Binary search on Answer

Interview problems

Ques : Capacity to ship packages within D days

[Leetcode 1011]

weights = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 } days = 5

Capacity of ship → minimum

2x → 20

Day-1 → 1, 2, 3, 4, 5 : 15 ✓

Day-2 → 6, 7 : 13 ✓

Day-3 → 8, 9 : 17 ✓

Day-4 → 10 : 10 ✓

Ques : Capacity to ship packages within D days

[Leetcode 1011]

weights = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 } days = 5

Capacity of ship → minimum

Ex → 10

Day 1 : 1, 2, 3, 4 : 10 ✓

Day 2 : 4, 5 : 9 ✓

Day 3 : 6 : 6 ✓

Day - 4 : 7 ✓

Day - 5 : 8 ✓

Capacity : 15 → Min

Day 1 → 1, 2, 3, 4, 5

Day 2 → 6, 7

Day 3 → 8

Day 4 → 9

Day 5 → 10

Ques : Capacity to ship packages within D days

[Leetcode 1011]

weights = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 } days = 5

Capacity of ship → minimum

Capacity → 14

Day 1 : 1, 2, 3, 4

Day 2 : 5, 6

Day 3 : 7

Day 4 : 8

Day 5 : 9

Ques : Capacity to ship packages within D days

[Leetcode 1011]

weights = {3, 2, 2, 4, 1, 4}

days = 3

Minᵐ Capacity :

lo = max element of array

hi = sum of array

Capacity = 16

Day 1 → 3, 2, 2, 4, 1, 4

B.S → on 4 to 16

lo hi

Ques : Capacity to ship packages within D days

[Leetcode 1011]

weights = { 3, 2, 2, 4, 1, 4 }

days = 3

sum = 16, max = 4

lo = 4 ~~6~~

hi = ~~16~~ 9 5

mid = ~~10~~ ~~6~~ 4 5

Day-1: 3, 2

Day-2: 2

Day-3: 4, 1

Day-4: 4

ans = ~~10~~ 6

```
if ( check(mid, weights, days) == true){
    ans = mid;
    hi = mid-1;
} else lo = mid+1;
```

Ques : Capacity to ship packages within D days

[Leetcode 1011]

```
// 3,2,2,4,1,4   days = 3    mid =
int n = weights.size();
int m = mid;
int count = 0;
for(int i=0;i<n;i++){
    if(m>=weights[i]){
        m -= weights[i];
    }
    else{
        count++;
        m = mid;
        m -= weights[i];
    }
}
if(count>days) return false;
else return true;
```

count += 1;

0	1	2	3	4	5
3	2	2	4	1	4

d = 3

mid = 5

Day-1 : 3 2

Day-2 : 2

Day-3 : 4 1

Day-4 : 4

m = 5 3 1 5 2 0 4 1 5 1

count = 0 1 2 3

Ques : Koko eating bananas [Leetcode 875]

n = 8

k = ?

minimum speed

[3, 6, 7, 11]

count = 10 8

ans = 6 4

speed = 6 8 4

Binary Search

↓

min speed

lo = 1 4

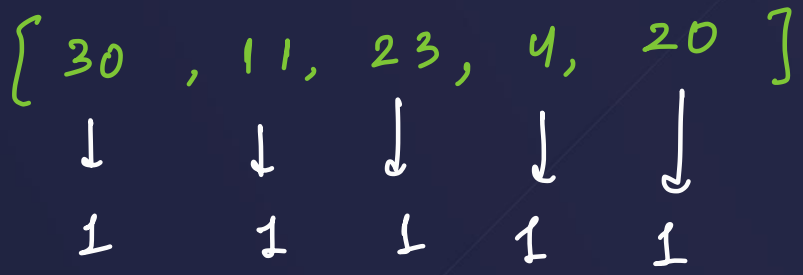
hi = 11 8 3

mid = $\frac{lo+hi}{2}$ = 6 3 4

hi = mid - 1

lo = mid + 1 ✗

Ques : Koko eating bananas [Leetcode 875]



h = 5

K = ?

lo = 1 ~~16~~ ~~24~~ ~~28~~ 30

hi = ~~30~~ 29

mid = ~~15~~ ~~23~~ ~~27~~ 29 30

count = ~~8~~ 6 ~~8~~ 6 5

ans = 30

Ques : Koko eating bananas [Leetcode 875]

