take off
Programming Contest

DIU Take-Off Programming Contest

Fall 2019

[Main Round]

Organized By

Daffodil International University

Department of CSE

Computer & Programming Club

Problem Set

Platform Support

CodeMarshal

Index

Problem Name	Setter Name	Reviewer
A. I will be the one	Saiful Islam	----------
B. The Fantabulous Organizer	Aquibuzzaman Md. Sayem	Farjana Akter
C. Dour De!	Hafizur Rahman Arfin	Shah Habibul Imran
D. Last But not Least	Raihanur Rahman	Nesar Ahammed
E. Game of Networking!	Debashish Saha Pranta	Erfanul Islam Bhuiyan
F. Vai Solve Hoyna!!	Mehedi Hasan	Tanima Hossain
G. Dhopash!	Azharul Islam Tazib	Nesar Ahammed
H. She's gonna die anyway!	Muhaiminul Islam Jim	Nazmus Sakib
I. The auto keyword	Pranto Das	Nesar Ahammed
J. Legacy	Mahmud Sajjad Abeer	Tanima Hossain

A. I will be the one

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

[Please do not copy paste. I am serious. Please do not copy paste]

DJ NAJ and his company, the top contestants of DIU (since first TOPC) will be retired soon. But they are going to retire with a heart full of pain, especially DJ NAJ. Do you know why? You are the reason of that. Before the explanation of the reason let us welcome you to the 12th Take-Off Programming Contest(TOPC) with a warm heart. Now back to the reasons. Although it is our 12th TOPC it has been observed that many of our contestants lose their way after the contest. Every semester more than 250 contestants participate and rarely anybody rises as a programmer. The second reason is that it is his last TOPC. After this he will no longer be directly connected to this. As he will be too busy with his **J**arina **O**roni **B**abe for spending a happy life. So he is feeling the loneliness about not having a successor (A successor is the one who will continue all the good work of DJ NAJ after his retirement). A successor who will continue as programmer in his place. The third and utmost reason is that in the history of TOPC never ever a contestants took the challenge to beat all his or her seniors and take their place. Now the real question is that will you? To do that you need to start competitive programming. And every programmer starts with a simple **"Hello World!"** printing. Today, it is not different. But you are **not allowed to print "Hello World!"**. **You have to print "DJ NAJ, I will be the one"**(without quotes). Can you do this?
Normally we use the following code to print "Hello World!":

```
#include<stdio.h>
int main()
{
    printf("Hello World!\n");
    return 0;
}
```

Your job is to use the same code but **print "DJ NAJ, I will be the one"**(without quotes). Please don't give any more pain to DJ NAJ or he will provide TALAK to his beloved **J**arina **O**roni **B**abe.

Input

There is no input in this problem.

Output:

Print **DJ NAJ, I will be the one**
Or copy the given code and **replace** **Hello World!** with **DJ NAJ, I will be the one** and then submit.

`Don't forget to print the newline character('\n') at the end.`

Sample Input	Sample Output
/* There is no input for this problem */	DJ NAJ, I will be the one

Problem Setter: **Saiful Islam**

B. The Fantabulous Organizer

Time Limit: **1.0 Second** **Memory Limit:** **1024 MB**

Description:

You are in a World of Coders where your school always hosts battles between programmers called programming contest to find the very best fighter. Yes, you read that right. Hosts battle, not programming contests. This year the God of Contests decided that you, a young blood, should organize this prestigious battle. And trust me, you don't want to mess with him. For arranging such a battle, you need weapons, lots of weapons. And for building weapons, you need builders. Now the budget is kinda low, so you can only hire one builder. As such, you must hire an experienced builder. 'Cause if you don't appoint an experienced builder, the builder will have to work till midnight which will get him really really angry. So angry that he might use the weapons against you. And it doesn't end there, he may curse you to hell too. So you've hired an experienced builder. Congratulations! Now you have to calculate the time he'll need to finish his task so that you can plan other parts of the battle properly.

Now you know that there will be N contestants in the battle. Each contestant needs **4 weapons** to fight. As the builder is experienced enough, he can make **2 weapons** **per minute**.

You have to calculate how much **time (in minutes)** the builder needs to complete his job.

Input

The only line of input will have N($1 \le N \le 300$), the number of contestants.

