BUBT Intra-University Programming Contest, Spring 2020 (Junior Division)

Organized By:

Dept. of CSE, BUBT

Contest Rules

* Contestants must log-in with the e-mail address, which they provided in the BUBT-IT club registration form. Moreover, the username of the contestant's account must match the username they filled in the BUBT-IT club registration form.

* While the contest is scheduled for a particular time length (four/five hours), the contest director has the authority to alter the length of the contest in the event of unforeseen difficulties. If the contest duration is altered, every attempt will be made to notify contestants in a timely and uniform manner.

* The Codeto.Win judge is implemented with a plagiarism checker. Therefore, if any solution is found to be matched with others, every team/person with a matching solution may be disqualified or blocked to submit problems.

* Notification of accepted or rejected solutions will be suspended at the last hour of the contest time to keep the final results secret.

* A contestant may submit a clarification request to judges only through the Codeto.Win clarification system. If the judges agree that an ambiguity or error exists, a clarification will be issued to all contestants. However, judges may prefer not to answer a clarification at all if it violates any rule or the question is irrelevant.

* Contestants are allowed to use online materials. But they should be used with caution, as the plagiarism checker may find a match with a contestant who also copied from the same site. However, **contestants are advised not to share ideas from any other individual**.

*** If the judges find or suspect any matched codes in the submissions of any contestant, the contestant may be interrogated if necessary. Furthermore, if the judges are not satisfied through the interrogation, the contestant may be disqualified. The disqualified contestant would not be able to participate in any of the future contests.**

*** Judges can alter the leaderboard if any suspicious activities are reported or noticed.**

*** The decision of the judges is final.**

Problem Setters

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Judge Panel Members

1. ***Md. Saifur Rahman,*** *Assistant Professor, Dept. of CSE*
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A. Father's Work

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 512 megabytes

Problem Statement:

"ZARA" is a little girl. She is very obedient to her father. Her father gives her **N** taka and tells her to eat anything she wants with all of the money. And every time "ZARA" goes to a chocolate shop which is very famous in the town and **spends all the money** by eating chocolates. Then she comes to her father again, and her father asks how much taka does she spend.

Input:

The first line of input denotes **N** (the amount of money that ZARA's father gives her).

Output:

Output an integer in a single line which is ZARA's answer to her father. See the sample input-output for better understanding.

Sample Input/Output:

Sample 1:

Sample Input	Sample Output
5	5

Sample 2:

Sample Input	Sample Output
100	100

B. Coin Toss

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 512 megabytes

Problem Statement:

Here is a game played several times with "**Badal**" and "**Fojael**". The coin contains two sides with different numbers printed on it. The umpire tosses the coin and only a single side of the coin stays at the top. If the side is for Badal then he slapped Fojael, else, Fojael Slapped Badal. It can be guaranteed that the choice of them wasn't the same.

Input:

The first line of input contains an integer denoting the number of test case **T (T<=1000)**.

The next T lines contain 3 integers **a, b, c (-100 <= a, b, c <= 100)**. Where a was the chosen number of Badal on one side of the coin and b was the chosen number of Fojael on the other side of the coin. The value c was on the upper side when the coin was tossed to the ground.

Output:

For each test case output, the case number first and print "**Badal slapped Fojael**" if Badal wins or "**Fojael slapped Badal**" if Fojael wins in a single line. SEEEEEEEEEE..... sample input-output for better understanding.

Sample Input/Output:

Sample Input	Sample Output
2 5 10 5 10 20 20	Case 1 : Badal slapped Fojael Case 2 : Fojael slapped Badal

C. Lets Write A Long Code

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 512 megabytes

Problem Statement:

In national contests to solve a problem, we have to write a long code. But for many online platform's easy problems we are not used to write a long code. It hampers us to be a good national contestant. So let's write a long code. I promise it's easy for everyone. Just do the 13 steps as follows and SEE sample input-output for better understanding.

In all the steps except step 7, you have to print the value of a and b where there is written letter a and letter b in the print.

