Lab Sheet 6

"No pain, no gain"

Single loop

1. Write a program to print the sum of the following series

   1+1/2+1/3+...+1/n.

Nested loops

2. Write for loops required for printing the following patterns.

a)

```
*
* *
* * *
* * * *
```

b)

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

c)

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

d)

```
    *
   * *
  * * *
 * * * *
```

e)

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

f)

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

g)

```
*
**
***
****
*****
****
***
**
*
```

Let's go Competitive

Write programs for the following and submit in codeforces (except 3 and 4).

3. Input heights of bear Limak and his big brother Bob and find the difference between the heights.

   Input

   The only line of the input contains two integers a and b ($1 \le a \le b \le 10$) — the weight of Limak and the weight of Bob respectively.

   Output

   Print one integer, denoting the difference between the heights.

4. Input heights of bear Limak and his big brother Bob as a and b. Each year Limak and Bob's heights increments by three times and two times respectively. Print the height of Limak and Bob after k years.

   Input

   Input contains three integers a,b,k- height of Limak, the height of Bob and no of years.

   Output

   Two integers - heights of Limak and Bob after k years

   Bear Limak wants to become the largest of bears, or at least to become larger than his brother Bob.

   Right now, Limak and Bob weigh a and b respectively. It's guaranteed that Limak's weight is smaller than or equal to his brother's weight.

   Limak eats a lot and his weight is tripled after every year, while Bob's weight is doubled after every year.

5. After how many full years will Limak become strictly larger (strictly heavier) than Bob?

   Input
   The only line of the input contains two integers a and b ($1 \le a \le b \le 10$) — the weight of Limak and the weight of Bob respectively.

   Output
   Print one integer, denoting the integer number of years after which Limak will become strictly larger than Bob.

   https://codeforces.com/problemset/problem/791/A

6. There is a special offer in Vasya's favorite supermarket: if the customer buys **a** chocolate bars, he or she may take **b** additional bars for free. This special offer can be used any number of times.

   Vasya currently has **s** roubles, and he wants to get as many chocolate bars for free. Each chocolate bar costs **c** roubles. Help Vasya to calculate the maximum possible number of chocolate bars he can get!

   Input
   The first line contains one integer t (1≤t≤100) — the number of test cases.

   Each of the next t lines contains four integers s,a,b,c (1≤s,a,b,c≤109) — the number of roubles Vasya has, the number of chocolate bars you have to buy to use the special offer, the number of bars you get for free, and the cost of one bar, respectively.

   Output
   Print t lines. i-th line should contain the maximum possible number of chocolate bars Vasya can get in i-th test.

   Example

   Input:

   2

   10 3 1 1

   1000000000 1 1000000000 1

   Output

   13

   1000000001000000000

   https://codeforces.com/problemset/problem/1065/A

7. Katie, Kuro, and Shiro are best friends. They have known each other since kindergarten. That's why they often share everything with each other and work together on some very hard problems.

   Today is Shiro's birthday. She really loves pizza so she wants to invite her friends to the pizza restaurant near her house to celebrate her birthday, including her best friends Katie and Kuro.

   She has ordered a very big round pizza, in order to serve her many friends. Exactly n of Shiro's friends are here. That's why she has to divide the pizza into n+1 slices (Shiro also needs to eat). She wants the

slices to be exactly the same size and shape. If not, some of her friends will get mad and go home early, and the party will be over.

Shiro is now hungry. She wants to cut the pizza with a minimum of straight cuts. A cut is a straight segment, it might have ended inside or outside the pizza. But she is too lazy to pick up the calculator.

As usual, she will ask Katie and Kuro for help. But they haven't come yet. Could you help Shiro with this problem?

Input
A single line contains one non-negative integer n ($0 \le n \le 10^{18}$) — the number of Shiro's friends. The circular pizza has to be sliced into n+1 pieces.

Output
A single integer — the number of straight cuts Shiro needs.

Sample Input: 3

Sample Output: 2

Sample Input: 4

Sample Output: 5

https://codeforces.com/problemset/problem/979/A

8. The kindergarten teacher Natalia Pavlovna has invented a new ball game. This game not only develops the children's physique but also teaches them how to count.

   The game goes as follows. Kids stand in a circle. Let's agree to think of the children as numbered with numbers from 1 to n clockwise and child number 1 is holding the ball. First, the first child throws the ball to the next one clockwise, i.e. to the child number 2. Then the child number 2 throws the ball to the next but one child, i.e. to the child number 4, then the fourth child throws the ball to the child that stands two children away from him, i.e. to the child number 7, then the ball is thrown to the child who stands 3 children away from the child number 7, then the ball is thrown to the child who stands 4 children away from the last one, and so on. It should be mentioned that when a ball is thrown it may pass the beginning of the circle. For example, if n = 5, then after the third throw the child number 2 has the ball again. Overall, n - 1 throw is made, and the game ends.

   The problem is that not all the children get the ball during the game. If a child doesn't get the ball, he gets very upset and cries until Natalia Pavlovna gives him candy. That's why Natalia Pavlovna asks you to help her to identify the numbers of the children who will get the ball after each throw.

Input
The first line contains integer n (2 ≤ n ≤ 100) which indicates the number of kids in the circle.

Output
In the single line print n - 1 number which are the numbers of children who will get the ball after each throw. Separate the numbers by spaces.

Example

Input: 10

Output: 2 4 7 1 6 2 9 7 6

Input: 3

Output: 2 1

https://codeforces.com/problemset/problem/46/A

Did you find competitive programming, interesting? Then solve the following two problems too.

1. https://codeforces.com/problemset/problem/333/A
2. https://codeforces.com/problemset/problem/991/A