Output:

You have to print the **time(in minutes) builder needs to complete the job.**

Sample Input	Sample Output
53	106
39	78

Problem Setter: Aquibuzzaman Md. Sayem
Reviewer: Farjana Akter
Alternate Solution Writer: Muhaiminul Islam Jim

C. Dour De!

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

Mr. Reeba is a very good programmer. The only thing he understands is programming. For this very reason, he has been sitting in a chair for hours and hours to code. He has acquired a great skill set but with that he has acquired great weight as well! Now after 4 years, he is realizing that he is getting popular among girls due to his skills. But he is sad ☹.

Because no girl is falling in love with him. They just like him as a "friend" or "vaiya". After some introspection, he found that it's his "fat vuri" that is the problem. So he decided to participate in the marathon named "**DIU Dour de**". The marathon is 3 hours long.

As he is so busy training hard for the marathon, he asked you to write a program. This program will get the **race finish time** of Mr. Reeba. And it will calculate **what medal** Mr. Reeba will get **according to the race rules**. The race rules are as follows:
If a runner finishes within **1 hour**, he/she will get a **"gold"** medal.
If a runner finishes within **2 hours**, he/she will get a **"silver"** medal.
If a runner finishes within **3 hours**, he/she will get a **"bronze"** medal.

Input

You will be given time **T (1 <= T <= 180)** **is the minutes** which is the time Mr. Reeba finishes the race.

Output:

You have to output the string "**bronze**", "**silver**" or "**gold**" (without quotes) according to the rules.

Sample Input	Sample Output
32	gold
167	bronze
77	silver

Notes:

In the first case the completion time is 32 minutes. So he finished it in 60 minutes or 1 hour. So he will get “gold” medal.

In the second case the completion time is 167 minutes. So he will not get “gold” or “silver” as it is more than both of their limits. So he will get “bronze”

In the third case the completion time is 77, so it falls in between “gold” and “bronze”. The result is “silver”.

1 hour = 60 minute
Don't forget to print the newline character(\n) at the end.

Problem Setter: **Hafizur Rahman Arfin**
Reviewer: **Shah Habibul Imran**
Alternate Solution Writer: **Muhaiminul Islam Jim**

D. Last But not Least

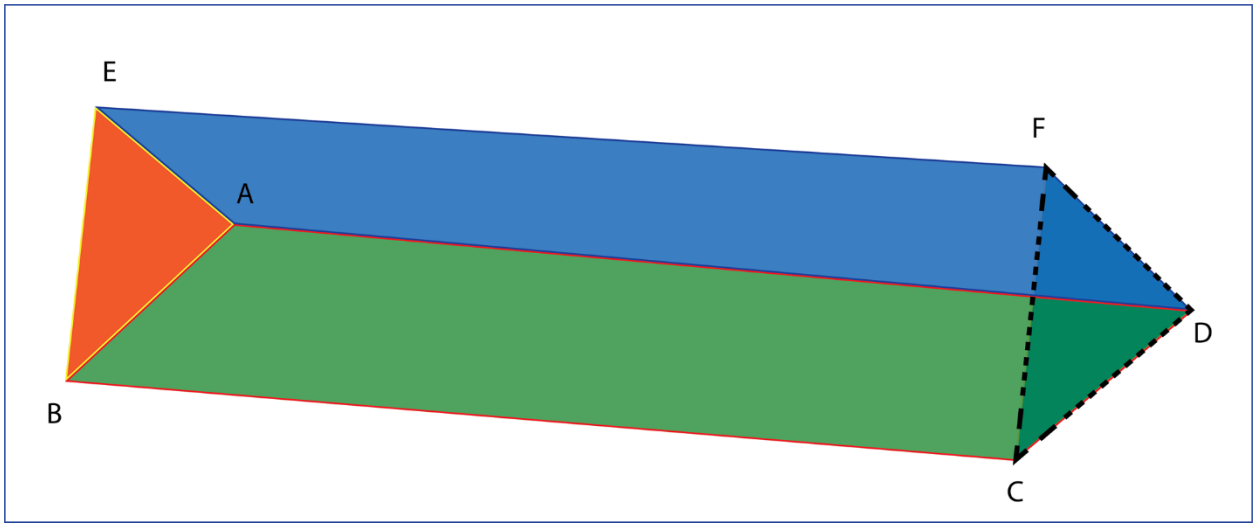
Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

