

Date Or Not?

Time Limit: 2 seconds

Memory Limit: 128 MB

Problem Statement

The trainers for Dec Course 2020 were on dates when they met up (well, some of them were, anyways). Being very strange people, they immediately decided to form a line. There are N people in the line. For convenience, we number them from left to right, the leftmost being 1 and the rightmost being N .

You are a very kaypoh person and you wish to determine the relationships among your future trainers. Obviously, they will not tell you the relationships outright. However, Physicist S secretly struck a deal with you. In exchange for money (he forgot to buy chocolate), he will answer some queries for you.

Specifically, he will answer queries of the form $[l, r]$, where $1 \leq l \leq r \leq N$. He will tell you the number of pairs of people (i, j) who are in a relationship such that $l \leq i < j \leq r$. However, to avoid giving away too much sensitive information, he will only answer Q queries.

It is guaranteed that each person is in **at most** one relationship, and that no one is in a relationship with themselves. As such, can you find all of the relationships?

Interaction Protocol

This is an interactive problem. You should not read from standard input or write to standard output. You need to add `#include "dateornot.h"` at the start of your program and implement the following function:

- `std::vector< std::pair<int, int> > find_dates(int N, int Q, int ST)`
 - N is the number of people in the line.
 - Q is the number of queries allowed.
 - ST is the subtask number.
 - This function will be called once per test case. You should return a list of all relationships among the N people.
 - If the list you returned is incorrect, your program will be judged as Wrong Answer.

To help you implement this function, you may use the following helper function:

- `int ask_s(int l, int r)`
 - l and r should satisfy $1 \leq l \leq r \leq N$, representing a query over the range $[l, r]$.
 - The function will return the number of relationships among the people such that both parties are in that range.

- This function may only be called at most Q times. If it is called more times, your program will be judged as Wrong Answer and immediately terminate.
- If the arguments passed into the functions are invalid, your program will be judged as Wrong Answer and immediately terminate.

Subtasks

For all test cases, $2 \leq N \leq 1000$.

Subtask 1: $Q = 6969$, There are no relationships $(a, b), (c, d)$ such that $a < c < b < d$. (31 marks)

Subtask 2: $Q = 500000$ (69 marks)

Subtask 2 is a special scoring subtask. Your score for this subtask will be determined as follows. Let X be the number of queries made:

- If $X > Q$, you will receive no marks.
- If $6969 < X \leq Q$, you will receive $(10 + 40 * (\frac{500001-X}{493032}))\%$ of the marks.
- Otherwise, you will receive 100% of the marks.

Your score for Subtask 2 is the minimum of your score for all test cases.

Grader

There is a grader available for testing. The grader input format is as follows:

$N Q ST M$

$A_1 B_1$

...

$A_M B_M$

denoting that there are M relationships, the i^{th} between persons A_i and B_i .

The grader will output either “Wrong Answer: Reason” or “Accepted: Score” depending on your program and the input test case.