Problem J
Longest Shortest Path

Input: Standard Input
Time Limit: See AtCoder

You are given a directed graph and two nodes s and t. The given graph may contain multiple edges between the same node pair but not self loops. Each edge e has its initial length d_e and the cost c_e. You can extend an edge by paying a cost. Formally, it costs $x \cdot c_e$ to change the length of an edge e from d_e to $d_e + x$. (Note that x can be a non-integer.) Edges cannot be shortened.

Your task is to maximize the length of the shortest path from node s to node t by lengthening some edges within cost P. You can assume that there is at least one path from s to t.

Input

The input consists of a single test case formatted as follows.

$N\ M\ P\ s\ t$
$v_1\ u_1\ d_1\ c_1$
...
$v_M\ u_M\ d_M\ c_M$

The first line contains five integers N, M, P, s, and t: N ($2 \leq N \leq 200$) and M ($1 \leq M \leq 2{,}000$) are the number of the nodes and the edges of the given graph respectively, P ($0 \leq P \leq 10^6$) is the cost limit that you can pay, and s and t ($1 \leq s, t \leq N$, $s \neq t$) are the start and the end node of objective path respectively. Each of the following M lines contains four integers v_i, u_i, d_i, and c_i, which mean there is an edge from v_i to u_i ($1 \leq v_i, u_i \leq N$, $v_i \neq u_i$) with the initial length d_i ($1 \leq d_i \leq 10$) and the cost c_i ($1 \leq c_i \leq 10$).

Output

Output the maximum length of the shortest path from node s to node t by lengthening some edges within cost P. The output can contain an absolute or a relative error no more than 10^{-6}.

Sample Input 1

```
3 2 3 1 3
1 2 2 1
2 3 1 2
```

Output for the Sample Input 1

```
6.0000000
```

Sample Input 2

```
3 3 2 1 3
1 2 1 1
2 3 1 1
1 3 1 1
```

Output for the Sample Input 2

```
2.5000000
```

Sample Input 3

```
3 4 5 1 3
1 2 1 2
2 3 1 1
1 3 3 2
1 3 4 1
```

Output for the Sample Input 3

```
4.2500000
```