Sajal Jayanto is a very good programmer. There's a rumor that he can solve any problem you can think of. So there's a secret mission going on to make a problem that he can't solve. This mission was initiated by VP ACM. VP ACM said that if anyone can make a problem that Sajal Jayanto can't solve, he will be rewarded. (the reward is a surprise)

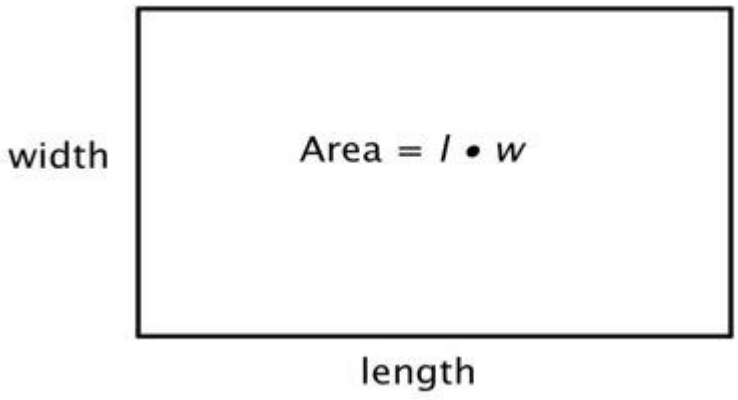
Mehedi, a promising programmer, wanted that reward and started thinking about different ideas. But alas! It wasn't as easy as he thought. So he started spending time with Sajal Vaia and kept talking with him about programming problems, hoping to find his weakness. In the meantime, Mehedi presented a few problems to Sajal Vaia but he solved all of them :(. While talking one day, Mehedi suddenly brought up a geometrical problem that he had been having trouble with recently. To his utter surprise, Sajal Vaia immediately avoided the problem saying **"dhurr beta! Ekhon ami parbo na"**. Hearing that Mehedi's instincts were going wild and he thought that maybe geometry is his weakness. Thinking that he became too excited and jumped on the spot (mon me laddu fuuta!). Even though he solved all of the problems Mehedi presented to him, Mehedi thought "Let's have a last try? (But not the least of course!)". He went home and couldn't sleep that night. He was thinking about different geometrical problems. Because he knew for sure that Sajal vaia wouldn't be able to solve geometric problems. But Mehedi wouldn't want to take a risk by making an easy problem. So he had to think for a while. After three sleepless nights, he came up with a problem. After making up the statement he presented it in front of Sajal Vaia.

The problem is like this. There is a tin shade house which has 4 shades. Two of those shades are rectangles and the other two are triangles. The triangles are equilateral (equilateral means all sides are of equal length). Both triangles are equivalent and both rectangles are also equivalent. Now given the sum of areas of the two rectangles and one side of one of the triangle, Sajal Jayanto has to calculate the length of the rectangle.



4 Shades of A Tin-Shade House

In the above image ABCD and ADFE represents the two above mentioned rectangles (May not look like it in the image. But trust me they are rectangles) and ABCD~ADFE. Which means the lengths, widths and areas are the same for both the rectangles.
ABE and CDF represent the two above mentioned equilateral triangles and ABE~CDF. Which means all the sides and areas are the same for both the triangles.



Area of a rectangle

As Mehedi expected Sajal Vaia was having a hard time and couldn't solve it within the given time limit and Mehedi got the surprise reward. After that that problem became a legend and many tried to solve it. You being another good solver, can you solve it?

Input

There are two integers **A** (**3** <= **A**<=10^6), **S** (**2** <= **S**<=10^3) And A > S .
Where,
A = **Sum of the area of Rectangle ABCD and AEFD.**
S = **Length of the triangle side AB.**

Output:

Print the **length of the sides BC of Rectangle rounded to two decimal places.**

Sample Input	Sample Output
100000 234	213.68
12 2	3.00

Notes:

In C/C++, you can use **%0.2f** for float and **%0.2lf** for double datatype to print the result up to two decimal places.
Don't forget to print the New Line (\n) character at the end.