1. Input 2 numbers as a and b and take another variable sum which is initially zero.
2. If a is even print "a is even" and add a to sum.
3. If a is odd print "a is odd" and decrease a from the sum.
4. If b is greater zero print "b is greater than zero" and add b to sum.
5. If b is less zero print "b is less than zero" and decrease b from sum.
6. If b is equal to zero print "b is equal to zero" and multiply sum with b.
7. Print "after adding,a+b is equal to X" where X is the summation of a and b. Only in this line, a and b are not the value of variables.
8. If a+b is even, add a and b to sum and print "after adding a b sum is equal to X" where X is the value of the sum.
9. If a+b is odd, remove a and b from sum and print "after removing a b sum is equal to X" where X is the value of the sum.
10. If a+b is equal to zero multiply sum with 10 and print "the result after multiplying sum = X" where x is the value of the sum.
11. Multiply sum with 5.
12. Print "THE ULTIMATE RESULT = X" where x is the value of the sum.
13. Print "I wanna be a national contestant and I can write long code".

Input:

Input two integers as **a** and **b** in one line where **(-100<=a, b>=100)**.

Output:

Print every desired output as asked each in a single line. Seeeeeeeeeeeeeeee..... sample input, output for better understanding.

Sample Input/Output:

Sample Input	Sample Output
2 8	2 is even 8 is greater than zero after adding,a+b is equal to 10 after adding 2 8 sum is equal to 20 THE ULTIMATE RESULT = 100 I wanna be a national contestant and I can write long code

D. Find Minimum

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 512 megabytes

Problem Statement:

There is a sequence **S**, consisting of digits **1, 2,…., 9**. You will take out three consecutive digits from **S**, treat them as a single integer **X** and bring it to me.

My favorite number is **753**. The closer to this number, the better. What is the minimum possible (**absolute**) difference between **X** and **753**. Where the length of **X** is equal to **3**.

Input:

S is a string of length between **4** and **10**.

Output:

Print the minimum possible difference.

Sample Input/Output:

Sample 1:

Sample Input	Sample Output
1234567876	34

Sample 2:

Sample Input	Sample Output
35753	0

Sample 2:

Sample Input	Sample Output
1111111111	642

E. Khalid's Favourite Number

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 512 megabytes

Problem Statement:

Khalid is your best friend. He likes numbers very much. Number nine (9) is his favorite. Let's assume the characters from '**A**' to '**Z**' associated with digits '**1**' to '**26**'. In other words, **A=1, B=2, C=3, D=4, ... Z=26**. Then you can find the values of the characters associated with his name (**KHALID**) as **K = 11, H = 8, A = 1, L = 12, I = 9, and D = 4**. If you write down these values side by side putting no space in between then it will become **11811294**. You have to add all the digits until it is reduced to a **single-digit** number.

As an example, if you add all the digits of **11811294** with one another then it will become, **1+1+8+1+1+2+9+4 = 27**, again **2+7 = 9**. Now it is reduced to a **single-digit** number and the value of the number is **9**. Wow, that's why **9** is Khalid's favorite number. Now Khalid wants to know if it is possible to get the number nine **(9)** after reducing it from a larger number according to the above conditions. Since the process is tiresome to do by hands, Khalid wants your help as you are a great programmer.

Input:

First line of the input contains an integer **T (1 ≤ T ≤1000)** the number of tests case. The following **T** lines each contain a number **N (9 ≤ N ≤ 10^{1000})**. Where **N** denotes the non-reducing number.

Output:

For each test case, print "**YES**" if it is possible to get '**9**' according to the above conditions. Otherwise, print "**NO**" (without quotes). For further understanding check the sample input/output.

Sample Input/Output:

Sample Input	Sample Output
3 11811294 246639 996999999999993	Case 1: YES Case 2: NO Case 3: YES

F. Apex Legends: Beginner's Guide

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 512 megabytes

Problem Statement:

Hello BUBTians!!

Hope you all are doing well. Recently I have played "Apex Legends" to pass my boring quarantine time. "Apex Legends" is a first-person shooter battle royale video game. In this game 20 squads (three players per squad) land on an island and search for weapons and supplies before attempting to defeat all other players in combat.

I want to play this game by following some method :

1. At first, I will fight with the nearest squad, and when I do that my squad position on the map will be replaced with the nearest squad position (no two squads distance from our squad will never be the same).
2. I will fight with the player who has the lowest health power in that squad.

