

# MULTIPLY BY 2, DIVIDE BY 6

1374B Codeforces (math)

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# CARACTERÍSTICAS

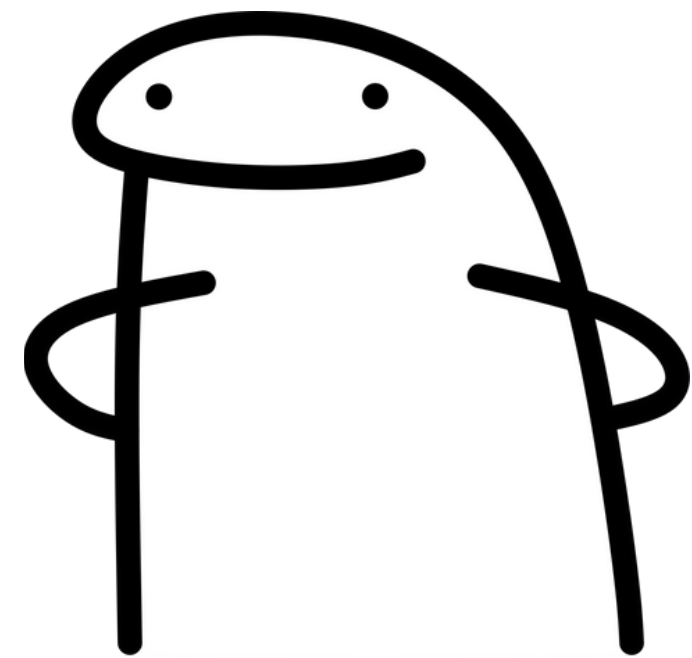
Se da un número entero **n**.

En un movimiento:

-Se puede multiplicar **n** por **2** o dividir **n** por **6** (si es divisible por 6).

$$n * 2$$

$$n / 6$$

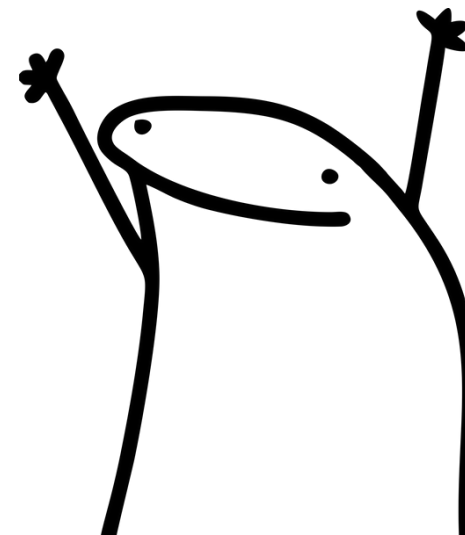
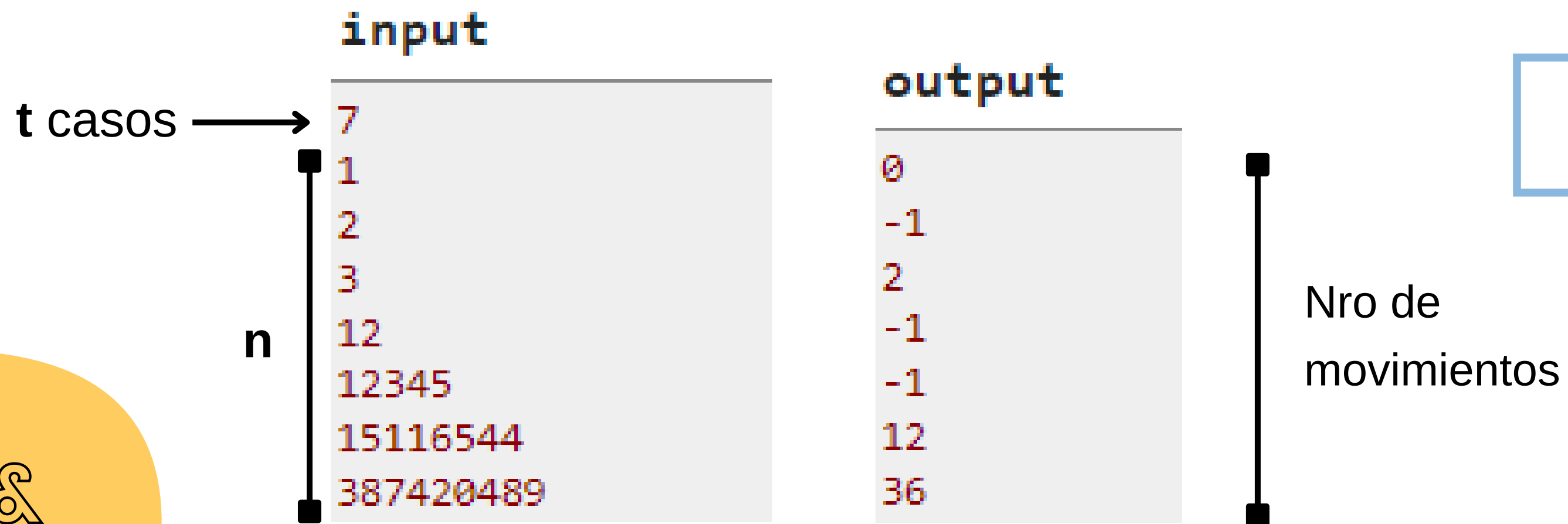


