Computer Programming Assignment-1
Deadline - (11:59 PM IST) 26th August 2013

Problem 1: Write complete program for finding solution to a quadratic equation $ax^2 + bx+c$, given a,b,c. Assume 'a' is non zero. Print the smaller root first.

a,b,c are real numbers and roots can be both real and imaginary. There is a comma between roots if roots are imaginary else roots are separated by single space.

INPUT:
3
1 -5 6
1 5 -6
1 5 18.5

OUTPUT:
2.00 3.00
-6.00 1.00
-2.50 - i3.50,-2.50 - i3.50

Problem 2: Given 2 dates as (dd mm yyyy), find the number of days elapsed between the two (including the two days). Note that the first day can be before or after or the same as the second day. First line contains a number N denoting the number of test cases followed by N lines as the test case. Each line has 6 values dd1 mm1 yyyy1 dd2 mm2 yyyy2.

Note: You also need to consider the case of leap year.

SAMPLE INPUT:
2
22 5 2008 5 6 2008
1 1 2012 30 12 2012

OUTPUT:
15
365

Problem 3: Given a positive integer N, find how many times the digit 3 appears in the number. Input contains number of test cases 't' followed by t lines each line containing an integer N such that 0<=N<=10^15.

SAMPLE INPUT:

3
134523383
333331
1245

OUTPUT:

4
5
0

Problem 4: Read four real numbers corresponding to two points (x1,y1) (x2,y2) and print the distance between them. In the first line scan N, the number of testcases followed by N lines each containing 4 real numbers x1 y1 x2 y2. For each testcase, print one line contianing a real number correct upto 1 decimal place.

SAMPLE INPUT:

1
0.0 0.0 1.0 0.0
-47.875000 -91.500000 -386.000000 -105.250000

OUTPUT:

1.0
338.4

Problem 5: Given end points of two line segments (x1, y1), (x2, y2) and (x3, y3), (x4, y4), verify whether these line segments intersect or not. Print YES, if they intersect and NO otherwise. First line contains a number N as the number of testcases followed by N lines as an individual test case. Each line consists of 8 space separated integers x1 y1 x2 y2 x3 y3 x4 y4.

SAMPLE INPUT:

3
0 0 1 1 2 2 2 0
-20 0 20 0 -20 2 20 2
0 -1 1 0 0 0 1 -1

OUTPUT:

NO
NO
YES

Problem 6: Alice went to the zoo today. There are N pigs in the zoo. Each pig gave birth to 2 piglets last night. But because of the monsoon season, viral fever caught some of the piglets and they died. Now, given the number of piglets that died, print the minimum and the maximum number of pigs who might not have lost a piglet at all. In the first line scan the number of testcases T and then T lines follow. Each line contains 2 integers a and b where 'a' denotes the number of pigs in the zoo and 'b' denotes the number of piglets that died.

SAMPLE INPUT:

2
3 3
3 2

OUTPUT:

0 1
1 2

Explanation: In the first case, there are 3 pigs and 3 piglets are lost. If all the pigs lose one piglet each, we have zero pigs who have not lost any piglets. If one of the pigs lose 2 piglets and another one lost 1 piglet, we have 1 pig who haven't lost any piglet. Therefore min=0 and max=1.

Problem 7: Pikachu is a math genius and he loves prime numbers. On his birthday, Rikachu wants to gift him a prime number. She goes to a number store but she is weak in maths and she needs your help. Help her in finding out which numbers are prime. Given a number n, output TRUE if 'n' is prime else output FALSE.
In the first line, scan the number of testcases T, and then T lines follow. Each line contains a number n. If n is prime, output "TRUE"(without quotes) else output "FALSE"(without quotes).

INPUT:

3
7
48
1

OUTPUT:

TRUE
FALSE
FALSE

Problem 8: You are running along with your friend in the morning PT. You take ‘x’ mins to complete one round and your friend takes ‘y’ mins to complete the same round. In the beginning both of you are at the starting position. Find after how many minutes you two will meet again. First line contains the number of testcase T followed by T lines. Each line contains 2 integers x and y. At t=0, you both are together at the starting position. Print the time in minutes after which you two will meet again at the starting point.

Note: 0 < x, y <= 10000.

