The Fundraising problem

A university has organized a charity event to raise funds. Each guest has been secretly assigned a $generosity$ factor. The university students have been divided into m groups of n students each, to collect donations from the guests. Each student has a $charm$ factor.

The rules of collecting donations from guests are as follows:

1. Each table must be approached by exactly one group of students, but a particular group can approach more than one table.
2. Each guest must be approached by exactly one student once, but a student can approach more than one guest.
3. A student can approach at most k guests throughout the duration of the event.

The donation collected by student i from guest j is $c[i] * g[j]$, where $c[i]$ is the charm of the ith student, and $g[j]$ is the generosity of the jth guest.

Total donation collected by a student is the sum of donations collected by him/her from all guests he/she approached during the event. Total donation raised from the charity event is the sum of total donations collected by each individual student.

Find the maximum possible total donation that can be raised during the event.

Input Format

The first line of input contains a single integer tc denoting the number of test cases. Input format for each test case is given below.

- First line of each test case cotains three integers m, n and t denoting the number of groups, the number of students in each group, and the total number of tables for the guests respectively.
- The next m lines represent a particular student group, and the jth student in the ith line denotes the charm of the jth student in the ith group.
- The next t lines each begin with an integer x, denoting the number of guests sitting at the ith table. Then x integers follow, representing the generosity of the guests sitting at the ith table.
- The last line of each test case contains an integer k denoting the maximum number of guests that a student can approach.

Constraints

- $1 \leq tc \leq 10$
- $1 \leq n, m, t, x, k \leq 15$
- $0 \leq charm, generosity \leq 1000000$
- The sum of m over all cases in each input is at most 15

Output Format

Print a single integer on a new line for each test case, which is the maximum possible donation that can be raised during the event, or print -1 if at least one of the rules for collecting donation from guests cannot be followed.

Sample Input 0

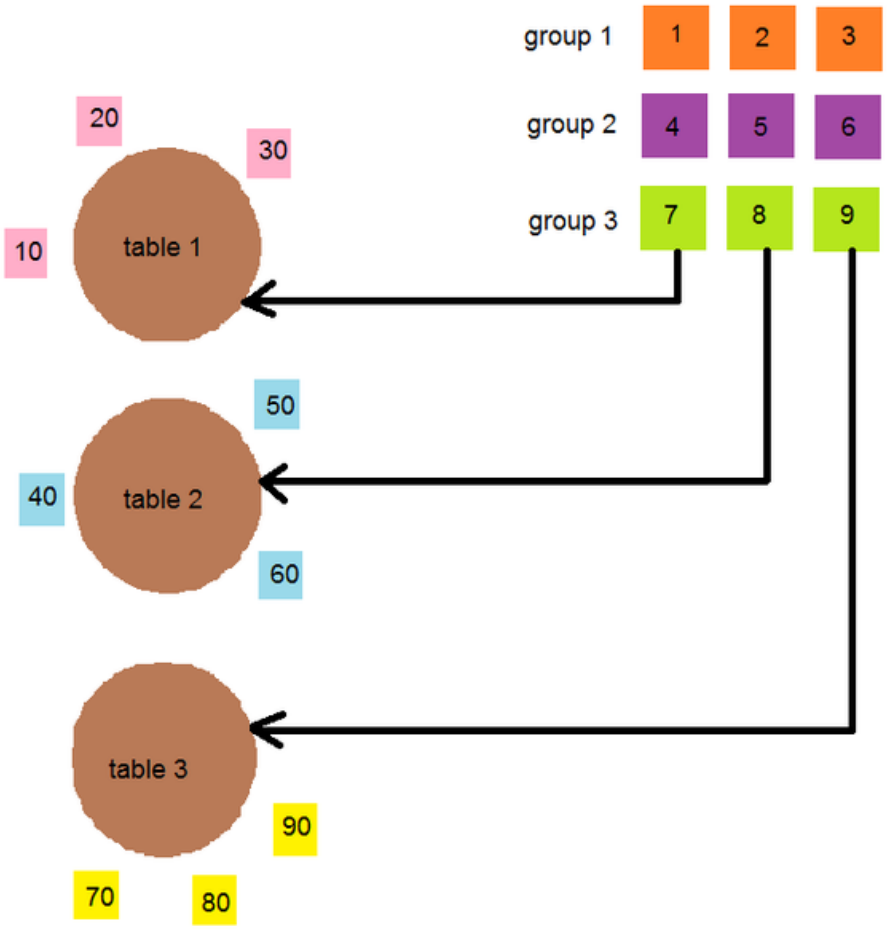
```
4
3 3 3
1 2 3
4 5 6
7 8 9
3 10 20 30
3 40 50 60
3 70 80 90
3
3 3 3
1 2 3
4 5 6
7 8 9
2 100 200
1 500
2 30 30
1
3 3 3
1 2 3
4 5 6
7 8 9
1 200
2 500 500
3 30 30 30
1
3 3 3
1 2 3
4 5 6
7 8 9
1 200
2 500 500
4 30 30 30 30
1
```

Sample Output 0

```
3780
7130
10350
-1
```

Explanation 0

In the first case:



test case 1

The third group has students with maximum charm (9,8,7), and k=3, therefore, the last group will approach all three tables, and each student will apprach three guests from the tables. Student with charm 9 will approach guests from the third table, student with charm 8 will approach guests from the second table, student with charm 7 will approach guests from first table. Other two groups will not approach any table or any guest, following the rules.

In the second case:
k=1. Therefore, each student can approach one guest each. The third group will approach first two tables, with student with charm 9 approaching guest with generosity 500, student with charm 8 approaching guest with generosity 200 and student with charm 7 approaching guest with generosity 100. The second group will approach the third table, such that students with charm 6 and 5 will approach one guest each, from that table. Notice that the first group won't approach any guest at all, and the student with charm 4 won't approach any guest either.

In the fourth case:
k=1, but the third table has 4 guests. Therefore, no single group will be able to approach all guests from the last table, therefore the rules cannot be followed in this case.