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Question 3:

First ,lets differentiate all the monster by check ai <= gi or a i> gi
to list strengthincrease[] and strengthdecrease[]
It takes O(N) time

Then just start from strengthincrease[] , its all monsters that can increase strength , to make sure Beat as many monsters as possible, hero be supposed to start from smaller a to higher a,it reduce hero's strength becomes to negative as far as possible before gaining g

So we sort strengthincrease[] from smaller a to higher a. it takes O(NlogN)(N = length of list)

After that we move to strengthdecrease[]

In this case, there are only six ways ,

1. defeat monster from smaller a to larger a
   But for example we have
   S = 100
   M1(a:45 , g:40) and M2(100:50)
   M1 first then M2 is infeasible
   100-45+40<100
   but it work M2 first then M1
   100-100+50>45
   So not satisfy
2. defeat monster from larger a to smaller a
   Also a example
   S = 100
   M1(a:80,g:20) M2(70:60)
   M1 first then M2 is infeasible
   100-80+20 < 70
   but it work M2 first then M1
   100-70+60>80
   So not satisfy

3. defeat monster from smaller a-g to larger a-g
   S = 100
   M1(a:40,g:30) M2 (a:100,g:50)
   M1 first then M2 is infeasible
   100-40+30 < 100
   but it work M2 first then M1
   100-100+50>40
   So not satisfy
4. defeat monster from larger a-g to smaller a-g
   S = 100
   M1(a:85,g:30) M2 (a:50,g:40)
   M1 first then M2 is infeasible
   100-85+30 < 50
   but it work M2 first then M1
   100-50+40>85
   So not satisfy
5. defeat monster from smaller g to larger g
   S = 100
   M1(a:75,g:10) M2 (a:40,g:20)
   M1 first then M2 is infeasible
   100-75+10 < 40
   but it work M2 first then M1
   100-40+20>75
   So not satisfy
6. defeat monster from smaller g to larger g

Because all of the others have counterexamples, so here we use small g to larger g to sort strengthdecrease[]

Totally it cost O(N)+ O(NlogN)(sort half N by smaller a and the other half by greater g)

So this algorithm is
First attact all the monsters with a <= g from smaller a to greater a
Then attact all the other monsters from greater g to smaller g
If hero can beat them all then there exist an algorithm,
Else there is no such ordering.