Problem Setter: Raihanur Rahman
Reviewer: Nesar Ahammed
Alternate Solution Writer: Nesar Ahammed

E. Game of Networking!

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

In December 2016, **Sheikh Awla Hawlader**, God of Computer Science took a great initiative for programmers in **Daring International University**. In January 2017, under the supervision of our beloved **Matha Mota Rogchota Noradhom**, a group of students managed to form an elite team under the banner of **DIU Chotur Programmers' Club (DIU CPC)**. From then **DIU CPC** is serving excellence in a new fashion and methodology for making **CSE DIU** great again.

Nothing in this world is perfect. The imperfections existed among ancestors and so among the elite team but we can tell what the elite team lacked. They faced some issues and sometimes they couldn't manage while interacting with the demigod. They actually didn't know what they were missing.

But I know what they were missing as I know which secret formula the demigod follows. He likes things balanced, even and prime. We know **among all the even numbers, two(2) is the only number that is prime and he thinks zero(0) is the most balanced number as it's neither positive nor negative**.

So, **you'll be given an array of N numbers. Consider that those N numbers represent the characteristics of a club. You have a magical power, you call it "Power of G", which can change any number into 0. But you can use the power of G only once. To please the demigod you must have at least two zeros (as 2 is even and prime, 0 is balanced) consecutively, at any place, after using the power of G.**

Can you tell if there's still a solution to make the demigod pleased?

Input

The first line will contain a positive integer number N($1 \le N \le 100$). On the next line, there will be N space-separated integer numbers. All the given N numbers are from 0 to 100 (inclusive).

Output:

Print **Solution Achhe Habibi!** if there's a solution and **Beriye jao, beyadob kothakar!** otherwise. Check out the samples for details.

Sample Input	Sample Output
7 2 4 4 1 1 3 9	Beriye jao, beyadob kothakar!
2 0 9	Solution Achhe Habibi!

Problem Setter: Debashish Saha Pranta
Reviewer: Erfanul Islam Bhuiyan
Alternate Solution Writer: Mehedi Hasan

F. Vai Solve Hoyna!!

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

Programming career requires so much patience and if you have someone mentoring you, it's always an advantage. It's a wonderful experience that someone from your university is training you to learn programming and support you when needed. It gives one hope that there's someone to guide you through this unknown journey.

In my case, I had someone who guided me through the process. Each time I got depressed, I used to meet him on campus. We used to have tea in the campus and discuss our problems.

Most often the conversations were like:-

Me: vai cha khaben?
He: na ami cha khai na
Me: vai ar partechina, kichu pari na, amare dia hobe na
He: jokhon mone hobe partesosh na tokhn bhujbhi ekta stage par hoise ekhon notun kichu shikhte hobe
Me: vai problem solve hoy na
He: table e boisha thak solve hobe

But if I again said "vai problem solve hoy na" on the same day or some other day he again replied the same "table e boisha thak solve hobe".

This also happens when I texted him and then he used no spaces between the words. For example:-.

He sometimes said "TableEBoishaThakSolveHobe" and sometimes "tableEboishathaksolveHobe". You see, **they are the same message with different casing of alphabets**. Some uppercase alphabets were changed to lowercase and some lowercase alphabets were changed to uppercase but we all know they are the same message with different casing.

I wonder if they are the same message or not if we forget about the casing.

But the messages can be large. Can you help me there? **I will give you two replies of Vai. Can you tell me if they are the same or not (considering that a lowercase and uppercase form of an alphabet is same)?**

Input

The first line of the input contains an integer T (1<=T<=100) denoting the number of test cases. For every test case there will be an integer N (1<=N<=1000). The next two lines contains two string S_1 and S_2 of length N.
Where the S_1 is the first and S_2 is the second replies of Vai.

