E: Taxi

Memory limit: **128 MB**

Taxi rides in Byteland are quite expensive, but at least the taxi cabs are spacious. Thus, group rides are very popular. The are n carrier companies, each characterized by three numbers:

- the maximum number c_i of passengers in a taxi cab,
- the price s_i for the first kilometer of a trip,
- the price p_i for each next kilometer of a trip.

Each company can supply any number of taxi cabs, but all cabs from one company are identical.

Johnny noticed a niche in the market and decided to become a middleman in ordering of taxis. He'll have to handle requests of the form: "order a taxi for m people on a distance of d kilometers" and has to find the cheapest possible combination of taxi cabs to fulfill it assuming that passengers are not willing to change taxis during the trip. His idea hit the jackpot, his services quickly became very popular, and he now has too many requests to handle them manually. You were hired to help with automating that process.

Input

The first line of input contains two integers n ($1 \le n \le 10^5$) and q ($1 \le q \le 10^5$), separated by a single space, and denoting respectively the number of carrier companies and the number of requests to be processed.

Each of the next n lines contains three integers separated by single spaces. In the i^{th} of those lines, the integers are c_i, s_i, and p_i, ($1 \le c_i \le 15$, $0 \le s_i, p_i \le 10^6$), denoting respectively the capacity of a single cab, the price for the first kilometer, and the price for each next kilometer.

Each of the next q lines contains two integers separated by a single space. In the i^{th} of those lines, there are m_i and d_i, ($1 \le m_i \le 10^6$, $1 \le d_i \le 10^6$), denoting respectively the number of people and the distance in i^{th} request.

Output

The output should contain exactly q lines, one for each request.

Each line of output should contain one integer, the minimum possible cost of fulfilling the request, in the same order as in the input.

Example

Input	Output
3 3 4 8 4 4 15 2 3 6 3 1 12 11 3 7 20	37 44 106

For the first request (1 passenger, 12 km) the cheapest way is to order one cab from the second carrier for a price of $15 + 11 \cdot 2 = 37$.

For the second request (11 passengers, 3 km) the cheapest way is to order two cabs from the first carrier for 8 passengers, and one cab from the third carrier for the remaining 3 passengers for a total price of $2 \cdot (8+2 \cdot 4) + (6+2 \cdot 3) = 44$.

For the third request (7 passengers, 20 km) the cheapest way is to order two cabs from the second carrier for a price of $2 \cdot (15 + 2 \cdot 19) = 106$.