COMP3121 Assignment 2 - Q3

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Answer

We denote

$$p_i = \frac{g_i}{a_i},$$

and calculate p_i for each monster .
Then divide monsters based on their p_i into two lists, one with $p_i \geq 1$, one with $p_i < 1$. Sort the first list in ascending order of a_i, second list in descending order of a_i.
Hero first fight monsters in the list that $p_i \geq 1$ from lowest a_i to highest a_i. In fighting with each monster if (when fighting with the k-th monster in the list)

$$S + \sum_{i=0}^{k-1} (g_i - a_i) - a_k < 0,$$

algorithm output "no such ordering", and end the algorithm. Else add the monster k to the order list to record the ordering of the fight.
When the first list loop finished hero then start to fight monsters in the list that $p_i < 1$ from highest a_i to lowest a_i. Again repeat the above process with S adding the gained strength from fightings in the first list of monsters, until all monsters are killed (list loop over) or hero's strength is less than a_k before tackling a monster k. If all monsters are killed, output the order list, otherwise output "no such ordering".