Output:

For each test case print "Case X: "(without quotes) where, X is the running test case number. Then **print table e boisha thak solve hobe if the replies didn't match otherwise print vai problem solve hoy na**

Sample Input	Sample Output
2 25 TableEBoishaThakSolveHobe tableEBoishaThakSolveHobe 9 Solvekoto otokevelS	Case 1: vai problem solve hoy na Case 2: table e boisha thak solve hobe

Problem Setter: Mehedi Hasan

Reviewer: Ummey Rukaya Suny
Alternate Solution Writer: Tanima Hossain

G. Dhopash!

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

Year 2017, dawn of a new era of **DIU CPC**. We were on the verge of hosting our very first mega event, **Google Summer of Code**. Auditorium 52 was the venue. After getting into the venue, to our surprise, the event floor was not ready as the carpenters were working on the SOFA sets and it was already 2:30PM on the clock and program was scheduled to be started at 3:00PM. We were expecting at least 6 guests thus we needed 3 SOFA sets but only two was ready, we needed one more! Time was clicking. Participants had started to arrive at the event and at nearly 2:50PM, carpenters denied to complete the very last SOFA as by their opinion, it wasn't possible by the remaining time and wrapped up to the store room! What we could do then! Me & Shafi Vai were trying out hard to find a solution and ended up in the store room to assemble a new SOFA, ourselves! We looked for the parts of the SOFA sets left by the carpenters and assembled a new one with some portion (Not that much necessary for stability) missing. We ran our own kind of testing by jumping on the SOFA and it passed and was moved to the venue alongside the other two SOFA sets. Here in the picture below, the rightmost SOFA (White Rectangled) is the SOFA we are talking about! Throughout the event, we were high on adrenaline thinking about if any time the SOFA would "**dhopash**" with the guests! Now you are in a much more difficult scenario.

You are expecting at least **N** **number of guests** and not a single SOFA is ready for you! You have to assemble SOFA sets all by yourself! But you have a limited resource of parts of a SOFA in the store room. **To assemble one unit of SOFA, you must have the parts with the described quantity given below:**

- **Arms x 2**
- **Backs x 2**
- **Seats x 2**
- **Structure x 1**

Maximum 2 guests can sit in a single SOFA. You have to find out if it is possible to assemble

the least number of SOFA sets with available parts in the store room for the guests and tell the organizer if they should carry on or should abort the program!

Input

The input starts with a number **T (1 ≤ T ≤ 20)**, the number of test cases. Each test case starts with blank line and a single integer **N(1 ≤ N ≤ 20)**, the total number of guests, and then 4 lines each having the name of the parts **S** (**a string with a max length of 10**) followed by **X (1 ≤ X ≤ 50)**, the quantity of the parts. Parts name may appear in arbitrary order.

Output:

For each case, print the case number "Case T: "(without quotes), where **T** is the case number starting from **1** and then print **"Carry On!"** if you can assemble the least number of SOFA or print **"Abort! Abort!"** if you can't! (without quotes). Also, **print an extra newline after every test case**.

Sample Input	Sample Output
2 4 Arms 7 Backs 9 Seats 5 Structure 2 5 Seats 5 Arms 7 Backs 9 Structure 2	Case 1: Carry On! Case 2: Abort! Abort!
2 3 Backs 5 Arms 9 Seats 3	Case 1: Abort! Abort! Case 2: Carry On!

Structure 3 2 Seats 5 Arms 7 Structure 4 Backs 4	

Problem Setter: Azharul Islam Tazib
Reviewer: Nesar Ahammed
Alternate Solution Writer: Nesar Ahammed

H. She's gonna die anyway!

Time Limit: 1.0 Second **Memory Limit:** 1024 MB

Description:

You either die a hero or live long enough to see yourself become the villain. And that's what **mAina** is facing. She has completed numerous missions to save our beloved earth. While doing so she had to watch many friends depart in horrible ways. Part of life? Yes but that got her mentally unstable. As for that reason, she was de-ranked.

In her leisure time, she thought she would try some math problems and found a problem involving series which was giving her a really hard time. Time passed and passed but she couldn't solve this problem. And the frustration got her even crazier. And the once hero turned into a monstrous villain.

Somehow she got the news that TOPC is taking place here today. She sent us an email where she told us that she wants you guys to solve her problem. If any of you can solve this one, she'll get the mental peace she was looking for and for avoiding such issues in the future she'll self destruct herself. Otherwise, she's gonna kill us all with a massive suicide bombing.

Here's the original problem for your convenience: **Given a few numbers taken from an arithmetic series you have to produce the sum of the first N numbers of that series. It's guaranteed that there will be one and only one unique answer for all the given input.**

Do you think you can save the day?

