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Task 1: -

Hawkeye and Black Widow have gone to acquire the soul stone. They meet Red Skull there and had a conversation with him regarding the soul stone. Now, Red Skull to Hawkeye and Black Widow,

Red Skull – "In order to take the stone, you must lose that which you love. An everlasting exchange. A soul, for a soul."

But before any sacrifice you both must prove me that you are worthy towards the sacrifice. For that I have a problem for you. If you are able to solve it successfully then I will assume that you are ready for the sacrifice and you can become the rightest/rightful owner of the SOUL STONE.

Red Skull – To show your mental strength, I am going to ask you a simple math-based problem on a concept that you have must heard before i.e., Prime Numbers. So, you are given a range [l, r] and you need to give me the prime number between [l, r]. Also, making it a worthy task, you have to sample out only those prime numbers whose sum of digits is also a prime. So, are you ready for the challenge?

Hawkeye and Black Widow – If it's for saving the world, then we are up to anything. Let's begin.

So, now you must play the part of Hawkeye and Black Widow and help them to save the world from Thanos's rage.

Somehow, Hawkeye and Black Widow are not so much good with mathematics involved with prime number. So, helping them to save the world, you must play your part and write them a code to help them out for getting the soul stone.

 Now the answers can be large enough, so you must take modulo with 10^2+7.

Red Skull – Let's begin. Let me first give you a sample of what you need to do, before handling the real stuff

Sample Input ➔ [7, 15]

Sample Output ➔ 18

Explanation: -

7, 11 are the prime falling inside and sum = 18 and mod with 10^2+7 yields 18.

Red Skull – I hope you have gotten I hold on the task, so, let me see your knowledge on the real stuff. Here comes the real stuff,

INPUT ➔ [46634, 87345]

Input Format – you are given a range from l to r both **inclusive.**

Output Format – To be stored somewhere, so as to provide it to the Red Skull. Be aware output is important to move towards the next step. Also, the outputs are big enough to defeat smaller data types. So, please use the maxed-out heroes of data storage (i.e., Big Size Data Types). Also remember **take modulo of the answer with 10^2+7** to get it in correct format.

Task 2: -

While Hawkeye and Black Widow are busy doing their work, Thor and Rocket are with Eitri on the other side of the world to get Thor a powerful weapon, so as to fight Thanos with equal competition. Now, Thor and Eitri are having a conversation over how to create that weapon,

"A king's weapon. Meant to be the greatest in Asgard. In theory, it could even summon the Bifrost."

"Does it have a name?"

"StormBreaker."

—Eitri and Thor

StormBreaker is an enchanted axe used by Thor. It was forged from Uru on Nidavellir, and can summon the Bifrost.

"I'm gonna hold it open."

"That's suicide."

"So is facing Thanos without that axe."

—Thor and Eitri

Etiri: - "The star that powers our forge was made to shut down. We need to open the cage around the star and re-lit the forge. But that's impossible to do. "

Thor: - "Don't worry. I will do it."

Etiri: - "But in this process you will die. That star will light you up completely."

Thor: - "Don't worry, we need to figure out a way to open the cage around the star by all our means and then try to keep it open till the formation of the weapon happens. Let's see what we can do here."

With Thor and Rocket's help, Etiri can open the cage around the star, re-lit the forge, and thus create the "StormBreaker".

Now, Thor is stuck around for finding the safest way to open the cage. The cage is in the shape of a polygon and is jammed at different angles. He must find out the way to cut the polygon into different triangles by connecting its vertices appropriately. If he gets this number than he can choose the safest way to break the obstruction into pieces and open the cage, so as to successfully build the "StormBreaker".
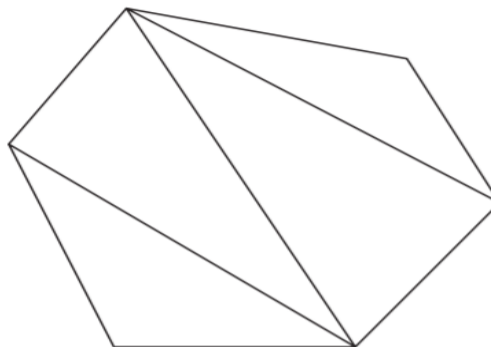
But somehow, he is weak in mathematics. So, you have to help him out to find this number.

Sample Input → 6-sided polygon cage (Hexagon)

Sample Output → Total 14 triangular divisions possible

Explanation: -

Consider this to be the 6-sided polygon cage. So, we can divide it into 14 triangles as per the marks show.

INPUT → Please consider the output obtained from **task 1** as an input to the second task. i.e., the number of sides of the polygon is the output of the task1.

Output Format – Output involves very large calculation that can only be handled in very long data types. So, please consider large data formats for solving this particular question. Also, the output of this task is served as an input to the next one. So, please store it carefully.

Task 3: -

Congratulations, with the help of your mathematics and coding skills, we are able to arrive at the last chapter of the fight.

Now, in the final fight between the Avengers and Thanos, Iron Man has understood the indication of Dr. Strange and he is ready to sacrifice himself for saving the whole world. Now to do so, he goes to Thanos and involves him in a fight to distract him and get all the stones out from his hand. But Thanos is smart enough to not easily give them the stones, so he creates an imitation of infinity gauntlet and wears it in one of his hands having the real in the opposite one. Now he has gauntlets in both of his hands. Now we need to detect the correct pairs of infinity stones to correctly form the gauntlet and save the world by destroying Thanos's army. So, basically here's the formulation, we have an array of integers and we need to identify "unique" subarrays from that array. By unique we mean that the elements of the array will have **GCD** contributing to 1. So, now Iron Man needs to identify this property from that array where different infinity stones are represented as numbers inside the array.

Sample Input → [1, 1, 1]

Sample Output → 6

Input → Please consider the output obtained from **task 2** as an input to the third and the final task.

Output Format – Output involves very large calculation that can only be handled in **very long data types**. So, please consider large data formats for solving this particular question. Solution to this problem will complete our quest and we will be able to save the world then. So, please take each and every step carefully.