

UTS Open '15 #4 - Subway

Ms. Evans is meeting some venture capitalists who may be able to fund her startup. Unfortunately, she is running late, and the meeting is in T ($1 \leq T \leq 2000$) minutes. The subway system is a network of N stations ($2 \leq N \leq 2000$) numbered from 1 to N which are connected to each other by M one-way links ($1 \leq M \leq 2000$). The i^{th} link connects station a_i to station b_i ($1 \leq a_i, b_i \leq N, a_i \neq b_i$) and could take anywhere from x_i to y_i minutes to traverse ($1 \leq x_i \leq y_i \leq 10^5$). The time taken is an integer number of minutes chosen uniformly at random from all integers between x_i and y_i inclusive.



The subway system is very unpredictable.

Since the system is complicated, Ms. Evans follows a simple procedure: at every point, she uses a link selected uniformly at random from all links leaving her current station. Ms. Evans ends her trip when she reaches the meeting or when she reaches a station without any outgoing links.

Ms. Evans starts at station 1 and the meeting will be held in station N . Ms. Evans arrived at the meeting after X minutes, and she was on time (that is, $X \leq T$). Calculate the expected value of X .

Portion of marks	Constraints on N	Constraints on M	Constraints on T
20%	$N = 2$	$M \leq 2000$	$T \leq 2000$
50%	$N \leq 100$	$M \leq 100$	$T \leq 100$
30%	$N \leq 2000$	$M \leq 2000$	$T \leq 2000$

Input Format

The first line will contain N , M , and T . The i^{th} of the next M lines will contain a_i , b_i , x_i , and y_i in sequence. It is guaranteed that the chance of Ms. Evans arriving on time will exceed 10^{-11} .

Output Format

A single line containing the answer to the problem. Your answer will be considered correct if its absolute or relative error does not exceed 10^{-6} .

Sample Input 1

```
2 1 4
1 2 1 100000
```

Sample Output 1

```
2.5000000000
```

Explanation

In this case, the answer is the average of the values that would let Ms. Evans be on time: $\frac{1 + 2 + 3 + 4}{4} = \frac{5}{2}$.

Sample Input 2

```
3 2 3
1 2 1 100000
2 3 1 100000
```

Sample Output 2

```
2.6666666667
```

Sample Input 3

```
3 3 2000
1 3 1 1
1 2 1 1
2 1 1 1
```

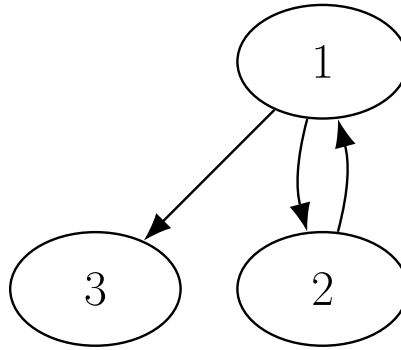
Sample Output 3

3.0000000000

Explanation

The answer is close to $(1) \left(\frac{1}{2} \right) + (3) \left(\frac{1}{4} \right) + \cdots + (1999) \left(\frac{1}{2^{1000}} \right) \approx 3$.

Picture



Sample Input 4

```
2 3 10
1 2 6 10
1 2 1 2015
1 2 8 17
```

Sample Output 4

8.2203841034

Sample Input 5

```
3 4 3
1 2 1 2
2 3 2 2
2 3 1 6
1 3 1 10
```

Sample Output 5

2.4938271605

Picture

