Fall 2021
ECE30017 Problem Solving through Computational Thinking

Week 2

- C1. Task Force
  Deadline: 11:59 PM, 10 Septeber (Fri)
- P2. Hospital Construction
  Deadline: 11:59 AM, 14 Septeber (Tue)

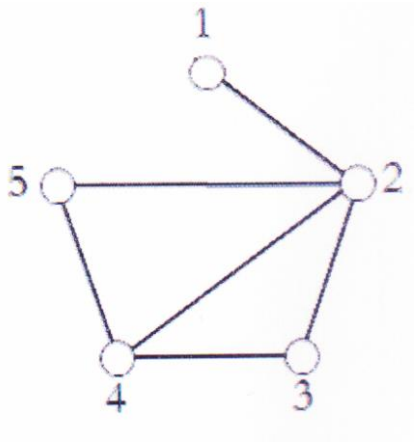
C1. Task Force

The marine corps wants to form a special task-force team for a critical mission. The team members are selected from their soldiers. The marine corps made the following member selection rule for a strong fellowship among the team members:

> Every member of the special force team has at least k friends in the special force team.

Given the friendship relations between the soldiers, write a program that finds the maximum size of the special task-force team that satisfies this rule.

(Continued)



For example, suppose that there are 5 soldiers and their friendship relations are represented as a graph shown above. In the graph, a node represents a solider and an edge represents the friendship between a pair of soldiers. For $k = 2$, there are 3 teams that satisfy the rule, that is, {2,3,4}, {2,4,5} and {2,3,4,5}. Hence, the answer is 4, which is the maximum number of team members over all possible teams satisfying the rule.

For k is 3, there is no teams that satisfy the rule. (Continued)

Requirements

Input Data

- The first line from the standard input has three integers n, k and f, where n is the number of soldiers, k is the minimum number of friends that a soldier has to have in order to join the team, and f is the total number of friendship relations, for $1 \leq k < n \leq 2000$ and $1 \leq f \leq \frac{n(n-1)}{2}$. The soldiers have IDs from 1 to n.
- Each of the next f lines contains two integers that represent the IDs of two soldiers who are in a friendship.

Output Data

- Your program should print out the maximum size (an integer) of the special task-force team to the standard output.
- If there are no teams that satisfy the rule, print out 0 to the standard output.
- Your program should return the result within 0.5 seconds.

(Continued)

Examples of test data

Input data 1

```
5 2 6
1 2
3 2
3 4
4 5
5 2
2 4
```

Output data 1

```
4
```

Input data 2

```
5 3 6
1 2
3 2
3 4
4 5
5 2
2 4
```

Output data 2

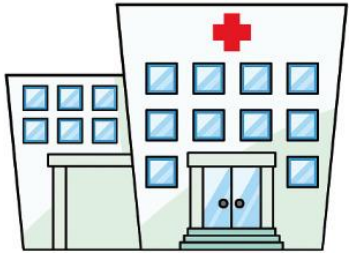
```
0
```

Team for C1

- Team members must work together for writing a report
  - scores on report and presentation will be shared
  - peer evaluation will be followed
- Each member must construct a solution program individually
  - Team members must not share their program code

101	이인석	이찬효
102	정성목	권혁찬
103	박건희	양희찬
104	이혜림	차경민
105	박은찬	홍순규
106	안제현	전영우
107	이수아	김영표
108	최시령	남진우
109	강석운	김해린
110	강동인	윤보영

P2. Hospital Construction



Problem description

- There is a city where n buildings stand along a highway for $1 \leq n \leq 10{,}000{,}000$. The i^{th} building stands at point x_i on the highway for $0 \leq x_i < 10{,}000{,}000{,}000$ and there are g_i people staying in the i^{th} building for $1 \leq g_i \leq 10{,}000$.
- There is no hospital along this highway. Thus, the city government is going to construct a hospital for the people staying in the buildings along the highway. A building **is within a walking distance** from the hospital if the distance between the building and the hospital is less than or equal to k points for $1 \leq k \leq 2{,}000{,}000$.
- The city government wants to locate the hospital at a point along a highway such that **as many people as possible** are **within the walking distance** from the hospital.
- Write a program that finds the number of people staying in the walking distance when the hospital is constructed at a such point. (continued)

P2. Hospital Construction

Requirements

- First two numbers given from the input are n and k. After that, n lines are given where i^{th} line has two numbers g_i and x_i.
- Your program should print out one number (i.e., the maximum number of people staying in walking distance from the hospital) within 0.5 second.
- The hospital could be built on the top of a building.

Examples of input data and output

Input

```
4 3
4 7
10 15
2 2
5 1
```

Output

```
11
```