Problem J

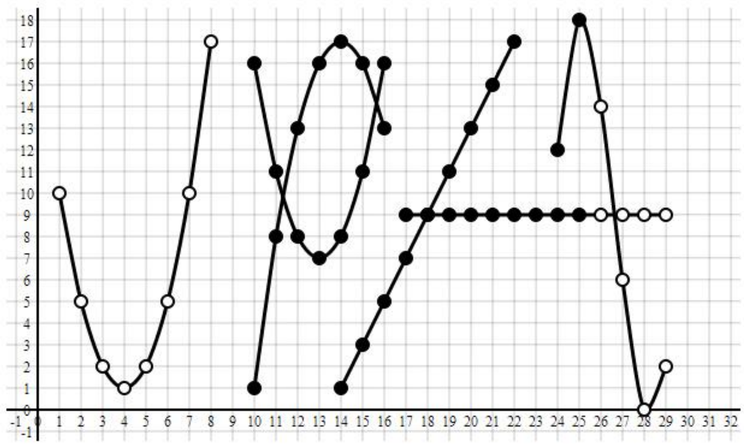
Alien Abduction Again

Last year there was an alien ship abducting people on Earth and returning them in bizarre locations. Some of them were returned in the middle of a desert, a jungle, an ocean, or a lake. Fortunately, our brilliant scientist (with some help from last year ICPC contestants) was able to quickly locate the positions in which the humans were returned and saved all the abducted humans. Nevertheless, the Earth government is still afraid that the alien ship will come back and do it again this year, or maybe even worse.

After analyzing last year report, our brilliant scientist now has a better knowledge on how the alien transporter technology works. For simplicity, let's assume our world is in one dimensional space (i.e., each person occupies space only in an interval of the x-axis). Depending on the person's orientation and posture, it requires different energy (at each integral point in the x-axis) to transport the person. To be precise, to transport a person p who lies on position $[x_1,\ x_2]$, it requires energy at each **integral** x position according to some function $f_p(x) = ax^3 + bx^2 + cx + d$.

Here is an example of 6 humans scattered on x-axis:

- Person #1 is at x = [1, 8] with $f_1(x) = x^2 - 8x + 17$
- Person #2 is at x = [10, 16] with $f_2(x) = -x^2 + 28x - 179$
- Person #3 is at x = [10, 16] with $f_3(x) = x^2 - 26x + 176$
- Person #4 is at x = [17, 29] with $f_4(x) = 9$
- Person #5 is at x = [14, 22] with $f_5(x) = 2x - 7$
- Person #6 is at x = [24, 29] with $f_6(x) = x^3 - 80x^2 + 2125x - 18732$



The graph on the right shows where on the x-axis each of the 6 person lies. The y-axis is the energy required for the transporter to operate. Note that there is no energy required for non-integral value of x. Each line (or curve) in the graph is a guideline that signifies a person.

When the alien ship performs the abduction on the human located at $[x_1,\ x_2]$, it requires energy equivalent to the total of energy at each integral x positions in between x_1 and x_2, inclusive. For example, if the alien ship tries to transport human at x = [10, 25], it would require 353 energy (i.e. the sum of the y-value of the black dots in the graph above). Observe that person #5 and person #6 are “partially” transported.

Since the transporter is operating at high energy, it creates a space distortion every time after it finished the abduction. The space distortion somehow equals to an imaginary human being registered to the system at $[\min(r_1, r_2),\ \max(r_1, r_2)]$ with some function $f_p(x)$ where $r_1 = (x_1 \cdot E)\ mod\ 10^6$, $r_2 = (x_2 \cdot E)\ mod\ 10^6$, and E is the energy required by the alien ship to perform the abduction to all humans at $[x_1,\ x_2]$ right before this imaginary human is registered. Note that this E is the non negative energy result after modulo 1,000,000,007 (see the output section).

To prevent mankind from being transported in the future, the brilliant scientist suggests us to emit negative energy with the same amount as soon as the transport operation is in progress.

Knowing this, the Earth government asks the brilliant scientist to build a device to disrupt the alien ship transport operation. However, in order to build this device, the scientist must be able to compute the total energy of a given range in the x-axis very quickly. Since the Earth is so large, even the brilliant scientist cannot compute the total energy by hand, he needs to create a program for this. Well... unsurprisingly, the brilliant scientist cannot program. Knowing that you are one of the best programmers on Earth, the scientist asks for your help again!

Note that your program must be very-very efficient, otherwise it will be too late to counter the transport operation and people will still be abducted!

Input

The first line of input contains an integer T ($T \le 30$) denoting the number of cases. Each case starts with an integer N. Each of the next N lines contains one of the following command:

- `p` x_1 x_2 a b c d : a person is registered at position $[x_1, x_2]$ with $f(x) = ax^3 + bx^2 + cx^2 + d$.
- `t` x_1 x_2 a b c d : an abduction is in progress at position $[x_1, x_2]$. After the abduction, an imaginary person is registered (due to the space distortion) which equals to the command:
  `p` $\min(r_1, r_2)$ $\max(r_1, r_2)$ a b c d
  where
  - $r_1 = (x_1 \cdot E) \bmod 10^6$
  - $r_2 = (x_2 \cdot E) \bmod 10^6$
  - E is the non negative energy result after modulo 1,000,000,007.

The constraints are:

- $1 \le N \le 100{,}000$
- $0 \le x_1 \le x_2 < 1{,}000{,}000$
- a, b, c, d are all signed 32-bit integers.

Output

For each case, output "`Case #X:`" in a line, where `X` is the case number starts from 1. For each transport (abduction) operation in each case in the input, print the total energy used modulo 1,000,000,007. If the result is negative, add it by 1,000,000,007 to make it non negative. This output corresponds to E in any previous explanations.

Sample Input	Output for Sample Input
2 7 p 1 8 0 1 -8 17 p 10 16 0 -1 28 -179 p 10 16 0 1 -26 176 p 17 29 0 0 0 9 p 14 22 0 0 2 -27 p 24 29 1 -80 2125 -18732 t 10 25 0 0 0 0 6 p 4 10 3 4 5 -600 t 2 5 1 0 0 0 t 999000 999900 0 0 0 0 p 3 6 0 0 0 141 t 2 5 3 1 2 5 t 0 999999 0 0 1 2	Case #1: 353 Case #2: 999999583 85385243 1000000006 67775098