Coding Area

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Vaccination Throughput

Problem Description

Vaccination drive is going on in your company. Your manager has been given the responsibility to manage the drive. During the drive he is not able to get what is the current status of vaccination and how many people got vaccinated. There is a room in which vaccine is administered. To maintain the social distancing norms and that there should be no crowding in the room, hence, only a particular number of people are allowed inside the room at a given instance. He has given you the responsibility to write a program which will calculate how many people got vaccinated in the given duration.

Input provided will consist of start time of vaccination drive and the time in minutes at which different people are supposed to enter the room. Also, account for the fact that the vaccinated person has to wait for 30 minutes (observation period) in the same room.

Vaccination takes no time i.e., if a person enters room at 10:48, that person is vaccinated at 10:48 itself and has to wait for 30 minutes (observation period) and can leave the room only at 11:18.

Once the room is fully occupied by vaccinated people, a security protocol kicks in and prevents any non-vaccinated person who is awaiting his turn to enter the vaccination room, for 15 minutes, from that time. However, during this period those who have completed their observation period are permitted to leave the room. Thus, the room ceases to be empty, but the protocol still prevents people waiting in queue to enter the room because the security protocol is in force. Upon completion of 15 minutes, the protocol is deactivated and the people waiting in line may enter the room. However, after 15 mins, if the room is still full, the protocol is activated again, and same rules apply.

However, the dynamics are different if the vaccination room is full, but no one is waiting in the queue. In such a case, the security protocol is deactivated as soon as one person leaves the room, provided the waiting queue is still empty. If the waiting queue becomes non-zero before the person leaves, then the security protocol lasts for full duration of 15 minutes.

For example,

If the vaccination room is full at 10:12 and person A was supposed to enter the room at 10:12, then because of the activation of security protocol, A can't enter the room. This is true even if person B leaves the vaccination room at 10:15. The earliest A can enter the room is at 10:27.

However, if A was to arrive at say 10:16 or later, and let's assume that there is no one in the queue before him, then he would find that the security protocol is deactivated because the room ceased to be full at 10:15. Hence A can enter the vaccination room at 10:16 itself.

Constraints

00.00 <= start time, required time <= 23.59

0 < N < 100

0 < capacity < 50

Anybody who enters the vaccination is guaranteed to receive a dose. The room will never run out of vaccines.

Input

First line consists of an integer denoting the capacity of vaccination room.

Second line consists of a string denoting time at which vaccination drive started.

Third line consists of a string denoting time at which the status of number of people who successfully left the vaccinations room, is desired. Let's call it the status update time.

Fourth line consists of an integer denoting total number of people (N) who came for vaccination.

Fifth line consists of N space separated integers denoting the time in minutes, relative to the vaccination drive start time, at which the people arrived for vaccination.

Output

Print the number of people who left the vaccination room at or before status update time.

Time Limit (secs)

1

Examples

Input

4

10.00

11.15

10

1 5 15 25 35 45 48 50 57 60

Output

6

Explanation-

In this case, we have room capacity of 4 people, and vaccination drive started at 10.00 and we have to calculate how many people got vaccinated and left the room at or before 11.15.

So,

At 10:01 person 1 enters the room and gets vaccinated and his observation period ends at 10:31.

At 10:05 person 2 enters the room and gets vaccinated and his observation period ends at 10:35.

At 10:15 person 3 enters the room and gets vaccinated and his observation period ends at 10:45.

At 10:25 person 4 enters the room and gets vaccinated and his observation period ends at 10:55.

Here at 10:25, room is full, and the security protocol is activated. At 10:31, person 1 leaves the room as his observation period is complete. At 10:31, the waiting queue is empty. Hence the security protocol will get deactivated at 10:31. Hence anybody arriving after 10:31 can directly be allowed in the vaccination room.

At 10:35, person 2 leaves the room and, person 5 enters the room and gets vaccinated and his observation period ends at 11:05.

So, the total number of people in the room at 10:35 is 3 (Person 3, Person4, Person 5).

At 10:45, person 3 leaves the room and person 6 enters the room. Person 6's observation period ends at 11:15.

So, the total number of people in the room at 10:45 is 3 (Person 4, Person 5, Person 6).

At 10:48, Person 7 enters the room, but he does not get counted as vaccinated because person 7's observation period will end at 11:18, but the status report is desired as of 11:15.

So, the total number of people vaccinated before 11:15 are 6.

Example 2

Input

10

09.15

12.45

12

2 7 9 12 13 15 17 18 19 24 25 30

Output

12

Explanation

Applying similar logic as applied in the example 1, the output of example 2 comes out to be 12.