

Task Minecraft

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We know that at the moment NOBODY is in a two-week Minecraft phase. Except Bobi, who does not know how to beat Minecraft. You have to help him. Let us make your work a little easier – the world Bobi is in is one-dimensional – it has only one coordinate.

His first task is to find the K portals which can take him to the other world – the Nether. You have to implement the following function:

```
std::vector<int> portals(int N, int K);
```

This function will be called once by Bobi and has a parameter N – the maximum coordinate of the one-dimensional world, and K – the number of portals. You have to return the coordinates of all portals. To communicate with the game you can use the following function:

```
int find_portals(int l, int r);
```

As parameters the function receives two coordinates and returns the number of portals with coordinates between l and r , where $1 \leq l \leq r \leq N$.

This way you will manage to help Bobi enter the other world of Minecraft – the Nether.

His next goal will be to find a Nether Fortress. But this turns out not to be such an easy job – as you know, the Nether is a place where one can die very easily, therefore Bobi is looking for the Nether Fortress which will have the smallest difficulty to reach. Besides that, along the way Bobi takes breaks – the longer he travels, the greater the chance that he dies, therefore he prefers to stop at certain places – let us call them stations. In this way we can represent Bobi's path to some fortress as a connected sequence of stations, where he knows in advance the difficulty of getting from one station to another. There is one more particularity – each of the found portals takes him to the same coordinate at which he was in the normal world. Let us note that the portals and the fortresses count as stations. Besides that, it is guaranteed that it is possible to get through the paths from every station to every other one.

You have to help Bobi find the coordinates of the Nether Fortress and the portal between which the smallest danger that Bobi can experience is achieved. By danger we mean the sum of all difficulties along the path from some portal to some fortress. To do so you have to implement the following function:

```
std::pair<int, int> minimal_danger(int N, std::vector<std::pair<int, std::pair<int, int>>> paths, std::vector<int> portals, std::vector<int> fortresses);
```

The first parameter of the function is the maximum station number and is equal to the value of N from the finding of the portals to the Nether. The second parameter of the function represents the possible pairs of stations between which Bobi can travel, and the difficulty of doing so (w_i). He can travel in both directions along this path. For each element in `paths`, the first value is the length of the path, and the others are the numbers of the stations between which there is a path. The second-to-last parameter contains the **correct** coordinates of the portals from before Bobi entered the Nether. The last parameter contains the coordinates of the Nether Fortresses. The function must return respectively the coordinate of the portal from which Bobi starts his journey, and the coordinate of the Nether Fortress where Bobi ends his journey.

So far so good. The only thing left for Bobi is to find the portal to the End. But what goes wrong? After Bobi has obtained the blaze rods he needs in order to make Eyes of Ender, he decides that he has to touch some grass and stop playing Minecraft for the day.

The next day he joins the server and what does he see - his world has become two-dimensional! He was very happy about that, but it complicates your task. You have to find the portal to the End by implementing the following function:

```
std::pair<int, int> find_end_portal(int L);
```

The parameter L is the maximum coordinate in the new two-dimensional world. The function must return the coordinates of the portal to the End. To communicate with the game you can use the following function:

```
std::string throw_eye(std::pair<int, int> coordinates);
```

This function can return one of these answers:

- NE: the portal to the End is located to the northeast of the coordinates at which Bobi is.
- N: the portal to the End is located to the north of the coordinates at which Bobi is.
- NW: the portal to the End is located to the northwest of the coordinates at which Bobi is.
- E: the portal to the End is located to the east of the coordinates at which Bobi is.
- NONE: the portal to the End is located at the coordinates at which Bobi is.
- W: the portal to the End is located to the west of the coordinates at which Bobi is.
- SE: the portal to the End is located to the southeast of the coordinates at which Bobi is.
- S: the portal to the End is located to the south of the coordinates at which Bobi is.
- SW: the portal to the End is located to the southwest of the coordinates at which Bobi is.

Keep in mind that to the south the coordinates decrease, and to the north they increase, as in a coordinate system. Everything called a "coordinate" in the task starts from 1.

Task

You have to implement the functions `portals`, `minimal_danger` and `find_end_portal`, which use as few queries as possible (i.e. calls to the helper functions).

