

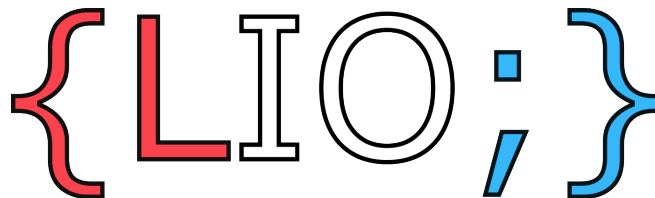
Lëtzebuerger Informatiksolympiad 2025

Finals

Task descriptions

Instructions

- The allowed programming language is C/C++.
- All the programs must be realized in the form of a console application. For instructions how to realize a console application in the allowed programming languages, please refer to the remarks on the site www.infosolympiad.lu under the heading *The tasks*.
- Under the input of the program is meant either the direct entry of data from the keyboard or the redirection from a text file in console mode. Under output of the program is meant either the direct display of data to the screen or the redirection to a text file in console mode.
- The formats of the input and output data shown in the execution examples must absolutely be respected.
- For testing, submitting and evaluating a program, the source file with a file extension `c/cpp` must be uploaded to the automated online judge CMS (Contest Management System), accessible via the homepage www.infosolympiad.lu or directly via the URL <http://158.64.50.79/cws/>. Please use your personal login (username and password) to access your account on the CMS. The filename of the single source file should be the same than the task name. Please refer to the CMS for technical details on how to test and submit a program.
- Please refer to the CMS for technical details like time limits and memory limits as well as compilation commands.
- You have the right to ask questions via the CMS, but the answers will not teach you how to use a programming language nor tell you how to solve the tasks by using a specific algorithm. The questions should be in relation with the CMS or should treat clarification issues concerning the task descriptions.



Bunny Hopping

Description

Lia recently got a new rabbit on her farm. Her rabbit is on a field, which is a straight line divided into $N + 1$ cells. The cells are numbered from 0 to N , and the rabbit starts on cell 0, and wants to go to cell N . The rabbit can jump between 1 and K cells forward (or backward) in one jump.

The i -th cell contains A_i carrots. The rabbit wants to maximise the number of carrots collected. Note that A_i can also be negative, which would mean the rabbit loses A_i carrots when it lands on that cell. (The rabbit may possibly have negative carrots, going into "carrot debt"). The 0-th cell does not contain any carrots.

Task

Calculate the maximum number of carrots the rabbit can collect, and output a path which achieves this number of carrots.

Note that you can still score points without outputting the path! Please refer to the section "Distribution of points".

Example

Let $N = 5$, $K = 2$, and $A = [1, -2, -3, -4, 5]$.

Then the maximum number of carrots is 3, and a path which achieves this is $0 \rightarrow 1 \rightarrow 3 \rightarrow 5$.

It first jumps to cell 1 and collects one carrot. Then it jumps to cell 3, where it gets -3 carrots (it loses 3 carrots), so now it has -2 carrots. Then it jumps to cell 5 and collects 5 carrots, so in total it has $1 + (-3) + 5 = 3$ carrots.

Constraints

- $1 \leq N \leq 10^4$
- $1 \leq K \leq 10^4$
- $-10^9 \leq A_i \leq 10^9$

Input and output of program

Input data

The first line contains two integers N and K separated by a space.

The second line contains N integers separated by a space - the i -th integer is A_i .

Output data

In the first line output the maximum number of carrots the rabbit can collect.

In the second line output the number of cells visited by the rabbit.

In the third line output the cells visited by the rabbit (in increasing order).

Execution example

Input

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

Output

```
3
4
0 1 3 5
```

Distribution of points

For each subtask, 75% the points will be given for printing the maximum number of carrots, and 25% the points will be given for printing a correct path.

For example, if your solution gives the right number of carrots for Subtask 1 (which is worth 6 points), but outputs a wrong path, then you will get $6 \cdot 0.75 = 4.5$ points.

Subtask	Points	Constraints/Description
1	6	$0 \leq A_i \leq 1000$
2	8	$K = N$ and $ A_i \leq 1000$
3	6	All A_i are equal ($A_1 = A_2 = \dots = A_n$) and $ A_i \leq 1000$.
4	12	$K = 2$ and $ A_i \leq 1000$
5	4	$K = 2$
6	10	$ A_i \leq 1000$
7	4	No additional constraints

Technical constraints

Task name	hopping
Input file	standard input
Output file	standard output
Time limit	1 second
Memory limit	256 megabytes

Chicken Roads

Description

Lia's chicken raising operations are thriving thanks to your previous efforts and therefore needs your help again. She now has N chicken coops scattered all over town and she would like to secure the paths between them. One should be able to reach each coop from all other coops using only secured roads.

Most of the paths between coops are rural roads which she can exploit as she pleases. But some roads are public roads for which she needs to acquire a permit to build the required security. There are R rural roads and P public roads. Each road has a length l_i and connects coops u_i and v_i .

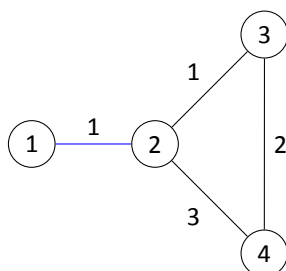
Lea knows the location of all her chicken coops, the length of the rural and public roads between them, and she wants you to find the minimum total length of roads to secure, while keeping the amount of needed permits to a minimum. The hassle of getting a permit far outweighs the cost of securing longer paths.

Task

Given the rural and public roads between the coops, find the minimum number of permits needed and the smallest total length of road she needs to secure, to make all coops reachable from any other coop using only secured roads.

Example

Lia's first farming complex looks like this :



The coops 1 and 2 are connected by a public road (shown in blue). Since the public road is the only way to get to coop 1, a permit must be acquired.

By taking the other roads with length 1 and 2, Lia only needs to secure a total road length of 4. These roads suffice to reach all coops from all other coops.

Constraints

- $1 \leq N \leq 2 \cdot 10^4$
- $0 \leq R, P \leq 10^7$
- $1 \leq u_i, v_i \leq N$
- $1 \leq l_i \leq 10^4$
- the coops are all reachable from each other

Input and output of program

Input data

The first line contains N, R, P .

The next lines each contain u_i, v_i, l_i of a road. The first R are rural roads, the next P are public roads.

Output data

On a single line, print the minimal amount of permits then the minimum total road length

Execution example

Input

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

Output

```
1 4
```

Distribution of points

Subtask	Points	Constraints/Description
1	10	$N \leq 10$
2	5	$l_i = 1, P = 0$
3	5	$P = 0$
4	5	$P = 1$
5	15	$l_i = 1$
6	10	No additional constraints

Technical constraints

Task name	chickenroads
Input file	standard input
Output file	standard output
Time limit	1 second
Memory limit	256 megabytes