11^{th} South African Regional
ACM Collegiate Programming Contest

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Problem 6 - Green Balloon
The Heist

Problem Description

You are a member of a notorious gang of bank robbers. Part of your success has always been due to your impressive getaway strategies. Your next target is a bank in Manhattan, and you are concerned that a clean getaway may be hampered by the traffic on the roads.

To help you to plan the best possible escape route you have collected information on the average time required to traverse a given section of the road under the expected traffic conditions at the time of the robbery. You have measured the time needed to travel from one intersection to the next, including the delay spent waiting at the first intersection of that road segment. Incidentally, it would appear that you wait exactly one minute at each intersection.

With this detailed information you set about planning an optimal escape route. From experience, you know that you will have to get out of Manhattan extremely quickly, or you are sure to be caught. The only way to reduce the travel time would be to skip some of the intersections, i.e., to *not* stop at all of the traffic lights. This is clearly a risky proposition, so using accident statistics you have derived a probability figure for successfully crossing each intersection, taking into account that the light may be red in your direction. Given your chosen profession, you are clearly willing to take some risks, but you are not willing to accept a route that has a total probability of avoiding collisions of less than 0.5.

Your objective is therefore to find the quickest route from the bank to your exit point, while keeping in mind that you can skip some of the traffic lights, shaving one minute off those segments in the process.

Input

Your input will consist of an arbitrary number of records (fewer than 20), with each record representing a complete problem.

The format of each record is:

n
$p_1\ p_2\ \cdots\ p_n$
$\texttt{start\_intersection}_1\ \texttt{end\_intersection}_1\ \texttt{time}_1$
...
$\texttt{start\_intersection}_k\ \texttt{end\_intersection}_k\ \texttt{time}_k$
-1

The first line of each record contains the value n, which represents the number of intersections in this record, with $n \in 2..20$.

The second line of a record contains n floating point values p_i (where $i \in 1..n$) denoting the probability of successfully skipping the light at intersection i. Note that $0 \leq p_i \leq 1.0$. An intersection with a collision avoidance probability of less than 0.5 can not be skipped, but it may of course be traversed in the usual manner.

The `start_intersection` and `end_intersection` fields denote the numbers you have assigned to the respective intersections. Intersections are numbered from 1 through to `n` inclusive.

The integer `time` field denotes the travelling time from `start_intersection` to `end_intersection` (in minutes) — this includes the 1 minute spent waiting for the light to turn green at `start_intersection`. This only specifies the time for the direction `start_intersection` to `end_intersection`; if the reverse route exists, it will be specified explicitly as another such entry. Only one path from `start_intersection` to `end_intersection` will be specified for the direction `start_intersection` to `end_intersection`. The `time` field is guaranteed to be between 1 minute and 10 minutes, inclusive.

You may assume that you always start your journey at the entry point (before the traffic light) of intersection 1 (the bank), and that your destination is the entry point (before the traffic light) of intersection n (the exit). You may also assume that there is at least one route from the bank to the exit.

A `start_intersection` value of -1 indicates the end of a given record. The end of all input records is indicated by an n value of zero.

Output

For each input record, your program must produce the appropriate output, which consists of a single number denoting the time required for following the best route.

In order to reduce your journey time you may skip zero or more of the intersections. If you skip an intersection, the travel time on road sections *leaving* that intersection are reduced by one minute. A route is only valid if the total probability of avoiding collisions (combined probability across all intersections that you skip) is greater than or equal to 0.5.

Sample Input

```
8
0.4 0.4 0.71 0.71 0.4 0.4 0.4 0.4
1 2 1
2 3 2
2 5 1
3 4 2
3 6 2
4 7 2
5 6 3
6 7 1
7 8 1
-1
9
0.4 0.4 0.8 0.8 0.8 0.4 0.6 0.6 0.4
1 2 1
2 3 1
2 7 1
3 4 2
4 5 2
5 6 2
6 9 1
7 8 3
8 6 2
-1
0
```

Sample Output

```
6
6
```

Time Limit

90 seconds