# OBJETIVO

- Encontrar el mínimo número de movimientos necesarios para llegar de **n** a **1**, a partir de estas operaciones.

**n → 1**

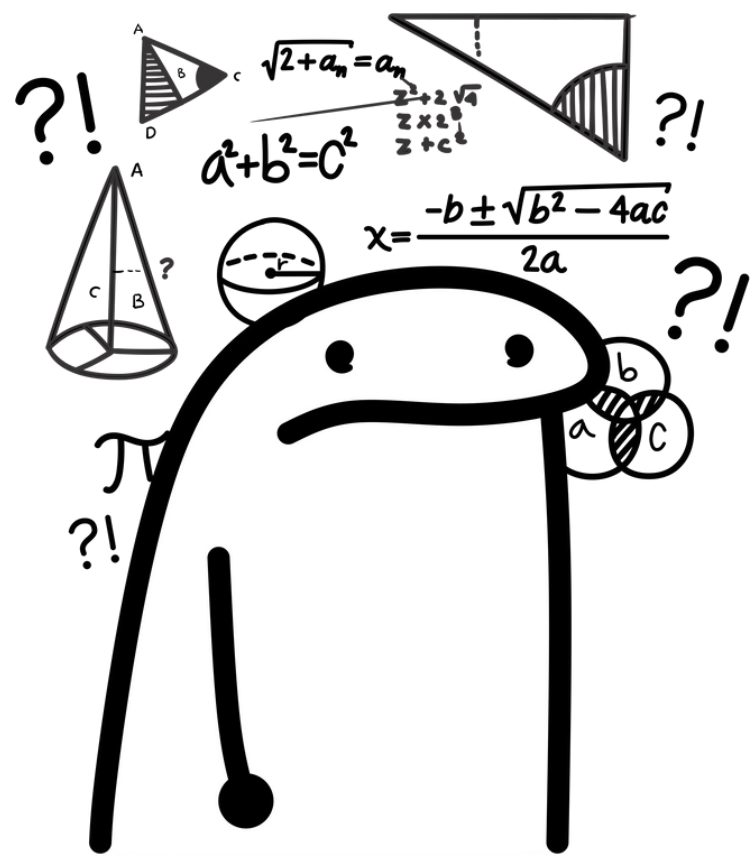
- Determinar si es posible hacerlo, o de lo contrario dar **-1** como respuesta



INPUT &  
OUTPUT

# SOLUCIÓN

**¿Cómo sabemos  
si es posible o no  
llegar a 1?**



**15116544:**

1. Divide by 6 and get 2519424;
2. divide by 6 and get 419904;
3. divide by 6 and get 69984;
4. divide by 6 and get 11664;
5. multiply by 2 and get 23328;
6. divide by 6 and get 3888;
7. divide by 6 and get 648;
8. divide by 6 and get 108;
9. multiply by 2 and get 216;
10. divide by 6 and get 36;
11. divide by 6 and get 6;
12. divide by 6 and get 1.

# SOLUCIÓN

## Criterios de divisibilidad del 6

Para saber si un número es divisible entre 6 hay que comprobar que sea divisible entre 3 y entre 2. Si es divisible entre 2 y entre 3 entonces es divisible entre 6.

$$6 = 3 * 2$$

$$54 = 3 * 3 * 3 * 2$$

$$54 = 3^3 * 2$$



# SOLUCIÓN

$$54 = 3^3 * 2$$

$$12 = 3 * 2^2$$

$$10 = 5 * 2$$

$$54 / 6 = 9$$

$$9 * 2 = 18$$

$$18 / 6 = 3$$

$$3 * 2 = 6$$

$$6 / 6 = 1$$

5  
movimientos

$$12 / 6 = 2$$

$$2 * 2 = 4$$

$$4 * 2 = 8$$

....

Es imposible  
de resolver

$$10 * 2 = 20$$

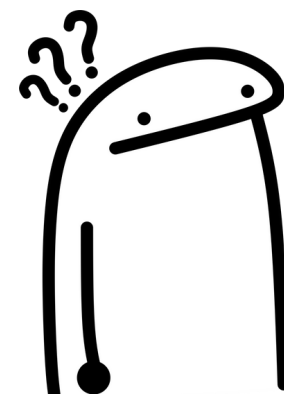
$$20 * 2 = 40$$

$$40 * 2 = 80$$

....

