I live in a crazy city full of crossings and bidirectional roads connecting them. On most of the days, there will be a celebration in one of the crossings, that's why I call this city crazy.

Everyday, I walk from my home (at crossing s) to my office (at crossing t). I don't like crowds, but I don't want to waste time either, so I always choose a shortest path among all possible paths that does not visit the crossing of the celebration. If no such path exists, I don't go to work (it's a good excuse, isn't it)!

In order to analyze this "celebration effect" in detail, I need n pairs of values (l_i, c_i), where l_i is the length of the shortest path from crossing s to crossing t, not visiting crossing i, c_i is the number of such shortest paths (not visiting crossing i). Could you help me? Note that if I can't go to work when celebration is held at crossing i, define $l_i = c_i = 0$. This includes the case when there is no path between s and t even if there's no celebration at all.

Ah, wait a moment. Please don't directly give me the values - that'll drive me crazy (too many numbers!). All I need is finding some interesting conclusions behind the values, but currently I've no idea what exactly I want.

Before I know what you should calculate, please prove that you can indeed find all the pairs (l_i, c_i) by telling me the value of $f(x) = (l_1 + c_1x + l_2x^2 + c_2x^3 + l_3x^4 + c_3x^5 + \ldots + l_nx^{2n-2} + c_nx^{2n-1}) \bmod 19880830$, for some given x.

Input

There will be at most 20 test cases. Each case begins with 5 integers n, m, s, t, q $(1 \le s, t \le n \le 100,000, 0 \le m \le 500,000, 1 \le q \le 5)$. n is the number of crossings, m is the number of roads and q is the number of queries. s and t are different integers that represent my home and office, respectively. Each of the following m lines describes a road with three integers: u, v, w $(1 \le u, v \le n, 1 \le w \le 10,000)$, indicating a bidirectional road connecting crossing u and crossing v, with length w. There may be multiple roads connecting the same pair of crossings, but a road cannot be connecting a crossing and itself. The next line contains q integers x_i $(1 \le x_i \le 10^9)$. The last test case is following by five zeros, which should not be processed.

Output

For each test case, print the case number and q integers $f(x_1), f(x_2), \ldots, f(x_q)$ separated by a single space between consecutive items, on one line.

Print a blank line after the output of each test case.

Explanation:

In the first sample, $l_1 = c_1 = 0, l_2 = 4, c_2 = 2, l_3 = 3, c_3 = 1, l_4 = c_4 = 0$. In the second sample, everything is zero.

Sample Input

```
4 5 1 4 2
1 2 1
1 3 1
2 4 2
3 4 3
1 4 4
1 10
3 2 1 3 1
1 2 12
2 3 2
1
0 0 0 0 0
```

Sample Output

```
Case 1: 10 132400

Case 2: 0
```