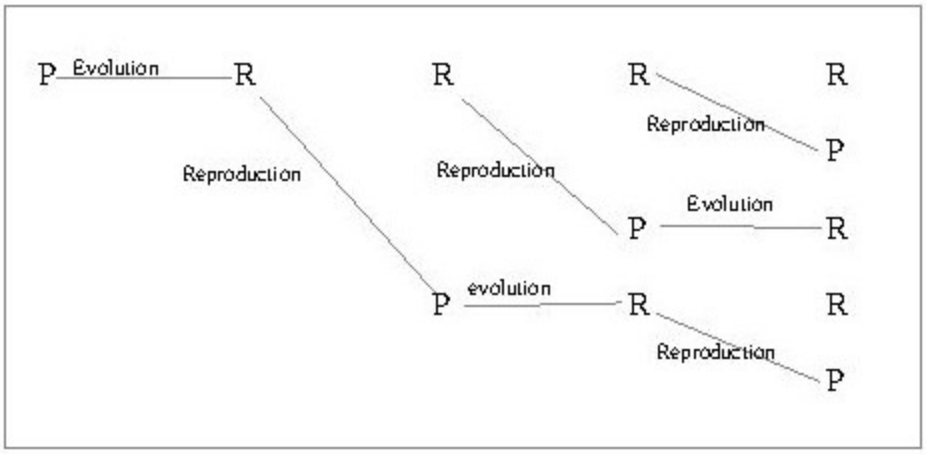
SAMPLE INPUT:
3
24 36
14 15
12 24

OUTPUT:
72
210
24

Problem 9: In Pokemon Land, every Pikachu evolves to Raichu after one month. Once a Raichu turns one month old, it gives birth to another Pikachu and the process goes on. Also the pokemons(Raichu and Pikachu) never die. Find, after N months how many Pokemons (Pikachu + Raichu) are there in the Pokemon Land. Initially(N=0) there was only one Pikachu. First line contains the number of testcases T followed by T lines.Each line contains a single integer N.Print the number of pokemons after N months.

This process of evolution and reproduction is explained in following diagram.

N: 0 1 2 3 4



Output: 1 1 2 3 5

SAMPLE INPUT:

5
0
2
4
6
9

OUTPUT:

1
2
5
13
55

Problem 10: Ash wants to have a total of Rs. 'X' in 't' years so that he can buy a Pokemon Gym. He finds an account that pays 'R' % interest compounded monthly. How much should Ash put into this account so that he'll have Rs. 'X' at the end of 't' years?

First line contains the number of testcases T followed by T lines where each line contains 3 numbers X t R (where t is integer).Print the amount Ash should deposit so as to have Rs.X at the end of t years at R% rate of interest compounded monthly.

SAMPLE INPUT:

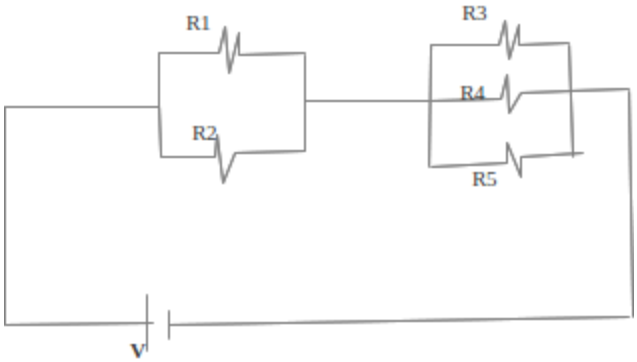
1

4000 2 5

OUTPUT:

3620.10

Problem 11:



Given the resistances (R1,R2,R3,R4,R5) (in **Ω**) and the voltage source(in V) (ref. figure) find the current through the individual resistance in A(ampere) in the order of corresponding resistances .
First line contains the number of testcases T followed by T lines.
Each line of Input will contain value of 5 resistances and Voltage source (all are integers).

SAMPLE INPUT:

1

2 2 3 3 3 12

OUTPUT:

3.0 3.0 2.0 2.0 2.0

Problem 12: Read coordinates of four points A (x1, y1), B (x2,y 2), C (x3, y3) and D (x4, y4) and verify whether P(x4,y4) is inside or outside the triangle formed by the other three points(ΔABC). Print NO if P is completely outside ΔABC else print YES. Make sure that your program works well for all directions (like horizontal, vertical etc.) of the sides of the triangle. Print YES even if P is on the sides of ΔABC.
First line contains the number of testcases T,followed by 4*T lines.FIrst line of each case is (x1,y1),second line is (x2,y2) and so on.

SAMPLE INPUT:

2
0.0 0.0
5.0 0.0
3.0 4.0
3.0 1.0
0.0 0.0
5.0 0.0
3.0 4.0
5.0 7.0

OUTPUT:

YES
NO

Problem 13: Accept a character from the user and print any one of the appropriate output
(I) LOWER CASE CHARACTER
(II) UPPER CASE CHARACTER
(III) NUMERAL
(IV) NON-ALPHANUMERAL

SAMPLE INPUT:

4
A
a
$
3

OUTPUT:

UPPER CASE CHARACTER
LOWER CASE CHARACTER
NON-ALPHANUMERAL
NUMERAL

Problem 14: Given two integers, see if one of them is the factor of other or not (second one could be factor of first or the other way). Print YES or NO as output.

SAMPLE INPUT:

4
25 5
0 3
1 22
5 76

OUTPUT:

YES
YES
YES
NO

Problem 15: Alice took a loan of P Rupees from the State Bank of Hyderabad at 12% compound interest per year. She repays P/10 Rupees every year. It is already ‘n’ years since she took the loan. How much further she has to pay now to close the loan.

INPUT:

1
1000 2

OUTPUT:

1042.40

Problem 16: Count the number of ‘1’s in the binary representation of a given number ’A’. Let the number of ‘1’s be N. Now treat sequence of these N ‘1’s together as another number ‘B’ in base ‘M’. Convert this number ‘B’ to a decimal(number with base 10) number and print it.
Input file will contain number of test cases ‘T’ followed by T lines each containing 2 integers ‘A’ and ‘M’.

INPUT:

2
10 3
31 10

OUTPUT:

4