Competitive Programming Reference

Enya Quetzalli Gómez Rodríguez

eithnegomez@hotmail.com
github.com/equetzal

Contents

Data Structures

STL Queue

```
#include <queue>

queue<int> q,p;
q.push(int(111)); //Receives an object copy
q.emplace(111); //Uses the constructor of the object
int val = q.front(); //Acces head element
int val = q.back(); //Access tail element
int sz = q.size();
q.pop();
q.empty();
q.swap(p); //Swap queue contents in O(1)
```

STL Stack

```
#include <stack>

stack<int> s,p;
s.push(int(111)); //Receives an object copy
s.emplace(111); //Uses the constructor of the object
int val = s.top();
int sz = s.size();
s.pop();
s.empty();
s.swap(p); //Swap stack contents in O(1)
```

Extras

Definitions

```
#if defined(_USE_MATH_DEFINES) && !defined(_MATH_DEFINES_DEFINED)
#define _MATH_DEFINES_DEFINED
    // e
    #define M_E        2.71828182845904523536
    // log2(e)
    #define M_LOG2E        1.44269504088896340736
    // log10(e)
    #define M_LOG10E    0.43429448190325182765
    // ln(2)
    #define M_LN2        0.69314718055994530942
    // ln(10)
    #define M_LN10        2.30258509299404568402
    // pi
    #define M_PI        3.14159265358979323846
    // pi/2
    #define M_PI_2        1.57079632679489661923
    // pi/4
    #define M_PI_4        0.78539816339744830962
    // 1/pi
    #define M_1_PI        0.31830988618379067154
    // 2/pi
    #define M_2_PI        0.63661977236758134308
    // 2/sqrt(pi)
    #define M_2_SQRTPI    1.12837916709551257390
    // sqrt(2)
    #define M_SQRT2        1.41421356237309504880
    // 1/sqrt(2)
    #define M_SQRT1_2    0.70710678118654752440
#endif
```

Read Data From Files

```
freopen("input.txt", "r", stdin);
freopen("output.txt", "w", stdout);
```

Template

```cpp
#include <bits/stdc++.h>

#define endl "\n"
#define fast_io ios_base::sync_with_stdio(false);cin.tie(NULL);

using namespace std;

typedef long long int lli;

int main(){


    return 0;
}
```

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I met the competitive programming at my university "The Superior School of Computer Sciences of the National Polytechnic Institute", thanks to a club within the school called "algorithmic club", where I met ICPC and loved competitive programming, this group of people at I belong has offered me everything I know now, we always pass all our knowledge to the following generations, and we all contribute to our community to achieve more and more. I will always be grateful to this group of people who changed my life

Special thanks: