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Problem D
Travel the Skies

One day your boss explains his new planning scheme for your company, Fly Away Air. Rather than having customers book tickets between destinations, they'll say when they want to leave and from where, and your company will take care of the rest. That means you get to generate their flight schedules and destinations for them! He has an eye on the books though and wants to make sure all your flights are fully booked. He tasks you with the job of determining if a set of flight plans in a given flight window is financially optimal in that regard.

You assure him that he put his trust—and his pocket book—in the hands of the right employee. Your job is to plan flight schedules for customers so that you fill each of the flights scheduled in the

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given flight window. To ensure you don't lose customers due to air sickness, you decide that each customer can only take one flight a day. Further, since you're sure that all of your customers are gracious folks, you decide to help your boss out and let them fly on any day on or after their suggested departure date. Finally, to simplify things, you do not worry about ensuring each customer return to their original departure airport, though this is allowed to be scheduled. If needed, they can book their own return flights!

Input

On the first line, you're given three integers: k, ($2 \leq k \leq 12$), the number of airports; n, ($1 \leq n \leq 8$), the number of days of the flight departure window; and m, ($1 \leq m \leq k \cdot (k-1) \cdot n$); the number of flights in the window. Then, m lines follow with four integers each: u, ($1 \leq u \leq k$), the flight's starting location; v, ($1 \leq v \leq k$, $u \neq v$), the flight's ending destination; d, ($1 \leq d \leq n$), the day on which the flight flies in the window; and z, ($1 \leq z \leq 30\,000$), the capacity of the flight. It is guaranteed there will be at most one flight in each direction between any two airports on a given day. Following are kn lines with three integers each: a, ($1 \leq a \leq k$), the airport; b, ($1 \leq b \leq n$), the day; and c, ($1 \leq c \leq 30\,000$), the number of customers wishing to begin their travels by leaving their homes to their local airport a on day b (notably, this does not include those who may be arriving from other flights, which is for you to decide). Each airport-day pair will appear exactly once.

Output

Output only the word `optimal` if all m flights can be filled to capacity, else output only the word `suboptimal` if it is not possible to fill all m flights. It is not necessary that each customer arriving at an airport ever be booked on a flight.

Example

Consider two airports: Chicago and Minneapolis, across two days. There are two flights: one from Chicago to Minneapolis on day 1, with capacity 30, and one from Minneapolis to Chicago on day 2, with capacity 50. On day 1, 10 people arrive at the airport in Minneapolis from their homes and 30 people arrive at the airport from their homes in Chicago. On day 2, 10 people arrive at both the Minneapolis and Chicago airports from their homes. We can fill all flights as follows. The first flight, on day 1, can take the 30 people that arrived in Chicago that day to Minneapolis.

The second flight, on day 2, can take the 30 people that arrived in Minneapolis from Chicago in the previous day's flight, plus it can take the 10 people that arrived at the Minneapolis airport on day 1 and the additional 10 people that arrived at the Minneapolis airport on day 2. Thus this flight plan is `optimal`.

Sample Input 1	Sample Output 1

<pre>2 2 2
1 2 1 30
2 1 2 50
2 1 10
1 1 30
1 2 10
2 2 10</pre>
	<pre>optimal</pre>

Sample Input 2	Sample Output 2

<pre>2 1 1
1 2 1 2
1 1 1
2 1 1</pre>
	<pre>suboptimal</pre>