Problem A. Segmentation

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

ZOYI is developing a tool called Channel which offers a tool to talk with online users in the site. Recently, ZOYI introduced a RF(Recency / Frequency) Model to distinguish users who are using the Channel and decided to classify the users through following calculations.

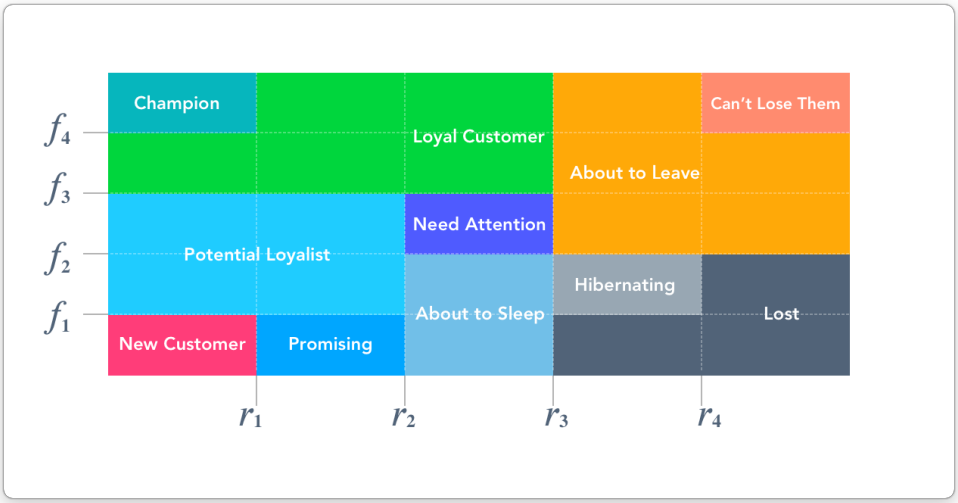

Figure : Distinguishing users in RF Channel. Horizontal axis represents Recency, while vertical axis represents Frequency.

($0 < f_1 < f_2 < f_3 < f_4$, $0 < r_1 < r_2 < r_3 < r_4$, all f_i and r_i are integers.)

x axis represents Recency and y axis represents Frequency. All online users are given values r, f by their connection record, and are classified into one of twelve conditions shown below.

- "`New Customer`"
- "`Promising`"
- "`About to Sleep`"
- "`Hibernating`"
- "`Lost`"
- "`Potential Loyalist`"
- "`Need Attention`"
- "`About to Leave`"
- "`Champion`"
- "`Loyal Customer`"
- "`Can't Lose Them`"
- "`None`"

Among those, "`None`"means the user has no connection record to the server. If $(r,\ f)$ is located on two or more classification boundaries, it follows the classification of $(r - 0.5, f - 0.5)$. For example, if the value of $(r,\ f)$ is $(r_4,\ f_2)$ it is classified as "`Hibernating` while if the value is $(r_3,\ f_4)$, it is classified as "`Loyal Customer`".

You want to investigate users' statuses who are interested in RUN, so you are trying to install the program in the following way :

- r: if the current time is t, $t -$ (most recent access time)
- f: number of visited times

Given events of site users, make a program which classifies the users following the given picture above.

Input

First line contains four space-separated integers $r_1,\ r_2,\ r_3,\ r_4$. $(0 < r_1 < r_2 < r_3 < r_4 \leq 10,000)$

Second line consists four space-separated integers $f_1,\ f_2,\ f_3,\ f_4$. $(0 < f_1 < f_2 < f_3 < f_4 \leq 10,000)$

Third line contains a single integer N. $(1 \leq N \leq 100,000)$

Next N lines contains events in time order, where ith element represents the event held at time i.

Each event is given as space-separated A and B, where B is the username which contains no whitespace with at most 10 alphabets. A has a value of 1 or 2, where 1 means the user entered the site while 2 means you should print how the user is classified.

Output

For events where A is 2, print how the user is classified in each line (without quotes).

Example

standard input	standard output
1 2 3 4 1 2 3 4 8 1 RUN 1 Alex 2 Alex 1 RUN 1 RUN 1 Alex 2 Alex 2 RUN	New Customer Potential Loyalist Need Attention

Note

The connection status of `Alex` is $f = 1$ (first visit), $r = 1$ (time 3 - 2 = 1) at time 3. Thus, Alex is classified as "`New Customer`".

At time 7, the connection status of `Alex` is $f = 2$ (second visit), $r = 1$ (time 7 - 6 = 1). Thus, Alex is classified as "`Potential Loyalist`".

At time 8, the connection status of `RUN` is $f = 3$ (third visit), $r = 3$ (time 8 - 5 = 3). Thus, RUN is classified as "`Need Attention`".