

First to Penalty



Contents

1	Template	1
2	Data structures	1
3	Graphs	1
4	Math	1
4.1	Identities	1
5	Geometry	2
6	Strings	2
7	Flow	2
8	Miscellaneous	2
9	Testing	2

1 Template

```
1 #include "bits/stdc++.h"
2 //assert(x>0) si falla da RTE
3 using namespace std;
4 #define endl '\n'
5 #define DBG(x) cerr<<#x<< "=" << (x) << endl;
6 #define RAYA cerr<<"===== "<<endl;
7 #define RAYAS cerr<<"..... "<<endl;
8 // #define DBG(x) ;
9 // #define RAYA ;
10 // #define RAYAS ;
11
12 //-----SOLBEGIN-----
13 int main() {
14     ios_base::sync_with_stdio(false); cout.tie(NULL); cin.tie(NULL);
15     int tC;
16
17     cin >> tC;
18     while (tC--) {
19
20     }
21 }
22
23 //-----EOSOLUTION-----
```

2 Data structures

3 Graphs

4 Math

4.1 Identities

$$C_n = \frac{2(2n-1)}{n+1}C_{n-1}$$
$$C_n = \frac{1}{n+1} \binom{2n}{n}$$
$$C_n \sim \frac{4^n}{n^{3/2}\sqrt{\pi}}$$
$$\sigma(n) = O(\log(\log(n))) \text{ (number of divisors of } n)$$
$$F_{2n+1} = F_n^2 + F_{n+1}^2$$
$$F_{2n} = F_{n+1}^2 - F_{n-1}^2$$
$$\sum_{i=1}^n F_i = F_{n+2} - 1$$
$$F_{n+i}F_{n+j} - F_nF_{n+i+j} = (-1)^n F_i F_j$$

(Möbius Inv. Formula) Let $g(n) = \sum_{d|n} f(d)$, then $f(n) = \sum_{d|n} g(d) \mu\left(\frac{n}{d}\right)$.

5 Geometry

6 Strings

7 Flow

8 Miscellaneous

9 Testing