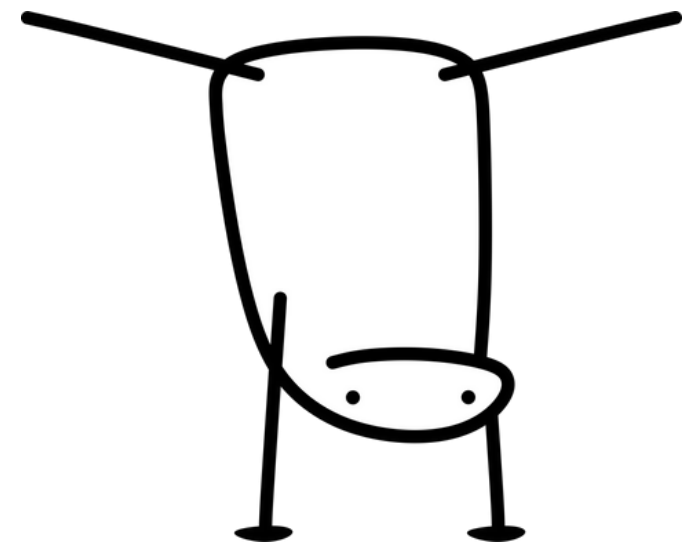
Es imposible  
de resolver

El exponente de 3 debe  
ser mayor al de 2



No debe haber factores  
diferentes de 3 y 2

# SOLUCIÓN



$$108 = 3^3 * 2^2$$

$$108 = 3 * 2 *$$

$$3 * 2 *$$

$$3 \quad ?$$

$$\boxed{n * 2}$$

$$12 = 3 * 2^2$$

$$12 = 3 * 2 *$$

$$? \quad 2$$

$$\boxed{n * 2}$$

# SOLUCIÓN

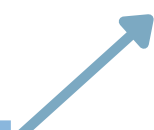
$$108 = 3^3 * 2^2$$

$$108 = 3 * 2 *$$

$$3 * 2 *$$

$$3 \quad ?$$

$n * 2$



m nro de movimientos

$$m = \text{exp\_3} + (\text{exp\_3} - \text{exp\_2})$$

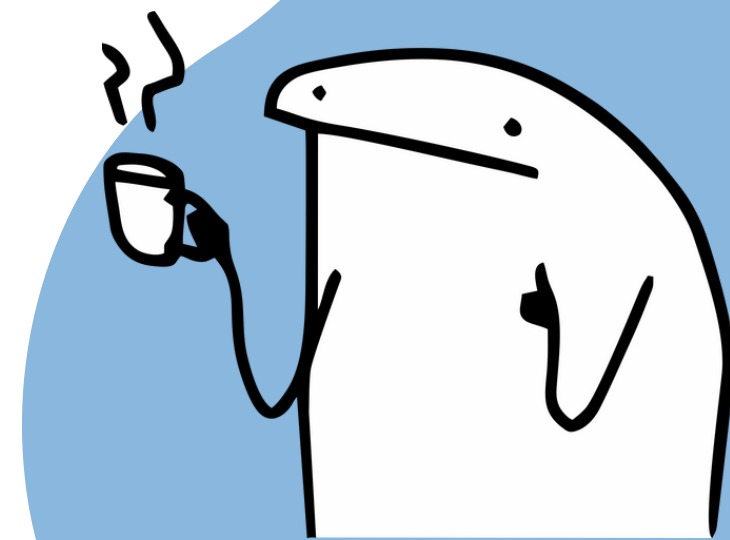
$$m = 3 + (3 - 2) = 4$$

$$108 / 6 = 18$$

$$18 / 6 = 3$$

$$3 * 2 = 6$$

$$6 / 6 = 1$$





# SOLUCIÓN



```
int main()
{
    int t,n;
    cin>>t;

    for(int i=0; i<t; i++)
    {
        cin>>n;
        if(n==1)
            cout<<0<<endl;
        else
        {
            int e_3=0, e_2=0;
            while(n%3==0)
            {
                e_3++;
                n/=3;
            }
            while(n%2==0)
            {
                e_2++;
                n/=2;
            }
            if(e_3>=e_2 && n==1)
                cout<<e_3 + (e_3-e_2)<<endl;
            else
                cout<<-1<<endl; //No se puede
        }
    }
}
```

[170018373](#)

Aug/28/2022 19:19<sup>UTC-5</sup>

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[1374B - Multiply by 2, divide by 6](#)

GNU C++17

Accepted

109  
ms

0 KB

GRACIAS