Constraints

- $1 \leq N, F \leq 10^5$
- $1 \leq M \leq 2 \cdot 10^5$
- $1 \leq L \leq 10^3$
- $1 \leq K \leq 1000$
- $1 \leq w_i \leq 10^9$
- In some of the tests there is only one Nether Fortress.
- In another part of the tests $K \leq 5$.

Scoring

Let us assume that we split the task into three "subtasks", each of them corresponding to one of the three functions implemented by you.

Subtask	Percentage of the points on a given test
1	25
2	50
3	25

For each test every one of the three subtasks is evaluated, after which the points for a given test (between 0 and 1) are found in the following way: $P = 0.25P_1 + 0.5P_2 + 0.25P_3$, where P_1, P_2, P_3 are the points of each subtask, and they are between 0 and 1 and are described below.

Subtask 1. Function `portals`

Let Q_1 be the number of calls to `find_portals` by the solution, and $Q_{1,author}$ be the number of calls of the author. Then:

$$P_1 = 0.1 + 0.9 \frac{\log N - \log Q_1}{\log N - \log(Q_{1,author})}.$$

Subtask 2. Function `minimal_danger`

If you return a correct answer, $P_2 = 1$, and otherwise $P_2 = 0$.

Subtask 3. Function `find_end_portal`

Let Q_3 be the number of calls to `throw_eye` by the solution, and $Q_{3,author}$ be the number of calls of the author. Then:

$$P_3 = 0.1 + 0.9(1 - (\frac{Q_3 - Q_{3,author}}{L^2 - Q_{3,author}})^{0.1}).$$

 Sample communication

Jury	Contestant
portals(100, 2)	
	find_portals(1, 10)
0	
	find_portals(42, 80)
1	
	find_portals(81, 100)
1	
	Returns {55, 90}
minimal_danger(100, {{15, {55, 12}}, {5, {12, 77}}}, {55}, {77})	
	Returns {55, 77}
find_end_portal(50)	
	throw_eye({10, 10})
NE	
	throw_eye({45, 20})
W	
	throw_eye({30, 20})
NONE	
	Returns {30, 20}

Sample grader

You are provided with a sample grader `Lgrader.cpp`.

The format of the input is the following:

- The first line contains the numbers N, K - the maximum coordinate in Bobi's one-dimensional world and the number of portals in it.
- The second line contains K numbers - the coordinate of each of the portals.
- The next line contains M - the number of pairs of stations between which Bobi can travel.
- The next M lines contain three numbers each - the coordinates of the pair of stations and the danger of the path between them.
- The next line contains a number F - the number of Nether Fortresses.
- The next line contains F numbers - the coordinates of the Nether Fortresses.
- The next line contains a number L - the maximum coordinate in Bobi's two-dimensional world.
- The next line contains two numbers - the coordinates of the portal to the End in Bobi's new world.

The format of the output is the following:

- The first line prints whether the answer of your solution is correct, followed by the number of queries used.

This is the whole task, but the authors judged that the statement was not long enough. Since they are worried that you might be too bored during the contest, and besides that they did not manage to come up with anything better to put in this statement, below you will be able to enjoy selected excerpts from the recent news.

EC: TikTok does not protect children online well enough

The European Commission announced that today it has sent a preliminary assessment to the social platform TikTok, in which it finds non-compliance with the European rules for the protection of underage users online.

The Commission specifies that the platform allows minors to create an open profile, visible even to those who do not have a TikTok account. This can lead to unwanted contacts and the content can be used for cyberbullying, the statement adds. This feature gives strangers a glimpse into the child's life and can lead to further consequences, because the content "may stay online forever", according to the EC.

It is added that even the so-called private accounts can easily be found through the "followers" lists of other users, and the photos uploaded there remain accessible to everyone, including those without an account on the platform. The settings are key to the safety of minors online, because they determine who can see their content and who can contact them. Under European legislation, platforms accessible to minors must ensure a high level of protection of privacy, safety and security, the Commission notes, BTA reported.

The EC expects the platform to change the settings for minors, so that their content is by default visible only to TikTok users approved by the underage user. According to the Commission, the content of underage users must not be accessible to an audience outside the platform.

It is envisaged that the EC will continue the talks with the platform, and after that it is possible that it will issue a non-compliance decision and impose a fine determined by the nature, gravity, frequency and duration of the infringement. The fine will not exceed 6 percent of the company's annual worldwide turnover, the statement specifies.

