E. Gellyfish and Mayflower

time limit per test: 3 seconds
memory limit per test: 1024 megabytes

Mayflower by Plum

May, Gellyfish's friend, loves playing a game called "Inscryption" which is played on a directed acyclic graph with n vertices and m edges. All edges $a \to b$ satisfy $a < b$.

You start in vertex 1 with some coins. You need to move from vertex 1 to the vertex where the boss is located along the directed edges, and then fight with the final boss.

Each of the n vertices of the graph contains a Trader who will sell you a card with power w_i for c_i coins. You can buy as many cards as you want from each Trader. However, you can only trade with the trader on the i-th vertex if you are currently on the i-th vertex.

In order to defeat the boss, you want the sum of the power of your cards to be as large as possible.

You will have to answer the following q queries:

- Given integers p and r. If the final boss is located at vertex p, and you have r coins in the beginning, what is the maximum sum of the power of your cards when you fight the final boss? Note that you are allowed to trade cards on vertex p.

Input

The first line of input contains two integers n and m ($1 \le n \le 200$, $n - 1 \le m \le \min(\frac{n(n-1)}{2}, 2000)$) — the number of vertices and the number of edges.

The i-th of the following n lines of input each contains two integers c_i and w_i ($1 \le c_i \le 200$, $1 \le w_i \le 10^9$) — describing the cards of the Trader on the i-th vertex.

In the following m lines of input, each line contains two integers u and v ($1 \le u < v \le n$), indicating a directed edge from vertex u to vertex v. It is guaranteed that every edge (u, v) appears at most once.

The next line of input contains one single integer q ($1 \le q \le 2 \cdot 10^5$) — the number of queries.

In the following q lines of input, each line contains two integers p and r ($1 \le p \le n$, $1 \le r \le 10^9$).

It is guaranteed that for all i, there exists a path from vertex 1 to vertex i.

Output

For each query, output the answer to the query.

Examples

input Copy

```
3 2
3 9
2 5
1 2
1 2
2 3
6
1 4
2 4
3 4
1 5
2 5
3 5
```

output Copy

```
9
10
11
9
```

Codeforces Round 1028 (Div. 1)
Finished
Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
322840874	Jun/04/2025 13:24	Accepted

→ Problem tags

dp graphs

No tag edit access

→ Contest materials

- Announcement (en)
- Tutorial (en)

```
14
14
```

input Copy

```
4 4
10 1000
2 5
1 2
3 9
1 2
1 3
2 4
3 4
9
2 3
3 3
4 1
4 2
4 4
4 5
4 101
4 102
4 103
```

output Copy

```
5
6
2
5
11
14
10002
10005
10009
```

input Copy

```
6 8
9 5
4 1
8 9
10 4
9 4
8 2
3 5
4 6
3 4
2 3
1 2
2 5
4 5
1 3
10
3 12
1 9
6 47
2 19
1 129
5 140
2 148
1 63
2 43
3 102
```

output Copy

```
10
5
46
10
70
154
81
35
21
109
```

Note

For the third query in the first example, we will play the game in the following order:

- buy 1 card with 9 power from the trader on vertex 1, and you'll still have 1 coin after the trade.
- move from vertex 1 to vertex 2.
- move from vertex 2 to vertex 3.
- buy 1 card with 2 power from the trader on vertex 3, and you'll have no coins after the trade.

In the end, we will have 1 card with 9 power and 1 card with 2, so the sum of the power of the cards is $9 + 2 = 11$.
For the fifth query in the second example, we will play the game in the following order:

- move from vertex 1 to vertex 3.
- buy 1 card with 2 power from the trader on vertex 3, and you'll still have 3 coins after the trade.
- move from vertex 3 to vertex 4.
- buy 1 card with 9 power from the trader on vertex 4, and you'll have no coins after the trade.

In the end, we will have 1 card with 2 power and 1 card with 9, so the sum of the power of the cards is $2 + 9 = 11$.
For the sixth query in the second example, we will play the game in the following order:

- move from vertex 1 to vertex 2.
- buy 1 card with 5 power from the trader on vertex 2, and you'll still have 3 coins after the trade.
- move from vertex 2 to vertex 4.
- buy 1 card with 9 power from the trader on vertex 4, and you'll have no coins after the trade.

In the end, we will have 1 card with 5 power and 1 card with 9, so the sum of the power of the cards is $5 + 9 = 14$.
For the seventh query in the second example, we will play the game in the following order:

- buy 10 cards with 1000 power from the trader on vertex 1, and you'll still have 1 coin after the trade.
- move from vertex 1 to vertex 3.
- buy 1 card with 2 power from the trader on vertex 3, and you'll have no coins after the trade.
- move from vertex 3 to vertex 4.

In the end, we will have 10 cards with 1000 power and 1 card with 2 power, so the sum of the power of the cards is $10 \cdot 1000 + 2 = 10\,002$.