Harry is waiting in the bus station, and he wants to go quickly home, the problem is that he dint know what route is the proper, but thankfully, somebody give he a table whit all routes times and how long takes to reach hes home, there is two types of routes, one who drop Harry directly in hes home, and other who drop he in a **x** amount of time that is needed to walk.

Input specifications

In the first input line you get the number of test cases **N (0 <= N <= 10)**, in the second line you have two numbers, the routes **R (0 <= R <= 2x10^3)**, and the start time in minutes **T (60 <= T <= 360)** after 12:00.
(Example: 60 minutes is equals to 01:00, this is the time Harry start waiting).
The next **R** lines contains the name of the route **S**, the time where the route reach the bus station **M ("T/60" <= M <= 360)**, a value **X** who represent the type of route **(1** for **direct drop, 2** for **indirect drop)**, for case **one** the only value you receive is the time needed to get home **D (10 <= D <= 360)**, for case **two** you receive **D (10 <= D <= 360)** who is the time to reach the drop point and **H (1 <= H <= 360)** who is the time from **D** to home.

Output specifications

For the **N** cases will be **N** output lines, each line contains:
"(<Test case>): <Route name> takes <Total time> minutes, Harry reach hes home at <Time harry reach home>pm."
Replacing <Test case> whit the respective test case, <Route name> whit the name of the route who takes the less time to get Harry home, <Total time> whit the respective time who took Harry to reach hes home and <Time harry reach home> whit the time moment of the day harry reach hes home; if two or more routes get the same amount of time, harry select the first one reach the bus station.

Input example

```
2
4 90
Oak 100 1 20
UTP 96 2 10 8
Pines 90 2 20 10
Invico 120 1 30
3 230
Virginia 230 1 50
La_38 290 2 10 5
Nacederos 240 2 20 5
```

Output example

(1) : UTP takes 20 minutes, Harry reach hes home at 1:54pm.
(2) : Nacederos takes 35 minutes, Harry reach hes home at 4:25pm.