**1) Прагмы:**

#pragma GCC optimize("Ofast,unroll-loops")

#pragma GCC target(«avx2,bmi,bmi2,lzcnt,popcnt")

**2) Ordered\_set:**

#include <ext/pb\_ds/assoc\_container.hpp>

using namespace \_\_gnu\_pbds;

using ordered\_set = tree<int, null\_type, less<int>, rb\_tree\_tag,

tree\_order\_statistics\_node\_update >;

ordered\_set st;

st.insert(5);

st.insert(7);

st.insert(19);

\*st.find\_by\_order(1); // 7

st.order\_of\_key(6); // 1

• order\_of\_key (k): Количество элементов строго меньше k.

• find\_by\_order(k): K-й элемент в наборе (считая от нуля).

•

**3) Bitset**

#include <bitset>

#include <cassert>

#include <cstddef>

bitset<64> a;

a[4] = true;

a[16] = true;

a.\_Find\_first(); // 4

a.\_Find\_next(4); // 16

|  |  |
| --- | --- |
| [**set**](https://en.cppreference.com/w/cpp/utility/bitset/set) | sets bits to true or given value (public member function) |
| [**reset**](https://en.cppreference.com/w/cpp/utility/bitset/reset) | sets bits to false (public member function) |
| [**flip**](https://en.cppreference.com/w/cpp/utility/bitset/flip) | toggles the values of bits |
| [**to\_string**](https://en.cppreference.com/w/cpp/utility/bitset/to_string) | returns a string representation of the data (public member function) |
| [**to\_ulong**](https://en.cppreference.com/w/cpp/utility/bitset/to_ulong) | returns an unsigned long integer representation of the data (public member function) |
| [**to\_ullong**](https://en.cppreference.com/w/cpp/utility/bitset/to_ullong)  **(C++11)** | returns an unsigned long long integer representation of the data (public member function) |

|  |  |
| --- | --- |
| [**operator& operator| operator^**](https://en.cppreference.com/w/cpp/utility/bitset/operator_logic2) | performs binary logic operations on bitsets (function template) |

**4) Рандом mt19937**

rnd(chrono::high\_resolution\_clock::now().time\_since\_epoch().count ());

**5) lower\_bound**

Returns an iterator pointing to the first element in the range [first, last) such that element < value (or comp(element, value)) is false, (i.e. that is greater than or equal to value), or last if no such element is found.

The range [first, last) must be partitioned with respect to the expression element < value (or comp(element, value)), i.e., all elements for which the expression is true must precede all elements for which the expression is false. A fully-sorted range meets this criterion.

The first version uses operator< to compare the elements, the second version uses the given comparison function comp.

**6) upper\_bound**

Returns an iterator pointing to the first element in the range [first, last) such that value < element (or comp(value, element)) is true (i.e. that is strictly greater than value), or last if no such element is found.

The range [first, last) must be partitioned with respect to the expression !(value < element) or !comp(value, element), i.e., all elements for which the expression is true must precede all elements for which the expression is false. A fully-sorted range meets this criterion.

The first version uses operator< to compare the elements, the second version uses the given comparison function comp.

**7) быстрый ввод вывод**

ios::sync\_with\_stdio(**false**); cin.tie(0); cout.tie(0);