Input:

The first line contains three integers **n (2 <= n<= 25)** — total number of squads in the game, x**, y (1 <= x, y<=100)** —coordinate points of our squad position on the map when the game start.

Then **(n-1)** lines follow, each line contains six integer. First integer is **s(1, 2, 3,.....n-1)** serial number of **i**th squad is **i**, then two integer **x, y (1 <= x, y<=100)** —coordinate points of ith squad position on map, then three integers $\mathbf{h_1, h_2, h_3}$ **(1 <=** $\mathbf{h_1, h_2, h_3}$**<=100)** — health power of each player of that squad.

Output:

Print **(n-1)** lines. Each the line contains two integers **s (1<=s<=n-1)** — serial number of the squad, I should fight and lowest health power of that squad.

Sample Input/Output:

Sample 1:

Sample Input	Sample Output
3 1 2 1 1 99 6 4 5 2 2 3 1 1 1	2 1 1 4

Sample 2:

Sample Input	Sample Output
10 1 2 1 15 16 3 1 2 2 2 3 4 7 6 3 4 5 9 1 1 4 6 7 3 2 2 5 8 9 89 77 55 6 10 10 3 55 6 7 9 10 44 23 23 8 11 12 52 11 22 9 13 14 90 91 92	2 4 3 1 4 2 5 55 7 23 6 3 8 11 9 90 1 1

G. Is It Hard!

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 512 megabytes

Problem Statement:

An Injured lion is walking forward. The lion moves one leg at a time, in the following cyclic order: right rear, right front, left rear, left front.

The lion's left rear leg is injured and moving it takes two seconds. A step with any other leg takes only one second.

After every **47** completed steps the lion takes a **42**-second break.

You are given the time (in seconds). Output the number of steps the lion has completed in the given time.

Input:

First-line of input takes an integer **T (1<=T<=60)** which denotes the number of the test case. In the next T line, each line of input contains an integer **K** that represents the following time. **K** will be between **0** and $\mathbf{10^6}$ (inclusive).

Output:

For each test case print the number of steps that the lion has completed in the given time. Print in the exact format of the given sample output.

Sample Input/Output:

Sample Input	Sample Output
4 2 3 6 80	Case 1: 2 Case 2: 2 Case 3: 5 Case 4: 47

H. Competition

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 512 megabytes

Problem Statement:

A competition was organized between two teams **A** and **B**. Each team will have **N** number of contestants. Therefore, there are a total of **2N** contestants. The point that each of the contestants gets, is the same as the position they acquire in the contest.

For example, if a contestant of team **A** wins 1st place, then his team will get 1 point, If a contestant from **B** team gets 7th place, then his team will get 7 points.

It is not possible to get a joint place among the contestants. Also, all the points are between **1** to **2N**.

How many types of point differences are possible between **A** and **B** teams.

Input:

The first line of input contains an integer **T (1<=T<=100)**, denoting the number of test cases. The next line of input contains an integer **N (1<=N<=10^4)**, which is described in the problem statement.

Output:

For each test case, the output is in a new line containing the answer of the problem for the value **N**.

Sample Input/Output:

Sample Input	Sample Output
2 3 4	5 9

I. Araf and Lice

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 256 megabytes

Problem Statement:

Araf's head is itching for some days and now he is tired of it. So, he asked his friend to check what's wrong and he confirms that Araf has lice (উকুন) in his head. He also told Araf the fact that the lice reproduce at the Fibonacci sequence. That is, at the age of 1 day it gives birth to 1 louse (উকুন), at the age of **2 days** it gives birth to **2 lice**, at the age of **3 days** it gives birth to **3 lice**, at the age of **4 days** it gives birth to **5 lice** and so on.

In other words, if there is **1** louse at **day-0** whose age is **0-day** then it will give birth at the following sequence:

day 1: **1 louse**, day 2: **2 lice**, day 3: **3 lice**, day 4: **5 lice**, day 5: **8 lice**, day 6: **13 lice** and so on.

Note: The above condition will be applicable for newly born lice too, that is at the age of 1 day they will start producing following the above sequence.

