Bill and Ted's Shortest Adventure

Bill and Ted have a history presentation and need to do well or else they will fail the class and Ted will have to go to military school in Alaska. Luckily, they have a time-traveling phone booth that they will use to go and collect different famous people from different time periods in history to help with their presentation.

Traveling between times can take a while and Bill and Ted have asked for your help in figuring out the shortest way to go through time in order to bring back a particular famous person, so they can collect as many famous people as possible and prepare for their presentation. Bill and Ted are going to be borrowing F famous people, each at a certain year Y. Bill and Ted have a phone directory that lists N different years and the number of minutes it takes for them to travel from one year to the next.. Bill and Ted can't bring you along, so they would like to know the minimum number of minutes they need to travel in order to get to the famous person at year Y in the shortest amount of time when they start time-traveling from the current year of 1989.

Input

Input begins with the number of famous people Bill and Ted are going to borrow F ($F \leq 20$). For each famous person there is a line containing N, the number of different years in the phone book ($1 \leq N \leq 50$). On each of the following N lines will be the year Y ($0 \leq Y \leq 1989$), followed by N integers, each equal to the number of minutes m_i ($0 \leq m_i \leq 600$) required to travel from year Y to year i. The last line will contain T ($0 \leq T \leq 1989$), the year in which our famous person lives.

Output

For each famous person, print out the minimum number of minutes required for Bill and Ted to have the shortest possible trip from 1989 to the famous person's year. Your output should follow the exact format shown in the sample output below.

Sample Input

```
2
5
1989 0 4 19 7 9
1312 8 0 14 7 3
0 5 9 0 3 4
621 9 3 8 0 9
1812 3 6 7 3 0
0
1
1989 0
1989
```

Sample Output

```
14
0
```