D. Dr. Tornado's Game (Game)

Problem Statement

Dr. Tornado was asked to design a game by NHSPCCamp, the game consists of N cities and M bi-directional roads connecting the cities. The cities are indexed from 1 to N. Initially the player is at city S, the goal of the player is to get to T via a series of roads.

There's a monster on each road, and their health is an integer no greater than 10^{12}, if the player wants to go through a road, the monster on that road must be killed. The monster respawns once the road is crossed. For a monster of health x, the player needs exactly x seconds to kill it, we can treat the health of the monster to be the time it takes to cross the road.

Dr. Tornado doesn't want his game to be beaten too quickly, nor does he want it to be so dull that no one wants to play it, so he wants the minimum possible time to go from S to T be exactly D seconds.

Dr. Tornado has planned out the relative strength of the monsters. In formal terms, suppose the i-th road connects u_i, v_i, and the health of the monster on that road has health h_i. Dr. Tornado has a permutation of 1 to M, denoted by $p_1, p_2, \ldots, p_M$, meaning the health of the monsters should satisfy $h_{p_1} < h_{p_2} < \cdots < h_{p_M}$.

He'll be busy for a while, so he can't work on the game, fortunately the only thing that hasn't been decided yet is the health of the monsters. Given the known information, is it possible to construct a game that satisfies his requirements? If so, please construct such a game for him.

Input Format

$N\ M\ S\ T\ D$
$p_1\ p_2\ \cdots\ p_M$
$u_1\ v_1$
$u_2\ v_2$
$\vdots$
$u_M\ v_M$

- N, M denotes the number of cities and roads, respectively.
- S, T denotes the index of the starting and ending city, respectively.
- D is the amount of time mentioned above.
- p_i means h_{p_i} is the i-th smallest health of all monsters.
- u_i, v_i denotes the endpoints of the i-th road.

Output Format

ans $h_1\ h_2\ \ldots\ h_M$

- ans is YES or NO, if there exists a valid sequence of monster health $h_1, h_2, \ldots, h_M$ then ans is YES, otherwise it's NO.
- the second line is needed only when ans is YES.
- $1 \leq h_i \leq 10^{12}$.
- h_i is a positive integer.
- $h_1, h_2, \ldots, h_M$ is a sequence of monster health satisfying all constraints mentioned above, if there's more than one solution, any one of them will be accepted. If your code fails to output a valid sequence, you would obtain 50% of the score of that subtask.

Constraints

- $2 \leq N \leq 10^5$
- $N - 1 \leq M \leq \min\{2 \times 10^5, \frac{N(N-1)}{2}\}$
- $1 \leq S, T \leq N$
- $S \neq T$
- $1 \leq D \leq 10^{11}$
- $1 \leq p_i \leq M$
- $1 \leq u_i, v_i \leq N$
- $u_i \neq v_i$
- No two roads connect the exact same cities
- Any city can go to every other city through a series of roads
- $p_1, p_2, \ldots, p_M$ are pairwise distinct
- All inputs are integers

Example

Sample Input	Sample Output
4 5 1 4 10 5 1 4 3 2 1 3 1 2 2 3 3 4 2 4	YES 4 8 7 6 3
5 4 3 4 1 1 2 3 4 3 1 1 2 2 5 5 4	NO

Scoring

There are 4 subtasks in this problem. The score and additional constraints of each subtask are as follows:

Subtask	Score	Additional constraints
1	5	$M = N - 1$
2	9	$M = N$, and every city is connected to exactly two roads
3	23	$N \leq 3000, M \leq 5000$
4	63	No other constraints

Additionally, if your code correctly determines whether a valid sequence exists, but fails to provide such a valid sequence, you would get 50% of the score of that subtask. Note that you should still output a sequence of M numbers in the range $[1, 10^{12}]$ when the answer is YES.