Mục lục

Bài A. kseq

Input:	`stdin`
Output:	`stdout`
Time limit:	2 giây
Memory:	512 MB

Given a sequence of positive integers $a = \langle a_1, \ldots, a_n \rangle$. A k-sequence of a is defined to be a sub-sequence of a containing k consecutive elements: $a_i, a_{i+1}, \ldots, a_{i+k-1}$. The weight of a k-sequence is defined to be the sum of its elements. Given a positive integer k, you are required to write a program that finds a k-sequence having maximal weight.

Input

The input consists following lines:

- line 1: contains n and k ($5 \leq n \leq 1000000, 1 \leq k \leq 50000$)
- line 2: contains n positive integers $a_1, \ldots, a_n$ ($a_i \leq 1000$)

Result

Write the weight of the k-sequence found.

Example

stdin	stdout
6 3 2 3 20 4 6 5	30

Explanation

The 3-sequence of maximal weight is 20, 4, 6 and its weight is 20 + 4 + 6 = 30.

Bài B. netalz

Input:	`stdin`
Output:	`stdout`
Time limit:	2 giây
Memory:	512 MB

Given a communication network which is modelled as an undirected connected graph $G = (V, E)$ in which $V = \{1, \ldots, N\}$ is the set of nodes. The distance between two nodes u and v of G is denoted by $d(u, v)$ and is defined to be the length (i.e., the number of edges) of the shortest path between u and v on G. The eccentricity $e(u)$ of a node u is defined to be the maximum distance between u and other nodes of G:

$$e(u) = \max_{v \in V} d(u, v)$$

The radius $r(G)$ of the graph G is define to be the minimum eccentricity:

$$r(G) = \min_{u \in V} e(u)$$

You are required to write a program that computes the radius of a G.

Input

The input consists following lines:

- line 1: contains N and M ($5 \leq N \leq 5000, 5 \leq M \leq 500000$) in which N is the number of nodes and M is the number of edges of the graph G
- line i+1 ($\forall i = 1, \ldots, M$): contains u and v in which (u, v) is an edges of G.

Result

Write out the radius of G.

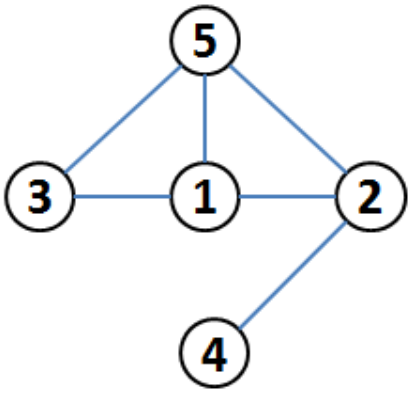
Example

stdin	stdout
5 6 1 2 1 3 1 5 2 4 2 5 3 5	2

Explanation

The graph is described in Figure 1. The distance between nodes are:

- $d(1, 2) = 1$
- $d(1, 3) = 1$
- $d(1, 4) = 2$
- $d(1, 5) = 1$
- $d(2, 3) = 2$
- $d(2, 4) = 1$



Hình 1: Illustration of the communication network G

- $d(2,5) = 1$
- $d(3,4) = 3$
- $d(3,5) = 1$
- $d(4,5) = 2$

The eccentricity of nodes are:

- $e(1) = 2$
- $e(2) = 2$
- $e(3) = 3$
- $e(4) = 3$
- $e(5) = 2$

Finally, the radius of the given graph is 2.

Bài C. primes

Input:	`stdin`
Output:	`stdout`
Time limit:	1 giây
Memory:	512 MB

Given a positive integer n. Your task is to calculate how many ways to represent n as sum of at most k different prime numbers.

Input

The input contains two integers n, k ($1 \leq n \leq 4000$,$1 \leq k \leq 10$).

Result

Write the number of ways to represent n as sum of at most k different prime numbers.

Example

stdin	stdout
28 4	5

Explanation

28 can be represented as sum of at most 4 different prime numbers by one of the following ways:

- 28=2+3+23
- 28=2+7+19
- 28=3+5+7+13
- 28=5+23
- 28=11+17

Bài D. machine3

Input:	`stdin`
Output:	`stdout`
Time limit:	1 s
Memory:	128 MB

An engineer needs to schedule a machine to run on some given periods $1, \ldots, n$ to produce a chemical product $\mathcal{C}$. Each period i is represented by a starting time point s_i and terminating time point t_i ($s_i < t_i$). You can assume that there is no two periods with the same terminate point. Due to a technical constraint, the machine must run on exactly two periods that are not overlap (two periods i and j are not overlap if $t_i < s_j$ or $t_j < s_i$). If the machine is runned on the period i, then the amount of $\mathcal{C}$ it will produce is equal to the duration of the period i (which is equal to $t_i - s_i$). Help the engineer to select k ($k \leq 3$) not-overlap periods to run the machine such that the amount of $\mathcal{C}$ produced is maximal.

Input

The input consists the following lines:

- Line 1: contains two positive integers n and k ($2 \leq n \leq 10^6$, $k \leq 3$);
- Line $i+1$: contains two positive integers s_i and t_i ($1 \leq s_i < t_i \leq 3 \times 10^6$).

Result

The output consists of only one single integer which is the amount of product $\mathcal{C}$ the machine will produce in the k selected periods. In case there is no solution (there does not exist two periods that are not overlap), the output contains the value -1.

Example

stdin	stdout
5 2 8 12 6 11 3 9 2 5 1 4	8

Explanation

The machine will be runned on two periods [2, 5] and [6, 11] and produce 8 unit of product $\mathcal{C}$.