They are investigating a dangerous near-miss between a passenger plane and Trump's helicopter

The Federal Aviation Administration of the USA is carrying out an investigation in connection with a violation of the flight safety procedures, in which a passenger plane was cleared for take-off while President Donald Trump's helicopter was approaching the Reagan National Airport in Washington, the Associated Press reported.

The incident happened on Tuesday. The presidential helicopter "Marine One" took off from a pad at the White House in order to make a flight to the Andrews Air Force Base. Trump was on board the helicopter, whose flight was the first leg of his trip to the west coast of the USA. At the same time a passenger plane took off from the Reagan airport.

On 29 January 2025, in a collision between a passenger plane and a "Black Hawk" military helicopter, 67 people died. The crash caused the Federal Aviation Administration to order that all take-offs and landings at the Reagan airport be suspended every time a helicopter flies past the airport, BTA writes.

The passenger plane that took off on Tuesday gained altitude above the presidential helicopter, so that the two aircraft were moving along trajectories on which there was no danger of a collision.

The Federal Aviation Administration published a statement noting that there had been a "momentary loss of separation, after which the aircraft continued to move away from each other".

"The air traffic controller maintained contact both with the pilot of the passenger plane and with the pilot of "Marine One", the statement adds.

The White House emphasized that President Trump was safe at all times. "Marine One" is flown by some of the best pilots in the world and at no point was the president exposed to risk", a White House spokesperson said.

The National Transportation Safety Board announced this morning that it continues to gather information about yesterday's incident and that it has still not decided whether to open an investigation.

New Russian attacks on Kyiv and Sloviansk: Five died, there are wounded

A new Russian attack on Ukraine - explosions were heard in Kyiv, where the air defence was activated, and in a strike on the town of Sloviansk in the Donetsk region at least five people died. The Ukrainian authorities report damage to residential buildings, commercial sites and the building of the consulate of Latvia.

In Kyiv the air defence systems were activated in order to repel a Russian attack, the mayor of the Ukrainian capital Vitali Klitschko said today, Reuters reported.

According to eyewitnesses, numerous explosions were heard in the city while people were running to the shelters.

The Air Force of Ukraine warned about missiles that had been launched towards Kyiv, BTA writes.

At least five people died and nine were wounded in a bombardment of the town of Sloviansk, in the Donetsk region, the head of the Donetsk regional military administration Vadym Filashkin announced on Telegram.

Two aerial bombs caused damage to 10 houses, one commercial site and the building of the consulate of Latvia, he specified.

A Russian drone attack on the port infrastructure in the Mykolaiv region caused damage to two merchant ships, the acting regional governor Heorhiy Reshetylov announced on Telegram.

Nobody was hurt in the attack, he added.

The flights from and to the Leipzig airport were suspended because of a UFO and a suspicious object

The flights from and to the Leipzig airport, which also serves another German city - Halle, were temporarily suspended during the past night, after an unidentified flying object was spotted in the area, and a suspicious object was found near one of the runways, DPA and Reuters reported, citing the police.

Several planes, one of which was operating a scheduled passenger flight, were diverted during this "security incident".

The northern runway of the airport was reopened for flights this morning.

The southern runway of the airport, which serves as a hub for the planes of the logistics company DHL, however, remained closed while specialists examine the object with the help of explosive ordnance disposal technology.

The German authorities are also investigating reports of an unknown flying object which was spotted in the area above the airport, and are establishing whether it is possible that it is connected with the incident.

A police spokesperson stated that there is no immediate danger.

The German airports are on a state of heightened alert after a series of unauthorized overflights of drones above sites, including military facilities, energy terminals, sea ports and sites owned by logistics companies.

The police in Germany warn that such drone overflights may be the work of Russian agents - claims which Russia categorically denies, Reuters notes.

Later the authorities announced that at the airport - a key logistics centre for NATO and for the cargo deliveries to Ukraine, a drone with an explosive device was found.

The police specified that a bomb disposal team used a robot for the neutralization.

Russia announced that it has hit three cargo ships in the Black Sea

Russia and Ukraine have intensified their mutual attacks on shipping, which has led to a rise in the world prices of wheat and threatens to turn the Black Sea into yet another strategic trade zone.

Russian forces hit three more cargo ships in the Black Sea on Wednesday, the Russian Ministry of Defence announced, cited by Reuters.

The ministry published video recordings of the strikes, but did not reveal more details.