If there are **n** lice at **day-0** whose age is **0-day** then you have to find the number of lice after **d** days.

Input:

The first line consists of a single integer **t (1<=t<=100)** — the number of test cases. The description of the test cases follows.

The first line of each test case consists of two space-separated integers **n**, **d (1<=n<=50, 0≤d≤40)** where **n** is the number of louse at **day-0** of **0-day** age and **d** is the number of days passes after the **0th day**

Output:

For each test case print a single integer. The number of lice in Araf's head after **d-days**.

Problem Setter: Walid Khan Jim, Intake 35, Dept. of CSE.

Sample Input/Output:

Sample Input	Sample Output
5 1 0 1 1 1 2 1 3 1 4	1 2 5 13 35

J. Ohi's Pandemic Marry

Input: Standard Input, **Output:** Standard Output
Time Limit: 1 second(s)
Memory Limit: 512 megabytes

Problem Statement:

Researcher Quwsar Ohi is going to get married soon. He invites all of the programmers of BUBT. They come from various cities. He heard about COVID- 19. Ohi wants his programmer friends who come from the same cities to sit serially in a straight line of chairs. And there is a separator between the chair lines of two different locations.

However, they are able to change the position of the chair and also change the separator. There are n different cities with **n-1** separators, and $\mathbf{A_i}$ peoples come from the $\mathbf{i^{th}}$ city.

Total number of chairs = Total number of people among all cities. You should find out, **K** = How many ways they can sit.

Let's have an example. Suppose,

n = 2, A_1 = 2, and A_2 = 2

That means,

2 persons, **a** and **b** come from $\mathbf{A_1}$ city. And 2 persons, **c** and **d** come from $\mathbf{A_2}$ city.

So they can sit like as,

A1	Separator	A2
a b	||	c d
a b	||	d c
b a	||	c d
b a	||	d c
c d	||	a b
d c	||	a b
c d	||	b a
d c	||	b a

After finding **K**, let's define a variable, **L = k%101**.

Imagine, You are given **L x L** points. Like as **L = 14** in Figure – 01.

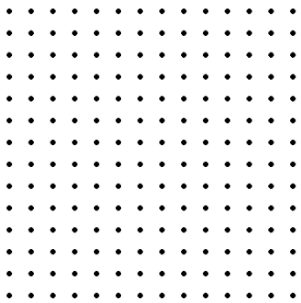
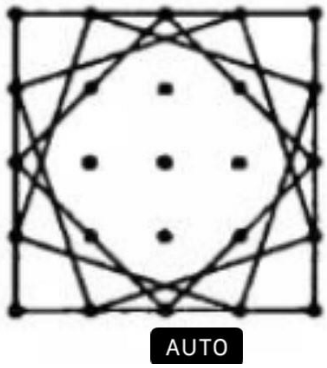
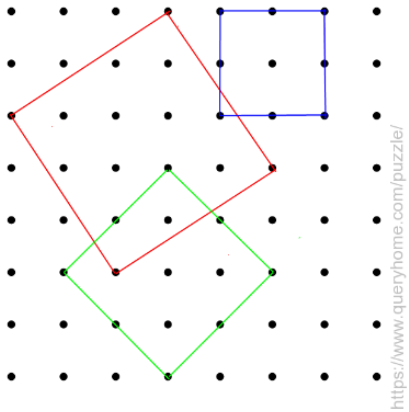


Figure - 01

Determine, **R%101** = The number of squares with all vertices belonging to the **L x L** points.

It does not matter that the side of the squares is parallel or not to the border of points. That means it can be like the figures in Figure - 2.





Figures– 02

NB: It is not possible to make a square with a single point.

Input:

The first line of input contains an integer **T** denoting the number of test cases. The next line of input contains an integer **n** that is the total number of cities that is followed by **n** integers like **A_1, A_2, …., A_n**.

Constraints:

1<=T<=10

1<=n<=100

0 <= Ai <= 100

Output:

For each test case, You should print the value of **R%101** with all conditions described as above.

Sample Input/Output:

Sample Input	Sample Output
5 1 1 1 2 1 3 2 1 2 2 2 2	0 1 4 20 33