Input

First line of the input contains an integer **T**, number of test cases. The following lines contain test cases. The first line of each case contains an integer **M**, next **M** lines contain two space-separated integers **k**, S_k, where S_k denotes the k^{th} term of a series. The final line of each case contains an integer **N**. You may assume that **no number in the input will have an absolute value greater than 1000**. Check the Sample Input section for the exact input format.

Output:

For each case, you have to produce the sum of first **N** elements of the series from which the given elements were taken. Check the Sample Output section for the exact output format.

Sample Input	Sample Output
2 2 1 5 2 10 4 1 3 9 5	Case 1: 50 Case 2: 45

Notes:

Note 1: a sequence of numbers in which each differs from the preceding one by a constant quantity (e.g. 1, 2, 3, 4, etc.; 9, 7, 5, 3, etc.).
Note 2: The first case represents the series 5 10…. As it's an arithmetic series, the next two numbers must be 15 and 20. Hence the sum of the first 4 elements of this series is equal to 5 + 10 + 15 + 20 = 50.

Problem Setter: Muhaiminul Islam Jim
Reviewer: Nazmus Sakib
Alternate Solution Writer: Nazmus Sakib

I. The auto keyword

Time Limit: 3.0 Second **Memory Limit:** 1024 MB

Description:

Mina got an assignment from her teacher. The assignment is:- Given N lines of code. The format of every line is like,

1. VaribleType VariableName;
2. VaribleType VariableName = VariableName + VariableName;
3. VaribleType VariableName = VariableName - VariableName;

There will be four types of variables **(int, float, double and auto)**. Here **auto** is a special keyword that decides the type of the variable according to the **initializer variable, which means auto keyword always used with an assignment operator**.

Mina finished her assignment. Before submitting to the teacher, she wants to check if her answer is correct or not. She knows you are a good programmer. Can you help her to check her solution?

Input

The first line contains an integer number **T (1 <= T <= 100)**, number of test cases. Then the next line consists of an integer **N (1 <= N <= 1000)** Number of lines of code. Next, **N** lines each will consist of a statement **S (length of the line = |S| <=50)**. It is granted that the name of every variable is unique and every line of code will be a valid code as described above. (See the sample input for details)

Output:

For each test case, **print the data type of auto declared variables following the input order** and print a newline(\n) after each test case. (see sample output for details)

Sample Input	Sample Output
3 5 int num1;	Case 1: float difference double sd

float num2;
auto difference = num2 - num1;
double summation = num1 + num2;
auto sd = summation + difference;
9
int a;
float b;
double c;
auto aa = a + a;
auto ab = a + b;
auto ac = a + c;
auto bb = b - b;
auto bc = b - c;
auto cc = c - c;
9
int a;
float b;
double c;
auto aa = a - a;
auto ab = a - b;
auto ac = a - c;
auto bb = b + b;
auto bc = b + c;
auto cc = c + c;
	Case 2:
	int aa
	float ab
	double ac
	float bb
	double bc
	double cc
	
	Case 3:
	int aa
	float ab
	double ac
	float bb
	double bc
	double cc

Problem Setter: **Pranto Das**
Reviewer: **Nesar Ahammed**
Alternate Solution Writer: **Raihanur Rahman**

J. Legacy

Time Limit: 1.2 Second **Memory Limit:** 1024 MB

Description:

TL;DR
Looking back at the last 4 years I must say, what a journey we all had together!

I had a lot of dreams and always curious about new. The only thing wrong about everything was that I knew no path to follow to fulfill those dreams maybe someday. One must aim to hit the target and I knew the target but I wasn't aiming.

It was summer, the summer of 2016. I met a person that now in my life I don't know if I'd ever be able to pay all his debts. We, the students of our class were so enthusiast back then and he smiled watching us making the baby steps through the world of Programming. Who knew that programming would be that fun and tempting! **But a master knows that hurdles are gonna come now and then. Thus, he taught the sailors to keep patience whenever it comes and they all are going to be good at the end.**

Everyone could see the progress and we were hunting for more bright minds to keep it that way. Those bunch of people combined has brought many glorious stories to DIU CSE and guided many students along the way. The infrastructures were rebuilt around them and led by the brightest minds around.

Many of you will never get to know how beautiful and adventurous those days were!

