L: Constitutional Tribunal

Memory limit: **128 MB**

The Constitutional Tribunal will be re-organized due to (apparently) low efficiency of their work. Before that happens the Tribunal will not accept any new pending laws until Chief Judge, the Judge number 1, makes a ruling on all the pending laws that were brought to the Tribunal before the re-organization. All of his subordinates, the Judges with numbers greater than 1, work according to old schedule: for each $i > 1$, the Judge number i comes to work at 8:00 and immediately takes c_i pending laws from his inbox (or all of them if there are less than c_i pending laws in his inbox), which he then evaluates, and at the end of the day, at 16:00, he puts all of the evaluated laws in his outbox. After 16:00 the laws are transferred to the next Judge: from outbox of Judge number i the laws are moved to inbox of his superior – Judge number p_i. Of course the final superior of all Judges is the Chief Judge, that is, the Judge number 1. The Chief Judge wants to know, when all the pending laws, will end up in his inbox. For this he came to work earlier today, and personally counted how many pending laws are in the inboxes of other Judges. It turned out that inbox of Judge number i (for $i > 1$) contains s_i pending laws. Help the Chief Judge to compute how many days will pass until all the pending laws will end up in his inbox, so that he can finally make a ruling on them.

Input

The input contains multiple testcases. The first line of input contains the number of testcases Z ($Z \geq 1$). Then all the testcases follow.

Each testcase begins with a line with a single integer n ($2 \leq n \leq 5000$), denoting the number of Judges in the Constitutional Tribunal. The next line contains $n-1$ integers $s_2, s_3, \ldots, s_n$, separated by single spaces, where s_i ($0 \leq s_i \leq 10^9$) denotes the number of pending laws that are currently in the inbox of Judge number i. The next line contains $n-1$ integers $p_2, p_3, \ldots, p_n$, separated by single spaces, where p_i ($1 \leq p_i < i$) means that Judge i is subordinate of a Judge number p_i. The last line (for this testcase) contains $n-1$ integers $c_2, c_3, \ldots, c_n$, separated by single spaces, where c_i ($1 \leq c_i \leq 10^9$) is the number of laws that Judge number i evaluates every day.

The sum of n over all testcases is no larger than 5000.

Output

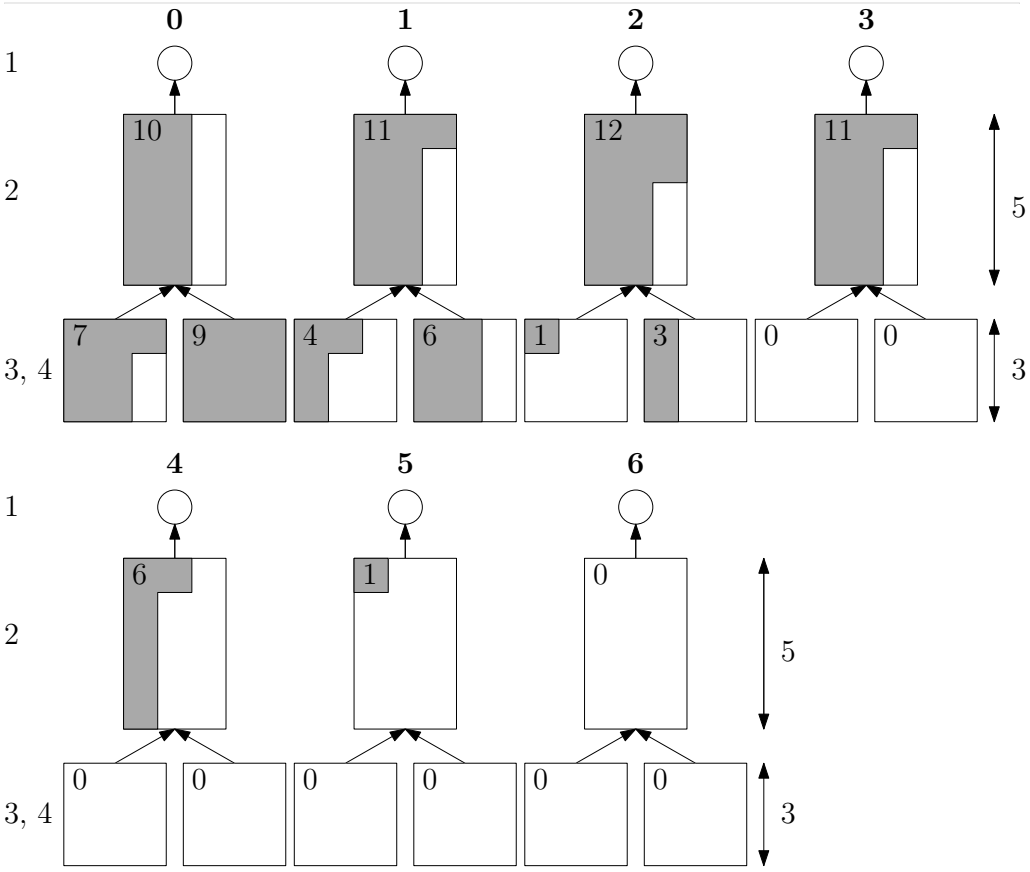
For each testcase you should output a single line containing one integer: the number of days that will pass until all the pending laws will end up in Chief Judge's inbox.

Example

Input	Output
2 4 10 7 9 1 2 2 5 3 3 4 4 0 5 1 2 3 5 1 2	6 7

The diagram shows the state in the morning of each day. The numbers of the days are written in bold above, and the numbers of the Judges are written on the left. The Chief Judge is denoted by circle, while for all the other judges their inboxes are represented by rectangles. The arrows denote the superiority relation. The rectangle representing Judge number i inbox has height c_i, marked on the right and width large enough to hold all the pending laws in his inbox. The laws in inbox are shaded, and their number is also written in the top left corner. Judge number i ($i > 1$) evaluates up to c_i laws every day — graphically this corresponds to "removing" the first column of laws from his inbox, and "shifting" of the remaining laws to the left. Removed laws are (at the end of the day) moved to the rectangle of superior Judge p_i.

First testcase:



Second testcase: