



acm International Collegiate
Programming Contest



The 2010 ACM UCLA Practice One Programming Contest

April 17, 2010

Universidad Centroccidental Lisandro Alvarado

Contest Session



Problem A

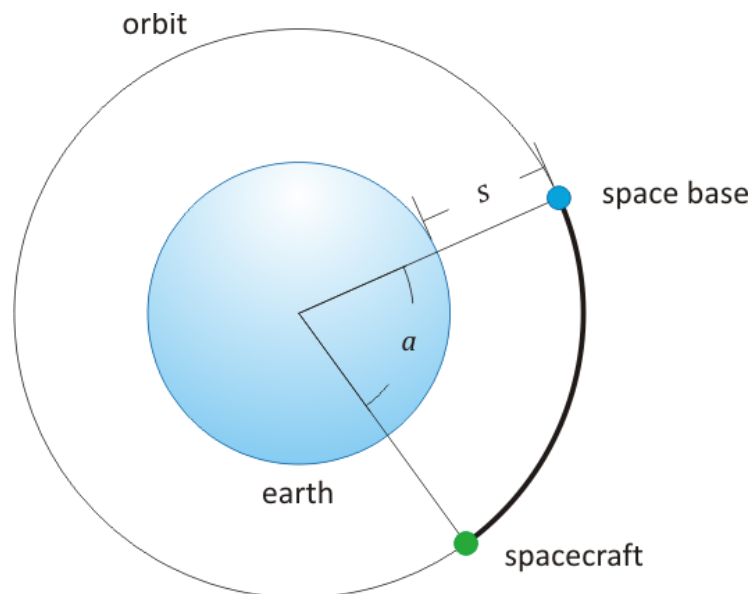
Aerospace Entities

Source file name: *aerospace.c*, *aerospace.cpp* or *aerospace.java*

Houston, we have a problem! We've seen a couple of iguanas eating some wires; we think that there must be a lot more. It seems that...

The communication was lost! It must be the dark Iguanas extraterrestrial empire, don't you think? They're always against our good intentions, but wait! Will it survive the crew? They were in the spacecraft and they were coming closer to our space base, maybe if they get close enough our base can save them. We have already told them, but we can't do anything else. The anxiety is too much! Please tell us if they can survive. Can you tell us the answer in the next few three hours?

Both the spacecraft and the space base are on the same circular orbit at s kilometers from the surface of the earth and they make an angle a with the center of earth, as shown in the next figure.



Note that the earth radius is 6,440 kilometers. They can be saved only if their distance to the base is at most x kilometers. By distance we mean the length of the shortest arc between the two entities.



Input

The first line of the input contains an integer indicating the number of test cases. For each test case, there're three integers in one line, s , a and x , where $10 \leq s, x \leq 10000$ and $0 < a < 360$, $10 \leq s \leq 100$.

The input must be read from standard input.

Output

For each test case, the output should consist of one line with the text "YES" or "NO" (without the quotes) if the crew can be saved or not, respectively.

The output must be written to standard output.

Sample input

```
1 3
2 1000 40 3000
3 4000 10 4200
4 6000 210 3000
5
```

Sample output

```
1 NO
2 YES
3 NO
4
```



Problem B

Bart Simpson

Source file name: bart.c, bart.cpp or bart.java

Every day in Springfield we saw Bart going to school. And every day we saw Bart writing in the chalkboard any kind of thing. Well, Principal Skinner annoyed as always, left the writing punishment, and put him the next task. Bart has to fill a box! Simple isn't? Well, almost. First, he is given two kinds of rods, one brown and one white with, maybe, different lengths. He has a lot of rods of each kind and the box can be filled only with these, he may use only one kind of bar if he wish. Second, it can be the case that the box can't be completely filled, so he must maximize the filled area. Both the rods and the box have the same width.

What has this to do with you? Well, Skinner asks you to tell him what is the length of the empty region, and, as Bart threw a lot of eggs to your house few days ago, you're glad to help him.

Input

The first line of the input contains an integer indicating the number of test cases. For each test case, there is a line with three integers, L , B and W , each one describing the lengths of the box, and brown and white bars, respectively. You can assume that $0 < L, B, W < 10000$.

The input must be read from standard input.

Output

For each test case, you must print one line with one integer, the length of the region that will be empty if the filled area is maximized.

The output must be written to standard output.

Sample input

```
1 3
2 54 3 5
3 55 3 5
4 7 4 5
5
```

Sample output

```
1 0
2 0
3 2
4
```



Problem C

Common Solution

Source file name: *common.c*, *common.cpp* or *common.java*

It's time for an easy problem and, also, easy to understand. Even better, I won't give you any history. I just will tell you what you have to do. First, you have a list of positive numbers, for example,

$$\{a_i\} = \{32, 12, 16, 90, 3, 49\}, \quad i = 1, 2, \dots, n$$

Now, tell me the maximum difference between two numbers from that set, let's say $a_j - a_i$, but with one condition, i must be less than j . For the previous example the answer would be $90 - 12 = 78$. Note that I don't mean about the absolute difference.

Well, to make the problem not so silly, I will let n be as high as 10,000, so the common solution of a couple of nested for loops won't work. But I will tell you a hint; you can do it with just one for loop. Just think about this, if you have a number a and another set of numbers, with which element from that set you will get the maximum difference between a and that element.

Input

The first line of the input contains an integer indicating the number of test cases. For each test case, there is a line with n , $2 \leq n \leq 10000$, and then one line with n numbers describing the set.

The input must be read from standard input.

Output

For each test case, the output should consist of only one line with one integer, the maximum difference of a couple of numbers from that set, fixed by the given condition.

The output must be written to standard output.

Sample input

```
1 4
2 2
3 20 100
4 4
5 1 2 3 4
6 4
7 4 3 2 1
8 6
9 32 12 16 90 3 49
10
```

Sample output

```
1 80
2 3
3 -1
4 78
5
```



Problem D

D Programming Language

Source file name: dpl.c, dpl.cpp or dpl.java

With increased popularity of programming competitions, there are so many online judges where contestants can practice. Usually, most of these sites allow users to submit their solutions to problems and, if they get accepted, the users total number of solved is increased. To increase competition among users, these sites maintain a ranking of users based on the total number of solves. Unfortunately, this, at times, has introduced unhealthy competition among some users. A lot of the problems at these sites are collected from external sites, and the online judge uses data file directly from these external sites. This means, for certain problem, one is only required to submit the output file to get a problem accepted, without solving the problem at all. Just out of curiosity, you try to investigate how many of these problems are actually using judge data from the external site. To accelerate your investigation, you want to automate the process of creating codes that will submit judge data only. In this problem, you are required to make such a code generator

Input

Each case of input starts with a positive integer $N < 200$. N lines follows, each containing at least 1 and at most 100 characters. The Input characters will consist of alphanumeric, spaces, backslash and quotation only. The last case is followed by a value of 0 for N .

The input must be read from standard input.

Output

Each case of output will start with a line containing the case number in the format Case x : where x is the case number, starting at one. The next few lines will be a D code which when compiled and run will generate the input given for that case. Since there are so many ways to write a program that will generate the same output, for this problem we will restrict ourselves to the following format.

```
import std.stdio;
import std.stream;
int main (string[] args)
{
<case specific lines>
writeln("\n");
return 0;
}
```



`<case specific lines>` will contain the same number of lines as N for that case, each formatted as: `writeln("<line>\n");` where `<line>` is the input value entered for that corresponding line. Note that, the two characters `"` and `\` must be escaped by a `\` in order to be displayed by `writeln()`. The sample input/output will clarify further.

In case you are curious, why there is a `writeln("\n");` before the `return 0;` it's there to get this code presentation error so that it's not counted as accepted. You don't want to increase your number that way, do you?

The output must be written to standard output.

Sample input

```
1 2
2 "I dont like lift information"
3 I like code
4 1
5 ACM - UCLA
6 0
7
```

Sample output

```
1 Case 1:
2 import std.stdio;
3 import std.stream;
4
5 int main (string[] args)
6 {
7 writeln("\"I dont like lift information\"");
8 writeln("I like code\n");
9 writeln("\n");
10 return 0;
11 }
12
13 Case 2:
14 import std.stdio;
15 import std.stream;
16
17 int main (string[] args)
18 {
19 writeln("ACM - UCLA\n");
20 writeln("\n");
21 return 0;
22 }
23
```



Problem E

Enhanced Quadrangle

Source file name: enhanced.c, enhanced.cpp or enhanced.java

Remember any square is a rectangle, any rectangle is an enhanced quadrangle, and any enhanced quadrangle is composed of four sides. But not all rectangles are squares, not all enhanced quadrangles are rectangles, and not all sets of four sides are enhanced quadrangles.

We have the length of four sides. You have to determine if they can form a square. If not, determine if they can form a rectangle. If not, determine if they can form an enhanced quadrangle.

Input

The first line of the input contains an integer indicating the number of test cases. For each test case, there is a line with four positive integer numbers, between 0 and 230.

The input must be read from standard input.

Output

For each test case, the output should consist of a line with the text "square", "rectangle", "enhanced quadrangle" or "pothook" (without the quotes) if the sides of the corresponding case can form a square, a rectangle, an enhanced quadrangle or none, respectively.

The output must be written to standard output.

Sample input

```
1 4
2 10 8 7 6
3 9 1 9 1
4 29 29 29 29
5 5 12 30 7
6
```

Sample output

```
1 enhanced quadrangle
2 rectangle
3 square
4 pothook
5
```




Problem F

Fast summatory

Source file name: *fast.c*, *fast.cpp* or *fast.java*

One of the first users of SPARC64 VII's new supercomputer was the Kaa engineer. He extended his exploration of powers of 3 to go from 0 to 333 and he explored taking various sums of those numbers.

“Awesome, this supercomputer is so fast and powerful,” remarked Kaa. “I only wish the Dr. Naha-sapeemapetilo were here to see these results.” (Kaa moved to a new apartment, once one became available on the twenty third floor of the George Smoot apartments on Saint Catherine Avenue.).

Input

The input will consist of at most 100 lines of text, each of which contains a single huge googol. Each huge googol will be 10^{10000} in length, and will only contain digits (no huge googol will be negative).

The final input line will contain a single zero on a line by itself.

The input must be read from standard input.

Output

Your program should output the sum of the huge googols given in the input.

The output must be written to standard output.

Sample input

```
1 123456789012345678901234567890
2 123456789012345678901234567890
3 123456789012345678901234567890
4 0
5
```

Sample output

```
1 370370367037037036703703670
2
```