Russia and Ukraine have intensified their mutual attacks on shipping, which has led to a rise in the world prices of wheat and threatens to turn the Black Sea into yet another strategic trade zone, after the Strait of Hormuz, which will be blocked as a result of war.

The intensifying attacks on ships, ports and export terminals in the Black Sea are starting to have an impact on the world supplies of grain and oil, turning the region into yet another key trade zone affected by an escalating conflict.

The Black Sea is one of the most important transport routes for the export of grain crops, crude oil and refined petroleum products. Its waters are shared by Russia and Ukraine, as well as by Bulgaria, Georgia, Romania and Turkey.

Russia – the largest exporter of wheat in the world, and Ukraine – one of the leading exporters of agricultural produce, have in recent weeks intensified their mutual attacks on port infrastructure, export facilities and merchant ships in the Black Sea. Kyiv has also increased the strikes on tankers associated with the trade in Russian oil.

The new escalation creates additional pressure on the world commodity markets, which are already facing problems because of disruptions on other key sea routes in the Middle East.

“The consequences can already be seen on the world agricultural markets”, the UN representative Kayoko Gotoh stated during a session of the Security Council. In her words, the growth of a “dangerous spiral of escalation” must not be allowed.

The flows of oil through the Strait of Hormuz are also affected by the tension between the USA and Iran, and the actions of the Tehran-backed Houthis in Yemen increase the risks for shipping in the Red Sea.

Grain exports under pressure The Ukrainian authorities report dozens of attacks on ships and port facilities during July. According to data of the country’s Ministry of Infrastructure, 35 assaults on ships in ports, 22 attacks on vessels at sea and 67 strikes on port infrastructure have been registered.

For comparison, during the whole of 2025, 14 ships were attacked. According to estimates of Reuters, Ukraine has carried out strikes on dozens of tankers associated with the export of Russian oil.

The consequences are already being felt in trade. The Russian shipping company FESCO announced that it has stopped accepting new orders for transport through the Black Sea, after one of its ships was damaged in an attack with a Ukrainian drone.

Meanwhile Russia has intensified its strikes on civilian ships and port infrastructure around Odesa – a main Ukrainian transport centre, through which over 90% of the country's agricultural exports pass.

Both Moscow and Kyiv claim that their attacks are aimed solely at military targets.

Agricultural produce remains a main source of export revenue for Ukraine more than four years after the beginning of the war. The country is looking for alternative routes, but according to the Ukrainian minister of agriculture Taras Vysotskyi they will not reach their full capacity before the end of August and will be able to take on only about half of the volumes which are usually transported through the Black Sea ports.

The activity in the Sea of Azov, which is connected to the Black Sea, has also been restricted since 10 July, which affects the work of the Russian grain port of Taman.

The exports from the Russian ports of Novorossiysk and Tuapse continue, but at a slower pace.

Oil exports are also affected The strikes on tankers during July led to damage to several ships and a temporary interruption of the loading operations in Novorossiysk and the terminal of the Caspian Pipeline Consortium (CPC) – a key route for the export of Kazakh oil.

"The CPC system is a critically important export route for Kazakhstan, through which about 80% of the country's crude oil exports pass. Any prolonged interruption may turn into a serious problem for the regional supplies", the ship broker BRS stated.

International maritime security companies warn that the ships which continue to visit Black Sea ports must carry out additional risk assessments, and that the crews must observe special safety measures during drone attacks.

"Innocent civilian seafarers cannot be regarded as collateral damage in the achievement of military goals. This is a dangerous and unacceptable precedent", stated Stephen Cotton, general secretary of the International Transport Workers' Federation.

Insurance in the Black Sea is getting more expensive The heightened security risks are already increasing the transport costs. According to market estimates, the average daily price for tankers carrying oil in the Black Sea has risen to over 300,000 dollars a day

compared with a little over 200,000 dollars a week earlier.

War insurance for ships visiting Black Sea terminals has increased to about 2% of the value of the vessels compared with approximately 1% two weeks ago. Even small changes in these rates mean hundreds of thousands of dollars of additional costs for a single voyage.

According to Niels Rasmussen, chief shipping analyst at BIMCO, if the reduced volume of transport in the Black Sea persists, the world market for crude oil tankers may register a decline of about 3% - at a moment when the sector is already under serious pressure.

The information is taken from bTV Novinite.