

Employees Wage

Given the list of check-in and check-out time of employees. Calculate the wage of the employees. By default, each employee earns X KVND per hour. However, there are M employees who have different hourly wage rates because of their performance.

Input

- The first line contains four integers N - the number of employees, X, M, K – the number of check-in/check-out records ($1 \leq N \leq 10^5$).
- The second line contains N integers which are the id of employees
- Each line in the next M lines contains two integers a, b representing that employee who has id equals to a, earn b VN per hour.
- Each line in the next K lines contains two integers representing a check-in/check-out record. The first integer is the id of the employee. The second integer is the time of check-in/check-out

All integers don't not exceed 10^9

Output

For each employee in ascending order of id, output the id and the wage.

Sample

Input	Output
3 40 1 6	1 360
1 2 3	2 160
1 60	3 0
1 4	
2 4	
1 5	
1 6	
2 8	
1 11	