Fall 2021
ECE30017-01 Problem Solving through Computational Thinking

Week 4

- C3. Two Trains
  Submission deadline: 11:59 PM, 28 Septeber (Tue)

C3. Two Trains

There are *N* cities identified by 1, 2, 3, ..., *N*, and *s*ome of two cities are connected directly with railroad.

A transportation corporation has two trains Alpha and Beta: Train Alpha takes *p* amount of fuel for moving between two adjacent cities, whereas train Beta takes *q* amount of fuel.

Interestingly, the two trains can be united if they stay in the same city. The united train takes *r* amount of fuel for $r < p + q$. Here we assume that no fuel is taken for uniting the two trains, and the fuel consumption of a train is the same for transiting any two adjacent cities.

Suppose that currently Alpha is located at City 1 and heading to City *N*, and Beta is at City 2 and heading to City *N* as well.

Write a program that finds the minimum of fuel required for moving Alpha and Beta to City *N*. Note that the two trains may be united at a city.

Requirements

Input

The input data is given to the standard input. The first line has five integers *p*, *q*, *r*, *N*, and M for each of these numbers is no more than 40000. *N* indicates that there are *N* cities identifies by 1, 2, ..., *N*. The 2nd to (*M*+1)-th lines contain *M* pairs of the identifiers of the two cities that a railroad connects directly.

Output

Print the minimum amount of the total fuel needed for the two trains to the standard output within 0.5 seconds

Example

Input file

```
4 4 5 8 8
1 4
2 3
3 4
4 7
2 5
5 6
6 8
7 8
```

Output file

```
22
```

Team for C3

301	이인석	홍순규
302	정성목	전영우
303	박건희	김영표
304	이혜림	남진우
305	박은찬	김해린
306	안제현	강석운
307	이수아	이찬효
308	최시령	권혁찬
309	강동인	차경민