Painter's Partition Problem

Given are N boards of length of each given in the form of array, and Mpainters, such that each painter takes 1 unit of time to paint 1 unit of the board.

The task is to find the minimum time to paint all boards under the constraints that any painter will only paint continuous sections of boards

Painter's Partition Problem

arr = [40, 30, 10, 20] M = 2 Time to Paint (Minimum) = ?

P1 = 40 P2 = 60 → 60

P1 = 70 P2 = 30 → 70

P1 = 80 P2 = 20 → 80

[40, 30, 10, 20]

min (max(boardlengths)) max = Sum(boardlengths)

40, 50, 60, 70, 80, 90, 100

54 ← 62

[min start] [max end]

mid = st + (e − s)/2

mid

Not possible Possible — left side

70 = 40 + 30 —

end = mid − 1

left side — 54 — Right side

st = mid + 1

62

Pseudocode

```
st = max(arr)    end = sum(arr)    ans = -1
while(start <= end){
    mid = st + (e-s)/2
    if(IsPossible(mid)) → left
        ans = mid
        end = mid-1
    else — Right
        st = mid+1
}
return ans
}

bool IsPossible(arr[], n, m, mid){        (max_allowed)
    pointers = 1 , time = 0
    for(i=0; i<n; i++){
        if(time + arr[i] <= maxAllowedTime)
            time += arr[i]
        else{
            pointer++
            time = arr[i]
        }
```