Bat Virus

Neverland is a country with ***N*** cities (indexed from ***0*** to ***N-1***). The cities are connected to each other by a network of ***R*** two-way roads.

Two cities are considered to be neighbors if they're directly connected by a two-way road.

To an unfortunate turn of events, the country got struck by a mysterious bat virus. Initially (on day D_1), patients with the virus were reported from some cities in the country. The virus spreads in a weird, but interesting way.

Consider a city C_0, with C_1, C_2, C_3, C_4, ..., C_t neighbor cities. On day D_i, let's say there are P_0, P_1, P_2, P_3, P_4, ..., P_t patients corresponding to each city. Then number of patients in C_0 on day

$$D_{(i+1)} = max(C_0, \frac{C_1}{2}, \frac{C_2}{2}, \frac{C_3}{2}, \frac{C_4}{2}, \ldots, \frac{C_t}{2})$$

Given the road network and initial conditions of virus, your task is to find the maximum number of bat-virus patients that will be recorded in the country (P_{max}), and the number of days (D_{max}) it will take for P_{max} to appear first.

Input Format

$N \quad R$

$s_0 \quad e_0$

$s_i \quad e_i$

$s_{R-1} \quad e_{R-1}$

M

$c_0 \quad p_0$

$c_j \quad p_j$

$c_{M-1} \quad p_{M-1}$

Constraints

$0 < N < 20000$

$0 < R < 50000$

$0 < M < 5000$

$0 \leq s_i, e_i, c_j < N$

$00 \leq p_j < 30000000$

$0 \leq i < R$

$0 \leq j < M$

A single city can be connected to 1 city at minimum and N-1 cities at maximum.

There are no isolated cities.

Output Format

D_{max} P_{max}

Sample Input 0

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6 5
0 1
1 2
2 3
3 4
4 5
2
0 100
4 5
```

Sample Output 0

```
6 196
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Explanation 0