2006 Canadian Computing Competition
Day 2, Question 1

Input file: `cntower2.in`
Output file: `cntower2.out`
Source file: `n:\cntower2\cntower2.___`

CN Tower 2

Recall that Christy C. Coder is in Toronto, on the CN Tower, intending to take photos of all the Toronto landmarks from the rotating restaurant as it turns. As we mentioned in the problem yesterday, the restaurant rotates 360 degrees every 72 minutes. From there, Christy can see the whole city, and take close-up pictures of all the landmarks using her fancy new 100x optical zoom camera. Since the restaurant itself rotates, she only needs to stand in one place to take pictures in all directions.

Since the waiters are not very understanding of her plan, Christy must take her pictures as quickly as possible. The program that you were to write yesterday determined the minimum amount of time needed to take pictures of all the landmarks.

The elevator normally takes 61 seconds to get from the ground up to the rotating restaurant. Unfortunately, when Christy arrives at the CN Tower, she learns that the elevator is out of service, so she has to take the stairs, which takes somewhat longer. Christy arrives at the top at 9:36 pm, by which time it is dark. She can only take pictures with a very powerful flash, which takes a long time to recharge between pictures. While the flash is charging, she cannot take any pictures. Thus, Christy needs a new program to calculate the minimum time that she must spend in the restaurant in order for it to rotate enough to bring all the landmarks in view, and taking into consideration the charging time of the flash. In addition to these difficulties, the restaurant closes at midnight. Thus, Christy may not have enough time to take pictures of all the landmarks.

As before, assume that Christy does not move around in the restaurant after choosing her initial position, but waits for it to rotate to the angle required to take each picture. As with the daytime problem, Christy can (very quickly) pick her initial position, since the restaurant is not that big. Christy always points her camera exactly perpendicular to the window to minimize distortion due to the glass. After taking the last picture, Christy must stay in the restaurant until her flash recharges. Since it is dark outside, if more than one landmark occupies an angular position, Christy can capture only one one landmark per photo (in order to keep the desired landmark in focus, blurring all others). **This last point is different than the CN Tower requirements from yesterday, since that was daytime!**

Input

The first line of input consists of an integer n ($1 \leq n \leq 1000$), the number of landmarks Christy wants to photograph. Each of the following n lines specify a landmark. Each landmark specification consists of the landmark name (a string of uppercase and lowercase letters), a space, and the compass angle, in degrees, to the landmark from the CN Tower (0

= north, 90 = east, 180 = south, 270 = west). Finally, the last line contains the amount of time, in seconds, required for the flash to charge.

Output

A single integer, the minimum number of seconds that Christy must remain in the restaurant. If the time is not an integer number of seconds, round it up to the nearest second. If it is not possible for Christy to take all the pictures before closing, instead output `not possible`.

Sample Input

```
5
CasaLoma 231
OntarioParliament 123
SkyDome 75
RoyalYorkHotel 340
PearsonAirport 165
10
```

Sample Output

```
3022
```

QOJ adaptation notes

Read from standard input and write to standard output. The historical file names and local Windows paths in the original statement are not used on QOJ. The full score is 25 points. The original statement pages are reproduced without changes; the original PDF is also available as an attachment.

No original numeric test weights were recovered. QOJ reconstructs 12 independent numbered batches totaling 25 points. Each batch must pass in full. The batch weights are: 2.083333, 2.083333, 2.083333, 2.083333, 2.083333, 2.083333, 2.083333, 2.083333, 2.083333, 2.083333, 2.083333, 2.083337.

The charging time includes recharging after the final photograph, as in the original statement. The available time is 144 minutes (8640 seconds). Twelve complete original input/output pairs are used; other orphan output files in the archive are not additional tests.