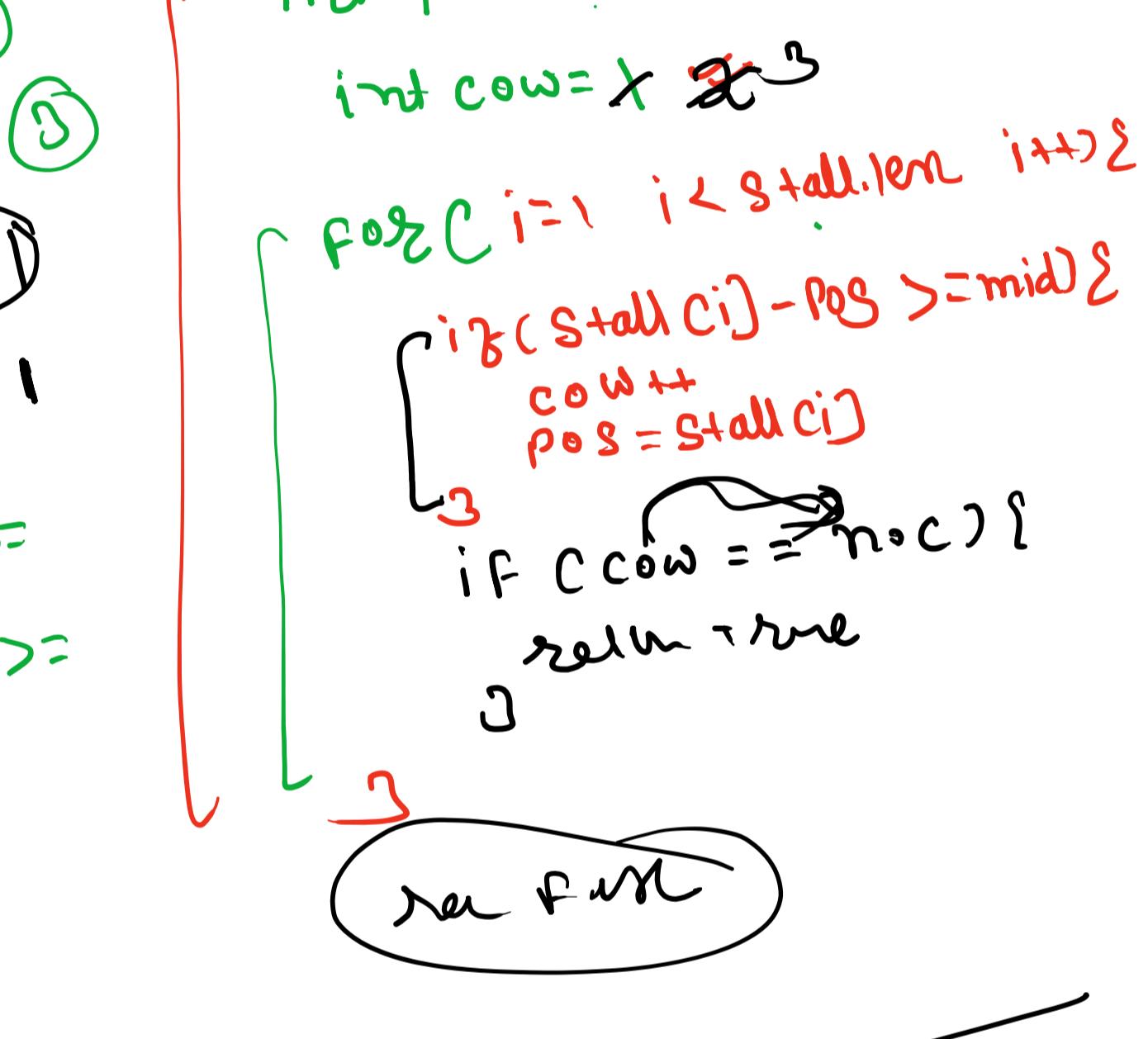
Farmer John has built a new long barn, with N ($2 \leq N \leq 100,000$) stalls. The stalls are located along a straight line at positions $x_1 \dots x_N$ ($0 \leq x_i < 1,000,000,000$).

His C ($2 \leq C \leq N$) cows don't like this barn layout and become aggressive towards each other once put into a stall. To prevent the cows from hurting each other, FJ wants to assign the cows to the stalls, such that the minimum distance between any two of them is as large as possible. What is the largest minimum distance?