But nothing lasts forever. Change is nothing but obvious and we can only get used to it and look forward. The new torches will still be enlightening many more and best wishes to all of them but it's time for many of us. **Time for us to leave and clear the path for the new.**

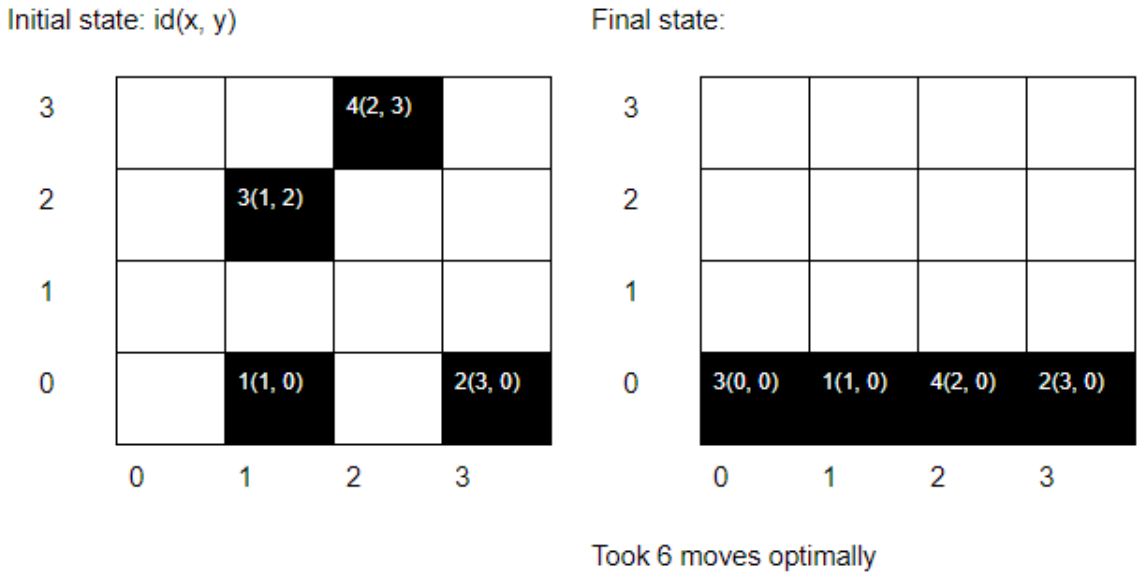
We just want you to follow and stick to the plan. Promise us that you won't lose hope no matter what. Many of us have been in distance and learned a lesson that unity is the solution to maintain continuous and long term progress.

Now is the time we pass all our responsibilities to you but someone must hold the liabilities. One more thing I/we must say:-

"Thanks for the memories :)"

If someone followed and sticked to the plan, he/she will be able to solve this problem, not very far from now. Maybe you're already there, who knows! Here's the problem we want you to solve:-

There were **N** people in a programming community. You'll be given the position of N people in Cartesian Coordinate. In **one move** a person can move independently to it's consecutive **cell(Up, Down, Right, Left)**. For example, if he's in the position (x, y) he can move to (x, y + 1) or (x, y - 1) or (x + 1, y) or (x - 1, y).



Picture: First sample is explained above.

They all want to come to the **lowest row where y = 0 and x can be any integer number** to unite for a meeting for future plans. As they are programmers, they want to take minimum moves required altogether to move to the last row. **Can you find the minimum total moves required? Also, consider that each cell can and will contain a maximum of 1 person at any moment.**

Input

The first line will contain T the number of test cases. Then, for each test case, the first line will contain the **number of people** N. On the next N lines, there will be the coordinates of each person. The coordinates will be given as **two integers** X_i and Y_i **separated by a single space in between**. Check out the sample input and diagram for clarification.

Constraints:

1 <= T <= 100

1 <= N <= 100

0 <= Xi < 100

0 <= Yi < 100,000

Output:

For each test case, print **"Case #X: Y"**(without quotes) where X is the number of test cases starting from 1 and Y is the most optimal result for that test case.

Sample Input	Sample Output
1 4 1 0 3 0 1 2 2 3	Case #1: 6

Problem Setter: Mahmud Sajjad Abeer

Reviewer: Tanima Hossain

Alternate Solution Writer: Tanima Hossain