[30 , 11 , 23 , 4 , 20]

h = 6

2 1 2 1 1

lo = ~~1~~ ~~16~~ 20 ~~22~~ 23

hi = ~~30~~ 22

mid = ~~15~~ 23 ~~19~~ ~~21~~ 22

count = ~~8~~ ~~6~~ ~~8~~ ~~7~~ 7

ans = 23

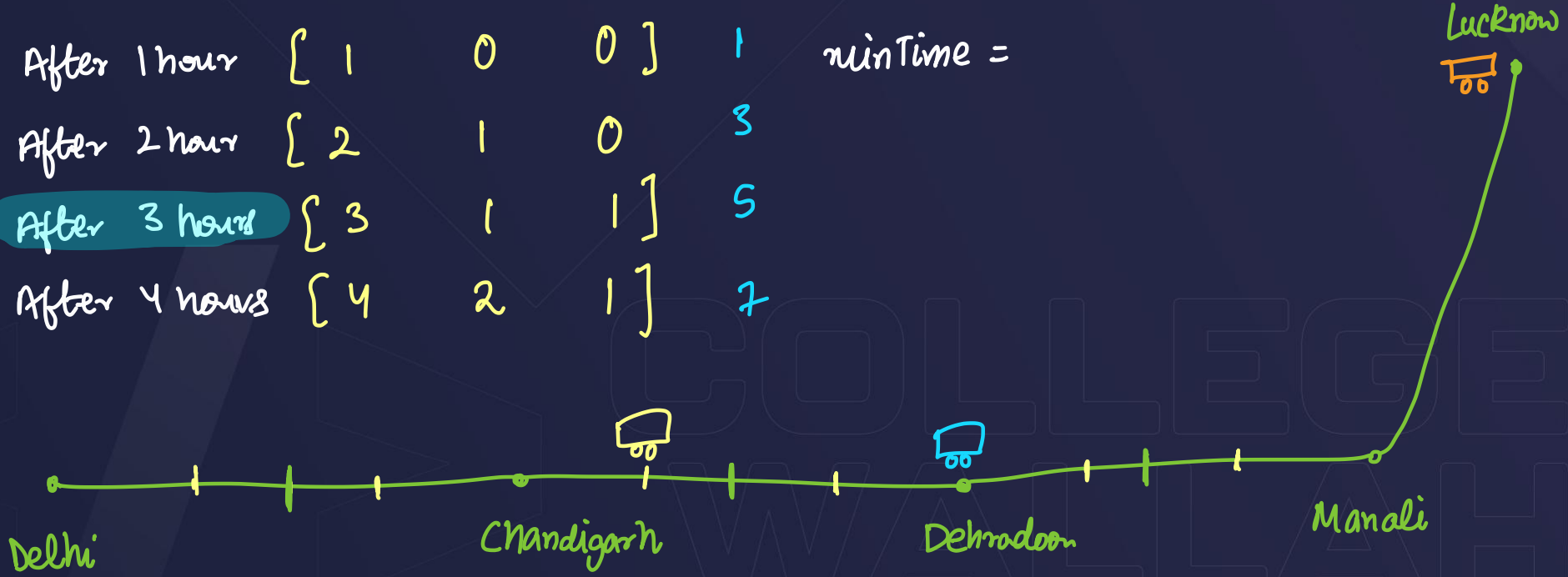
count <= hours

Ques : Minimum time to complete trips [Leetcode 2187]

	B1	B2	B3	
	[1	2	3]	
After 1 hour	[1	0	0]	1
After 2 hour	[2	1	0	3
After 3 hours	[3	1	1]	5
After 4 hours	[4	2	1]	7

atleast total Trips = 5

minTime =



Ques : Minimum time to complete trips [Leetcode 2187]

B1 B2 B3 B4 B5 B6 B7

[9, 7, 10, 9, 10, 9, 10]

totalTrips = 1

minTime = ?

```
long long minimumTime(vector<int>& time, int totalTrips) {
    // 3 3 3
    // after 15 hours [5 5 5] = 15
    int n = time.size();
    int mx = -1;
    for(int i=0;i<n;i++){
        mx = max(mx,time[i]);
    }
    long long lo = 1;
    long long hi = (long long)mx*(long long)totalTrips/([redacted];
    long long ans = -1;
    while(lo<=hi){
        long long mid = lo + (hi-lo)/2;
        if(check(mid, time, totalTrips)==true){
            ans = mid;
            hi = mid - 1;
        }
        else lo = mid + 1;
    }
    return ans;
}
```

mx = 10

lo = 1

hi = mx * tt / n = 10 * 1 / 7

= 1