**COMP9101 Ass02**

**Name: Zanning Wang**

**zID: z5224151**

**Q3:**

In order to try to kill all monsters, we can divide the monsters into two category, the first one is that ai <= gi, which means by killing those monster, we will gain the strength after killing those monsters, the other category is those ai > gi. for ai <= gi. In order to ensure we can kill the next monster, we should accumulate the strength as most as we can, therefore we should start with the smallest ai, for ai > gi, after killing those monster, we will definitely lose some strength, we may not be able to kill the next monsters if the strength we recover is too low, therefore we should start with the largest gi, the sudo-code may like below:

文本

描述已自动生成

For line 4, we divide all monster into two category, the first category is ai <= gi, the second is ai > gi, the output array1 may like that: array1 = [[2,4],[3,6],[4,5]] (the first one is ai, the second is gi), which the time complexity is the number of monster (O(n))

For line5-6, the function sort\_1 sort the first value, which is ai in ascending order, the function sort\_2 sort the second value, which is gi in descending order, which the time complexity is O(NlogN)

From line8-22, we check if the current strength S can beat the next monster with our algorithm, if not return “no such ordering”,the time complexity for those two loop is O(2N)

Therefore, the total time complexity is O(NlogN).