Sorting Exams

Filename: sorting

In June of every year, a select group of the AP teachers get together to grade all of the exams. Since there are so many exams, the teachers are split into many groups and each group grades just some of the exams. After each group finishes, for record keeping purposes, the physical exams must all be sorted in alphabetical order. Naturally, each group already sorts their exams, thus, the last remaining step is to take several stacks of sorted exams and put them together into one sorted stack.

As part of the AP curriculum, you've learned how to merge two sorted stacks into one sorted stack. If the sizes of the two sorted stacks are x and y, respectively, you can produce the one sorted stack in $x+y$ steps. The AP teachers have asked you to devise an algorithm that repeatedly uses this technique to merge all of their stacks together into one sorted stack. Natually, they would like your algorithm to take as few steps as possible.

For example, imagine there are four stacks of 10 papers each. One method would be to merge the first two stacks, creating a stack of 20 papers. This takes 20 steps. Then, you could merge this newly created stack with one of the other stack, creating a stack of 30 papers. This takes 30 steps. Finally, you can merge the last two remaining stacks of sizes 30 and 10 into one sorted stack of size 40. This takes 40 steps. The total number of steps taken here is 20+30+40 = 90. Consider a different alternative for picking stacks to be merged in this example. Merge the first two stacks of size 10 into one stack of size 20. This takes 20 steps. Then, merge the last two stacks of size 10 into one stack of size 20. This takes 20 steps. Finally, merge the two stacks of size 20 together to form one sorted stack of size 40. This takes 40 steps. The total work here is 20+20+40 = 80 steps. Thus, for this particular set of papers, the optimal cost for merging them into one sorted stack is 80 steps.

The Problem

Given a list of the sizes of the stacks of sorted papers after the AP teachers have finished grading in their groups, calculate the minimum number of steps it will take to merge all of the stacks into one sorted stack, using the method described above where at each step, any two stacks are chosen to merge into one, over and over again.

The Input

The first line of the input file will contain a single positive integer, n ($n \leq 50$), representing the number of exam grading sessions to process. The information for each grading session follows. The first line of input for each grading session contains a single positive integer, g ($g \leq 500$), representing the number of grading groups for that grading session. The second line of input for each grading session will contain g space-separated positive integers, each less than or equal to 500, representing the number of papers graded by each group in the grading session.

The Output

For each grading session, output a single integer repsenting the minimum number of steps necessary to merge all of the sorted stacks of papers into a single sorted stack of papers.

Sample Input

```
3
3
1 2 3
4
1 2 3 4
3
1 3 2
```

Sample Output

```
9
19
9
```