 $n=5$ 

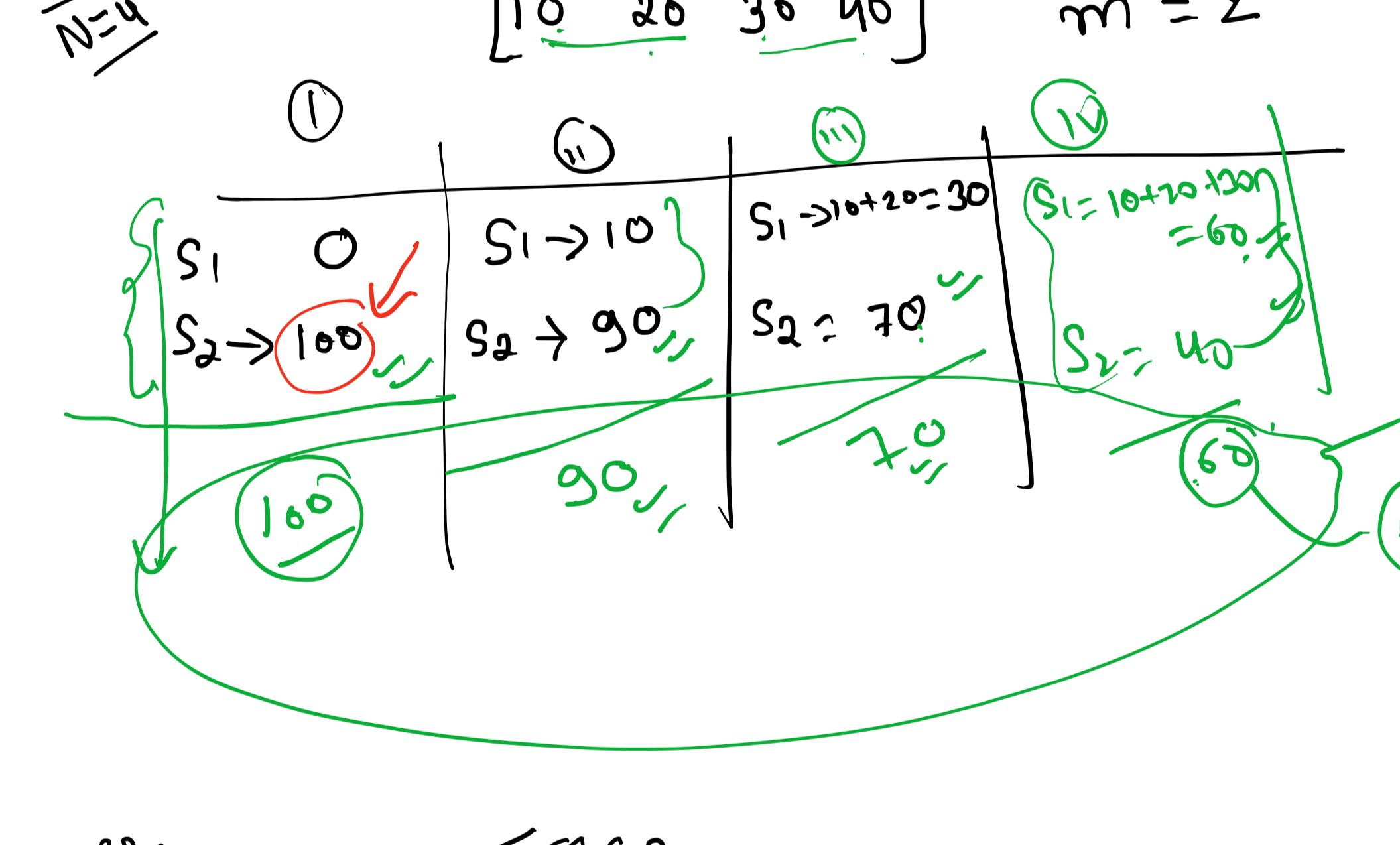
$$\begin{aligned} & \text{min} = 1 \\ & \text{min} = 2 \\ & \text{min} = 3 \\ & \text{min} = 4 \end{aligned}$$

```
public static int largest_min(int[] stall, int noc) {
    int hi = stall[stall.length - 1] - stall[0]; // last stall - 1st stall
    int lo = 0;
    int ans = 0;
    while (lo <= hi) {
        int mid = (lo + hi) / 2;
        if (isimpossible(stall, noc, mid) == true) {
            ans = mid;
            lo = mid + 1;
        } else {
            hi = mid - 1;
        }
    }
    return ans;
}
```



Book Allocation Problem

You are given number of pages in n different books and m students. The books are arranged in ascending order of number of pages. Every student is assigned to read some consecutive books. The task is to assign books in such a way that the maximum number of pages assigned to a student is minimum.



$$\frac{S1+24}{2} = 62$$

$$\frac{S2+40}{2} = 62$$

$S1 = 10$

$$= 10 + 20 = 30$$

$$= 30 + 62 = 62$$

$S2 = 30 + 40 = 70$

$$= 70 + 62 = 132$$

$S3 = 10 + 20 + 30 = 60$

$$= 60 + 62 = 122$$

$S4 = 30 + 40 + 60 = 130$

$$= 130 + 62 = 192$$

$S5 = 10 + 20 + 30 + 40 = 100$

$$= 100 + 62 = 162$$

$S6 = 10 + 20 + 30 + 40 + 60 = 160$

$$= 160 + 62 = 222$$

$S7 = 10 + 20 + 30 + 40 + 60 + 60 = 220$

$$= 220 + 62 = 282$$

$S8 = 10 + 20 + 30 + 40 + 60 + 60 + 60 = 280$

$$= 280 + 62 = 342$$

$S9 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 = 340$

$$= 340 + 62 = 402$$

$S10 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 = 400$

$$= 400 + 62 = 462$$

$S11 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 = 460$

$$= 460 + 62 = 522$$

$S12 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 520$

$$= 520 + 62 = 582$$

$S13 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 580$

$$= 580 + 62 = 642$$

$S14 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

$$= 640 + 62 = 702$$

$S15 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

$$= 640 + 62 = 702$$

$S16 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

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$S17 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

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$S18 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

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$S19 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

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$S21 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

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$S22 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

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$S26 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

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$S31 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

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$S40 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

$$= 640 + 62 = 702$$

$S41 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

$$= 640 + 62 = 702$$

$S42 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

$$= 640 + 62 = 702$$

$S43 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

$$= 640 + 62 = 702$$

$S44 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

$$= 640 + 62 = 702$$

$S45 = 10 + 20 + 30 + 40 + 60 + 60 + 60 + 60 + 60 + 60 + 60 = 640$

$$= 640 + 6$$