Fall 2021
ECE30017 - Problem Solving through Computational Thinking

Week 10

- **C7. Medicine**
  Deadline: 11:59 PM, 5 November (Fri)
- **P7. Bulldozer**
  Deadline: 11:59 PM, 9 November (Tue)

C7. Medicines

A pharmacist received a prescription that administers n medicines for a patient. To avoid side-effects of drug interactions, the pharmacist looked up a database and retreived a list of m pairs of conflicting medicines. The patient must not take two conflicting medicines together at the same day.

The patient was instructed to take all medicines within two days, however, the pharmacist found that it is impossible to distribute the n medicines over two days while avoiding conflict. To report this issue, the pharmacist wants to identify the first pair of conflicting medicines in the listing that confirms this impossibility.

Write an efficient program that finds the first pair of medicines, which would violate the conflicting list.

Requirements

Input data

- The first line from the standard input has an integer n, which represents that the number of medicines for $1 \leq n \leq 10{,}000$. The IDs of the medicines are assigned from 1 to n.
- The second line has an integer m, the number of conflicting medicine pairs, for $1 \leq m < 100{,}000$
- The remaining m lines show the list of conflicting medicine pairs. Each line has two positive integers, which are IDs of two medicines that the patient should not take at the same day.

Output data

- Print an integer between 1 to m to the standard output. The integer is an index of the conflicting medicine pair in the list, which would first result in a conflict.
- Your program should return the answer within 0.5 second.

Example of test data

Input data 1

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

Output data 1

```
5
```

Input data 2

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

Output data 2

```
4
```

Team fof C7

701	이인석	남진우
702	정성목	김해린
703	박건희	이혜림
704	김영표	전영우
705	박은찬	권혁찬
706	이수아	차경민
707	최시령	홍순규
708	강석운	이찬효
709	강동인	-

P7. Bulldozers

A company had made contracts for m construction tasks with different clients, and scheduled them in the next n days from tomorrow (i.e., tomorrow is the first day). Every construction task takes exactly one full day with one Bulldozer. The contract for each task t_i specifies the early due date s_i , that is, the s_i-th day from tomorrow and states that the task should be done within d days from s_i. To complete all m tasks in the n days, the company rents k Bulldozers for the n days. With k Bulldozers, a maximum of k tasks can be done simultaneously in a day as each Bulldozer should be fully assigned to a task for a day. You may assume that s_i + d ≤ n

Write a program to find a minimum number of Bulldozers, k to accomplish a given list of m construction tasks in n days for given d.

Requirements

Input data

- The input data is given from the standard input.
- The first line contains three integers n, d, and m for $1 \leq n \leq 100{,}000$ and $1 \leq d < n$ and $1 \leq m \leq 100{,}000$.
- The second line contains m integers such that the i-th integer represents s_i of task t_i

Output data

- Print an integer to the standard output. The integer represents the minimum number of Bulldozers to be rented in order to complete the m tasks in time.
- Your program should return the answer within 0.5 second

Example of test data

Input data

```
8 2 12
1 2 4 2 1 3 5 6 2 3 6 4
```

Output data

```
2
```